Revision of the Genus *Pachnaeus*

(Coleoptera: Curculionidae: Entiminae)

by

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ABSTRACT

The weevil genus *Pachnaeus* Schoenherr, 1826 (Coleoptera: Curculionidae: Entiminae: Eustylini Lacordaire) is revised to accommodate 21 species, including the following 10 new species from the northern Caribbean region: *Pachnaeus andersoni* sp. nov. (Little Cayman), *Pachnaeus eisenbergi* sp. nov. (Jamaica), *Pachnaeus godivae* sp. nov. (Cayman Brac), *Pachnaeus gordoni* sp. nov. (Jamaica), *Pachnaeus howdenae* sp. nov. (Bahamas), *Pachnaeus ivieorum* sp. nov. (Bahamas with adventive records from Florida), *Pachnaeus maestrensis* sp. nov. (Cuba), *Pachnaeus morelli* sp. nov. (Haiti), *Pachnaeus obrienorum* sp. nov. (Cuba and Bahamas), and *Pachnaeus quadrilineatus* sp. nov. (Jamaica).

Pachnaeus can be distinguished from similar, co-occurring taxa such as *Exophthalmus quadrivittatus* (Olivier, 1807), *Exophthalmus roseipes* (Chevrolat, 1876), *Exophthalmus vittatus* (Linnaeus, 1758), and *Diaprepes abbreviatus* (Linnaeus, 1758) by (1) the presence of postocular vibrissae, (2) endophallus primarily membranous and sac-like proximally, and long (>3 × width), tubular, and sclerotized distally, (3) additional endophallic sclerites typically absent, (4) a never bicarinate, typically tricarinate, rostrum, and several additional characteristics of the pedon, endophallus, pronotal structure, rostral structure, and scaling. Based on these characters, *Pachnaeus sommeri* (Munck af Rosenschoeld in Schoenherr, 1840) comb, nov. and *Pachnaeus gowdeyi* (Marshall, 1926) comb. nov. are transferred into the genus from *Exophthalmus* Schoenherr and *Lachnopus* Schoenherr respectively.

This revision provides genus and species redescriptions, diagnoses, illustrations, and the first comprehensive key to all 21 species within the present circumscription of *Pachnaeus*, in addition to reviewing the known biology and observed intraspecific variation within species. The complex taxonomic history of the genus is reviewed, and the evolutionary relationships of its presumed constituent clades are proposed through the construction of informal species groups and subgroups based on diagnosable shared traits. Lectotypes for *Pachnaeus citri* Marshall, *Pachnaeus costatus* Perroud, and *Exophthalmus sommeri* Munck af Rosenschoeld in Schoenherr and paralectotypes of *P. citri* (3 specimens) and *E. sommeri* (4 specimens) are designated. New state and national records are reported for *Pachnaeus azurescens* Gyllenhal in Schoenherr for Florida, U.S.A. and new national records are reported for *Pachnaeus litus* (Germar) for the Bahamas. Validity of the names *Docorhinus* Schoenherr, 1823 and *Pachnaeus* Schoenherr, 1826 is treated. Generic placement of *Pachnaeus roseipes* Chevrolat, 1876 is explored.

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CHAPTER 1. INTRODUCTION

The genus *Pachnaeus* Schoenherr, 1826 comprises a clade of broad-nosed weevils native to the Greater Antilles, the Lucayan archipelago, and coastal portions of the eastern continental United States. *Pachnaeus* Schoenherr can be separated from most morphologically similar taxa within its known range by (1) the presence of postocular vibrissae, albeit these sometimes reduced in length to the extent they are hidden by the anterolateral margin of the pronotum, (2) vestiture composed of a mixture of generally pastel-colored, circular to oblong, appressed scales and intermixed, sparser, elongate and typically flattened, appressed to erect, setose scales, though these sometimes reduced in size and density or denuded on some elytral intervals, (3) lateral posterior margin of pronotum lacking a posteriorly directed lobe which extends below the elytral humerus as in many *Exophthalmus* Schoenherr, 1823 *sensu stricto*, (4) pronotal disc usually with integumental sculpturing obscured by scaling but, where not, variously sculptured from smooth to punctate but never with large, glabrous, rugulose to undose to pustulate raised areas as seen in many members of the genus *Diaprepes* Schoenherr,1823, (5) proximal (=anterior) endophallic structure primarily membranous and distal (=posterior) endophallic structure long (length > 3x width), tubular, and sclerotized, these structures continuous (Fig. 3.85), (6) additional endophallic sclerites other than the long, tubular, distal (=posterior) sclerite typically absent, thought occasionally with a heavily sclerotized patch ventrally or laterally on the proximal (=anterior) portion of the otherwise membranous and sac-like proximal (=anterior) portion of the endophallus, (7) the proximal (=anterior), ventral margin of the long, tubular, endophallic sclerite variably structured—ranging from slightly convex, to truncate, to concave, to angularly incised—but never anteriorly (= proximally) narrowed and curving upwards as seen in members of the Puerto Rican genus *Compsoricus* Franz 2012, (8) the aedeagal apex not strongly laterally expanded at the ostium, (9) rostrum moderately short and never bicarinate, typically tricarinate though sometimes monocarinate to planar; with a slightly to moderately raised, somewhat trigonal, nasal plate that overlies and dorsally obscures the buccal cavity from above, the nasal plate at slightly raised above the level of the frons surrounding it, never set in a notable, subtrigonal notch in the apex of the rostrum, *e.g.*, as seen in *Compsus* Schoenherr, 1823, (10) rostrum never with a notably raised, transverse carina located dorsally between the antennal insertions at the intersection of frons and epifrons as seen in many members of the genus *Diaprepes* Schoenherr, 1823, (11) rostrum never longitudinally corrugated ventrally as in *Diaprepes famelicus* (Oliver, 1790). Most members can also be distinguished by their short, typically somewhat linear, typically somewhat laterally opened occipital sutures and by the ventral margin of the rostrum in lateral view being linear or nearly so, not notably convexly curved, though these latter characters are not consistent for all members of the genus; *e.g.*, the large and aberrant species *Pachnaeus sommeri* (Munck af Rosenschoeld in Schoenherr, 1840) which has a long, ventrally slightly curved rostrum with sigmoidal occipital sutures that extend onto the ventral aspect of the rostrum (Fig. 3.82) and possesses patches of dense, shaggy scaling on pronotum and elytra not seen in other members of this genus but similar to those seen in some Jamaican members of the genus *Exophthalmus* Schoenherr, 1823 *sensu lato*.

Pachnaeus Schoenherr is part of a complex of West-Indian, citrus-feeding entimines composed of several morphologically and behaviorally similar, co-occurring, yet variously related taxa (Woodruff 1985). Past workers have had great difficulty in separating *Pachnaeus* Schoenherr from these genera, especially *Diaprepes* Schoenherr, 1823, *Lachnopus* Schoenherr, 1840, and *Exophthalmus* Schoenherr, 1823.

Pachnaeus does not appear to be as threatening to New-World citriculture as some emerging sternorrhynchan pests—*e.g.*, *Toxoptera citricida* (Kirkaldy, 1907) (Hemiptera, Aphididae) and *Diaphorina citri* Kuwayama, 1908 (Hemiptera, Liviidae)—or even as some closely related entimine taxa—*e.g.*, *Diaprepes abbreviatus* (Linnaeus, 1758). However, the genus has historically been one of the more important pests to citriculture in the New World and remains a major threat to the industry today.

We have come to see international transport and establishment of insect pest taxa somewhat regularly within the citrus trade in our increasingly globalized world. This includes members of the citrus root weevil complex—*e.g.*, introduction of the Antillean *Diaprepes abbreviatus* (Linnaeus, 1785) into Florida (Woodruff 1964), Texas (French and Skaria 2000), Louisiana (Strain 2009), South Carolina at Charleston (inaturalist.org/observations/8759792, inaturalist.org/observations/17187057, inaturalist.org/observations/55945609, inaturalist.org/observations/92842880, inaturalist.org/observations/98013112, inaturalist.org/observations/98410565), Georgia at Savannah (inaturalist.org/observations/32792373, inaturalist.org/observations/87462900) and St. Simons Island (inaturalist.org/observations/16868828, inaturalist.org/observations/18546696, inaturalist.org/observations/33913693) with sporadic records elsewhere in the state, Alabama along the west coast of Mobile Bay from Spanish Fort to Gulf Shores (inaturalist.org/observations/60922543, inaturalist.org/observations/40276237, inaturalist.org/observations/60670935, inaturalist.org/observations/93886132, inaturalist.org/observations/26707104, inaturalist.org/observations/95613230, inaturalist.org/observations/43431693, inaturalist.org/observations/33101398) with sporadic records elsewhere in the state, California (Jetter and Godfrey 2009), Madeira (Andrade and Stüben 2020), and the Canary Islands (López-Cepero et al. 2014), along with recent records in Mexico (inaturalist.org/observations/89820653); interception of the Lesser Antillean *Diaprepes famelicus* (Olivier, 1790) in Italy (Cuoco et al. 2014); and introduction of the Jamaican *Exophthalmus similis* (Drury, 1773) sec. Vaurie 1961 into the Bahamas (Thomas 2011). *Pachnaeus* Schoenherr appears to be no exception, with introductions outside of the genus' native range represented in both the literature and by specimens examined in the present work. The present study suggests that there have been several instances in recent history where members of the genus *Pachnaeus* have become established outside of their native ranges. This seems to be especially true for Cuban species becoming established within the southeastern, continental United States and other islands throughout the Greater Antilles.

In chapter 2 of the present work, I explore the application and validity of the generic names *Docorhinus* Schoenherr, 1823 and *Pachnaeus* Schoenherr, 1826 and designate the type material for the type species of both genera, *Curculio opalus* Olivier, 1807. Chapter 3 comprises a revision of the genus *Pachnaeus* Schoenherr with diagnoses, descriptions, and review of the known biology of its constituent taxa and provides the first comprehensive key to the genus. Chapter 4 examines past treatment of *Pachnaeus* *roseipes* Chevrolat, 1876 and establishes a new genus name for this historically problematic species, and chapter 5 discusses the status of the genus at completion of the present revisionary effort and addresses remaining gaps in knowledge and broader implications of this work.

CHAPTER 2. *PACHNAEUS* SCHOENHERR, 1826 (INSECTA: COLEOPTERA: CURCULIONIDAE): PROPOSED PRECEDENCE OVER *DOCORHINUS* SCHOENHERR, 1823

Abstract. The purpose of this application, under Article 23.9.3 of the Code, is to conserve use of the generic name *Pachnaeus* Schoenherr, 1826 (Curculionidae: Entiminae: Eustylini). The name *Pachnaeus* is threatened by its senior objective synonym, *Docorhinus* Schoenherr, 1823, for which it was erroneously erected as a replacement name. Strict application of the Code would result in unnecessary confusion since the name *Pachnaeus* has been heavily used in the agricultural and taxonomic literature for the last 193 years, whereas its senior objective synonym *Docorhinus* has been treated as valid only once since it was (erroneously) replaced by *Pachnaeus*. Several members of *Pachnaeus*, for example *Pachnaeus opalus* (Olivier, 1807) ("northern citrus root weevil"), *Pachnaeus litus* (Germar, 1824) ("southern citrus root weevil"), and *Pachnaeus citri* Marshall, 1916, are well documented and serious pests of citrus. Reverting the genus name to its senior synonym would lead to nomenclatural instability and confusion in the literature and, because of the singular treatment of *Docorhinus* as valid. Prevailing usage (Article 23.9.1) cannot be invoked to resolve this discrepancy. We therefore request a reversal of precedence under the Commission's plenary power, with *Docorhinus*, the senior objective synonym, being suppressed.

Keywords. Nomenclature; taxonomy; Insecta; Coleoptera; Curculionidae; *Pachnaeus*; *Docorhinus*; *Pachnaeus opalus*; *Pachnaeus litus*; *Pachnaeus citri*; blue-green notcher, blue-green citrus weevil; citrus root weevil; verde-azul.

1. *Docorhinus* Schoenherr (1823: column 1140) was established to contain a single species, *Curculio opalus* Olivier (1807: 339) the type by original designation. However, this species was transcribed as “Typ.: *Curc. opalus* Bosc n. sp.” by Schoenherr (1823), including both an incorrect authority and the use of “n. sp.” following the authority. *Curculio opalus* Olivier, 1807 however was already available nomenclaturally and the original description notes that it was described from specimens from Bosc’s collection.

2. *Pachnaeus* Schoenherr (1826: 121) was established as a replacement name for *Docorhinus* and encompassed both *Curculio opalus* Olivier, 1807 and *Cyphus litus* Germar (1824: 431). In establishing *Pachnaeus*, the type species was listed as “Typus: – *Curc. opalus* Bosc in litter.” by Schoenherr (1826), again using the incorrect authority in addition to *in litteris* following the authority, likely in reference to his designation of this species as the type species of *Docorhinus*. This is followed immediately by “– congenericus: *Cyphus litus* Germ.”, thus increasing the size of the taxon by one species. Schoenherr (1826) provided no justification for the replacement of *Docorhinus* by the name *Pachnaeus*.

3. The lectotype of *Pachnaeus opalus* (Olivier, 1807) (Fig. 2.1, lectotype by present designation) and one paralectotype (Fig. 2.2, paralectotype by present designation) are still in the Olivier Collection at the Muséum National d’Histoire Naturelle (MNHN), Paris. The lectotype has a dark-bordered, handwritten label typical of the Bosc collection (Hélène Perrin, pers. comm.), and is labeled as having been moved from the Bosc collection in 1828.

4. The validity of the name *Docorhinus* has remained largely unaddressed since its formation. Most major works regarding the systematics of this taxonomic group—*e.g.*,

Gemminger & Harold 1871; Horn 1876; Leng 1920; Guenther & Zumpt 1933; Emden & Emden 1939; Kuschel 1955; Howden 1993 —do not address *Docorhinus* and simply treat *Pachnaeus* as valid. *Docorhinus* is included in the *Index Animalium* (Sherborn, 1925: 1987, 1929: 4583, 1932b: 431), which references Schoenherr's (1823, 1826) works, but provides no information on the validity of the name.

5. O'Brien & Wibmer (1982: 46) and Morrone (1999: 145) both treated *Pachnaeus* as valid and *Docorhinus* as a nomen nudum. However, no justification for this treatment as nomen nudum was given in these aforementioned works. Alonso-Zarazaga & Lyal (1999: 179) treated the name *Docorhinus* as valid, stating "strictly speaking, the synonymy should be reversed because of precedence." These authors nevertheless supported the suppression of *Docorhinus*, asserting that they "will apply for the suppression of this name because several well-known citrus pests of economic importance are currently included in *Pachnaeus*". However, no case regarding suppression of *Docorhinus* appears to have been made. Anderson (2002: 780) treated *Pachnaeus* as valid and *Docorhinus* as a synonym.

6. With respect to the discrepancy in authority in both of Schoenherr's works (1823, 1826) – Bosc instead of Olivier – Article 67.7 of the Code (ICZN, 1999) applies: "[i]f, in fixing the type species for a nominal genus or subgenus, an author wrongly attributes the name of the type species, or of the genus or subgenus, to an author or date other than that denoting its first establishment, or cites wrongly the first express inclusion of nominal species in that genus or subgenus, he or she is nevertheless to be considered, if the nominal species was otherwise eligible, to have validly fixed the type species."

7. With respect to the use of "n. sp." (Schoenherr, 1823) following the authority, the Code is unclear as to the validity of designating a valid species name as typifying a genus name, but incorrectly treating it as a new species name. Schoenherr was aware of Olivier's (1807) work, as evidenced by his referencing species names from this work elsewhere, e.g., by fixing *Curculio quadrivittatus* Olivier, 1807 (p. 325) as the type of *Exophthalmus* Schoenherr, 1823 (column 1140). We therefore suggest considering Schoenherr's (1823) use of "n. sp." following the authority as a mistake, while treating as valid the fixation of *Curculio opalus* Olivier, 1807 as the type of *Docorhinus*.

8. To establish prevailing usage under Art. 23.9.1, two conditions must be met. Article 23.9.1.2, which requires that the junior synonym (*Pachnaeus*) has been used as the presumed valid name in at least 25 works, published by at least 10 authors in the immediately preceding 50 years and encompassing a span of not less than 10 years, is met. A list of 205 supporting references from 1823 to 2019 has been deposited with the ICZN Secretariat and is available on request. Article 23.9.1.1, which requires that the senior synonym, *Docorhinus*, has not been used as a valid name after 1899, is not met. This is because Alonso-Zarazaga & Lyal (1999) treated *Docorhinus* as valid. However, this is the only treatment of *Docorhinus* as valid since establishment of the genus in 1823.

9. Article 23.9.6 does not apply because there is no reason to consider Alonso-Zarazaga & Lyal's (1999) treatment to be *deliberately* used contrary to Art. 23.9.1. Therefore, this treatment of *Docorhinus* as valid must take into account in determining usage under Arts. 23.9.1.1 and 23.9.1.2. Additionally, we do not believe the detailed discussion given with regards to the status of the name *Docorhinus* in this catalogue can be said to constitute a "mentioning of a name in a synonymy, or its mere listing in an abstracting publication, or

in a nomenclator or other index or list of names" as required by Art. 23.9.6. Instead, we treat this as an unambiguous treatment of *Docorhinus* as valid. As such, prevailing usage cannot be applied to preserve usage of the name *Pachnaeus*, and the Commission is here formally petitioned under Art. 23.9.3 to preserve its use.

10. *Pachnaeus* is native to the costal Southeastern United States, Lucayan Archipelago, and Greater Antilles and includes 11 described species and one subspecies (O'Brien & Wibmer, 1982: 46; Zayas, 1988: 167–170; Lopez, 1992: 1–8) and several undescribed species (Reily & Franz, unpublished data). The genus contains several species that are important crop pests —*e.g.*, *Pachnaeus opalus* (Olivier, 1807) ("northern citrus root weevil"), *Pachnaeus litus* (Germar, 1824: 431) ("southern citrus root weevil"), and *Pachnaeus citri* Marshall (1916: 453). Members of the genus are often referred to by the common names "blue-green notcher", "blue-green citrus weevil", or "citrus root weevil" in the continental US and "verde-azule" in Puerto Rico and Cuba and are "among the earliest recorded pests in Florida and the West Indies" (Woodruff, 1985). *Pachnaeus* contains several species that are reported in numerous works as important pests. Major outbreaks of *Pachnaeus opalus* are reported from peach (Sherman & Mizell, 1995), strawberry (Moznette, 1921), and citrus (Woodruff 1985). Major outbreaks of *Pachnaeus litus* and *Pachnaeus citri* are reported primarily from citrus, however outbreaks are also known from other crops (Edwards, 1936; McCoy, 1999; Wolfenbarger, 1952). *Pachnaeus marmoratus* Marshall, 1916, *Pachnaeus azurescens* Gyllenhal in Schoenherr, 1834, *Pachnaeus psittacus* (Olivier, 1807), and an undescribed Bahaman species (Strong 1933; Leng & Mutchler 1914; Blackwelder 1947; Vaurie 1952; Turnbow & Thomas 2008) have occasionally been reported as minor pests of various crops. In addition to

being generalist feeders in their native ranges (Woodruff, 1981), members of *Pachnaeus* are highly prone to introduction, presumably traveling between groves and nurseries in or on potted saplings or between ports in fruit shipments.

11. Members of this genus are part of a larger complex of Caribbean citrus-feeding broad-nosed weevils that has proven systematically problematic (Franz, 2012; Zhang et. al., 2017). This complex has been called a "'Pandora's Box' of taxonomic confusion" (Woodruff, 1985) and "notoriously difficult" (Thomas, 2011). The group is comprised of many morphologically similar and potentially co-occurring taxa, many of which are poorly delimited. Fixation of the name *Pachnaeus* is critical to avoid potential, additional confusion if species are transferred in future into this genus from elsewhere in the complex.

12. All works regarding biology and control of this genus and all species descriptions since 1826 have used the name *Pachnaeus*. Since its establishment in 1823, the name *Docorhinus* has been used only in nomenclatural works discussing this name's validity or purported invalidity. Were strict priority applied, *Docorhinus* Schoenherr, 1823 would be treated as valid and have precedence an objective senior synonym over *Pachnaeus* Schoenherr, 1826. Switching to an all-but-unused, if technically valid, genus name threatens the stability of *Pachnaeus* by creating a discontinuity in name usage for this economically important taxon. Thus, application of strict priority is not desirable and *Pachnaeus* should be given precedence over *Docorhinus*.

13. The International Commission on Zoological Nomenclature is accordingly asked:

(1) to use its plenary power to suppress the genus-group name *Docorhinus* Schoenherr, 1823 for the purposes of the Principle of Priority but not for the purposes of the Principle of Homonymy;

(2) to place on the Official List of Generic Names in Zoology the name *Pachnaeus* Schoenherr, 1826 (gender: masculine), type species by original designation: *Curculio opalus* Olivier, 1807; and

(3) to place on the Official Index of Rejected and Invalid Generic Names in Zoology *Docorhinus* Schoenherr, 1823, suppressed as ruled in (1) above.

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CHAPTER 3. REVISION OF *PACHNAEUS* SCHOENHERR, 1826

Methods

To communicate what is a rather complex taxonomic history of this genus and to allow future workers to better understand non-taxonomic literature regarding this taxon, nomina nuda are included, when possible, within the synonymy sections of the taxa they would refer to if those names were available.

Square brackets, [ ], are used to indicate content added for clarification of quotes, descriptive information about labels and literature, and uncertainty in label transcriptions. When used to indicate uncertain label data transcriptions, a question mark, ?, is included following the questionable label data within the square brackets.

Body length and width at elytral bases measurements were completed with a millimeter ruler and error for all such measurements is ± 0.5 mm. Body length was measured from apex of the rostrum to maximal extent of elytral apices. These measurements are intended only to give the reader a general idea of size range within species and do not represent averages as they are based only on the largest and smallest known exemplars.

Lateral shots of endophalluses were taken with an Olympus CH-2 and images of previously described types, except as otherwise noted, were taken with a Bausch & Lomb Sterozoom 4, both with an Amscope Mu1000 camera inserted into an eyepiece. These shots were z-stacked using CombineZP. A few images taken by others (*i.e.*, type images of *Exophthalmus sommeri* Munck af Rosenschoeld in Schoenherr, *Pachnaeus azurescens* Gyllenhal in Schoenherr, and *Pachnaeus griseus* Gyllenhal in Schoenherr, by staff at the Entomological Collection staff at the Naturhistoriska Riksmuseet, Stockholm; type images of *Pachnaeus juvenalis* de Zayas and *Pachnaeus rosadonetoi* de Zayas by Michael A. Ivie; and male genitalia and variation within *Pachnaeus gowdeyi* (Marshall, 1926) by Jennifer C. Girón Duque) were captured with various but unknown imaging systems. All other images were taken on a ZEISS SteREO Discovery.V20 and stacked using Zerene Stacker.

Genitalic dissections were prepared using standard techniques. This involved rehydration of dry-mounted specimens in a hot water bath followed by removal of the abdomen to access internal portions of the terminalia. These were processed via maceration in hot 10% aqueous KOH solution followed by transfer to glacial acetic acid to neutralize and further clear sclerotized portions. Specimens were then rinsed in distilled water to remove remaining soft tissue and placed in glycerol for examination. Microscopic examination of whole specimens and dissections was performed using primarily an AmScope 7X-45X trinocular stereo zoom.

Number of specimens, sex of specimens if known, verbatim label data, and unique identifiers are provided for material examined.

Unique identifiers beginning with ASUHIC refer to material housed in the ASU Hasbrouck insect collection prior to the accession of the Charles W. O'Brien Collection (CWOB). Unique identifiers beginning with ARTSYS are primarily material borrowed from other collections for which a unique identifier could not be ascertained. These specimens were digitized as part of the present study within the Collection of Externally Processed Specimens for Arthropod Systematics Research (ARTSYS). ARTSYS numbers were also given to material from the Charles W. O'Brien Collection (CWOB) which was housed external to ASU at the start of databasing efforts for the present study.

A few records with ARTSYS numbers also have presently un-databased identifiers for the World Weevil Database (WWD) and are housed at the Canadian Museum of Nature Collection (CMNC). These presently un-databased numbers are presented preceding the ARTSYS identifier followed by a forward slash (*e.g.*, WWD0104147 / ARTSYS0007711). ASUHIC and ARTSYS databased records can be found by searching the ecdysis portal (https://serv.biokic.asu.edu/ecdysis/) for the entire catalogue number as presented (*e.g.,* ASUHIC0088761).

Unique identifiers preceded by [MCZ-ENT 00] have identifier labels starting with "MCZ-ENT 00" followed by the catalogue number (*e.g.*, MCZ-ENT 00529512); these records can be found by searching just the number without leading zeros (*e.g.,* 529512) in the identifiers category of MCZBASE (https://mczbase.mcz.harvard.edu).

Unique identifiers preceded by [NCSU00] have identifier labels starting with "NCSU00" followed by the catalogue number (*e.g.*, NCSU0060425); these records can be found by searching just the number (*e.g.*, 60425) in the specimen identifier category of the NCSU Insect Museum Specimen Database Portal (http://specimens.insectmuseum.org).

Unique identifiers starting with NHMUK can be found by searching the Natural History Museum Data Portal (https://data.nhm.ac.uk/).

A single specimen of *Pachnaeus Psittacus* (Olivier, 1807) included in this study bears the identifier label TAMU-ENTO X0737715. This specimen record can now be found on gbif.org (https://www.gbif.org/occurrence/245429378) but could not be located online at time of databasing and was given an ARTSYS number at that time which follows the identifier as presented on the label following a forward slash (*i.e.*, TAMU-ENTO X0737715 / ARTSYS0007433).

The following abbreviations are used for collections from which material, data, or photos were obtained:

ANSP	Academy of Natural Sciences of Drexel University, Philadelphia, Pennsylvania
ASUHIC	Arizona State University Hasbrouck Insect Collection, Tempe, Arizona
CMNC	Canadian Museum of Nature Collection, Ottawa
CMNH	Carnegie Museum of Natural History, Pittsburgh, Pennsylvania
CSUC	Colorado State University Collection, Fort Collins, Colorado
CWOB	Charles W. O’Brien Collection, Tempe, Arizona
FMNH	The Field Museum, Chicago, Illinois
FSCA	Florida State Collection of Arthropods, Gainesville, Florida
IES	Institute of Ecology and Systematics, Havana
MCZ	Museum of Comparative Zoology, Cambridge, Massachusetts
MJC	M. Andrew Jansen Collection, Gainesville, Florida
MZLU	Lund Museum of Zoology, Lund
MNHN	Muséum National d'Histoire Naturelle, Paris
MTEC	Montana State University Entomology Collection, Bozeman, Montana
NCSU	North Carolina State University Insect Museum, Raleigh, North Carolina
NHMD	Natural History Museum of Denmark, Copenhagen
NHMUK	Natural History Museum, London
NHRS	Naturhistoriska Riksmuseet, Stockholm
TAMU	Texas A&M University Collection, College Station, Texas
WIBF	West Indian Beetle Fauna Project, Bozeman, Montana

Selected records were also included from inaturalist.org, bugguide.net, and gbif.org.

These observational records function primarily as supplementary range data for species with limited or no specimen data from nearby localities.

Names and nomenclatural acts in this work are provisional and intended solely to provide a framework for later publication. All names and nomenclatural acts herein are disclaimed for nomenclatural purposes (see ICZN 1999, Art. 8.3).

Genus level synonymy

***Pachnaeus* Schoenherr, 1826: 121**

=*Pachnëus* Gemminger and Harold, 1871: 2224

Unjustified emendation of *Pachnaeus* Schoenherr, 1826 employing ë in place of ae.

Pacnaeus Latreille, 1829: 78

Incorrect subsequent spelling of *Pachnaeus* Schoenherr, 1826.

Pachnacus Gundlach 1891: 331

Incorrect subsequent spelling of *Pachnaeus* Schoenherr, 1826.

Pachneaus Cunliffe and van Hermann 1916: 35

Incorrect subsequent spelling of *Pachnaeus* Schoenherr, 1826.

Pachyneus Watson 1938b: 281

Incorrect subsequent spelling of *Pachnaeus* Schoenherr, 1826.

Pachnaeous Schroeder and Beavers 1977: 498

Incorrect subsequent spelling of *Pachnaeus* Schoenherr, 1826.

=*Docorhinus* Schoenherr, 1823: c. 1140

Proposed for suppression for the purposes of the Principle of Priority but not for the purposes of the Principle of Homonymy and requested to be placed on the Official Index of Rejected and Invalid Generic Names in Zoology by Reily and Franz 2019.

Diagnosis of *Pachnaeus* Schoenherr

Pachnaeus Schoenherr comprises a clade of moderately sized (7–20 mm), oblong, typically pastel colored and moderately densely scaled, eustyline weevils which can be separated from morphologically similar and co-occurring genera by the following characters, as noted in Franz 2012: (1) the presence of pale-colored, anteriorly directed, postocular vibrissae arising from internal face of a variously pronounced post-ocular lobe of the pronotum, (2) endophallus of aedeagus composed of conjoined but distinct anterior and posterior portions, with the posterior portion long (> 3x width), sclerotized, and tubular, never laminate, typically slightly narrowed posteriorly and widened anteriorly, and occasionally posteriorly curved, and the anterior portion membranous, ampullate, and anteriorly rounded, and (3) hypostomal-labial sutures not reduced, long, typically somewhat linear, and anteriorly extending to the posterior margin of the labial prementum—*i.e.*, generally ending at the hypostomal sulcus.

The combined presence of postocular vibrissae and structure of the male genitalia as noted above appear to be sufficient to separate this genus from other similar and co-occurring taxa. However, postocular vibrissae are consistently present in the genus; however, they are greatly reduced in number or length in some Jamaican and Bahamian species and many similar and co-occurring taxa also possess postocular vibrissae making this character of limited diagnostic utility. Based on a larger taxon sampling than provided by Franz (2012) hypostomal-labial sutures appear of limited diagnostic use as the hypostomal-labial sutures are often entirely obscured by scales. Accessing male genitalic characters requires dissection and clearing of genitalia, which is not always feasible and, when possible, still requires having male specimens. Diagnosability to the level of genus based primarily on male genitalic characters is clearly not ideal. As such development of other diagnostic characters is desirable for separating this genus from similar and co-occurring taxa, if not absolutely mandatory based on the seeming consistency in general endophallic structure seen in this genus (Fig. 3.85). Several other useful diagnostic characters for *Pachnaeus* have come to light through the present work. Elytral and pronotal scaling in *Pachnaeus* is typically composed of a mix of pastel-colored, circular to oblong, appressed scales with sparser, somewhat setose to elongate, and typically flattened appressed to erect scales intermixed. Scales, and particularly appressed scales, are sometimes greatly reduced in size, leaving bare patches of the integument visible (Figs. 3.23–3.25) or scale density may be greatly reduced or scaled entirely denuded on some elytral intervals and portions of the pronotum (Figs. 3.8–3.11, 3.62–3.66). In a single species which differs from much of the genus in several other external characters, *Pachnaeus sommeri* (Munk af Rosenschoeld in Schoenherr, 1840), elytral and pronotal scaling is composed primarily of dense patches of shaggy scales surrounded by heavily denuded areas, though appressed, pale oblong scaling is present near the elytral margins and suture (Figs. 3.78–3.81).

Some Hispaniolan and Cuban members of the closely related and morphologically similar taxon *Exophthalmus* Schoenherr, 1823 *sensu stricto*— *i.e*., species near *Exophthalmus quadrivittatus* (Olivier, 1807)—are somewhat similar in form. However, they possess only short, sparse postocular vibrissae which never seem to arise from a distinct lobe as in many species of *Pachnaeus* and they generally have more prominently produced and often somewhat globose eyes than typical of *Pachnaeus*. This group can also be reliably distinguished by the structure of their pronotal bases which, unlike in *Pachnaeus*, have a pair of posteriorly directed, typically subangulate, lateral lobes that extend posteriorly beyond elytral bases ventral to the humeri and also by the presence of a pair of raised lobes dorsally at the pronotal bases which are generally isolated adjacent to between the third elytral striae and which are typically separated at middle by a variably distinct but usually notable notch located just anterior to the scutellum.

Pachnaeus is morphologically similar to *Diaprepes* Schoenherr, 1823, which co-occurs in parts of its range. Many members of the genus *Diaprepes* Schoenherr possess similarly structured and located postocular vibrissae; however, this does not apply uniformly across the entire genus *Diaprepes* Schoenherr, and in some cases the presence of postocular vibrissae seems to be variable within the same species. Unlike *Pachnaeus* Schoenherr, these species are generally larger in size, generally have a submentum that is heavily impressed in at least the posterior third and a rostrum that is significantly more elongate, and generally have the ventral margin of the rostrum in lateral view distinctly more curved than in *Pachnaeus* Schoenherr. Most members of *Diaprepes* also have distinct sculpturing of the pronotal disc apparent in dorsal view which includes prominent glabrous, rugulose to undose to pustulate raised areas, and many members of *Diaprepes* have a variably pronounced, thin, transverse carina on the rostral dorsum with extends much of the width of the epifrons between the antennal insertions. Members of this genus also consistently possess additional endophallic sclerites beyond those seen in *Pachnaeus.*

Diaprepes famelicus (Olivier, 1790), in addition to lacking postocular vibrissae, being sparsely scaled, and being primarily isolated to areas outside the known range of *Pachnaeus—i.e.*, the Lesser Antilles and Bermuda with a record of interception in Italy (Cuoco et al. 2014), lacks an impressed submentum and the ventral margin of the rostrum in lateral view is only slightly concave. This species is readily separated from *Pachnaeus*, and from species presently treated in *Diaprepes* Schoenherr, by the combination of absence of post-ocular vibrissae and by the distinctly longitudinally corrugated sculpturing of the ventral surface of its rostrum. In addition, the aedeagal ostium of *Diaprepes famelicus* (Olivier) has a distinct, trigonal incision that is absent in both *Pachnaeus* Schoenherr and other members of *Diaprepes* Schoenherr. Based on these observations, *Diaprepes famelicus* (Olivier) may be misplaced within *Diaprepes* Schoenherr belongs to a distinct and probably undescribed genus.

While not useful for separating the genus from more closely related taxa within the *Exophthalmus* Genus Complex sensu Zhang et al. 2017, *Pachnaeus* never has a bicarinate rostrum as in some members of somewhat superficially similar and occasionally co-occurring genera such as *Compsus* Schoenherr, 1823 and *Artipus* Sahlberg, 1823. Instead, the rostrum is typically tricarinate, though sometimes with the lateral carinae reduced making it monocarinate, and more frequently with all rostral carinae reduced giving the epifrons a subplanar appearance. *Pachnaeus* also generally has a raised, somewhat trigonal, nasal plate with a typically bilobed anterior margin which overlies and dorsally obscures the buccal cavity from above. The nasal plate is usually slightly raised above the level of the frons surrounding it and never set in a notable, subtrigonal notch in the apex of the rostrum as seen in *Compsus* Schoenherr, 1823.

The proximal (=anterior), ventral margin of the long, tubular, endophallic sclerite is variably structured in *Pachnaeus*, ranging from truncate to notably angulately notched, but it is never anteriorly (=proximally) laterally narrowed and curving upwards, as in members of the Puerto Rican genus *Compsoricus* Franz, 2012. The tubular endophallic sclerite is consistently thin and elongate in form, ranging from subconical to somewhat lanceolate, and is always greater than three times as long as wide and often comparably much longer. The length of the endophallic sclerite helps to separate the genus from members of the Jamaican *Exophthalmus vittatus* (Linnaeus, 1758)/ *E. similis* (Drury, 1773)/ E. *impressus* (Fabricius, 1781) clade, which is especially useful for distinguishing the aberrant, eastern Cuban *P. sommeri* (Munck af Rosenschoeld in Schoenherr, 1840) as it is superficially very similar in form to some of these Jamaican taxa.

Additional endophallic sclerites other than the long, tubular, distal (=posterior) sclerite are typically absent, unlike in several other closely related and superficially similar genera, *e.g.*, *Diaprepes* Schoenherr, 1823 and Central American species near *Exophthalmus opulentus* (Boheman in Schoenherr, 1840), among many others. However, there is occasionally a heavily sclerotized patch ventrally or basally (=frontally) at the proximal (=anterior) end of the otherwise membranous and sac-like proximal (= anterior) portion of the endophallus (Fig. 3.85A, E, N). In some species of *Pachnaeus*, this may be simply a thickening of the distal end of the sac-like portion of the endophallus, but in others it appears to be a distinct ventral sclerite that might be developed from remnants of a ringlike sclerite seen in Jamaican species near *Exophthalmus vittatus* (Linnaeus, 1758). The aedeagal apex in *Pachnaeus* is never strongly laterally expanded at the ostium, as is seen in some members of the genus *Diaprepes* Schoenherr, 1823 and *Lachnopus* Schoenherr, 1840.

Redescription of *Pachnaeus* Schoenherr

Moderately sized (7–20 mm long), oblong entimines belonging to the tribe Eustylini Lacordaire, 1863. Integument color ranging typically from black to castaneous, rarely flavotestaceous. Variably vested, but typically heavily covered in a mix of densely overlapping, pale-colored, and sometimes glittery or iridescent, circular to oval, appressed scales overlain by sparser, linear, typically white to translucent, subappressed scales. Females are, on average, slightly larger and slightly wider than males.

Head typical of the tribe. **Eyes** somewhat circular to elliptical, finely faceted, and typically black. **Occiput** usually sparsely scaled. **Temples** at most slightly constricted posterior to eyes, and usually finely rugose, though this is often obscured by scales. **Rostrum** generally tricarinate, with epifrons typically bearing one medial carina and two lateral carinae, though medial and/or lateral carinae can range from prominent to obsolete. **Frons** variably angled downward from epifrons in lateral profile. **Nasal plate** at least slightly raised, usually somewhat trigonal or chevron-shaped, typically mostly denuded except for a few anteriorly directed setae, and bounded posteriorly by elongate, erect setae which are set in punctures. Anterior margin of epistome usually somewhat bisinuate. The lateral portion of epifrons, *i.e.*, the space between the lateral carina and the scrobe, varies from obliquely dorsally faced to laterally faced, and from planar or slightly convex to notably concavely impressed. **Scrobe** laterally situated, somewhat arcuate, extending from the apex of the rostrum to the anteroventral margin of the eye. **Occipital suture** beginning at the anteroventral margin of the eye and descending below the scrobe along the lateral or ventrolateral aspect of the head, the posterior portion sometimes occluded by scales, shorter than the diameter of the eye, and typically anteriorly directed toward the middle of the pleurostomal sinus.

Mandibles bearing numerous long, erect, slightly curved, and anteriorly directed setae laterad to transversely elliptical to circular mandibular processes scar. Deciduous mandibular processes are almost never intact in preserved specimens but, when present, they are somewhat scythiform. **Prementum** with numerous short suberect setae on anterior half. **Anterior tentorial pits**, when visible, located ventrally and immediately laterad to the hypostomal labial suture. A pair of long, anteriorly directed setae located immediately posterior to the anterior tentorial pits, however these are often broken off in preserved specimens.

Antennae 12 segmented. **Scape** long, distally expanded, narrowly clavate, apically rounded, sparsely to moderately covered in short, appressed, setose scales; funicular insertion on posterior face of scape. **Funicle** seven segmented with antennomeres 2–9 clavate, moderately clothed in short, appressed, setose scales, and each bearing a sparse ring of short, thick, erect setae subapically; antennomere 3 longer than antennomere 2;

antennomeres 4 through 9 gradually becoming shorter than preceding antennomere. Scape and funicle moderately clothed in pale, setose scales. **Club** compactly 4 segmented, fusiform to ovate, densely covered in extremely fine, velutinous hairs. **Pronotum** typically somewhat trapezoidal, but occasionally more subglobose; variable in sculpture, punctation and vestiture. Pronotal collar slightly laterally constricted ante-apically. Posterior pronotal margin ranging from slightly to deeply bisinuate to accommodate the bases of the elytra which overlap the pronotum dorsally, the impressed basal margin of the pronotum vested in pappolepidia. **Postocular lob**e variably shaped and variably laterally pronounced, sometimes nearly obsolete, and bearing a variably structured brush of Postocular vibrissae which arise from its interior surface. **Prosternum** completely separated by contiguous procoxae into distinct anterior basisternum and posterior sternellum. **Mesoventrite** anteriorly rectangular, posteriorly laterally and ventrally expanded and separated into three truncate lobes to accommodate the mesocoxae. **Metaventrite** bearing variably produced and variably shaped, anteriorly directed lobes laterad to the mesocoxae, and a variably pronounced suture which runs parallel to the anterior margin; slightly tumescent immediately anterior to the mesocoxae, this tumescence ending somewhat abruptly at a pair of sutures which run parallel to the anterior margins of the metacoxae; posteromedially bearing a typically denuded and variably shaped medial impression. **Mesepisternum** subtrigonal. **Mesepimeron** anterodorsally widened securiform to trigonal. **Metepisternum** somewhat elongate securiform, the widened anterior portion typically posteriorly bounded by a ventrally located but slight impression. **Metepimeron** semicircular to semifusiform, the ventral margin relatively straight; completely concealed beneath the elytra.

Scutellar shield small, visible, and variably shaped.

Abdomen with 5 visible ventrites. Abdominal ventrites 1 and 2 fused, the suture between them obliterated medially in some species. Abdominal ventrites 2 to 4 trapezoidal. Abdominal ventrite 5 trigonal in females, parabolic in males, bearing many suberect, slightly posteriorly directed, elongate setae.

Elytra with scaling variable in color, density, and arrangement. Elytral striae composed of regular, linearly arranged, small punctures which are variably obscured by scales. Elytral apices not strongly produced, bearing a patch of dense, short, erect setose scales.

Procoxae subconical. **Mesocoxae** globose. **Metacoxae** transversely amygdaliform with anterior margin sigmoidal and posterior margin arcuate. **Trochanters** trigonal and in well-preserved specimens bearing a single, long, erect seta distally. **Femora** lacking teeth or setae, slightly inflated at or beyond middle, and narrower proximally than distally. **Tibiae** with short apical setal comb and bearing many long, erect, pale setae along the ventral aspect. Protibiae and mesotibiae mucronate, with a dense tuft of setae arising just proximad of, and in most cases partly obscuring, the mucro. Protibiae in many species apically curved or bent. Metatibial corbel variable in shape, though typically semicircular to lens shaped, enclosed, and glabrous. **Tarsi** pseudotetramerous. Tarsomeres 1 and 2 trigonal, tarsomere 3 somewhat cordate. Tarsomeres 1 to 3 dorsally clothed in appressed, linear scales with a few, thick, suberect, setae intermixed; ventrally clothed in dense, erect setae. Tarsomere 4 small, cylindrical, hidden. Tarsomere 5 clavate, widening apically and slightly ventrally curved; clothed similar to dorsal vestiture of tarsomeres 1 to 3. Tarsal claws free and simple.

Tergite VII (pygidium) of females acutely trigonal, finely rugose, with many fine, pale setae apically and laterally. **Tergite VIII of females** trigonal, bearing a small patch of setae at the apex. **Sternite VIII of females** with plate apically trigonal and bearing many erect setae dorsoapically, these denser and shorter nearer the apex. **Spiculum ventrale** with arms fused into plate, but with thickened struts still visible, these short, closely set, subparallel, and narrowing apically; apodeme long, rodlike, and enlarged at the apex. **Coxites** in lateral view subquadrate to subtrigonal, usually slightly less tall near apex than proximally; composed of two sclerotized lobes—*i.e.*, into distinct proximal and distal gonocoxites—separated by a transverse membranous region. **Styli** short, cylindrical, and each tipped with a tuft of a few fine setae. **Spermatheca** with hooked, cornu tapering apically; ramus distad to collum, and both subcylindrical; spermathecal compressor muscle present between nodulus and cornu.

Tergite VII (pygidium) of males apically parabolic, somewhat trapezoidal in dorsal view; bearing short, anteriorly directed extensions ventrolaterally; bearing many fine, pale setae apically and laterally. **Hemisternites (sternite VIII) of males** composed of a pair of comma-shaped sclerites. **Spiculum gastrale** with lamina variably shaped, flat and bilobed, the apices of the lobes acutely angled and ventrally heavily sclerotized; stylus long, anteriorly (= proximally) widened and slightly dorsally curved at the apex. **Tegmen** with basal piece thin, ringlike; parameres small, somewhat trigonal; apodeme rodlike, long, often ventrally curved or bent and slightly widened at the apex. **Aedeagus** with pedon of penis tubular, slightly ventrally curved, apex acutely subangulate, anteriorly (= proximally) slightly dorsoventrally flattened and slightly laterally widened; aedeagal apodemes rodlike, usually about as long as tegmenal apodeme. Ostium with sides anteriorly converging toward insertion of elongate, dorsal, mesal endophallite which overhangs most to all of the ostium. Internal sac variably clothed in fine papillae which often do not survive clearing. **Endophallus** composed of a single distal (=posterior), variably shaped but consistently long (> 3x width) and tubular sclerite—this never with an elongate projection arising from the proximal (=basal, =anterior) ventral margin—and an ampulate, proximal (=anterior) sac-like portion, occasionally with heavily sclerotized patches laterally or ventrally at the proximal (= anterior) extent of the sac-like portion.

Etymology of *Pachnaeus*

The generic name *Pachnaeus* is derived from the Ancient Greek *παχνήεις*, from *πάχνη* (“hoarfrost” or “rime”) + -*εις* (masculine suffix meaning “full of, tending to, or thoroughly possessing”). The name likely refers to the turquoise to grey, frost-like color of the scales of many species. This etymology was not explicitly established at time of erection of the genus but was first suggested subsequently by Agassiz (1846: 117).

Geographical distribution of *Pachnaeus* Schoenherr

The known native range of *Pachnaeus* Schoenherr consists of eastern and Gulf Coast of the continental United States (along the coast as far north as New Jersey and as far west as Mississippi), the Lucayan Archipelago (Grand Bahama, Bimini Islands, Andros, Berry Islands, New Providence, Eleuthera, and Long Island), Cuba (the main island and Isla de la Juventud), the Cayman Islands (Cayman Brac and Little Cayman), Jamaica, Hispaniola (Dominican Republic and Haiti), and Puerto Rico. Several members of the genus are prone to travel, typically with fruit or live plants of the genus *Citrus* L. (Rutaceae), and introductions and interceptions outside of the native range are well known. Reported locations of establishment outside the native range include citrus groves in the Lower Rio Grande Valley of Texas, specifically Cameron, Hidalgo, and Willacy Counties (Ancico et al. 2002) and Tabasco and Tamaulipas, Mexico (Ruíz Cancino and Coronado Blanco 2002: 111, Ruíz Cancino et al. 2006: 96, López-Arroyo and Loera-Gallardo 2009: 313), though these are unconfirmed. Specimens have been intercepted at the California border, New York, Wisconsin, and Ontario, Canada. Introductions and interceptions also seem to regularly occur within the native range of the genus. The genus does not appear to be established in California, and it is not known from other major citrus producing regions—*e.g.,* China, Brazil, and the Mediterranean. A few older specimens are labeled as being from French Guiana or Brazil, but these are likely erroneous data labels or adventive records.

Overview of past taxonomic treatment of *Pachnaeus* Schoenherr

Pachnaeus Schoenherr, 1826: 121 was established as a replacement name for *Docorhinus* Schoenherr, 1823: c. 1140. At time of erection by Schoenherr (1826), *Pachnaeus* Schoenherr included two species—the type species of *Docorhinus* Schoenherr, *Curculio opalus* Olivier, 1807: 339, and *Cyphus litus* Germar, 1824: 431. Gyllenhal in Schoenherr (1834) added two names, *Pachnaeus azurescens* Gyllenhal in Schoenherr, 1834: 58 and *Pachnaeus griseus* Gyllenhal in Schoenherr, 1834: 59. Boheman in Schoenherr (1840: 426) sank *P. griseus* Gyllenhal in Schoenherr to the level of subspecies under *P. azurescens* Gyllenhal in Schoenherr. Perroud (1853) added one species, *Pachnaeus costatus* Perroud, 1853: 495. Lacordaire (1863: 107, note 1) included *Curculio psittacus*

Olivier, 1807: 339 in the genus. LeConte (1874: 457) included the genus in his higher-level classification of the polyphyletic, former suborder Rhynchophora, as did Horn (1876). The latter also treated the continental United States fauna, misidentifying *P. litus* (Germar) as *P. opalus* (Olivier) (Horn 1876: 82), and erecting *Pachnaeus distans* Horn, 1876: 83, a junior synonym for *P. opalus* (Olivier). Chevrolat (1876) added one species to the genus, *Pachnaeus roseipes* Chevrolat, 1876: CCXXVII, which would later prove not to be congeneric. Marshall added two species, *Pachnaeus marmoratus* Marshall, 1916 and *Pachnaeus citri* Marshall, 1916. Schwarz and Barber (1922: 29) re-treated the continental United States fauna, fixing the confusion created by Horn (1876) and formally sinking *P. distans* Horn as a synonym of *P. opalus* (Olivier). Marshall (1922: 60) moved *P. roseipes* Chevrolat to the genus *Exophthalmodes* Pierce, 1916. The genus then remained largely unchanged until the 1980s, with most of the related literature from the first half of the 1900s focusing on agricultural impact and control of *P. litus* (Germar). Interest in citrus pests throughout the Americas seemingly increased in correlation with the advent of in-home refrigeration, the modernization of frozen concentrated orange juice production and subsequent industrialization and commercialization of this product. Interest was further spurred by the introduction of the major citrus pest *Diaprepes abbreviatus* into the continental United States (Woodruff 1964, French and Skaria 2000, Strain 2009, Jetter and Godfrey 2009) and the Cuban citrus boom of the 1970 to 1990s (Muraro et al. 1998). This renewed interested in citrus as a cash crop saw significant treatment of the genus (Wolfenbarger 1952, Woodruff 1981, Woodruff 1985, Futch and McCoy 1993) and the addition of four new names, *Pachnaeus pater* de Zayas, 1988, *Pachnaeus juvenalis* de Zayas, 1988, *Pachnaeus alayoi*

Lopez Castilla, 1992, and *Pachnaeus rosadonetoi* Lopez Castilla, 1992. Reily and Franz (2019) addressed the discrepancy in generic name by applying for suppression of *Docorhinus* Schoenherr, 1823.

At time of writing no comprehensive revision of the genus had been undertaken, comparative notes regarding differences between species were sparse and mostly related to the two commonly collected continentally occurring species, *P. litus* (Germar) and *P. opalus* (Olivier), and keys were only available for separating these two species (*e.g.*, Woodruff 1981).

Higher-level placement of *Pachnaeus* Schoenherr within Entiminae

Pachnaeus Schoenherr is often still treated within the tribe Tanymecini Lacordaire, 1863 in peer-reviewed publications, collections, and grey literature. This is based on the presence of postocular vibrissae, a character traditionally used to delimit tanymecines. Franz (2012) moved the genus to Eustylini Lacordaire, 1863 based on morphological analysis and this is supported by available molecular data (Mazo-Vargas 2011, Zhang et al. 2017). I generally agree with this placement in Eustylini Lacordaire, at least more so than the prior placement within Tanymecini Lacordaire, based on my own examination of these taxa and of available tanymecine material. However, it should perhaps be noted that Eustyline higher-level systematics remains rather poorly resolved, despite recent efforts (Franz 2010, Franz 2012, Franz 2013, Zhang et. al 2017).

Uncertainty remains with regards to how closely related predominantly South American members of Eustylini Lacordaire which have bicarinate rostra—*i.e.*, Eustylini I clade South America sensu Franz 2012: 515, “Eustylini” sensu Zhang et al 2017: 229—are to the West Indian Eustylini *sensu lato* which have typically monocarinate to tricarinate rostra—*i.e.*, *Exophthalmus* genus complex sensu Zhang et al. 2017. These primarily south American genera with bicarinate rostra are perhaps best thought of as a Eustylini *sensu stricto* and include *Brachyomus* Lacordaire, 1863, *Compsus* Schoenherr, 1823 (but not including *Compsoricus* Franz, 2012), *Eustylus* Schoenherr, 1843, *Oxyderces* Schoenherr, 1823 (possibly a synonym of *Compsus*), *Plococompsus* Marshall, 1922 (presently treated as a subjective synonym of *Oxyderces* but maybe distinct or maybe a junior synonym of *Compsus*), and *Xestogaster* Marshall, 1922. This group may also include primarily Northeastern South American taxa such as *Phaops* Sahlberg, 1823 such as *Phaopsis* Kuschel, 1955 and *Anidius* Kuschel, 1955, though these taxa may also represent a distinct lineage. The different rostral structure—bicarinate versus with a median rostral carina—suggests to me that these species groups may not be that closely related.

The limited available molecular data (Zhang et al 2017, which included South American representatives, *i.e.*, *Compsus* sp.GZ134 and *Xestogaster* sp. 1) seems also to suggest this group as distant from the West Indian Exophthalmus genus complex. Franz (2012) resolved this South American group (including *Phaops*, = Eustylini I clade South America sensu Franz 2012: 515) based on the synapomorphies of having "large endophallic sclerites positioned in anterior third of aedeagus" (p. 537, character 102, state 1) and an "endophallus with complex, multipart sclerite, which typically includes strongly recurved parts and various non-longitudinally oriented projections" (p. 537, character 103, state 11) and a more narrow subset of this group (*i.e.*, excluding *Phaops*, =*Eustylus*–*Exorides* clade sensu Franz 2012: 522, 530, 545) based on the synapomorphies of having a "metatibial apex in region of inner flange with a densely arranged patch of small, subcircular, lamellate, appressed scales" (p. 530 character 59, state 1) and a spermatheca with "collum and ramus contiguous, each short to very short, yet inner margins straight and angled in a sharp narrow triangle" (p. 545 Character 140, state 1). The *Exophthalmus* genus complex sensu Zhang et al. 2017 was also considered monophyletic by Franz (2012) and synapomorphies listed for this clade included medial rostral carination as mentioned above, *i.e.*, "rostrum dorsally mono- or tricarinate" (p. 521, character 16, state 1), an "endophallus with a variously configured, elongate tubular sclerite in mid region… coded as inapplicable in taxa that lack large endophallic sclerites" (pp. 539–540, character 110, state 1) with "endophallic sclerites more or less conspicuously separated into an anterior (typically membranous/laminate) and posterior (often tubular) sclerites… applicability as in character 110 [= coded as inapplicable in taxa that lack large endophallic sclerites]" (p. 540, character 111, state 1)

This last character (p. 540, character 111, state 1) is reported to include a state reversal in the *Compsus maricao–Exophthalmus quinquedecimpunctatus* [sic] clade (= *Compsoricus maricao* (Wolcott, 1924) + *Exophthalmus quindecimpunctatus* (Olivier, 1807: 300), both Puerto Rican species which I believe are closely related based on their medially impressed pronota with impression surrounded by moderately-strongly raised ridges, strongly glittery green scales, similarly structured and strongly convex rostral dorsa, and very strongly produced, subglobose to slightly subconical and basally emarginate eyes. In these two species the posterior and anterior structures appear to be fused into a single, narrowly ampulate sclerite which is reported as synapomorphic for this clade—*i.e.*, "endophallus with a long (posterior), fully sclerotized, ampullate–tubular sclerite that varies in width throughout (widest near mid region, and anterior and posteriorly gradually constricted)".

It also remains somewhat unclear how closely related West Indian taxa within the *Exophthalmus* genus complex—*e.g.*, *Tetrabothynus* Labram & Imhoff, 1852, *Tropirhinus* Schoenherr, 1823, *Compsoricus* Franz 2012, *Diaprepes* Schoenherr, 1823, *Exophthalmus* Schoenherr, 1823 *sensu stricto*, the Puerto Rican *Exophthalmus roseipes* (Chevrolat, 1876) (probably a monotypic genus near *Diaprepes*), Jamaican species currently treated in *Exophthalmus* Schoenherr near *E. vittatus* (Linnaeus, 1758) (=*Prepodes* Schoenherr, 1823 *sensu stricto*), and Pachnaeus Schoenherr, 1826 — are to Central American mainland species in *Exophthalmus* Schoenherr *sensu lato* (=*Exophthalmodes* Pierce, 1916) or other similar and presumably closely related mainland Central American taxa such as *Rhinospathe* Chevrolat, 1871 and *Chauliopleurus* Champion, 1911. Available molecular work (Zhang et al. 2017) suggests these taxa—excepting perhaps *Chauliopleurus*, for which the specimen sampled (ASUHIC0033787) was misidentified and is, in fact, an undescribed species near *Exophthalmus sulcicrus* Champion, 1911 —to be somewhat closely related to the West Indian members of the *Exophthalmus* genus complex, but a distinct clade. Zhang et al. (2017: 229, 235–237) which appears to have arisen from a colonization of the mainland from the islands sometime between the late-Oligocene (*circa* 25 MYA) to mid-Miocene (*circa* 14 MYA).

Exophthalmus Schoenherr, 1823 *sensu stricto* as herein discussed includes Hispaniolan species near *Exophthalmus quadrivittatus* (Olivier, 1807) which have stripes or bands of irregular patches of white, yellow, or very light pink shaggy scaling and typically similar pronotal patches dorsally and laterally, as well as a pair of raised lobes just laterad to middle of the pronotal base that are separated by a typically somewhat deep incision and lateral expansions of the pronotal base which extend as subangulate lobes beneath the elytral humeri—*i.e.,* [*E. quadrivittatus* (Olivier, 1807) (type species of *Exophthalmus* Schoenherr, 1823) + *E. laetus* (Olivier, 1807) + *E. mannerheimi* Boheman, 1840, = regular shaggy scale patches group] + [*E. hieroglyphicus* + *E. sphacelatus* (Olivier, 1807), = irregular shaggy scale patches group]. It may also include Hispaniolan species with moderately dense blue to grey scaling interrupted in stripes or patches by slightly impressed areas of denser and paler shaggy scaling, and which have strongly truncate elytral bases and sub right-angular elytral humeri and widely expanded and sometimes subconical eyes—*e.g., E. cinerascens* (Fabricius, 1792), *E. obsoletus* (Olivier, 1807), and *E. frenatus* (Marshall, 1934). While this genus, in its strict sense, seems to almost exclusively Hispaniolan, some other, similarly shaggy scaled insular West Indian species with lateral lobes of the pronotum extending below the humeri such as the Cuban *E. pictus* Guérin-Méneville, 1847 and its subspecies [form?] *E. pictus fulvovirgatus* (Marshall, 1934) may also be closely related.

The genus *Diaprepes* Schoenherr, 1823 has historically been difficult to separate from *Pachnaeus* because of their numerous shared characters. Both genera contain members which are moderately large to large and similarly shaped entimines; both genera typically have a median rostral carina, though this character is variably reduced to a more planar to evenly convex rostral surface in some species; both genera often have pale appressed scales on part or all of the elytra; and many members of both genera—but not all for both genera as these are reduced in some members of Pachnaeus and apparently either reduced or absent, sometimes variably so within the same species, in some members of

Diaprepes—possess large tufts of postocular vibrissae. There are several striped or brunneous species of *Pachnaeus* as presently circumscribed that look very superficially similar to members of *Diaprepes* (*e.g.*, Figs. 3.6–3.7, 3.23–3.25, 3.78–3.81). General similarity in form of *Pachnaeus* and *Diaprepes* is confounded further by their similar native and introduced ranges, with members of both genera co-occurring in some parts of their present ranges—*e.g.*, Florida, the Gulf Coast, and the Bahamas. *Pachnaeus* appears to be primarily native to Jamaica, Cuba, the Lucayan Archipelago, and the southeastern Atlantic and Gulf Coast of the continental United States, with only one presumedly Hispaniolan-native species—*Pachnaeus morelli*, sp. nov. from Haiti, which may represent past literature records of *P. litus* (Germar, 1824) on the island (Perez-Gelabert 2008)—one possibly Hispaniolan-native species—*Pachnaeus psittacus* (Olivier 1807), though this species likely Cuban in origin—and one species reported from and confirmed to occur in Puerto Rico, but probably not native there—*P. psittacus* (Olivier, 1807). This contrasts with the apparent native range of *Diaprepes*, members of which appear to be primarily Puerto Rican and Lesser Antillean in origin, though there may be species of *Diaprepes* native to the Dominican Republic. No members of *Pachnaeus* occur in the Lesser Antilles and all members of *Pachnaeus* occurring in Hispaniola and Puerto Rico are densely blue to green scaled. I have seen no confirmed records of any species of *Diaprepes* in Jamaica and do not believe the genus to occur on the island. Cuban records of the genus (*e.g.*, O'Brien and Kovarik 2001) are suspect and seem likely to represent misidentifications of members of other genera.

Recent molecular work (Zhang et al. 2017) suggests *Pachnaeus* and *Diaprepes* to be distinct monophyletic groups with a high level of support for the monophyly of

[[*Diaprepes* Schoenherr, 1823 + *Exophthalmus roseipes* (Chevrolat, 1876)] + [*Exophthalmus* Schoenherr, 1823 sensu stricto + [*Rhinospathe* Chevrolat, 1878 + Central American *Exophthalmus* Schoenherr *sensu lato* (=*Exophthalmodes* Pierce, 1916)] + [*Pachnaeus* Schoenherr, 1826 + [large, Jamaican species with shaggy scale patches presently treated in *Exophthalmus* (= *E. similis* (Drury 1773) sec. Vaurie 1961 + *E. vittatus* (Linnaeus, 1758) sec. Vaurie 1961; = *Prepodes* Schoenherr, 1823)]. This provides strong evidence that *Pachnaeus* and *Diaprepes* are somewhat closely related and both members of a single lineage that arose within the insular Caribbean between 18 and 33 MYA, but that *Diaprepes* is more closely related to Hispaniolan and Cuban species in and near *Exophthalmus* sensu stricto and similar mainland Central American species and that related *Diaprepes* is less closely related to *Pachnaeus* or large, Jamaican species with shaggy scale patches presently treated in *Exophthalmus* (*i.e., E. similis* (Drury 1773) sec. Vaurie 1961, *E. vittatus* (Linnaeus, 1758) sec. Vaurie 1961and E. impressus (Fabricius, 1781) sec. Vaurie 1961).

Lachnopus Schoenherr, 1840 is likely not monophyletic (Girón and Franz 2012, Girón 2015, Girón et al. 2018). However, there does seem to be a large group of species which includes the type species of *Lachnopus*, *Curculio aurifer* Drury, 1773, which do constitute a clade of *Lachnopus* Schoenherr, 1840 *sensu stricto* + *Ischionoplus* Chevrolat, 1878 (Girón and Franz 2012) with proposed synapomorphies of scales smooth—*i.e.*, not ribbed or otherwise sculptured (Girón and Franz 2012: 70, character 1, state 1)—and legs with “premucro developed into a spine on apex of metatibiae (Girón and Franz 2012: 76, character 34, state 1). This clade might be best referred to as a “*Lachnopus* Genus Complex” following in practice of Zhang et al. 2017. It might also be wise to restrict the name *Lachnopus* to primarily Cuban species of *Lachnopus* Schoenherr *sensu stricto,* which share a dorsally raised carina along the posterior margin of the pronotum (Girón and Franz 2012: 74, character 17, state 1) which appear to constitute a clade—*i.e., Curculio hispidus* Gyllenhal, 1834, *Lachnopus niveoirroratus* Jacqelin du Val, 1857, *Curculio aurifer* Drury, 1773, *Lachnopus gowdeyi* Marshall, 1926 sec. Girón and Franz 2012 (nec. *Lachnopus gowdeyi* Marshall, 1926 but instead a likely-unnamed Jamaican species of *Lachnopus*, see also the discussion under *Pachnaeus gowdeyi* (Marshall) below), *Lachnopus lineatoguttatus* Perroud, 1853, *Ptilopus vittatus* Klug, 1829, *Lachnopus splendidus* Boheman, 1840, *Ptilopus argus* Reiche, 1840, and *Lachnopus guerinii* Jacqelin du Val, 1857—or to at least use different subgeneric or species group names to other clades. Regardless of the monophyly of *Lachnopus*, at least the majority of species in the genus do not appear to be very closely related to *Pachnaeus* or other members of the *Exophthalmus* genus complex sensu Zhang et al. 2017 (Mazo-Vargas 2011, Zhang et al. 2017) and appear to be more closely—but still rather distantly—related to predominantly South American members of Eustylini Lacordaire which have bicarinate rostra (Eustylini I clade South America sensu Franz 2012: 515, = "Eustylini" sensu Zhang et al 2017: 229).

However, there are some instances of convergence in external morphology (*e.g.,* reduction of scaling, more prominently truncate and strongly subquadrate pronotal bases, and elongation of rostral shape) which have led to species of *Pachnaeus* as presently circumscribed being confused with and treated as *Lachnopus* in past, namely *Lachnopus gowdeyi* (Marshall, 1926) *sensu stricto.* The placement *Lachnopus gowdeyi* (Marshall, 1926) in *Pachnaeus* in the present work was only truly resolvable by examining images of male genitalia (J.C. Girón, Pers. Comm.), which match very well to other species of *Pachnaeus*—*i.e.*, possess a long, tubular endophallic sclerite and do not have the pedon expanded at the ostium—and not well to species of *Lachnopus* near the type species of *Lachnopus*, *Curculio aurifer* Drury, 1773—*i.e.*, lack a long, tubular endophallic sclerite and have the pedon strongly expanded at the ostium. Members of *Lachnopus gowdeyi* (Marshall) *sensu stricto* also share with other members of *Pachnaeus* the presence of postocular vibrissae— albeit they are reduced in length and number— whereas members of *Lachnopus* Schoenherr *sensu stricto* do not appear to possess postocular vibrissae. Placement of this species in *Pachnaeus* was further enforced in finding a morphologically similar and presumedly very closely related species which seem to be intermediate in rostral and elytral form, *Pachnaeus gordoni* Reily sp. nov. This species which shares with *Lachnopus gowdeyi* (Marshall) *sensu stricto* the reduction of scaling on the elytral disc and pronotum, dense bands of white scaling on the femora, and relatively truncate elytral bases However, it does not have as strongly truncate elytral bases with prominently subquadrate humeri as seen in *Lachnopus gowdeyi* (Marshall) *sensu stricto* and it has a shorter rostrum with a notably raised median carina as frequently seen in other species of *Pachnaeus*.

Historical treatment of *Pachnaeus* Schoenherr within the agricultural literature

Most past agricultural literature has focused primarily on *Pachnaeus litus* (Germar, 1824), with occasional treatment of also *P. azurescens* Gyllenhal in Schoenherr, 1834, *P. opalus* (Olivier, 1807), and *P. citri* Marshall, 1916. Little is known about the habits of other species. However, due to the morphological similarity of many species of this genus, misidentifications are rampant in both unpublished label data and past literature alike for all these names. As such, the reader should employ a certain level of skepticism regarding previously published data on life history, plant and natural enemy associations, locality records, and treatment methodologies of all species. I have attempted to identify and correct known misidentifications in the literature within species synonymy sections treated below.

The association between *Pachnaeus* Schoenherr and *Citrus* L. is well documented, including a relatively large body of agricultural literature regarding the control and bionomics of members of the genus within citrus groves. The precise history of the spread of *Citrus* L.—an Old-World taxon—in the New World is not well known (but see Robinson 1945, Crist 1955, and Spiers et al. 2017for an overview) and, thus, the historical origins of the association between *Pachnaeus* and *Citrus* L. remains equally unclear. The earliest possible date of this interaction is 1493, when Columbus introduced citrus into the New World, but the association of the two taxa likely occurred much later. Most literature regarding the natural history of this weevil genus is based on the most encountered and most agriculturally impactful species, *P. litus* (Germar). Egg mass differentiation of *P. litus* (Germar) from similar entimines via molecular means was treated by Jones et al. (1984) and Weathersbee et al. (2003). Larval morphology was treated at the generic level by van Emden (1950, 1952) and larval feeding behavior by Futch and McCoy (1993). The role of temperature and humidity on egg and neonate larval survivorship for *P. litus* (Germar) and *P. opalus* (Olivier) was addressed by Tarrant and McCoy (1989). Pupal morphology and development were briefly addressed by Alvarez and Calante (1981) and by Montes (1980). Sexual differentiation of *P. litus* (Germar) was addressed by Estrada Ortiz and Auchet Jenkens (1979).

Woodruff (1962) provided a key—based primarily on body size, scaling pattern and color, and elytral base structure—to common citrus weevils encountered in Florida, including *Artipus floridanus* Horn, 1876, "fuller rose beetles" (= *Naupactus cervinus* (Boheman in Schoenherr, 1840) with *Naupactus godmanni* (Crotch, 1867) treated as a junior synonym), *Pachnaeus litus* (Germar), and *P. opalus* (Olivier). Woodruff (1979) updated this key, including also *Diaprepes abbreviatus* (Linnaeus, 1758) and *Tanymecus lacaena* (Herbst, 1797) and adding postocular vibrissae and tibial corbel characters. Beavers and Woodruff (1971) provide a preliminary larval head capsule key to separate *Diaprepes abbreviatus* (Linnaeus), "fuller rose beetle" (= "*Pantomorus* spp."), *Pachnaeus litus* (Germar), and *P. opalus* (Olivier)

Woodruff (1981) provided an overview of the two species known to occur in Florida at time of writing, *P. litus* (Germar) and *P. opalus* (Olivier), including a key to these two species modified from Woodruff (1979), notes on their known generalized biology, their distribution within Florida including a map of approximate range of both species within the state, notes on the polyphagous nature of these two species and their preference for *Citrus* L., discussion of their economic importance, and some discussion of historical means of chemical and biological control.

Woodruff (1985) treated the citrus weevil complex in Florida and the West Indies, including discussion on the genera *Artipus* Sahlberg, 1823, *Cleistolophus* Sharp, 1891, *Compsus* Schoenherr, 1823, *Diaprepes* Schoenherr, 1823, *Epicaerus* Schoenherr, 1823, *Exophthalmus* Schoenherr, 1823, *Lachnopus* Schoenherr, 1840, *Litostylus* Faust, 1894, *Naupactus* Dejean, 1821 specifically *Naupactus cervinus* (Boheman in Schoenherr)), and *Tanymecus* Germar, 1817 in addition to *Pachnaeus* Schoenherr, including some limited discussion of known plant associations. With regards to *Pachnaeus* Schoenherr, Woodruff (1985) says that all species whose habits are known feed on citrus, concluding that they "seem to be so commonly associated with citrus that it would appear to be their natural host." This author focuses heavily on other species of Rutaceae as potential native hosts but makes no definitive claims about associations between native plants in this family and members of *Pachnaeus* Schoenherr, saying "it is obvious that none of the pests is host specific and they appear to be adaptable to many introduced plants." McCoy (1999) treated the generalized biology of the citrus root weevil complex—with particular attention to *Diaprepes abbreviatus* (Linnaeus), *Naupactus godmanni* (Crotch), *Exophthalmus vittatus* (Linnaeus, 1758), and select economically important species of *Pachnaeus* Schoenherr —*i.e.*, *P. litus* (Germar), *P. opalus* (Olivier), and *P. citri* Marshall). McCoy (1999) addresses their economic impact ("larvae… cause estimated annual loss of $75–100 million in citrus production … in Florida, Jamaica, Puerto Rico, the Dominican Republic, Dominica, Martinique, and Cuba"), and reviews some of the control and monitoring measures employed against them in past. With respect to *Pachnaeus* Schoenherr specifically, McCoy (1999) comments only on their general morphological similarity ("indistinguishable to the average person") and noting the differences in distribution between the more southerly ("tropical") *P. litus* (Germar) and northerly ("temperate") *P. opalus* (Olivier) and well-established differences in their morphology (strong pronotal and elytral base bisinuosity in *P. litus* (Germar) and lack thereof in *P. opalus* (Olivier)). McCoy (1999) discusses the high degree of polyphagy seen all three species treated and their preference for *Citrus* L., provides limited comments on known emergence habits in *P. litus* (Germar) and *P. opalus* (Olivier) (continuous emergence from the soil with a peak emergence mid-May to mid-July in Florida) and *P. citri* Marshall (that emergence is triggered by the rainy season), enumerates a few generalized details of their life history (adult lifespan of up to 120 days, female egg production of 30 to 75 eggs per egg mass and production of up to 4000 eggs per female during a lifespan, hatching time of seven to 10 days—dependent on moisture, and larval development time of eight to 10 months), notes that neonate larval survival rate is adversely affected ("25% lower than that of other weevils in Florida") by low (60 to 70° F) soil temperatures, and says that root damage by *Pachnaeu*s Schoenherr larvae is generally less serious root damage than caused by those of *Diaprepes* Schoenherr.

Key to species of *Pachnaeus* Schoenherr, 1826

1. Elytra each with a distinct, thin stripe of white scales along sutural margin and two thicker stripes of shaggy, tan to off-white scales (Figs. 3.80A, 3.81A). Western Cuba. ....*Pachnaeus sommeri* (Munck af Rosenschoeld in Schoenherr, 1840)

1'. Elytra variously striped or not but, if striped, not as above...................................2

2.(1') Pronotal disc heavily denuded of appressed scales, giving a dark brunneous appearance, but bearing many thin subappressed setose scales (Figs. 3.23A, 3.24A, 3.25A); elytral scales reduced in size and abundance; legs and head with at most a few sparse appressed scales. Cayman Islands..3

2'. Pronotal disc not appearing glabrous or, if so, glabrous patches not bearing subappressed setose scales; elytral scales not reduced in size but occasionally with bare regions. Not from the Cayman Islands..4

3.(2) Elytra, at least on disc, almost entirely denuded of appressed scales, with much of the underlying integument visible, interrupted by only a few scattered setose scales (Fig. 3.23A, 3.24A). Cayman Brac........*Pachnaeus godivae* Reily, sp. nov.

3'. Elytral disc moderately densely covered in a mix of suberect, elongate scales and pale blue, appressed scales with only small patches of glabrous integument visible (Fig. 3.25A). Little Cayman Island....*Pachnaeus andersoni* Reily, sp. nov.

4.(2’) Elytral bases rather strongly, usually subangulately, produced forward near middle of each elytron and protruding anteriorly at least slightly at elytral humeri (Figs. 3.69A, 3.70A, 3.76A, 3.77A). Pronotal disc largely impunctate dorsally. ..5

4’. Elytral bases not anteriorly produced near middle or, if so, not notably anteriorly produced at elytral humeri. 6

5.(4) Densely clothed in unicolorous, pale mint green, overlapping, appressed scales. Median rostral carina consistently denuded in a thin, slightly raised line. Haiti...... .... *Pachnaeus morelli* Reily, sp. nov.

5’. With at least some notably paler colored patches of scales laterally on pronotum and elytral epipleura. With a distinct, pointed, anteriorly directed protuberance just mediad to elytral humeri, this less prominent in females. Widespread, native to Cuba, established in Southern to Central Florida, with many adventive records elsewhere; not known from Hispaniola. .... *Pachnaeus litus* (Germar, 1824)

6.(4’) Pronotal disc medially impressed along midline, sometimes only shallowly or only in posterior half. Median discal suture present (Fig. 3.3A, D), though sometimes reduced to a few, small, deep foveae. Elytral bases truncate, never strongly anteriorly produced near middle. Jamaica...7

6’. Pronotal disc dorsally convex, not notably impressed medially. Median discal suture typically absent or faint and shallow. Elytral bases variable. Not from Jamaica. 12

7.(6) Elytra with irregular, denuded, patches along suture in anterior half or more (Figs. 3.8A, 3.11A). Metafemora, and typically other femora, with bands of densely overlapping matte, pale scales present subapically (Figs. 3.8B–C, 3.11B–C). Scaling predominantly cupreous to tan or grey; never with blue to green colored scales. Eastern Jamaica (*i.e.*, Surrey County)..8

7’. Elytra without denuded patches along suture in anterior half; sometimes with denuded patches or stripes elsewhere on elytra. Femora typically unicolorously, iridescently, and relatively evenly scaled. Typically with some blue to green scales. 9

8.(7) Median rostral carina of female as a steep-sided longitudinal mound (Fig. 3.11C). Rostrum short and broad. Known only from one low altitude (> 400 m elevation) site Northwest of Kingston at Swain Spring, Jamaica. .... *Pachnaeus gordoni* Reily, sp. nov.

8. Epifrons of female not prominently medially raised, subplanar to slightly convex (Fig. 3.8C). Rostrum relatively long and thin. Known from high altitude (< 1000 m elevation) sites on the southern slope of the Blue Mountains, Jamaica. .... *Pachnaeus gowdeyi* (Marshall, 1926)

9.(7’) Elytra with two pairs of heavily denuded, irregularly longitudinal ridges arising from bases (Figs. 3.6A–B, 3.7A–B). Scales mostly yellow to cream. Southern coast of Jamaica.................................... *Pachnaeus quadrilineatus* Reily, sp. nov.

9’. Elytra without heavily denuded, longitudinal ridges arising from bases. 10

10.(9’) Protibial mucro long, greater than or equal to diameter of ventroapical protibial face surrounding tarsal insertion (Figs. 3.84A–B). Protibia apically strongly arcuate (Fig. 3.83A). Leg scales iridescent; usually pink to purple, but occasionally dark blue. Elytra often with a marmorated pattern of matte white and glittery green scales (Fig. 3.2A); occasionally entirely green scaled (Figs. 3.3A, 3.5); rarely with green scaled areas mostly denuded (Fig. 3.4)........................ .... *Pachnaeus marmoratus* Marshall, 1916

10’. Protibial mucro short, less than diameter of ventroapical protibial face surrounding tarsal insertion (Figs. 3.84C–H). Protibia apically at most slightly bent (Figs. 3.83B, D). Leg scales typically dull in luster, variably colored but typically pale. 11

11.(10’) Male with tubular anterior sclerite of endophallus apically bent (Figs. 3.13A–B). Postocular lobes rounded and large, about as tall as eye (Figs. 3.12A–B). .... *Pachnaeus citri* Marshall, 1916

11’. Male with tubular anterior sclerite of endophallus apically straight (Figs. 3.13C–D). Postocular lobes angulate and small, less than ½ as tall as eye (Figs. 3.12C–D).. *Pachnaeus eisenbergi* Reily, sp. nov.

12.(6’) Scaling dull, brown to grey, never blue or green. Postocular lobe obsolete. Postocular vibrissae short and few. Pronotal disc typically very coarsely punctured. Northern to central Bahamas. 13

12’. Scale color and Postocular lobe structure variable; scaling typically blue to green and pronotal lobe typically notably anteriorly projected. If from the Bahamas, then predominantly iridescent and greenish, bluish, cupreous, or purperescent scaled (Figs. 3.40–3.45). If from the Bahamas, Postocular lobe and Postocular vibrissae prominent (Figs. 3.40B–C, 3.41B–C). If from the Bahamas, pronotum at most with a few sparse punctures. 14

13.(12) Small (6–12 mm long). Scales light colored, predominantly tan to light grey. Epifrons denuded in a thin line at middle and densely scaled laterally (Figs. 3.46D, 3.47D). ....*Pachnaeus howdenae* Reily, sp. nov.

13’. Large (12–16 mm long). Scales dark colored, predominantly chocolate brown to charcoal grey. Epifrons very heavily denuded with only sparse, scattered scales in lateral portions (Figs. 3.49D, 3.50D). ....*Pachnaeus ivieorum* Reily, sp. nov.

14.(12’) Rostrum short and strongly quadrate. Epifrons strongly planar; bearing prominent, suberect, elongate scales overlying dense, appressed scales in interocular region; epifrons scales often heavily caked in yellow waxy exudate (Figs. 3.40C–D, 3.41C–D). Median rostral carina at most extremely slightly raised in a thin line, often partly or wholly obscured by appressed scales. Predominant scale color typically brilliantly teal, but highly variable, occasionally purperescent to dark blue (Figs. 3.42, 3.43C–D) or bluish white with alternating densely and sparsely scaled elytral bands (Fig. 3.45A). Pronotum mostly impunctate and smooth, with sparser scaled areas of disc somewhat glabrous. North-Central Cuba and Bahamas.*Pachnaeus obrienorum* Reily, sp. nov.

14'. Not conforming well to preceding description. Epifrons variably scaled but, if bearing suberect, elongate pale scales in interocular area, then median rostral carina prominently raised. Continental United States or Greater Antilles. 15

15.(14') Metasternum with distinct lateral subtrigonal patch of scales matching elytral and pronotal scale color (Fig. 3.61); head, legs, scutellum, and much of ventral aspect with paler colored scales than pronotum and elytra. ....*Pachnaeus psittacus* (Olivier, 1807)

15'. Metasternum with scales concolorous throughout, lacking distinctly colored subtrigonal patch of scales; scale color variable but typically similar throughout body. 16

16.(15') A broad, generally rectangular, raised mound occupying most of dorsal surface of epifrons (Fig. 3.65). Intercarinal spaces slightly but notably impressed and about as wide as lateral rostral carinae. Each elytral base slightly arcuately projecting forward at mid-elytron. Elytral scales either evenly purperescent or distinctly dark and light striped on alternating elytral intervals. Southeastern Coast of Santiago de Cuba and Guantánamo Provinces, Cuba. 17

16’. Median rostral carina not as a rectangular mound occupying most of dorsal surface of epifrons. If as a wide, convex mound, then elytral bases truncate and intercarinal spaces not notably impressed. Scale color variable, but typically blue green to grey; never striped. 18

17.(16) Odd elytral intervals costately raised and more sparsely scaled than even intervals, giving the elytra a striped appearance (Figs. 3.63A, 3.64A). Extreme Southeastern Cuba, from Santiago de Cuba to Guantanamo. .... *Pachnaeus costatus* Perroud, 1853

17’. Even and odd elytral intervals uniformly purperescent to periwinkle scaled (Figs. 67A, 68A). Known only from the Western Sierra Maestra..................................... .... *Pachnaeus maestrensis* Reily, sp. nov.

18.(16) Median rostral carina as a prominently raised ridge denuded in a thin, linear swath along its dorsal apex (Figs. 3.52C, 3.53C, 3.56C, 3.57C); epifrons never evenly convex or subplanar. Known only from Eastern Cuba southeast of Camagüey Province...19

18’. Median rostral carina at most very weakly raised along midline; epifrons typically evenly convex to subplanar or with variably but at most very faintly expressed lateral and median carinae. Continental United States and Western to Central Cuba, not known from Eastern Cuba..20

19.(18) Males with tubular endophallic sclerite ventrally with an angulate notch in posterior margin and sclerite slightly shorter than width of adjacent portion of aedeagus (Figs. 3.51A–B). In both sexes with median rostral carina as a strongly and narrowly raised linear ridge denuded along entire midline to or slightly behind interocular pit (Figs. 3.56C–D, 3.57C–D). Mid- to high-altitude areas around the Sierra Cristal and Sierra Nipe, with a single questionable literature record near Santiago de Cuba. .... *Pachnaeus pater* de Zayas, 1988

19'. Males with tubular endophallic sclerite ventrally lacking an angulate notch in the posterior margin and sclerite slightly longer than width of adjacent portion of aedeagus (Figs. 3.51C–D). Females with median rostral carina as a moderately raised ridge denuded along midline anteriorly and narrowing posteriorly, the denuded area not reaching the interocular pit (Figs. 3.53C–D). Low to mid altitude areas around Baracoa, Cuba.*Pachnaeus rosadoneto*i Lopez Castilla, 1992

20.(18') Epifrons in female dorsally tumescent, gradually rising toward midline as an evenly convex mound (Figs. 3.26A–B); males similar but, in some, only very slightly convex and verging on planar. In both sexes never with distinctly raised carinae and epifrons never rugose or roughly sculptured. Midline of rostrum denuded in stripe about as wide as distal, expanded portion of scape and bearing many, extremely fine, confused punctures; never as a raised carina. Laterally faced portion of epifrons anterior to eye and dorsad to scrobe subplanar to very slightly impressed and clothed primarily in appressed to subappressed scales. Central to Western Cuba and established in central Florida with recent sporadic

observational records in northern Florida...
.... *Pachnaeus azurescens* Gyllenhal in Schoenherr, 1834

20’. Epifrons never dorsally tumescent, never gradually rising toward midline as an evenly convex mound. Lateral rostral carinae variable but typically slightly raised. Midline of rostrum, if not heavily overlapped by scales, typically denuded in an impunctately smooth line that is notably narrower than distal, expanded portion of scape; often as a faintly raised carina (Figs. 3.26C–D). Laterally faced portion of epifrons anterior to eye and dorsad to scrobe typically rather deeply impressed and clothed primarily in suberect to erect scales. Eastern continental United States.. *Pachnaeus opalus* (Olivier, 1807)

Infrageneric treatment of *Pachnaeus* Schoenherr, 1826

citri species group

Diagnosis. This species group comprises a putative clade native to Jamaica and the Cayman Islands which share a medially impressed pronotal disk, at least near the posterior margin. The exact relationship of the subgroups placed within this group remains somewhat uncertain, but it does seem clear based on the shared pale blue scaling with occasional specimens that have a pair of paired pronotal impressions near mid-disc present in both the *eisenbergi* subgroup and *marmoratus* subgroup that these subgroups may be more closely related to each other than they are to other subgroups.

***marmoratus* species subgroup**

Diagnosis. This species subgroup comprises a putative clade native to Jamaica which share moderately to strongly raised oblique-longitudinal ridges surrounding the typically notable, angular to teardrop shaped median pronotal impression. The foretibiae are strongly curved (Figs. 3.83A, C), the eyes are slightly protrusive from the head in dorsal view, and the area before the eye between the dorsal aspect of the epifrons and the scrobe is comprised of an obliquely declined, usually slightly convexly curved, face as opposed to a laterally facing planar to concave surface. The rostra tend to be fairly shallow in height in comparison to some other members of the genus, and rostral carinae are at most very slightly raised.

***Pachnaeus marmoratus* Marshall, 1916: 454**

Figs. 3.1–3.5, 3.83A, 3.84A–B, 3.85A, 3.86

Pachnaeus marmoratus Marshall, 1916: 454 (original combination)

Leng and Mutchler 1917: 216; Guenther and Zumpt, 1933: 105; Blackwelder 1947: 799; van Whervin 1968; O'Brien & Wibmer 1982: 46; Woodruff 1985: 374; Lopez Castilla 1992: 1; Morrone 1999: 145

Pachneus marmoratus Marshall, 1916 sec. Imperial Bureau of Entomology 1917: 124 Incorrect subsequent spelling of *Pachnaeus* Schoenherr, 1826 in review of Marshall 1916.

Pachnaeus marmaratus Marshall, 1916 sec. Gowdey 1926: 25

Incorrect subsequent spelling of *P. marmoratus* Marshall, 1916.

Diagnosis. This species can be separated from other members of the genus by the iridescent, typically pink scales which cover the legs and by its unusually long protibial mucro which is about as long as the width of the ventral face of the protibial apex near the insertion of the tarsi (Fig. 3.83A, 3.84A–B). The matte-white and iridescent-green marmorated elytral pattern typical of this species (Fig. 3.1) is diagnostic when present, but the amount of white scaling is highly variable, ranging from mostly white specimens with only a few scattered blotches of green (Fig. 3.2), to specimens that have elytra and pronotum entirely green excepting a small, teardrop- to diamond-shaped patch of white scales within the mid-pronotal impression (Fig. 3.5). In some specimens from Hardwar Gap in the Blue mountains, the typically green-scaled areas are heavily denuded (Fig. 3.4) and occasionally in this population the normally pink scaling of legs and, to a much lesser extent, the head is instead dark blue scaled.

The endophallus of males has a heavily sclerotized area near the proximal (= anterior) end of the membranous, sac like region that is visible ventrally (Fig. 3.85A) and which distinguishes this species from most others except *P. psittacus* (Olivier, 1807)—but see also the discussion regarding this character and the shared presence of glittery green and matte white scales in the diagnosis section of *P. psittacus* (Olivier, 1807) below.

Pachnaeus psittacus (Olivier, 1807) occurs throughout much of the Greater Antilles, ranging from central Cuba through Puerto Rico with a questionable record from Mexico but, unlike the present species, it is not known to occur in Jamaica.

Redescription. Habitus typical of the genus, though often notably distinct due to its typical, marmorated pattern of scaling on the body**.** Body length 9.5 to 14.0 mm. Body width at elytral bases 3.5 to 6.0 mm. Integument rufotestaceous to piceous. Densely clothed in a mix of appressed, pale, oval to circular scales with intermixed sparser, subappressed, elongate and typically flattened, white to translucent scales. Often distinctly patterned, with elytra covered in brilliant, green scales typically interspersed with large, irregularly shaped patches of matte white scales, but see the variation section below; pronotum similarly colored to elytra, but with patches more regularly shaped, consisting of a somewhat teardrop-shaped white patch at the center of the pronotal disc and, typically, a pair of dorsolateral white stripes which extend from near the anterior pronotal margin to the posterior pronotal margin; legs usually iridescently lavender to pink scaled; head usually dorsally iridescently cupreous scaled, body ventrally usually iridescently green scaled.

Head typical of the genus. **Occiput** without a median, longitudinal sulcus at base. **Interocular pit** small, slightly impressed, somewhat rounded, in some specimens teardrop shaped or with a variably expressed, thin, short, linear sulcus posteriorly. **Eyes** roughly circular, slightly protruding laterally from head. **Rostrum** weakly tricarinate; comprising a little over half the entire length of the head. **Median rostral carina** gradually rising to a very slightly raised but distinct, rounded-topped, longitudinal mound which is anteriorly narrower and steeper, and which is denuded in a moderately wide, glabrous and impunctate swath along the center line from the posteromedial margin of the frons to just posterior to the interocular pit. **Intercarinal rostral spaces** very slightly impressed between median and lateral carinae; moderately densely clothed in iridescent, usually pinkish, appressed, round to oval scales, with few, appressed, short, white, setose scales intermixed. **Lateral rostral carinae** weakly raised, typically faintly defined medially but not laterally, and not distinctly demarcated from the lateral portion of the epifrons anterior to the eye. **Lateral portion of epifrons anterior to the eye** obliquely dorsally faced, planar to convex but not notably impressed. **Scrobe** somewhat comma shaped, strongly widened posteriorly. **Occipital sutures** usually ventrolaterally open, longitudinal, pit-like foveae, mostly obscured by appressed scales near the anteroventral margin of the eye. **Frons** not strongly declined from epifrons, somewhat densely covered in appressed, circular to oval, opalescent, white to pale pink scales, except on the nasal plate. **Nasal plate** distinctly raised and bearing long setae set in punctures along the posterior margin. **Mandibles** apically bearing numerous, long setae surrounding the mandibular scar, dorsolaterally and laterally with a few elongate, pale opalescent scales intermixed. **Submentum** 2 to 3 times as long as wide, usually weakly impressed, clothed with appressed to suberect, oval, opalescent scales, with a few suberect, short, setose scales intermixed anteriorly.

Antennae typical of the genus. **Scape** extending slightly behind posterior margin of eye. **Funicle** with last two segments subconical.

Thorax typical of the genus. **Pronotum** somewhat trapezoidal. Pronotal collar laterally constricted and delimited by a faint sulcus behind the anterolateral margin of the pronotum. Pronotal disc with a pair of posteriorly diverging, slightly raised ridges covered with brilliant green scales, the area between the pronotal ridges depressed and densely covered in overlapping, circular, matte white scales. Pronotum occasionally with a single pair of paired punctures on the disc near mid-disc, often also with another pair of punctures or impressions just anterior to the posterior margin of pronotum adjacent to fourth elytral stria. These paired punctures often obliterated or obscured by scales. **Pronotal bases** very weakly bisinuate to accommodate slightly overhanging elytral bases. **Postocular lobe** obsolete or very nearly so, not anteriorly projected, not laterally expanded. **Postocular vibrissae** clearly visible, moderately long, slightly longer ventrally than dorsally. **Prosternum** moderately to densely clothed in confused, circular to oval, white or iridescent green scales. **Mesoventrite** sparsely clothed in green to white appressed scales near the anterior margin—sparser laterally than medially, posteriorly covered in appressed, oval, green to white, overlapping scales. Mesoventrite intercoxal process with a few short, appressed to subappressed, setose scales intermixed. **Metaventrite** with appressed, green to white circular scales with a few, short, setose scales intermixed. Distance between mesocoxa and metacoxa greater than or equal to 2 times the diameter of the mesocoxa as typical of the genus. **Mesepisternum** densely covered in appressed, overlapping, green to white, circular scales. **Mesepimeron** similarly scaled to mesepisternum. **Metepisternum** similarly scaled to mesepisternum with a few subappressed, short, white setose scales intermixed. **Scutellar shield** subquadrate to shield-shaped, densely covered in oblong, opalescent, green scales. **Abdomen** with ventrites 1 to 4 densely covered with overlapping, opalescent green to matte white, round to oval scales with sparsely intermixed suberect, elongate, scales. Ventrite 5 similarly scaled, but apically clothed in suberect, pale, setose scales with a few longer suberect setae intermixed.

Elytra typical of the genus; usually densely and completely scaled. Elytral striae composed of small punctures. Elytral bases only very slightly bisinuate—slightly linearly projecting anteriorly from scutellum to near mid-elytron, nearly truncate laterad to this. Anteriorly directed toothlike projection mediad to elytral humeri absent. Elytral humeri obtusely angulate.

Legs typical of the genus. **Coxae** usually entirely clothed in greenish appressed scales but see the variation section below. **Trochanters** clothed pinkish appressed, oval to elongate scales. **Femora** densely covered in circular, lavender to pink scales with short subappressed, white, setose scales intermixed. **Tibiae** scaled similarly to femora; with at most a few, very small denticles along the ventral side. Protibiae strongly apically curved. Protibial mucro about as long as the width of the tibia just proximad to it, and extending notably beyond surrounding setae. **Tarsi** dorsally clothed in opalescent pink, linear scales. Tarsomere 5 nearly 2 times the length of tarsomere 3.

Male terminalia typical of the genus. **Penis** with temones about 0.75 times the length of the pedon. **Tegmen** about 0.49 times the length of the penis, with manubrium comprising about 0.62 times the total length. **Endophallus** with distal, tubular sclerite in dorsal view subcylindrical, not notably wider proximally than distally, slightly tapered apically; longer than (1.27 times) the width of the pedon adjacent to endophallus; more-or-less straight in lateral view, not bent ventrally, tapered near apex and apex slightly upturned dorsally, slightly dorsally and ventrally expanded in ante-apical quarter, and slightly ventrally expanded near base; about 4.2 times as long as wide and about 0.21 times the length of the pedon; in ventral view with posterior ventral margin slightly convexly arcuate. Sac-like proximal portion of endophallus with a sclerotized patch at proximal end. **Spiculum gastrale** with lateral margins of basal plate slightly but evenly arcuate, verging on linear; basal plate about 0.69 times as wide as long, and about 0.33 times as long as the length of the apodeme.

Female terminalia typical of the genus. **Spiculum ventrale** with basal plate about 0.39 times the total length; basal plate at insertion of apodeme lacking a heavily sclerotized angular patch. **Coxites** about 0.42 times the total length of spiculum ventrale. Proximal gonocoxite about 0.67 times as tall as long; distal gonocoxite about 0.90 times as tall as long; distal gonocoxite about 0.60 times the length of the proximal gonocoxite.

Variation. This species is quite variable in elytral and pronotal pattern, with specimens ranging from almost entirely white with only a few scattered, wavy, green lines on the elytra and along the tops of the raised pronotal ridges (Fig. 3.2), to entirely green except for a small, white, typically teardrop shaped to trigonal patch posteromedially on the pronotal disk (Fig. 3.5). Slight variation in integument color observed is likely due primarily to some combination of specimen preservation history and teneralness.

The metaventrite coloration varies from green-scaled to white scaled to medially green with variably sized and shaped patches of white scales between meso- and metacoxae and the mesepimeron sometimes has a white-scaled patch along the posterior margin. The abdominal ventrites vary in scaling from mostly green to mostly white. In general, specimens that are more white-scaled dorsally tend to also be more-white scaled ventrally.

In some specimens, some or all the coxae have a variably large patch of pinkish, appressed scales apically near the insertion of the trochanter, and in a few specimens the procoxae have a patch of densely overlapping white scales on the medial face. Teeth along the ventral side of the tibiae are consistently few in number but vary in number and size, ranging from very small to obsolete.

The population at Hardwar Gap, in the Blue Mountains, exhibits a surprising amount of variation in form (Fig. 3.4). One specimen (ARTSYS0001572) lacks most of its green scales, instead having a sparsely scaled reticulated elytral pattern of black, slightly raised, heavily denuded, glabrous patches bearing only scattered iridescent, appressed, greenish scales intermixed among white scaled patches. It has similarly denuded, longitudinal stripes dorsally along the apices of the raised pronotal ridges (Fig. 3.4A–B). This specimen also has notably large impressions at the dorsolateral angles of the pronotal bases. Another specimen (ARTSYS000137) also has more sparsely scaled patches on elytra and pronotum, but differs in that the scales on the head, legs, and abdomen are dark blue as opposed to pink (Fig. 3.4C–D), it has a strongly elongated submentum which is deeply impressed to the point of being pit-like and very narrowly linear. This latter specimen was treated on determination label data to be a distinct species by C.W. O'Brien and in early versions of this manuscript, but increasingly this seems to just represent variation within the species. Other specimens from this locality are within the more typical range of variation seen in this species.

Material examined.

Lectotype by present designation (Fig. 3.1): <u>Jamaica:</u> Portland Parish: <u>Bath:</u> female, "Bath, Jamaica [green line] 96-144. | Type [red-bordered circular label] | Pachnaeus marmoratus TYPE. Mshl", NHMUK, NHMUK012848579.

This species was likely described from multiple specimens ("One of the specimens was…" Marshall 1916: 455) but only the present specimen is known. According to the original description, it was collected by one Mrs. E.M. Swainson.

27 other specimens: <u>Jamaica:</u> 1 male, "Sp. 78 JAM 15 | Pachnaeus marmoratus Marshall", ASUHIC, ASUHIC0088761; **Clarendon Parish:** <u>Trout Hall:</u> 1 male, "off Citrus | Jamaica, Trouthall, Clarendon - IX - 1917. A. H. Ritchie | Pres. by Imp. Bur. Ent. 1921-7. | Pachnaeus marmoratus, Mshl. var. DET. G.A.K.M.", NHMUK, ARTSYS0007351; **Manchester Parish:** <u>Mandeville:</u> 1 female, "Jamaica: Mandeville. A.E. Wight", MCZ, [MCZ-ENT 00]529512; **Portland Parish:** <u>Port Antonio:</u> 1 female, "Pt. Antonio 2/21 Jam. A.E. Wight | F.C. Bowditch Coll.", MCZ, [MCZ-ENT 00]529537; **Saint Andrew Parish:** <u>Hardwar Gap:</u> 1 female, "JAMAICA, 4000' Hardwar gap VII.23.1966 Howden & Becker | Exophthalmus marmoratus Det. Marshall C.W. O'Brien 1972", CWOB, ARTSYS0001342; 1 male, "JAMAICA, 4000' Hardwar gap VIII.25.1966 A.T. Howden | Pachnaeus marmoratus Mshll DET. at BM A.T. Howden 1973", CMNC, ARTSYS0001364; 1 female, "JAMAICA, 4000' Hardwar gap VII.30.1966 A.T. Howden | Pachnaeus marmoratus Mshl. DET. at BM A.T. Howden 1973", CMNC, ARTSYS0001365; 1 male, "JAMAICA, 4000' Hardwar gap VII.5.1966 A.T. Howden | H. & A. Howden collection | Pachnaeus sp. DET. not in BM. A.T. Howden 1973 | Pachnaeus marmoratus DET. Form A A. Howden", CMNC, ARTSYS0001572; 1 female, "JAMAICA, PortlandP. Hardwar Gap Dec. 5, 1975 C.W.&L. O'Brien &Marshall | Pachnaeus sp. nov. det. C. W. O'Brien 1999", CWOB, ARTSYS0001373; **Saint Ann Parish:** <u>Claremont:</u> 1 male, "Claremont Jamaica Coll. by Lilly Perkins May | Carnegie Museum Specimen Number CMNH-375,233", CMNH, ARTSYS0007357; <u>Moneague:</u> 1 male, "JAMAICA, St. Ann, Moneaque VIII.20.1966 A.T. Howden | Pachnaeus form? of DET. marmoratus A. Howden", CMNC, ARTSYS0001568; **Saint James Parish:** <u>Niagara:</u> 1 female, "JAMAICA, St. James Niagara VIII.16.1966 A.T. Howden | Pachnaeus marmoratus Mshl. DET. at BM A.T. Howden 1973", CMNC, ARTSYS0001367; **Saint Thomas Parish:** <u>Bath:</u> 1 female, "JAMAICA: Bath; VII:10:1967 leg. W. Klopp | Pachnaeus marmoratus DET. Mshll A T Howden '78", FMNH, ARTSYS0007352; 1 male, "Jamaica F. Klages. | Bath | Holland Collection | Carnegie Museum Specimen Number CMNH-375,051 | Pachnëus", CMNH, ARTSYS0007353; 1 male, "Jamaica F. Klages. | Bath. | Holland Collection | Carnegie Museum Specimen Number CMNH-375,231", CMNH, ARTSYS0007354; 1 male, "Jamaica F. Klages. | Bath. | Holland Collection | Carnegie Museum Specimen Number CMNH-375,663", CMNH, ARTSYS0007355; 1 male, "Jamaica F. Klages. | Bath. | Holland Collection | Carnegie Museum Specimen Number CMNH-375,086", CMNH, ARTSYS0007356; <u>Mahogany Vale:</u> 1 male, "JAMAICA, St. And. Mahogany Vale VIII.20.1966 | A.T. Howden collector | H. & A. Howden collection | Pachnaeus marmoratus Mshl. DET. at BM A.T. Howden 1973", CMNC, ARTSYS0001569; 1 female, "JAMAICA, St. And. Mahogany Vale VIII.20.1966 | A.T. Howden collector | H. & A. Howden collection", CMNC, ARTSYS0001570; <u>Whitfield Hall:</u> 1 male, "JAMAICA, St. Thomas Whitfield Hall VII.28.1966 A.T. Howden | Pachnaeus marmoratus Mshl. DET. at BM A.T. Howden 1973", CMNC, ARTSYS0001366; 2 male, 1 female, "JAMAICA, St. Thomas Whitfield Hall VII.28.1966 A.T. Howden | H. & A. Howden collection", CMNC, ARTSYS0001573, ARTSYS0001574, ARTSYS0001575; **Trelawny Parish:** <u>Good Hope:</u> 1 female, "JAMAICA, Try. Good Hope VIII.11.1966

A.T. Howden | H. & A. Howden collection", CMNC, ARTSYS0001571; <u>Greenwood:</u> 1 female, 1 male, "Jamaica Greenwood 3-12-90 H.W. Browning on Citrus", CWOB, ARTSYS0001343, ARTSYS0001344; 1 female, "Jamaica Greenwood 3-12-90 H.W. Browning on Citrus | Pachnaeus marmoratus DET. Marshall C.W. O'Brien 1974", CMNC, ARTSYS0001567.

Etymology. The specific epithet *marmoratus* is a Latin adjective meaning "marbled". While no etymology was explicitly given in the original description, this species was presumably named for the pattern of "creamy-white scaling variegated with glittering pale green markings" (Marshall 1916) expressed in most specimens.

Geographical distribution and chorological affinities. This species is known from throughout northern, central, and eastern Jamaica. It has been recorded from Clarendon, Manchester, Portland, Saint Andrew, Saint Ann, Saint James, Saint Thomas, and Trelawny parishes. This species likely also occurs in Saint Catherine and Saint Mary Parishes.

Biology. In the original description, Marshall (1916: 455) reports this species collected from yam (*Dioscorea* L.; Dioscoreaceae) and this association has been occasionally reported as pestiferous (*e.g.*, Montaldo 1991: 109). This species has been collected on *Citrus* L. but does not seem to have the eruptive potential of some other species in the genus. Most records of the species with known collecting dates are from July to September, with a few records from late-February to mid-March.

***Pachnaeus quadrilineatus* Reily, sp. nov.**

Figs. 3.6–3.7, 3.83C, 3.84E–F, 3.85B, 3.86

Diagnosis. This species can easily be separated from all others by the pattern of dense, cream to pale yellow scales, by the presence of four, strongly raised and mostly denuded, somewhat irregular elytral striae arising from the humeri and bases of the third to fourth elytral intervals, and the similarly denuded but more regularly linear stripes along the apices of the raised pronotal ridges. The protibial mucro is shorter than half the width of the protibial apex near the insertion of the tarsi (Figs. 3.83C, 3.84E–F) Males of this species do not have a heavily sclerotized patch at the proximal (= anterior) end of the endophallus as in the preceding species (Fig. 3.85B).

Description. Habitus generally typical of the genus, but with yellowish scaling and raised, denuded elytral carinae**.** Body length 11.0 to 14.5 mm. Body width at elytral bases 4.0 to 6.0 mm. Integument piceous. Body densely clothed in most areas with a mix of appressed, circular to matte yellowish off-white to iridescent pale blue oval scales with many intermixed suberect, elongate and typically flattened, translucent scales except on raised pronotal and elytral striae, which bear only small, sparse, appressed ovoid, opalescent scales. Distinctly patterned, each elytron with two raised, irregular but generally longitudinal, generally denuded carinae in at least the anterior 3/4 of the elytron—though in some specimens these raised carinae are very sparsely clothed with small, appressed, ovoid scales. One of these denuded elytral carinae arises from near the 3rd to 4th elytral intervals, the second arises at the humerus and, in females, is irregularly bifurcating posterior to the anterior quarter of the elytron. The remainder of the elytron is generally covered in matte to slightly pearlescent, yellow to cream scales; in some specimens, scales very near the raised elytral striae and along the elytral margins are instead of an opalescent pale-blue coloration. Pronotal scales are similarly colored to those on the elytra, and the pronotum is somewhat similarly striped, with small, longitudinal patches which are wholly to mostly denuded laterally and dorsally along the raised pronotal ridges extending from the anterior pronotal margin to near the posterior pronotal margin. The legs are white to cream scaled. The head is dorsally yellow to cream scaled and ventrally pearlescent white to cream scaled.

Head typical of the genus. **Occiput** without a median, longitudinal sulcus at base. **Interocular pit** small, round, in some specimens teardrop shaped or with a variably expressed, thin, short, linear sulcus posteriorly. **Eyes** roughly circular, slightly protruding laterally from head. **Rostrum** usually weakly tricarinate dorsally; comprising a little over half the entire length of the head. **Median rostral carina** expressed as a slightly raised, flat- to rounded-topped, longitudinal mound denuded in a moderately wide, glabrous and very finely and confusedly punctured swath along the center line from the posteromedial margin of the frons to beyond the posterior margin of the eyes. **Intercarinal rostral spaces** at most very slightly impressed between median and lateral carinae; densely clothed in yellow to cream and often somewhat pearlescent, appressed, oval scales, with many, suberect, elongate, flattened translucent scales intermixed. **Lateral rostral carinae** at most weakly raised, typically somewhat clearly defined medially but not laterally, and not distinctly demarcated from the lateral portion of the epifrons anterior to the eye. **Lateral portion of epifrons anterior to the eye** obliquely dorsally faced.

Scrobe arcuate, slightly widened posteriorly. **Occipital sutures** laterally open, longitudinal, pit-like foveae, mostly obscured by appressed scales near the anteroventral margin of the eye. **Frons** angularly declined from epifrons, with a few, cream to white, appressed, oval, opalescent scales and a pair of small, densely scaled patches subapically behind the nasal plate. **Nasal plate** mostly denuded**,** distinctly raised and bearing long setae set in punctures along the posterior margin. **Mandibles** apically bearing numerous, long setae surrounding the mandibular scar, dorsolaterally and with a few elongate, pale opalescent scales intermixed. **Submentum** slightly narrower apically than subapically, 2 to 3 times as long as wide, weakly impressed, clothed with appressed, oval, slightly opalescent cream to yellowish scales, with a few suberect, short, setose scales intermixed anteriorly.

Antennae typical of the genus. **Scape** extending to or slightly behind posterior margin of eye. **Funicle** with last two segments subconical.

Thorax typical of the genus. **Pronotum** somewhat trapezoidal. Pronotal collar laterally constricted and delimited by a faint sulcus behind the anterolateral margin of the pronotum. Pronotal disc with a pair of posteriorly diverging, slightly raised ridges which are mostly denuded near their apices but sometimes sparsely dotted with small, sparse, appressed, non-overlapping opalescent, ovoid scales. The area between the pronotal ridges is notably impressed and densely covered in overlapping, circular, pale yellow to cream colored scales with many, erect to suberect elongate, flattened scales intermixed. Pronotum typically lacking paired punctures. **Pronotal bases** only very weakly bisinuate to accommodate slightly overhanging elytral bases. **Postocular lobe** very small, nearly obsolete in some specimens, and typically comprising a small, obtusely angulate, anteriorly directed projection, not strongly laterally expanded. **Postocular vibrissae** clearly visible, moderately long, slightly longer medially than ventrally or dorsally. **Prosternum** moderately to densely clothed in confused, circular to oval, white to yellow scales. **Mesoventrite** sparsely clothed in white to cream appressed scales immediately behind the anterior margin, posterior to this densely covered in appressed, oval, white to cream, overlapping scales with a few subappressed, white, setose scales intermixed. Mesoventrite intercoxal process with many moderately long, suberect, setose scales intermixed. **Metaventrite** with appressed, white to cream, oval scales with many, short, setose scales intermixed. Distance between mesocoxa and metacoxa greater than or equal to 2 times the diameter of the mesocoxa as typical of the genus. **Mesepisternum** densely covered in appressed, overlapping, white or cream or opalescent pale-blue, oval scales, with a few subappressed, short, white setose scales intermixed. **Mesepimeron** similarly scaled to mesepisternum. **Metepisternum** similarly scaled to mesepisternum. **Scutellar shield** subquadrate, densely covered in oblong, opalescent scales.

Abdomen with ventrites 1 to 4 densely covered with overlapping, white to cream, round to oval scales with many intermixed, suberect, elongate, scales. Ventrite 5 similarly scaled, but apically bearing suberect, pale, setose scales with a few longer erect setae intermixed.

Elytra densely and completely scaled except for irregular, raised areas which have at most a few, small, sparse opalescent scales. Elytral striae mostly hidden by scales except in raised areas where they are enlarged and clearly visible as denuded punctures. Elytral bases only very slightly bisinuate—slightly curvilinearly projecting anteriorly from scutellum to near mid-elytron, nearly truncate laterad to this. Anteriorly directed toothlike projection mediad to elytral humeri absent. Elytral humeri obtusely angulate.

Legs typical of the genus. **Coxae** entirely clothed in cream to iridescent, pale blue, appressed scales. **Trochanters** clothed in cream to pale blue appressed, oval to elongate scales. **Femora** densely covered in oval, cream to pale blue scales with a few, short, suberect, white, setose scales intermixed. **Tibiae** scaled similarly to femora, but scales smaller and more linear in general; with at most a few, very small denticles along the ventral side. Protibiae moderately apically curved. Protibial mucro shorter than half the width of the tibia just proximad to it, and the apex mostly hidden by setae. **Tarsi** dorsally clothed in white to cream, linear scales. Tarsomere 5 about 2 times the length of tarsomere 3.

Male terminalia typical of the genus. **Penis** with temones about 0.80 times the length of the pedon. **Tegmen** about 0.50 times the length of the penis, with manubrium comprising about 0.68 times the total length. **Endophallus** with distal, tubular sclerite in dorsal view subcylindrical, not notably wider proximally than distally, slightly tapered apically; much longer than (1.60 times) the width of the pedon adjacent to endophallus; slightly ventrally curved in distal 3/5 in lateral view, but recurving to straight at the very apex, the apex slightly tapered—more notably so dorsally than ventrally; about 6.6 times as long as wide and about 0.21 times the length of the pedon; in ventral view with posterior ventral margin slightly convexly arcuate. Sac-like proximal portion of endophallus entirely membranous. **Spiculum gastrale** with lateral margins of basal plate very slightly sigmoidal, verging on linear and subparallel; basal plate about 0.64 times as wide as long, and about 0.38 times as long as the length of the apodeme.

Female terminalia typical of the genus. **Spiculum ventrale** with basal plate about 0.46 times the total length; basal plate at insertion of apodeme lacking a heavily sclerotized angular patch. **Coxites** about 0.63 times the total length of spiculum ventrale. Proximal gonocoxite about 0.44 times as tall as long; distal gonocoxite about 0.76 times as tall as long; distal gonocoxite about 0.57 times the length of the proximal gonocoxite.

Variation. This species is somewhat sexually dimorphic in the structure of the more lateral of the irregular, raised elytral striae, with these being linear in males (Fig. 3.6) and posteriorly branching in females (Fig. 3.7). Pronotal and elytral vestiture within raised and more denuded areas varies some within this species, ranging from almost entirely nude to very sparsely clothed with small, opalescent scales. Structure of the median potion of the epifrons varies from flat-topped to slightly convex. There is some variability in scale iridescence with specimens ranging from entirely matte scaled (Fig. 3.7) to bearing patches of opalescent to matte yellowish to cream scales in the areas surrounding the raised elytral striae and near the elytral suture and margins faintly pale blue hue and more iridescent (Fig. 3.6)—this is probably due to preservation history, with the more iridescent scale coloration seen in most specimens likely typical of the species in life. The single specimen from Black River examined is lighter in integument color and is presumed to be teneral.

Material examined.

Holotype by present designation: Jamaica: Clarendon Parish: Portland Ridge: male, "JAM.: Clar. Port. Ridge 11.viii.74 S. & J. Peck | H. & A. Howden Collection | Pachnaeus sp. # 3 DET. A. Howden", CMNC, ARTSYS0001559.

8 paratypes by present designation: Jamaica: Clarendon Parish: Portland Ridge: 1 male, "JAM.: Clar. Port. Ridge 11.viii.74 S. & J. Peck | H. & A. Howden Collection", CWOB, ARTSYS0001321; 1 male, same data as previous specimen, CMNC, ARTSYS0001560; 1 female, "JAM.: Clar. Port. Ridge 11.viii.74 S. & J. Peck | H. & A. Howden Collection | Pachnaeus det. J. Girón 2018", CMNC, ARTSYS0001561; 1 male, "JAMAICA: Clarendon Par. Portland Ridge. ca 250' 18June1970. #1. TJWalker JJ Whitesell,PC Drummond | not Exophthalmus, has ocular brissae-Pachnaeus? Vaurie 1971", FSCA, ARTSYS0001057; 1 male, "JAMAICA: Clarendon Par. Portland Ridge. ca 250' 18June1970. #1. TJWalker JJ Whitesell,PC Drummond", FSCA, ARTSYS0001056; **Saint Catherine Parish:** Hellshire: 1 male, "JAM: St. Clath. Hellshire Hills 26.VII-16.viii. 1974 J. Peck", CMNC, ARTSYS0007358; 1 female, "JAMAICA. Hellshire Hills | - viii 1963 H.A. Hespenheide", CMNC, ARTSYS0001558; **Saint Elizabeth Parish:** Black River: 1 female (teneral?), "JAMAICA Black R. July 1961, J Maldonado C | 321", ASUHIC, ASUHIC0088726.

Etymology. The specific epithet *quadrilineatus* is formed from the Latin prefix *quadri-*, meaning "four", and the Latin adjective *lineatus*, meaning "lined". The name refers to the four, raised, denuded, irregular striae by which the species is readily distinguished. The name is an adjective and is masculine.

Geographical distribution and chorological affinities. This species is known only from low-elevation, coastal regions along the southern coast of Jamaica, from Black River in the west to Hellshire in the east. It is not known to co-occur with other congeners.

Biology. Little is known about the biology of this species, but all specimens have been collected between June and July in low elevation (less than 250 m) areas near the coast.

***gowdeyi* species subgroup**

Diagnosis. This species subgroup comprises a putative clade native to eastern-central Jamaica which share obliquely transverse, densely scaled, pale-colored bands on the anterior faces of the metafemora and smaller but similarly dense pale patches on the dorsal faces of profemora and mesofemora (Figs. 3.8B–C, 3.11B–C). They also possess a transverse impression centered at the posterior half of the pronotal disk (Figs. 3.8A, 3.11A) which is often bounded by a pair of irregular punctures, but this area is sometimes only faintly impressed. Females have a heavily denuded, irregular but typically somewhat longitudinal patch on the anterior 3/4 of elytral intervals 1 to 3 (Figs. 3.8A, 3.9A, 3.9C (left), 3.11A).

***Pachnaeus gowdeyi* (Marshall 1926: 531), comb. nov.**

Figs. 3.8–3.10, 3.87

Pachnaeus gowdeyi (Marshall 1926: 531), **comb. nov.**

Transferred from *Lachnopus* Schoenherr, 1840.

= *Lachnopus gowdeyi* Marshall, 1926: 531 (original combination)

Blackwelder 1947: 796; van Whervin 1968; Woodruff 1985: 373; Morrone 1999: 141

Menoetius gowdeyi (Marshall, 1926) sec. O'Brien & Wibmer 1982: 37

Menoetius Dejean, 1821 is suppressed for the purposes of the Principle of Priority but not for the purposes of the Principle of Homonymy and has been placed on the Official Index of Rejected and Invalid Generic Names in Zoology (ICZN 1987). For overview of the complex taxonomic history of *Lachnopus* Schoenherr, 1840, *Menoetius* Dejean, 1821, and *Ptilopus* Schoenherr, 1823 see O'Brien and Wibmer 1986, ICZN 1987, Girón and Franz 2012, and Girón et al. 2018.

*nec Lachnopus gowdey*i Girón and Franz 2012: 69, 75

Misidentification of an unknown Jamaican species of *Lachnopus* Schoenherr, 1840 near *Lachnopus aurifer* (Drury, 1773).

Girón 2015, Girón et al. 2018: 39, 59

This species (*e.g.,* ASUHIC0006875, ASUHIC0006876, ASUHIC0006877, ASUHIC0006878) appears to be a true member of the genus *Lachnopus* Schoenherr, 1840 which appears to be very closely related (Girón and Franz 2012, Girón 2015, Girón et al. 2018) to the type species, *Lachnopus aurifer* (Drury, 1773) and is superficially very similar. This Jamaican species was found feeding on citrus and beans at Kitson Town, Saint Catherine Parish (near 18.016667, -77.05000). The unpublished name *goudeyi* appears to also be being used in online sources for this non-focal taxon (gbif.org/occurrence/192153988, gbif.org/occurrence/192153991, gbif.org/occurrence/1455641972, gbif.org/occurrence/1455641884, gbif.org/occurrence/1455642007, gbif.org/occurrence/1455642038).

Diagnosis. Females of this species can be distinguished from the other member of this subgroup, *Pachnaeus gordoni* Reily, sp. nov., by their significantly narrower and longer rostrum in which the median rostral carina is obsolete or nearly so, by their more strongly quadrate elytral humeri with a notable impression medial to the humerus at elytral bases, and by their more strongly acuminate elytral apices. This species is not similar to most other members of the genus *Pachnaeus* Schoenherr known to occur in Jamaica, or elsewhere, and is unlikely to be confused with congeners.

The combination of generally brunneous color, the strongly quadrate elytral bases, and the elongate and narrowed structure rostrum make this species superficially similar to some members of the genus *Lachnopus* Schoenherr, 1840, hence past confusion with this genus

Description. Habitus not typical of the genus, somewhat similar in form to some members of *Lachnopus* Schoenherr owing to narrowed rostral structure, strongly quadrate elytral humeri, brunneous coloration, and patches of sparse scaling**.** Body length 11.0 to 12.0 mm but see variation section. Body width at elytral bases 4.0 to 4.5 mm. Integument ranging from rufotestaceous to rufopiceous. Somewhat variable in scaling pattern and scale coloration but generally patchy, with darker-colored tan to cupreous, smaller-scaled areas and lighter-colored periwinkle to cream, larger-scaled areas. A sparsely scaled to wholly denuded, broad, irregularly sided, longitudinal patch present in the anterior 3/4 of the elytra on the first 2 to 3 elytral intervals. Each elytron with a pair of moderately large, irregular, glabrous and denuded patches along intervals 2 through 4 which are located near the middle of the elytral disc and near the posterior 1/3, these glabrous patches typically slightly darker than the surrounding integument, more sparsely punctured, and slightly raised. Immediately laterad and posterior to these large, denuded patches are variably sized irregular patches of light-colored, densely overlapping, large, appressed, circular to oval scales with many intermixed subappressed, elongate, flattened scales. The lateral portions of the elytra and most of the elytral declivity are variably clothed in an irregular mosaic of lighter-colored, larger, densely overlapping, appressed, circular scales with a few intermixed subappressed, elongate, flattened, scales and patches of smaller, darker-colored, circular to oval scales. This mottled patterning is interrupted by a few small, denuded patches. Pronotum similarly scaled to elytra, with dorsum sparsely scaled except for small patches of larger, circular to oval, lighter-colored scales immediately laterad to the center line and patches of sparse, smaller, darker-colored scales typically present at least within the transverse impression near the base of the pronotum. Legs with similar patchy scaling, femora consistently with a patch or band of denser, lighter-colored scales subapically at least on the dorsal face, though typically expressed as notable, oblique bands on at least the metafemora. Head dorsally sparsely scaled, except for a few scattered elongate, appressed, pale scales, and notable patches of dense scaling surrounding the posterior margin of the eye; ventrally with moderately sparsely scattered cream to periwinkle, appressed, oval to elongate scales.

Head generally typical of the genus but with rostrum a bit longer and narrower than usual. **Occiput** without a median, longitudinal sulcus at base. **Interocular pit** oblong, about twice as long as wide. **Eyes** roughly circular, very slightly protruding laterally from head. **Rostrum** very weakly tricarinate; comprising a little over half the entire length of the head. **Median rostral carina** nearly obsolete; at most an only very slightly raised, glabrous, longitudinal mound, bearing many small, confused punctures and only a few, sparse, elongate, iridescent, appressed scales. **Intercarinal rostral spaces** very narrow and distinctly but shallowly impressed between median and lateral carinae; bearing only a few, pale, appressed, elongate to oval scales. **Lateral rostral carinae** somewhat weakly raised, typically clearly defined medially but not laterally, and not distinctly demarcated from the lateral portion of the epifrons anterior to the eye. **Lateral portion of epifrons anterior to the eye** obliquely dorsally faced. **Scrobe** somewhat comma shaped, strongly widened posteriorly. **Occipital sutures** ventrally to ventrolaterally open, longitudinal, pit-like foveae, entirely visible and not heavily obscured by scales near the anteroventral margin of the eye. **Frons** not strongly angularly declined from epifrons, sparsely clothed in appressed, ovoid, opalescent scales, except on the nasal plate, with a pair small, densely scaled patches apically at either side of the nasal plate. **Nasal plate** not distinctly raised and bearing just a few long setae set in punctures near the anterolateral margin of the frons. **Mandibles** apically bearing several, long setae surrounding the mandibular scar. **Submentum** 2 to 3 times as long as wide, deeply impressed, posteriorly clothed with suberect, oval, slightly opalescent cream-colored scales and anteriorly with erect, short, setose scales.

Antennae typical of the genus. **Scape not** extending behind posterior margin of eye. **Funicle** with last two segments subconical.

Thorax typical of the genus in structure, but with a transverse depression dorsally on the disc near the posterior margin. **Pronotum** somewhat trapezoidal. Pronotal collar not notably laterally constricted and not delimited by a sulcus behind the anterolateral margin of the pronotum. Pronotal disc dorsally with a variably expressed, transverse, typically somewhat fusoid impression in the posterior third, sparsely scaled, bearing a few variably sized patches of multi-colored pastel, appressed, circular to oval scales laterad to the midline and elsewhere dorsally only sparsely covered with a few, small, oval, iridescent scales which grow larger and denser laterally and with a few, subappressed, small, short, linear scales intermixed. Pronotum laterally somewhat densely covered in multi-colored pastel, appressed, circular to oval scales with a few, subappressed, small, short, linear scales intermixed. Pronotum with a pair of punctures at the lateral-most extent of the transverse dorsal impression and typically asl a second pair of irregularly shaped punctures just anterior to the posterior margin of the pronotal disc adjacent to fourth elytral intervals. **Pronotal bases** only very weakly bisinuate to accommodate the elytral bases. **Postocular lobe** obsolete or very nearly so, not anteriorly projected, not laterally expanded. **Postocular vibrissae** typically visible but short, sparse, and slightly longer ventrally than dorsally. **Prosternum** laterally moderately densely clothed in confused, overlapping, circular to oval, tan scales laterally, the prosternal basisternum sparsely scaled in thinner, more elongate, appressed, tan scales. **Mesoventrite** very sparsely clothed in appressed scales anteriorly; posterolateral arms densely covered in appressed, oval, tan, overlapping scales with a few subappressed, white, setose scales intermixed. Mesoventrite intercoxal process moderately sparsely clothed in oval, iridescent scales with a few, short, subappressed, setose scales intermixed. **Metaventrite** laterally with patches of dense appressed, multi-colored pastel, circular to oval scaling with a few, short, setose scales intermixed, but medially mostly denuded except for a few, small, sparsely distributed, oval to elongate scales. Distance between mesocoxa and metacoxa greater than or equal to 2 times the diameter of the mesocoxa as typical of the genus. **Mesepisternum** with the anterior margin bearing a dense patch of more elongate oval, densely overlapping, tan scales, elsewhere sparsely clothed in appressed, multicolored pastel, circular to oval scales, with a few subappressed, short, white setose scales intermixed throughout. **Mesepimeron** similarly scaled to posterior portion of mesepisternum. **Metepisternum** posteriorly similarly scaled to mesepimeron, but with a patch of densely overlapping, circular to oval, tan scales at the anterior margin. **Scutellar shield** subquadrate to somewhat shield shaped, and sometimes slightly impressed medially, mostly nude, bearing at most a few thin, elongate, appressed opalescent scales. **Abdomen** with ventrites 1 to 4 laterally with dense patches of overlapping, tan to lavender, circular to oval scales with sparsely intermixed subappressed, elongate scales, but medially only sparsely clothed with smaller, tan to periwinkle appressed scales. Ventrite 5 similarly scaled as the sparse, medial scaling of preceding ventrite, but apically with suberect, pale, setose scales and a few longer, erect setae intermixed.

Elytra variably and somewhat irregularly patterned. Elytral striae mostly visible, obscured by scales only within some of the densely overlapping, light-scaled patches laterally. Strial punctures somewhat more confused, sparser, and shallower within glabrous patches than in more heavily scaled patches. Elytral bases nearly truncate and at most slightly obliquely projecting anteriorly from scutellum to humerus. In some specimens there is an extremely slight sinuosity present near mid-elytron. Anteriorly directed toothlike projection mediad to elytral humeri absent but with a small but notable impression on the dorsum of the elytron arising from the elytral base just mediad to the humerus. Elytral humeri obtusely angulate.

Legs typical of the genus. **Coxae** moderately densely clothed in tan appressed scales. **Trochanters** sparsely clothed in tan, appressed, elongate scales. **Femora** somewhat sparsely clothed in small oval to elongate, tan to cupreous scales with subappressed, white, setose scales intermixed. Femorae subapically with a patch or oblique band of densely overlapping, larger, white to periwinkle, circular to broadly oval scales, this band of dense scaling consistently present and well defined at least on the metafemora, usually also present on others. **Tibiae** scaled similarly to posterior portion of femora, but with scales more linear and with at most a few, very small denticles along the ventral side. Protibiae moderately apically curved. Protibial mucro shorter than half the width of the tibia just proximad to it, and the apex mostly hidden by surrounding setae. **Tarsi** dorsally clothed in off-white to slightly pinkish, linear scales. Tarsomere 5 about 2 times the length of tarsomere 3.

Male terminalia apparently typical of the genus. **Penis** with temones about 0.65 times the length of the pedon. **Tegmen** not observed. **Endophallus** with distal, tubular sclerite in dorsal view subconical, notably wider proximally than distally, tapered apically with a slight lateral bulge proximad to this, and slightly widened near the base; slightly longer than (1.07 times) the width of the pedon adjacent to endophallus; more-or-less straight in lateral view, not bent ventrally, tapered near apex, slightly dorsally and ventrally expanded in ante-apical quarter, and slightly ventrally expanded near base; about 4.5 times as long as wide and about 0.15 times the length of the pedon; not observed in ventral view. Sac-like proximal portion of endophallus entirely membranous. **Spiculum gastrale** not observed.

Female terminalia typical of the genus. **Spiculum ventrale** with basal plate about 0.43 times the total length; basal plate at insertion of apodeme lacking a heavily sclerotized angular patch. **Coxites** about 0.65 times the total length of spiculum ventrale. Proximal gonocoxite about 0.51 times as tall as long; distal gonocoxite about as 0.70 tall as long; distal gonocoxite about 0.60 times the length of the proximal gonocoxite.

Variation. The few female specimens seen in person vary in density of pale scaling, shape of the denuded elytral patch, and integument color ranges from rufotestaceous to rufopiceous. It is unclear if this variation in integument color represents teneral specimens. However, based on the frequency of paler forms it seems more likely that it may not be. Males appear to be a bit smaller on average than females based on limited images available at this time (Fig. 3.9C (right)). Marshall (1926) gives a smaller size-range for his specimens than in the specimens that I have observed in person.

According to Marshall, males differ from females by lacking the anterior portion of the denuded patch near the elytral suture, the posterior portion of the elytral denuded patches smaller, patches of overlapping, pale scales on the elytra lacking, the transverse impression near the pronotal base more weakly impressed, and the elytra much narrower and more gradually acuminate.

The dorsal elytral denuded patches seen in females vary somewhat in shape. Marshall (1926) says that in some specimens they are not a single continuous patch but instead a pair of patches. Examination of Marshall's type series and of additional specimens from the CMNC has not yet been possible but should help to clarify the range of morphological variation typical of this species.

Material examined.

The type series of 2 males and 5 females collected by Carlton Cragg Gowdey at **Saint Andrew Parish:** <u>Cinchona Botanical Garden</u> in July 1923 was not examined, but presumably was deposited in and is still part of Marshall's collection at NHMUK.

3 Other specimens: <u>Jamaica:</u> Portland Parish: <u>Hardwar Gap:</u> 1 female, "JAMAICA,PortlandP. Hardwar Gap at night Dec.7,1975 L.B.O'Brien", CWOB, ARTSYS0007580; 1 female, "JAMAICA,PortlandP. Hardwar Gap at night Dec.8,1975 L.B.O'Brien", CWOB, ARTSYS0007581; 1 female, "JAMAICA,PortlandP. Hardwar Gap at night Dec.7,1975 G.B.Marshall", CWOB, ARTSYS0007582.

I have also seen dorsal photos of 4 additional specimens (Fig. 3.9C), 2 female and 2 male, collected in mid- to late-July 1966 from 4000'elevation at Hardwar Gap taken by Howden and Becker from the CMNC collection (J. C. Girón 2020, pers. comm).

Etymology. While no explicit etymology given in the original description, this species is unquestionably named for Carlton Cragg Gowdey, a Jamaican government entomologist who is credited to have been the first person to have attempted a serious inventory of Jamaica's insect fauna (Gowdey 1926), and who collected the type series of this species at Cinchona in 1923. This name is a noun in the genitive case and is masculine.

Geographical distribution and chorological affinities. This species is known only from Portland Parish at mid-elevation (1200–1450 m) sites on the southwestern slope of the Blue Mountains. It apparently co-occurs at Hardwar Gap with *P. citri* Marshall and *P. marmoratu*s Marshall but is readily distinguishable from these species on grounds of coloration alone.

Biology. This species has been collected in July and early-December, with December specimens collected at night at Hardwar Gap. Woodruff (1985: 373) claims this species feeds on *Citrus* L. and cites van Whervin (1968) as an overview of this species' biology, but van Whervin only mentions this species as being endemic to Jamaica and says nothing about its biology. There seems to be little other evidence that this species is citrivorus.

Pachnaeus gordoni **Reily, sp. nov.**

Fig. 3.11, 3.87

Diagnosis. This species can be distinguished from the preceding species, *Pachnaeus gowdeyi* (Marshall, 1926), by its short, wide rostrum with a strongly raised and ridge-like median rostral carinae (Fig. 3.11C–D), by its less pronounced elytral humeri, and by its less acuminate elytral apices. This species is somewhat strongly dissimilar to other members of the genus *Pachnaeus* Schoenherr known to occur in Jamaica and is unlikely to be confused with other congeners. However, it can readily be separated from other species on the basis of the dense bands of pale, typically white to off white, scaling apically on the femorae and the heavily denuded patch on pronotal and elytral disc.

Description. Habitus somewhat typical of the genus but differing in its brunneous coloration and patches of sparse scaling**.** Body length 9.5 mm. Body width at elytral bases 3.5 mm. Integument rufocastaneous. A sparsely scaled, broad, longitudinal, glabrous stripe is present in the anterior 2/3 of the elytra on the first 3 elytral intervals, expanded at about the anterior 1/3 onto interval 4 with a pair of linear, white-scaled patches present behind these expansions, and paired, irregular, white-scaled patches also present posterior to the denuded patch and on elytral intervals 9 and 10 near the elytral apex. The remainder of the elytra are somewhat densely clothed in cupreous, appressed, circular scales with a few intermixed subappressed, elongate, flattened, scales interrupted by a few, small, scattered, denuded patches. Pronotum similarly scaled to elytra, with the dorsum sparsely scaled except for a few sparse, circular to oval, cupreous scales. Legs are moderately clothed in cupreous scales. The femora bear a dense patch or band of white scales subapically at least on the dorsal face; this patch is expressed as an oblique band on the metafemora, but generally restricted to the more dorsal aspects of other femorae. The head is sparsely scaled with only a few scattered, elongate to circular, appressed, cupreous scales which are mostly confined to lateral and ventral aspects of the head. **Head** typical of the genus. **Occiput** lacking a median, longitudinal sulcus at base. **Interocular pit** teardrop shaped. **Eyes** slightly taller than long, very slightly protruding laterally from head. **Rostrum** strongly tricarinate and short, about half the entire length of the head. **Median rostral carina** strongly raised as a steep sided ridge arising anterior to the interocular pit and joining into the nasal plate; glabrous, bearing many small, confused punctures and only a few, sparse, elongate, iridescent, subappressed scales. **Intercarinal rostral spaces** deeply impressed between median and lateral carinae, especially immediately anterior to the eyes; bearing only a few, pale, appressed, elongate scales. **Lateral rostral carinae** notably raised, clearly defined medially but not laterally, and not distinctly demarcated from the lateral portion of the epifrons anterior to the eye. **Lateral portion of epifrons anterior to the eye** obliquely dorsally faced and convex. **Scrobe** comma shaped, strongly widened posteriorly. **Occipital sutures** ventrolaterally open, longitudinal, pit-like foveae; obscured by appressed scales immediately anterior to the anteroventral margin of the eye. **Frons** not strongly declined from epifrons, mostly denuded except for a few appressed, ovoid, opalescent, cupreous scales and a pair of small, densely scaled patches apically at either side of the nasal plate. **Nasal plate** slightly raised and bearing just a few long setae set in punctures near the anterolateral margin of the frons and a single pair of shorter, appressed, iridescent setae laterad to medially. **Mandibles** apically bearing a few, long setae surrounding the mandibular scar. **Submentum** trigonal and evenly narrowing posteriorly, a little longer than wide, somewhat deeply impressed posteriorly but not anteriorly, clothed with subappressed, elongate, cupreous scales and, anteriorly, with a few erect, short, setose scales intermixed.

Antennae typical of the genus. **Scape** extending slightly behind the posterior margin of the eye. **Funicle** with last two segments subconical.

Thorax typical of the genus. **Pronotum** somewhat trapezoidal. Pronotal collar very slightly constricted ventrolaterally, not delimited laterally by a distinct sulcus behind the anterolateral margin of the pronotum. Pronotal disc with a small, weakly impressed, somewhat transverse —though only slightly wider than long —impression in the posterior third. Dorsally sparsely scaled, bearing only a few, cupreous, appressed, circular to oval scales and a small patch of a few, circular, overlapping, pale scales medially just anterior to the pronotal base. Densely covered in cupreous, appressed, circular scales with a few, subappressed, small, short, linear scales intermixed laterally. Pronotal disc lacking paired punctures. **Pronotal bases** only very weakly bisinuate to accommodate the slightly overhanging elytral bases. **Postocular lobe** obsolete, not anteriorly projected, and not notably laterally expanded. **Postocular vibrissae** visible but very sparse, reduced in size and number to just a few white, elongate setae. **Prosternum** sparsely but fairly evenly clothed in confused, oval, cupreous scales. **Mesoventrite** sparsely but fairly evenly clothed in confused, oval, cupreous scales with a few appressed elongate, white scales intermixed. **Metaventrite** laterally with patches of dense, appressed, cupreous, circular scales and a few, short, setose scales intermixed. Metaventrite medially denuded except for a few, small, cupreous, oval to elongate scales. Distance between mesocoxa and metacoxa roughly 2 times the diameter of the mesocoxa as typical of the genus. **Mesepisternum** sparsely but evenly clothed in confused, oval, cupreous scales with a few appressed elongate, white scales intermixed. **Mesepimeron** clothed as mesepisternum. **Metepisternum** clothed as mesepimeron. **Scutellar shield** subquadrate, nude and glabrous, slightly impressed anteromedially.

Abdomen with ventrites 1 to 5 laterally with dense patches of overlapping, cupreous, round to oval scales and subappressed, elongate scales intermixed; medially sparsely clothed with similarly colored, oval to elongate, appressed scales. Ventrite 5 apically with sparse suberect, pale, setose scales with a few longer erect setae intermixed.

Elytra somewhat irregularly patterned. Elytral striae visible in medial denuded patch, elsewhere partly obscured by scales. Elytral bases nearly truncate, sublinear and obliquely projecting anteriorly from scutellum to humerus. Anteriorly directed toothlike projection mediad to elytral humeri absent, but with a small, denuded impression arising from the elytral base just mediad to the humerus. Elytral humeri obtusely angulate.

Legs typical of the genus. **Coxae** moderately sparsely clothed in cupreous, appressed, circular to oval scales. **Trochanters** sparsely clothed in cupreous, appressed, elongate scales. **Femora** somewhat sparsely clothed in small, oval to elongate, cupreous scales with subappressed, white, setose scales intermixed. Apically with a patch or oblique band of densely overlapping, larger, white, circular to broadly oval scales, this patch of dense scales most prominent on the metafemora. **Tibiae** scaled similarly to posterior portion of femora, but scales more linear and with a few, very small denticles along the ventral side. Protibiae moderately apically curved. Protibial mucro shorter than half the width of the tibia just proximad to it, the apex not hidden by surrounding setae. **Tarsi** dorsally clothed in pale pinkish, linear scales. Tarsomere 5 about 2 times the length of tarsomere 3.

Male terminalia unknown.

Female terminalia typical of the genus. **Spiculum ventrale** with basal plate about 0.43 times the total length; basal plate at insertion of apodeme lacking a heavily sclerotized angular patch. **Coxites** about 0.54 times the total length of spiculum ventrale. Proximal gonocoxite about 0.78 times as tall as long; distal gonocoxite about as 0.81 times tall as long; distal gonocoxite about 0.72 times the length of the proximal gonocoxite.

Material examined.

Holotype by present designation (Fig. 3.11): Jamaica: Saint Andrew Parish: Swain Spring: female, “SWAIN SPRING ST. ANDREW NO 13 JAMAICA 17-9-55 | ON CITRUS COM. INST. ENT. COLL. NO. 14975 | Pres. by Comm. Inst. Ent. B.M. 1981–315”, NHMUK, ARTSYS0007558.

Etymology. The specific epithet *gordoni* honors merchant, lay preacher, deputy mayor of Kingston, member of the Jamaican House of Assembly, and National Hero of Jamaica, The Right Excellent George William Gordon. This name is a noun in the genitive case and is masculine.

Geographical distribution and chorological affinities. This species is known only from the type locality of Swain Spring, Jamaica, near Kington. This species may co-occur with other widespread Jamaican species such as *P. eisenbergi* Reily, sp. nov., *P. marmoratus* Marshall or *P. citri* Marshall, but this remains uncertain.

Biology. Little is known about the biology of this species. The holotype was collected on *Citrus* L. in mid-September. It is recorded only from a single low altitude locality of Swain Spring which lies at approximately 400 m elevation.

***eisenbergi* species subgroup**

Diagnosis. This species subgroup constitutes a putative clade native to Jamaica which possess moderately dense pale scaling across much of the body and usually have stripes of paler—typically white— scaling laterally and dorsomedially on the pronotum. They possess a slight but usually notable median pronotal impression and lack distinctly raised longitudinal pronotal ridges as in the *marmoratus* species subgroup. Members of this species subgroup are only known to occur in Jamaica and no other similar species besides *P. litus* (Germar) are known this island. The median discal impression appears to be sufficient to distinguish this group from most other similarly blue-green scaled members of the genus.

These species are superficially similar to many of the blue-green scaled Cuban and continental United States species, particularly the wide-spread *Pachnaeus litus* (Germar, 1824) which, in its commonly encountered form established in South Florida and likely native to the vicinity of Havana is similarly sized, similarly pale blue-scaled, and possesses similar, white, lateral and dorsal pronotal scale patches. *Pachnaeus litus* (Germar) has been questionably reported and once recorded from Jamaica—see data and discussion for this species below—but it is unlikely to be established on this island (van Whervin 1968). Members of the Jamaican *eisenbergi* species subgroup can easily be separated from this superficially similar, widely distributed, and frequently intercepted Cuban species by their relatively truncate elytral bases which are never strongly subangularly projected forward near mid-elytron and which always lack dentiform projections mediad to the humeri.

Some more heavily green-scaled morphs of the co-occurring *Pachnaeus marmoratus* Marshall, 1916 may appear somewhat similar, but these can readily be distinguished by their more glittery green scales, usually iridescent pink to purple scaled legs, and strongly apically curved protibia with very long protibial mucrones.

The two members of this subgroup are nearly identical and can only be reliably separated by shape of the postocular lobe (Fig. 3.12), and apical structure of the endophallus in lateral view (Fig. 3.13). For this reason, they are almost always unidentifiable from photographic records and past literature records regarding the previously described member of this subgroup, *P. citri* Marshall, 1916, are questionable.

Pachnaeus citri **Marshall 1916: 453**

Figs. 3.12A–B, 3.13A–B, 3.14–3.19, 3.85C, 3.88

Pachnaeus citri Marshall, 1916: 453 (original combination)

Ritchie (1917: 5); Leng and Mutchler 1917: 216; Schwarz and Barber 1922: 30; Gowdey, 1926: 25; Guenther and Zumpt, 1933: 104; Wolcott 1933: 450; Blackwelder 1947: 799; Ebeling 1950: 492; Ebeling 1959: 209, 273, 282, 426; van Whervin 1968; Woodruff 1981; O'Brien & Wibmer 1982: 46; Woodruff 1985: 374; Lopez Castilla 1992: 1; Morrone 1999: 145; Franz 2012; Franz 2013

Pachneus citri Marshall. 1916 sec. Imperial Bureau of Entomology 1917: 124

Incorrect subsequent spelling of *Pachnaeus* Schoenherr, 1826 in a review of Marshall 1916.

Ebeling 1950: 535, 539, 740

nec Pachnaeus citri Marshall, 1916 sec. Quayle 1938

Misidentification of *Pachnaeus litus* (Germar, 1824).

nec *Pachneus citri* Marshall, 1916 sec. Jeppson 1989: 56

This author claims the species “occurs in tropical Central America and is a pest in Florida”. This is probably a literature-based and not specimen-based misidentification, in part, for multiple species including several green-scaled species of *Exophthalmus* Schoenherr *sensu lato* or *Compsus auricephalus* (Say, 1824) and in part for *Pachnaeus opalus* (Olivier) and/or *Pachnaeus litus* (Germar).

Pachnaeus litus (Germar, 1824) sec. Gowdey 1923

Misidentification, see also discussion under the synonymy section of *P. litus* (Germar) below.

Pachnaeus “(sp. near *opalus*)” Gosse 1848: 349 (tentative placement, these specimens do not appear to be among the material I examined from NHMUK and may instead, in whole or in part, represent the similar Jamaican species *Pachnaeus eisenbergi* Reily, sp. nov.)

Pachnaeus “probably *distans*” Ritchie, 1916: 143

Pachnaeus sp. “1” Zhang et al. 2017

Pachnaeus sp. “1 AMV2011a” Zhang et al. 2017: Supplementary data 4, Table S1

Diagnosis. *Pachnaeus citri* Marshall, 1916 can be separated from the next species, *Pachnaeus eisenbergi* Reily, sp. nov., to which it is presumably very closely related, by its more prominent postocular lobes which are large, arcuate, and notably laterally expanded ventrad to the head (Fig. 3.12A–B), and also by the tubular endophallic sclerite in males being apically bent ventrally, never straight (Fig. 3.13A–B). This is in contrast to *Pachnaeus eisenbergi* Reily, sp. nov. in which the postocular lobes are small, angular, and restricted to laterad to the head (Fig. 3.12C–D), and the endophallic sclerite is apically straight (Fig. 3.13C–D).

Pachnaeus citri Marshall tends to be a bit more densely scaled, especially on the pronotum, and typically lacks the white scale patches that are relatively commonly seen dorsally on the elytra (Fig. 3.21A) of females, and to a lesser extent males, of *P. eisenbergi* Reily, sp. nov. There is, however, a good deal of variation in scale density within both species, and elytral white patches are variably absent within *P. eisenbergi* Reily, sp. nov. making both characters unreliable for diagnosis in isolation/

Redescription. Habitus typical of the genus. Body length 8.5 to 13.5 mm. Body width at elytral bases 3.0 to 6.0 mm. Integument rufocastaneous to piceous. Densely clothed in a mix of appressed, oval to circular pale blue scales with intermixed sparser, subappressed, elongate and typically flattened, white to translucent scales. Elytra typically uniformly iridescently pale blue scaled except for a variably expressed stripe or patches of white scaling along the anterior portion of elytral intervals 9 and 10. Pronotum similarly colored as elytra, with longitudinal patches of white scales dorsolaterally and along the posterior portion of the discal midline. Legs iridescently pale blue to pink to white scaled/ Head white or iridescently pale blue scaled.

Head typical of the genus. **Occiput** lacking a median, longitudinal sulcus at middle. **Interocular pit** very small, weakly defined, round, in some specimens obsolete. **Eyes** oval to slightly dorsolaterally fusoid, slightly taller than wide, not protruding notably laterally from head. **Rostrum** moderately to strongly tricarinate, comprising over half the entire length of the head or more. **Median rostral carina** slightly raised, and denuded in a moderately wide, glabrous and finely punctured swath along the center line from the posteromedial margin of the frons to just posterior to the interocular pit. **Intercarinal rostral spaces** slightly impressed between median and lateral carinae, moderately densely clothed in iridescent, typically pale blue, appressed, oval scales, with a few, appressed, short, white, setose scales intermixed. **Lateral rostral carinae** weakly raised, typically clearly defined medially but not laterally; not distinctly demarcated from the lateral portion of the epifrons anterior to the eye. **Lateral portion of epifrons anterior to the eye** obliquely dorsally faced, planar to convex but not notably impressed. **Scrobe** arcuate, at most slightly widened posteriorly. **Occipital sutures** laterally open, longitudinal, pit-like foveae that typically widening slightly anteriorly and which are mostly obscured by appressed scales near the anteroventral margin of the eye. **Frons** not strongly declined from epifrons, though sometimes with a weakly raised, transverse patch just posterior to the antennal insertions on the dorsal surface of the rostrum demarcating frons from epifrons. Frons usually moderately to densely covered in pale—typically blue or white—appressed, circular scales, except on the nasal plate. **Nasal plate** mostly denuded, slightly raised, and typically bearing long setae set in punctures along the posterior margin, though these sometimes restricted to the more lateral portions. **Mandibles** apically bearing many long setae surrounding the mandibular scar dorsolaterally and laterally, and often with a few pale—typically blue or white, appressed, elongate, scales intermixed. **Submentum** 1.5 to 2 times as long as wide, very weakly impressed, densely clothed with appressed to suberect, oval, pale scales, with a few suberect, short, setose scales intermixed anteriorly.

Antennae typical of the genus. **Scape** extending to or slightly behind posterior margin of eye. **Funicle** with last two segments subconical.

Thorax typical of the genus. **Pronotum** somewhat trapezoidal in females, usually slightly more subquadrate in males. Pronotal collar laterally constricted and delimited by a groove behind the postocular lobe. Pronotal disc without a pair of posteriorly diverging ridges, but notably, if usually only rather weakly, impressed medially. Densely clothed in appressed, typically pale blue scales, usually with a variably expressed longitudinal, median stripe or patch of white scales on the pronotal disc and patches of white scaling dorsolaterally. The dorsolateral, white-scaled patches are often mostly restricted to near the anterior and posterior margins and separated into two nebulous, white-scaled areas by a somewhat oval shaped patch of the same color as the base scale color of the pronotum, but occasionally much of the lateral aspect of the pronotum is white scaled. **Pronotal bases** only very weakly bisinuate to accommodate the slightly overhanging elytral bases. **Postocular lobe** large, strongly anteriorly projected as a large, apically rounded, subarcuate lobe which is usually notably laterally expanded creating a relatively large gap between the postocular lobe and the ventrolateral portion of the head. **Postocular vibrissae** clearly visible, moderately long, anteromedially directed, and slightly longer

ventrally than dorsally. **Prosternum** very densely clothed in confusedly overlapping, circular to oval, pale blue to white scales. **Mesoventrite** sparsely clothed in white to pale blue appressed scales near the anterior margin, but posteriorly densely covered in appressed, oval, white to pale blue, overlapping scales. Mesoventrite intercoxal process with many short, subappressed, setose scales intermixed. **Metaventrite** densely covered in appressed, white to pale blue circular scales with short, setose scales intermixed. Distance between mesocoxa and metacoxa greater than or equal to 2 times the diameter of the mesocoxa as typical of the genus. **Mesepisternum** densely covered in appressed, overlapping, white to pale blue, circular scales with a few subappressed, short, white setose scales intermixed. **Mesepimeron** similarly scaled to mesepisternum.
Metepisternum typically with a dense patch of pale blue scales near the anterior margin and posteriorly similarly scaled to mesepisternum. **Scutellar shield** variably shaped but typically subquadrate, and densely covered in oblong, pale blue scales.

Abdomen with ventrites 1 to 4 densely covered with overlapping, typically pale blue, round to oval scales with many suberect, elongate, scales intermixed. Ventrite 5 similarly scaled, but apically densely clothed in suberect, pale, setose scales with many longer erect setae intermixed.

Elytra typical of the genus; usually densely and completely scaled in appressed, typically pale blue, circular scales with short, subappressed, translucent to white, setose scales intermixed; sometimes with white patches or stripes along the elytral epipleura, but typically without white patches or stripes on the dorsal aspect. Elytral striae composed of very small punctures which are typically at least faintly visible and only very rarely heavily overlapped by scales. Elytral bases at most very slightly bisinuate, usually nearly truncate, typically slightly linearly projecting anteriorly from scutellum to near mid-elytron and sub linearly truncate laterad to this. Anteriorly directed toothlike projection mediad to elytral humeri absent but with a small impression arising from the elytral base just mediad to the humerus. Elytral humeri obtusely angulate.

Legs typical of the genus. **Coxae** variably densely clothed in pale blue to white appressed scales with intermixed, elongate, subappressed white setose scales. **Trochanters** clothed in pale blue appressed, oval scales with intermixed, elongate, subappressed white setose scales. **Femora** moderately densely covered in circular to oval, typically pale blue, appressed scales with short, subappressed, white, setose scales intermixed. **Tibiae** scaled similarly to femora and with at most a few, very small denticles along the ventral side. Protibiae slightly apically bent inward. Protibial mucro much shorter than the width of the tibia just proximad to it, not extending notably beyond surrounding setae. **Tarsi** dorsally clothed in pale blue, linear scales. Tarsomere 5 about 2 times the length of tarsomere 3.

Male terminalia typical of the genus. **Penis** with temones about 0.68 times the length of the pedon. **Tegmen** about 0.50 times the length of the penis, with manubrium comprising about 0.63 times the total length. **Endophallus** with distal, tubular sclerite in dorsal view subconical, notably wider proximally than distally, slightly tapered apically and notably widened in the posterior third; slightly shorter than (0.96 times) the width of the pedon adjacent to endophallus; curved conical in lateral view, bent ventrally in apical quarter, slightly tapered near apex and slightly dorsally and ventrally expanded near base; about 3.1 times as long as wide and about 0.12 times the length of the pedon; in ventral view with posterior ventral margin subangulately convex to slightly convexly arcuate. Sac-like proximal portion of endophallus entirely membranous. **Spiculum gastrale** with lateral margins of basal plate convex and obtusely angulate; basal plate about 0.63 times as wide as long, and about 0.31 times as long as the length of the apodeme.

Female terminalia typical of the genus**. Spiculum ventrale** with basal plate about 0.48 times the total length; basal plate at insertion of apodeme lacking a heavily sclerotized angular patch. **Coxites** about 0.57 times the total length of spiculum ventrale. Proximal gonocoxite about 0.75 times as tall as long; distal gonocoxite about 1.02 times as tall as long; distal gonocoxite about 0.62 times the length of the proximal gonocoxite.

Variation. This species shows a wide range of variation in scale color. The typical blue form of this species (Figs. 3.17–3.18) is prevalent throughout most of its range, though exact hue varies from dull, pale blue to vibrant turquoise and there is some slight variation in scale iridescence within this form, though they tend to be dull to only very slightly iridescently blue scaled, never brilliantly glittery greenish scaled as seen in *P. marmoratus* Marshall *or P. psittacus* (Olivier). The amount of white scaling laterally on pronotum and elytral epipleura also seems to be rather variable within populations.

The typical, blue-scaled form does not seem to be very common in the Blue Mountains, and many specimens from mid-elevational sites on the southwestern slope of the Blue Mountains are, instead, of a dull grey to cupreous scale color. Members of this blue-mountains population are also very slightly larger on average, and often have small, scattered denuded patches on their elytra (Fig. 3.19E–H). These higher elevation forms are otherwise indistinguishable. The cause of this variation in scale color and density remains uncertain. One possibility is that it may be due to phenotypic plasticity within the species due to an elevational gradient, given that the Blue Mountains are one of the highest mountain ranges on the island. Alternatively, this variation may represent genotypic variation at an infraspecific level. It does not seem likely that this variation is indicative a cryptic species complex owing to the existence of apparent intermediate forms—*e.g.*, small, mottled, dark grey specimens (Fig. 3.19C–D) and intermediate sized very pale blue specimens with small, scattered, denuded patches (Fig. 3.19G–H).

A small series of specimens from Ewarton in North-Western Saint Catherine Parish are rather strongly iridescent and lavender scaled (Fig. 3.19A–B). I believe this to be a preservation artifact given variability in scale coloration and iridescence seen in other populations of the typical, blue-scaled form of this species. Further supporting this notion, other species of the genus—*e.g., P. litus* (Germar) and *P. obrienorum* Reily, sp. nov., also occasionally have purperescent scaled forms present within otherwise generally blue to green scaled populations.

Material examined

Lectotype by present designation (Fig. 3.14): Jamaica: Saint Andrew Parish (see Ritchie 1917: 5): female, "Brit. W. Indies, Jamaica [green line] 1916. A. H. Ritchie. | Type H.T. [red bordered circular label] | Pachnaeus citri, Mshl. TYPE.♀ | 1916-226 | ON CITRUS. | J.140", NHMUK, NHMUK012848580.

3 Paralectotypes by present designation (Figs. 3.15–3.16): **Jamaica: Saint Andrew Parish (see Ritchie 1917: 5):** 1 male, "Type H.T. [red bordered circular label] | Brit. W. Indies, Jamaica, [green line] 1916. A. H. Ritchie. | ON CITRUS. | 1916-226 | J.140 | Pachnaeus citri, Mshl. Type.♂", NHMUK, NHMUK012848581; 1 female, "Brit. W. Indies, Jamaica 1916. A. H. Ritchie. | ON CITRUS. | Pachnaeus citri, Mshl. COTYPE. |

G.A.K. Marshall Coll. B.M.1950-255.", NHMUK, NHMUK012848582; 1 sex indeterminate (this specimen's status as a type and sex was missed at time of recording because, unlike the other paralectotypes, it is not labeled as being a type; however, it is from the same collecting event and is deposited alongside the other types in the NHMUK collection), "BRIT. W. INDIES, JAMAICA [green line] 1916. A.H.RITCHIE. | on citrus. | [upside down] 1916-244 | Pachnaeus citri Mshl.", NHMUK.

144 other specimens: **<u>Jamaica:</u>** 1 male, "Jamaica | Collection of Frederick Allen Eddy | P. litus Germ glaucus " [Sa?]lle 2 495 May 9-07", MCZ, [MCZ-ENT 00]529538; 1 female, "Jamaica | W. G. Dietz Coll. | Pachnaeus Det. C. W. O'Brien 1980", MCZ, [MCZ-ENT 00]529539; 1 female, "Jamaica | W. G. Dietz Coll. | Litus germ | Jan-Jul 2004 Caribbean Database", MCZ, [MCZ-ENT 00]529375; 2 male, "Jamaica | W. G. Dietz Coll.", MCZ, [MCZ-ENT 00]529517, [MCZ-ENT 00]529518; 2 male, 2 female, "JAMAICA.", ANSP, ARTSYS0007484, ARTSYS0007485, ARTSYS0007486, ARTSYS0007487; 1 male, "Jamaica | Pachnaeus opalus Jamaica", ANSP, ARTSYS0007488; 1 male, "Jamaica. | Klages Coll'n Exot. Coleopt. C. M. Acc. 2275 | Carnegie Museum Specimen Number CMNH-376,175 | Pachnaeus opalis Oliv.", CMNH, ARTSYS0007498; 1 female, "Jamaica. | Klages Coll'n Exot. Coleopt. C. M. Acc. 2275 | Carnegie Museum Specimen Number CMNH-375,046", CMNH, ARTSYS0007499; 1 female, "Jamaica. | Klages Coll'n Exot. Coleopt. C. M. Acc. 2275 | Carnegie Museum Specimen Number CMNH-375,280", CMNH, ARTSYS0007500; 1 female, "Jamaica. | Klages Coll'n Exot. Coleopt. C. M. Acc. 2275 | Carnegie Museum Specimen Number CMNH-375,281", CMNH, ARTSYS0007501; 1 female, "Jamaica. | Klages Coll'n Exot. Coleopt. C. M. Acc. 2275 | Carnegie Museum Specimen Number CMNH-375,321", CMNH, ARTSYS0007502; 1 male, “Jamaica. | Klages Coll’n Exot. Coleopt. C. M. Acc. 2275 | Carnegie Museum Specimen Number CMNH-375,3808”, CMNH, ARTSYS0007503; 1 female, “Jamaica. | Holland Collection | Carnegie Museum Specimen Number CMNH-375,333 | Pachnëus opalus Oliv. | Pachnaeus spp. det. R.S. Anderson, 2006”, CMNH, ARTSYS0007504; 1 male, “Jamaica. | Holland Collection | Carnegie Museum Specimen Number CMNH-375,013”, CMNH, ARTSYS0007505; 1 female, “Jamaica. | Holland Collection | Carnegie Museum Specimen Number CMNH-375,638”, CMNH, ARTSYS0007506; 1 male, “Jamaica. | Holland Collection | Carnegie Museum Specimen Number CMNH-375,674”, CMNH, ARTSYS0007507; 1 male, “Jamaica. | Holland Collection | Carnegie Museum Specimen Number CMNH-376,019”, CMNH, ARTSYS0007508; 1 female, “Jamaica. F. Klages. | C. M. Acc. 349 | Carnegie Museum Specimen Number CMNH-375,238”, CMNH, ARTSYS0007509; 1 female, “Jamaica. F. Klages. | C. M. Acc. 349 | Carnegie Museum Specimen Number CMNH-375,319”, CMNH, ARTSYS0007510; 1 male, “Jamaica. F. Klages. | C. M. Acc. 349 | Carnegie Museum Specimen Number CMNH-375,391”, CMNH, ARTSYS0007511; 1 female, “Jamaica. F. Klages. | C. M. Acc. 349 | Carnegie Museum Specimen Number CMNH-375,499”, CMNH, ARTSYS0007512; 1 male, “Jamaica. F. Klages. | C. M. Acc. 349 | Carnegie Museum Specimen Number CMNH-375,531”, CMNH, ARTSYS0007513; 1 female, “Jamaica | July 30 ‘37 Carn. Mus. Acc. 11619 | Carnegie Museum Specimen Number CMNH-375,540”, CMNH, ARTSYS0007514; 1 male, “Jamaica | July 30 ‘37 Carn. Mus. Acc. 11619 | Carnegie Museum Specimen Number CMNH-375,589”, CMNH, ARTSYS0007515; 1 female, “sp 77 JAM 2 | IND57 Pa. sp1 | Pachnaeus sp. nov. 1”, ASUHIC, ASUHIC0088785; **Clarendon Parish:** <u>Pedro River:</u> 1 male, “JAM: Clar. Pedro R. 1750’ 17.VIII.74 S. & J. Peck”, CMNC, ARTSYS0007540; **Hannover Parish:** <u>Round Hill Bluff:</u> 1 male, “Jamaica 4km.NE.Hopewell 13-1-2001 H. Hendriksen”, NHMD, ARTSYS0007543; **Kingston Parish:** <u>Kingston:</u> 1 female, “Kingston Jamaica | Liebeck Collection | P. opalus Oliv. distans Horn | Pachnaeus distans Horn det. JanScott 1978”, MCZ, [MCZ-ENT 00]529387; 1 male, “Jamaica, W.I. C. M. Acc. 2522 | Kingston July 1893 | Carnegie Museum Specimen Number CMNH-375,037”, CMNH, ARTSYS0007527; <u>Palisadoes:</u> 1 male, “JAMAICA Palisades July 1961 J. Maldonado C. | 250 | Pachnaeus citri det. N.M. Franz, 2009”, ASUHIC, ASUHIC0088762; 1 female, “JAMAICA Palisades July 1961 J. Maldonado C. | 252”, ASUHIC, ASUHIC0088763; 1 sex indeterminate (partial, disarticulated, and heavily cleared), “JAMAICA Palisades July 1961 J. Maldonado C. | 251”, ASUHIC, ASUHIC0088764; **Manchester Parish:** <u>Christiana:</u> 1 female, “JAMAICA Christiana July 1961 J. Maldonado C. | 253”, ASUHIC, ASUHIC0088765; <u>Kendal</u>: 1 female, “JAM:Kendall,Burnt Ground (Heron’s Hill), Manchester Par. Apr.14,1959 M. W. Sanderson J59-4 | Pachnaeus 2”, CWOB, ARTSYS0001357; 1 male, “Sweeping vegetation at base of Herron Hill (Mile Gully Hill) | 3-4 mi. N Mandeville, JAMAICA June20,1958 MWSanderson J58-15”, CWOB, ARTSYS0001358; <u>Mandeville:</u> 1 male, “Mandeville, JAMAICA June 19, 1958 MWSanderson”, CWOB, ARTSYS0001356; 2 male, “Jamaica: Mandeville. A. E. Wight”, MCZ, [MCZ-ENT 00]529513, [MCZ-ENT 00]529515; 1 male, “Jamaica, W. I. Manchester Parish, Mandeville. W. of town on Wards Ave. VIII 14, 1973 T. Gruenwald | on vegetation at night”, CWOB, ARTSYS0001359; 1 female, “Jamaica, W. I. Manchester Parish, Mandeville. W. of town on Wards Ave. VIII 14, 1973 T. Gruenwald | on vegetatio[n] at night”, CWOB, ARTSYS0001360; Walderston: 1 male, “JAMAICA 4 mi. South Christiana July 1961 J. Maldonado C. | 256”, ASUHIC, ASUHIC0088766; 1 male, “JAMAICA 4 mi. South Christiana July 1961 J. Maldonado C. | 257”, ASUHIC, ASUHIC0088767; **Portland Parish**: Rio Grande River: 6 male, 5 female, “Rio Grande Riv. Jam 2/18 | F. C. Bowditch Coll.”, MCZ, [MCZ-ENT 00]529525, [MCZ-ENT 00]529531, [MCZ-ENT 00]529532, [MCZ-ENT 00]529533, [MCZ-ENT 00]529535, [MCZ-ENT 00]529536, [MCZ-ENT 00]529526, [MCZ-ENT 00]529527, [MCZ-ENT 00]529528, [MCZ-ENT 00]529529, [MCZ-ENT 00]529530; 1 female, “Rio Grande Riv. Jam 2/26 | F. C. Bowditch Coll.”, MCZ, [MCZ-ENT 00]529534; **Saint Andrew Parish:** Chestervale: 1 female, “HAITI: Chester Vale. 13-16.vi,1908. Dr. M.Cameron. B.M. 1936-555 | M. Cameron Journal W.I. 867 | Data error? Jamaica? B.H. Reily 2018”, NHMUK, ARTSYS0007579; Constant Spring: 1 female, “Jamaica, W.I. C. M. Acc. 2522 | Constant Spring July 1893 | Carnegie Museum Specimen Number CMNH-374,959”, CMNH, ARTSYS0007528; Content Gap: 1 female, 3 male, “JAMAICA, St. Andrew Parish, Content Gap, Pine Grove Hotel, 3600ft., 8-10-VIII-85 J.E. Ege, coll.”, CWOB, ARTSYS0001361, ARTSYS0001362, ARTSYS0007567, ARTSYS0007568; road to Hardwar Gap: 1 female, “JAMAICA. St. Andrew road to Hardwar Gap c 1250’ | 15.vi.1963 H.A. Hespenheide”, CMNC, ARTSYS0007575; Hermitage: 1 female, “Hermitage St. Andrew Jamaica | June 1937 Carn. Mus. Acc. 11619 | Carnegie Museum Specimen Number CMNH-376,092”, CMNH, ARTSYS0007532; 1 male, “Hermitage St. Andrew Jamaica | June 1937 Carn. Mus. Acc. 11619 | Carnegie Museum Specimen Number CMNH-375,144”, CMNH, ARTSYS0007533; Irish Town: 1 male, “JAMAICA, St. And. Irish Town VIII.28.1966 A. T. Howden | H. & A. Howden Collection” CMNC, ARTSYS0007574; Pleasant Hill [locality uncertain, as there are multiple localities with this name in the area, but almost certainly the one located 2km due west of Cinchona Botanical Gardens based on altitude given]: 2 male, 1 female, “Pleasant Hill 3700-3750ft. Blue Mts., | Jamaica (R.) VII, 24, 1923”, ANSP, ARTSYS0007563, ARTSYS0007564, ARTSYS0007565; 1 female, “ Blue Mts., Jamaica (R.) VII, 19, 1923 | Pleasant Hill 3700-4400ft. | from epiphytic bromeliads”, ANSP, ARTSYS0007566; Mona: 1 male, “JAMAICA. St. Andrew Mona (UWI) | 10.VI.1963 H. A. Hespenheid”, CMNC, ARTSYS0007536; 1 female, “JAMAICA. St. Andrew Mona (UWI) | 11.VI.1963 H. A. Hespenheid”, CMNC, ARTSYS0007537; 1 male, “JAMAICA. St. And: Mona | 14.VI.1963 H. A. Hespenheid”, CMNC, ARTSYS0007538; 1 male, “JAMAICA. St. And: Mona | 2.VII.1963 H. A. Hespenheid”, CMNC, ARTSYS0007539; Stony Hill: 1 male, “JAMAICA, St. And. Stony Hill VII.25.1966 | A. Howden Collection | Pachnaeus citri Mshll. det. at BM A.T. Howden 1973”, CMNC, ARTSYS0007541; 1 female, “JAMAICA, St. And. Stony Hill VII.25.1966 | A. Howden Collection | H. & A. Howden Collection”, CMNC, ARTSYS0007542; Mahogany Vale: 1 male, “JAMAICA, St. And. Mahogany Vale VII.20.1966 | Howden&Becker Collectors | Pachnaeus det. R.S. Anderson 2018 ”, CMNC, ARTSYS0007576; 1 male, “JAMAICA, St. And. Mahogany Vale VII.20.1966 | Howden&Becker Collectors”, CMNC, ARTSYS0007577; 1 female, “JAMAICA, St. And. Mahogany Vale VII.12.1966 | A.T. Howden Collector | H. & A. Howden Collection”, CMNC, ARTSYS0007578; Newcastle: 1 male, “JAMAICA, St. Andrew Parish, Newcastle, 14.5 km upwards of The Cooperage, ca 1.5 km south of Newcastle, N 17°56’32” W 76°28’16” [GPS data is wrong]; 110 m | beating roadside vegetation (incl. coffee and mango plants) JAM 2 Dec 10/2008; Leg. N. Franz”, ASUHIC,

ASUHIC0088784; **Saint Ann Parish:** Kellits: 1 male, “JAM. Clar. Kellits,Mason R. Bog 2300’ 18.VIII.1974 S. & J.Peck | H. & A. Howden Collection | Pachnaeus DET. citri Mshll A. Howden ‘73”, CMNC, ARTSYS0007489; 3 male, 2 female, “JAM. Clar. Kellits,Mason R. Bog 2300’ 18.VIII.1974 S. & J.Peck | H. & A. Howden Collection”, CMNC, ARTSYS0007490, ARTSYS0007491, ARTSYS0007492, ARTSYS0007493; 1 male, 1 female, “JAM. Clar. Kellits,Mason R. Bog 2300’ 4.VIII.1974 S. & J.Peck | H. & A. Howden Collection”, CMNC, ARTSYS0007494, ARTSYS0007495; 2 female, “JAMAICA Clarendon: Mason River Savannah | 3.VIII.1963 H.A. Hespenheide”, CMNC, ARTSYS0007496, ARTSYS0007497; Walkers Wood: 1 male, “JAMAICA: St. Ann Par. 1 mi S Walkers Wood 5 AUG 1985, M. A. Ivie ex pasture | Pachnaeus citri Marshall det. M. A. Ivie 1986”, WIBF, ARTSYS0007544; **Saint Catherine Parish:** Bogwalk: 1 female, 2 male, “JAMAICA, St. Catherine Parish, Bogwalk, overgrowm citrus/coffee plantation, 95m N 18°7’7” W 77°1’11” | collected on citrus trees, Tru-Juice plantation; Dec 17/2008 Leg. N. Franz; JAM 27”, ASUHIC, ASUHIC0088770, ASUHIC0088771, ASUHIC0088772; 1 female, “Jamaica Bogwalk 21-V-91 H.W. Browning on Citrus”, CWOB, ARTSYS0001350; 1 male, “Jamaica Bogwalk 19-VII-88 M. Alam on Citrus”, CWOB, ARTSYS0001351; Ewarton: 1 female, “JAMAICA: Par. of St. Catherine, Charlton Exp. Sta., 11-VI- 75, Grissell, Bent & Woodruff”, FSCA, ARTSYS0001349; 1 male, “Coombs- Ewarton- Jamaica- 4-5-55 No:17 J.R.R.S. | on citrus COM. INST. ENT. COLL. NO. 14975 | Pres. by Comm. Inst. Ent. B.M. 1981-315 | Pachnaeus sp.n.”, NHMUK, ARTSYS0007559; 2 male, 1 female “Coombs- Ewarton- Jamaica- 4-5-55 No:17 J.R.R.S. | on citrus COM. INST. ENT. COLL. NO. 14975 | Pres. by Comm. Inst. Ent. B.M. 1981-315”, NHMUK, ARTSYS0007560, ARTSYS0007561, ARTSYS0007562; <u>5 miles east of Linstead [locality uncertain, probably near Riversdale]:</u> 1 male, "5 miles east of | JAMAICA: Par. of St. Catherine, Linstead | Fred D. Bennett coll. 25-VI-76 | Citrus sp.", CWOB, ARTSYS0001353; 1 female, 1 male, "5 miles east of | JAMAICA: Par. of St. Catherine, Linstead | Fred D. Bennett coll. 25-VI-76 | Citrus sp. | Pachnaeus citri Mshl. Det. C.W. O'Brien 1971", ASUHIC, ASUHIC0088780, ASUHIC0088781; <u>Rose Hall nr. Linstead</u> 1 male, "JAMAICA: Par. of St. Catherine, Rose Hall nr. Linstead, 18-VI- 75, Bent, Grissell, Woodruff", FSCA, ARTSYS0001345; 1 female, "JAMAICA: Par. of St. Catherine, Rose Hall nr. Linstead, 11-VI- 75, Bent, Grissell, Woodruff", FSCA, ARTSYS0001346; <u>Old Harbor:</u> 1 male, "Jamaica F. Klages. | Old Harbor | Holland Collection | Carnegie Museum Specimen Number CMNH-375,076", CMNH, ARTSYS0007529; 1 male, "Jamaica F. Klages. | Old Harbor | Holland Collection | Carnegie Museum Specimen Number CMNH-375,640", CMNH, ARTSYS0007530; 1 female, "Jamaica F. Klages. | Old Harbor | Holland Collection | Carnegie Museum Specimen Number CMNH-375,6137", CMNH, ARTSYS0007531; <u>Worthy Park:</u> 2 male, "JAMAICA: Par. of St. Catherine, Worthy Pk. 18-VI- 75, Bent, Grissell & Woodruff", FSCA, ARTSYS0001347, ARTSYS0001348; 1 female, "JAMAICA: Par. of St. Catherine Worthy Park | 11-VI- 75 R. Woodruff", CWOB, ARTSYS0001352; **Saint Thomas Parish:** 1 female, "JAMAICA St. Thomas July 1961 J. Maldonado C. | 254", ASUHIC, ASUHIC0088768; 1 female, "JAMAICA St. Thomas July 1961 J. Maldonado C. | 255", ASUHIC, ASUHIC0088769; <u>Albion:</u> 1 male, "JAMAICA, St. Thomas Parish, Albion, off main road from Kingston to Morant Bay; 15m N 17°53'12" W 76°36'36" | dry agricultural/living habitat, on legume shrubs at night; JAM 9 Dec 10/2008; Leg. N. Franz", ASUHIC, ASUHIC0088773; 1 female, “JAMAICA, St. Thomas Parish, Albion, off main road from Kingston to Morant Bay; 15m N 17°53’12” W 76°36’36” | dry agricultural/living habitat, on legume shrubs at night; JAM 9 Dec 10/2008; Leg. N. Franz | Pachnaeus citri Mshl.”, ASUHIC, ASUHIC0088774; <u>Bath:</u> 4 male, 2 female, “Bath Jamaica July 5, 1902 W. Robinson”, MCZ, [MCZ-ENT 00]529519, [MCZ-ENT 00]529520, [MCZ-ENT 00]529521, [MCZ-ENT 00]529524, [MCZ-ENT 00]529522, [MCZ-ENT 00]529523; 1 male, “Bath Jamaica F. Klages. | June 4 1885 | Holland Collection | Carnegie Museum Specimen Number CMNH-375,442”, CMNH, ARTSYS0007516; 1 male, “Bath Jamaica F. Klages. | June 4 1885 | Holland Collection | Carnegie Museum Specimen Number CMNH-375,476”, CMNH, ARTSYS0007517; 1 female, “Bath Jamaica F. Klages. | June 4 1885 | Holland Collection | Carnegie Museum Specimen Number CMNH-375,641”, CMNH, ARTSYS0007518; 1 female, “Bath Jamaica F. Klages. | June 4 1885 | Holland Collection | Carnegie Museum Specimen Number CMNH-375,900”, CMNH, ARTSYS0007519; 1 male, “Bath Jamaica F. Klages. | June 5 1885 | Holland Collection | Carnegie Museum Specimen Number CMNH-375,069”, CMNH, ARTSYS0007520; 1 male, “Bath Jamaica F. Klages. | June 5 1885 | Holland Collection | Carnegie Museum Specimen Number CMNH-375,315”, CMNH, ARTSYS0007521; 1 male, “Bath Jamaica F. Klages. | June 5 1885 | Holland Collection | Carnegie Museum Specimen Number CMNH-375,376”, CMNH, ARTSYS0007522; 1 male, “Jamaica F. Klages. | Bath | Holland Collection | Carnegie Museum Specimen Number CMNH-375,492”, CMNH, ARTSYS0007523; 1 male, “Jamaica F. Klages. | Bath | Holland Collection | Carnegie Museum Specimen Number CMNH-375,624”, CMNH, ARTSYS0007524; 1 female, “Jamaica F. Klages. | Bath | Holland Collection | Carnegie Museum Specimen Number CMNH-375,798”, CMNH, ARTSYS0007525; 1 male, “Jamaica F. Klages. | Bath | Holland Collection | Carnegie Museum Specimen Number CMNH-376,089”, CMNH, ARTSYS0007526; 1 female, “JAMAICA: Bath; VII:20:1967 leg. W. Klopp | Pachnaeus citri Marshall det. A.T. Howden ‘78”, FMNH, ARTSYS0007534; 1 male, “JAMAICA: Bath; VII:20:1967 leg. W. Klopp | Pachnaeus sp. Det. R.S. Anderson 1992”, FMNH, ARTSYS0007535; Portland Gap: 1 male, “JAM.St.Thomas 5500’ below Portland Gap 1-5.VIII.1974 S.Peck” CMNC, ARTSYS0007572; 1 female, “JAM.St.Thomas 5500’ below Portland Gap 1-5.VIII.1974 S.Peck | H. & A. Howden Collection”, CMNC, ARTSYS0007573; Whitfield Hall: 1 female, “JAMAICA, St. Thomas Whitfield Hall VII.28.1966 A.T. Howden | Pachnaeus citri det. at BM A.T. Howden 1973”, CMNC, ARTSYS0007569; 1 female, “JAMAICA, St. Thomas Whitfield Hall VII.28.1966 A.T. Howden | H. & A. Howden Collection | Pachnaeus citri det. at BM A.T. Howden 1973”, CMNC, ARTSYS0007570; 1 female, “JAMAICA Whitfield Hall 1.viii.1974 S. & J. Peck | H. & A. Howden Collection”, CMNC, ARTSYS0007571; Seaforth: 1 male, “JAMAICA, St. Thomas Parish, Seaforth, Agricultural area near Seaforth, Road towards Coley; N 17°56’32” W 76°28’16”; 110m | Dec 10/2008 Leg. N. Franz JAM 5”, ASUHIC, ASUHIC0088775; 1 male, “JAMAICA, N Seaforth, Agricultural area near Seaforth, Road towards Coley; N 17°56’32” W 76°28’16”; 110m | Dec 10/2008 Leg. N. Franz JAM 5”, ASUHIC, ASUHIC0088776; **Trelawny Parish:** Greenwood: 1 male, “Jamaica Greenwood 3-12-90 H.W. Browning on Citrus”, CWOB, ARTSYS0001354; Hector’s River north of Coleyville: 1 female, “JAMAICA: Trelawny Par., Hector’s River, north of Coleyville 21-VII-1985 C.B. & H.V. Weems Jr., G.B. Edwards”, CWOB, ARTSYS0001355.

Etymology. The specific epithet *citri* is a Latin noun in the genitive case meaning "of citrus". While no etymology was explicitly given in the original description, this species was doubtless named for the collection of the type series on *Citrus* L. (Marshall 1916).

Geographical distribution and chorological affinities. This species is only known from Jamaica and is widespread across the island, presumably moved around with agricultural trade in past. It may co-occur at some localities with *P. gowdeyi* (Marshall), *P. gordoni* Reily, sp. nov., *P. marmoratus* Marshall, and/or *P. eisenbergi* Reily, sp. nov.
Cuban records of this species are likely misidentifications of other species, particularly of the superficially similar *P. litus* (Germar) which has historically been a more economically impactful species to the global citrus industry. This latter species, however, is only known from Jamaica based on a single specimen record from Old Harbor (ARTSYS0001526) and from sporadic records in the literature, most of which are probably misidentifications of *P. citri* Marshall (see van Whervin 1968 and discussion under *P. litus* (Germar) below). It seems rather unlikely that *P. litus* (Germar) is presently established in Jamaica.

Biology. *Pachnaeus citri* Marshall has been collected from early December through late August, but most records of this species are from summer months. It occurs at a wide range of altitudes, ranging from near sea level to over 1650 m in the Blue Mountains. This species has been taken by sweeping, picked from vegetation at night, and beaten from vegetation. Available label data frequently associates this species with present and former agricultural areas where host plants such as citrus, coffee, and mango are present.

In the original description, Marshall (1916: 454) reports this species on collected *Citrus* L. (Rutaceae), and it has repeatedly been taken in association with this plant since. Regarding the record from the original description, Ritchie (1917: 5), who collected the type series, noted leaf damage to the infested trees. The association between this species and *Citrus* L. is repeated by Strong (1933: 228), Edwards (1936: 335, misidentified as *P. litus* (Germar)), Quayle (1938: 322, probably misidentification of *P. litus* (Germar) in part), Ebeling (1950: 492, both as *P. citri* Marshall and misidentified as *P. litus* (Germar)), Woodruff (1985: 375), and McCoy (1999: 152).

Citrus fruit production is a major industry in Jamaica worth approximately J$4 billion (approximately USD$ 26 million, MOA 2015) and this species has historically been one of the most important pests of *Citrus* L. on the island. However, to what extent historical Jamaican records of this species are misidentifications of the externally nearly indistinguishable *P. eisenbergi* Reily, sp. nov. or less-marmorated forms of *P. marmoratus* Marshall is not known.

Van Whervin (1968) reported that *P. citri* Marshall is probably equally detrimental to Jamaican citriculture as *Exophthalmus vittatus* (Linnaeus, 1758), calling this latter species "generally the most important economically important" species of *Exophthalmus* Schoenherr, 1823 and reporting major outbreaks in *Citrus* L. in 1931 and 1933. This author also reported continuing problems with both these genera into the early- to mid-1950s and said the species was "fairly abundant" at Mona, "Charleston" (probably Charles Town), Manchester, and "Ashley" (locality uncertain) in 1966 and 1967. Van Whervin reports a preference for *Citrus* L. but suggests that these adult weevils may transfer to other hosts if young citrus leaves are not available or if pressured to by high population density. Van Whervin treats the following taxa as hosts of this species in addition to citrus: quickstick (*Gliricidia sepium* (Jacq.) Steud.; Fabaceae), Manilla tamarind (*Pithecellobium dulce* (Roxb.) Benth.; Fabaceae), star apple (*Chrysophyllum cainito* L.; Sapotaceae), avocado (*Persea americana* Mill.; Lauraceae), mango (*Mangifera indica* L.; Anacardiaceae), acerola cherry (*Malpighia emarginata* DC.; Malpighiaceae), and guava (*Psidium guajava* L.; Myrtaceae).

Van Whervin reports that, like other Jamaican citrus-feeding entimines, adults emerge in spring and probably also after the October rains. They are gregarious and are habitually shade-seeking—remaining on the undersides of leaves during the hottest parts of the day. They are active both day and night, usually spending most of the day in copula—females sometimes feeding while in copula—with intermittent periods dedicated to feeding in both sexes and egg-laying in the females. They also mate and feed at night, and occasionally on cloudy days, but females spend most of their time in the dark laying eggs. When disturbed, adults tend to either drop to the ground and hide or take to the wing and fly away, as seems to be typical of many entimines that dwell primarily in plant crowns. Adult lifespan ranges from a few weeks to about nine months (17 to 281 days in males, 21 to 262 days in females), and on average males (101.2 days, n = 10) are a bit shorter-lived than females (121.3 days, n = 10). With regards to oviposition, eggs are laid in single rows either between two leaves or in a single leaf which the weevil folds in half, the former more common in lab with 187 out of 241 cases of oviposition being between two leaves. This species, confusingly, showed a preference in the field for citrus and star-apple leaves for oviposition and generally did not lay on quickstick, but instead showed a preference for quickstick over orange leaves for oviposition in lab trials, choosing quickstick as an oviposition site 139 times out of 194 in the lab. After egg-laying, the female deposits a viscous substance around the eggs to glue the leaf surfaces together around them, this behavior apparently being a means to prevent the eggs from desiccating more so than as protection from predators. Females produce an average of 1453 eggs per female (range = 175 to 4246, number of females = 10) with an average of 33 eggs per cluster (range = 4 to 131 eggs per cluster, number of females = 10, number of clusters studied = 428). Eggs take an average of 6.1 days to commence eclosion and it takes on average 13 hours for the entire egg cluster to hatch (range = 5.2 to 7.0 days for commencement of eclosion, number of egg clusters studied = 85). After hatching, the first instar larvae drop from the leaves to the soil, burrow, and feed on the roots of the host plant for 7 to 8 months as they develop in pupal cells in the soil—this development period remains questionable to me as it seems likely derived from the same range given in Dixon (1954) for *Exophthalmus vittatus* (Linnaeus, 1758) and *E. similis* (Drury, 1773). Woodruff (1985: 375) repeats most of the host information given by van Whervin (1968), except leaving out an explicit listing of quickstick as a host, though he does mention this plant as a common host of *Exophthalmus* Schoenherr and *Diaprepes* Schoenherr. Biggs-Allen (1990)—a work that I have, to date, only managed to obtain an abstract for—reports continuous emergence of adults in the field between May and November, with the peak in May. Biggs-Allen says that *P. citri* Marshall was observed, along with *E. vittatus* (Linnaeus), attacking one-year-old seedlings of Seville orange (*Citrus aurantium* L.; Rutaceae), resulting in significant losses (16.65 ± 6.59 % mortality of seedlings). Larval burrowing was also studied in several substrates and moisture levels by this author, with an optimal moisture level found to be 15% and lower levels less optimal.

Eggs were found to be particularly susceptible to MK-139 (1-(3,5-Dichloro-2,4-difluorophenyl)-3-(2,6-difluorobenzoyl)urea) and dichlorvos (2,2-dichlorovinyl dimethyl phosphate), and rather tolerant to diazinon (O,O-Diethyl O-[4-methyl-6-(propan-2-yl)pyrimidin-2-yl] phosphorothioate) and chlorpyrifos (O,O-Diethyl O-(3,5,6-trichloropyridin-2-yl) phosphorothioate). Adult males were found to be 4 to 13 times more susceptible to insecticides, and particularly carbamates, than females.

Clarke et al. 1993 reports, citing van Whervin (1968), only that this species has a rather high recorded fecundity of over 4200 eggs per female.

McCoy (1999: 152), in addition to calling this species “an important citrus pest in Jamaica” and reporting that the species feeds on mango, avocado, and star apple, reports pimento (*Pimenta dioica* (L.) Merr.; Myrtaceae), cacao (*Theobroma cacao* L.; Malvaceae), and peanut (*Arachis hypogaea* L.; Fabaceae) as hosts. This author cites a lack of detailed studies of the life cycles of the species but says that adult emergence is triggered by the rainy season, that adults live for up to 120 days, and that females lay 30 to 75 eggs per mass and can produce as many as 4000 eggs during a lifetime.

Based on data reported herein, this species has also been collected from epiphytic bromeliads (Bromeliaceae) at Pleasant Hill in the Blue Mountains.

***Pachnaeus eisenbergi* Reily, sp. nov.**

Figs. 3.12C–D, 3.13C–D, 3.20–3.22, 3.85D, 3.88

Diagnosis. This species is extremely similar to the preceding species, *Pachnaeus citri* Marshall, but is distinguishable by its small, angular, laterally restricted postocular lobes that do not extend ventrally to or near level with the prosternal collar (Fig. 3.12C–D). It is generally a bit more sparsely scaled than the preceding species, with patches of integument visible between scales at least on the pronotum, giving it a slightly more glabrous appearance, and the legs are also typically at least slightly glabrous because of sparser scaling. In many, but not all, specimens of this species, there are scattered irregular patches of paler colored scaling dorsally on the elytra (Fig. 3.21). These tend to be more prominent and numerous in females than males. Most definitively—although a difficult character to access and not usable without male specimens in hand—while *P. citri* Marshall has an apically bent tubular endophallic sclerite (Fig. 3.13A–B), the tubular endophallic sclerite in the present species is apically straight (Fig. 3.13C–D).

More prominently white-spotted forms may be somewhat reminiscent of *P. marmoratus* Marshall, but they can be distinguished by their duller, non-glittery, pale blue scaling, their non-iridescent leg scaling, and their slightly bent, as opposed arcuately curved, protibiae which have mucrones that are much shorter than the width of the tibia and not extending notably beyond surrounding setae.

Description. Habitus typical of the genus. Body length 7.5 to 14.5 mm. Body width at elytral bases 2.5 to 6.0 mm. Integument rufotestaceous to rufocastaneous. Moderately densely clothed in a mix of appressed, oval to circular pale blue scales with intermixed sparser, subappressed, elongate and typically flattened, white to translucent scales. Elytra are dorsally either uniformly pale blue scaled or mostly pale blue scaled and mottled with small, irregular patches of white scaling. In some specimens there are variably expressed stripes or a series patches of white scales along the elytral epipleura which may extend as far posteriorly as to near the anterior of the elytral declivity. The pronotum similarly scaled as the elytra, but with variably prominent, longitudinal patches of white scales dorsolaterally and along the posterior portion of the discal midline. Legs are moderately sparsely scaled in white to blue to pale pinkish appressed scales, with much of the surrounding, glabrous integument typically visible surrounding scales. The head is white to pale pinkish to pale blue scaled.

Head typical of the genus. **Occiput** lacking a median, longitudinal sulcus at base. **Interocular pit** small, teardrop shaped. **Eyes** oval, slightly taller than wide, not protruding laterally from head in females, very slightly so in males. **Rostrum** moderately to strongly tricarinate, comprising over half the entire length of the head or more. **Median rostral carina** somewhat strongly raised, and denuded in a moderately wide, glabrous and impunctate swath along the center line from the posteromedial margin of the frons to just posterior to the interocular pit or just behind. **Intercarinal rostral spaces** slightly impressed between median and lateral carinae, usually moderately densely clothed in pale colored, appressed, oval scales, with few, subappressed, short, white, setose scales intermixed. **Lateral rostral carinae** moderately raised, typically clearly defined medially but not laterally, and not distinctly demarcated from the lateral portion of the epifrons anterior to the eye. **Lateral portion of epifrons anterior to the eye** obliquely dorsally faced, planar to convex but not notably impressed. **Scrobe** arcuate, at most slightly widened posteriorly. **Occipital sutures** laterally open, longitudinal and typically anteriorly widening, pit-like foveae that are mostly obscured by appressed scales near the anteroventral margin of the eye. **Frons** not strongly declined from epifrons, though sometimes with a weakly raised, transverse patch just posterior to the antennal insertions on the dorsal surface of the rostrum demarcating frons from epifrons. Frons usually moderately to densely covered in pale—typically blue, pink, or white—appressed, circular to oval scales, except on the nasal plate. **Nasal plate** slightly raised and bearing long setae set in punctures along the posterior margin. **Mandibles** apically bearing numerous, long setae surrounding the mandibular scar, and dorsolaterally and laterally with a few elongate, appressed, pale scales intermixed. **Submentum** 1.5 to 2 times as long as wide, very weakly impressed, densely clothed with appressed to suberect, oval, pale scales, with a few suberect, short, setose scales intermixed anteriorly. **Antennae** typical of the genus. **Scape** extending to or slightly behind posterior margin of eye. **Funicle** with last two segments subconical.

Thorax typical of the genus. **Pronotum** somewhat trapezoidal. Pronotal collar laterally constricted and delimited by a groove behind the postocular lobe. Pronotal disc without a pair of posteriorly diverging ridges, but typically notably but slightly impressed medially, at least near the base. Pronotum moderately densely clothed in appressed pale blue scales, usually with small patches of glabrous integument visible between scales; dorsolaterally with variably expressed longitudinal patches of white scaling and usually a small patch of white scales dorsomedially on the disc near the base of the pronotum. **Pronotal bases** only very weakly bisinuate to accommodate the slightly overhanging elytral bases. **Postocular lobe** small, anteriorly projected as an obtusely angulate projection, at most very slightly laterally expanded apically. **Postocular vibrissae** clearly visible, moderately long, anteriorly directed, and longest at the apex of the postocular lobe. **Prosternum** very densely clothed in confused, circular to oval, pale blue to white scales. **Mesoventrite** densely clothed in appressed, oval, pale blue, overlapping scales.

Mesoventrite intercoxal process with short, setose scales intermixed. **Metaventrite** somewhat densely covered in appressed, pale blue circular scales with short, setose scales intermixed. Distance between mesocoxa and metacoxa greater than or equal to 2 times the diameter of the mesocoxa, as typical of the genus. **Mesepisternum** densely covered in appressed, overlapping, pale blue, circular scales with a few subappressed, short, white setose scales intermixed. **Mesepimeron** similarly scaled to mesepisternum.

Metepisternum anteriorly typically with a dense patch of pale blue scales; posteriorly similarly but more sparsely scaled to the mesepisternum. **Scutellar shield** variably shaped but typically subquadrate, and densely covered in oblong, pale blue scales.

Abdomen with ventrites 1 to 4 somewhat densely covered with overlapping, pale blue, circular to oval scales and with many suberect, elongate, scales intermixed. Ventrite 5 similarly scaled, but apically densely clothed in suberect, pale, setose scales with many longer erect setae intermixed.

Elytra densely and completely scaled. Elytral striae composed of very small punctures which are not heavily overlapped by scales. Elytral bases very slightly bisinuate to nearly truncate; typically slightly linearly projecting anteriorly from scutellum to near mid-elytron and nearly truncate laterad to this. Anteriorly directed toothlike projection mediad to elytral humeri absent. Elytral humeri obtusely angulate.

Legs typical of the genus. **Coxae** somewhat sparsely clothed in pale blue and/or pale pinkish appressed scales with intermixed, elongate, subappressed white setose scales and much of the underlying integument visible around scales. **Trochanters** similarly scaled to coxae. **Femora** somewhat sparsely covered in circular to oval pale blue to pale pink scales with short subappressed, white, setose scales intermixed and much of the underlying integument visible around scales. **Tibiae** scaled similarly to femora and with a few small denticles along the ventral side. Protibiae slightly apically bent inward in males, moderately curved in females. Protibial mucro much shorter than the width of the tibia just proximad to it, not extending notably beyond surrounding setae. **Tarsi** dorsally clothed in pale blue or pale pink, linear scales. Tarsomere 5 about 2 times the length of tarsomere 3.

Male terminalia typical of the genus. **Penis** with temones about 0.55 times the length of the pedon. **Tegmen** about 0.52 times the length of the penis, with manubrium comprising about 0.65 times the total length. **Endophallus** with distal, tubular sclerite in dorsal view subconical, notably wider proximally than distally, tapered apically with a slight lateral bulge proximad to this, and notably widened near the base; slightly longer than (1.19 times) the width of the pedon adjacent to endophallus; more-or-less straight in lateral view, not bent ventrally, tapered near apex, slightly dorsally and ventrally expanded in ante-apical quarter, and slightly ventrally expanded near base; about 4.0 times as long as wide and about 0.15 times the length of the pedon; in ventral view with posterior ventral margin subangulately convex to slightly convexly arcuate. Sac-like proximal portion of endophallus entirely membranous. **Spiculum gastrale** with lateral margins of basal plate convex and subarcuate; basal plate about 0.52 times as wide as long, and about 0.44 times as long as the length of the apodeme.

Female terminalia typical of the genus. **Spiculum ventrale** with basal plate about 0.40 times the total length; basal plate at insertion of apodeme lacking a heavily sclerotized angular patch. **Coxites** about 0.55 times the total length of spiculum ventrale. Proximal gonocoxite about 0.55 as tall as long; distal gonocoxite about as 0.83 times tall as long; distal gonocoxite about 0.58 times the length of the proximal gonocoxite.

Variation. The color of the scales on head and legs are somewhat variable in this species, ranging from pale blue (Fig. 3.22) to white to pale pink (Figs. 3.20–3.21) or even some combination of these. In many specimens, but not all, the elytra bear variably expressed, scattered, small, irregular spots of white scaling (Fig. 3.21) and these patches tend to be more numerous and more frequently expressed in females than in males.

Material examined.

Holotype by present designation: Jamaica: Saint Mary Parish: Richmond: male, "Richmond, Jamaica 16.II.1921 NO. 381 | Pres. by Comm Inst Ent B.M. 1981–315 | Pachnaeus sp. n. DET. G.A.K.M.", NHMUK, ARTSYS0007596.

Marshall noted this species as new in his determination label placed on the above-designated holotype. He made that identification with at least some understanding of the identity of *P. citri* Marshall, given that this specimen was collected a few years after he himself had described the preceding species, but his rationale for calling it new was not recorded.

17 paratypes by present designation: Jamaica: 1 female, "Jamaica | MUSEUM PARIS COLL. H.W. BATES 1952", MNHN, ARTSYS0007590; 1 male, "Jamaica", NHMUK, ARTSYS0007589; 1 female, "Jamaica. Col. L.W. Wilmer 1920–81", NHMUK, ARTSYS0007591; 1 male, "on citrus. | Jamaica: B.W.I. July-1954. | Collector F.J.Simmonds | Pres by Com Inst Ent B M 1955-511", NHMUK, ARTSYS0007595; 1

female, “Jamaica coll: L[C?] Perkins | J. & S. Ramos Collection, UPRM”, ASUHIC, ASUHIC0187518; **Manchester Parish:** Balaclava: 1 female, “Jamaica: Balaclava. A.E. Wight”, MCZ, [MCZ-ENT 00]529510; 1 male, “Jamaica: Balaclava. A.E. Wight”, MCZ, [MCZ-ENT 00]529511; Mandeville: 1 male, “Jamaica: Mandeville. A.E. Wight”, MCZ, [MCZ-ENT 00]529514; 1 female, “Jamaica Mandeville | Gift of Thomas Barbour”, MCZ, [MCZ-ENT 00]529516; New England: 1 male, “on citrus | New England, Manchester par. Jamaica W.I. June 2 1964 | 65-285 | Pres by Comm Inst Ent B M 1965-2”, NHMUK, ARTSYS0007592; 1 female, “on citrus | New England, Manchester par. Jamaica W.I. June 3 1964 | 65-289 | Pres by Comm Inst Ent B M 1965-2”, NHMUK, ARTSYS0007593; 1 male, “on citrus | New England, Manchester par. Jamaica W.I. June 3 1964 | 65-286 | Pres by Comm Inst Ent B M 1965-2”, NHMUK, ARTSYS0007594; **Saint Ann Parish:** Moneague: 1 female, 1 male, “JAMAICA, St. Ann, Moneaque, VIII.20.1966 A.T. Howden | H. & A. Howden Collection”, CMNC, ARTSYS0007598, ARTSYS0007599; **Saint Catherine Parish:** Old Harbor: 1 male, “Old Harbor | Jamaica F. Klages. | Holland Collection | Carnegie Museum Specimen Number CMNH-375,588”, CMNH, ARTSYS0007601; **Saint James Parish:** St. Bran’s Burg: 1 male, “JAMAICA:St.James, nr.Palmyra,21-II-1970 R.E.Woodruff blacklight trap”, FSCA, ARTSYS0007602; **Saint Thomas Parish:** Bath: 1 female, “Jamaica F. Klages. | Bath. | Holland Collection | Carnegie Museum Specimen Number CMNH-375,584”, CMNH, ARTSYS0007600.

Etymology. The specific epithet honors the late, actor Aron Eisenberg, best known for his role on *Star Trek: Deep Space Nine* as Nog, the first Ferengi in Starfleet. The name is a reference to the small postocular lobes—the Ferengi being known, among other less favorable traits, for their earlobes—which allow this species to be distinguished from the otherwise nearly externally identical *P. citri* Marshall. This name is a noun in the genitive case and is masculine.

Geographical distribution and chorological affinities. This species is known from scattered, low-elevation localities throughout Jamaica. It co-occurs at some localities with *P. citri* Marshall and *P. marmoratus* Marshall and can be difficult to distinguish from the former, presumably closely related species. Some past literature records of *P. citri* Marshall may in fact be of this externally nearly indistinguishable species.

Biology. This species has been recorded from *Citrus* L. and was once taken from a blacklight trap near Palmyra, Saint James Parish. It has been collected during mid-February and from early-June to mid-August.

***andersoni* species subgroup**

Diagnosis. This species subgroup comprises a putative clade native to the eastern Cayman Islands, which share reduced scale coverage dorsally, leaving moderate to large patches of the underlying integument surrounding appressed scales on the pronotum and elytral disc. Additionally, members of this group have legs and heads with only a few, sparse, appressed scales, giving them a somewhat glabrous, brown appearance. The pronotum is shallowly, and sometimes almost obsoletely so, medially impressed, but this impression is restricted to near the posterior margin in this subgroup.

Members of the present subgroup share some similarities in overall form with the taxa in the *eisenbergi* subgroup, which usually have less-deeply evaginated pronota than in other subgroups in the *citri* group and both subgroups lack raised pronotal ridges seen in the *marmoratus* subgroup and femoral banding as in the *gowdey*i subgroup. Both species of the present subgroup have sparse, non-glittery, pale blue—though tan in a few specimens of *P. godivae*—round to oval, appressed scales similar to those seen in to the more densely, pale blue scaled members of the *eisenbergi* subgroup.

Pachnaeus godivae **Reily, sp. nov.**

Figs. 3.23–3.24, 3.85E, 3.89

Pachnaeus azurescens griseus Gyllenhal in Schoenherr, 1834 sec. Thomas et al. 2013: 27 Misidentification.

Diagnosis. This species is known only from Cayman Brac. The appressed scales in this species are very small and very sparse on the elytral disk, leaving most of the underlying integument visible dorsally. The legs are strongly denuded and somewhat glabrous, with the few leg scales almost all elongate, subappressed, and setose, except a few appressed scales along the dorsal face of the femora and at the femoral apices.

This species can be separated from the similar, Little Cayman Island species, *P. andersoni* Reily, sp. nov., by its notably sparser elytral scaling and by the presence of a heavily sclerotized area at the proximal (= anterior) end of the sac-like portion of the endophallus in males (Fig. 3.23E–F). This sclerotized endophallic patch is mostly confined to the lateral and frontal (=anterior, =proximal) aspects of the sac-like portion of the endophallus and it is primarily visible laterally. This area of sclerotization seems to seems to be distinct in structure—*i.e.*, it is seemingly not a distinct sclerite, per say, but instead seems to be a slightly thickened patch of the membranous sac-like portion of the endophallus—and, thus, presumably in evolutionary origin from the ventrally located, and primarily ventrally visible, secondary sclerites seen in some other species of the genus, *i.e., P. marmoratus* Marshall and *P. psittacus* (Olivier).

This species is somewhat superficially similar, albeit smaller and with a different rostral and male genitalic structure, to the Lesser Antillean *Diaprepes famelicus* (Olivier). However, the ranges of these two taxa are not known to overlap.

Description. Habitus somewhat typical of the genus but very sparsely scaled. Body length 9.0 to 12.5 mm. Body width at elytral bases 3.5 to 5.5 mm. Integument rufotestaceous to rufocastaneous and clearly visible over much of the body. Very sparsely scaled in a mix of appressed, circular to oval, tan to pale blue scales with intermixed subappressed, elongate to ovoid, white to translucent scales. Elytra are moderately appressed scaled laterally and on the elytral declivity, but mostly denuded of appressed scales anteromedially. The pronotum is similarly scaled to the elytra, with the dorsum mostly denuded of appressed scales. The legs are mostly denuded and glabrous except for sparse, elongate, translucent setose scales and even fewer, round to oval appressed scales. The head is mostly denuded except for moderately sparse, elongate, translucent setose scales and a few, appressed, tan to pale blue scales ventral to the eyes.

Head typical of the genus. **Occiput** lacking a median, longitudinal sulcus at base. **Interocular pit** very small and variably shaped, and sometimes nearly obsolete. **Eyes** oval, very slightly taller than wide, not protruding laterally from head in females, slightly so in males. **Rostrum** at most very weakly tricarinate but usually subplanar dorsally, heavily denuded, and strongly to moderately irregularly rugose; comprising about half the entire length of the head. **Median rostral carina** at most very slightly raised, denuded in a moderately wide, glabrous, and impunctate swath along the center line from the posteromedial margin of the frons to just posterior to the interocular pit. **Intercarinal rostral spaces** not notably impressed between median and lateral carinae but usually moderately to strongly rugose, often with a pair of anteriorly diverging raised, somewhat linear, glabrous patches; bearing a few, sparse, elongate, translucent, setose, appressed to subappressed scales and, in a few specimens, just a few appressed ovoid pale colored appressed scales. **Lateral rostral carinae** at most very weakly raised, not typically clearly defined medially or laterally, and not distinctly demarcated from the lateral portion of the epifrons anterior to the eye. **Lateral portion of epifrons anterior to the eye** obliquely dorsally faced, planar to very slightly concave. **Scrobe** arcuate, at most slightly widened posteriorly. **Occipital sutures** laterally open, short but longitudinal, pit-like foveae, usually slightly obscured by a few appressed scales near the anteroventral margin of the eye. **Frons** at most very weakly declined from epifrons; mostly denuded except for a few, very small, ovoid, appressed scales, these mostly concentrated anterolaterally. **Nasal plate** variably raised and bearing long setae set in punctures along the posterior margin. **Mandibles** apically bearing numerous, long setae surrounding the mandibular scar. **Submentum** 1.5 to 2 times as long as wide, not notably impressed, sparsely clothed with subappressed oval, pale scales, with a few suberect, short, setose scales intermixed anteriorly.

Antennae typical of the genus. **Scape** extending to or slightly behind posterior margin of eye. **Funicle** with last two segments subconical.

Thorax typical of the genus but heavily denuded. **Pronotum** somewhat trapezoidal. Pronotal collar slightly laterally constricted and delimited by a groove behind the postocular lobe. Pronotal disc without a pair of posteriorly diverging ridges, but typically slightly impressed medially near the base; dorsally mostly nude and glabrous except for short, white to transparent, elongate scales set in punctures; laterally also with moderately sparse, tan to pale blue appressed, oval scales; lacking a medial, longitudinal, linear mid-discal fovea or suture. **Pronotal bases** weakly bisinuate to accommodate the slightly overhanging elytral bases. **Postocular lobe** small, anteriorly projected as an anteriorly truncate projection, and at most very slightly laterally expanded apically. **Postocular vibrissae** clearly visible, moderately long, anterodorsally directed, and longest at the middle of the postocular lobe. **Prosternum** moderately to sparsely clothed in confused, oval, pale scales. **Mesoventrite** somewhat sparsely clothed in appressed, oval, pale scales. Mesoventrite intercoxal process with short, setose scales intermixed.

Metaventrite moderately to sparsely covered in appressed, pale, oval scales with many short, setose scales intermixed. Distance between mesocoxa and metacoxa greater than or equal to 2 times the diameter of the mesocoxa. **Mesepisternum** sparsely clothed with a few appressed, overlapping, pale blue to tan, circular scales and many subappressed, short, white to translucent, setose scales. **Mesepimeron** similarly scaled to mesepisternum. **Metepisternum** similarly scaled to mesepisternum immediately behind the anterior margin, posteriorly similarly scaled but with more intermixed appressed, pale blue to tan, oval scales. **Scutellar shield** variably shaped but typically subquadrate, and typically sparsely covered in oval, pale scales.

Abdomen with ventrites 1 to 4 sparsely scaled with tan to pale blue, oval scales and many suberect, elongate, scales. Ventrite 5 similarly scaled, but apically densely clothed in suberect, pale, setose scales with many longer erect setae intermixed.

Elytra very sparsely scaled dorsally on the disc, usually moderately to sparsely scaled in appressed, pale blue to tan scales laterally and on the declivity. Elytral striae composed of small but distinct, round punctures which are rarely overlapped by scales. Elytral bases only very slightly bisinuate, typically slightly linearly projecting anteriorly from scutellum to near mid-elytron, nearly truncate laterad to this and with a slight forward projection just mediad to the humerus. Anteriorly directed toothlike projection mediad to elytral humeri absent, but the forward projection near the humeri is somewhat pronounced in a few specimens and there is a slight impression on the disc posteromediad to this. Elytral humeri obtusely angulate.

Legs typical of the genus. **Coxae** somewhat sparsely clothed in pale appressed scales with a few elongate, subappressed white setose scales intermixed. **Trochanters** bearing sparse, elongate, pale appressed scales. **Femora** very sparsely scaled and notably glabrous, with only a few, oval, pale scales, these predominantly confined apically and basally, and sparse, short subappressed to suberect, white to translucent, setose scales. **Tibiae** scaled similarly to, but a bit more densely than, femora, and with just a few moderately distinct denticles along the ventral side. Protibiae apically straight or nearly so. Protibial mucro much shorter than the width of the tibia just proximad to it and not extending notably beyond surrounding setae. **Tarsi** dorsally clothed in white to translucent, linear scales. Tarsomere 5 about 1.5 times the length of tarsomere 3.

Male terminalia generally typical of the genus but with a sclerotized area mostly restricted to the frontal and lateral portions of the anterior (=proximal) end of the typically sac-like anterior portion of the endophallus. **Penis** with temones about 0.51 times the length of the pedon. **Tegmen** about 0.54 times the length of the penis, with manubrium comprising about 0.58 times the total length. **Endophallus** with distal, tubular sclerite in dorsal view cylindrical, slightly tapered apically, and notably widened near the posterior margin; slightly shorter than (0.92 times) the width of the pedon adjacent to endophallus; more-or-less straight in lateral view, not bent ventrally, tapered near apex and dorsally expanded near base; about 5.0 times as long as wide and about 0.12 times the length of the pedon; in ventral view with posterior ventral margin slightly concavely arcuate. Sac-like proximal portion of endophallus with a heavily sclerotized patch at proximal end, but this mostly confined to lateral and frontal (=anterior, = proximal) aspects. **Spiculum gastrale** with lateral margins of basal plate sigmoidal; basal plate about 0.67 times as wide as long, and about 0.32 times as long as the length of the apodeme.

Female terminalia typical of the genus. **Spiculum ventrale** with basal plate about 0.40 times the total length; basal plate bearing a heavily sclerotized, angularly diamond shaped patch surrounding the insertion of the apodeme. **Coxites** about 0.60 times the total length of spiculum ventrale. **Proximal gonocoxite** about 0.77 times as tall as long; **distal gonocoxite** about 0.98 times as tall as long; distal gonocoxite about 0.53 times the length of the proximal gonocoxite.

Variation. Appressed scale color in this species varies from pale blue to tan and the density of scale coverage in more-heavily scaled areas of pronotum and elytra is somewhat variable. Some specimens have a somewhat less rugose rostral dorsum or less pronounced nasal plate, but this typically seems to be related to rubbing, as though the raised areas have been polished down from wear.

Material examined.

Holotype by present designation: <u>Cayman Islands:</u> Cayman Brac: <u>National Trust Parrot Reserve:</u> male, “CAYMAN: Cayman Brac, Brac Parrot Reserve, 22 May 2009, R. Turnbow | N19°72.103 W79°78.811 [GPS data is incorrectly parsed on the label; the correct locality is: 19.72103, -79.78811]”, CWOB, ARTSYS0001378.

16 Paratypes by present designation: <u>Cayman Islands:</u> Cayman Brac: 1 female, “CAYMAN: Cayman Brac, N19°43.158’ W79°47.579’, 5 June 2008, R. Turnbow | Pachnaeus azurescens griseus Boh. det. C.W. O’Brien, 2009”, FSCA, ARTSYS0001383; <u>National Trust Parrot Reserve:</u> 1 male, 5 female, same data as holotype, CWOB, ARTSYS0001376, ARTSYS0001374, ARTSYS0001377, ARTSYS0001379, ARTSYS0001375, ARTSYS0007584; 1 male, “CAYMAN: Cayman Brac, Brac Parrot Reserve, 23 May 2009, R. Turnbow”, CWOB, ARTSYS0001380; 2 female, “CAYMAN: Cayman Brac, Brac Parrot Reserve, 24 May 2009, R. Turnbow”, CWOB, ARTSYS0001381, ARTSYS0007585; 2 female, “CAYMAN: Cayman Brac, Brac Parrot Reserve, 25 May 2009, R. Turnbow”, CWOB, ARTSYS0001382, ARTSYS0007586; 1 female, “CAYMAN ISLANDS: Cayman Brac, Bight Road [North Hiking Trail] at Maj. Donald Dr., 24 - V - 2009, Col.: M.C. Thomas | Pachnaeus azurescens griseus Boh. det.

C.W. O'Brien, 2009", FSCA, ARTSYS0001384; 1 female, same data as previous specimen, CWOB, ARTSYS0007587; 1 female, "CAYMAN ISLANDS: Cayman Brac, Bight Road [North Hiking Trail] at Maj. Donald Dr., 24 - V - 2009, Col.: M.C. Thomas", CWOB, ARTSYS0001385; <u>Eastern Bluff:</u> 1 male, "CAYMAN IS.: Cayman Brac Brac Paradise Subdivision N19°44.688' W79°44.359' R.H. Turnbow, B.K. Dozier blacklight trap | Pachnaeus azurescens griseus Boh. det. C.W. O'Brien 2009 | FSCA_BD_01", FSCA, ARTSYS0001386.

1 other specimen: 1 male, "Pachnaeus azurescens griseus Boh. det. C.W. O'Brien 2009 | FSCA_004", FSCA, ARTSYS0007588.

Etymology. The specific epithet *godivae* refers to Countess Godgifu of Mercia, more commonly known as Lady Godiva, an Anglo-Saxon countess who, according to legend, rode naked through the streets of Coventry in order to gain remission from oppressive taxation imposed on the people by her husband. The name is a reference to the sparse scaling in this species, which gives it a heavily denuded appearance, making specimens generally a chocolatey brown in overall coloration. This name is a noun in the genitive case and is feminine.

Geographical distribution and chorological affinities. This species is known only from Cayman Brac. No other species is known to occur on this island.

Biology. Very little is known about the biology of this species, but it has been collected from late-May to early-June and it was taken once in a blacklight trap.

***Pachnaeus andersoni* Reily, sp. nov.**

Figs. 3.25, 3.85F, 3.89

Diagnosis. This species is known only from Little Cayman Island and is generally similar to the preceding, Cayman Brac species, *P. godivae* Reily, sp. nov. However, the present species can be distinguished from its more heavily denuded Cayman Brac counterpart by having its elytral disc more densely covered with appressed, pale blue scales, with only small patches of underlying integument visible around them. Males also lack the heavily sclerotized patch at the proximal (=anterior) end of the membranous, sac-like portion of the endophallus as seen in the preceding species. This Little Cayman species, for which known representation is limited to the male holotype, also has a deep, longitudinal, medial incision at the base of the occiput (Fig. 3.25A) that has not been observed in other species of the genus.

Description. Habitus somewhat typical of the genus but sparsely scaled**.** Body length 9.0 mm. Body width at elytral bases 4.0 mm. Integument rufocastaneous and clearly visible on much of legs, head, pronotal disc and on elytra between scales. The elytra are moderately scaled in appressed, oval, pale blue scales both dorsally and laterally; however, elytral scaling is generally denser laterally than dorsally. The pronotum is similarly scaled to the elytra laterally, but dorsally the disc is mostly denuded of appressed scales and somewhat glabrous. The legs are sparsely scaled in mix of pale blue, appressed, scales and translucent, setose scales, around which much of the denuded and glabrous integument is visible. The head is mostly denuded excepting a few sparse, appressed scales ventral to and between the eyes, and elongate, translucent setose scales and a few appressed, pale blue scales on the epifrons.

Head typical of the genus. **Occiput** with a deeply impressed, median, longitudinal sulcus at base. **Interocular pit** very small and with a slightly impressed, linear, longitudinal impression posteriorly. **Eyes** oval, very slightly taller than wide, slightly protruding laterally from head in males. **Rostrum** with carinae nearly obsolete, with only a few slightly raised, glabrous ridges on the epifrons, and comprising slightly over half the entire length of the head. **Median rostral carina** as an only very faintly raised, longitudinal mound near middle of the epifrons. **Intercarinal rostral spaces** not impressed between median and lateral carinae, not strongly rugose, but with a pair of anteriorly diverging raised, linear, glabrous patches, and bearing sparse, elongate, translucent, setose, appressed to subappressed scales and a few, oval, pale colored, appressed scales. **Lateral rostral carinae** not notable raised, not clearly defined dorsally or laterally, and not distinctly demarcated from the lateral portion of the epifrons anterior to the eye. **Lateral portion of epifrons anterior to the eye** obliquely dorsally faced and subplanar. **Scrobe** arcuate, not widened posteriorly. **Occipital sutures** laterally open, short but longitudinal, pit-like foveae, slightly obscured by a few appressed scales near the anteroventral margin of the eye. **Frons** very weakly declined from epifrons; mostly denuded except for a few, very small, oval, appressed scales, these mostly restricted anterolaterally. **Nasal plate** very slightly raised and bearing long setae set in punctures along the posterior margin. **Mandibles** apically bearing numerous, long setae surrounding the mandibular scar. **Submentum** about 1.5 times as long as wide, not impressed, moderately clothed with subappressed oval, pale scales, with a few suberect, short, setose scales intermixed anteriorly.

Antennae typical of the genus. **Scape** extending behind posterior margin of eye. **Funicle** with last two segments subconical.

Thorax typical of the genus. **Pronotum** somewhat trapezoidal. Pronotal collar slightly laterally constricted and delimited by a groove behind the postocular lobe. Pronotal disc without a pair of posteriorly diverging ridges, but slightly impressed medially near the base. Pronotum dorsally heavily denuded and glabrous excepting scattered short, translucent elongate scales and just a few, scattered, pale blue, appressed, oval scales; laterally moderately clothed in sparse, pale blue, appressed, oval scales with translucent, elongate scales intermixed. **Pronotal bases** weakly bisinuate to accommodate the slightly overhanging elytral bases. **Postocular lobe** small, anteriorly projected as an anteriorly truncate projection, very slightly laterally expanded apically. **Postocular vibrissae** clearly visible, moderately long, anterodorsally directed, and longest near the middle of the postocular lobe. **Prosternum** moderately clothed in confused, pale blue, oval, appressed scales, with a few, erect setose scales interspersed. **Mesoventrite** somewhat sparsely clothed in pale blue, oval, appressed scales. Mesoventrite intercoxal process with short, setose scales intermixed. **Metaventrite** moderately covered in pale blue, oval, appressed scales with many short, setose scales intermixed. Distance between mesocoxa and metacoxa about 2 times the diameter of the mesocoxa. **Mesepisternum** sparsely clothed with a few, overlapping, pale blue, oval, appressed scales, these mostly concentrated anteriorly, and a few subappressed, short, pale setose scales. **Mesepimeron** similarly scaled to mesepisternum, but scales more evenly distributed and with more subappressed, short setose scales intermixed. **Metepisternum** similarly scaled to mesepimeron immediately behind the anterior margin, scales slightly sparser posterior to this. **Scutellar shield** subquadrate, the posterior margin rounded, and sparsely covered in pale blue, oval, appressed scales.

Abdomen with ventrites 1 to 4 very sparsely scaled with pale blue, oval, appressed scales and many pale, suberect, elongate, setose scales. Ventrite 5 similarly scaled, but apically densely clothed in suberect, pale, setose scales with many longer erect setae intermixed.

Elytra entirely but somewhat sparsely scaled, with much of the underlying integument visible between scales; scaling notably sparser dorsally on the elytral disc than laterally or on the declivity. Elytral striae composed of small but distinct, round punctures which are rarely overlapped by scales. Elytral bases only very slightly bisinuate, slightly linearly projecting anteriorly from scutellum to near mid-elytron, nearly truncate laterad to this and with a slight forward projection just mediad to the humerus. Anteriorly directed toothlike projection mediad to elytral humeri absent, but the forward projection near the humeri is somewhat pronounced and there is a slight impression on the disc posteromediad to this. Elytral humeri obtusely angulate.

Legs typical of the genus. **Coxae** somewhat sparsely clothed in pale blue, appressed scales with pale, elongate, subappressed, setose scales intermixed. **Trochanters** bearing a few sparse, pale, elongate appressed scales. **Femora** very sparsely scaled and notably glabrous, with only a few sparse, pale, oval appressed scales and many sparse, short subappressed to suberect, setose scales. **Tibiae** scaled similarly to femora, and with just a few denticles along the ventral side. Protibiae apically nearly straight. Protibial mucro much shorter than the width of the tibia just proximad to it and not extending notably beyond the surrounding setae. **Tarsi** dorsally clothed in white, linear scales. Tarsomere 5 about 1.5 times the length of tarsomere 3.

Male terminalia typical of the genus. **Penis** with temones about 0.40 times the length of the pedon. **Tegmen** about 0.57 times the length of the penis, with manubrium comprising about 0.63 times the total length. **Endophallus** with distal, tubular sclerite in dorsal view cylindrical, slightly tapered apically, and notably widened near the posterior margin; slightly shorter than (0.96 times) the width of the pedon adjacent to endophallus; more-or-less straight in lateral view, not bent ventrally, tapered near apex and dorsally expanded near base; about 3.7 times as long as wide and about 0.12 times the length of the pedon; in ventral view with posterior ventral margin concavely arcuate. Sac-like proximal portion of endophallus entirely membranous. **Spiculum gastrale** with lateral margins of basal plate sigmoidal; basal plate about 0.59 times as wide as long, and about 0.34 times as long as the length of the apodeme.

Female terminalia unknown.

Material examined.

Holotype by present designation (Fig. 3.25): <u>Cayman Islands:</u> Little Cayman: male, "CAYMAN: Little Cayman, North Coast Rd. 26 May 2009 R. Turnbow", CWOB, ARTSYS0007583.

Etymology. The specific epithet *andersoni* honors Dr. Robert "Bob" S. Anderson, who helped to locate many of the specimens used in the present work and who has provided critical advice and support at various stages of manuscript preparation. This name is a noun in the genitive case and is masculine.

Geographical distribution and chorological affinities. This species is known only from Little Cayman Island. No other species is known to occur on the island.

Biology. Very little is known about the biology of this species, but the holotype was collected in late-May.

Tentative but problematic paired pronotal punctation characters for an [*opalus* group + *pater* group] species group

There seems to be a large group of species which occur throughout Cuba, the Lucayan Archipelago, and the continental United States that differ from other members of the genus by having a pair of paired punctures surrounding the midline of the pronotal disc—these generally near the middle of the disc—and a secondary pair of paired pronotal punctures posterior to this—these generally in the basal quarter to sixth of the disc— and in this group the posterior pair are more narrowly separated than the anterior pair. This is in contrast to some Jamaican species, *e.g., Pachnaeus citri* Marshall, 1916, which, when paired punctures are present—they are not consistently present within this species as is suggested by Marshall (1916) and exemplars I have examined range from having no notable paired pronotal punctures to one or both pairs clearly visible—have the more posteriorly located pair of punctures more widely separated than the anterior pair.

This larger group with a pair of pronotal punctures more closely set than the posterior pair includes the *opalus* species group as presently circumscribed, the *pater* species group and, potentially also *Pachnaeus psittacus* (Olivier, 1807) and *Pachnaeus obrienorum* Reily, sp. nov.—see discussion on questionable placement of paired pronotal punctures under these species.

Note that, for all species, the posterior pair of discal punctures in the basal quarter to sixth of the disc should not be confused with a pair of punctures or bare patches at or near the posterior pronotal margin just adjacent to the fourth elytral intervals. These pronotal base punctures or bare patches are variably present in many species of the genus, though they seem to be consistently absent in members of the *litus* species group. These pronotal base punctures do not seem to be otherwise greatly informative of relationships between taxa within this genus.

Confounding the utility of paired pronotal puncture characters—and the reason I have largely avoided them for delimiting larger groupings—is the fact that any to all of these pairs of punctures may be covered by scaling or simply absent within some individuals irrespective of species. However, mid-discal puncture location nevertheless does seem to be fairly consistent and diagnostic of larger groups of species when presented with a large enough series of specimens to ascertain what placement is typical, if not reliably constant, for the species.

***opalus* species group**

Diagnosis. This group of species native to eastern Cuba, the eastern continental United States, and the Lucayan Archipelago and can be distinguished from similar species by their medially convex and irregularly punctured pronotal discs. These irregular pronotal punctures are finer and shallower in *Pachnaeus azurescens* Gyllenhal in Schoenherr, 1834 than in other members of this species group, yet irregular punctures are still also consistently present in this species.

***azurescens* species subgroup**

Diagnosis. These typically pastel, blue green to bluish grey scaled species can be separated from other, similar members of the genus by their relatively truncate elytral bases and by the endophallic sclerites in ventral view being similarly shaped and notably thinner than is typical of the genus (Fig. 3.85G–H). Admittedly, this genitalic character is a difficult to use for diagnosis, but it does seem to unite these species, as does their extreme external similarity in scale color and pattern, overall similarity in form, and shared irregularly punctate, medially convex pronotal discs.

***Pachnaeus opalus* (Olivier, 1807: 339)**

Figs. 3.26C–D, 3.27–3.30, 3.85G, 3.90

= *Curculio opalus* Olivier, 1807: 339 (original combination)

Olivier 1808: No. 83 Charanson, pl. 24, fig. 345; Sherborn 1929: 4583; Sherborn 1932: 386

Type species of *Docorhinus* Schoenherr, 1823: c. 1140 by original designation.

Docorhinus Schoenherr, 1823 was proposed for suppression for the purposes of the Principle of Priority but not for the purposes of the Principle of Homonymy and requested to be placed on the Official Index of Rejected and Invalid Generic Names in Zoology by Reily and Franz 2019.

Docorhinus opalus (Olivier, 1807) sec. Schoenherr 1823: c. 1140

Sherborn 1929: 4583; Sherborn 1932b: 431, Alonso-Zarazaga and Lyal 1999: 179

Type species of *Pachnaeus* Schoenherr, 1826: 11, 122 by original designation

Pachnaeus Schoenherr, 1826 was requested to be placed on the Official List of Generic Names in Zoology by Reily and Franz 2019.

Pachnaeus opalus (Olivier, 1807) sec. Schoenherr, 1826: 11, 122

Gyllenhal in Schoenherr, 1834: 58; Schoenherr 1834b: c. 420; Dejean 1836: 276; Ersch and Gruber 1836: 59; Boheman in Schoenherr 1840: 425; Laporte de Castelnau 1840: 309; Sturm 1843: 196; Stephens in Smedley et al. 1845: 2; Chevrolat in d'Orbigny 1847: 381; LeConte in White 1849: 33; Jekel 1849: 87; Blanchard et al. 1850: 309; Leclerc 1856 : 291; Melsheimer 1853: 96; Lacordaire 1863: 107, note 1; Chevrolat in d'Orbigny 1869: 249; Taschenberg 1869: 140; Crotch 1874: 117; Schwarz in Hubbard and Schwarz 1878: 456 (in part); Horn 1886: 140; Schwarz 1889: 170 (in part; St. Augustine, Florida records reported here from the collection of Charles Johnston are likely correctly identified, other references are misidentifications for *P. litus* (Germar)); Riley 1882: 916; Wickham 1909: 405 (Crescent City records are likely this species, Estero records may or may not be); Pierce 1913: 400; Watson 1914: lxv; Lucas 1915: 183; Watson 1914b: 751 (review of Watson 1914); Blatchley and Leng 1916: 117 (in part in reporting records by Schwarz in Hubbard and Schwarz 1878: 456); Schwarz and Barber 1922: 30; Blatchley 1925: 90–91; Leng and Mutchler 1927: 46; Sherborn 1929: 4583; Guenther and Zumpt, 1933: 105; Brimley 1938: 235; Snapp 1938: 466; USDA 1938: 683; Löding 1945: 141; Wolfenbarger 1952: 139; Griffiths and Thompson 1957: 72; Woodruff 1962: 1; Ebeling 1959: 227, 273, 282, 426; Mead 1964: 575; Kipp 1970: 39; Beavers and Woodruff 1971: 1–2; Beavers and Selhime 1975: 31; Altieri and Whitcomb 1979: 178; Woodruff 1979; Beavers et al. 1980; Lovestrand and Beavers 1980; Woodruff 1981; O'Brien & Wibmer 1982: 46; Bullock 1985; Knapp 1985; Woodruff 1985: 374; Tarrant and McCoy 1989; Suggars Downing et al. 1991; Lopez Castilla 1992: 1; Schroeder 1992; Futch and McCoy 1993; Howden 1993: 3; Fontes et al. 1994: 212; Sherman and Mizell 1995; McCoy 1999; Morrone 1999: 145; Bloem et al. 2002: 642; Weathersbee et al. 2003: 641; Dolinski and Lacey 2007: 165; Senchina 2008: 203; Jacas et al. 2009: 113; Jacas et al. 2010; Olmstead et al. 2013: 7; Cranshaw and Shetlar 2018: 474

There has been a great deal of confusion over the identity of this species in past, much of it stemming from Horn (1876) who applied to this name to *P. litus* (Germar, 1824) and simultaneously erected the objective junior synonym *Pachnaeus distans* Horn, 1876 for the present species. It was not until Moznette (1921) recognized this mistake and Schwarz and Barber (1922) formally explained it that these nomenclatural errors came to light. As such, many records for this name appearing between 1876 and 1922—and a few later records where erroneous identity could be established—are treated below under

Pachnaeus opalus (Olivier, 1807) sec. Horn, 1876 in the synonymy section for *Pachnaeus litus* (Germar, 1824).

Pachnaeous opalus Schroeder and Beavers 1977: 498

Incorrect subsequent spelling of *Pachnaeus* Schoenherr, 1826.

Pachnaeus opalescens Marshall, 1916: 454

Incorrect subsequent spelling.

Pachnaeus opalis (Olivier, 1807) sec. Habeck 1989: 331

Incorrect subsequent spelling.

Pachneus opalis (Olivier, 1807) sec. Tamburo and Butcher 1955: 69

Incorrect subsequent spelling and incorrect subsequent spelling of *Pachnaeus* Schoenherr, 1826.

Pachnaeus opilus Sherborn 1933: 780

Incorrect subsequent spelling.

Pachnaeus opulus (Olivier, 1807) sec. Drapiez 1842: 261

Incorrect subsequent spelling.

Pachneus opalus (Olivier, 1807) sec. Gemminger and Harold, 1871: 2225

Unjustified emendation of *Pachnaeus* Schoenherr, 1826 employing ë in place of ae. Laessle 1945: 162, 169 (spelled correctly in index, p. 289; may be, in part or whole, a misidentification of *P. litus* (Germar, 1824)); Schauff 1987: 34; Jeppson 1989: 56; Schroeder 1992: 563 (misspelled only in *resumen*).

Pachyneus opalus (Olivier, 1807) sec. Watson 1938b: 281

Incorrect subsequent spelling of *Pachnaeus* Schoenherr, 1826.

nec Pachnaeus opalus (Olivier, 1807) sec. Wickham in Nutting 1895: 41, 207

Misidentification of *Pachnaeus obrienorum* Reily, sp. nov.

nec Pachnaeus opalus (Olivier, 1807) sec. Horn, 1876: 82

Misidentification of *Pachnaeus litus* (Germar, 1824).

nec Pachnaeus opalis Horn, 1876 sec. Moznette 1921: 24

Incorrect subsequent spelling of *Pachnaeus opalus* (Olivier, 1807) sec. Horn, 1876.

Pachnaeus opalus chrysocollus Dejean, 1836: 276

Subspecific per Art. 45.6.4. Nomen nudum, not available as it fails to meet the requirements of Art. 12 (ICZN 1999).

Pachneus opalus chrysocollis Gemminger and Harold, 1871: 2225

Unjustified emendation of *Pachnaeus* Schoenherr, 1826 employing ë in place of ae. This name is, additionally, subspecific per Art. 45.6.4 and is an incorrect subsequent spelling of the nomen nudum *Pachnaeus opalus chrysocollus* Dejean, 1836.

Guenther and Zumpt, 1933: 105

Pachnaeus sp. Watson 1938: 112

=*Pachnaeus distans* Horn, 1876: 83

Bertkau 1876: 424; Rye 1876: 79; Bertkau 1878: 216; Schwarz in Hubbard and Schwarz 1878: 456; Austin 1880: 44; Riley 1884: 20; Henshaw 1885: 135; Beutenmuller 1890: 201; Packard 1890: 222; Riley 1882: 916; Beutenmuller 1893: 38; Hamilton 1894: 253; Riley 1893: 21; Henshaw 1898: lxvi; Slosson 1895: 135; Castle and Laurent 1897: 9; Skinner 1903: 339; Titus and Pratt 1904: 8; Currie1905: 7; Sledd 1905: 27; Pierce 1907: 254; Houser 1909: 52; Pierce 1909: 358; Smith 1910: 379; Champion 1911: 181; Blatchley 1914: 247; Marshall 1916: 454; Blatchley and Leng 1916: 118; Leng 1920: 312; Manee 1924:40; Chapin 1925: 37

Synonymized by Schwarz and Barber 1922: 30

As a synonym of *P. opalus* (Olivier): Imperial Bureau of Entomology 1924: 225; Blatchley 1925: 91; Leng and Mutchler 1927: 46; Guenther and Zumpt, 1933: 105; Wolfenbarger 1952: 139; Woodruff 1981; O’Brien & Wibmer 1982: 46; Morrone 1999: 145

Diagnosis. This variable but typically blue green scaled species is native to the continental United States and can be distinguished from co-occurring congeners by its relatively truncate elytral bases which lack anteriorly directed, dentiform protrusions on the elytral bases just mediad to the elytral humeri. It is also separable by its moderately punctate to coarsely rugose pronotal disc and by its relatively short and deep, typically tricarinate, and dorsally non-tumescent rostrum (Fig. 3.26C–D). This final, rostral character is necessary to separate this species from the very similar *Pachnaeus azurescens* Gyllenhal in Schoenherr which has been introduced into Florida in the recent past and which has, instead, a dorsally convexly subplanar to strongly convexly tumescent epifrons (Fig. 3.26A–B).

Redescription. Habitus typical of the genus. Body length 7.5 to 13.5 mm. Body width at elytral bases 3.0 to 6.0 mm. Integument variable, ranging from testaceous to piceous. Densely clothed in a mix of appressed, circular, pale—usually turquoise but occasionally grey or tan—scales with sparser, subappressed, elongate and typically flattened, white to translucent scales intermixed. Elytral scales typically uniformly colored, in a few specimens the elytral humeri are slightly lighter in color or there are irregularly scattered, small patches which are slightly paler than the base color, but elytra never with distinct patches or stripes of paler scales as seen in some other species. Pronotum usually similarly colored to elytra, but often with variably expressed longitudinal patches of paler scales dorsolaterally and often a paler scaled just anterior to the posterior pronotal margin. A few specimens have a paler longitudinal stripe or patch along much of the discal midline of the pronotum. Leg and head scales similarly colored to body scales or slightly paler; in some turquoise-bodied specimens from Monticello, Jefferson County, heads and legs are off white to tan.

Head typical of the genus. **Occiput** without a median, longitudinal sulcus at base. **Interocular pit** extremely small, and in most specimens inconspicuous. **Eyes** oval, slightly taller than wide, not protruding laterally from head in females, very slightly so in males. **Rostrum** with carinae variable, but in most specimens tricarinate and with the distance between the lateral carinae typically widening posteriorly, but some specimens have the central carina obsolete, or nearly so; rostrum short and stout, comprising at most about half the entire length of the head. **Median rostral carina** variably expressed—ranging from slightly raised as a narrow hump to subplanar or even slightly convexly mound like—and denuded in a thin, impunctate line along the center line from the posteromedial margin of the frons to or just posterior to the interocular pit. **Intercarinal rostral spaces** usually very slightly impressed in lateral half between median and lateral carinae, these impressions usually deepest just anterior to the anterior margin of the eye; densely clothed in overlapping, appressed to subappressed, circular to oval scales with a few flattened, subappressed, setose scales intermixed. **Lateral rostral carinae** typically slightly but notably raised, clearly defined dorsally and laterally, and distinctly demarcated from the lateral portion of the epifrons anterior to the eye. **Lateral portion of epifrons anterior to the eye** dorsally to obliquely dorsally faced and concavely impressed, typically deeply and distinctly so. **Scrobe** arcuate, not widened posteriorly. **Occipital sutures** laterally open, short but longitudinal, pit-like foveae, with edges mostly obscured by scales in most specimens. **Frons** somewhat weakly but angularly declined from epifrons, typically slightly concave medially; moderately densely covered in oval, appressed scales except on the anterior portion of the nasal plate. **Nasal plate** very slightly raised, often with a few appressed oval scales on the posterior half but anteriorly nude, and bearing a few long setae set in punctures along the posterior margin. **Mandibles** apically bearing numerous, long setae surrounding the mandibular scar. **Submentum** less than 1.5 times as long as wide, slightly impressed, somewhat densely clothed with subappressed to suberect oval, pale scales, with many suberect, short, setose scales intermixed.

Antennae typical of the genus. **Scape** extending to the posterior margin of eye. **Funicle** with last two segments subconical.

Thorax typical of the genus. **Pronotum** variably shaped—in females typically trapezoidal, widening evenly anteriorly; in males the posterior half or more typically parallel sided; laterally inflated near the middle in a few male specimens from North Carolina and Georgia. Pronotal disc, at least laterally, variably but distinctly irregularly punctate or rugose. Pronotal collar slightly laterally constricted and delimited by a groove behind the postocular lobe, but this often obscured partly or wholly by scales. Pronotal disc without a pair of posteriorly diverging ridges and not notably medially impressed. Clothed in overlapping, appressed, circular scales with many subappressed, short, setose scales intermixed; bearing many, small, irregularly placed punctures. **Pronotal bases** weakly bisinuate to accommodate the slightly overhanging elytral bases. **Postocular lobe** small, anteriorly projected as an anteriorly rounded, obtuse projection, and slightly laterally expanded apically. **Postocular vibrissae** clearly visible, moderately long, anterodorsally directed, and longest at the middle of the postocular lobe. **Prosternum** densely clothed in confused, circular to oval, pale scales with a few, erect setose scales interspersed. **Mesoventrite** densely clothed in overlapping, pale, oval, appressed scales. Mesoventrite intercoxal process with many short, setose scales intermixed. **Metaventrite** densely covered in overlapping, pale, circular, appressed scales with many short, setose scales intermixed. Distance between mesocoxa and metacoxa about 2 times the diameter of the mesocoxa. **Mesepisternum** densely clothed in overlapping, pale, circular, appressed scales with a few subappressed, short, pale setose scales intermixed. **Mesepimeron** similarly scaled to mesepisternum. **Metepisternum** similarly scaled to mesepimeron, though scales very slightly denser immediately behind the anterior margin. **Scutellar shield** variably shaped, though typically subquadrate with the posterior margin rounded to ogival; usually densely covered in pale, oval, appressed scales.

Abdomen with ventrites 1 to 4 densely scaled with pale, circular scales and many subappressed, elongate, scales. Ventrite 5 similarly scaled, but appressed scales more elongate oval than on preceding segments; apically, medially, and along the lateral margins with many long, erect setae intermixed.

Elytra entirely and densely scaled. Elytral striae composed of small but distinct, round punctures which are rarely overlapped by scales. Elytral bases only very slightly bisinuate, typically slightly linearly projecting obliquely anteriorly from scutellum to near mid-elytron, nearly truncate laterad to this; in some specimens with a slight forward projection just mediad to the humerus. Anteriorly directed toothlike projection mediad to elytral humeri absent. Elytral humeri obtusely angulate.

Legs typical of the genus. **Coxae** densely clothed in pale, overlapping, appressed scales with many elongate, subappressed. pale. setose scales intermixed. **Trochanters** somewhat densely covered in elongate, pale, appressed scales. **Femora** densely covered in circular to oval, pale, appressed scales with many short subappressed, white, setose scales intermixed. **Tibiae** scaled similarly to femora and with a few, small denticles along the ventral side. Protibiae slightly apically bent inward. Protibial mucro much shorter than the width of the tibia just proximad to it, not extending notably beyond surrounding setae. **Tarsi** dorsally clothed in pale, linear scales. Tarsomere 5 about 1.5 times the length of tarsomere 3.

Male terminalia typical of the genus. **Penis** with temones about 0.63 times the length of the pedon. **Tegmen** about 0.55 times the length of the penis, with manubrium comprising about 0.65 times the total length. **Endophallus** with distal, tubular sclerite in dorsal view subcylindrical, slightly tapered near the apex and very slightly widened near the base; longer than (1.26 times) the width of the pedon adjacent to endophallus; nearly straight in basal half and notably ventrally curved in apical half in lateral view, tapered near apex; about 6.6 times as long as wide and about 0.19 times the length of the pedon; in ventral view with posterior ventral margin truncate to very slightly concavely arcuate. Sac-like proximal portion of endophallus entirely membranous. **Spiculum gastrale** with lateral margins of basal plate convex and subarcuate; basal plate about 0.70 times as wide as long, and about 0.36 times as long as the length of the apodeme.

Female terminalia typical of the genus. **Spiculum ventrale** with basal plate about 0.42 times the total length; basal plate at insertion of apodeme lacking a heavily sclerotized angular patch. **Coxites** about 0.56 times the total length of spiculum ventrale. Proximal gonocoxite about 0.62 times as tall as long; distal gonocoxite about 0.95 times as tall as long; distal gonocoxite about 0.44 times the length of the proximal gonocoxite.

Variation. This species is rather variable (Figs. 3.27–3.29). Scale coloration ranges from mint green to purplish grey to tan. In some green-bodied Florida specimens, the heads are white or even tan to cupreous in scale coloration. Outside of Florida, head scale color seems to more typically match body color. The extent to which the paler lateral scale patches on the pronotum are expressed is rather variable and in a few specimens there is a pale colored stripe that extends along the pronotal midline (Fig. 3.29E–F), sometimes as far anteriorly as to near the anterior margin of the pronotal disc, similar to as seen in the typical form of *P. litus* (Germar) or the typical form of *P. citri* Marshall. Rostral carinal structure varies rather widely, but the lateral carinae are typically at least slightly raised above the level of the surrounding epifrons, and the epifrons is never medially raised as a tumescent convex mound as in *P. azurescens* Gyllenhal in Schoenherr. Pronotal sculpturing is variable, ranging from distinctly, irregularly rugose to faintly irregularly punctured, but never wholly impunctate as in *P. litus* (Germar). Shape, size, amount of lateral expansion, and ventral extent of the postocular lobes are also highly variable.

The mottled, grey- to tan-colored, and generally more narrow-bodied population from the Miami area (Fig. 3.30 and inaturalist.org/observations/21118372) is treated here as intraspecific variation. However, this form may be worthy of re-evaluation for treatment at the species level if additional specimens can be located as this population seems to be rather distinct in form in comparison to other variation seen within the species. Future reconsideration of these specimens seems further merited given that this population occurs significantly south of the historically known range of this species (see map in Woodruff 1981).

There is some overlap in color pattern between this species and *P. litus* (Germar), the Florida population of which typically has a paler colored stripe which runs most or all the way down the midline of the pronotum. This pale medial stripe is very uncommon in *P. opalus* (Olivier), but is rarely present—*e.g.*, in specimens from Myakka River State Park, Sarasota County, (Fig. 3.29, ARTSYS0001220, ARTSYS0007379). Specimens with this pronotal stripe are uncommon and seem to be mostly south of the historically reported boundary of these species within Florida in places with other problematic records reported by Woodruff (1981). It is possible that this may be the result of some small amount of gene flow between these taxa, *i.e.*, hybridization, in this area or it could simply be phenotypic or genotypic variation within the present species.

Material examined.

Lectotype by subsequent designation (Reily and Franz 2019): <u>USA:</u> "*Caroline*": male, "MUSEUM PARIS CAROLINE COLL. BOSC 1828 [cream label with thin black border] | TYPE [red label] | opalus. lina bos [handwritten cream label with thick black border at bottom]", MNHN.

Paralectotype by subsequent designation (Reily and Franz 2019): <u>USA:</u> "*Caroline*": female, "COLLECTION OLIVIER TYPE [green circular label with thin black border]", MNHN.

143 other specimens: 1 female, "[dark blue disc] | [Daniel] Ziegler., Pachnaeus Schonh.", MCZ, [MCZ-ENT 00]529388.

<u>USA:</u> Alabama: <u>Baldwin Co.:</u> 1 female, "Ala: Baldwin Co. 1 mi. N Foley June 12, 1982, Coll. E.G. Riley", CWOB, ARTSYS0001229; <u>Dale. Co.:</u> 1 male, "Ala. Dale Co. Ft.

Rucker Mil. Res. 26 May 1989 R. Turnbow", CMNC, ARTSYS0007404; Mobile Co.: 1 male, "Mobile Ala-V-21 Loding | [blank green label]", ANSP, ARTSYS0001551; Russell Co.: 1 female, "Russel Ala | Col. by EN White | Pres. by E.B. Chope", FMNH, ARTSYS0007403; **Florida:** 3 female, 1 male, "Fa.", ANSP, ARTSYS0007359, ARTSYS0007360, ARTSYS0007361, ARTSYS0001552; 1 male, ".Fla | [underside of same label, perhaps reused paper?] Latty | F M N H Col. No. (E Chope Coll) | 8309 [in reference to Samuel Henshaw's number for this species]", FMNH, ARTSYS0007366; 2 female, 1 male, "Fla. | F M N H Col. No. (E Chope Coll)", FMNH, ARTSYS0007367, ARTSYS0007368, ARTSYS0007369; 1 female, "Fla | U.S. America: Florida | Pres. by Imp. Bur. Ent. Brit. Mus. 1922—449.", NHMUK, ARTSYS0007365; Alachua Co.: 1 female, "Gainesville, FLA. V-16-1966 J.W. Perry Blacklight trap", CWOB, ARTSYS0001217; 1 male, "Gainesville, FLA. Alachua County V-18-1969 | R.L. Westcott Collector", CMNC, ARTSYS0007377; 1 female, "Gainesville FLA. Alachua Co. V-16-1970 F.W. Mead | UV. Trap", CWOB, ARTSYS0001218; 1 male, "FLORIDA: Alachua Co., Gainesville | D.W. Meifert 8-V-72", FSCA, ARTSYS0001231; 1 male, "FLORIDA: Alachua Co., San Felasco Hammock State Preserve 25-VI-1987 Randall W. Lundgren | to fluorescent light at night", CWOB, ARTSYS0001225; 1 male, "FLA: Alachua Co., Gainesville 3-VII-1996 Coll. A.K. Rasmussen", CWOB, ARTSYS0001219; 1 female, "Gainesville, FL 32611, UF Natural Area 29.63481, -82.37023 17-II-12 DAY", MJC, ARTSYS0007405; Brevard Co.: 1 male, "Courtenay, FLA. Brevard County | G.T. Smith 3-VI-70 | Valencia | at Citrus sinensis", FSCA, ARTSYS0001235; Broward Co.: 1 male, "Peter Rauch 16 Mar 63 Ft. Lauderdale, Fla", CWOB, ARTSYS0001222; Charlotte Co.: 1 female, "Fl: Charlotte Co. Pt. Charlotte I-

III/98 E. &J. Huether", CMNC, ARTSYS0007382; 2 male, "FLORIDA, Charlotte Co. Harbor Heights, 30 July 1996, S.M. Clark", CWOB, ARTSYS0001206, ARTSYS0001207; Duval Co.: 1 female, "FLORIDA: Duval Co. Jacksonville | G. Virgona 11-VI-81 | Thuja orientalis", FSCA, ARTSYS0001236; 1 male, "R. Foster. St. John's Bluff, East Florida | Ent. Club. 44-12.", NHMUK, ARTSYS0007372; Flagler Co.: 1 male, 1 female, "FLORIDA: Flagler Co. nr.Palm Coast, 4 mi.S. Washington Oaks Garden St.Pk.; 8-V-1993 P.&L.Skelley,at night", CWOB, ARTSYS0001210, ARTSYS0001211; Franklin Co.: 1 male, 1 female, "FL. FranklinCo. 1 mi.S.Ochlockonee Bay, 4-V-1997 C.W. O'Brien", CWOB, ARTSYS0001208, ARTSYS0001209; Hamilton Co.: 1 male, "Fla. Hamilton Co. 3mi.WWhiteSprings at lite 8 May 1974 R. Turnbow", CWOB, ARTSYS0001223; Highlands Co.: 1 female, "Avon Park, FLA. Highlands Co. | A.L. Collier Coll. 27-V-69", FSCA, ARTSYS0001234; Hillsborough Co.: 1 female, "Tampa Fla.", ANSP, ARTSYS0007362; 1 male, "FLA. Hillsborough River State Park 30-VII-1976 | Collector: C.W. O'Brien", CWOB, ARTSYS0001221; Jefferson Co.: 1 female, "FL.JeffersonCo. 3mi.E.Monticello 18-VII-1993, R. Mizell | Peach Orchard, Tedder Trap", CWOB, ARTSYS0001192; 1 male, "FL.JeffersonCo. 3mi.E.Monticello 18-VIII-1993, R. Mizell | Tedder Trap in forest", CWOB, ARTSYS0001193; 1 female, "FL.JeffersonCo. 3mi.E.Monticello 9-IX-1993, R. Mizell | Pecan Grove, Tedder trap", CWOB, ARTSYS0001194; 3 female, 1 male, "FL.Jefferson Co., Monticello, 7-v-1995 Russ Mizell | yellow Tedder trap. Lab woods", ASUHIC, ASUHIC0088731, ASUHIC0088732, ASUHIC0088733, ASUHIC0088734; 2 female, 5 male, "FL.Jefferson Co., Monticello, 27-v-1996 Russ Mizell | yellow Tedder trap", ASUHIC, ASUHIC0088735, ASUHIC0088740, ASUHIC0088736, ASUHIC0088737,

ASUHIC0088738, ASUHIC0088739, ASUHIC0088741; 2 female, 1 male, "FL.JeffersonCo., Monticello,lab peach,28-V-1998, R.Mizell", CWOB, ARTSYS0001195, ARTSYS0001196, ARTSYS0001197; 1 male, "FL.JeffersonCo., Monticello, 30-IX-2000,R.Mizell,per- simmon&pecan", CWOB, ARTSYS0001198; 1 female, "FL.JeffersonCo., Monticello, VI-8- 2001, pecanCircle trap C.W.O'Brien", ASUHIC, ASUHIC0088742; 1 female, "FL.JeffersonCo., Monticello, VI-8- 2001, pecanCircle trap C.W.O'Brien", CWOB, ARTSYS0001199; 1 male, "FL.JeffersonCo., Monticello,peach- persimmon,VI-15-2001,R.Mizell", ASUHIC, ASUHIC0088743; 3 female, "FL.JeffersonCo., Monticello,peach- persimmon,VI-15-2001,R.Mizell", CWOB, ARTSYS0001200, ARTSYS0001201, ARTSYS0001202; 1 male, "FL.JeffersonCo., Monticello, Circle trap pecan VI-15-2001. | CW. O'Brien &R.Mizell", ASUHIC, ASUHIC0088744; 1 female, "]FL.JeffersonCo., Monticello, Circle trap pecan VI-15-2001. | CW. O'Brien &R.Mizell", ASUHIC, ASUHIC0088745; 2 female, 2 male, "FL.Jefferson Co.,Monticello, pecan,30-vi- 2001,R.Mizell", ASUHIC, ASUHIC0088746, ASUHIC0088747, ASUHIC0088748, ASUHIC0088749; 1 male, "FL.Jefferson Co.,Monticello, pecan,woods,10- viii- 2001,R.Mizell", ASUHIC, ASUHIC0088750; 1 female, "FL.Jefferson Co.,Monticello, 18-viii-2001, R.Mizell | Circle trap on persimmon", CWOB, ARTSYS0001203; 1 female, 1 male, "FL.Jefferson Co.,Monticello, persimmon,8- ix-2001, R.Mizell | Circle trap", ASUHIC, ASUHIC0088751, ASUHIC0088752; 1 male, "FL.Jefferson Co.,Monticello, lab woods,15-ix- 2001, R.Mizell | on poplar", ASUHIC, ASUHIC0088753; 1 female, "FL.Jefferson Co.,Monticello,26-x- 2001,home woods,R.Mizell | Circle trap", CWOB, ARTSYS0001204; 2 female, "FL.Jefferson Co.,Monticello, pecan, 1-xi- 2001, R.Mizell |

Circle trap", ASUHIC, ASUHIC0088754, ASUHIC0088755; 1 male, "FL.Jefferson Co.,Monticello, R.Mizell, persi- mon,9-xi-2001 | Circle trap", ASUHIC, ASUHIC0088756; 1 female, "FL.JeffersonCo. Monticello, 10- V-2002,pecan, R.Mizell", CWOB, ASUHIC008875; Lake Co.: 1 female, "Tavies, FLA. Lake County | R.J. Griffith coll. 10-VI-69", FSCA, ARTSYS0001233; Leon Co.: 2 male, 5 female, "FLA.LeonCo. Tallahassee June 11, 1977 G.B.Marshall", CWOB, ARTSYS0001177, ARTSYS0001179, ARTSYS0001178, ARTSYS0001180, ARTSYS0001181, ARTSYS0001182, ARTSYS0001183; 2 female, "FLA.LeonCo. Tallahassee June 11, 1977 G.B.Marshall | on crabapple", CWOB, ARTSYS0001184, ARTSYS0001185; 2 female, 2 male, "FLA.Tallahassee LeonCo.6-18-1977 G.B. Marshall | on crabapple", CWOB, ARTSYS0001186, ARTSYS0001188, ARTSYS0001187, ARTSYS0001189; 1 male, "FLA.LeonCo. Tallahassee 14-V-1975 | [131]P.H. Carlson", CWOB, ARTSYS0001190; 1 female, "FL.LeonCo. Tallahassee V-1985 G.J. Wibmer", CWOB, ARTSYS0001191; 1 male, "FLORIDA:LeonCo. Tall TimbersRes. Sta. | E. E. Grissell 11-V-1975 Collector", FSCA, ARTSYS0001232; Levy Co.: 1 female, "Levy Co 4.27 Fla | COLL BY P. Laurent | This specimen probably ex. Philip Laurent Coll'n based on type of original | box and evidence from label data on specimens in similar storage boxes.", ANSP, ARTSYS0007375; 1 male, "Levy Co 4.28 Fla | COLL BY P. Laurent | This specimen probably ex. Philip Laurent Coll'n based on type of original | box and evidence from label data on specimens in similar storage boxes.", ANSP, ARTSYS0007376; Marion Co.: 1 female, "FLA.MarionCo.Ocala National Forest, 3 mi.N.Hwy.40 at Zay Prairie 20May1976 | at night C.W. O'Brien G.B. Marshall", CWOB, ARTSYS0001224; 1 female, "FLA. Marion Co. Ocala | V.28-1973 A.E. Lewis", CWOB, ARTSYS0001212;

1 female, “FLORIDA: Marion Co. Citra, NW 24th Ave. 8/27-VII-1992 F. W. Skillman Jr. UV light”, CWOB, ARTSYS0007648; Miami-Dade Co: 1 female, “Miami, FLA. 2.IV.69 Hallas | N.M.Downie Colls. 1992 Acc. Z-18,343 FIELD MUSEUM”, FMNH, ARTSYS0007374; Pinellas Co.: 2 male, “FL: Pinellas Co. Ft, Desoto S.P. VI/3/98 J. Huether”, CMNC, ARTSYS0007380, ARTSYS0007381; Polk Co.: 1 female, “FL, Polk Co. Alturas [1?]0 May 1995 Donald Sutton | on citrus”, CWOB, ARTSYS0007649; Putnam Co.: 1 male, “FL.PutnamCo., 3mi.E.Melrose, K.OrdwayPres. on oak16-7-1998 | C.W. O’Brien Collector”, CWOB, ARTSYS0001226; 1 female, “Putnam Co., Fla. IX 11 67 CampBellRidge [Redwater Lake, near Hawthorne]”, FMNH, ARTSYS0007373; Sarasota Co.: 1 male, “FL:Sarasota Co. Englewood 16 Apr 1982 N.M.Downie | N.M.Downie Colls. 1992 Acc. Z-18,343 FIELD MUSEUM”, FMNH, ARTSYS0007378; 1 female, “USA, Florida, Sarasota Co., North Port, 2 August 1996, S.M. Clark”, CWOB, ARTSYS0001215; 1 male, “FLA.SarasotaCo.OscarSchererSt.Pk. | 20-Aug-1977 G.J.&Z.T.Wibmer”, CWOB, ARTSYS0001216; 1 male, “FLA.SarasotaCo. MyakkaR.St.Pk.UV trap29July1976CW. O’Brien&Marshall”, CWOB, ARTSYS0001220; 1 female, “USA:Florida Sarasota Co. Myakka Riv. St. Pk. 3 May 1991 N.M.Downie | N.M.Downie Colls. 1992 Acc. Z-18,343 FIELD MUSEUM”, FMNH, ARTSYS0007379; Volusia Co.: 1 female, “P.Orange 16/4. Fla. | Annette F. Braun collection”, ANSP, ARTSYS0007370; 2 female, “Ent’prise, V-15 Fla.”, ANSP, ARTSYS0007363, ARTSYS0007364; 1 male, “Daytona Beach Fla. VI-2-1960 E.B. Smith | on Irish juniper”, CWOB, ARTSYS0001214; Wakulla Co.: 1 female, “Magnolia Fla. | F.R.Mason Coll. | G.A.K. Marshall Coll B.M. 1950-255.”, NHMUK, ARTSYS0007371; **Georgia:** 1 female, “GEO | This specimen probably ex. Philip

Laurent Coll'n based on type of original | box and evidence from label data on specimens in similar storage boxes.", ANSP, ARTSYS0001554; 1 female, "GEO. | Morrison Coll. | This specimen probably ex. Philip Laurent Coll'n based on type of original | box and evidence from label data on specimens in similar storage boxes.", ANSP, ARTSYS0007400; 1 male, "Okefenoke Swamp Ga. 7-27-39 P.B. Lawson", CMNC, ARTSYS0007401; Echols Co.: 1 female, "Echols Co. Ga. 8-20, 1966, R. J. Beshear Collector", CMNC, ARTSYS0007402; McIntosh Co.: 1 female, "GA: McIntosh Co. Sapelo Island Horsepasture Rd. 11-VI-15 J. Hyatt", CSUC, ARTSYS0001555; 1 male, "GEORGIA, McIntosh Co., Darien, 28.VII.1996, S. M. Clark", CWOB, ARTSYS0001227; **Mississippi:** Jackson Co.: 1 female, "Jackson Co, Miss Magnolia St. Park Ocean Springs, R. McManaway, Coll. 21 JUL 72 | [underside of same label] [0?]438", CWOB, ARTSYS0001228; **North Carolina:** 1 male, "N.C. | This specimen probably ex. Philip Laurent Coll'n based on type of original | box and evidence from label data on specimens in similar storage boxes.", ANSP, ARTSYS001553; Moore Co.: 1 male, "Southern Pines N.C. VI-23-16 A. H. Manee | [blank green label]", ANSP, ARTSYS0001547; 2 female, "Southern Pines N.C. VII-10-16 A. H. Manee | [blank green label]", ANSP, ARTSYS0001548, ARTSYS0001549; **South Carolina:** Beaufort Co.: 3 female, 8 male, "Hilton Head Is., S.C. VII-13.65 A. T. Howden", CMNC, ARTSYS0007383, ARTSYS0007384, ARTSYS0007385, ARTSYS0007386, ARTSYS0007387, ARTSYS0007388, ARTSYS0007389, ARTSYS0007390, ARTSYS0007391, ARTSYS0007392, ARTSYS0007393; 2 female, 3 male, "Hilton Head Is., S.C. VII-15.65 A. T. Howden", CMNC, ARTSYS0007394, ARTSYS0007395, ARTSYS0007396, ARTSYS0007397, ARTSYS0007398; 1 male, "Hilton Head Is., S.C.

VII-17.65 A. T. Howden", CMNC, ARTSYS0007399; Charleston Co.: 1 male, "USA, SOUTH CAROLINA Saint John's County Seabrook Island near marsh land | 13-VII-1999 L. O'Connor Black Light", CWOB, ARTSYS0001230; 1 female, "Seven Mile, S.C. Charleston County IX, 23, 1917, (R&H)", ANSP, ARTSYS0001550.

Selected observational records:

USA: **Alabama**: Baldwin Co.: Robertsdale, Poplar Rd., 30.556958, -87.615058, ±4m, 20 June 2022, inaturalist.org/people/scottwphipps, inaturalist.org/observations/122653889; **Florida**: Alachua Co.: 29.570514, -82.196161, 30 June 2019, Laura Gaudette (inaturalist.org/people/gaudettelaura), inaturalist.org/observations/28020296; 29.713844, -82.460756, 9 May 2020, Joshua Doby (inaturalist.org/people/joshuadoby), inaturalist.org/observations/45431150; 29.782321, -82.201374, ±29.46km, June 2020, Geoffrey Parks (inaturalist.org/people/abrahamlimpkin), inaturalist.org/observations/49173319; 29.722381, -82.463677, 1 May 2021, Adam Pitcher (inaturalist.org/people/verdeloth8), inaturalist.org/observations/76417894; 29.671963, -82.333796, ±29.46km, July 2021, inaturalist.org/people/my-terr-bio-thea, inaturalist.org/observations/85917054; 29.647725, -82.347297, 12 May 2022, Cally (inaturalist.org/people/calliopia), inaturalist.org/observations/116690055; Gainesville, [29.651997, -82.324992], 20 June 2009, Nancy Collins (bugguide.net/user/view/14022), bugguide.net/node/view/294546, bugguide.net/node/view/294547, bugguide.net/node/view/294548; Gainesville, 29.634188,-82.369782, 13 May 2019, Jeff Eickwort (inaturalist.org/people/eickwort), inaturalist.org/observations/25059046; Gainesville, 29.618034, -82.361704, ±7m, 20 May 2019, Joel Mathias (inaturalist.org/people/joelmathias), inaturalist.org/observations/25454256; Gainesville, 29.682603, -82.241236, 26 April 2020, inaturalist.org/people/mbelitz, inaturalist.org/observations/43823586; Gainesville, 29.658333, -82.4175, 5 May 2020, inaturalist.org/people/waywardtadpole, inaturalist.org/observations/45630884; Gainesville, 29.68585, -82.433572, 11 May 2020, inaturalist.org/people/jharris287, inaturalist.org/observations/45637161; Gainesville, 29.624595, -82.31617, ±8m, 1 May 2021, inaturalist.org/people/prettypickens, inaturalist.org/observations/76538240; Gainesville, 29.635058, -82.367497, ±22m, 11 May 2021, Zion (inaturalist.org/people/zneedham1), inaturalist.org/observations/78425446; [Gainesville], 29.679469, -82.372311, ±8.2km, 12 May 2021, Cody Andrews (inaturalist.org/people/cody_andrews), inaturalist.org/observations/78772773; Gainesville, 29.632995, -82.369363, ±56m, 21 May 2021, Zion (inaturalist.org/people/zneedham1), inaturalist.org/observations/79732213; Gainesville, 29.633511, -82.367872, ±7m, 31 August 2021, Zion (inaturalist.org/people/zneedham1), inaturalist.org/observations/93169698; Gainesville, 29.670136, -82.302333, 11 November 2021, Radha Krueger (inaturalist.org/people/happyflippers), inaturalist.org/observations/100866200; Gainesville, 29.629094, -82.363395, ±8m, 17 July 2022, Steve Raduns (inaturalist.org/people/rdz), inaturalist.org/observations/126751951; Gainesville, 1555 Museum Rd., 29.644899, -82.34333, 31 July 2018, Vijay Barve (inaturalist.org/people/vijaybarve), inaturalist.org/observations/14984863; Gainesville, 1715 NW 8th Ave., 29.658993, -82.345038, ±127m, 24 April 2019, inaturalist.org/people/pmaxp, inaturalist.org/observations/23085355; Gainesville, 1721 NE 75th St., 29.668498, -

82.238135, ±74m, 26 April 2020, Laura Gaudette, inaturalist.org/people/gaudettelaura, inaturalist.org/observations/44111385; Gainesville, 2901 SW 13th St., 29.62373, -82.338638, ±32m, 22 June 2019, Johanna Schwartz (inaturalist.org/people/johannaschwartz), inaturalist.org/observations/27493886; Gainesville, 400 NE 11th St., 29.653525, -82.315601, ±16m, 23 April 2017, Ryan S. Terrill (inaturalist.org/people/terrilldactyl), inaturalist.org/observations/5920179; Gainesville, 916 NE Ninth St., 29.660558, -82.315155, ±5m, 18 August 2020, inaturalist.org/people/gburleigh, inaturalist.org/observations/56826410; Gainesville, 916 NE Ninth St., 29.66065, -82.315125, ±4m, 7 August 2021, inaturalist.org/people/gburleigh, inaturalist.org/observations/90338752; Gainesville, Club House, 29.610076, -82.365088, ±45m, 6 April 2022, inaturalist.org/people/nezzuar, inaturalist.org/observations/110732480; [Gainesville, Deer Run], 29.712385, -82.398592, ±122m, 23 April 2021, Sarah Fazenbaker (inaturalist.org/people/sfaze), inaturalist.org/observations/76653063; Gainesville, NE 15th St., 29.67516, -82.30546, ±76m, 25 May 2021, inaturalist.org/people/nwtaylor, inaturalist.org/observations/80379289; Gainesville, NE 39th Ave., 29.675668, -82.273222, ±5m, 19 May 2022, inaturalist.org/people/aalihamm, inaturalist.org/observations/117786178; Gainesville, NE 39th Ave., 29.676555, -82.271923, ±99m, 19 May 2022, inaturalist.org/people/raziaalihamm, inaturalist.org/observations/127007288; Gainesville, NE 80th Way, 29.743581, -82.235124, ±22m, 12 May 2020, inaturalist.org/people/cornifer, inaturalist.org/observations/45680991; [Gainesville, Newman's Lake], 29.668608, -82.238762, ±2m, 4 June 2019, inaturalist.org/people/joannerusso, inaturalist.org/observations/26503265; [Gainesville, Newman's Lake],29.668533, -82.238699, ±8m, 27 June 2019, Laura Gaudette (inaturalist.org/people/gaudettelaura), inaturalist.org/observations/27762782; Gainesville, NW 16th Ave., 29.666637, -82.337495, ±12m, 15 May 2021, inaturalist.org/people/mcvallejo, inaturalist.org/observations/78947179; Gainesville, NW 18th Pl., 29.669019, -82.389343, ±65m, 27 May 2021, Kaitlyn Rockrohr Rodriguez (inaturalist.org/people/kaitlyn166), inaturalist.org/observations/80485652; Gainesville, NW 51st Terr., 29.664788, -82.397683, ±38m, 3 May 2020, Melissa Meadows (inaturalist.org/people/melissa247), inaturalist.org/observations/44831896; Gainesville, NW Third Pl., 29.654153, -82.351783, ±65m, 14 August 2020, Tilly (inaturalist.org/people/ryantilbrook), inaturalist.org/observations/56427678; Gainesville, SE Veitch St., 29.639855, -82.324463, ±35m, 18 May 2022, Steven Cassidy (inaturalist.org/people/stegosteven), inaturalist.org/observations/117658847; Gainesville, SW 25th Terr., 29.619087, -82.360083, ±22m, 24 May 2022, inaturalist.org/people/pouletnatures, inaturalist.org/observations/118562281; Gainesville, SW 35th Pl., 29.61972, -82.360113, ±13m, 3 June 2022, inaturalist.org/people/pouletnatures, inaturalist.org/observations/120107243; Gainesville, SW 35th Pl., 29.619495, -82.360192, ±11m, 17 June 2022, inaturalist.org/people/pouletnatures, inaturalist.org/observations/122257814; Gainesville, SW 35th Pl., 29.61957, -82.360122, ±13m, 27 June 2022, inaturalist.org/people/pouletnatures, inaturalist.org/observations/123789049; Gainesville, SW 35th Pl., 29.61975, -82.36023, ±18m, 28 July 2022, inaturalist.org/people/pouletnatures, inaturalist.org/observations/128403518; Gainesville, SW 71st Ln., 29.58797, -82.429345,

±35m, 9 July 2022, inaturalist.org/people/robyn1bird, inaturalist.org/observations/125452851; Gainesville, SW 73rd Ave., 29.586892, -82.453697, ±5m, 21 May 2020, Brickman Way (inaturalist.org/people/brickman), inaturalist.org/observations/46777336; Gainesville, SW Fourth Ave., 29.648108, -82.329047, ±24m, 8 May 2022, inaturalist.org/people/mcvallejo, inaturalist.org/observations/116206936; Gainesville, University Heights, 29.641928, -82.336059, ±1m, 26 July 2021, Robert Simons (inaturalist.org/people/simonsr35), inaturalist.org/observations/88732206; Gainesville, University of Florida, 29.646687, -82.338913, 18 April 2017, Lisa Lundgren (inaturalist.org/people/lisalundgren9), inaturalist.org/observations/5827620; Gainesville, University of Florida, 29.634958, -82.367438, ±8m, 29 April 2019, Johanna Schwartz (inaturalist.org/people/johannaschwartz), inaturalist.org/observations/24218370; Gainesville, University of Florida, 29.64282, -82.3422, ±8m, 15 July 2020, Austin Smith (inaturalist.org/people/austinsmith), inaturalist.org/observations/54750304; [Gainesville, University of Florida], 29.638875, -82.360733, ±4m, 10 May 2021, inaturalist.org/people/brantleesr, inaturalist.org/observations/78296503; Gainesville, University of Florida, 29.650463, -82.343475, ±48m, 21 May 2021, inaturalist.org/people/anyah325, inaturalist.org/observations/79660118; Gainesville, University of Florida, 29.650187, -82.34447, ±7m, 9 June 2022, Cabell Eades (inaturalist.org/people/ceades27), inaturalist.org/observations/120957771; Gainesville, W Newberry Rd., 29.661025, -82.425877, ±7m, 28 June 2022, inaturalist.org/people/botanistsean, inaturalist.org/observations/123876245; Gainesville, W University Ave., 29.65194, -82.382493, ±5m, 16 August 2020, Nicholas Cravey (inaturalist.org/people/nicholascravey), inaturalist.org/observations/56699861; Gainesville, SW 36th Way, 29.633163, -82.376847, ±65m, 16 April 2020, Noah Frade (inaturalist.org/people/noaboa), inaturalist.org/observations/42316624; High Springs, NW 242nd St., 29.830376, -82.602762, ±15m, 23 July 2021, inaturalist.org/people/bssammel, inaturalist.org/observations/88263156; High Springs, NW 243rd Way, 29.803909, -82.599284, ±20m, 29 April 2020, inaturalist.org/people/jane1126, inaturalist.org/observations/44328080; High Springs, NW State Rd. 45, 29.809904, -82.606531, ±4m, 15 May 2022, Bryce Langford (inaturalist.org/people/bryce_langford), inaturalist.org/observations/117128142; [Longleaf Flatwoods Reserve], 29.563235, -82.198563, ±1.03km, 4 June 2020, Noah Frade (inaturalist.org/people/noaboa), inaturalist.org/observations/48536728; Newberry, 29.646318, -82.606503, ±13.3km, 10 May 2022, Sarah Watson (inaturalist.org/people/sarah4398), inaturalist.org/observations/116464551; Newberry, 18730 W Newberry Rd., 29.656447, -82.541478, ±198m, 23 May 2018, Joshua Doby (inaturalist.org/people/joshuadoby), inaturalist.org/observations/12779372; Newberry, SW 258th St., 29.642655, -82.616009, ±24m, 12 May 2022, Althia Verdote (inaturalist.org/people/althiav), inaturalist.org/observations/116690018; Newberry, SW 258th St., 29.642765, -82.616021, ±12m, 12 May 2022, Lula Mccullors (inaturalist.org/people/lula24), inaturalist.org/observations/116690186; Baker Co.: Sanderson, Osceola National Forest, 30.206808, -82.432885, ±657m, 27 June 2021, inaturalist.org/people/cld9, inaturalist.org/observations/84773298; Bay Co.: Lynn Haven, E 24th St., 30.221495, -85.640008, ±12m, 20 July 2020, inaturalist.org/people/holley85, inaturalist.org/observations/53751551; Columbia Co.: 30.028654, -82.701906,

±29.41km, May 2021, inaturalist.org/people/roara, inaturalist.org/observations/81315328; [White Springs], 30.314633, -82.717016, ±31m, 14 October 2018, Rick Owen (inaturalist.org/people/rickowen), inaturalist.org/observations/46552065; DeSoto Co.: Arcadia, 27.102365, -81.998819, 28 July 2022, Josh Olive (inaturalist.org/people/josholive), inaturalist.org/observations/128409490; Duval Co.: 30.272811, -81.403833, ±29.38km, May 2022, inaturalist.org/people/team_bingebirder, inaturalist.org/observations/118817205; Jacksonville, near maritime hammock at Hanna Park, [30.3707, -81.3994], 16 May 2019, Justin Lemmons (bugguide.net/user/view/94964), bugguide.net/node/view/1678982, bugguide.net/node/view/1678983; Jacksonville, North Beach, 30.366711, -81.39955, ±8m, 22 June 2019, Stephen Klem (inaturalist.org/people/stephenklem), inaturalist.org/observations/27468739; Flagler Co.: Palm Coast, Zebulah's Trail, 29.470238, -81.225503, ±65m, 22 April 2020, Austin Smith (inaturalist.org/people/austinsmith), inaturalist.org/observations/42898201; Gilchrist Co.: High Springs, NE Ginnie Springs Rd., 29.834717, 82.702473, ±65m, 27 June 2021, inaturalist.org/people/angelarivera, inaturalist.org/observations/84803956; Trenton, 29.740788, -82.696862, ±109m, 3 July 2022, Brandon Woo (inaturalist.org/people/brandonwoo), inaturalist.org/observations/124712459; Hernando Co.: Brooksville, Florida Forest Service, 28.539562, -82.27243, ±133m, 1 July 2022, Brandon Woo (inaturalist.org/people/brandonwoo), inaturalist.org/observations/124393032; Weeki Wachee, Seville, 28.683178, -82.505645, ±126m, 26 June 2022, Brandon Woo (inaturalist.org/people/brandonwoo), inaturalist.org/observations/123698772; Hillsborough Co.: Thonotosassa, Hillsborough

River State Park, 28.147736, -82.228462, ±20m, 24 June 2022, inaturalist.org/people/leach, inaturalist.org/observations/123213804; <u>Jefferson Co.</u>: Monticello, Oaklands Plantation Rd., 30.511475, -83.969614, ±250m, 13 June 2018, inaturalist.org/people/iamashark, inaturalist.org/observations/13607503; [Monticello, Oaklands Plantation Rd.], 30.511475, -83.969614, ±250m, 22 May 2020, inaturalist.org/people/iamashark, inaturalist.org/observations/47147929; Leon Co.: 30.335884, -84.323814, ±29.38km, July 2020, Joshua Copen (inaturalist.org/people/the_land_philosopher), inaturalist.org/observations/53509751; Miccosukee, 30.502625, -84.129494, 13 July 2022, Rosey (inaturalist.org/people/zeenies), inaturalist.org/observations/126130432; Tallahassee, 30.425694, -84.315956, 6 September 2019, Jana Miller (inaturalist.org/people/janabuggs0, inaturalist.org/observations/32224663; Tallahassee, 30.449822, -84.176026, 10 May 2020, inaturalist.org/people/sharonious, inaturalist.org/observations/45534801; Tallahassee, 30.482584, -84.217424, ±4m, 10 June 2021, Jeff O'Connell (inaturalist.org/people/jeffoconnell), inaturalist.org/observations/85277178; Tallahassee, 30.673162, -84.217995, ±677m, 14 June 2022, Jonathan Layman (inaturalist.org/people/jlayman), inaturalist.org/observations/129453022; <u>Marion Co.</u>: Rainbow Springs State Park, 29.100457, -82.429472, ±3.67km, 13 August 2021, Dimi Marinos (inaturalist.org/people/dimi_marinos), inaturalist.org/observations/91109402; Silver Springs, Ocala National Forest, 29.246513, -81.770695, ±12m, 22 April 2022, inaturalist.org/people/arakso, inaturalist.org/observations/112418399; Silver Springs, Ocala National Forest, 29.17388, -81.860384, ±18m, 13 May 2022, Giovanni Bennett (inaturalist.org/people/moosegoosegoose), inaturalist.org/observations/116877912; Miami-Dade Co.: Kendall, 25.667874, -80.35042, ±2m, 9 March 2019, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/21118372; Orange Co.: Bay Lake, 28.384417, -81.488785, 25 June 2019, inaturalist.org/people/zoology123, inaturalist.org/observations/27644280; Pasco Co.: [Withlacoochee River], 28.352193, -82.126922, ±31m, 26 July 2018, David Durieux (inaturalist.org/people/durieudm), inaturalist.org/observations/14837606; [Withlacoochee River], 28.35216, -82.126637, ±30m, 26 July 2018, Nils Tack (inaturalist.org/people/nilstack), inaturalist.org/observations/15037307; Pinellas Co.: Safety Harbor, Philippe Park, 28.009256, -82.6791, ±133m, 5 August 2020, inaturalist.org/people/natureloversunite, inaturalist.org/observations/55490556; Putnam Co.: Hawthorne, 29.688844, -81.970139, 13 July 2021, Jillian Rutkowski (inaturalist.org/people/jillian71), inaturalist.org/observations/86929915; Hawthorne, 138 Silver Dollar Dr., 29.650165, -81.968811, ±22m, 28 April 2018, inaturalist.org/people/silverdollarpond, inaturalist.org/observations/13888499; Taylor Co.: Steinhatchee, 29.791948, -83.32631, ±59.54km, 13 May 2021, Dallas James Nelson (inaturalist.org/people/dallas51), inaturalist.org/observations/78586475; Union Co.: Lake Butler, 29.95095, -82.410767, ±5m, 24 May 2020, inaturalist.org/people/emilyellis13, inaturalist.org/observations/47148853; Volusia Co.: [Glenwood Manor Farms, Dunstable Dr.], 29.093674, -81.349531, ±199m, 21 June 2022, Peter May (inaturalist.org/people/pgmay), inaturalist.org/observations/122986668; [Glenwood Manor Farms], Dunstable Dr., 29.094077, -81.349628, ±199m, 14 July 2022, Peter May (inaturalist.org/people/pgmay), inaturalist.org/observations/126227095; New Smyrna

Beach, S SR-415, 29.006794, -81.070743, ±56m, 30 August 2021, inaturalist.org/people/sunflower_eyes_, inaturalist.org/observations/93105319; Ormond Beach, [29.286389,-81.075], 29 March 2017, bugguide.net/user/view/120005, bugguide.net/node/view/1351422, bugguide.net/node/view/1351429; South Daytona, Halifax Mobile Estates, 29.10976, -80.994894, ±8m, 13 June 2021, Nichole Bryan (inaturalist.org/people/nichole88), inaturalist.org/observations/82920454; Wakulla Co.: Crawfordville, 30.123214, -84.309813, ±5m, 27 May 2019, inaturalist.org/people/lillybyrd, inaturalist.org/observations/26027465; **Georgia**: Berrien Co.: Ray City, [31.075556, -83.1975], collected via suction samples in pecan orchard from tree canopy, 7 July 2021, bugguide.net/user/view/146514, bugguide.net/node/view/2133191, bugguide.net/node/view/2133193, bugguide.net/node/view/2133194; Lowndes Co.: Valdosta, 30.848837, -83.334114, 30 May 2021, Glenn Mitchell, inaturalist.org/people/glennmitchell, inaturalist.org/observations/80898359; **North Carolina**: Jones Co.: [White Oak Township, Haywood Landing], 34.814505, -77.174296, ±4m, 8 June 2018, inaturalist.org/people/wdmunroe, inaturalist.org/observations/13368362; New Hanover Co.: Wilmington, Sir Tyler Dr., 34.241353, -77.824203, ±10m, 15 June 2020, inaturalist.org/people/sebjamin, inaturalist.org/observations/63838486; **South Carolina**: Beaufort Co.: Hilton Head Island, 32.160477, -80.780979, ±3.54km, 28 July 2021, inaturalist.org/people/madisonstriegel, inaturalist.org/observations/88970661; Charleston Co.: Charleston, 32.844599, -79.965312, ±8m, 6 June 2021, inaturalist.org/people/traddpearson, inaturalist.org/observations/81889882; Charleston, 331 Fort Johnson Rd., 32.746412, -79.902838, ±249m, 12 May 2017, Aaron Burnette (inaturalist.org/people/aaron_burnette), inaturalist.org/observations/6186445.

Etymology. The name *opalus* is a Latin masculine noun in apposition meaning opal and refers to the color of the type specimens, as explained in the original description.

Geographical distribution and chorological affinities. *Pachnaeus opalus* (Olivier) is the only known member of the genus native to the continental United States (see also the geographical distribution sections for the two Cuban species which have been introduced into Florida, *P. litus* (Germar) and *P. azurescens* Gyllenhal in Schoenherr). Most records of the species are from central and northern Florida, but the range of the species extends north along the Atlantic coast with records as far north as Baltimore, Maryland (Taschenberg 1869: 140) and Manumuskin, New Jersey (Blatchley and Leng 1916: 118) and west along the gulf coast as far west as at least Ocean springs, Mississippi and probably occurs in Louisiana but I know of no records of it in the state. The southern extent of this species is further south than Lake Okeechobee as reported by Woodruff (1981)—though these more southerly records are few and may simply be adventive individuals brought in through the plant or fruit trade. This species' range overlaps slightly with that of the northernmost portion of the range of the established Florida population of *P. litus* (Germar) and also co-occurs with the established Florida populations of *P. azurescens* Gyllenhal in Schoenherr.

In addition to the counties listed in the material above, Woodruff (1981: 2) also reports the species from Florida in <u>Calhoun</u>, <u>Escambia</u>, <u>Liberty</u>, <u>Nassau</u>, and <u>Seminole</u> counties, where the species unquestionably occurs, and from Desoto, Hardee, Manatee, and Osceola counties, which are likely good records, but some may, alternatively, be specimens of the very similar, introduced Cuban species *P. azurescens* Gyllenhal in Schoenherr. *Pachnaeus opalus* (Olivier) also occurs in Clay Co., Florida based on a single female labeled “Green Cove spgs. 1.6.06 Fla. | Fred Knab Collector | Pachnaeus distans Horn” in the NHMUK collection but not borrowed and not given a unique identifier and, thus, not included in the material examined section here.

There are three specimens—likewise unborrowed—within the Olivier collection at MNHN which are placed below a hand-written header label that is pinned into the box reading, “P. guyanensis. Cat.Mus. Guyane”. These specimens are labeled as follows: “[typed green label black border] MUSEUM PARIS ANCIENNE COLLECTION | [blank green label]”; “[typed green label black border] MUSEUM PARIS ANCIENNE COLLECTION”; “[typed yellow label black border] MUSEUM PARIS GUYANE LEPRIEUR 833-38 | [dark green on top circular label with faded handwriting on underside of label] 898 96”. This data presumably erroneous but the last of these specimens deserves further discussion as the label data attached to it lends some credibility to the record of this species in South America. Naval pharmacist and naturalist François Mathias René Leprieur was stationed in Cayenne from 1830 to 1849. In 1858, after a nearly decade-long assignment in Martinique, Leprieur retired back to Cayanne and remained there until time of death on 16 July 1870 (see https://plants.jstor.org/stable/10.5555/al.ap.person.bm000004943). Leprieur collected extensively in the area, both locally in Cayenne and on expeditions into the interior, and sent much of his material home to France, where it was deposited in the MNHN collection. It is possible, if seemingly unlikely, that these specimens do represent adventive or established records of *P. opalus* (Olivier) in French Guiana. “Pachnaeus guyanensis” appears to be a manuscript name of unknown origin.

Ruíz Cancino et al. (2006: 96) and López-Arroyo and Loera-Gallardo (2009: 313) report this species from Tamaulipas. This is likely a misidentification, the most probable candidate being *Compsus auricephalus* (Say).

Biology. *Pachnaeus opalus* (Olivier) is well known to be a minor to moderate pest of *Citrus* L. in Florida (Rutaceae; Beavers et al. 1980, Bullock 1985, Dolinski and Lacey 2007: 165, Suggars Downing et al. 1991: 584, Futch and McCoy 1993, Knapp 1985, McCoy 1999: 152, Schroeder and Beavers 1977: 498), but this species is probably less detrimental to the Florida citriculture industry than its congener, *P. litus* (Germar).

In addition to citrus, outbreaks of this species have repeatedly been observed in peach (*Prunus persica* (L.) Batsch; Rosaceae). Snapp (1938: 466) first was the first to report this species shaken from peach at Fort Valley, Georgia on July 8, 1924, and again on August 15, 1938, but he did not note it as pestiferous and claimed the species to be rare in Georgia. Sherman and Mizell (1995) reported the first significant outbreak in peach from experimental orchards at the University of Florida main campus in Gainesville, within signs of infestation starting as early as late 1989. In this outbreak the authors noted symptoms of visual tree decline by May of 1990—*i.e.*, stunting of terminal growth with vigorous growth of water sprouts, difficulty recovering after pruning, and crop failure—in older (3+ years old) trees and trees that were stressed by heavy fruit loads. Root scarring and larvae were first observed by these authors in February 1991, and one planting that was observed to be in decline was uprooted in June 1991 and the trees were found to have extensive root damage from larval feeding. Symptoms of visual tree decline had spread to other plots by 1992 and trapping efforts were initiated to determine the identity of adults from 1993 to 1995, during which time there were yearly outbreaks. Sherman and Mizell also report similar symptoms of decline in peach orchards during this time at Madison and Quincy, Florida, and they suggest that infestations probably account for reduced orchard life throughout northern Florida. They claim that adult emergence in northern Florida generally occurs between mid-May and early-August for this species.

Other authors have also reported this species as problematic to peach production in recent past. Olmstead et al. (2013: 7) said that larvae have been increasingly found on peach root systems in orchards planted in former citrus groves and are responsible for tree decline and death in peaches, while Cranshaw and Shetlar (2018: 474) simply note that the larvae are known to do damage to peaches. I have also seen specimen records, as cited above, from peach at Monticello, Jefferson Co., FL taken in July of 1993, May of 1998, and June of 2001.

It has also been reported in the literature from *Casuarina equisetifolia* L. (Casuarinaceae; McCoy 1999: 152), *Carya illinoinensis* (Wangenh.) K. Koch (Juglandaceae; Watson 1938b: 281), *Diospyros* L. (Ebenaceae; Manee 1924: 40 including *Diospyros kaki* Thunb. (Ebenaceae; Mead 1964: 575), *Dysphania ambrosioides* (L.) Mosyakin & Clemants (Amaranthaceae; Altieri and Whitcomb 1979: 178), *Juniperus communis* L. 'Hibernica' (Cupressaceae; Bloem et al. 2002: 642), *Magnolia* L. (Magnoliaceae; Watson 1914: lxv), *Malpighia emarginata* DC. (Malpighiaceae; Tamburo and Butcher 1955: 69

(misidentified as *M. glabra* L.)), *Malus* Mill. (Rosaceae; Bloem et al. 2002: 642), *Pinus* L. (Pinaceae; Beutenmuller 1893: 38, Blatchley and Leng 1916: 118), *Quercus* L. (Fagaceae; Beutenmuller 1893: 38, Pierce 1907: 254, Blatchley and Leng 1916: 118, McCoy 1999: 152), *Rosa* L. (Rosaceae; McCoy 1999: 152), *Solidago altissima* L. (Asteraceae; Altieri and Whitcomb 1979: 178), *Solidago canadensis* L. var. *scabra* Torr. & A. Gray (Asteraceae; Fontes et al. 1994: 212), *Toxicodendron* Mill. (Anacardiaceae, Habeck 1988: 331) including *Toxicodendron radicans* (L.) Kuntze (Anacardiaceae, Senchina 2008: 203), and *Phaseolus* L. (Fabaceae) in orchards of *Carya illinoinensis* (Wangenh.) K. Koch (Juglandaceae; Watson 1938b: 281). This species is also recorded from poplar (*Populus* L.; Salicaceae) based on specimen records reported above. McCoy (1999: 152) reports the species from “woody ornamentals” and claimed it to be associated with “27 known host plants” but provided no specific reference to what these taxa are.

Adults have been collected from mid-February to early-November, but most records are from between May and July. This species comes to lights and has been taken via UV traps, Tedder's traps, and circle traps.

Laessle (1945: 162, 169) reported that this species is preyed on by northern bobwhite (*Colinus virginianus* (Linnaeus, 1758); Odontophoridae) and Chapin (1925: 37) reports it from the gut content of a white-eyed vireos (*Vireo griseus* (Boddaert, 1783); Vireonidae). Reported hymenopteran parasitoids of this species include *Quadrastichus haitiensis* (Gahan, 1929) (Eulophidae; Beavers et al. 1980, Kipp 1970: 39, Schauff 1987: 35), *Brachyufens osborni* (Dozier, 1932) (Trichogrammatidae; Beavers et al. 1980, Jacas et al.

2010, Schauff 1987: 33), and an unknown species of *Trichogramma* Westwood, 1833 (Trichogrammatidae; Beavers et al. 1980).

The entomopathogenic nematodes *Heterorhabditis bacteriophora* Poinar, 1976 (Heterorhabditidae; Suggars Downing et al. 1991, Schroeder 1992 ("HP-88 strain" and "Florida strain")) and *Steinernema carpocapsae* (Steinernematidae; Suggars Downing et al. 1991, Schroeder 1992 ("All strain")) have been reported to attack this species.

Beavers and Woodruff (1971: 1–2) provided head capsule characters to separate mature larvae of this species from *Pachnaeus litus* (Germar), *Diaprepes abbreviatus* (Linnaeus), and *Naupactus cervinus* (Boheman in Schoenherr).

Only very little seems to be known about the life history of this species, but still more than many other congeners. Tarrant and McCoy (1989) examined the effects of temperature and relative humidity on eggs and larvae produced by adults collected from Ft. Green, Florida. They found that neonate larvae survived twelve hours exposure to temperatures ranging from 5° C to 50° C; mean percentage egg hatch declined at all temperatures as relative humidity was decreased due to egg desiccation, with saturation vapor pressure deficit accounting for 81.9% of the observed variation in percent egg hatch; the developmental threshold for eggs was 11.2° C; and the thermal constant was 151. McCoy (1999: 152) said only that hatching in this species happens seven to 10 days after oviposition and is affected by moisture and that the larvae develop over a period of eight to 10 months.

***Pachnaeus azurescens* Gyllenhal in Schoenherr, 1834: 58**

Figs. 3.26A–B, 3.31–3.39, 3.85H, 3.91

Pachnaeus azurescens Gyllenhal in Schoenherr, 1834: 58 (original combination)
Schoenherr 1834b: c. 420; Dejean 1836: 276; Boheman in Schoenherr 1840: 426; Sturm 1843: 196; Chevrolat in d'Orbigny 1847: 381; Jekel 1849: 87; Perroud 1853: 495; Jacquelin Du Val in De La Sagra and Guérin-Méneville 1857: 80; Lacordaire 1863: 107, note 1; Chevrolat in d'Orbigny 1869: 249; Taschenberg 1869: 140; Jekel 1875: 138 (or possibly a misidentification of *P. litus* (Germar)); Houser 1909: 52; Marshall 1916: 454; Colcord 1921: 261; Sherborn 1923: 628; Sherborn 1933: 780; Guenther and Zumpt, 1933: 104; Blackwelder 1947: 799; Ebeling 1959: 319; Montes 1978a: 52; Estrada Ortiz 1981; O'Brien & Wibmer 1982: 46; Woodruff 1985: 374; Lopez Castilla 1992: 1; Morrone 1999: 145; Rodríguez Velázquez and Mestre Novoa 2002: 7; Lozada Piña et al. 2004: 106; Peck 2005: 230; Mestre Novoa et al. 2009: 56, 61
Some of these records may represent misidentifications of *P. litus* (Germar) as it appears there has been a good deal of confusion between these two names by past workers, with the present name apparently most often being applied to larger, Cuban specimens of *P. litus* (Germar).

Pachneus azurescens Gyllenhal in Schoenherr, 1834 sec. Gemminger and Harold, 1871: 2224
Unjustified emendation of *Pachnaeus* Schoenherr, 1826 employing ë in place of ae.
Leng and Mutchler 1914: 468; Cross and Jeffreys 2010: 31

Pachnaeus azurascens Gyllenhal in Schoenherr, 1834 sec. Sorauer 1912: 540

Incorrect subsequent spelling.

Kleine 1932: 240

Pachnacus azurescens Gyllenhal in Schoenherr, 1834 sec. Gundlach 1891: 331

Incorrect subsequent spelling of *Pachnaeus* Schoenherr, 1826.

Pachnaeus azurescen Gyllenhal in Schoenherr, 1834 sec. Cañizares Zayas 1963: 31

Incorrect subsequent spelling.

nec Pachneus azurescens Gyllenhal in Schoenherr, 1834 sec. Parsons 1940: 4, 6–7

Misidentification of *Pachnaeus litus* (Germar) with incorrect subsequent spelling of *Pachnaeus* Schoenherr, 1826.

=*Pachnaeus griseus* Gyllenhal in Schoenherr, 1834: 59

Schoenherr 1834b: c. 420; Sherborn 1926: 2837; Sherborn 1933: 780

Synonymized by Morrone 1999: 145

Most recent authors have accepted this name as a junior synonym, and I follow suit. Available photos of the lectotype do not show the rostral carinae very well but do otherwise seem to conform to the present species. It seems probable that this name simply represents variation in scale color, either natural or as an artifact of preservation history. Alternatively, this may be a teneral specimen, a notion supported by its somewhat flavotestaceous, *i.e.*, paler than typical, integument. I hope to examine this specimen in person in future to further confirm its identity.

=*Pachnaeus azurescens griseus* Gyllenhal in Schoenherr, 1834 sec. Boheman in Schoenherr, 1840: 426

Sturm 1843: 196; Jacquelin Du Val in De La Sagra and Guérin-Méneville 1857: 80; Houser 1909: 52; Guenther and Zumpt, 1933: 104; Blackwelder 1947: 799; O'Brien & Wibmer 1982: 46; Peck 2005: 230

Pachnaeus azurescens "Var. β" Boheman in Schoenherr, 1840: 426

This refers specifically to *P. griseus* Gyllenhal in Schoenherr as a subspecies of *P. azurescens* Gyllenhal in Schoenherr.

Pachneus azurescens griseus Gyllenhal in Schoenherr, 1834 sec. Gemminger and Harold 1871: 2224

Unjustified emendation of *Pachnaeus* Schoenherr, 1826 employing ë in place of ae.

nec *Pachnaeus azurescens griseus* Gyllenhal in Schoenherr sec. Thomas et al. 2013: 27

Misidentification of *Pachnaeus godivae* Reily, sp. nov.

=*Pachnaeus juvenalis* de Zayas, 1988: 169 **syn. nov.**

Peck 2005: 230

de Zayas (1988: 169) established the species *Pachnaeus juvenalis* de Zayas, 1988 for the population from Embalse el Enlace on Isla de la Juventud.

A few purportedly diagnostic characters provided in the rather brief original description suggest the identity of this taxon as *P. azurescens* Gyllenhal in Schoenherr—namely the rostral carinae obsolete or nearly obsolete, pronotal base only slightly bisinuate, and the elytral bases relatively truncate. de Zayas also provides a drawing of one of the types which is a good match to known specimens of *P. azurescens* Gyllenhal in Schoenherr from other sites on Isla de Juventud ([MCZ-ENT 00]529396, ARTSYS0007555, ARTSYS0007545, ARTSYS0007548, ARTSYS0007553, ARTSYS0007546, ARTSYS0007547, ARTSYS0007549, ARTSYS0007550, ARTSYS0007551, ARTSYS0007554, ARTSYS0007552). The original description also notes the slightly larger, more elongate form typical of this population ("*Oblonga, moderadamente alargada*") which is likely only interpopulational variation, not interspecific variation, given that similar, more elongate and larger forms also occur in other populations of this species on the main island of Cuba, though this form is somewhat less common in mainland populations.

The holotype (Figs. 3.35A–C) of *P. juvenalis* de Zayas was photographed by Michael A. Ivie (Pers. Comm.) While these images only show limited portions of the specimen, they do seem to be of a specimen of *P. azurescens* Gyllenhal in Schoenherr, and probably a female based on rostral morphology.

The logic used in the original description to justify establishing *P. juvenalis* de Zayas as new is limited. de Zayas begins by explicitly noting that his proposed new species is problematic ("*Ésta una especie conflictiva*") and uses that problematicity as the sole justification for providing a description of and name for the taxon ("*y voy a hacer su descripción*"). Providing an explicit description of this population because of its problematic nature was good taxonomic practice on the part of the author. However, formally naming this population was not good taxonomic practice given that the author made no comment on how his proposed new species differs from any other previously described species, nor did he provide any means to diagnose other, previously described species of the genus within the text. It seems that de Zayas, like many other authors who have worked on this genus in past, simply may not have understood the identity of *P. azurescens* Gyllenhal in Schoenherr.

I believe that it is increasingly understood authors should avoid creating new named taxa without justifying them as distinct from previously established taxa. The primary purpose of creating a name for taxon is to allow yourself and others an easier means to communicate how a taxon differs from other taxa in terms of its appearance, biology, geography, and/or evolutionary history by encapsulating that information within a name. To do so, one must have some understanding of how a taxon differs from others sufficient to decide that two taxa are, in fact, distinct. Communicating to the reader how a proposed new species differs from established species as a prerequisite to naming that species is clearly best practice. The most recent version of The Code even explicitly recommends doing so (Recommendation 13 A, ICZN 1999) as have many of its predecessors (Recommendation 13A, ICZN 1985; General Recommendation 1, ICZN 1964; General Recommendation 1, ICZN 1961; Appendix A, Blanchard et al. 1905) and nowhere in the code will one find the concept that differences in presumedly new taxa cannot be treated in the absence of a formal name for the taxa in question. I feel this is a good opportunity to encourage future biologists that providing detailed descriptions is an acceptable and better alternative to erecting formal names for problematic specimens.

=*Pachnaeus alayoi* Lopez Castilla, 1992: 2 **syn. nov.**

Hidalgo-Gato González et al. 2002: 25; Rodríguez Velázquez and Mestre Novoa 2002: 7; Peck 2005: 230

In the original description, Lopez Castilla (1992) says that *P. alayoi* Lopez Castilla is similar to *P. azurescens* Gyllenhal in Schoenherr but differs by having 1) a longer rostrum that is more convex dorsally and 2) pronounced lateral carinae—possibly meaning laterally pronounced but not dorsally pronounced based on the preceding note that the rostrum is dorsally strongly convex. These characters states apply well to *P. azurescens* Gyllenhal in Schoenherr, despite the author's claim to the contrary.

Lopez Castilla provides a few other external characters as diagnostic for his proposed new species including prominence of the depression between the raised lateral aspect of the rostral carinae and the edge of the scrobes and acuteness of elytral apices. These characters tend to be highly variable within *P. azurescens* Gyllenhal in Schoenherr (Fig. 3.35, 3.36C–D).

Lopez Castilla provides spermathecal characters as diagnostic for his species, including having a more voluminous corpus and a less sclerotized spermatheca. These also vary widely within *P. azurescens* Gyllenhal in Schoenherr (Fig. 3.37).

Lopez Castilla notes that this proposed new species has an aedeagus with conspicuous striae in the apex of pedon. This also varies in *P. azurescens* Gyllenhal in Schoenherr (Fig. 3.38), and other species, possibly based on level of wear.

Based on available images of the male holotype (Fig. 3.36), Lopez Castilla's (1992) original written description, and available drawings of the male genitalia, *i.e.,* apex of the pedon (Lopez Castilla 1992: 3), *P. alayoi* Lopez Castilla conforms well to known variation in *Pachnaeus azurescens* Gyllenhal in Schoenherr.

Lopez Castilla's drawing of the male genitalia, *i.e.*, apex of the pedon, of *P. azurescens sensu* Lopez Castilla 1992, however, do not conform well to male specimens of *P. azurescens* Gyllenhal in Schoenherr. I have not seen the genitalia of the male holotype and have only seen habitus images of the holotype and the rostrum of one paratype, but this discrepancy suggests that some of the male paratypes of *P. azurescens* sec Lopez Castilla may be a distinct species.

To date I have not seen any other specimens taken from the type locality of Guane, Pinar del Rio Province, Cuba, but I have seen males matching well to the original description and genitalic drawings of *P. alayoi* Lopez Castilla from as near Viñales (approximately 36 miles northeast of the type locality) and from other, more distant localities in the Cordillera de Guaniguanico of Pinar del Rio and Artemisa Provinces. These specimens conform well to variation seen in other populations of *P. azurescens* Gyllenhal in Schoenherr.

Pachnaeus sp. "GZ25" Zhang et al. 2017

Pachnaeus sp. "GZ40" Zhang et al. 2017

"a *Pachnaeus*, allied to *P. opalus*" Wickham in Nutting 1895: 70 (in part, see also *P. litus* (Germar, 1824) below)

Diagnosis. This species can reliably be separated from others on the basis of its relatively elongate rostrum with epifrons lacking dorsally raised carinae. In most specimens the epifrons is notably raised as a convex mound, higher at center than laterally. In some specimens there may be almost-imperceivably shallow—so much so that they typically aren't readily visible unless the rostral scales are heavily rubbed—longitudinal impressions in the lateral quarter. In some males there is only a very slight dorsal expansion of the epifrons giving it a somewhat subplanar gestalt.

Boheman in Schoenherr (1840) claimed that E.F. Germar erroneously treated this species as synonymous with *Pachnaeus litus* (Germar), noting elytral base differences that correctly separate these two species. A primary source for this claim could not be located and it may be based on personal communication between these authors or examination of Germar's specimens, which I have not yet seen. Regardless, the assessment that these are distinct taxa was correct, as *P. litus* (Germar) can easily be distinguished by its more strongly anteriorly projecting elytral bases with toothlike, anteriorly directed projections just mediad of the humeri. Nevertheless, workers have frequently confused these taxa and other blue green scaled species from Cuba and southern Florida in past.

Pachnaeus azurescens Gyllenhal in Schoenherr can reliably be separated from the very similar continental United States native species, *P. opalus* (Olivier), by this later species' shorter, stouter rostrum with at least the lateral rostral carinae dorsally raised and the median rostral carina variable, but with the epifrons never tumescent to subplanar.

Pachnaeus azurescens Gyllenhal in Schoenherr also tends to have a less prominently irregularly punctate pronotal disc which tends to be slightly more glabrous than in *P. opalus*. The lateral pale-scaled patches of the pronotum are also typically more strikingly pale in *P. azurescens* Schoenherr in Gyllenhal than in *P. opalus* (Olivier), and *P. azurescens* Schoenherr in Gyllenhal tends to have a pale-scaled area anterior to the pronotal base which is more prominent than in *P. opalus* (Olivier). However, there is great variation in all of these pronotal characters in both species and some overlap in character states between these species, making them extremely difficult to separate without having specimens in hand or images that adequately represent rostral structure—a fact that has confounded efforts to understand the range expansion of *P. azurescens* Gyllenhal in Schoenherr into central Florida in recent past owing to the primarily photographic record of the introduced Floridian population.

Pachnaeus azurescens Gyllenhal in Schoenherr can be readily separated from *P. psittacus* (Olivier, 1807) on the basis of the latter species' notably raised lateral carinae and variably produced median rostral mound, the generally darker and more brilliantly glittery green or blue and more densely overlapping appressed scales seen in *P. psittacus* (Olivier), the pale-blue to white venter, head, and legs, and the presence of a notably darker and brilliantly green or blue, and the presence of a typically subtrigonal patch of scales on the lateral aspect of the metasternum seen in *P. psittacus* (Olivier) and not seen in *P. azurescens* Gyllenhal in Schoenherr or any other species of the genus. *Pachnaeus psittacus* (Olivier) is also mostly confined to eastern Cuba, Puerto Rico, and Hispaniola, its exact origin being uncertain (see discussion under this species); however, it has been reported—perhaps erroneously—as co-occurring with *P. azurescens* Gyllenhal in Schoenherr in the literature (*e.g.,* Lopez Castilla 1992).

Pachnaeus azurescens Gyllenhal in Schoenherr can easily be distinguished from the two members of the superficially similar *pater* species group on the basis of the strongly raised central and lateral rostral carinae with deep impressions between them that define this group. These southeastern Cuban species are also not known to co-occur with the more western to central Cuban *P. azurescens* Gyllenhal in Schoenherr, with *Pachnaeus rosadonetoi* Lopez Castilla, 1992 restricted to southeastern Cuba in lower altitude areas around Baracoa and *Pachnaeus pater* de Zayas, 1988 restricted to the Sierra Cristal and Sierra de la Nipe ranges.

Members of the *eisenbergi* species subgroup, *Pachnaeus citri* Marshall, 1916 and *Pachnaeus eisenbergi* Reily, sp. nov., are somewhat superficially similar to the present species but have a dorsomedially impressed pronotum which generally has a pale patch medially extending well onto the pronotal disc, and additionally these species do not co-occur with other, similar taxa such as *P. azurescens* Gyllenhal in Schoenherr as they are restricted to Jamaica.

Redescription. Habitus typical of the genus**.** Body length 7.5 to 14.5 mm. Body width at elytral bases 2.5 to 5.5 mm. Integument variable, ranging from testaceous to piceous. Moderately to densely clothed in a mix of appressed, subcircular to oval, turquoise, grey, pale green, and/or violet scales with sparser, subappressed, elongate and typically flattened, white to translucent scales intermixed. Elytral scales typically fairly uniformly colored, sometimes with indistinct, slightly paler areas on the humeri and epipleura, but never with distinct patches or stripes of paler scales as seen in some other species. Pronotum similarly colored to elytra, but usually with distinct and dense, longitudinal patches of paler scales laterally which join into an indistinct paler-scaled patch just anterior to the posterior pronotal margin. Leg and head scales similarly colored to body but often slightly paler.

Head typical of the genus. **Occiput** without a median, longitudinal sulcus at base. **Interocular pit** small, round, and in most specimens inconspicuous, sometimes the interocular area surrounding it slightly impressed. **Eyes** oval, slightly taller than wide, at most only very slightly protruding laterally from head. **Rostrum** with carinae dorsally obsolete or nearly so, generally with dorsal portion of epifrons moderately to strongly tumescently convexly expanded dorsally into a convex, evenly curving and notable hump, occasionally—especially in males—less-notably inflated and more subplanar, and in a few specimens with extremely slightly impressed, linear longitudinal impressions just anterior to the anterior margin of the eyes; rostrum rather elongate, comprising slightly more than half the entire length of the head. **Median rostral carina** not strongly raised above the curve of the convexly surfaced epifrons; notable only as a moderately wide, denuded and finely punctured, longitudinal swath along the center line of the epifrons, and extending from the posteromedial margin of the frons to or just posterior to the interocular pit. **Intercarinal rostral spaces** usually not notably impressed, at most with an almost-imperceptibly slight, longitudinal impression in lateral half between where median and lateral carinae would be if these carinae were present as raised mounds as seen in other species; rather sparsely clothed in appressed to subappressed, circular to oval, overlapping scales with a few subappressed, setose scales intermixed. **Lateral rostral carinae** never notably raised or defined dorsally, always lower than the peak of the gradually raised, tumescent hump at center of the rostrum; generally, clearly defined ventrolaterally and distinctly demarcated from the lateral portion of the epifrons anterior to the eye. **Lateral portion of epifrons anterior to the eye** laterally to obliquely laterally faced and generally concavely impressed. **Scrobe** arcuate, at most very slightly widened posteriorly. **Occipital sutures** laterally open, short but longitudinal, pit-like foveae, heavily obscured by scales in most specimens. **Frons** rather strongly angularly to curvilinearly declined from epifrons, slightly to moderately concavely impressed surrounding the nasal plate; sparsely to moderately covered in oval, appressed scales except on the nasal plate. **Nasal plate** slightly but notably raised, mostly nude but occasionally bearing a few appressed scales posteriorly and typically bearing a few long setae set in punctures along the posterior margin these mostly concentrated apicolaterally. **Mandibles** apically bearing numerous, long setae surrounding the mandibular scar. **Submentum** about 1.5 to 2 times as long as wide, generally not impressed, at most very slightly so; its boundary difficult to make out, especially posteriorly; variably clothed with appressed to subappressed circular to oval, pale scales, with a few subappressed, short, setose scales intermixed.

Antennae typical of the genus. **Scape** extending to the posterior margin of eye. **Funicle** with last two segments subconical.

Thorax typical of the genus. **Pronotum** very variably shaped, but typically laterally constricted immediately behind the anterior margin and then, posterior to this, sides typically curvilinearly expanding to about the middle, the sides of posterior half ranging from slightly posteriorly diverging to subparallel to slightly posteriorly converging. Pronotal disc typically sparsely and shallowly irregularly punctate. Pronotal collar laterally constricted and delimited by a groove behind the postocular lobe, but this often obscured partly or wholly by scales. Pronotal disc without a pair of posteriorly diverging

ridges and not notably medially impressed. Clothed in overlapping, appressed, circular scales and many subappressed, short, setose scales and typically bearing numerous, small, shallow, irregularly placed punctures and bare patches. **Pronotal bases** only very weakly bisinuate to accommodate the slightly overhanging elytral bases. **Postocular lobe** small, anteriorly projected as variably shaped projection, and not notably laterally expanded apically. **Postocular vibrissae** clearly visible, moderately long, anterodorsally directed, and longest at the middle of the postocular lobe. **Prosternum** densely clothed in confused, circular to oval, pale scales, with a few, erect, setose scales intermixed.
Mesoventrite moderately to densely clothed in overlapping, appressed, circular to oval, pale scales, these usually notably sparser near the anterior margin. Mesoventrite intercoxal process with many short, setose scales intermixed. **Metaventrite** densely covered in overlapping, pale, circular, appressed scales with many short, setose scales intermixed. Distance between mesocoxa and metacoxa about 2 times the diameter of the mesocoxa. **Mesepisternum** densely clothed in overlapping, pale, circular, appressed scales, and with a few subappressed, short, pale setose scales intermixed. **Mesepimeron** similarly scaled to mesepisternum. **Metepisternum** somewhat similarly scaled to mesepimeron, though scales slightly more elongate; scales densely overlapping in a patch just behind the anterior margin, and slightly sparser posterior to this. **Scutellar shield** variably shaped, though typically subquadrate with the posterior margin rounded; sparsely to moderately covered in pale, oval to subcircular, appressed scales, usually with a few, short, pale, subappressed setose scales intermixed.
Abdomen with ventrites 1 to 4 densely scaled with pale, overlapping, circular scales and with many subappressed, elongate, scales intermixed. Ventrite 5 similarly scaled, but

apically densely clothed in suberect, pale, setose scales with many longer erect setae intermixed.

Elytra entirely and moderately densely to densely scaled. Elytral striae composed of small but distinct, round punctures which are rarely overlapped by scales. Elytral bases only very weakly bisinuate, typically slightly curvilinearly projecting obliquely anteriorly from scutellum to near mid-elytron, nearly truncate laterad to this. Anteriorly directed toothlike projection mediad to elytral humeri absent. Elytral humeri obtusely angulate, nearly right angular in most specimens.

Legs typical of the genus. **Coxae** moderately to densely clothed in pale, overlapping, appressed scales with many, pale, elongate, subappressed setose scales intermixed. **Trochanters** similarly, if slightly more sparsely, scaled as coxae. **Femora** densely covered in pale, circular to oval, appressed scales with many short subappressed, white, setose scales intermixed. **Tibiae** scaled similarly to femora, though appressed scales a bit more elongate in general, and with a few, small denticles along the ventral side. Protibiae slightly to moderately apically bent inward. Protibial mucro much shorter than the width of the tibia just proximad to it and not extending notably beyond surrounding setae. **Tarsi** dorsally clothed in pale, linear scales. Tarsomere 5 about 2 times the length of tarsomere 3.

Male terminalia typical of the genus. **Penis** with temones about 0.41 times the length of the pedon. **Tegmen** about 0.51 times the length of the penis, with manubrium comprising about 0.57 times the total length. **Endophallus** with distal, tubular sclerite in dorsal view cylindrical, nearly even in width throughout, very slightly tapered apically, not notably widened near the posterior margin; notably longer than (1.40 times) the width of the pedon adjacent to endophallus; very slightly scythiform in lateral view, rising dorsally just proximad to middle and then curving slightly ventrally in distal quarter, very slightly tapered near apex but not notably dorsally expanded near base; about 7.8 times as long as wide and about 0.18 times the length of the pedon; in ventral view with posterior ventral margin truncate. Sac-like proximal portion of endophallus entirely membranous.

Spiculum gastrale with lateral margins of basal plate sigmoidal; basal plate about 0.61 times as wide as long, and about 0.38 times as long as the length of the apodeme.

Female terminalia typical of the genus. **Spiculum ventrale** with basal plate about 0.44 times the total length; basal plate at insertion of apodeme lacking a heavily sclerotized angular patch. **Coxites** about 0.59 times the total length of spiculum ventrale. Proximal gonocoxite about 0.53 times as tall as long; distal gonocoxite about 0.86 times as tall as long; distal gonocoxite about 0.49 times the length of the proximal gonocoxite.

Variation. This seems to be a single species with a wide range of morphological variation. This wide range of variation seems to have historically proven problematic for workers, whose efforts to resolve this taxon have been further confounded by its rather limited representation in collections and similarity to other members of the genus. *Pachnaeus griseus* Gyllenhal in Schoenherr has variously been treated historically as either a subspecies of or as synonymous with *P. azurescens* Gyllenhal in Schoenherr since it was first reduced to subspecific level within *P. azurescens* Gyllenhal in Schoenherr by Boheman in Schoenherr (1840). However, it should be noted that the original description of *P. griseus* Gyllenhal in Schoenherr includes mention of claimed rostral carinae differences between *P. griseus* and *P. azurescens*—specifically noting a lack of notably pronounced rostral carinae in *P. azurescens* Gyllenhal in Schoenherr ("*P. opalo et P. griseo valde affinis, rostro vix carinato*…") and a claimed presence of at least slight medial carinal elevation in *P. griseus* ("*P. opalo et P. azurescenti valde similis et affinis, … rostrum capite paulo angustius, sed non brevius, crassum, supra sub-planum, carinula parum elevata instructum*…"). The lectotype of *P. griseus* Gyllenhal in Schoenherr (Fig. 3.34) is deposited at NHRS, Stockholm, along with the lectotype of *P. azurescens* Gyllenhal in Schoenherr (Fig. 3.31). The images of the lectotype of *P. griseus* Gyllenhal in Schoenherr available to me do not show the sculpturing of the rostrum very well, though they do generally seem to generally conform in rostral structure to some specimens of *P. azurescens* Gyllenhal in Schoenherr with a less strongly inflated but still tumescent epifrons which do have subtle, extremely shallow, longitudinal, linear impressions laterally, giving them a very faintly tricarinate appearance. I believe that this is the rostral difference being described in the original descriptions of these taxa, but I am hopeful that future examination of these types in person may help to resolve this discrepancy. Based on available images of these specimens, I agree with and maintain the treatment of *P. griseus* Gyllenhal in Schoenherr as a junior synonym of *P. azurescens* Gyllenhal in Schoenherr, with the former seeming to be a teneral specimen—being that it is largely identical to the holotype of *P. azurescens* Gyllenhal in Schoenherr excepting its paler integument color and less iridescent, paler body scales—and smaller postocular lobe—a highly variable character within this species.

The Havana population of *P. azurescens* Gyllenhal in Schoenherr (Figs. 3.32–3.33) matches the lectotype of *P. azurescens* Gyllenhal in Schoenherr reasonably well, with both sexes in this population tending to be on the smaller end of the range of size variation seen within this species. Many older specimens without detailed locality data below the national level also match this population well.

The Isla de Juventud population was described as a distinct species by de Zayas (1988), *i.e., P. juvenalis* de Zayas. However, this posthumous publication does not provide comparative diagnostic notes with which to separate this purported species from other taxa and even acknowledges the problematicity of the species at the beginning of the original description. Fernando de Zayas' types remain in his personal collection at the de Zayas home in Havana and were not accessible for in person study for the present work. However, images of the lateral aspect of the anterior half, the lateral view of the eye and postocular lobe, and of the metatibial corbel of the holotype (Michael A. Ivie, Pers. Comm., Fig. 3.35) collected near Embalse el Enlace in December of 1977 by Walter Calante (de Zayas 1988) match reasonably well to other known specimens from two other localities on the island, Nueva Gerona and La Cieba. The Isla de la Juventud population is slightly larger on average than other populations on the main island of Cuba, with this size difference most notable in the typically smaller males of the species and noted in the original description by de Zayas. Otherwise, there don't seem to be other reliable characters with which to separate this population from others and there is a good deal of overlap between this population and nearby populations on the main island, even in terms of range of size.

The Cordillera de Guaniguanico population was described as a distinct species by Lopez Castilla (1992), *i.e., P. alayoi* Lopez Castilla, from a male holotype and four paratypes—two male, two female, all collected at Guane. Lopez Castilla claimed that his species was sympatric at its type locality with *P. azurescens* Gyllenhal in Schoenherr sec. Lopez

Castilla 1992, though his concept of *P. azurescens* may be a misidentification of some other undescribed species or simply variation within *P. azurescens* Gyllenhal in Schoenherr. The holotype (Fig. 3.36A–C) and at least one of the paratypes (Fig. 3.36D) appear to be specimen of *P. azurescens* Gyllenhal in Schoenherr based on available images.

The western Sierra de Escambray population (Mayarí, Cuatro Vientos, and Pico de San Juan, all in Cienfuegos Province) was included in past molecular work by Zhang et al. (2017). This population, like others, is somewhat variable in terms of its rostral structure, postocular lobe structure, body shape, general scale color, and elytral scale density, which lead to specimens from different collecting events (and even from the same collecting event!) being treated as multiple taxa by Zhang et al. (2017), though in this case not as described species but with different informal codes on labels and in publication. This population, in general, tends to have notably larger females—which overlap in dimensions with those from the Isla de las Juventud population—but smaller males. Individuals in this population typically have small, irregularly distributed, sparsely scaled to denuded patches on their elytra, but seem otherwise indistinguishable from the holotype of *P. azurescens* Gyllenhal in Schoenherr.

Material examined.

Lectotype of *Pachnaeus azurescens* Gyllenhal in Schoenherr, 1834 by present designation (Fig. 3.31): Cuba: female, “Pachnaeus azu, rescens. Dej. ex. Ins. Cuba. Dej. | [red label] Typus”, NHRS, NHRS-JLKB 000027163.

This species may have been described from this single specimen, but the original description is not explicit. As such it is here designated as a lectotype (see also ICZN 1999, recommendation 73F).

Lectotype of *Pachnaeus griseus* Gyllenhal in Schoenherr, 1834 by present designation (Fig. 3.34): Cuba: female, "Pachn. griseus. Chev. e Cuba. Chevr. | [red label] Typus", NHRS, NHRS-JLKB 000027164.

This species may have been described from this single specimen, but the original description is not explicit. As such it is here designated as a lectotype (see also ICZN 1999, recommendation 73F).

Holotype of *Pachnaeus juvenalis* de Zayas, 1988 by original designation (Fig. 3.35): Cuba: Isla de Juventud: Embalse el Enlace.

I have seen images of a specimen taken by Michael A. Ivie (Pers. Comm) from the type series that is presumably the holotype, but have not seen the label on this specimen or images of it. According to de Zayas (1988: 170) the holotype is one of 20 exemplars collected at [Embalse] el Enlace, Isla de Pinos [=Isla de Juventud], in December 1977 by Walter Calante and is deposited in the de Zayas collection in Havana.

61 other specimens: Cuba: 4 female, 1 male, "Cuba. Ch. Wright", MCZ, [MCZ-ENT 00]529436, [MCZ-ENT 00]529437, [MCZ-ENT 00]529438, [MCZ-ENT 00]529439, [MCZ-ENT 00]529440; 3 male, "Cuba. | Wright Coll", MCZ, [MCZ-ENT 00]529433, [MCZ-ENT 00]529434, [MCZ-ENT 00]529435; 1 female, "D. Sharp coll. ex Lethierry et al. B.M. 1933-281& B.M. 1948-336 | P. azurescens. (Dejean.) - Cuba.", NHMUK, ARTSYS0007726; 1 female, "Mus. Westerm. | Cuba.", NHMD, ARTSYS0007727; 1 female, "Mus. Westerm. | P. azurescens Dej. Cuba.", NHMD, ARTSYS0007728;

Artemisa province: <u>San Vicente:</u> 1 female, "CUBA: San Vicente, Sierra delRosario, Pinar del RioProv. June 17, 1959 M. W. Sanderson C59-31 | Pachnaeus 4", CWOB, ARTSYS0007717; 1 male, "CUBA: San Vicente, Sierra delRosario, Pinar del RioProv. June 17, 1959 M. W. Sanderson C59-32", CWOB, ARTSYS0007718; <u>Las Ánimas:</u> 1 male, "Las Animas,Sierra Rangel,Cuba,Elev. 1500 ft.Ap.28/33, SCBrunner&AROtero. | Pres. by Imp. Inst. Ent. B. M. 1941-91", NHMUK, ARTSYS0007724; <u>Pan de Guajaibón:</u> 1 male, "Cuba: Pan deGuajai- bon, Pinar del Rio Prov. May 16-17, 1953, M. L. Jaume", CWOB, ARTSYS0007723; **Cienfeuegos Province:** <u>Mayarí:</u> 1 female, 1 male, "CUBA: Cienfuegos Mayari, 2 km E. 21.96651, -80.11497, 842m 18.v.2013, R. Anderson 2013-017X, hardwood forest", CMNC, WWD0104147 / ARTSYS0007711, WWD0104148 / ARTSYS0007712; 1 male, "CUBA: Cienfuegos Mayari, 2 km E. 21.96651, -80.11497, 842m 18.v.2013, R. Anderson 2013-017X, hardwood forest, Pachnaeus sp. 2 det. R. S. Anderson 2016", CMNC, WWD0104149 / ARTSYS0007713; 1 male, "CUBA: Cienfuegos: Mayari, 2.5 km E. N21°58'15.56" W80°07'05.81" 860m 18 May 2013, G. Zhang [CB13_L20][sic, including brackets] | [red label] Photo taken | SP 25 | Pachnaeus sp. 4 det. N.M. Franz 2012", ASUHIC, ASUHIC0033693; 1 female, 2 male, "CUBA: Cienfuegos Prov. Res. Ecológica Pico San Juan 21.97083° N, 80.11859° W 856 m; MV lights; forest edge 18-V-2013; A.B.T. Smith, A. Deler-Hernández", CMNC, ARTSYS0007714, ARTSYS0007715, ARTSYS0007716; <u>Cuatro Vientos:</u> 1 female, "CUBA: Cienfuegos: Cuatro Vientos, 2.5 km S. to Hotel Serrano, Rio Cabagan N21.93123 W80.08461, 651m, 20 May 2013 G. Zhang [CB_L24] [sic, including brackets] | [red label] Photo taken | SP.25", ASUHIC, ASUHIC0033689; 1 female, 1 male, "CUBA: Cienfuegos: Cuatro Vientos, 2.5 km S. to Hotel Serrano, Rio Cabagan

N21.93123 W80.08461, 651m, 20 May 2013 G. Zhang [CB_L24] [sic, including brackets] | [red label] Photo taken | SP 25”, ASUHIC, ASUHIC0033690, ASUHIC0033692; 1 male, “CUBA: Cienfuegos: Cuatro Vientos, 2.5 km S. to Hotel Serrano, Rio Cabagan N21.93123 W80.08461, 651m, 20 May 2013 G. Zhang [CB_L24] [sic, including brackets] | [red label] Photo taken | SP40”, ASUHIC, ASUHIC0060439; 1 female, “CUBA: Cienfuegos: Cuatro Vientos, 2.5 km S. to Hotel Serrano, Rio Cabagan N21.93123 W80.08461, 651m, 20 May 2013 G. Zhang [CB_L24] [sic, including brackets] | DNA | SP40”, ASUHIC, ASUHIC0033980; 1 male, “CUBA: Cienfuegos: Cuatro Vientos, 2.5 km S. to Hotel Serrano, Rio Cabagan N21.93123 W80.08461, 651m, 20 May 2013 G. Zhang [CB_L24] [sic, including brackets] | [red label] Photo taken”, ASUHIC, ASUHIC0033691; 2 female, 1 male, “CUBA: Cienfuegos: Cuatro Vientos, 2.5 km S. to Hotel Serrano, Rio Cabagan N21.93123 W80.08461, 651m, 20 May 2013 G. Zhang [CB_L24] [sic, including brackets] | SP41”, ASUHIC, ASUHIC0033948, ASUHIC0033632, ASUHIC0033626; 1 male, “CUBA: Cienfuegos: Cuatro Vientos, 2.5 km S. to Hotel Serrano, Rio Cabagan N21.93123 W80.08461, 651m, 20 May 2013 G. Zhang [CB_L24] [sic, including brackets] | SP.41”, ASUHIC, ASUHIC0033904; <u>Pepito Tey (= “Soledad”)</u>: 1 female, “Central Soledad Cuba 1-VII 1932 B.B. Leavitt”, MCZ, [MCZ-ENT 00]529452; 1 female, “Soledad nr. Cienfuegos Cuba 6-20-VIII | N[eal]. A[lbert]. Weber Coll”, MCZ, [MCZ-ENT 00]529464; **Isla de la Juventud:** <u>La Ceiba:</u> 1 female, “Isla de Pinos. La Ceibo. [= La Ceiba, Isla de la Juventud] | 1918 T[homas]. Barbour + W[inthrop]. S[prague]. Brooks”, MCZ, [MCZ-ENT 00]529396; <u>Nueva Gerona:</u> 1 female “Nueva Gerona Isle of Pines | July 31 1912 | Carn. Mus. Acc. 4745| Carnegie Museum Specimen Number CMNH-376,211”, CMNH, ARTSYS0007555; 1

female, “Nueva Gerona Isle of Pines | June 1 1912 | Carn. Mus. Acc. 4656| Carnegie Museum Specimen Number CMNH-375,261”, CMNH, ARTSYS0007545; 1 female, “Nueva Gerona Isle of Pines | June 1 1912 | Carn. Mus. Acc. 4656| Carnegie Museum Specimen Number CMNH-375,489”, CMNH, ARTSYS0007548; 1 female, “Nueva Gerona Isle of Pines | June 1 1912 | Carn. Mus. Acc. 4656| Carnegie Museum Specimen Number CMNH-376,051”, CMNH, ARTSYS0007553; 1 male, “Nueva Gerona Isle of Pines | June 1 1912 | Carn. Mus. Acc. 4656| Carnegie Museum Specimen Number CMNH-375,278”, CMNH, ARTSYS0007546; 1 male, “Nueva Gerona Isle of Pines | June 1 1912 | Carn. Mus. Acc. 4656| Carnegie Museum Specimen Number CMNH-375,422”, CMNH, ARTSYS0007547; 1 male, “Nueva Gerona Isle of Pines | June 1 1912 | Carn. Mus. Acc. 4656| Carnegie Museum Specimen Number CMNH-375,581”, CMNH, ARTSYS0007549; 1 male, “Nueva Gerona Isle of Pines | June 1 1912 | Carn. Mus. Acc. 4656| Carnegie Museum Specimen Number CMNH-375,737”, CMNH, ARTSYS0007550; 1 male, “Nueva Gerona Isle of Pines | June 1 1912 | Carn. Mus. Acc. 4656| Carnegie Museum Specimen Number CMNH-375,759”, CMNH, ARTSYS0007551;1 male, “Nueva Gerona Isle of Pines | June 1 1912 | Carn. Mus. Acc. 4656| Carnegie Museum Specimen Number CMNH-376,214”, CMNH, ARTSYS0007554; 1 male, “Nueva Gerona Isle of Pines | June 1 1912 | Carn. Mus. Acc. 4656 | Pachnaeus litus germar | Carnegie Museum Specimen Number CMNH-376,007”, CMNH, ARTSYS0007552; **La Habana Province:** <u>Havana:</u> 1 male, “1557 | Havane Leseleuc [Auguste de Léséleuc] | Bowring 63•47* | Pachnaeus griseus Gyl. Det. from descr. G. A. K. Marshall”, NHMUK, ARTSYS0007730; 1 female, “1558 | Bowring 63•47* | distans Horn [this specimen followed the preceding specimen in the NHMUK collection and, owing to this and the similar labeling, it is here treated as from the same collecting event]", NHMUK, ARTSYS0007725; 1 female, "Havana Cuba May 21-28, [1893 (see Wickham in Nutting 1895: 70)] Wickham. | Sharp Coll. 1905-313.", NHMUK, ARTSYS0007729; 1 female, "Havana Cuba May 21-28, [1893 (see Wickham in Nutting 1895: 70)] Wickham.", MCZ, [MCZ-ENT 00]529481; 1 female, "Havana Cuba May 21-28, [1893 (see Wickham in Nutting 1895: 70)] Wickham. | F. C. Bowditch Coll.", MCZ, [MCZ-ENT 00]529363; **Pinar del Rio Province:** <u>San Vicente:</u> 1 female, 2 male, "CUBA: Pinar del Rio Vinales National Park near Dos Hermanos 123m, 22.62109 -83.73834 III/IV.2012, CarBio Team, CU-24", CMNC, WWD0109084 / ARTSYS0007719, WWD0109085 / ARTSYS0007720, WWD0109086 / ARTSYS0007721; 1 male, " CUBA: Pinar del Rio Vinales National Park near Dos Hermanos 123m, 22.62109 -83.73834 III/IV.2012, CarBio Team, CU-24 | Pachnaeus sp. 4 det. R. S. Anderson 2016", WWD0109087 / ARTSYS0007722; 3 male, 1 female, "Banos de San Vicente, P. de R. VIII.'39 CUBA Parsons", MCZ, [MCZ-ENT 00]529487, [MCZ-ENT 00]529488, [MCZ-ENT 00]529489, [MCZ-ENT 00]529490. **<u>USA:</u> Florida:** <u>Polk Co.:</u> 1 male, "FL: Polk co. 2635 Ewell Rd. Lakeland,IV/1-5/2015 R. Morris | Pachnaeus sp. det. R.F. Morris 2015", CWOB, ARTSYS0007731; 1 female, "Lake Alfred, Fla. | H. O. Andersen Coll. 26 IV 62 | On leaves of | At Citrus sinensis", CWOB, ARTSYS0007732.

Selected observational records:

<u>USA</u>: Florida: <u>Hardee Co.</u>: Wauchula, Maude Rd., 27.58177, -81.679221, ±5m, 16 November 2019, inaturalist.org/people/emilie66, inaturalist.org/observations/35741352;

Zolfo Springs, 27.502426, -81.807608, ±31m, covered in spiderweb, 26 June 2018, Colin Purrington (inaturalist.org/people/colinpurrington), inaturalist.org/observations/13827312; Zolfo Springs, Brantwood Dr., 27.498416,-81.805357, ±200m, 18 July 2021, Colin Purrington (inaturalist.org/people/colinpurrington), inaturalist.org/observations/87584129; Hernando Co.: [Brooksville, Fickett Hammock Preserve], 28.613987, -82.4687, ±61m, 7 July 2021, Stephen D.M. (inaturalist.org/people/steven_dm), inaturalist.org/observations/87773759; Hillsborough Co.: 28.196061, -82.554419, ±29.66km, May 2019, Arturo Santos(inaturalist.org/people/aispinsects), inaturalist.org/observations/32919555; 28.196061, -82.554419, ±29.66km, June 2019, Arturo Santos (inaturalist.org/people/aispinsects), inaturalist.org/observations/25457114; [Plant City], 28.017182, -82.143341, ±244m, 9 May 2018, Sheila Rypkema (inaturalist.org/people/sheila38), inaturalist.org/observations/12300109; Thonotosassa, 28.147981, -82.228649, ±9m, 9 July 2021, Joseph Serrano (inaturalist.org/people/joseph_serrano), inaturalist.org/observations/86977673; Manatee Co.: Myakka City, 73rd Ave. E., 27.406328, -82.108542, ±357m, 7 June 2020, Marisa Fajardo (inaturalist.org/people/mothrisa), inaturalist.org/observations/48868058; Orange Co.: 28.324728, -81.291679, September 2020, Christian (inaturalist.org/people/trilodite), inaturalist.org/observations/59808380; Orange Co., Winter Park, [28.5961, -81.3467], 10 May 2008, Eric Haley (bugguide.net/user/view/9190), bugguide.net/node/view/181997, bugguide.net/node/view/181998; Polk Co.: 28.194606,-81.963642, ±29.66km, June 2021, inaturalist.org/people/cellerbe, inaturalist.org/observations/84135147; 27.826405, -81.595353, 26 May 2020, Daniel Estabrooks (inaturalist.org/people/daniel_e), inaturalist.org/observations/47528858; Bartow, 27.878075, -81.862076, ±4m, 6 July 2021, inaturalist.org/people/karenmimfl, inaturalist.org/observations/85928420; on Citrus L. (Rutaceae), 3 July 2012, Kelly McGough (bugguide.net/user/view/73110), bugguide.net/node/view/683109, bugguide.net/node/view/683117; Circle B Bar Reserve, [27.9966, -81.8653], 23 June 2014, Owen Davids (bugguide.net/user/view/110527), bugguide.net/node/view/1158608; [Colt Creek State Park], 28.28994, -82.042617, ±25m, 22 May 2020, Robby Deans (inaturalist.org/people/hydaticus), inaturalist.org/observations/48055495; Hilochee WMA, 28.1748, -81.7407, 28 July 2017, Tom Palmer (inaturalist.org/people/tpalmer), inaturalist.org/observations/7283535; [Lakeland], 28.150912, -81.872916, ±168m, 23 June 2019, inaturalist.org/people/lizch, inaturalist.org/observations/27531730; [Lakeland], 808 W. Beacon Rd., 28.018474, -81.965918, ±10m, 20 May 2019, inaturalist.org/people/lsmith11wfwf, inaturalist.org/observations/25467252; Lakeland, Lakeland Linder International Airport, 27.99607, -82.026528, ±10m, 29 June 2021, Alexis Cardas (inaturalist.org/people/aphelocoma_acc), inaturalist.org/observations/86194413; [Lakeland], Magnolia Ave., 27.971311, -81.912078, 65m, 15 May 2020, inaturalist.org/people/c-l, inaturalist.org/observations/45982648; Winter Haven, Michael V. Lewis Arboretum, 28.020938, -81.674134, ±117m, 24 July 2018, Tom Palmer (inaturalist.org/people/tpalmer), inaturalist.org/observations/14722633

Etymology. The name *azurescens* is a Latin participle derived from a false separation of the Medieval Latin *lazur* via Old French (dropping the l as if it were equivalent to the French article l') meaning “the sky-blue pigment or paint made from lapis lazuli" combined with the Latin suffix -ēscēns, meaning “resembling”. This name refers to the predominantly azure color of the scales of the lectotype, as explained in the original description.

Geographical distribution and chorological affinities. This species is native to western Cuba, where it co-occurs with *P. litus* (Germar). It has only somewhat recently been introduced into central Florida and appears to be established there. The earliest known record from Florida was collected from orange trees, *Citrus* × *sinensis* (L.) Osbeck (Rutaceae), at Lake Alfred, Polk County in late-April of 1962. Numerous other observational records have appeared since 2008. Based on available records, the Floridian population appears to be expanding in range, with older records in Polk and Orange counties where the population seems to have persisted, and more recent records in Hardee, Hernando, Hillsborough, and Manatee counties appearing within the past few years.

Pachnaeus azurescens Gyllenhal in Schoenherr, has historically had no overlap in range with the continental US native species, *P. opalus* (Olivier). While *P. azurescens* Gyllenhal in Schoenherr is established within the northern portion of the non-native, Floridian range of the introduced Cuban species, *P. litus* (Germar), there is not much evidence to suggest that these species co-occur at the same sites. It should be mentioned that *P. litus* (Germar) itself seems like it may be expanding northward based on available recent observational records on iNaturalist and past distributional maps of this species (Woodruff 1981 and see geographical distribution section under *P. litus* (Germar)). It seems interesting enough to be worth noting, though perhaps it simply coincidental, that

P. azurescens Gyllenhal in Schoenherr seems to have become established near the boundary between the Floridian ranges of *P. opalus* (Olivier) and *P. litus* (Germar), raising questions about the role of interspecific competition on invasive species colonization and establishment.

Biology. This species is found at low- to mid-elevation (> 900 m) sites from March to August in Cuba and early-April to mid-November in Florida. It is associated with hardwood forest and forest edge habitat in Cienfuegos Province, Cuba, and it has rarely been collected at mercury vapor lights there.

Cook and Horne (1908) reported on life history; adult, larval, and egg-mass morphology, larval behavior, natural enemies (ants and birds), physical and chemical treatment options for grove infestation, and citrus damage done by larvae and adults of *P. litus* (Germar) and, to a lesser extent, *P. azurescens* Gyllenhal in Schoenherr. They report on a major outbreak at Santiago de las Vegas, Havana starting in early April 1905 that caused the death of many orange trees (*Citrus* × *sinensis* (L.) Osbeck; Rutaceae) and serious injury of others, as well as damage to other plants in the vicinity of this outbreak. Unfortunately, the species identifications in this work are somewhat suspect: specimens the authors call *P. litus* (Germar) are correctly identified, based on available figures, but the very limited diagnosis of their *P. azurescens* Gyllenhal in Schoenherr—"smaller than *P. litus* and of a deep blue color"—is insufficient to identify this taxon to species-level and its actual identity remains unclear.

Pachnaeus azurescens Gyllenhal in Schoenherr is reported as a pest of *Citrus* L. (Rutaceae; Anonymous 1917: 56, Cañizares Zayas 1963: 31, Cardin 1915: 119, Cook and

Horne 1908: 11, Estrada Ortiz 1981, Fawcett 1915: 198; Fernandez García and Herrera Oliver 2004: 29, González Fernández et al. 2010: 202, Houser 1909: 52-53, Mestre Novoa et al. 2009: 56, Montes 1978a: 52, Quayle 1938: 326), but is likely less detrimental to this crop than *P. litus* (Germar). Specimen and observational data presented here confirms the association between *Citrus* L. and *P. azurescens* Gyllenhal in Schoenherr but confirmed records of this association are rare and restricted to the introduced Floridian population.

This species has also been reported from *Annona cherimola* Mill. (Annonaceae; Cook and Horne 1908: 14 ("Anone, eaten well in laboratory."), Houser 1909: 53), *Arachis hypogaea* L. (Fabaceae; Cook and Horne 1908: 14 ("Pea-nut, eaten almost as well as orange in field and laboratory."), Houser 1909: 53), *Carya illinoinensis* (Wangenh.) K. Koch (Juglandaceae; Cook and Horne 1908: 14 ("Pecan, eaten very well."), Houser 1909: 53), *Cedrela odorata* L. (Meliaceae; Anonymous 1917: 55, Cardin 1915: 117), *Coffea* L. (Rubiaceae; Cook and Horne 1908: 14 ("Coffee, eaten in laboratory only when beetles were very hungry. Eggs laid on it."), Houser 1909: 53; Pierce 1918: 63), *Diospyros kaki* Thunb. (Ebenaceae; Cook and Horne 1908: 14 ("Japanese persimmon, eaten very well and eggs laid on it."), Houser 1909: 53), *Manihot esculenta* Crantz (Euphorbiaceae; Anonymous 1917: 64, Cardin 1915: 171), *Litchi chinensis* Sonn. (Sapindaceae, Cañizares Zayas 1963: 31), *Mucuna pruriens* (L.) DC. (Fabaceae; Cook and Horne 1908: 14 ("Velvet-bean, same as cow-pea [= eaten by the beetles only when very hungry]."), Houser 1909: 53), *Persea americana* Mill. (Lauraceae; Anonymous 1917: 52, Cardin 1915: 100, Cook and Horne 1908: 14 ("Aguacate, eaten well in laboratory and the seedlings eaten in garden."), Houser 1909: 53), *Pouteria sapota* (Jacq.) H. E. Moore &

Stearn (Sapotaceae; Cañizares Zayas 1963: 31, Estévez García et al. 2015: 53, fig. 1 (as P. *litus* (Germar)), *Rosa* L. (Rosaceae; Cook and Horne 1908: 15 ("Rose, eaten only when beetles were very hungry; eggs laid on leaves."), Houser 1909: 53), *Saccharum* L. (Poaceae; Fernandez García and Herrera Oliver 2004: 29), and *Vigna unguiculata* (L.) Walp. (Fabaceae; Cook and Horne 1908: 14 ("Cow-pea, eaten by the beetles only when very hungry."), Houser 1909: 53). Rooster vine, *Aristolochia* L. sp. (Aristolochiaceae), has been reported as potentially toxic to this species (Cook and Horne 1908: 14 ("eaten only when beetles were very hungry; it seems to have a poisonous effect."), Houser 1909: 53). However, it is unclear to what extent some of these records represent this species as there has been past confusion regarding its identity and none of the available Cuban specimens have label data reporting plant associations.

Imperial Bureau of Entomology (1924b: 592) in reference to Roig et al. (1923; a work that has been unobtainable to date) reports *P. azurescens* Gyllenhal in Schoenherr, *P. litus* (Germar), *P. psittacus* (Olivier), and *P. costatus* Perroud attacking *Citrus* L. (Rutaceae), *Annona* L. (Annonaceae), *Arachis hypogaea* L. (Fabaceae), *Persea americana* Mill, (Laureaceae), and *Eriobotrya japonica* (Thunb.) Lindl. (Rosaceae) in Cuba.

This species does occur on mamey sapote (*Pouteria sapota* (Jacq.) H. E. Moore & Stearn, (Sapotaceae) on Isla de Juventud based on images provided by Estévez García et al. (2015: 53, fig. 1B). The introduced Florida population has been collected on oranges (*Citrus* × *sinensis* (L.) Osbeck; Rutaceae). Vázquez Moreno et al. (2008: 136) reports this species to be attacked by *Beauveria bassiana* (Bals.-Criv.) Vuill. (Cordycipitaceae) and observational records are known of specimens entangled in spider webs.

***howdenae* species subgroup**

Diagnosis. Members of this species subgroup comprise a putative clade from the northern Bahamas, with most records from islands in the Little Bahama Bank where they are likely native. These species are united by their very coarsely punctured pronota with lateral margins strongly arcuate in dorsal view. They also possess strongly reduced postocular vibrissae, and have a longitudinally shortened metasternum, which is at most about as long between the mesocoxae and metacoxae as the diameter of the mesocoxae. They are superficially similar to some members of the tribe Geonemini Gistel, 1856 as suggested by Wickham in Nutting (1895: 207) who treated one member as "near *Barynotus*". As such, they are not typical of the genus and are unlikely to be confused with other potentially co-occurring species of *Pachnaeus*.

***Pachnaeus howdenae* Reily, sp. nov.**

Figs. 3.46–3.48, 3.83B, 3.84C–D, 3.85J, 3.92

"a fine Otiorhynchid near *Barynotus*" Wickham in Nutting 1895: 207

Diagnosis. This small grey species is distinct from other members of the genus and can readily be separated from them by its small size, by its mottled tan to pinkish-grey scales, by its strongly reduced postocular vibrissae which are often not visible but, when visible, are comprised of at most a few, sparse, very short setae. It is also distinct from most species of the genus by having a broad pronotum with sides strongly arcuate in dorsal view, obsolete lateral rostral carinae, a central carina which is only very slightly raised and denuded as a thin line restricted primarily to the anterior of the epifrons and with only a slight impression either side (Fig. 3.46D), a frons which is mostly denuded and notably but slightly deflected downward in relation to epifrons, small and obliquely ventrally opened occipital sutures atypical of the genus, nearly straight and relatively shorty and stocky protibiae (Figs. 3.83B, 3.84C–D), and very densely scaled legs.

Description. Habitus not typical of the genus but instead similar in form to some members of the tribe Geonemini Gistel owing to its arcuately laterally expanded pronotal shape, heavily reduced postocular vibrissae, reduced rostral carinae, and grey scaling**.** Body length 6.5 to 11.5 mm. Body width at elytral bases 2.0 to 4.5 mm. Integument piceous. Densely clothed in a mix of tan to grey to cinereous, oblong to oval, appressed scales with sparser, subappressed, elongate, white to translucent setose scales intermixed. Elytral scales irregularly mottled with lighter and darker patches, and with small, sparsely scaled patches near many of the elytral punctures where much of the underlying, dark integument can be seen. Pronotum scaled similarly to elytra, but with scales generally a bit more subcircular. Body lacking regular scale patterning or stripes. Leg and head scales similarly colored to body.

Head generally typical of the genus, though rostral dorsum a bit more planar than usual. **Occiput** without a median, longitudinal sulcus at base. **Interocular pit** extremely small and in most specimens inconspicuous. **Eyes** oval, slightly taller than wide, not protruding laterally from head. **Rostrum** with carinae obsolete or nearly so; rostrum comprising slightly more than half the entire length of the head. **Median rostral carina** only very slightly raised and denuded in a very thin line along the center line from where it joins into the posteromedial margin of the frons to or just anterior to the interocular pit. **Intercarinal rostral spaces** at most very shallowly impressed, epifrons typically almost planar; excepting the medial rostral carina rather densely clothed in appressed, subcircular, overlapping scales with subappressed, setose, flattened scales intermixed. **Lateral rostral carinae** not notably raised, not clearly defined dorsally or laterally, and not distinctly demarcated from the lateral portion of the epifrons anterior to the eye. **Lateral portion of epifrons anterior to the eye** laterally faced and planar to very slightly concavely impressed. **Scrobe** arcuate, slightly widened posteriorly. **Occipital sutures** obliquely ventrally open, relatively long, longitudinal, pit-like foveae, not obscured by scales in most specimens except near the anterior extent from within which many, elongate, flattened scales arise. **Frons** slightly angularly declined from epifrons; planar to slightly convex; mostly denuded except a few, sparsely placed, small, oval, appressed and very small, very short, translucent, elongate, flattened appressed scales which are mostly confined to the posterior and lateral portions near the intersection of the epifrons. **Nasal plate** not usually notably raised, a few specimens with a slight bulge anteromedially, nude and sparsely and irregularly punctured, and with at most a few long setae set in punctures along the posterior margin, these mostly confined near the lateral portion of the rostral apex. **Mandibles** apically bearing just a few, long setae surrounding the mandibular scar. **Submentum** about 2 times as long as wide in males and a bit broader in females, moderately impressed, somewhat densely clothed with subappressed to suberect oblong, pale scales posteriorly and many suberect, short, setose scales anteriorly.

Antennae typical of the genus. **Scape** extending to the posterior margin of eye. **Funicle** with last two segments subconical.

Thorax somewhat typical of the genus but a bit wider and shorter in dorsal view than in most other species. **Pronotum** somewhat subglobose, more notably so in males, the lateral margins in dorsal view rather evenly convexly arcuate in anterior half and widest near middle, the posterior quarter of the lateral margin more linearly narrowing. Pronotal disc variably but distinctly irregularly punctate. Pronotal collar slightly laterally constricted and delimited by a groove behind the postocular lobe, but this often obscured partly or wholly by scales and typically restricted to the ventrolaterally directed portion of the pronotum. Pronotal disc without a pair of posteriorly diverging ridges and not notably medially impressed; clothed in overlapping, appressed, circular to oval scales and many subappressed, short, setose scales and bearing numerous, irregularly placed punctures. **Pronotal bases** nearly truncate; slightly obliquely and linearly anteriorly directed laterally. **Postocular lobe** obsolete, the lateral anterior margin of the pronotum truncate or nearly so. **Postocular vibrissae** very short, sparse, anteriorly directed, of even length, and usually mostly obscured beneath the edge of the pronotum. **Prosternum** densely clothed in confused, oblong to oval scales with a few, erect setose scales interspersed. **Mesoventrite** with scattered, small appressed scales which grow larger and denser posteriorly; near the anterior margin mostly nude, near middle the appressed scales smaller and somewhat plumose, and posteriorly heavily covered in larger appressed, oval, pinkish-grey scales. Mesoventrite intercoxal process with a few moderately long, setose scales intermixed. **Metaventrite** rather densely covered in pale, overlapping, appressed to subappressed, oval scales with many short, setose scales intermixed. Distance between mesocoxa and metacoxa less than or equal to the diameter of the mesocoxa. **Mesepisternum** densely clothed in pale, subcircular, appressed scales, these denser and overlapping anteriorly, and with a few short, pale, flattened, elongate, subappressed scales intermixed. **Mesepimeron** moderately densely clothed in confused, overlapping, pale, oval to elongate, appressed scales with many short, pale, flattened, elongate, subappressed scales intermixed. **Metepisternum** densely clothed in pale, subcircular, appressed scales—these often very densely overlapping in a patch near the anterior margin—and with many short, pale, flattened, elongate, subappressed scales intermixed. **Scutellar shield** variably shaped, though typically subtrigonal to ogival; densely covered in pale grey, oval, appressed scales.

Abdomen with ventrites 1 and 2 densely scaled with pale, appressed to subappressed, oblong scales and with many white, erect to suberect, setose scales intermixed. Ventrites 3 to 4 as preceding but appressed scales smaller, sparser, mostly non-overlapping, and in most specimens denser posteriorly than anteriorly. Ventrite 5 similar to 3 and 4 but with many long, erect setae intermixed throughout except near anterior margin.

Elytra mostly densely scaled except for a few small, more sparsely scaled patches that are mostly confined to near strial punctures. Elytral striae composed of small but distinct, round punctures which are rarely overlapped by scales. Elytral bases truncate, extending nearly linearly transversely from scutellum to humerus. Anteriorly directed toothlike projection mediad to elytral humeri absent. Elytral humeri not prominently expanded, somewhat rounded, indistinct and only slightly wider than pronotal bases.

Legs with tibiae notably shorter, stockier, and more heavily covered in overlapping scales than usual for the genus, otherwise generally similar. **Coxae** densely clothed in pale, overlapping, appressed scales with many elongate, subappressed, pale, setose scales intermixed. **Trochanters** densely covered in elongate, pale, appressed scales with many moderately long, subappressed, white, setose scales intermixed. **Femora** densely covered in overlapping, circular to oval, appressed scales with many short subappressed, white, setose scales intermixed. **Tibiae** atypically short and stocky; scaled similarly to femora but appressed scaling denser and setose scales longer and more numerous; bearing a few, very small, rounded denticles along the ventral side but these usually mostly to entirely obscured by setae. Protibiae apically straight, not bent inward. Protibial mucro much shorter than half the width of the tibia just proximad to it, not extending notably beyond surrounding setae. **Tarsi** dorsally clothed in pale grey, linear scales. Tarsomere 5 about 2 times the length of tarsomere 3.

Male terminalia typical of the genus. **Penis** with temones about 0.67 times the length of the pedon. **Tegmen** about 0.47 times the length of the penis, with manubrium comprising about 0.60 times the total length. **Endophallus** with distal, tubular sclerite in dorsal view subconical, notably wider proximally than distally, slightly tapered apically and notably widened near the base; slightly longer than (1.19 times) the width of the pedon adjacent to endophallus; more-or-less straight in lateral view, not bent ventrally, tapered near apex and slightly dorsally expanded near base; about 3.3 times as long as wide and about 0.18 times the length of the pedon; in ventral view with posterior ventral margin slightly concavely arcuate. Sac-like proximal portion of endophallus entirely membranous.

Spiculum gastrale with lateral margins of basal plate convex and obtusely angulate; basal plate about 0.63 times as wide as long, and about 0.35 times as long as the length of the apodeme.

Female terminalia typical of the genus. **Spiculum ventrale** with basal plate about 0.38 times the total length; basal plate at insertion of apodeme lacking a heavily sclerotized angular patch. **Coxites** about 0.58 times the total length of spiculum ventrale. Proximal gonocoxite about 0.68 times as tall as long; distal gonocoxite about 1.00 times as tall as long; distal gonocoxite about 0.47 times the length of the proximal gonocoxite.

Variation. This species exhibits slight variation in scale color—generally ranging from tan to slightly pale pinkish grey—and slight variation in pronotal sculpturing—typically relatively coarsely and irregularly punctured but sometimes a bit less prominently so. The specimen from Harbor Island (ARTSYS0007678) is significantly darker in overall color, but this appears to be because it is heavily rubbed.

Material examined.

Holotype by present designation: Bahamas: Abaco: Man-O-War Cay: male, **"**Man-O-War Cay, nr. Abaco, Bahamas, Aug. 15-24, 1971 H. & A. Howden", CMNC, ARTSYS0007689.

28 Paratypes by present designation: Bahamas: Abaco: Man-O-War Cay: 8 female, 17 male, same data as holotype, CMNC, ARTSYS0007651, ARTSYS0007652, ARTSYS0007653, ARTSYS0007654, ARTSYS0007655, ARTSYS0007656, ARTSYS0007657, ARTSYS0007658, ARTSYS0007659, ARTSYS0007660, ARTSYS0007661, ARTSYS0007662, ARTSYS0007663, ARTSYS0007664, ARTSYS0007665, ARTSYS0007666, ARTSYS0007667, ARTSYS0007668, ARTSYS0007669, ARTSYS0007670, ARTSYS0007671, ARTSYS0007672,

ARTSYS0007673, ARTSYS0007674, ARTSYS0007675; 1 female, “Man-O-War Cay, nr. Abaco, Bahamas, Aug. 15-24, 1971 H. & A. Howden | nearest Lachnopus DET. Diaprepes A T HOWDEN”, CMNC, ARTSYS0007650; 1 male, “Man-O-War Cay, nr. Abaco, Bahamas, Aug. 15-24, 1971 H. & A. Howden | Genus ? Have 24 more DET. HOWDEN”, CWOB, ARTSYS0007676; 1 female, “Man-O-War Cay, nr. Abaco, Bahamas, Aug. 15-24, 1971 H. & A. Howden”, CWOB, ARTSYS0007677.

1 other specimen: Bahamas: North Eleuthera: Harbour Island: 1 female, “Harbor Isl Bahamas | July-8 [1893 (see Wickham in Nutting 1895: 207)] Wickham | Pres. by Comm Inst Ent B.M. 1981-315 | Pachnaeus sp. n.”, NHMUK, ARTSYS0007678.

Etymology. The specific epithet *howdenae* is a patronym in honor of entimine expert Anne T. Howden, who collected the type series of this species and who’s other collecting provided a significant portion of the material examined in this revision. This name is a noun in the genitive case and is feminine.

Geographical distribution and chorological affinities. Most specimens of this species have been collected on Man-O-War Cay, near Abaco, where it co-occurs with *P. ivieorum* Reily, sp. nov. A single specimen taken by Wickham is known from Harbor Island, near Eleuthera. They are not known to co-occur with any other species.

Biology. Very little is known about the biology of this species, but it has been collected from early-July to late-August.

***Pachnaeus ivieorum* Reily, sp. nov.**

Figs. 3.49–3.50, 3.85K, 3.93

Diagnosis. This species is somewhat similar to the co-occurring *Pachnaeus howdenae* Reily, sp. nov. but is much larger, its scales are generally of a mottled, dark brown to charcoal color, and the pronotum is less broad and has less arcuate lateral margins—the margins subparallel and nearly linear in the posterior half for most specimens. The median rostral carina is more-or-less obsolete except for a wide and at most extremely slightly raised, denuded area along the midline which is present in some specimens. The legs are rather sparsely scaled, leaving much of the underlying glabrous integument visible around the scales, and the protibiae are not short and stocky, but instead longer and more typical of the genus, and very slightly apically bent. The postocular vibrissae in this species tend to be more numerous and usually more visible than in the previous species, but they are still highly reduced in length and generally mostly hidden beneath the anterior lateral margin of the pronotum. Like the preceding species, it is superficially similar in form to some members of the tribe Geonemini Gistel and, as such, is unlikely to be confused with other members of the genus *Pachnaeus.*

Description. Habitus not typical of the genus, similar in form to some members of the tribe Geonemini Gistel owing to its arcuately laterally expanded pronotal shape, reduced postocular vibrissae, reduced rostral carinae, and brunneous scaling. Body length 11.5 to 14.0 mm. Body width at elytral bases 3.5 to 5.5 mm. Integument piceous. Moderately densely clothed in a mix of tan to cupreous to fuscus, circular, appressed scales with sparser, tan to grey, elongate, setose, subappressed to suberect scales intermixed. Elytral scale pattern typically irregularly mottled brown, with lighter and darker patches, this generally more strikingly noticeable in males which often, though not always, have lighter light-scaled elytral areas and darker dark-scaled elytral areas than seen in females, which seem to generally be a bit more uniform in elytral coloration, though still often have small, paler patches near the elytral punctures. Both sexes often have many irregular, sparsely scaled patches on each elytron, in which much of the underlying, dark integument can be seen. Pronotum scaled similarly to elytra; typically with paler patches of scales laterally and a small, thin longitudinal patch of paler scales medially near the posterior margin and two, nebulous paler patches just anterior to this laterad of the midline and confined to the posterior half of the disc. Legs more sparsely, darkly, and more elongate scaled—scales mostly oval to oblong—than the body, except in the distal half of the femora which is rather densely clothed in paler tan to grey, circular to broadly oval, appressed scales. Head with scales similarly colored to body but significantly sparser and with many more elongate and setose scales present, these particularly noticeable on the otherwise sparsely scaled interocular space.

Head generally typical of the genus, though rostral dorsum a bit more planar than usual. **Occiput** without a median, longitudinal sulcus at base. **Interocular pit** small, round to oval, the area surrounding it often slightly raised anteriorly and slightly impressed posteriorly. **Eyes** oval, 1.5 to 2 times taller than wide, not protruding laterally from head. **Rostrum** with carinae obsolete or nearly so; rostrum comprising slightly more than half the entire length of the head. **Median rostral carina** at most very slightly raised and denuded as a broad, glabrous, poorly defined, and very finely punctate patch along the median half of the epifrons from where it joins into the posteromedial margin of the frons to behind the interocular pit, and generally to near the posterior margin of the eyes. **Intercarinal rostral spaces** at most very shallowly impressed, epifrons usually planar; moderately clothed in nonoverlapping, appressed, oval scales with subappressed to suberect, setose scales intermixed. **Lateral rostral carinae** not notably raised, not clearly defined dorsally; usually clearly defined laterally, and distinctly demarcated from the typically strongly impressed laterally faced portion of the epifrons anterior to the eye. **Lateral portion of epifrons anterior to the eye** laterally faced and mostly planar except for a thin and somewhat deep longitudinal impression just ventrad to the lateral rostral carinae, this sometimes restricted to the anterior half of the lateral portion of the epifrons anterior to the eye. **Scrobe** arcuate, slightly widened posteriorly. **Occipital sutures** obliquely ventrally open, relatively short, subcircular to teardrop-shaped, pit-like foveae, typically obscured by scales near the posterior extent but otherwise open. **Frons** not strongly declined from epifrons; nude and glabrous with fine, confused punctures, sometimes very slightly impressed just posterior to nasal plate but typically subplanar. **Nasal plate** with at most a slight bulge anteromedially near the margin, nude and with at most a few long setae set in punctures along the posterior margin, these mostly confined near the lateral portion of the rostral apex. **Mandibles** apically bearing just a few, stout, long setae surrounding the mandibular scar. **Submentum** about 2 times as long as wide in males and a bit broader in females, usually moderately impressed, moderately clothed in mix of suberect oblong, pale scales and many suberect, short, setose scales. **Antennae** typical of the genus. **Scape** extending beyond the posterior margin of eye. **Funicle** with last two segments subconical.

Thorax typical of the genus. **Pronotum** broadly trapezoidal in dorsal view, in females lateral margins widening slightly and gradually in the anterior half and typically subparallel in the posterior half; similar in males but generally more laterally expanded near middle and slightly narrowed in the posterior quarter. Pronotal disc variably but distinctly irregularly punctate. Pronotal collar slightly laterally constricted and delimited by a groove behind the postocular lobe, but this often obscured partly or wholly by scales and typically restricted to the ventrolaterally directed portion of the pronotum. Pronotal disc without a pair of posteriorly diverging ridges and not notably medially impressed. Dorsally mostly clothed dorsally in small, nonoverlapping, circular to oval, appressed scales and with many subappressed, short, setose scales intermixed; pronotal disc bearing numerous, irregularly placed punctures; similarly scaled laterally but appressed scales larger, denser, paler, and typically overlapping. **Pronotal bases** nearly truncate; slightly obliquely and linearly anteriorly directed laterally. **Postocular lobe** obsolete, the lateral anterior margin of the pronotum truncate or nearly so. **Postocular vibrissae** short, anteriorly directed, of more-or-less even length throughout, and partly obscured beneath the edge of the pronotum. **Prosternum** densely clothed in pale, subcircular to oval, appressed scales; the prosternal process is generally denuded except near the anterior apex between the procoxae and occasionally with a few erect, long setose scales. **Mesoventrite** with scattered, small appressed scales which grow larger and denser posteriorly; near the anterior margin mostly nude, near middle the appressed scales are smaller and somewhat plumose, and posteriorly covered in larger, tan to grey, oval, appressed scales. Mesoventrite intercoxal process with a few moderately long, setose scales intermixed. **Metaventrite** rather densely covered in appressed and subappressed, pale, oval scales, these denser and more overlapping laterally, less so medially; with many short, setose scales intermixed. Distance between mesocoxa and metacoxa less than or equal to the diameter of the mesocoxa. **Mesepisternum** densely clothed in appressed, pale grey to tan scales, these denser, more elongate, slightly plumose, and overlapping anteriorly but sparser and more circular to oval posteriorly; with a few subappressed, short, pale, flattened scales intermixed throughout; typically with a denuded glabrous patch along the ventral margin. **Mesepimeron** similarly scaled to the anterior, more plumose scaled portion of the mesepisternum, but scales slightly sparser and larger. **Metepisternum** near the anterior margin similarly scaled to the mesepimeron; somewhat sparsely clothed in pale, subcircular, subappressed scales with many short, pale, flattened, subappressed, scales intermixed posteriad to this. **Scutellar shield** variably shaped, though typically subquadrate; densely covered in oblong, tan, appressed scales.

Abdomen with ventrites 1 and 2 moderately densely scaled with tan and brunneous, oval to oblong, appressed to subappressed scales—these often sparser, narrower, and less overlapping medially than laterally—and with many, tan, erect to suberect, setose scales intermixed. Ventrites 3 to 4 scaled as preceding but appressed scales smaller, sparser, and non-overlapping. Ventrite 5 similar to 3 and 4 but scales narrower and with many long, erect setae intermixed throughout except near anterior margin.

Elytra mostly moderately densely and evenly scaled except for a few fairly small, paired, sparser patches where much of the underlying integument can be seen—one pair typically located before middle around the fourth elytral striae, one pair located anteriad to the elytral declivity around the sixth or seventh elytral striae, and one pair on the declivity. Elytral striae composed of small but distinct, round punctures which are not overlapped by scales. Elytral bases truncate, extending nearly linearly transversely from scutellum to humerus. Anteriorly directed toothlike projection mediad to elytral humeri absent. Elytral humeri not prominently expanded, indistinct and only slightly wider than pronotal bases.

Legs typical of the genus. **Coxae** sparsely but rather evenly clothed in pale grey to cupreous, overlapping, appressed scales with many, pale, elongate, subappressed, setose scales intermixed. **Trochanters** sparsely but evenly clothed in long, grey to tan, subappressed, setose scales. **Femora** in apical third and basal fifth moderately densely covered in overlapping, cupreous to tan circular to oval, appressed scales with many short pale, subappressed, setose scales intermixed, between apical third and basal fifth the appressed scales are generally darker brown, sparser, and smaller. **Tibiae** scaled similarly to paler scaled, apical portion of femora ventrally and the medial darker scaled portion of the femora dorsally; however, both dorsally and ventrally the tibial scales are denser, smaller, and more elongate than those on the femora and the setose scales are tan to grey, longer, and more numerous; bearing at most just a few, small denticles apically along the ventral side, these typically partly obscured by scales. Protibiae at most very slightly bent inward apically, in some specimens apically straight. Protibial mucro very short, shorter than one quarter the width of the tibia just proximad to it, not extending notably beyond the surrounding setae. **Tarsi** dorsally clothed in tan to cupreous, linear scales, occasionally with a few appressed, elongate oval, cupreous scales intermixed apically on tarsomeres 1 and 2. Tarsomere 5 about 1.5 times the length of tarsomere 3.

Male terminalia typical of the genus. **Penis** with temones about 0.67 times the length of the pedon. **Tegmen** about 0.53 times the length of the penis, with manubrium comprising about 0.64 times the total length. **Endophallus** with distal, tubular sclerite in dorsal view subcylindrical, very slightly tapered apically and notably widened near the base; slightly longer than (1.16 times) the width of the pedon adjacent to endophallus; more-or-less straight in lateral view, not bent ventrally, tapered near apex and slightly dorsally expanded near base; about 5.0 times as long as wide and about 0.15 times the length of the pedon; in ventral view with posterior ventral margin slightly concavely arcuate. Sac-like proximal portion of endophallus entirely membranous. **Spiculum gastrale** with lateral margins of basal plate sigmoidal; basal plate about 0.74 times as wide as long, and about 0.31 times as long as the length of the apodeme.

Female terminalia typical of the genus. **Spiculum ventrale** with basal plate about 0.38 times the total length; basal plate bearing a heavily sclerotized, subangularly diamond shaped patch surrounding the insertion of the apodeme. **Coxites** about 0.59 times the total length of spiculum ventrale. Proximal gonocoxite about 0.43 times as tall as long; distal gonocoxite about 0.87 times as tall as long; distal gonocoxite about 0.41 times the length of the proximal gonocoxite.

Variation. The elytra in this species are variably mottled with an irregular pattern of small paler brunneous patches of scales surrounded by darker charcoal grey areas. This seems to be a gradient in patterning with intermediate forms between this and a more typical, mostly brown form.

Material Examined.

Holotype by present designation: <u>Bahamas:</u> Abaco: <u>Man-O-War Cay:</u> male, **"**Man-O-War Cay, nr. Abaco, Bahamas, Aug. 15-24, 1971 H. & A. Howden", CMNC, ARTSYS0007690.

9 Paratypes by present designation: <u>Bahamas:</u> Abaco: <u>Man-O-War Cay:</u> 1 female, **"**Man-O-War Cay, nr. Abaco, Bahamas, Aug. 15-24, 1971 H. & A. Howden | Pachnaeus ? det. J. Girón 2018", CMNC, ARTSYS0007679; 3 female, **"**Man-O-War Cay, nr. Abaco, Bahamas, Aug. 15-24, 1971 H. & A. Howden", CMNC, ARTSYS0007680, ARTSYS0007681, ARTSYS0007682; 1 female, **"**Man-O-War Cay, nr. Abaco, Bahamas, Aug. 25-30, 1971 H. & A. Howden | H. & A. Howden Collection", CMNC, ARTSYS0007683; 1 male, **"**Man-O-War Cay, nr. Abaco, Bahamas, Aug. 25-30, 1971 H. & A. Howden", CMNC, ARTSYS0007684; <u>Marsh Harbour:</u> 2 female, "Marsh Harbour, Abaco, Bahamas, Aug. 25, 1971 H. & A. Howden", CMNC, ARTSYS0007685, ARTSYS0007686; 1 male, "Marsh Harbour, Abaco, Bahamas, Aug. 25, 1971 H. & A. Howden | H. & A. Howden Collection", CMNC, ARTSYS0007687.

4 other specimens: <u>Bahamas:</u> Grand Bahama: 1 male, "BAHAMAS:Grand Bahamas J. Wallace Farm 19-X-1992 Bahama Survey Team *Persea americana*", CWOB, ARTSYS0007691.

<u>USA:</u> Florida: <u>St. Lucie Co.:</u> 1 male, "FLORIDA: St. Lucie Co., Ft. Pierce in citrus ex Great Exuma, BAHAMAS R. Morris", CWOB, ARTSYS0007688; 1 male, "FLORIDA: St. Lucie Co., Ft. Pierce in citrus ex Great Exuma, BAHAMAS R. Morris| Pachnaeus sp. nov.", CWOB, ARTSYS0007837; 1 female, "FLORIDA: St. Lucie County, Ft. Pierce| via Bahamas| R. Morris coll. ex limes", CWOB, ARTSYS0007838.

Etymology. The specific epithet *ivieorum* is a patronym in honor of Michael A. and Donna Ivie who have spent decades helping to build a better understanding of the West Indian insect fauna. I am also personally indebted to the Ivies for accommodating me during my time working in the MTEC and WIBF collections. This name is a noun in the genitive case and is neuter.

Geographical distribution. Most specimens have been collected from Man-O-War Cay, near Abaco where it co-occurs with *P. howdenae* Reily, sp. nov., but the species may also be established on other Bahamian Islands. Several specimens have intercepted from citrus. being shipped to Fort Pierce, Florida from Great Exuma, Bahamas, but it is not yet known to be established in the continental United States.

Biology. Little is known about the biology of this species. It has been collected from mid- to late-August in Abaco and mid-October in Grand Bahama and has been taken in association with avocado (*Persea americana* Mill., Lauraceae) in Grand Bahama, and at Fort Pierce, Florida in shipments of *Citrus* L. (Rutaceae), and specifically limes, from the Bahamas.

***pater* species group**

Diagnosis. This group comprises a putative clade native to eastern Cuba that can be separated from similar members of the genus by their relatively truncate elytral bases, by the males having a very strongly, very steeply raised median rostral carina and moderately raised lateral rostral carinae with very notable, wide impressions between median and lateral carinae. Members of this group are somewhat similar to *P. litus* (Germar) but lack anteriorly directed dentiform projections just mediad of the elytral humeri and their elytral bases are not strongly, anteriorly produced near the middle of each elytron. Species in this group typically possess paired pronotal punctures, one pair near middle of the pronotal disc and a second, more narrowly separated pair in the basal quarter to sixth, but these are sometimes absent or obscured by scales. Pronotal scaling tends to be denser than in the *opalus* species group and these species lack irregular pronotal punctation, generally having relatively smoothly sculptured pronotal discs. Scaling in this group typically ranges from blue green to slightly purperescent and most individuals have at least some purperescent scales on the body.

Pachnaeus pater **de Zayas, 1988: 167**

Figs. 3.51A–B, 3.52–3.54, 3.85M, 3.94

Pachnaeus pater de Zayas, 1988: 167 (original combination)

Lopez Castilla 1992:1; Peck 2005: 230

Pachnaeus sp. “GZ1” Zhang et al. 2017

Diagnosis. Females of this inland, montane, eastern Cuban species are at most only very slightly larger than males of the species and are smaller on average than those in the more easterly, coastal *P. rosadonetoi* Lopez Castilla, 1992.

In females of *P. pater* de Zayas, the very narrow and very strongly raised median rostral carina is similar to that of the male and extends beyond the middle of the eyes, often to or beyond the posterior extent of the eyes (Fig. 3.54C). This contrasts to females of *P. rosadonetoi* Lopez Castilla, in which the broadly angulate and only moderately raised median rostral carina ends just anterior to the eye (Fig. 3.57C).

In females of *P. pater* de Zayas, the interocular pit is located posterior to or near middle of the eyes. This contrasts to females of *P. rosadonetoi* Lopez Castilla, in which the interocular pit is located notably anterior to the middle of the eyes.

The occipital sutures in males of *P. pater* de Zayas extend apically to or near the pleurostomal sinus as shallowly impressed furrows that are typically filled with notably more-erect scales than the surrounding area.

Males of *P. pater* de Zayas have a sclerotized tubular portion of the endophallus that is slightly shorter than the width of the aedeagus surrounding the endophallic sclerite and which has a deeply incised, angulate notch in the ventral posterior margin (Fig. 3.51A–B), as opposed to being slightly longer than the width of the aedeagus surrounding the endophallic sclerite and with a very slightly concavely arcuate ventral posterior margin as seen in *P. rosadonetoi* Lopez Castilla (Fig. 3.51C–D).

Redescription. Habitus typical of the genus**.** Body length 8.0 to 12.0 mm. Body width at elytral bases 3.0 to 4.5 mm. Integument castaneous. Pronotum and elytra rather densely clothed in a mix of rather dull, turquoise to purperescent, overlapping, circular, appressed scales with many white to translucent, elongate and typically flattened, subappressed scales intermixed; some specimens have patches of paler scaling along the posterior pronotal margin and/or laterally on the pronotum. Elytra are slightly paler and more densely scaled on the epipleura than on the disc. Head, legs and venter are rather densely scaled in both sexes, and typically these scales are of similar color and structure to those on the body.

Head typical of the genus. **Occiput** without a median, longitudinal sulcus at base. **Interocular pit** small, variably shaped but typically oval to elongate and occasionally obsolete; typically not overlapped by scales. **Eyes** oval, slightly taller than wide, not notably protruding laterally from the head. **Rostrum** tricarinate with the median carina strongly and steeply raised and the lateral carinae slightly but usually notably raised; rostrum comprising a little over half the entire length of the head. **Median rostral carina** as a distinctly raised and very steeply sloped ridge; laterally moderately clothed in pale, appressed and subappressed scales; denuded in a thin linear swath along the midline which runs from the posteromedial margin of the frons to or just behind the interocular pit in both sexes. **Intercarinal rostral spaces** notably impressed between median and lateral carinae; moderately densely clothed, in appressed to subappressed, oval to elongate, scales with many translucent, flattened, suberect scales intermixed. **Lateral rostral carinae** slightly raised dorsally, but always lower than the peak of the median rostral carina; typically notably defined ventrolaterally and distinctly demarcated from the lateral portion of the epifrons anterior to the eye. **Lateral portion of epifrons anterior to the eye** obliquely laterally faced; slightly convex just ventral to the lateral carinae. **Scrobe** arcuate, not widened posteriorly. **Occipital sutures** laterally opened posteriorly and ventrolaterally opened anteriorly; long, linear, and posteriorly widening pit-like foveae; typically obscured by overlapping scales posteriorly near the eye. **Frons**

moderately angularly declined from epifrons, not notably concavely impressed surrounding the nasal plate; moderately covered in pale, oval, appressed scales except on the nasal plate. **Nasal plate** very slightly raised; mostly nude but sometimes with a few overlapping appressed scaled near the posterior margin; typically bearing several long setae set in punctures along the posterior margin, these longer and more concentrated laterally than medially. **Mandibles** apically bearing numerous, long setae surrounding the mandibular scar with a few elongate, appressed scales typically intermixed laterally. **Submentum** about 1.5 times as long as wide, slightly impressed; densely clothed with pale, elongate to oval, appressed to subappressed scales, with moderately long, pale, suberect to subappressed, setose scales intermixed throughout.

Antennae typical of the genus. **Scape** extending posterior to the posterior margin of eye. **Funicle** with last two segments subconical.

Thorax typical of the genus. **Pronotum** slightly laterally constricted immediately behind the anterior margin, typically linearly to curvilinearly expanded to near middle, the posterior half subparallel sided. Pronotal collar slightly laterally constricted but not notably delimited by a groove behind the postocular lobe. Pronotal disc without a pair of posteriorly diverging ridges and not notably medially impressed; moderately densely clothed in pale, subcircular, appressed scales and with many, pale, short, subappressed, setose scales intermixed. **Pronotal bases** only very weakly bisinuate to accommodate the slightly overhanging elytral bases. **Postocular lobe** relatively large; anteriorly projected as an obtusely angular to near right angular projection. **Postocular vibrissae** clearly visible, moderately long, anterodorsally directed, and longest at the middle of the postocular lobe. **Prosternum** rather densely clothed in confused, pale, circular to oval, appressed scales, with many, short, suberect to erect, setose scales intermixed.

Mesoventrite moderately clothed in pale, subcircular to oval, appressed scales, these usually notably sparser near the anterior margin. Mesoventrite intercoxal process with many moderately long, setose scales intermixed. **Metaventrite** moderately densely covered in overlapping, pale, circular to oval, appressed scales with many short, setose scales intermixed. Distance between mesocoxa and metacoxa about 2 times the diameter of the mesocoxa. **Mesepisternum** moderately to densely clothed in pale, circular to oval, appressed scales, these generally denser anteriorly, and with a few pale, short, subappressed to suberect, setose scales intermixed. **Mesepimeron** similarly scaled to mesepisternum but appressed scales generally a bit sparser. **Metepisternum** similarly scaled to mesepimeron. **Scutellar shield** subquadrate, occasionally with the anterior half slightly laterally constricted; moderately clothed in mostly non-overlapping, pale, iridescent, oval, appressed scales, usually with some of the underlying integument visible.

Abdomen with ventrites 1 to 4 rather densely scaled with pale, overlapping, subcircular to oval, appressed scales with many suberect, short, setose scales intermixed. Ventrite 5 similarly scaled, but typically with appressed scales more elongate and apically sparser than in preceding ventrites and with many, long, suberect to erect, setose scales intermixed posteriorly.

Elytra entirely and moderately densely scaled. Elytral striae composed of very small, circular to oval punctures which are typically heavily overlapped at their edges by surrounding appressed scales. Elytral bases at most very weakly bisinuate, usually nearly truncate; typically slightly curvilinearly projecting obliquely anteriorly from scutellum to near mid-elytron, nearly truncate laterad to this. Anteriorly directed toothlike projection mediad to elytral humeri absent but often with a small impression or series of irregular small punctures dorsally on the elytral disc just anteromedial to the humeri. Elytral humeri obtusely angulate to subrectilinear.

Legs typical of the genus. **Coxae** moderately clothed in pale, overlapping, oval, appressed scales with pale, subappressed, setose scales intermixed. **Trochanters** similarly scaled as coxae, but with appressed scales smaller. **Femora** rather densely covered in pale, circular to oval, appressed scales with many moderately long, pale, suberect, setose scales intermixed. **Tibiae** scaled similarly but a bit more sparsely than femora, and with at most just a few very small denticles along the ventral side. Protibiae slightly apically bent inward. Protibial mucro much shorter than half the width of the tibia just proximad to it, not extending notably beyond surrounding setae. **Tarsi** dorsally clothed in pale, linear, appressed scales. Tarsomere 5 about 2 times the length of tarsomere 3.

Male terminalia typical of the genus. **Penis** with temones about 0.75 times the length of the pedon. **Tegmen** about 0.54 times the length of the penis, with manubrium comprising about 0.69 times the total length. **Endophallus** with distal, tubular sclerite in dorsal view subconical, tapered in the apical quarter, slightly laterally expanded in the ante-apical quarter, and slightly widened near the base; slightly shorter than (0.96 times) the width of the pedon adjacent to endophallus; more-or-less straight in lateral view, notably tapered near the apex, and slightly dorsally expanded at the base; about 4.0 times as long as wide and about 0.14 times the length of the pedon; in ventral view with posterior ventral margin deeply incised with an acutely subangulate notch. Sac-like proximal portion of endophallus entirely membranous. **Spiculum gastrale** with lateral margins of basal plate slightly sigmoidal; basal plate about 0.63 times as wide as long, and about 0.37 times as long as the length of the apodeme.

Female terminalia typical of the genus. **Spiculum ventrale** with basal plate about 0.41 times the total length; basal plate at insertion of apodeme lacking a heavily sclerotized angular patch. **Coxites** about 0.63 times the total length of spiculum ventrale. Proximal gonocoxite about 0.37 times as tall as long; distal gonocoxite about 0.73 times as tall as long; distal gonocoxite about 0.47 times the length of the proximal gonocoxite.

Variation. This species shows some variation in scale color, ranging from almost entirely purperescent to mostly pale turquoise scaled, though most specimens have at least some patches of purperescent scaling. Males tend to be only slightly smaller than females and, while there is some slight variation in rostral structure between sexes—mostly in terms of rostral length, it is not as significant as in the very similar but more dimorphic *P. rosadonetoi* Lopez Castilla.

Material examined.

Holotype of *Pachnaeus pater* de Zayas, 1988 by original designation (Fig. 3.52):

<u>**Cuba:**</u> **Holguin Province:** <u>Mayarí</u>.

I have seen a few, limited images of the holotype—*i.e.*, a lateral shot of anterior half of specimen, a close up of eye and postocular lobe, and an image of the metatibial apex—taken by Michael A. Ivie (Pers. Comm.), but I have not examined the types in person. According to de Zayas (1988: 170) the holotype was collected in October 1966 at

Mayarí, Holguin Province (formerly part of Oriente Province)—not to be confused with the town of Mayarí in Cienfuegos Province as clarified elsewhere by de Zayas (1988: 80). The holotype is deposited in the de Zayas collection in Havana. Based on the structure of the rostrum, it appears to be a female.

1 Paratype of *Pachnaeus pater* de Zayas, 1988 by original designation: Cuba: Santiago de Cuba Province: "Juraguá" [=Playa Juraguá].

A single paratype was collected in June 1966 at "Juraguá" (=Playa Juraguá) in Santiago de Cuba Province (formerly part of Oriente Province)—not to be confused with the town of Juraguá in Cienfuegos Province as clarified elsewhere by de Zayas (1988: 73). The identity of the paratype is questionable given the distance of this collecting locality from both the type locality and of other specimens matching the original description collected near the type locality. This issue is not likely to be resolved until matching material from or near Playa Juraguá can be obtained or the paratype can be examined. This, however, does not affect the validity of the species. Based on available images of the holotype, information and drawings provided in the original description, and geographic proximity to the type locality, the following specimens are treated as members of this species.

10 other specimens: Cuba: Holguín Province: Culebro: 1 female, "CUBA: Holguin: Parque Nacional Pico Cristal N20°34.247' W075°25.673' 557m. 11 May 2013 G. Zhang [CB13_L5] | sp 1 | DNA", ASUHIC, ASUHIC0033978; Parque Nacional La Mensura-Piloto: 1 male, "CUBA: Holguin: Mayarí, Parque Nacional La Mensura-Piloto N20°31.730' W075°46.098' 750m. 09 May 2013 G. Zhang [CB13_L2] | sp 1. | DNA", ASUHIC, ASUHIC0033603; 1 male, "CUBA: Holguin: Mayarí, Parque Nacional La Mensura-Piloto N20°31.730' W075°46.098' 750m. 09 May 2013 G. Zhang [CB13_L2] |

Photo Taken | sp 1 | Pachnaeus sp. 2 det N.M. Franz, 2012", ASUHIC, ASUHIC0033613; 1 female, "CUBA: Holguin: Mayarí, Parque Nacional La Mensura-Piloto N20°31.730' W075°46.098' 750m. 09 May 2013 G. Zhang [CB13_L2] | Photo Taken | sp 1", ASUHIC, ASUHIC0033614; 1 female, "CUBA: Holguin: Mayari, Parque Nacional La Mensura-Piloto N20°31.730' W075°46.098' 750m. 09 May 2013 G. Zhang [CB13_L2] | sp 1 | DNA", ASUHIC, ASUHIC0033861; 1 male, "CUBA: Holguin: Mayarí, Parque Nacional La Mensura-Piloto, Estación de investigación de la Montaña en Pinares de Mayarí N20°29.056' W075°47.300' 658m. 11-12May2013 G. Zhang [CB13_L7] | sp 1 | DNA", ASUHIC, ASUHIC0033860; 1 male, "CUBA: Holguin, Mayarí P.N. Mensura Piloto 20.48640 -75.79134, 657m. 10.v.2013, R. Anderson 2013-005X, hand collections | Pachnaeus sp. 1 det. R.S. Anderson, 2016", CMNC, WWD0072671 / ARTSYS0001368; 1 male, "CUBA: Holguin, Mayarí P.N. Mensura Piloto 20.48640 -75.79134, 657m. 10.v.2013, R. Anderson 2013-005X, hand collections", CMNC, WWD0072673 / ARTSYS0001369; 1 male, "CUBA: Holguín, Sierra de Nipe, Pinares de Mayarí 07JUL1990, at u.v. light 650m, M. A. Ivie colr | Pachnaeus sp. det. R. S. Anderson 1994", WIBF, ARTSYS0007556; 1 male, "CUBA: Holguín, Sierra de Nipe, 23km S. Mayarí, Pinares de Mayarí 650m 03 JULY 1990 M. A. Ivie colr, at night", WIBF, ARTSYS0007557.

Etymology. The specific epithet *pater* is a masculine Latin noun in apposition meaning "father". In the original description, de Zayas explains that the name of this species was chosen because it was described on fathers' day and dedicated to the memory of his father.

Geographical distribution and chorological affinities. This species is known primarily from mid- to high-elevation (550 to 750 m) sites in the Nipe and Cristal ranges. The holotype was reportedly collected at Mayarí but may be from a higher-elevation site near this municipio. The paratype collecting locality of Playa Juraguá, Santiago de Cuba Province, is suspect given that this low-elevation locality on the south coast of eastern Cuba is not near other known records of this seemingly restricted species, or even known records of the similar *P. rosadonetoi* Lopez Castilla. The paratype may represent a range extension of the similar *P. rosadonetoi* Lopez Castilla, a misidentified specimen of a similar described species such as *P. litus* (Germar), a particularly densely scaled form of *P. costatus* (Perroud), or some other yet undescribed species. Ignoring the problematic paratype, this species is otherwise unknown to co-occur with other members of the genus.

Biology. Little is known about the biology of this species, but it has been collected from early-May to early-July, and in October at mid- to high-elevation (550–750 m) sites in the Nipe and Cristal ranges.

Pachnaeus rosadonetoi **Lopez Castilla, 1992: 4**

Figs. 3.51C–D, 3.55–3.57, 3.85L, 3.94

Pachnaeus rosadonetoi Lopez Castilla, 1992: 4 (original combination)

Hidalgo-Gato González et al. 2002: 26; Peck 2005: 230

Pachnaeus sp. “GZ52” Zhang et al. 2017

Pachnaeus sp. “GZ53” Zhang et al. 2017

Diagnosis. Females of this coastal, eastern Cuban species are usually notably larger than males. Females of *P. rosadonetoi* Lopez Castilla are generally slightly larger and slightly paler scaled than females of the more westerly, inland, montane *P. pater* de Zayas.

In females of *P. rosadonetoi* Lopez Castilla the broadly angulate and only moderately raised median rostral carina ends just anterior to the eye (Fig. 3.57C). This is in contrast with females of *P. pater* de Zayas, in which the narrow and strongly raised median rostral carina extends beyond the middle of the eyes and often to or beyond the posterior extent of the eyes (Fig. 3.54C).

In females of *P. rosadonetoi* Lopez Castilla, the interocular pit is located notably anterior to the middle of the eyes. This is in contrast with to females of *P. pater* de Zayas, in which the interocular pit is located posterior to or near middle of the eyes.

The occipital sutures in the male of this species are slit-like openings shorter than the length of the eye, and they do not extend apically to or near the pleurostomal sinus as a shallowly impressed furrow as is seen in males of *P. pater* de Zayas.

Males of *P. rosadonetoi* Lopez Castilla have a sclerotized tubular portion of the endophallus that is slightly longer than the width of the aedeagus surrounding the endophallic sclerite and which has a very slightly concavely arcuate ventral posterior margin (Fig. 3.51C–D). This is as opposed to slightly shorter than the width of the aedeagus surrounding the endophallic sclerite and with a deeply incised, angulate notch in the ventral posterior margin as seen in. *pater* de Zayas (Fig. 3.51A–B).

Redescription. Habitus typical of the genus. Body length 9.0 to 16.0 mm. Body width at elytral bases 3.5 to 6.5 mm. Integument rufotestaceous to piceous. Pronotum and elytra rather densely clothed in a mix of overlapping, rather dull, pale blue green to turquoise to slightly purperescent, circular, appressed scales with many elongate and typically flattened, white to translucent, subappressed scales intermixed; some specimens have patches of paler scaling laterally on the pronotum. Elytra are slightly paler and more densely scaled on the epipleura than on the disc. Head, legs, and venter are rather densely scaled in both sexes; in the female these parts tend to be pale scaled, verging on white or pale blue, while the males have mostly bright blue to purperescent scales on head, legs, venter, and in small patches on the elytral humeri.

Head typical of the genus. **Occiput** without a median, longitudinal sulcus at base. **Interocular pit** small, oval, in some specimens partly overlapped by scales, and in females with the occiput immediately behind the interocular pit rising to notably higher than the level of the epifrons. **Eyes** oval, notably but slightly taller than wide, very slightly protruding laterally from the head in the male, not notably protruding laterally from the head in females. **Rostrum** tricarinate with the median carina strongly and steeply raised and the lateral carinae slightly raised; rostrum comprising about half the entire length of the head in the female, a little over half in the male. **Median rostral carina** as a distinctly raised and steeply sloped, ridge; laterally fairly densely clothed in appressed scales and denuded in a thin linear swath along the midline which runs from the posteromedial margin of the frons to just before the interocular pit in females and just behind the interocular pit in males. **Intercarinal rostral spaces** notably impressed between median and lateral carinae in the female, a little deeper in the male; moderately to densely clothed in strongly overlapping, oval to elongate scales, these appressed in males and subappressed to suberect in females and with a few, pale, flattened, elongate, subappressed to suberect scales intermixed. **Lateral rostral carinae** slightly raised dorsally—a bit more so in males than in females, but consistently lower than the peak of the median rostral carina; typically notably defined ventrolaterally and distinctly demarcated from the lateral portion of the epifrons anterior to the eye. **Lateral portion of epifrons anterior to the eye** slightly obliquely laterally faced, slightly convex just ventral to the lateral carinae. **Scrobe** arcuate, not widened posteriorly. **Occipital sutures** laterally opened, short, teardrop shaped, pit-like foveae that are obscured by overlapping scales at least posteriorly near the eye but typically throughout most to all of their length. **Frons** moderately angularly declined from epifrons, not notably concavely impressed surrounding the nasal plate; moderately covered in oval, appressed scales except on the nasal plate. **Nasal plate** very slightly raised, mostly nude but sometimes with a few overlapping appressed scaled near the posterior margin and typically bearing several long setae set in punctures along the posterior margin, these longer and more concentrated laterally than medially. **Mandibles** apically bearing numerous, long setae surrounding the mandibular scar with a few elongate, appressed scales typically intermixed laterally in females. **Submentum** about 1.5 times as long as wide in male, very slightly longer than wide in females, slightly impressed; densely clothed with appressed to subappressed, oval, pale scales, with suberect to subappressed, moderately long, setose scales intermixed throughout.

Antennae typical of the genus. **Scape** extending posterior to the posterior margin of eye. **Funicle** with last two segments subconical.

Thorax typical of the genus. **Pronotum** not notably laterally constricted immediately behind the anterior margin, typically curvilinearly expanded to about the anterior third, the posterior two-thirds subparallel sided. Pronotal collar laterally constricted and delimited by a slight groove behind the postocular lobe in the male, but this as only a very shallow impression or reduced to few scattered punctured in females. Pronotal disc without a pair of posteriorly diverging ridges and not notably medially impressed. Clothed in densely overlapping, appressed, circular scales and many subappressed, short, setose scales. **Pronotal bases** only very weakly bisinuate to accommodate the slightly overhanging elytral bases. **Postocular lobe** relatively small, anteriorly projected as an obtusely angular projection, at most very slightly laterally expanded apically. **Postocular vibrissae** clearly visible, moderately long, anterodorsally directed, and longest at the middle of the postocular lobe. **Prosternum** rather densely clothed in confused, pale, circular to oval, appressed scales, with many, short, suberect to erect, setose scales interspersed. **Mesoventrite** moderately to densely clothed in overlapping, pale, subcircular to oval, appressed scales, these usually notably sparser near the anterior margin. Mesoventrite intercoxal process with many moderately long, setose scales intermixed. **Metaventrite** moderately densely covered in pale, circular to oval, appressed scales with many short, setose scales intermixed. Distance between mesocoxa and metacoxa a little less than 2 times the diameter of the mesocoxa. **Mesepisternum**

moderately to densely clothed in pale, circular to oval, appressed scales, these generally denser and more elongate anteriorly, and with many short, pale, subappressed to suberect, setose scales intermixed. **Mesepimeron** similarly scaled to mesepisternum but appressed scales more regularly subcircular. **Metepisternum** similarly scaled to mesepimeron, though scales notably denser and a bit more elongate on average in the dorsoventrally widened anterior portion. **Scutellar shield** subquadrate with the posterior margin obtusely angled; moderately densely covered in strongly overlapping, oval to elongate, pale scales in females, and clothed in only sparse, linear to oval, appressed scales with much of the underlying integument visible in the male.

Abdomen with ventrites 1 to 4 very densely scaled with pale, overlapping, subcircular to oval, appressed scales with many suberect, short, setose scales intermixed. Ventrite 5 similarly scaled to preceding ventrites, but typically with scales more elongate in form, generally sparser, and subappressed to suberect, and having many, long, suberect to erect, setose scales intermixed posteriorly.

Elytra entirely and rather densely scaled. Elytral striae composed of very small and often difficult to discern, oval punctures which are typically heavily overlapped at their edges by surrounding appressed scales. Elytral bases only very weakly bisinuate, typically slightly linearly to curvilinearly projecting obliquely anteriorly from scutellum to near mid-elytron, nearly truncate to very slightly concavely curvilinearly recurved posteriorly laterad to this, and with a slight forward projection just mediad to the humeri. Anteriorly directed toothlike projection mediad to elytral humeri absent but this area of the elytral base typically slightly protruding forward and often with a small impression or series of irregular small punctures dorsally on the elytral disc just anteromedial to the humeri. Elytral humeri obtusely angulate.

Legs typical of the genus. **Coxae** moderately clothed in pale, overlapping, oval, appressed scales with pale, subappressed, setose scales intermixed. **Trochanters** similarly scaled as coxae, but with appressed scales more elongate. **Femora** rather densely covered in pale, circular to oval, appressed scales with many moderately long suberect, pale, setose scales intermixed. **Tibiae** scaled similarly to femora, and with at most just a few very small denticles along the ventral side. Protibiae at most slightly apically bent inward. Protibial mucro much shorter than half the width of the tibia just proximad to it, not extending notably beyond surrounding setae. **Tarsi** dorsally clothed in pale, linear, appressed scales. Tarsomere 5 about 2 times the length of tarsomere 3.

Male terminalia typical of the genus. **Penis** with temones about 0.61 times the length of the pedon. **Tegmen** about 0.52 times the length of the penis, with manubrium comprising about 0.68 times the total length. **Endophallus** with distal, tubular sclerite in dorsal view subconical, slightly wider proximally than distally, slightly tapered apically and slightly laterally expanded at base; slightly longer than (1.13 times) the width of the pedon adjacent to endophallus; more-or-less straight in lateral view, the apex very slightly tapered; about 5.7 times as long as wide and about 0.17 times the length of the pedon; in ventral view with posterior ventral margin slightly convexly arcuate. Sac-like proximal portion of endophallus entirely membranous. **Spiculum gastrale** with lateral margins of basal plate sigmoidal; basal plate about 0.69 times as wide as long, and about 0.38 times as long as the length of the apodeme.

Female terminalia typical of the genus. **Spiculum ventrale** with basal plate about 0.43 times the total length; basal plate at insertion of apodeme lacking a heavily sclerotized angular patch. **Coxites** about 0.56 times the total length of spiculum ventrale. Proximal gonocoxite about 0.42 times as tall as long; distal gonocoxite about 0.55 times as tall as long; distal gonocoxite about 0.59 times the length of the proximal gonocoxite.

Variation. Males and females appear to be fairly strongly dimorphic based on limited specimens available, with females slightly larger, paler-scaled, and with shorter, stouter rostra and with only moderately raised, rather broadly angulate rostral carinae. Appressed scale coloration shows slight variation, ranging from a very pale blue green with paler yellowish tinges to slightly darker blue with paler pinkish areas.

Material Examined.

Holotype of *Pachnaeus rosadonetoi* Lopez Castilla, 1992 by original designation (Fig. 3.55): <u>Cuba:</u> Guantánamo Province: <u>El Yunque</u>.

According to the original description (Lopez Castilla 1992: 6), the type series consists of the male holotype, one male, and two female paratypes. However, Hidalgo-Gato González et al. (2002: 26), reports three female paratypes. I have not seen the paratypes, nor images of them, so their sex remains uncertain.

The male holotype (Fig. 3.55) was collected at El Yunque, Guantánamo Province in July 1964 by Israel García Avila. The paratypes were collected at El Blanquillo, Guantánamo Province on 23 March 1985 by René Lopez Castilla on leaves of blue mahoe (*Talipariti elatum* (Sw.) Fryxell; Malvaceae) at a plantation of this tree. These specimens were deposited in the zoological collection at IES in Havana and appear in the general catalogue of this collection (holotype: CZACC7.104160; paratypes: CZACC7.104161, CZACC7.104162, CZACC7.104163"; Hidalgo-Gato González et al. 2002: 26)).

4 other specimens: Cuba: Guantánamo Province: Nibujón: 1 female, "CUBA: Guant.: Nibujón PN Humboldt, Send. Mirador 20.52036, -74.69018, 100 m on plants, 3 km N Nibujón leg. N. Franz, II-02-2012 | sp. 52", ASUHIC, ASUHIC0053580; El Yunque de Baracoa: 1 female, "CUBA: Guant.: Baracoa El Yunque, along road near Flora y Fauna Stat., on plants 20.32775, -74.56942, 100 m leg. N. Franz, I-31-2012 | sp. 53 | DNA | Photo Taken", ASUHIC, ASUHIC0033675; 1 male, "CUBA: Guant.: Baracoa El Yunque, along road near Flora y Fauna Stat., on plants 20.32775, -74.56942, 100 m leg. N. Franz, I-31-2012 | sp. 26(?)", ASUHIC, ASUHIC0088783; 1 female, "CUBA: Guantanamo El Yunque, 20-150m 20.317, -74.571, 31.I.2012 R Anderson, wet rainforest | Pachnaeus sp. 7 det. R.S. Anderson 2016", CMNC, WWD0105972 / ARTSYS0001387.

Etymology. The specific epithet is a masculine Latin noun in the genitive case and is a patronym in honor of Dr. Germano H. Rosado-Neto of the Federal University of Paraná, Brazil, as noted in the original description.

Geographical distribution and chorological affinities. This species is reported only from low-altitude areas in Guantánamo Province near Baracoa, ranging from 3 km north of Nibujón in the northwest to El Blanquillo, a locality south of Cabacu and north of Sabanilla, in the southeast.

Biology. Little is known about the biology of his species, but it has been collected from late-January to early-February, in late-March, and in July. It is known only from low altitude sites near the coast and reported from wet rainforest. Three paratypes were collected on leaves in a blue mahoe (*Talipariti elatum* (Sw.) Fryxell; Malvaceae) plantation.

***psittacus* species group**

Diagnosis. This group was erected to contain a single problematic species, *Pachnaeus psittacus* (Olivier, 1807), which occurs throughout the eastern Greater Antilles, ranging from Central Cuba to Puerto Rico, but which is likely of Cuban origin. This species has a pronotum that is densely scaled and not medially impressed and has elytral bases that are rather strongly arcuately projected anteriorly over the posterior margin of the pronotum near the middle of each elytron. It lacks moderately to strongly anteriorly directed projections of the elytral bases just mediad to the humeri, has thin and slightly raised lateral rostral carinae, and has a wide, usually distinctly raised and somewhat hump-like median rostral mound bounded by narrow, longitudinally linear intercarinal spaces. Many specimens of *Pachnaeus psittacus* (Olivier, 1807) have a very slight lateral constriction of the pronotum in the posterior half in dorsal view (Fig. 3.58A), a character which this species shares with *Pachnaeus costatus* (Perroud, 1853) (Fig. 3.64A). These characters would seem to suggest a close relationship to the *costatus* species subgroup. However, the rostral median mound is usually only slightly to moderately raised in this species, never strongly quadrate as in members of the *costatus* species subgroup. Furthermore, some specimens of *Pachnaeus psittacus* (Olivier, 1807) possess a pair of pronotal punctures near middle of the elytral disc, which are never seen in members of the *costatus* species subgroup or other members of the *litus* species group, but which are instead seen in the *opalus*, *pater*, and *citri* species groups.

The combination of matte-white and glittery green scaling seen in *Pachnaeus marmoratus* Marshall, 1916 is similar to the pattern of verdant and brilliant dorsal scaling and dull and generally white to off white ventral, head, and leg scaling of *P. psittacus* (Olivier). In addition, *P. psittacus* (Olivier) and the Jamaican *P. marmoratus* Marshall both possess a ventral sclerotized area at the base of the endophallus not seen in other species. While shared scale color might simply be convergent, I suspect at least this latter shared endophallic character—and likely also the presence of brilliant, glittery scales in both species—to be due to homology and not homoplasy, indicating a shared character state in a common ancestor to both the Jamaican and most of the Cuban fauna. The hypotheses that these shared character states are homologous—or, explicitly, that *P. marmoratus* Marshall and *P. psittacus* (Olivier) share 1) glittery green and white scaling and 2) a ventral sclerotized area at the base of the endophallus because they share a common ancestor which also had these characters—needs to be further tested.

A single specimen of *Pachnaeus psittacus* (Olivier) from Morne Basile, Haiti, near 19.3928°, -72.4486°; ([MCZ-ENT 00]529548) has what appears to be very slightly impressed posterior discal punctures which are more narrowly set than the pair at mid disc. This might suggest placement of this species with other Cuban species with paired pronotal punctures in the *opalus* species group, *pater* species group, or an [*opalus* group + *pater* group] group. However, these potential paired posterior discal punctures consist only of slight divots that are mostly obscured by heavy scaling, are not seen outside this single specimen, and might simply be variation in pronotal sculpturing and not the same structures as the distinct punctures sometimes seen in other species.

Zhang et al. (2017) do not suggest a *P. psittacus* (Olivier) + *citri* species group clade, but instead place the Jamaican and Cuban fauna as sister taxa with a posterior probability of 1. This molecular analysis places *P. psittacus* (Oliver) as sister to (*P. rosadonetoi* Lopez Castilla+ *P. pater* de Zayas), but with only moderately high support for the node (posterior probability of 0.77). These authors also did not include *P. costatus* Perroud or *P. maestrensis* Reily, sp. nov. in their analysis, and so this analysis says nothing about their placement with respect to other members of the genus, including *P. psittacus* (Olivier).

***Pachnaeus psittacus* (Olivier, 1807: 339)**

Figs. 3.58–3.61, 3.83D, 3.84G–H, 3.85N, 3.95

= *Curculio psittacus* Olivier 1807: 339 (original combination)

Olivier 1808: No. 83 Charanson, pl. 24, fig. 541; Schoenherr 1845: 303; Jekel 1849: 262; Sherborn 1932b: 431

Pachnaeus psittacus (Olivier, 1807) sec. Chevrolat in d'Orbigny 1847: 381

Lacordaire 1863: 107, note 1; Chevrolat in d'Orbigny 1869: 249; Jekel 1875: 138; Tepper 1890: 30; Marshall 1916: 454; Guenther and Zumpt, 1933: 105; Blackwelder 1947: 799; Ebeling 1959: 319, 426; Montes 1978a: 52; Estrada Ortiz 1981; O’Brien & Wibmer 1982: 46; Woodruff 1985: 374; Lopez Castilla 1992: 1; Morrone 1999: 145; Fernandez

García and Herrera Oliver 2004: 29; Lozada Piña et al. 2004: 106; Peck 2005: 230; Perez-Gelabert 2008: 136; Mestre Novoa et al. 2009: 56, 61

Pachneus psittacus Gemminger and Harold, 1871: 2225

Unjustified emendation of *Pachnaeus* Schoenherr, 1826 employing ë in place of ae.

Leng and Mutchler 1914: 468

Pachnaeus sp. "GZ38" Zhang et al. 2017

nec Pachnaeus "(?) *psittacus*" Strong 1933: 228 (

Misidentification of *P. obrienorum* Reily, sp. nov.

Diagnosis. This species can be readily separated from all others by its vibrantly brilliant and glittery, pale, green to blue scales dorsally with head, legs, and scutellum lighter scaled, usually matte white. Most of the ventral aspect posterior to the prosternum is also pale scaled, usually matte white, excepting a typically subtriangular patch of darker, glittery scales matching the color of the dorsum on the ventrolateral face of the metasternum (Fig. 3.61); this darker metasternal patch is diagnostic of the species as it is consistently present within this species and not within any other known congeners. The rostrum in some specimens is nearly non-carinate with only a slightly raised, broad hump at the middle, which descends very gradually into slightly impressed, thin, linear, longitudinal depressions laterally, these demarcating the usually rather faintly dorsally raised lateral carinae, but the structure epifrons is otherwise similar to that seen in the *costatus* subgroup. Males of this species have an atypically long endophallic sclerite and a secondary sclerite ventrally near the proximal (= anterior) end of the membranous sac-like portion of the endophallus which distinguishes this species from most others except *Pachnaeus marmoratus* Marshall. Females of this species are distinct in that the spermathecal duct is not only notably more heavily sclerotized than is typical of the genus but is also but irregularly coiled into convoluted bundle near the distal half to third (Fig. 3.59F).

Redescription. Habitus typical of the genus**.** Body length 9.0 to 15.0 mm. Body width at elytral bases 3.5 to 6.0 mm. Integument piceous to atrous. Usually very densely clothed in a mix of densely overlapping, appressed, circular, brilliantly shining, green to azure scales with many subappressed, elongate and typically flattened, white to translucent scales intermixed. Elytral and pronotal appressed scales typically uniformly colored, never with distinct patches or stripes of paler scales as seen in some other species. Leg, head, and ventral scales—excepting a typically subtriangular darker patch on the metasternum—paler colored, usually matte white.

Head typical of the genus. **Occiput** without a median, longitudinal sulcus at base. **Interocular pit** small, round, and in most specimens inconspicuous, the interocular area surrounding it slightly raised. **Eyes** semicircular to teardrop shaped, at most slightly taller than wide, slightly protruding laterally from head in males and very slightly in females. **Rostrum** tricarinate, in most specimens with the median carinae slightly raised as abroad mound and the lateral carinae only very slightly raised; rostrum comprising about half the entire length of the head. **Median rostral carina** as a relatively wide and laterally obliquely sloped to round-topped mound; mostly clothed in appressed scales but these sparser medially than laterally, usually showing some of the underlying glabrous, dark integument in an irregular and poorly defined line along the midline from posteromedial margin of the frons to the interocular pit, though this typically interrupted in a few places by appressed scales. **Intercarinal rostral spaces** typically slightly but notably impressed between median and lateral carinae; very densely clothed in strongly overlapping pale, oval, appressed scales with a few subappressed to suberect, flattened, setose scales intermixed. **Lateral rostral carinae** typically very slightly raised dorsally, lower than the peak of the median rostral carina; not defined ventrolaterally and not distinctly demarcated from the lateral portion of the epifrons anterior to the eye. **Lateral portion of epifrons anterior to the eye** laterally to slightly obliquely laterally faced, subplanar to very slightly convex. **Scrobe** arcuate, not widened posteriorly. **Occipital sutures** laterally to ventrolaterally open, short, longitudinal to teardrop shaped, pit-like foveae that are obscured posteriorly by scales in most specimens. **Frons** rather strongly angularly to curvilinearly declined from epifrons; slightly to moderately concavely impressed surrounding the nasal plate; moderately to densely covered in pale, oval, appressed scales except on the nasal plate. **Nasal plate** slightly but notably raised, nude and typically bearing several long setae set in punctures along the posterior margin. **Mandibles** apically bearing numerous, long setae surrounding the mandibular scar with a few appressed, elongate scales typically intermixed laterally. **Submentum** about 1.5 times as long as wide, at most slightly impressed; densely clothed with pale, oval, subappressed to suberect scales, with moderately long, suberect, setose scales intermixed anteriorly.

Antennae typical of the genus. **Scape** extending behind the posterior margin of eye. **Funicle** with last two segments subconical.

Thorax typical of the genus. **Pronotum** typically slightly laterally constricted immediately behind the anterior margin and then, posterior to this, typically curvilinearly expanded to near middle, the posterior half ranging from slightly laterally constricted near the basal quarter to subparallel sided. Pronotal collar laterally constricted and delimited by a groove behind the postocular lobe, but this often obscured partly or wholly by scales or reduced to a series of punctures. Pronotal disc without a pair of posteriorly diverging ridges and not notably medially impressed. Clothed in densely overlapping, glittery green, circular, appressed scales and with many subappressed, short, setose scales intermixed. Pronotum sometimes with a single pair of paired punctured on the disc near middle, but these often obliterated or obscured by dense scaling typical of this species. **Pronotal bases** slightly bisinuate to accommodate the overhanging elytral bases. **Postocular lobe** small, anteriorly projected as variably shaped projection, and not notably laterally expanded apically. **Postocular vibrissae** clearly visible, moderately long, anterodorsally directed, and longest at the middle of the postocular lobe. **Prosternum** densely clothed in confused, typically white, circular to oval, appressed scales with many, long, erect, setose scales intermixed. **Mesoventrite** moderately to densely clothed in overlapping, typically white, circular to oval, appressed scales, these usually notably sparser near the anterior margin. Mesoventrite intercoxal process with many moderately long, setose scales intermixed. **Metaventrite** densely covered in overlapping, typically white—excepting a large, usually subtrigonal patch of bright blue to green scales on the lateral face—circular to oval, appressed scales and with many moderately long, setose scales intermixed. Distance between mesocoxa and metacoxa about 1.5 times the diameter of the mesocoxa. **Mesepisternum** densely clothed in overlapping, typically white, circular to oval, appressed scales and with a few short, pale subappressed, setose scales intermixed. **Mesepimeron** similarly scaled to mesepisternum. **Metepisternum** similarly scaled to mesepimeron. **Scutellar shield** variably shaped, though typically subquadrate to cordiform with the posterior margin typically bearing at least a slight notch at middle, though this sometimes obscured by scales or obliterated; moderately to densely covered in strongly overlapping, typically white, oval to subcircular, appressed scales, usually with at least a few short, fine, pale, appressed, setose scales intermixed.

Abdomen with ventrites 1 to 4 densely scaled with overlapping, pale, typically white, oval to subcircular, appressed to subappressed scales with many suberect, moderately long, setose scales intermixed. Ventrite 5 similarly scaled, but posteriorly with shorter, more elongate, subappressed to suberect scales.

Elytra entirely and densely scaled. Elytral striae composed of very small and often difficult to discern, oval punctures which are typically overlapped at their edges by surrounding appressed scales. Elytral bases usually notably arcuately projected forward near mid-elytron, typically moderately curvilinearly projecting obliquely anteriorly from scutellum to near mid-elytron, and curvilinearly recurved very slightly posteriorly laterad to this. Anteriorly directed toothlike projection mediad to elytral humeri absent. Elytral humeri weakly curved, only very slightly produced.

Legs typical of the genus. **Coxae** moderately to densely clothed in overlapping, pale, oval, appressed scales with many pale, elongate, subappressed, setose scales intermixed.

Trochanters similarly, if slightly more sparsely, scaled as coxae and with appressed scales more elongate. **Femora** densely covered in pale, circular to oval, appressed scales with many moderately long, pale, suberect, setose scales intermixed. **Tibiae** scaled similarly but more sparsely to femora, and with many moderately large, serrate denticles along the ventral side. Protibiae slightly apically bent inward. Protibial mucro much shorter than the width of the tibia just proximad to it, not extending notably beyond surrounding setae. **Tarsi** dorsally clothed in pale, linear, appressed scales. Tarsomere 5 about 2 times the length of tarsomere 3.

Male terminalia typical of the genus but with tubular endophallic sclerite very long. **Penis** with temones about 0.58 times the length of the pedon. **Tegmen** about 0.59 times the length of the penis, with manubrium comprising about 0.65 times the total length. **Endophallus** with distal, tubular sclerite in dorsal view lanceolate, tapered in the apical half and posteriorly subparallel sided; much longer than (1.65 times) the width of the pedon adjacent to endophallus; slightly ventrally curved in distal 3/5 in lateral view, but recurving to straight at the very apex, the apex slightly tapered—more notably so dorsally than ventrally; about 7.0 times as long as wide and about 0.29 times the length of the pedon; in ventral view with posterior ventral margin with a shallow, subangular notch. Sac-like proximal portion of endophallus with a sclerotized patch at the proximal end. **Spiculum gastrale** with lateral margins of basal plate convexly arcuate; basal plate about 0.69 times as wide as long, and about 0.42 times as long as the length of the apodeme.

Female terminalia typical of the genus but with spermathecal duct more heavily sclerotized and irregularly coiled into convoluted bundle near the distal half to third (Fig. 3.59F). **Spiculum ventrale** with basal plate about 0.47 times the total length; basal plate at insertion of apodeme lacking a heavily sclerotized angular patch. **Coxites** about 0.61 times the total length of spiculum ventrale. Proximal gonocoxite about 0.58 times as tall as long; distal gonocoxite about 0.75 times as tall as long; distal gonocoxite about 0.61 times the length of the proximal gonocoxite.

Variation. The darker colored areas of the pronotum, elytra, and metasternum range from more vibrant green (Figs. 3.58, 3.59) to brilliantly teal blue (Fig. 3.60), most specimens falling at the extremes of this color range. Paler areas on head, legs, and venter also seem to vary predictably with variation in dorsum color from white to pale blue for dorsally green- and blue-scaled forms respectively. Leg scales are typically white but range from blue green to cupreous or a mix. Rarely the pale scales of the underside or head are faintly tinged with tan or orange. Appressed scales near the rostral midline are occasionally iridescent blue green. Pronotal shape varies some, and the lateral margins may be posteriorly parallel but are generally slightly laterally constricted in the posterior half. Puerto Rican specimens seem to be very slightly smaller on average than Cuban or Hispaniolan specimens but otherwise indistinct.

Material examined. The type locality reported in the original description is “Porto-Rico” and the type was reported to have been deposited in MNHN collection in the original description (Olivier 1807: 339). The types of this species do not appear to be in Olivier’s collection—the only specimens of this species associated with Olivier’s collection are labeled as having been collected by authors after Olivier’s death—and the types could not be located elsewhere in the MNHN collection.

The Code makes it clear that "a neotype is not to be designated as an end in itself, or as a matter of curatorial routine, and any such neotype designation is invalid", (ICZN 1999, Article 75.2) and that the designation of neotypes is based upon "an exceptional need" (Art. 75.3) to do so. Olivier's original description mentions the white scale coloration of head, legs, scutellum, and venter which is diagnostic of this species. Known Puerto Rican specimens match well with Olivier's description (Oliver 1807: 339) and illustration (Olivier 1808: No. 83 Charanson, pl. 24, fig. 341). No other species of the genus is known to occur in Puerto Rico, and no other Puerto Rican entimine is known to have the color pattern described and pictured by Olivier. Therefore, the identity of this species is not in any way dubious, despite type specimens not being locatable at this time. For the above outlined reasons, I do not consider there to be "an exceptional need" to merit the designation of a neotype and do not do so.

Olivier's type specimens may have been permanently lost or destroyed, but it is equally possible that they still exist, perhaps misplaced somewhere, perhaps disassociated from data owing to habits of some early entomologists to either place specimens and their labels on different pins or to not label their specimens at all, or perhaps transferred—either licitly or illicitly—to a different collection. If types can be located in future, fixation should be a simple matter of designating lectotypes as per Article 74 of the Code (ICZN 1999).

55 other specimens: 1 male, no data, ANSP, ARTSYS0007421; 1 male, "Cuba | Pachnaeus psittacus Haiti Ol", ANSP, ARTSYS0007419.

Cuba: 1 female, 3 male, "Cuba | W.G. Dietz Coll.", MCZ, [MCZ-ENT 00]529444, [MCZ-ENT 00]529445, [MCZ-ENT 00]529446, [MCZ-ENT 00]529447; 1 male, "Cuba |

Deyr. | psittacus Oliv | Jan-Jul 2004 Caribbean Database", MCZ, [MCZ-ENT 00]529380; 1 male, "332 | Cuba Poey Coll. | Pachnaeus psittacus personatus MB curculionides", ANSP, ARTSYS0007416; 1 male, "332 | Cuba Poey Coll.", ANSP, ARTSYS0007417; 1 female, "var. | Cuba Poey Coll.", ANSP, ARTSYS0007418; 1 male, "WEST INDIES Cuba 12 JAN 1909 | Pachnaeus spp.", WIBF, ARTSYS0007422; 1 male, "C. Stewart Cuba X-23-[19]27 | T P R F Ent. No. 3056 | Taken on sugar cane. | L.C. Scaramuzza Collector", MCZ, [MCZ-ENT 00]52471; 1 female, "[blank yellow circle] | 189. | Collection of Frederick Allen Eddy | Pachnaeus Psittacus [label cut in half] Cuba O.St Mar. 28-[18]99", MCZ, [MCZ-ENT 00]529383; 1 female, "[blank yellow circle] | 381. | Collection of Frederick Allen Eddy | Pachnaeus Psittacus [label cut in half] Cuba O.St May 3-[19]06", MCZ, [MCZ-ENT 00]529384; **Santiago de Cuba Province:** <u>Santiago de Cuba:</u> 1 male, "Santiago Cuba VIII-21'[19]20 | M. Hebard | 137 | Detm. by G. Marshall | [blank green label]", ANSP, ARTSYS0007420; **Camagüey Province:** <u>Jaronu:</u> 1 male, "Central Jaronú Cuba V-5-[19]30 | Weeds & grasses | L.C. Scaramuzza Collector", MCZ, [MCZ-ENT 00]529492; **Cienfuegos Province:** <u>Pepito Tey (= "Soledad"):</u> 1 female, "Soledad nr. Cienfuegos Cuba 6-20-VIII | N. Banks collector", MCZ, [MCZ-ENT 00]529508; 2 male, "CUBA: Soledad (Cienfuegos) XI-30-1926 PJ Darlington, Jr.", MCZ, [MCZ-ENT 00]529479, [MCZ-ENT 00]529480; 1 female, "Soledad Cuba Cienfuegos X-15-1926 Darlington | Pachneus sp.", MCZ, [MCZ-ENT 00]529496; 1 female, "Soledad, Cuba 22-III-1925 Geo. Salt", MCZ, [MCZ-ENT 00]529460; 1 female, "Soledad, Cienfuegos Cuba Jan-Feb 1927 C.T. & B.B. Brues", MCZ, [MCZ-ENT 00]529454; 1 female, "Soledad, Cienfuegos Cuba Jan-Feb 1927 C.T. & B.B. Brues | Pachnaeus", MCZ, [MCZ-ENT 00]529455; 1 female, "Westend Limones Seboruco, Soledad, Cienfuegos, Cuba 18-VIII-[19]30 Richard Dow", MCZ, [MCZ-ENT 00]529465; <u>Covadonga:</u> 1 female, "C. Covadonga (Zapata Sw.) IX-16-[19]36 Cuba Davenport", MCZ, [MCZ-ENT 00]529365; <u>Cuatro Vientos:</u> 1 female, "CUBA: Cienfuegos: Cuatro Vientos, 2.5km S. to Hotel Serrano, Rio Cabagan N21.93123 W80.08461 651m, 20 May 2013 G. Zhang [CB_L24][sic, including brackets] | DNA | Photo taken | SP38 EXTC", ASUHIC, ASUHIC0033638; **Las Tunas Province:** <u>Jobabo:</u> 1 female, "Jobabo, Cuba. IV-6-[19]25 | T P R F Ent. No. 137 | C. F. Stahl Collector.", MCZ, [MCZ-ENT 00]529353; **Ciego de Ávila Province:** <u>Baraguá:</u> 1 male, "Baraguá, Cuba XI-27-[19]27 | T P R F Ent. No. 3056 | Taken on bushes | | L.C. Scaramuzza Collector | [picture of a camera] Jan-Jul 2004 Caribbean Database", MCZ, [MCZ-ENT 00]529355; **Sancti Spíritus Province:** <u>Jatibonico:</u> 1 female, "C. Jatibonico Cuba. V-31-[19]28 | T P R F Ent. No. 3056 | At light | L.C. Scaramuzza Collector", MCZ, [MCZ-ENT 00]529356; **Holguín Province:** <u>Pinares de Mayarí:</u> 1 male, "CUBA:Holguín,Sierra de Nipe, Pinares de Mayarí 07 JUL 1990,at u.v. light 650m, M. A. Ivie colr", WIBF, ARTSYS0007423.

<u>**Hispaniola:**</u> 1 female, "StDom | Deyr. | azures [label torn in half] cens Sch", MCZ, [MCZ-ENT 00]529358; 1 male, "Deyr. | StDom | Pachnaeus psittacis Ol", MCZ, [MCZ-ENT 00]529382; 1 female, "[8677 ?] | Antilles S.Dom | Fry Coll. 1905 100.", NHMUK, ARTSYS0007414; 1 female, "Antilles S.Dom | Fry Coll. 1900 100.", NHMUK, ARTSYS0007415.

<u>**Dominican Republic:**</u> 1 female, "DOMINICAN REPUBLIC: XII-1998 B.G. Phillips on Citrus sp.", CWOB, ARTSYS0001340; **Dajabón Province:** <u>9 km south of Loma de Cabrera:</u> 1 female, "DOMINICAN REPUBLIC: Dajabon. 9km S Loma de Cabrera. 19-

21N,71-37W 620 m. 12 July 1992 | J. Rawlins,S. Thompson C. Young, R. Davidson Disturbed pastures in mesic woodland | Carnegie Museum Specimen Number CMNH-345,463”, CMNH, ARTSYS0007426; 1 female, “DOMINICAN REPUBLIC: Dajabon. 9km S Loma de Cabrera. 19-21N,71-37W 620 m. 12 July 1992 | J. Rawlins,S. Thompson C. Young, R. Davidson Disturbed pastures in mesic woodland | Carnegie Museum Specimen Number CMNH-346,130”, CMNH, ARTSYS0007428; 1 female, “DOMINICAN REPUBLIC: Dajabon. 9km S Loma de Cabrera. 19-21N,71-37W 620 m. 12 July 1992 | J. Rawlins,S. Thompson C. Young, R. Davidson Disturbed pastures in mesic woodland | Carnegie Museum Specimen Number CMNH-346,161”, CMNH, ARTSYS0007430; 1 female, “DOMINICAN REPUBLIC: Dajabon. 9km S Loma de Cabrera. 19-21N,71-37W 620 m. 12 July 1992 | J. Rawlins,S. Thompson C. Young, R. Davidson Disturbed pastures in mesic woodland | Carnegie Museum Specimen Number CMNH-346,188”, CMNH, ARTSYS0007432; 1 male, “DOMINICAN REPUBLIC: Dajabon. 9km S Loma de Cabrera. 19-21N,71-37W 620 m. 12 July 1992 | J. Rawlins,S. Thompson C. Young, R. Davidson Disturbed pastures in mesic woodland | Carnegie Museum Specimen Number CMNH-345,386”, CMNH, ARTSYS0007425; 1 male, “DOMINICAN REPUBLIC: Dajabon. 9km S Loma de Cabrera. 19-21N,71-37W 620 m. 12 July 1992 | J. Rawlins,S. Thompson C. Young, R. Davidson Disturbed pastures in mesic woodland | Carnegie Museum Specimen Number CMNH-345,894”, CMNH, ARTSYS0007427; 1 male, “DOMINICAN REPUBLIC: Dajabon. 9km S Loma de Cabrera. 19-21N,71-37W 620 m. 12 July 1992 | J. Rawlins,S. Thompson C. Young, R. Davidson Disturbed pastures in mesic woodland | Carnegie Museum Specimen Number CMNH-346,147”, CMNH, ARTSYS0007429; 1 male, “DOMINICAN REPUBLIC:

Dajabon. 9km S Loma de Cabrera. 19-21N,71-37W 620 m. 12 July 1992 | J. Rawlins,S. Thompson C. Young, R. Davidson Disturbed pastures in mesic woodland | Carnegie Museum Specimen Number CMNH-346,171", CMNH, ARTSYS0007431; <u>10 km south of Loma de Cabrera:</u> 1 female, "DOMINICAN REPUBLIC: Dajabon. 10km S Loma de Cabrera. 19-20N, 71-37W 650 m. 12 July 1992 | J. Rawlins,S. Thompson C. Young, R. Davidson Marshy habitat in disturbed woodland | Carnegie Museum Specimen Number CMNH-343,345", CMNH, ARTSYS0007424; **Distrito Nacional:** <u>La Victoria:</u> 1 female, "La Victoria, Distrito Nacional Republica Dominica August 7, 1967 J.C. Schaffner", TAMU, TAMU-ENTO X0737715 / ARTSYS0007433; **El Seibo Province:** <u>9 km north of Pedro Sanchez:</u> 1 male, "DOM.REP.,ElSeibo, 9km.N.Pedro Sanchez,Aug.2, 1979 L.B.O'Brien", CWOB, ARTSYS0001341.

<u>Haiti:</u> Artibonite Department: <u>Morne Basile:</u> 1 male, "Mt.Basil N.Haiti to 4700 ft Sept. 9 | 1934 Darlington", MCZ, [MCZ-ENT 00]529548

<u>USA</u>: Puerto Rico: <u>Isabella:</u> 1 male, "Puerto Rico Isabella VII-20-1984 D. Pashley | Pachnaeus psittacus (Oliv.) det. R.S. Anderson 1987", CMNC, ARTSYS0001370; <u>Manatí:</u> 1 male, "PUERTO RICO,Playa Esperanza road,Manati 14-XII-88,Virkki", CWOB, ARTSYS0001338; <u>Lares:</u> 1 male, "Lares, P.R. 24-iii-47 Coll. J.P. Arias. | Pachnaeus det. C.W. O'Brien 1999", CWOB, ARTSYS0001339; <u>Mayagüez:</u> 1 male, "PUERTO RICO: Mayaguez Oct. 1976 C. Hamel. Coll | J. & S. Ramos collection, UPRM | 35", ASUHIC, ASUHIC0187520; 1 female, "Mayaguez, P.R. Jan 1936 Coll: J.D. Morales | 61 | J. & S. Ramos collection, UPRM | [barcode] UPRM-INVCOL [barcode] 230 | Pachnaeus psittacus det N. M. Franz, 2007 | 34", ASUHIC, ASUHIC0187519; <u>Barranquitas:</u> 1 female, "Barranquitas P. R. Acc. 73-57 July 1957 |

L.F. Martorell Collectors | MEBT-MC (EEA) collection, UPRM | 1021", ASUHIC, ASUHIC0187521; <u>Gurabo:</u> 1 male, "PUERTO RICO Gurabo, Agr. Expt. Sta. On Grasses Sept. 23, 197[8?] S. MedinaGaud | MEBT-MC (EEA) collection, UPRM | Pachnaeus psittacus det N. M. Franz, 2007 | 1020", ASUHIC, ASUHIC0187522.

<u>Mexico (locality probably erroneous):</u> 1 male, "Mex[ico?]", MCZ, [MCZ-ENT 00]529556.

Selected observational records:

<u>Dominican Republic</u>: **La Altagracia Province**: Higüey, La Lotificación Sajour, 18.612666, -68.726813, 8 November 2021, Josías (inaturalist.org/people/josiasconacento), inaturalist.org/observations/100904021; **La Vega Province**: Constanza, Arroyo Frío, 19.003601, -70.588961, ±2.28km, 2 September 2017, Maribel Armenteros (inaturalist.org/people/maribela), inaturalist.org/observations/11400534; Jarabacoa, 19.110814, -70.591999, ±148m, 27 May 2014, Joshua LaPergola (inaturalist.org/people/doctorscience), inaturalist.org/observations/45035441.

Etymology. The specific epithet *psittacus* is a Latin masculine noun in apposition meaning parrot and presumably refers to the vibrant coloration of this species which is arguably reminiscent of some psittaciform birds. While Olivier (1807) does not explicitly explain this name, this etymological interpretation is supported by his use of the French vernacular name *charançon perroquet* (=parrot weevil).

Geographical distribution and chorological affinities. This species is widespread through the eastern Greater Antilles, with populations in Puerto Rico, Hispaniola, and Cuba. The geographic origins of this species and the means by which it has become established on other islands remain uncertain. The species was originally described from Puerto Rico (Olivier 1807: 339), though it is almost certainly introduced on this island as this is well outside of the otherwise known native range of the genus, other members ranging only as far east as Haiti. It is almost certain that the Puerto Rican population from which this species was originally described was introduced to that island in recent past and that this species is not native to Puerto Rico as has been occasionally assumed in past. It is not as easy to rule out a Hispaniolan origin as there are other members of the genus that are apparently native to that island (*i.e.*, *P. morelli* Reily, sp. nov.). Tepper (1890: 30) was first to report *P. psittacus* (Olivier) from Haiti and Perez-Gelabert (2008: 136) called it a Hispaniolan endemic, though specific evidence for this claim seems lacking.

This species appears to be widespread throughout Eastern Cuba based on available data here presented and given the apparent relatedness of this species to others known species from Cuba, it seems likely that this species originated in Cuba. Mestre Novoa et al. (2009: 56, 61) reported the species at Topes de Colantes, Sancti Spíritus Province and confirmed specimens are known from localities near there. Estrada Ortiz (1981) reports this species as far east as Isla de Juventud and from Santa Amelia, La Habana Province, Peck (2005: 230) also reports it from Isla de Juventud, and Fernandez García and Herrera Oliver (2004: 29) say it is in the Sierra de Rangel near San Cristobal, Artemisa Province (see also Peck 2005: 8 for details on this locality). However, these more westerly records are suspect and confirmed specimens are known only from as far northeast in Cuba as Cienfuegos Province. Lozada Piña et al. (2004: 106) report it from Pico del Potrerillo, where it may occur.

A single specimen labeled “Mex”—probably in combination with misidentifications of superficially similar species belonging to other genera, *e.g., Compsus auricephalus* (Say, 1824), *Exophthalmus agrestis* (Boheman in Schoenherr, 1840), and other green-scaled, Central American members of *Exophthalmus* Schoenherr *sensu lato*—may be the source of past confusion about the presence of members of the genus in Mexico as reported by past authors (see Schoenherr 1840: 426, Lacordaire 1863: 107, Schwarz and Barber 1922: 30, O’Brien and Wibmer 1982: 46). Records from Mexico, including the present specimen questionably labeled as such, are likely erroneous as has been pointed out by past authors and the species probably does not occur on the Central American mainland.

Biology. *Pachnaeus psittacus* (Olivier) has been reported and recorded to feed on *Citrus* L. (Rutaceae; Estrada Ortiz 1981, Fernandez García and Herrera Oliver 2004: 29, Mestre Novoa et al. 2009: 56), and has also been collected on sugar cane (*Saccharum* L. spp., Poaceae) and grasses in general.

Imperial Bureau of Entomology (1924b: 592) in reference to Roig et al. (1923; a work that has been unobtainable to date) reports *P. azurescens* Gyllenhal in Schoenherr, *P. litus* (Germar), *P. psittacus* (Olivier), and *P. costatus* Perroud attacking *Citrus* L. (Rutaceae), *Annona* L. (Annonaceae), *Arachis hypogaea* L. (Fabaceae), *Persea americana* Mill, (Laureaceae), and *Eriobotrya japonica* (Thunb.) Lindl. (Rosaceae) in Cuba.

This species has occasionally been taken at lights, including U.V. lights, and is known from a wide range of habitats and elevations ranging from near sea level to around 1450 m, but with most records at low to mid elevation (>700 m). It appears to occur throughout the year through much of its range.

***litus* species group**

Diagnosis. This species group comprises a putative clade native to Cuba and Haiti which can be distinguished by their elytral bases being anteriorly projected at mid elytron, either arcuately as in the *costatus* species subgroup or subangularly and with a second, small anterior projection just proximad to the elytral humeri as in the *morelli* species subgroup. Members of this group also lack a notable median pronotal suture or impression, they lack pronotal punctures, and they generally have rather dense scaling covering the pronotum—the exception being *Pachnaeus costatus* Perroud, 1853 which has a ring of sparsely scaled to denuded patches near mid pronotum but rather dense scaling elsewhere on the pronotum.

***costatus* species subgroup**

Diagnosis. This species subgroup comprises a putative clade native to the southeastern coast of Cuba united by their broad, generally rectangular, median rostral mound, their longitudinally linear and narrow intercarinal spaces, their pale pastel and moderately dull scale color—*i.e.*, not glittery green or blue dorsally—and their generally uniformly colored and relatively densely overlapping scaling ventrally.

***Pachnaeus costatus* Perroud, 1853: 495**

Figs. 3.62–3.66, 3.85O, 3.96

Pachnaeus costatus Perroud, 1853: 495 (original combination)

Lacordaire 1863: 107, note 1; Guenther and Zumpt, 1933: 104; Blackwelder 1947: 799; Ebeling 1959: 319, 426; Montes 1978a: 52; O'Brien & Wibmer 1982: 46; Woodruff 1985: 374; Lopez Castilla 1992: 1; Morrone 1999: 145; Peck 2005: 230

Pachneus costatus Gemminger and Harold, 1871: 2225

Unjustified emendation of *Pachnaeus* Schoenherr, 1826 employing ë in place of ae.

Leng and Mutchler 1914: 468

Diagnosis. In the original description, Perroud (1853) compared this species to *P. azurescens* Gyllenhal in Schoenherr, claiming it to differ from the latter by its more convex body, by its more elongate prothorax, and by its larger and more transversely elliptical eyes. However, body shape, thoracic shape, and eye shape vary substantially within both species and variation in these characters overlaps to an extent that they are not diagnostic.

Perroud also claims that the punctation of the elytra differs between these species but does not explain how they differ. In general, the strial punctures in *P. costatus* tend to be hard to make out because they are often either partly or entirely obscured by surrounding, dense, appressed scales and/or clogged with off-white to yellow waxy exudate, whereas in *P. azurescens* they tend to be more readily visible.

This species can be reliably distinguished from all other Cuban species by the other character which Perroud claims as diagnostic, consistently more sparsely scaled—albeit somewhat variably so, ranging from slightly sparser to entirely denuded—and distinctly raised, odd elytral intervals. In more sparsely scaled specimens of *P. costatus* Perroud, this gives the appearance of having six dark blue to black costae on each elytron (Figs. 3.62–3.64). In more densely scaled specimens, the odd intervals may be only slightly darker than the even intervals (Fig. 3.66), but odd intervals are consistently, if only slightly, raised and at least a bit darker and more sparsely scaled.

The four more sparsely scaled to wholly denuded, transversely arranged, and typically subtrigonal patches arranged in a transverse ring near the middle of the pronotum are also diagnostic of this species. The more laterally located pair of these often extends ventrally to near the insertion of the procoxae or, rarely, this ventral extension is separated into a third, small pair of sparsely scaled to denuded patches. There is, however, a great deal of variation in this pronotal character, and in a few older specimens which lack specific locality data (ARTSYS0007408, ARTSYS0007409) and one female from Loma del Gato ([MCZ-ENT 00]529469), these patches are only very faintly visible, being scaled almost as densely as the surrounding areas (Fig. 3.66).

This species can also be separated from most others by the very broad, somewhat rectangular, typically flat-topped, and sparsely scaled median rostral mound bordered by intercarinal spaces which are narrow—about the same width as the lateral rostral carinae, and also by the elytral bases being relatively strongly and arcuately anteriorly projected forward over the posterior margin of the pronotum near the middle of each elytron but with elytral bases lacking an anteriorly directed, toothlike projection just mediad to the humeri. This latter character does not separate this species from *P. psittacus* (Olivier) or the closely related *P. maestrensis* Reily, sp. nov.

The more distinctly striped forms of *P. obrienorum* Reily, sp. nov., especially the Long Island population (Fig. 3.45), are superficially similar to this species as they occasionally have similarly raised, sparser scaled, darker odd elytral intervals. However, members of the Cuban population (Fig. 3.44C–D) are not striped. This primarily Bahamian and not co-occurring species is generally notably smaller than *P. costatus* Perroud, never has a quadrate median rostral mound, and has a patch of dense, appressed circular and overlying, elongate, suberect scales that usually covers most of the epifrons.

The brilliantly blue to green *P. psittacus* (Olivier) may co-occur with this species in some localities, but it can easily be separated by its vibrant green to blue coloration, white to lighter blue and more densely and evenly scaled head and legs, pale scaled underside, and the presence of diagnostic, usually subtrigonal patches of scales of the same color as the dorsum and distinctly darker from surrounding scaling on the ventrolateral aspect of the metasternum.

Pachnaeus maestrensis Reily, sp. nov. is superficially similar and is likely very closely related, but it can be distinguished by its lack of costately raised and more sparsely scaled odd elytral intervals and by its pale purperescent scale coloration.

Redescription. Habitus typical of the genus excepting the more sparsely scaled even elytral intervals**.** Body length 9.0 to 14.5 mm. Body width at elytral bases 4.0 to 6.5 mm. Integument piceous to atrous. Elytra with even intervals generally very densely scaled in overlapping, white to pale blue or pale lavender, circular, appressed scales with pale subappressed, flattened, elongate scales intermixed. Odd intervals slightly costately raised and typically at least slightly—though usually distinctly—more sparsely scaled than even intervals; odd intervals mostly to wholly lacking elongate scales, and typically with much of the underlying, dark integument visible around scales. The result of this variable scale density under lower magnification is that sparsely scaled areas take on a dark blue coloration, the exact hue variable based on scale density in darker areas, while densely scaled areas range from pale blue to off-white, yielding a pattern of six darker longitudinal ribs on each elytron. Pronotum very densely scaled in overlapping, circular, white to pale blue or pale lavender appressed scales with pale, flattened, elongate, subappressed scales intermixed; at mid pronotum ringed by at least two pairs of subtrigonal to irregularly shaped patches of sparser, smaller, pale blue to lavender, appressed scaling with shorter, appressed, elongate scales intermixed and in these patches much of the underlying dark integument visible around scales; one pair of these sparsely scaled patches is located either side of the midline of the pronotal disc and is typically subtrigonal, the second pair located laterally and typically extending ventrally to the level of the procoxal insertion. Head sparsely to moderately scaled in pale, elongate, appressed scales, with scales generally denser laterally than dorsally. Legs and venter moderately and relatively evenly scaled in pale, appressed scales.

Head typical of the genus. **Occiput** without a median, longitudinal sulcus at base. **Interocular pit** small, round, and in most specimens inconspicuous, the interocular area around it usually strongly glabrous and subplanar. **Eyes** oval, notably taller than wide, at most very slightly protruding laterally from head in males and not protruding laterally from head in females. **Rostrum** tricarinate, with the median carinae strongly raised as a wide, typically flat-topped, quadrate area and the lateral carinae usually very slightly raised but obsolete in some specimens; rostrum comprising about half the entire length of the head. **Median rostral carina** as a very wide and slightly tumescent to flat-topped and typically subrectangular mound which is often slightly impressed anteromedially; very sparsely clothed in pale, elongate, appressed scales, leaving most of the underlying glabrous, dark integument visible. **Intercarinal rostral spaces** very narrow; at most very slightly impressed between median and lateral carinae; moderately clothed in overlapping, pale, elongate, appressed scales with a few subappressed, setose scales intermixed. **Lateral rostral carinae** at most very slightly raised dorsally and much lower than the highest point of the median rostral mound, generally clearly defined ventrolaterally and distinctly demarcated from the lateral portion of the epifrons anterior to the eye. **Lateral portion of epifrons anterior to the eye** obliquely laterally faced, subplanar to very slightly concave. **Scrobe** arcuate, not widened posteriorly. **Occipital sutures** laterally open, short, longitudinal, pit-like foveae that are obscured posteriorly by scales in most specimens. **Frons** rather strongly curvilinearly declined from epifrons, moderately concavely impressed surrounding the nasal plate; moderately to densely covered in pale, oval, appressed scales except on the nasal plate. **Nasal plate** slightly but notably raised, nude, and typically bearing several long setae set in punctures along the posterior margin. **Mandibles** apically bearing numerous, long setae surrounding the mandibular scar, occasionally with a few appressed, oval scales laterally. **Submentum** about 1.5 to 2 times as long as wide, at most slightly impressed; densely clothed with subappressed to pale, oval, suberect scales, with moderately long, suberect, setose scales intermixed at least anteriorly.

Antennae typical of the genus. **Scape** extending behind the posterior margin of eye. **Funicle** with last two segments subconical.

Thorax typical of the genus. **Pronotum** typically slightly laterally constricted immediately behind the anterior margin and then, posterior to this, typically curvilinearly widening to just anterior to middle; typically slightly laterally constricted near the basal quarter. Pronotal disc mostly impunctate; in more denuded specimens with extremely small, shallow, regular punctures that are visible within the denuded patches, but these not visible in more densely scaled specimens. Pronotal collar laterally constricted and delimited by a groove behind the postocular lobe, but this typically obscured partly or wholly by scales and waxy exudate. Pronotal disc without a pair of posteriorly diverging ridges and not notably medially impressed. Mostly clothed in densely overlapping, pale, circular to oval, appressed scales and many short, pale, subappressed, setose scales; usually heavily caked in white to yellow, waxy exudate except in more sparsely scaled patches. **Pronotal bases** moderately bisinuate to accommodate overhanging elytral bases. **Postocular lobe** small, anteriorly projected as variably shaped projection, not notably laterally expanded apically. **Postocular vibrissae** clearly visible, moderately long, anterodorsally directed, and usually longest at the middle of the postocular lobe. **Prosternum** densely clothed in confused, pale, circular to oval, appressed scales with many, long, erect, setose scales intermixed; scales often heavily caked in pale waxy exudate. **Mesoventrite** moderately to densely clothed in overlapping, pale, circular to oval, appressed scales, these usually notably sparser near the anterior margin. Mesoventrite intercoxal process with many moderately long, setose scales intermixed. **Metaventrite** moderately to densely covered in pale, circular, appressed scales with many short, setose scales intermixed. Distance between mesocoxa and metacoxa about 1.5 times the diameter of the mesocoxa. **Mesepisternum** variably densely clothed in pale, circular to oval, appressed scales, and a few short, pale, subappressed, setose scales intermixed. **Mesepimeron** similarly scaled to mesepisternum, though scales typically a bit sparser. **Metepisternum** in anterior, dorsoventrally expanded portion moderately densely covered in overlapping, pale, oval, appressed scales, the posterior portion similarly but more sparsely scaled, throughout with short, white, subappressed, setose scales intermixed. **Scutellar shield** variably shaped, though typically subquadrate with the posterior margin rounded to ogival; moderately to densely covered in strongly overlapping, oval to subcircular, white to pale blue, appressed scales, usually with at least a few short, pale, appressed, fine, setose scales intermixed.

Abdomen with ventrites 1 to 2 densely scaled with pale, circular, appressed scales with many suberect, moderately long, setose scales intermixed. Ventrites 3 to 5 similarly scaled, but appressed scales more oval.

Elytra with even elytral intervals entirely and very densely scaled in overlapping, pale, circular, appressed scales with many short, elongate, flattened, subappressed, setose scales intermixed and often somewhat heavily matted in white to yellow, waxy exudate; odd elytral intervals with only sparser, appressed, circular scales, often with much of the underlying, dark, glabrous integument visible around them. Elytral striae composed of very small and often difficult to discern, round to oval punctures which are typically heavily overlapped at their edges, and sometimes entirely, by surrounding appressed scales; strial punctures often clogged with pale, waxy exudate. Elytral bases moderately bisinuate, typically linearly to curvilinearly projecting obliquely anteriorly from scutellum to near mid-elytron and truncate to very slightly curvilinearly posteriorly recurved laterad to this. Anteriorly directed toothlike projection mediad to elytral humeri absent. Elytral humeri obtusely angulate.

Legs typical of the genus. **Coxae** moderately clothed in pale, oval, appressed scales with many pale, elongate, subappressed, setose scales intermixed. **Trochanters** similarly, but more densely, scaled as coxae. **Femora** somewhat sparsely covered in pale, oval, appressed, scales with moderately long, pale, suberect, setose scales intermixed and with a large amount of the underlying integument visible surrounding scales. **Tibiae** scaled similarly to femora, and with a few, small denticles along the ventral side. Protibiae slightly apically bent inward. Protibial mucro much shorter than the width of the tibia just proximad to it, not extending notably beyond surrounding setae. **Tarsi** dorsally clothed in pale, appressed, linear scales. Tarsomere 5 about 2 times the length of tarsomere 3.

Male terminalia typical of the genus. **Penis** with temones about 0.70 times the length of the pedon. **Tegmen** about 0.53 times the length of the penis, with manubrium comprising about 0.68 times the total length. **Endophallus** with distal, tubular sclerite in dorsal view subconical, slightly tapered apically, and notably widened near the posterior margin; slightly longer than (1.12 times) the width of the pedon adjacent to endophallus; more-or-less straight in lateral view, not bent ventrally, tapered near apex and slightly dorsally expanded near base; about 4.8 times as long as wide and about 0.15 times the length of the pedon; in ventral view with posterior ventral margin truncate to very slightly concavely arcuate. Sac-like proximal portion of endophallus entirely membranous.

Spiculum gastrale with lateral margins of basal plate sigmoidal; basal plate about 0.70 as wide as long, and about 0.29 times as long as the length of the apodeme.

Female terminalia typical of the genus. **Spiculum ventrale** with basal plate about 0.44 times the total length; basal plate at insertion of apodeme bearing a heavily sclerotized, angular patch. **Coxites** about 0.51 times the total length of spiculum ventrale. **Proximal gonocoxite** about 0.68 times as tall as long; **distal gonocoxite** about as 0.84 times as tall as long; distal gonocoxite about 0.61 times the length of the proximal gonocoxite.

Variation. There is a good deal of variation in scale density on raised, more sparsely scaled, odd elytral intervals and more sparsely scaled pronotal patches, with these areas ranging from nearly entirely denuded to only slightly sparser scaled than surrounding areas. For the more laterally oriented sparsely scaled pronotal patches, either the ventral extension of the lateral patch may not extend to the insertion of the procoxae or the patch may be interrupted by a stripe of dense, pale scaling near middle to form two irregularly shaped patches. Patch shape of both dorsal and lateral pronotal patches are highly variable in shape but are often somewhat trigonal.

Available images of live specimens suggest that this species produces a yellow, waxy exudate which tinges paler areas a pale yellow, and this was mentioned by Perroud (1853) in his original description. However, this exudate does not usually seem to maintain its yellow color in pinned material.

Material examined.

Lectotype by present designation: <u>Cuba:</u> Santiago de Cuba Province: <u>Santiago de Cuba:</u> female, “801 Pachnaeus costatus n. sp. Perroud S^{t} yago de Cuba [reverse of label]

801 Prepodes S^{t} yago de cuba | nov. Species [reverse of label illegible, probably cut from repurposed paper and not related to specimen data] | Type", MNHN.

The lectotype (Fig. 3.62) is deposited in Benoît-Philibert Perroud's collection at MNHN, Paris in a box labeled as "85 II". It is missing both head and thorax and appears to have been mostly gutted by dermestids or other collection pests. Fortunately, the elytra, abdomen, and legs are intact, and it happens to be a distinctly and strikingly striped exemplar with clearly raised odd elytral intervals that matches other known specimens from the type locality. Additionally, Perroud (1853) provided a rather extensive and detailed original description of this species which matches well to both what remains of the lectotype and to other known specimens from the type locality. This species may have been described from this single specimen, but the original description is not explicit. As such it is here designated as a lectotype (see also ICZN 1999, recommendation 73F).

16 other specimens: <u>**Cuba:**</u> 1 female, "522 | Cuba Poey Coll. | Pachnaeus costatus Per. Curculionites", ANSP, ARTSYS0007406; 1 male, "522 | Cuba Poey Coll. | Pachnaeus costatus Per.", ANSP, ARTSYS0007407; 1 female, "D. Sharp coll. ex. Lethierry et al. B.M. 1933-281 & B.M. 1948-336 | P. costatus Perroud - Cuba [label torn in three pieces]", NHMUK, ARTSYS0007408; 1 male, " [round label] Cuba [underside of label] 45 105 | Costatus Perr [underside of label:] sp", NHMUK, ARTSYS0007409; 1 female, "Ind. Coll. Lacord. à lignées mieux marquées. | Bowring 63•47*", NHMUK, ARTSYS0007410; **Guantánamo Province:** <u>US Naval Station Guantanamo Bay:</u>1 female, "CUBA: Guantanamo GTMO Naval Base, vic. Sherman Ave. site 2 19.919778°, -75.136222° 6.x.2013, D. Matthews", FSCA, ARTSYS0001051; **Santiago de Cuba Province:** <u>Playa de Aguadores:</u> 1 female, "Aguadores Oriente June 6, 1936 | Cuba 1936

Darlington Collector | R. Anderson (1) exch. II-92", MCZ, [MCZ-ENT 00]529470; Gran Piedra Botanical Garden: 1 male, "CUBA: Santiago Prov. Santiago, 10m Jardin Botanico 5-17.XII.1995,S.Peck dist. forest FITs,95-74", CMNC, ARTSYS0001371; Loma del Gato: 1 female, "CUBA: Loma(Pico)del Gato,SierraMaestra, Oriente Prov. May 26-28, 1959 M. W. Sanderson C59-5", CWOB, ARTSYS0001322; 1 male, "CUBA: Loma(Pico)del Gato,SierraMaestra, Oriente Prov. May 26-28, 1959 M. W. Sanderson C59-5 | Pachnaeus 1", CWOB, ARTSYS0001323; 1 female, "Loma del Gato Cobre Range, O July 3-7, 1936 about 3000 ft. | Cuba 1936 Darlington Collector", CMNC, ARTSYS0001372; 2 female, same data as previous specimen, MCZ, [MCZ-ENT 00]529468, [MCZ-ENT 00]529469; 1 male, "E.E.A. de Cuba, No. 9360 | Loma del Gato Oriente, Cuba July-1929 | Hno. Norberto Colegio La Salle Coll. | Pres. by Imp. Inst. Ent. B.M. 1935-359. | Pachnaeus costatus, Perr. Det. G. A. K. Marshall.", NHMUK, ARTSYS0007411; 1 male, "E.E.A. de Cuba, No. 9360 | Loma del Gato Oriente, Cuba July-1929 | Hno. Norberto Colegio La Salle Coll. | Pres. by Imp. Inst. Ent. B.M. 1935-359.", NHMUK, ARTSYS0007412; 1 female, "Loma del Gato,Sie- rra del Cobre, O-riente, Cuba, Sep- tember 24-30, 1935. | J.Acuña, S.C.Bruner, L.C.Scaramuzza,col. Elev. 2600-3325 ft. | Pres. by Imp. Inst. Ent. B.M. 1941-91", NHMUK, ARTSYS0007413.

Selected observational records.

Cuba: Guantánamo Province: US Naval Station Guantanamo Bay: Guantánamo Bay, US Naval Station Guantanamo Bay, 19.905084, -75.154241, ±15m, on *Calliandra haematomma* (DC.) Benth. var. *colletioides* (Griseb.) Barneby, 16 January 2016, Kristin A. Bakkegard (inaturalist.org/people/kbakkegard), inaturalist.org/observations/9369272;

[US Naval Station Guantanamo Bay], 19.896169, -75.160592, ±4m, 30 September 2018, Wayne Fidler (inaturalist.org/people/wayne_fidler), inaturalist.org/observations/17084679; **Santiago de Cuba Province:** <u>Santiago de Cuba</u>: [trail west of Río San Juan near Arroyo Canasí], 19.985184, -75.809301, ±157m, on Fabaceae, 12 July 2020, Alex Alfil (inaturalist.org/people/alex835), inaturalist.org/observations/53487808; [near the mouth of Río San Juan], 19.966887, -75.821851, ±44m, 16 July 2020, Alex Alfil (inaturalist.org/people/alex836), inaturalist.org/observations/53487808.

Etymology. Perroud (1853) provided no etymology of this name at time of description. However, *costatus* is a Latin masculine adjective meaning "ribbed" and clearly refers to the alternating pattern of raised costae on odd elytral intervals that readily distinguish this species from other co-occurring congeners.

Geographical distribution and chorological affinities. This species is known only from the Southeastern coast of Cuba from Santiago de Cuba and Loma del Gato— apparently a mountain peak in the Sierra del Cobre near 20.0111°, -76.0371° (Peck 2005:8) and not the locality of the same name north-east of Santiago de Cuba—in the west to US Naval Station Guantanamo Bay in the east. It may co-occur with the relatively wide-spread Eastern Greater Antilles species *Pachnaeus psittacus* (Olivier), but it can easily be distinguished from this species based on elytral coloration and scaling pattern alone. This species is not presently known to co-occur with *Pachnaeus maestrensis* Reily, sp. nov. which is known only from the coastline near the base of Pico Turquino. However, the known ranges of these species are geographically near each other, there is limited known specimen representation for both species—and particularly *P. maestrensis*—and there has been a paucity of collecting efforts in the Western Sierra Maestra in general, presumably in no small part due to the famously rough terrain of this area.

Biology. Most records of this species are from mid- to low-altitude (< 1000 m) localities near the coast. It is also known from one observational record from US Naval Station Guantanamo Bay on *Calliandra haematomma* (DC.) Benth. var. *colletioides* (Griseb.) Barneby and apparently frequents members of the family Fabaceae. The species has also been reported as pestiferous on *Citrus* L. (Montes Díaz et al. 2014) and *Persea americana* Mill. (Ebeling 1950: 319) but likely doesn't constitute a major pest to these crops and there appear to be no substantiated records of major outbreaks in these crops. Imperial Bureau of Entomology (1924b: 592) in reference to Roig et al. (1923)—a paper which has proven unobtainable to date—reports *P. azurescens* Gyllenhal in Schoenherr, *P. litus* (Germar), *P. psittacus* (Olivier), and *P. costatus* Perroud attacking *Citrus* L. (Rutaceae), *Annona* L. (Annonaceae), *Arachis hypogaea* L. (Fabaceae), *Persea americana* Mill, (Laureaceae), and *Eriobotrya japonica* (Thunb.) Lindl. (Rosaceae) in Cuba.

This species has been collected in mid-January, from late-May to mid-July, from late-September to early-October, and from early- to mid-December. It has been taken via flight intercept trap in disturbed forest.

***Pachnaeus maestrensis* Reily, sp. nov.**

Figs. 3.67–3.68, 3.85P, 3.96

Diagnosis. This moderately large species is separated from other similar and potentially co-occurring taxa by its purperescent scale coloration, by its very broad and usually somewhat rectangular, typically flat-topped, and sparsely scaled median rostral mound with intercarinal spaces narrowed to about the same width as the lateral rostral carinae, by its lack of raised and more sparsely scaled odd elytral intervals, and by its elytral bases which are anteriorly arcuately projected forward over the posterior margin of the pronotum near the middle of each elytron but lacking an anteriorly directed, toothlike projection just mediad to the humeri.

Pachnaeus costatus Perroud is superficially similar and is likely very closely related, but it can be distinguished by its costately raised and more sparsely scaled, odd elytral intervals and by the pale blue to white scale coloration in preserved specimens, though with paler scales sometimes stained yellow by waxy exudate in live specimens. In addition, in dorsal view, the lateral margins of the pronotum are linear and more-or-less subparallel in their posterior half in *P. maestrensis*, but typically notably curvilinearly laterally impressed in the posterior half in *P. costatus* Perroud.

The brilliantly blue to green *P. psittacus* (Olivier) may co-occur with this species in some areas, but it can easily be separated by its vibrant green to blue coloration, white to light blue and more densely and evenly scaled head, white to light blue legs and underside, and by the presence of usually subtrigonal patches of glittery, green to blue scales that are notably darker than the surrounding scaling on the lateral aspect of the metasternum.

Some specimens of *P. azurescens* Gyllenhal in Schoenherr are similarly colored but are generally more sparsely scaled and can be distinguished by their lack of distinctly raised lateral rostral carinae and presence of at least sparse irregular pronotal punctation.

Some specimens of *P. obrienorum* Reily, sp. nov. are similarly colored—albeit not ones from Cuba—but they are generally smaller and have strongly quadrate rostra with the epifrons never strongly medially raised.

Some specimens of *P. rosadonetoi* Lopez Castilla and *P. pater* de Zayas may be similarly colored, but these species aren't known to co-occur with the present species, and they can readily be distinguished by their generally smaller size and angulately raised median rostral carina that is denuded in a thin longitudinal swath along the midline.

Description. Habitus typical of the genus. Body length 12.0 to 14.0 mm. Body width at elytral bases 5.0 to 6.0 mm. Integument piceous. Clothed in a mix of densely overlapping, circular, pale blue and purperescent, appressed scales with many white, elongate and typically flattened, subappressed to suberect scales intermixed. Elytral and pronotal appressed scales are an irregular mix of blue and lavender, but never with distinct patches or stripes of paler scales as seen in some other species except that the scales are very slightly paler near the suture in the posterior half. Head sparsely to moderately scaled in pale, elongate, appressed scales, generally denser laterally than dorsally. Legs and venter moderately and relatively evenly scaled in pale, appressed scales.

Head typical of the genus. **Occiput** without a median, longitudinal sulcus at base. **Interocular pit** small, round, and inconspicuous, the interocular area around it subplanar.

Eyes oval, notably taller than wide, not notably protruding laterally from head. **Rostrum** tricarinate, with the median carinae strongly raised as a wide, flat-topped, quadrate area and the lateral carinae only very slightly raised; rostrum comprising about half the entire length of the head in the female, a little over half in the male. **Median rostral carina** as a very wide and flat-topped, subrectangular mound; very sparsely clothed in pale, elongate to oval, appressed scales, leaving most of the underlying, dark integument visible. **Intercarinal rostral spaces** very narrow; only very slightly impressed between median and lateral carinae; moderately to sparsely clothed in pale, oval, appressed scales with a few short, pale, subappressed, setose scales intermixed. **Lateral rostral carinae** very slightly raised dorsally, much lower than the peak of the median rostral carina; clearly defined ventrolaterally and distinctly demarcated from the lateral portion of the epifrons anterior to the eye in the male, less clearly so in the female. **Lateral portion of epifrons anterior to the eye** obliquely laterally faced, subplanar to very slightly concave. **Scrobe** arcuate, not widened posteriorly. **Occipital sutures** laterally open, short, longitudinal, pit-like foveae that are obscured posteriorly by scales. **Frons** rather strongly curvilinearly declined from epifrons, slightly concavely impressed surrounding the nasal plate; sparsely to moderately covered in pale, oval, appressed scales except on the nasal plate. **Nasal plate** slightly but notably raised, nude, and bearing several long setae set in punctures along the posterior margin, longer and more concentrated laterally. **Mandibles** apically bearing numerous, long setae surrounding the mandibular scar. **Submentum** about 2 times as long as wide, slightly impressed, densely clothed with pale, oval, subappressed to suberect, scales and with pale, suberect, moderately long, setose scales intermixed at least anteriorly.

Antennae typical of the genus. **Scape** extending behind the posterior margin of eye. **Funicle** with last two segments subconical.

Thorax typical of the genus. **Pronotum** slightly laterally constricted immediately behind the anterior margin and then, posterior to this, typically curvilinearly widening to near middle; parallel sided in posterior half. Pronotal disc impunctate. Pronotal collar laterally constricted and delimited by a slightly noticeable groove behind the postocular lobe in male, not so in female. Pronotal disc without a pair of posteriorly diverging ridges and not notably medially impressed. Clothed in densely pale, circular to oval, appressed scales and many short, pale, subappressed, setose scales. **Pronotal bases** moderately bisinuate to accommodate the overhanging elytral bases. **Postocular lobe** small, anteriorly projected as variably shaped projection, not notably laterally expanded apically. **Postocular vibrissae** clearly visible, moderately long, anterodorsally directed, and longest at the middle of the postocular lobe. **Prosternum** densely clothed in confused, pale, circular to oval, appressed scales, with moderately long, erect, setose scales interspersed; scales often heavily caked in pale waxy exudate. **Mesoventrite** sparsely to moderately clothed in pale, circular to oval, appressed scales, these usually notably sparser near the anterior margin. Mesoventrite intercoxal process with many moderately long, setose scales intermixed. **Metaventrite** moderately to densely covered in pale, circular to oval, appressed scales with many short, setose scales intermixed. Distance between mesocoxa and metacoxa about 1.5 times the diameter of the mesocoxa. **Mesepisternum** variably densely clothed in pale, circular to oval, appressed scales, and a few subappressed, short, pale setose scales intermixed. **Mesepimeron** similarly scaled to mesepisternum. **Metepisternum** in female similarly scaled to mesepisternum with a bare

patch just behind anteriorly expanded portion, in male more sparsely scaled throughout.
Scutellar shield subquadrate with the posterior margin rounded to ogival; moderately to densely covered in strongly overlapping, elongate, pale blue to lavender, appressed scales with a few fine, short, pale, subappressed, setose scales intermixed.
Abdomen with ventrites 1 to 2 densely scaled with pale, circular, appressed scales with many suberect, moderately long, setose scales intermixed. Ventrites 3 to 5 similarly scaled, but appressed scales more oval.
Elytra entirely and moderately to densely scaled. Elytral striae composed of very small and often difficult to discern, round to oval punctures which are typically heavily overlapped at their edges, and sometimes entirely, by surrounding appressed scales; strial punctures often clogged with waxy exudate. Elytral bases usually moderately bisinuate, linearly projecting obliquely anteriorly from scutellum to near mid-elytron and truncate to very slightly curvilinearly posteriorly recurved laterad to this. Anteriorly directed toothlike projection mediad to elytral humeri absent. Elytral humeri obtusely angulate.
Legs typical of the genus. **Coxae** moderately to densely clothed in pale, oval, appressed scales with many pale, elongate, subappressed, setose scales intermixed. **Trochanters** similarly, but more densely, scaled as coxae. **Femora** somewhat sparsely covered in pale, oval, appressed scales with moderately long, pale, suberect, setose scales intermixed and with a large amount of the underlying integument visible surrounding scales. **Tibiae** scaled similarly to femora, and with a few, small denticles along the ventral side. Protibiae slightly apically bent inward. Protibial mucro much shorter than the width of the tibia just proximad to it, not extending notably beyond surrounding setae. **Tarsi**

dorsally clothed in pale, appressed, linear scales. Tarsomere 5 about 2 times the length of tarsomere 3.

Male terminalia typical of the genus. **Penis** with temones about 0.70 times the length of the pedon. **Tegmen** about 0.57 times the length of the penis, with manubrium comprising about 0.61 times the total length. **Endophallus** with distal, tubular sclerite in dorsal view subconical, wider proximally than distally, slightly tapered apically, and very slightly widened near the base; slightly longer than (1.12 times) the width of the pedon adjacent to endophallus; more-or-less straight in lateral view, not bent ventrally, tapered near apex—this more notable dorsally than ventrally; about 4.3 times as long as wide and about 0.15 times the length of the pedon; in ventral view with posterior ventral margin very slightly concavely arcuate. Sac-like proximal portion of endophallus entirely membranous. **Spiculum gastrale** with lateral margins of basal plate sigmoidal; basal plate about 0.68 times as wide as long, and about 0.31 times as long as the length of the apodeme.

Female terminalia typical of the genus**. Spiculum ventrale** with basal plate about 0.47 times the total length; basal plate at insertion of apodeme lacking a heavily sclerotized angular patch. **Coxites** about 0.54 times the total length of spiculum ventrale. Proximal gonocoxite about 0.59 times as tall as long; distal gonocoxite about 0.86 times as tall as long; distal gonocoxite about 0.61 times the length of the proximal gonocoxite.

Material examined.

Holotype by present designation (Fig. 3.67): Cuba: Santiago de Cuba Province: Pico Turquino: male, “Coast below Pico Turquino June 26-30, ‘36 | Cuba 1936 Darlington Collector”, MCZ, [MCZ-ENT 00]529449.

1 Paratype by present designation (Fig. 3.68): Cuba: Santiago de Cuba Province: Pico Turquino: 1 female, same label data as male, MCZ, [MCZ-ENT 00]529450.

Etymology: The specific epithet *maestrensis* is a toponym referring to the Sierra Maestra, the mountain range from which the types originate. It also honors the Cuban, son revival band of the same name as the mountain range, whose music has been a regular part of my listening rotation throughout this project. This name is an adjective and is masculine.

Geographical distribution and chorological affinities: This species is known only from the type locality, on the coast south of Pico Turquino, Santiago de Cuba Province, Cuba. No other species are reported from this locality.

Biology. Very little is known about this species, but it has been collected in late-June near the coast south of Pico Turquino.

***morelli* species group**

Diagnosis. This species group can be distinguished from other similar taxa by their elytral bases which are strongly and usually somewhat subangularly anteriorly produced near mid elytron into projections that overhang the pronotal bases and by their notable, if sometimes only slight, anterior projections of the elytral bases just mediad to the humeri. Members of this group tend to have relatively strongly quadrate rostra with a variably, but at most moderately produced but consistently present, median carina which occupies the medial half or less of the epifrons. In this group the median carina is never expressed as a large, raised, flat-topped to convex, and somewhat quadrate mound as in the *costatus* species subgroup, nor as steep sided ridge bounded by impressions as in the somewhat superficially similar *pater* species group. They also differ from the *pater* species group by the consistent lack of paired pronotal punctures.

Pachnaeus litus **(Germar, 1824: 431)**

Figs. 3.69–3.75, 3.85Q, 3.97

= *Cyphus litus* Germar, 1824: 431 (original combination)

Lyphus litus Germar, 1824 sec. Gundlach 1891: 331

Incorrect subsequent spelling of *Cyphus* Germar, 1824.

Cephus litus Germar, 1824 sec. New York Entomological Society 1925: 250

Incorrect subsequent spelling of *Cyphus* Germar, 1824, and clearly a lapsus calami based on placement in alphabetical index of this work.

Pachnaeus litus (Germar, 1824) sec. Schoenherr 1826: 122

While I have elsewhere attempted to treat usage of names and misusage and misspelling of the present name, providing a comprehensive accounting of usage of this name, which is extensively used throughout the agricultural and taxonomic literature, is beyond the scope of the present work. *Pachnaeus litus* (Germar, 1824) has long been known to be the most important pest of tropical fruit crops in this genus and particularly of citrus. A complete, annotated bibliography of this species is greatly needed, is in progress, and will comprise a subsequent and independent work.

Pachneus litus (Germar, 1824) sec. Gemminger and Harold, 1871: 2225

Unjustified emendation of *Pachnaeus* Schoenherr, 1826 employing ë in place of ae.

van Hermann 1907: 40; Heyne and Taschenberg 1908: 224, Taf. 29. No. 21; Leng and Mutchler 1914: 468 (in part); Ebeling 1950: 355; Griffiths and Thompson 1957: 71; King 1960: 200; Schauff 1987: 34; Jeppson 1989: 56; Cross and Jeffreys 2010: 31

Pachnacus litus (Germar, 1824) sec. Gundlach 1891: 331

Incorrect subsequent spelling of *Pachnaeus* Schoenherr, 1826.

Pachneaus litus (Germar, 1824) sec. Cunliffe and van Hermann 1916: 35

Incorrect subsequent spelling of *Pachnaeus* Schoenherr, 1826.

Pachnaeous litus (Germar, 1824) sec. Schroeder and Beavers 1977: 498

Incorrect subsequent spelling of *Pachnaeus* Schoenherr, 1826.

Duncan et al. 1999: 75

Pachnaeus latus (Germar, 1824) sec. Beavers et al. 1980: 94

Incorrect subsequent spelling.

Pachnaeus litius (Germar, 1824) sec. Moznette 1923:42

Incorrect subsequent spelling.

Pachnaeus "*litus* ?" sec. Dejean 1836: 276

nec Pachnaeus litus (Germar, 1824) sec. Gowdey 1923

Misidentifications of *Pachnaeus citri* Marshall, 1916

Colcord 1925: 291 (citation of Gowdey 1923); Gowdey 1926: 25; Edwards 1931, Edwards 1934, Russel 1935: 646–647 (review of Edwards 1934); Edwards 1936: 335; Blackwelder 1947 (in part); Wolfenbarger 1952: 139

van Whervin (1968) provides an overview of past reports of *P. litus* (Germar) in Jamaica, saying that it "appears likely" this species does not occur there and suggesting misidentifications of *P. citri* Marshall to be the source of these records. *Pachnaeus litus* (Germar) is known from Jamaica based on a single specimen from Old Harbor but likely isn't established on the island. I have yet to obtain a copy of Gowdey's (1923) work, which is likely the source of this misidentification, not Edwards (1931) as suggested as the source by van Whervin (1968: 1). Edwards' early works (1931, 1934) have also proven elusive.

Chlorima (*Pachnaeus*) *litus* (Germar, 1824) sec. de Cristofori and Jan 1832: 55

Thylacites glaucus Sturm, 1826: 202

Nomen nudum as it fails to meet the requirements of Art. 12 (ICZN 1999).

Note also that *Thylacites* Germar, 1817: 341 is suppressed under the plenary power of the ICZN for the purposes of the Principle of Priority but not for those of the Principle of Homonymy (Opinion 1440, ICZN 1987).

nec Thylacites glaucus Faust, 1881: 288

Original combination of *Xylinophorus* (*Eutinopus*) *glaucus* (Faust, 1881) sec. Faust 1885: 177 (Tanymecini, Piazomiina).

Pachnaeus glaucus (Sturm, 1826) sec. Dejean 1836: 276

Nomen nudum as it fails to meet the requirements of Art. 12 (ICZN 1999).

Treated as a synonym of *Pachnaeus litus* (Germar) by: Sturm 1843: 196; Guenther and Zumpt, 1933: 104; Blackwelder 1947: 799; O'Brien & Wibmer 1982: 46; Morrone 1999: 145

Pachneus glaucus (Sturm, 1826) sec. Gemminger and Harold 1871: 2225

Treated as a synonym of *Pachnaeus litus* (Germar) and including an unjustified emendation of *Pachnaeus* Schoenherr, 1826 employing ë in place of ae.

=*Pachnaeus opalus* (Oliver, 1807) sec. Horn, 1876: 82

This misidentification by Horn led to significant confusion of these two species, as well as similar species within Cuba including *P. azurescens* Gyllenhal in Schoenherr.

Moznette (1921: 24–25) appears to have been the first to recognize and treat this name as a synonym of *P. litus* (Germar).

Schwarz in Hubbard and Schwarz 1878: 456 (in part); Ashmead 1880: 61; Riley 1882: 916; Henshaw 1885: 135; Hubbard 1885: 133; Penzig 1887 : 439; Beutenmuller 1890: 201; Hamilton 1894: 253; Henshaw 1895: 12, 162; Schwarz 1889: 169, 170 (in part; St. Augustine, Florida records reported here from the collection of Charles Johnston are likely correctly identified, other references are misidentifications for *P. litus* (Germar)); Pierce 1907: 254; Pierce 1909: 358; Champion 1911: 181; Blatchley and Leng 1916: 117 (in part excluding records by Schwarz in Hubbard and Schwarz 1878: 456); Banks 1917: 228; Popenoe 1917: 7; Imperial Bureau of Entomology 1918: 473 (review of Watson 1918); Watson 1918: 240; Blatchley 1920: 163; Leng 1920: 312; Colcord 1921: 262; Stevens 1921: 58; Chaffin 1921: 26; Wheeler 1923: 139; Quayle 1938: 322

As synonym: Schwarz and Barber 1922: 30; Imperial Bureau of Entomology 1924: 225; Leng and Mutchler 1927: 46 (not explicitly included but Leng 1920: 312 is referenced as to be corrected); Blatchley 1932: 292; Guenther and Zumpt, 1933: 104; Blackwelder 1947: 799; Wolfenbarger 1952: 139; Woodruff 1981; O'Brien & Wibmer 1982: 46; Morrone 1999: 145

Cucutis opalus (Olivier, 1807) sec. Horn, 1876 sec. Ashmead 1880: 61

Incorrect subsequent spelling of *Curculio* Linnaeus, 1758 in treatment of *Pachnaeus opalus* (Olivier, 1807) sec. Horn 1876.

Pachnaeus opalis (Olivier, 1807) sec. Horn, 1876 sec. Moznette 1921: 24

Incorrect subsequent spelling of *Pachnaeus opalus* (Olivier, 1807) sec. Horn, 1876.

Pachnaeus citri Marshall, 1916 sec. Quayle 1938: 322

Misidentification.

Pachneus azurescens Gyllenhal in Schoenherr, 1834 sec. Parsons 1940: 4, 6–7

Misidentification including incorrect subsequent spelling of *Pachnaeus* Schoenherr, 1826.

Pachneus citri litus (Germar, 1824) sec. Ebeling 1950: 535

Incorrect subsequent spelling of *Pachnaeus* Schoenherr, 1826, and not a specimen-based determination but instead probably a lapsis.

“a bluish green weevil of the genus *Atypus*” Cushman1922: 273

Atypus Latreille, 1804 (Araneae, Atypidae) is a genus of Old-World mygalomorph spiders. It is unclear how this error arose, but it was corrected to *Pachnaeus* in the errata of the journal (Washington Academy of Sciences 1922: [I]).

“a *Pachnaeus*, allied to *P. opalus*” sec. Wickham in Nutting 1895: 70

Error in part, see also *P. azurescens* Gyllenhal in Schoenherr, 1834.

Pachnaeus sp. “GZ6” Zhang et al. 2017

Pachnaeus sp. “GZ24” Zhang et al. 2017

Pachnaeus sp. “GZ26” Zhang et al. 2017

Diagnosis. This typically blue to green scaled species is readily distinguished from most congeners by its elytral bases being strongly and subangularly anteriorly projected at the middle of each elytron and by the small, dentiform, anteriorly directed projections on the base of each elytron just mediad to the elytral humeri. This species is most similar in form to the Haitian *P. morelli* Reily, sp. nov., to which it is probably very closely related, but it can be distinguished from this uniformly mint-green colored Haitian species by the presence of paler scaling laterally on pronotum and elytral epipleura, by the typically more prominent, dentiform, anterior projections of the elytral bases just mediad to the humeri, and by the pronotum of males in dorsal view not being notably subglobose as seen in *P. morelli* Reily, sp. nov.

Redescription. This redescription is based on typical specimens from Havana and Southern Florida, though it also applies well to many of the other known adventive records of this species. However, there appears to a great deal of variation in this species and atypical forms are common throughout Cuba, and particularly Western Cuba.

Habitus typical of the genus. Body length 9.5 to 12.5 mm. Body width at elytral bases 4.0 to 5.5 mm. Integument ranging from testaceous to piceous. Moderately to very densely clothed in a mix of densely overlapping, pale, circular to oval, appressed scales with white to translucent, elongate and typically flattened, subappressed scales intermixed. Elytra dorsally uniformly iridescently pale blue to turquoise scaled and typically with a densely, paler scaled area covering most of the epipleura. Pronotum similarly colored, but with irregular patches of paler and denser appressed scales with many suberect, flattened, elongate scales intermixed laterally and usually with a distinct but variably expressed stripe of paler appressed scaling along the discal midline, but see variation section below. Legs iridescently pale blue scaled. Head white or very pale blue scaled.

Head typical of the genus. **Occiput** without a median, longitudinal sulcus at base. **Interocular pit** fairly small and generally round. **Eyes** oval, slightly taller than wide, very slightly protruding laterally from the head. **Rostrum** tricarinate, with the median carinae notably raised and the lateral carinae typically slightly raised; rostrum comprising about half the entire length of the head. **Median rostral carina** typically as a raised, wide, flat to convex topped mound; laterally densely clothed in appressed scales and denuded in a relatively wide, longitudinal swath along the midline which runs from posteromedial margin of the frons to just behind the interocular pit. **Intercarinal rostral spaces** typically very slightly impressed between median and lateral carinae; very densely clothed in strongly overlapping, pale, circular to oval, appressed to subappressed scales with a few, pale, flattened, subappressed to suberect setose scales intermixed. **Lateral rostral carinae** typically very slightly raised dorsally but occasionally dorsally obsolete, lower than the peak of the median rostral carina; notably defined ventrolaterally and distinctly demarcated from the lateral portion of the epifrons anterior to the eye. **Lateral portion of epifrons anterior to the eye** laterally to very slightly obliquely laterally faced, typically slightly convexly impressed. **Scrobe** arcuate, not widened posteriorly. **Occipital sutures** laterally opened, short, longitudinal, pit-like foveae that are typically obscured by overlapping scales throughout most to all of their length. **Frons** rather strongly angularly to curvilinearly declined from epifrons, at most very slightly concavely impressed surrounding the nasal plate; moderately to densely covered in pale, oval to elongate, appressed scales except on the nasal plate. **Nasal plate** typically very slightly raised, bearing at least a few scattered, pale, oval, appressed scales posteriorly, and with several long setae set in punctures along the posterior margin, these usually longer and more concentrated laterally than medially. **Mandibles** apically bearing numerous, long setae surrounding the mandibular scar. **Submentum** about 1.5 times as long as wide, very slightly impressed; densely clothed with pale, oval to elongate, subappressed to suberect scales with suberect, moderately long, setose scales intermixed at least anteriorly but typically throughout.

Antennae typical of the genus. **Scape** extending to or slightly behind the posterior margin of eye. **Funicle** with last two segments subconical.

Thorax typical of the genus. **Pronotum** typically slightly laterally constricted immediately behind the anterior margin and then, posterior to this, typically curvilinearly expanded to anterior third, the posterior ⅔ ranging from subparallel sided to slightly linearly widening. Pronotal disc wholly impunctate. Pronotal collar laterally constricted and delimited by a groove behind the postocular lobe. Pronotal disc without a pair of posteriorly diverging ridges and not usually notably medially impressed or incised, though sometimes with an extremely faint longitudinal impression along the midline near the base. Clothed in densely overlapping, pale, circular, appressed scales with many subappressed, short, setose scales intermixed. **Pronotal bases** strongly and somewhat angularly bisinuate to accommodate overhanging elytral bases. **Postocular lobe** extremely variably shaped ranging from obsolete to small and anteriorly projected as a variably shaped but typically obtusely angular projection; never notably laterally expanded apically. **Postocular vibrissae** clearly visible, moderately long, anteriorly directed, and usually longest at the middle of the postocular lobe. **Prosternum** densely clothed in confused, pale, circular to oval, appressed scales with many, short, suberect to subappressed, setose scales intermixed. **Mesoventrite** densely clothed in overlapping, pale, subcircular to oval, appressed scales, these usually notably sparser near the anterior margin. Mesoventrite intercoxal process with many moderately long, setose scales intermixed. **Metaventrite** densely covered in overlapping, pale, circular to oval, appressed scales with many short, setose scales intermixed. Distance between mesocoxa and metacoxa a little more than the diameter of the mesocoxa. **Mesepisternum** densely clothed in overlapping, pale, circular to oval, appressed scales, and a few short, pale, subappressed to suberect, setose scales intermixed. **Mesepimeron** similarly scaled to mesepisternum. **Metepisternum** similarly scaled to mesepimeron, but usually posteriorly with appressed scales a bit sparser and with more setose scales. **Scutellar shield** variably shaped, though typically subquadrate with the posterior margin rounded; densely covered in strongly overlapping, pale oval to elongate, appressed scales.

Abdomen with ventrites 1 to 4 very densely scaled with overlapping, pale, subcircular to oval, appressed scales with many, moderately long, pale, suberect to subappressed, setose scales intermixed. Ventrite 5 similarly scaled, but with many very long, pale, suberect to erect, setose scales intermixed near the posterior apex.

Elytra entirely and densely scaled. Elytral striae variable, but typically composed of very small and often difficult to discern, subcircular to oval punctures which are typically heavily overlapped at their edges by surrounding appressed scales. Elytral bases strongly bisinuate, linearly to slightly curvilinearly projecting obliquely anteriorly from scutellum to near mid-elytron, concavely curvilinearly recurved posteriorly laterad to this, and with a notable curvilinear forward projection just mediad to the humeri. Anteriorly directed toothlike projection mediad to elytral humeri present, typically more prominent in males. Elytral humeri obtusely angulate.

Legs typical of the genus. **Coxae** moderately to densely clothed in overlapping, pale, oval, appressed scales with many, pale, elongate, subappressed, setose scales intermixed. **Trochanters** similarly scaled as coxae, but with appressed scales more elongate. **Femora** rather densely covered in pale, circular to oval, appressed scales with many short, pale, subappressed, setose scales intermixed. **Tibiae** scaled similarly to femora but with scales generally smaller and more elongate, and with at most just a few very small denticles along the ventral side. Protibiae at most very slightly apically bent inward. Protibial mucro much shorter than half the width of the tibia just proximad to it, not extending notably beyond surrounding setae. **Tarsi** dorsally clothed in pale, linear to elongate oval, appressed scales. Tarsomere 5 a little more than 1.5 times the length of tarsomere 3.

Male terminalia typical of the genus. **Penis** with temones about 0.72 times the length of the pedon. **Tegmen** about 0.50 times the length of the penis, with manubrium comprising about 0.63 times the total length. **Endophallus** with distal, tubular sclerite in dorsal view subconical, slightly wider proximally than distally, slightly tapered apically, very slightly laterally expanded near ante-apical quarter, and slightly widened near the base; slightly shorter than (0.94 times) the width of the pedon adjacent to endophallus; more-or-less straight in lateral view, not bent ventrally, tapered near apex—this more notable dorsally than ventrally, and very slightly dorsally and ventrally expanded near base; about 5.3 times as long as wide and about 0.17 times the length of the pedon; in ventral view with posterior ventral margin truncate. Sac-like proximal portion of endophallus entirely membranous. **Spiculum gastrale** with lateral margins of basal plate convex and obtusely angulate; basal plate about 0.79 times as wide as long, and about 0.36 times as long as the length of the apodeme.

Female terminalia typical of the genus. **Spiculum ventrale** with basal plate about 0.41 times the total length; basal plate at insertion of apodeme lacking a heavily sclerotized angular patch. **Coxites** about 0.56 times the total length of spiculum ventrale. Proximal gonocoxite about 0.61 times as tall as long; distal gonocoxite about 0.77 times as tall as long; distal gonocoxite about 0.62 times the length of the proximal gonocoxite.

Variation. As presently conceived, this species is extremely variable. The generally smaller, pale blue to turquoise form bearing a distinct median pale stripe dorsally on the pronotum is common in Havana and established in Southern Florida, but a wide variety of other forms varying in size, scale color, scale density, pattern of pronotal pale patches, and median rostral carina structure make this taxon difficult to treat. This variation has caused great confusion among past workers, resulting in misidentifications of different forms as different species—particularly mistreatment of larger forms as *P. azurescens* Gyllenhal in Schoenherr. It may be that some of these forms do, in fact, represent distinct species but, if so, there seem to be very few reliable morphological characters with which to delimit them. Intermediate forms for many of the variants are represented by specimens with limited to no data, further complicating efforts to understand patterns of this observed variation in terms of distinguishing interpopulational from intrapopulational variation.

The southern Florida population, and many adventive records outside of Cuba, match well to the population around Havana and to the original description by Germar (1824: 431), which explicitly notes the mid-discal pale line of scales present on the pronotum of these individuals. Havanan specimens tend to have a bit more strongly pronounced tooth-like projections mediad to the elytral humeri than continental specimens and most intercepted adventive conspecifics. This Floridian, Havanan, and typically intercepted form tends to be on the smaller side of the size-range observed for this species as presently circumscribed, whereas many—but not all—of the primarily Cuban specimens lacking a dorsal pronotal stripe tend to be larger.

Despite the typical form in the vicinity of Havana being the smaller form with a distinct pale stripe medially on the pronotum, there are several specimens from localities around Havana which do not match well to the original type description ([MCZ-ENT 00]529386, [MCZ-ENT 00]529357, ARTSYS0007792, ARTSYS0007793, ARTSYS0007794, ARTSYS0007795, ARTSYS0007796, ARTSYS0007797, ARTSYS0007798, ARTSYS0007790, ARTSYS0007791, [MCZ-ENT 00]529361, [MCZ-ENT 00]529362, [MCZ-ENT 00]529364, ARTSYS0007783, ARTSYS0007784, ARTSYS0007785, ARTSYS0007786, ARTSYS0007787, ARTSYS0007788, ARTSYS0007789). These tend to be a bit larger on average for both sexes and are generally moderately densely pale blue scaled. They have a relatively broad and flat to convex-topped median rostral carina, and large, pale patches which generally cover a large portion of the lateral aspect of the pronotum. This form typically lacks a median, longitudinal pale stripe dorsally and the pronotum is typically relatively sparsely scaled dorsally allowing some of the underlying dark integument show through around the scales, typically giving the pronotal disc a darkened and somewhat glabrous appearance.

Specimens from around Pepito Tey—known as Soledad prior to the Cuban revolution (and see Peck 2005: 8)—in Cienfuegos Province show a rather wide range of variation in form. This population consistently has flat to slightly convex-topped median rostral carinae that are denuded in a moderately wide swath along middle. This population ranges from small to moderate in size, with a few notably larger females. They have variable scale coloration ranging from entirely pale blue green to off-white and sometimes including some scattered purperescent scales. Most specimens from this population lack a longitudinal stripe of pale scaling dorsomedially on the pronotal disc, but there are a few which possess this. Most specimens from this population have paler patches laterally on the pronotum, but size, placement, and extent of coverage of these paler patches are very variable, ranging from absent to having the majority of the lateral aspect of the pronotum cream colored. Pronotal disc scale density in this population is very variable, ranging from having scales densely overlapping and little of the underlying integument visible and giving the pronotum a rather matte luster, to relatively sparsely scaled and allowing much of the underlying dark integument show through around the scales and giving the pronotal disc a darkened and somewhat more glabrous appearance.

The Jaronu population ([MCZ-ENT 00]529354, [MCZ-ENT 00]529491, [MCZ-ENT 00]529493, [MCZ-ENT 00]529494, [MCZ-ENT 00]529495) is slightly larger on average—females more notably so—and they are generally fairly densely pale blue scaled. They have a median rostral carina that is relatively narrow and denuded in a rather thin line at center. They also have large, pale, and typically yellowish patches laterally on the pronotum, these are especially concentrated in the anterior half and, in some specimens, also along the posterior margin. This population has pronota that are very densely scaled with little of the underlying integument visible dorsally. A single specimen from the nearby locality of Hoyo de Bonet, near Cubitas (ARTSYS0007820) also matches well to this Jaronu population.

The Cayamas population (ARTSYS0007821, ARTSYS0007822, ARTSYS0007823, ARTSYS0007824, ARTSYS0007825) is relatively large on average for both sexes and specimens are relatively densely pale blue scaled. They have a relatively broad and flat to convex-topped median rostral carina, and large, pale patches which generally cover a large portion of the lateral aspect of the pronotum. In this population the pronotum typically lacks a longitudinal pale stripe medially on the disc, but some individuals of this population have a very faint, thin line of paler scaling along the pronotal midline. These specimens tend to be very densely scaled dorsally with little of the underlying integument visible.

There is a distinct population ranging between Mayarí and Cuatro Vientos, Cienfuegos (ASUHIC0033681, ASUHIC0033685, ASUHIC0033683, ASUHIC0033684, ASUHIC0033641, ARTSYS0007780, ARTSYS0007813, ARTSYS0007814, ARTSYS0007815, ASUHIC0015296, ASUHIC0033686, ASUHIC0033629, ARTSYS0007816, ARTSYS0007817, ARTSYS0007818, ARTSYS0007819) which is somewhat variable in size. This population differs from the original description by having a notable amount of purperescent scaling scattered throughout the body. These specimens have a relatively broad and flat to convex-topped median rostral carina, they lack a median pale stripe on the pronotal disc, they have a few scattered pale patches that are mostly confined to near the anterior and posterior margins of the pronotum, and they have relatively sparse scaling dorsally on the pronotum that allows some of the underlying dark integument show through around the scales and gives the pronotal disc a darkened and somewhat glabrous appearance. Two specimens ([MCZ-ENT 00]529485, [MCZ-ENT 00]529486) from Buenos Aires, a high elevation locality near Planta Cantú in the Sierra de Sancti Spíritus (*i.e.*, near 21.9000°, -79.5800°; see US War Department 1909: 373–377, Peck 2005: 8)—not to be confused with Buenos Aires, a locality west-northwest of Mayarí in Cienfuegos Province—are similar to those from between Mayarí and Cuatro Vientos, Cienfuegos.

A singleton female from Andros Island, Bahamas (ARTSYS0007811) is slightly more elongate than typical and is entirely sky-blue excepting very slightly paler areas on the head, laterally on the pronotum, and laterally on elytra near the humeri (Fig. 3.73G–H) and this specimen has a very thin median rostral carina (Fig. 3.75A).

This species varies substantially in the shape of the spermatheca (Fig. 3.74) but that variation doesn't seem to correspond strongly to population.

Material examined. The type material of this species has not been examined. It is presumably still in E.F. Germar's collection which is housed in the Zentralmagazin Naturwissenschaftlicher Sammlungen at Martin-Luther-Universität Halle-Wittenberg. Germar's original description is of one or more individuals from Cuba which are from a population that is relatively small in size (*i.e.,* specifically, similar in size to *Chlorophanus viridis* (Linnaeus, 1785), which ranges from about 8 to 11 mm long), and which have a pair of pale, longitudinal stripes laterally and a single pale, longitudinal stripe dorsally on the pronotum. This description matches well to individuals from around Havana and also to the population which has been established in Southern Florida and distinctly notes the median pale stripe on the disc of the pronotum as seen in these populations. The following specimens and observations are a good match to this typical form.

402 other typical specimens: 1 male, [no data], ANSP, ARTSYS0001481; 1 male, "ca. 16593", FMNH, ARTSYS0007450; 1 male, "D. Sharp coll. ex Lethierry et al. B.M. 1933-281 & B.M. 1946-336", NHMUK, ARTSYS0007442; 1 female, "1553 | Bowring. 63•47*", NHMUK, ARTSYS0001473; 1 female, "See Register | Brit. Mus. 1989-99", NHMUK, ARTSYS0001470.

<u>**North America:**</u> 1 female, "Pachnaeus opalus Ol. N.Amer. | Pascoe Coll. 93-60.", NHMUK, ARTSYS0001469.

<u>**Bahamas:**</u> **Abaco:** <u>Marsh Harbour</u>: 3 male, "B.W.I.,Bahamas,Abaco nr. Marsh Harbor Bahama Citrus Growers 28-V-1992 K. Hibbard *Citrus sinensis*", CWOB, ARTSYS0007733, ARTSYS0007734, ARTSYS0007735; **Eleuthera:** <u>Rock Sound:</u> 1 male, "BAHAMAS: Eleuthera nr. Rock Sound.20- V-1993.Bahama Survey Team. *Persea americana*", FSCA, ARTSYS0001527; **Grand Bahama:** <u>Brookwood Grove:</u> 1 female, "BAHAMAS: Grand Bahamas Brookwood Grove 19-X-1992, Bahama Survey Team, lime", FSCA, ARTSYS0001528; 1 male, BAHAMAS: Grand Bahamas Brookwood Grove 19-X-1992, Bahama Survey Team, lime | FSCA_BD_02", FSCA,

ARTSYS0007779; Gina Farm: 1 male, "BAHAMAS:Grand Bahamas Gina Farm, 20-X-1992 Bahamas Survey Team Citrus paradisi leaves", FSCA, ARTSYS0001529.

Guyana (locality probably erroneous, though possibly adventive): 2 female, "Br.GUIANA Linder '24", MCZ, [MCZ-ENT 00]529554, [MCZ-ENT 00]529555.

Jamaica: Saint Catherine Parish: Old Harbor: 1 female, "Jamaica F.Klages. | Old Harbor | Holland Collection | Carn. Mus. Acc. 4745 | Carnegie Museum Specimen Number CMNH-375,972", CMNH, ARTSYS0001526.

United States: Florida: 1 female, "Florida W.H. Ashmead | Collection C.V. Riley | U.S.America: Florida. | Pres. by Imp.Bur.Ent. Brit. Mus. 1922-449. | Pachnaeus litus Germ (=opalus Horn not Oliv)", NHMUK, ARTSYS0001468; 1 male, "Fla.", ANSP, ARTSYS0001480; Everglades National Park (county uncertain): 1 male, "EVERGLADES NAT'L PARK V-28-70 | N.M.Downie Colln. 1992 Acc. Z-18,343 FIELD MUSEUM", FMNH, ARTSYS0007459; Broward Co.: 1 male, "Davie,FLORIDA Broward Co. | K.L. Tyson 30-IX-74 | Brassaia actinophylla", FSCA, ARTSYS0001176; 1 female, "Ft. Lauderdale, Broward Co., FLORIDA | G.H. Gwin 25-III-71 | AT CITRUS SINENSIS", FSCA, ARTSYS0001172; 4 female, 3 male, "Florida: Ft. Lauderdale 26-30.III.1979 B. Howden", CMNC, ARTSYS0001406, ARTSYS0001407, ARTSYS0001408, ARTSYS0001412, ARTSYS0001409, ARTSYS0001410, ARTSYS0001411; 3 male, "Florida: Ft. Lauderdale 26-30.III.1979 B. Howden | H. & A.Howden Collection", CMNC, ARTSYS0001413, ARTSYS0001414, ARTSYS0001415; 1 female, "FLORIDA, Broward Co., Lauderhill, 16-XII-2005, S. M. Clark and M. H. Goodman", CWOB, ARTSYS0001133; 1 female, 1 male, "FLA. Everglades N.P. Monroe Co. [not Monroe Co., Broward Co.] Hwy 27 vi-15-1966 A.E.

Lewis", CWOB, ARTSYS0001154, ARTSYS0001157; 1 female, "FLA. Everglades N.P. Monroe Co. [not Monroe Co., Broward Co.] Hwy 27 vi-15-1966 | A.E. Lewis", CWOB, ARTSYS0001155; 1 male, "FLA. Everglades N.P. Monroe Co. [not Monroe Co., Broward Co.] Hwy 27 vi-15-66 | A.E. Lewis", CWOB, ARTSYS0001156; Collier Co.: 1 female, "FL.CollierCo.2mi. N.EvergladesCity Hwy.29,23-IX-2000 C.W.O'Brien", CWOB, ARTSYS0001136; 1 male, "U.S.A.: FLORIDA, Collier Co. - Naples - Island Walk 26°14.8'N,81°42.7'W D. Brzoska 28-V 2013", CWOB, ARTSYS0007739; Highlands Co.: 1 male, "USA: FL: Highlands Co.; Archbold Biolog- ical Field Station; Hg light; 7.ix.1983", CWOB, ARTSYS0007737; 1 male, "USA: FL: Highlands Co.; Archbold Biolog- ical Field Station; Hg light; 24.ix.1987", CWOB, ARTSYS0007738; 1 male, "USA: FL: Highlands Co.; Archbold Biological Field Station; Hg light; 4.ix.1988 | Pachnaeus sp. det. B.H. Reily, 2017", CWOB, ARTSYS0007736; 1 female, "FL :Polk 6.3 mi. N. Avon Pk. VIII/24/08 J. Huether", CWOB, ARTSYS0001122; Indian River Co.: 1 male, "FLA. Ind. RiverCo. 5mi.S.Vero Beach night Oct. 8, 1978 salt marsh | Collector: C. W. O'Brien", CWOB, ARTSYS0001135; Lee Co.: 1 female, "Leheigh, Fla. IV-[3?]-197[3?] | N.M.Downie Colln. 1992 Acc. Z-18,343 FIELD MUSEUM", FMNH, ARTSYS0007464; 1 male, "Leheigh, Fla. 4-16-1975 N.M.Downie | N.M.Downie Colln. 1992 Acc. Z-18,343 FIELD MUSEUM", FMNH, ARTSYS0007463; 1 male, 1 female, "Leheigh, Fla. 4-13-1977 N.M.Downie | N.M.Downie Colln. 1992 Acc. Z-18,343 FIELD MUSEUM", FMNH, ARTSYS0007462, ARTSYS0007465; 2 female, "FL:Lee Co. Lehigh Acres 17-19 Apr 1982 N.M.Downie | N.M.Downie Colln. 1992 Acc. Z-18,343 FIELD MUSEUM", FMNH, ARTSYS0007460, ARTSYS0007461; 1 male, "FLA. Lee Co. Sanibel Is. | V-23-1973 A.E. Lewis", CWOB, ARTSYS0001213; Miami-Dade Co.: 1

female, “Everglades N.P. Dade Co., FLA. IV-25-1976 R.L. Penrose”, CMNC, ARTSYS0001432; 1 male, “FLA. Hwy 1, 3 mi N. Monroe Co.-Dade Co. line. XIII-2-1970 | C.W.O’BRIEN COLLECTOR”, CWOB, ARTSYS0001127; 1 male, “Biscayne II.5 Fla | CollHubbard &Schwarz | U.S.America: Florida. | Pres. by Imp.Bur.Ent. Brit. Mus. 1922-449.”, NHMUK, ARTSYS0001460; 1 male, “FLA:DadeCo,S.Miami DeeringEstatePark,forest SW167St&SW72Ave 1.VI-25.VIII.86,S&JPeck oldhammock,malaise-FIT”, CMNC, ARTSYS0001418; 1 female, “FLA:DadeCo,S.Miami DeeringEstatePark,forest SW167St&SW72Ave 1.VI-25.VIII.86,S&JPeck younghammock,malaise-FIT”, CMNC, ARTSYS0001419; 1 male, same data as previous specimen, FMNH, ARTSYS0007483; 1 male, “FL:Dade Co.Charles Deering Estate Park, 7.v.90, 90-1, R.S.Anderson”, CMNC, ARTSYS0001420; 1 female, “FL: Dade Co. 4mi NE Everglades N. Pk. East Ent. 6.XII. 85 Anderson”, CMNC, ARTSYS0001436; 1 female, “FLA.EvergladesN. P.GumboLimboTr. VII-17-1973night O’Brien&Marshall”, CWOB, ARTSYS0001124; 2 female, “FLORIDA: Dade co. Local. Homestead Habitat Myrcia cerifera Coll. Date Howard Oct 1980”, CWOB, ARTSYS0001167, ARTSYS0001168; 1 male, “FLORIDA: Dade co. Local. Homestead Habitat shore Coll. Date Howard Oct 1980”, CWOB, ARTSYS0001169; 1 male, “FLA. Dade Cnty., Homestead, TREC 21-IV-97, BLT R.M. Baranowski”, CWOB, ARTSYS0001134; 1 female, “FLA: DadeCo. EvergladesN.P.,Long PineKey, pinelands 8.VI-28.VIII.86 S&JPeck malaise FIT”, CMNC, ARTSYS0001435; 1 female, “Matheson Hammock Dade Co. Fla Apr 11 1951 H.&A Howden | Mangrove”, CMNC, ARTSYS0001421; 1 male, “Matheson Hammock Dade Co. Fla Apr 11 1951 H.&A Howden”, CMNC, ARTSYS0001422; 1 male, 1 female, “FLA. Dade Co. Matheson Hamm. | V-22-1973 A.E. Lewis”, CWOB, ARTSYS0001162, ARTSYS0001163; 2 male, “FLA. Dade Co. Matheson Hamm. | V-23-1973 A.E. Lewis”, CWOB, ARTSYS0001160, ARTSYS0001161; 1 male, “Miami Fla. | Annette F. Braun Collection | Pachnaeus opalus Oliv.”, ANSP, ARTSYS0001493; 2 male, “Miami Fla. | Annette F. Braun Collection”, ANSP, ARTSYS0001494, ARTSYS0001495; 1 male, “Miami, Fla. | Feb. | N.M.Downie Colln. 1992 Acc. Z-18,343 FIELD MUSEUM”, FMNH, ARTSYS0007476; 1 male, “Miami 3.13 Fla. | Coll. by P.Laurent. | This specimen probably *ex* Philip Laurent Coll’n. based on type of original | box and evidence from label data on specimens in similar storage boxes”, ANSP, ARTSYS0001500; 1 male, 1 female, “Miami, V-1 Fla. | D.M.Castle Collector | Chicago H.H.Mus. (FWNunenmacher Collection)”, FMNH, ARTSYS0007477, ARTSYS0007478; 2 female, 3 male, “Miami V.2 Fla”, ANSP, ARTSYS0001506, ARTSYS0001507, ARTSYS0001508, ARTSYS0001509, ARTSYS0001510; 1 female, 1 male, “Miami Fla. V-3 | [blank green label]”, ANSP, ARTSYS0001498, ARTSYS0001499; 1 female, “Miami, V.5 Fla. | D.M.Castle Collector | Chicago H.H.Mus. (FWNunenmacher Collection)”, FMNH, ARTSYS0007479; 1 female, “Miami, VII-8 Fla. | Wilkinson Collector”, ANSP, ARTSYS0001501; 1 male, “Miami, VII-18 Fla. | Wilkinson Collector”, ANSP, ARTSYS0001502; 1 male, 2 female, “Miami [VIII-3 crossed out] Fla | V.2.10”, ANSP, ARTSYS0001503, ARTSYS0001504, ARTSYS0001505; 1 male, “Miami,Fla.(H) VIII, 12, 1915.”, ANSP, ARTSYS0001497; 1 male, “Miami,Fla.(H) III, 2, 1916.”, ANSP, ARTSYS0001496; 1 male, “Miami Fla. IV-2-1921 | JNKnull Collector | [blank green label]”, ANSP, ARTSYS0001489; 1 male, “Miami Fla. IV-3-1921 | JNKnull Collector | [blank green label]”, ANSP, ARTSYS0001490; 1 female, “Miami Fla. IV-12-1921 | JNKnull Collector | [blank green label]”, ANSP, ARTSYS0001491; 1 female, “U.S.America: Miami. 4-iii-1924 G.B.Pearson B.M.1924-381”, NHMUK, ARTSYS0001461; 1 male, “Miami V:22:37 Fla. | Pres. by H.S. Dybas”, FMNH, ARTSYS0007480; 1 female, “Miami Fla. 26-V-37 | Pres. by C. H. Seevers | Conocarpus flowers”, FMNH, ARTSYS0007481; 1 female, “Miami Fla. 26-V-37 | Pres. by C. H. Seevers”, FMNH, ARTSYS0007482; 1 male, “Miami Fla. III-23-60 J.R. McFarlin | Pachnaeus litus (Germ.) R E. Woodruff”, CWOB, ARTSYS0001121; 1 male, “Miami Beach, Fla 1956 W. Rosenberg Coll. | N.M.Downie Colln. 1992 Acc. Z-18,343 FIELD MUSEUM”, FMNH, ARTSYS0007474; 1 male, “MIAMI BEACH FLA SPRING 1956 W. Rosenberg Coll. | N.M.Downie Colln. 1992 Acc. Z-18,343 FIELD MUSEUM”, FMNH, ARTSYS0007475; 1 male, “Fl.DadeCo.,Coral Gables,GirlScoutCp. Mahachee,9950Old CutlerRd.,UV trap | 10-16-VI-1998 J. & N Gleason”, CWOB, ARTSYS0001126; 1 male, “FL:Dade Co. Miami Old Cutler Hammock Park, 9.v.90, 90-4 R.S Anderson”, CMNC, ARTSYS0001426; 1 male, “Paradise Key Fla. IV-5-1921 | JNKnull Collector | [blank green label]”, ANSP, ARTSYS0001488; 1 female, “Paradise Key Fla. IV-6-1921 | JNKnull Collector | [blank green label]”, ANSP, ARTSYS0001487; 1 male, “Paradise Key Fla. Apr. 6 1951 H.&A Howden | Night Beating | Pachnaeus litus Germ DET. AT BM A.T. HOWDEN 1973”, CMNC, ARTSYS0001423; 2 female, 1 male, “May 2, 1969 | ca. ½ mi. NW of Rockdale, E. Dade Co., Florida | Charles S. Bergson collector | *ex* Charles S. Bergson Coll’n.”, ANSP, ARTSYS0001484, ARTSYS0001486, ARTSYS0001485; 1 male, “May 3, 1969 | Rockdale, E. Dade Co., Florida | Charles S. Bergson collector | *ex* Charles S. Bergson Coll’n.”, ANSP, ARTSYS0001482; 1 male, “May 4, 1969 | Rockdale, E. Dade Co., Florida | Charles S. Bergson collector | *ex* Charles S. Bergson Coll'n.", ANSP, ARTSYS0001483; 1 female, "FLORIDA,U.S.A Royal Palm Park. W.S.Blatchley Coll. | Brit. Mus. 1935-440. Pachnaeus opalus,Oliv. W.S.Blatchley det. | WSB coll. RoyalPalm Park, Fla. 3-26 | 151"m NHMUK, ARTSYS0001462; 1 female, "FLORIDA,U.S.A Royal Palm Park. W.S.Blatchley Coll.", NHMUK, ARTSYS0001463; 1 male, "Roy. Palm State Park, Florida F. M. Jones | II.25.'33 | Col. 2. | (?) 2. Pachnaeus opalus Oliv. [cut from recycled paper reading "ELAWARE" on the back]", ANSP, ARTSYS0001492; 1 female, "FLORIDA: Dade Co. Everglades N. Park Royal Palm Hammock 1-31.VII.81 S.Peck intercept-malaise", CMNC, ARTSYS0001434; 1 male, "FLA:DadeCo. EvergladesNP,RoyalPalm Hammock,2.V-2.VIII.85 S&JPeck,hammock for. malaise-FIT", FMNH, ARTSYS0007468; 1 female, "Coral Gables, U. of Miami Campus III:25:47; FLA. | Col. + pres. by D.J. Zimring | Pachnaeus sp. Det. C. W. O'Brien 1975", FMNH, ARTSYS0007473; <u>Monroe Co.</u>: 1 female, "Big Coppet Key FLORIDA March 20, 1959 G.R. Ferguson | 16593 C.A.F. '61 | N.M.Downie Colln. 1992 Acc. Z-18,343 FIELD MUSEUM | Pachnaeus litus Germ.", FMNH, ARTSYS0007445; 3 male, "Big Coppet Key FLORIDA March 20, 1959 G.R. Ferguson | 16593 C.A.F. '61 | N.M.Downie Colln. 1992 Acc. Z-18,343 FIELD MUSEUM", FMNH, ARTSYS0007446, ARTSYS0007447, ARTSYS0007448; 1 male, "Big Coppet Key FLORIDA March 20, 1959 G.R. Ferguson | 16593 C.A.F. '61", CMNC, ARTSYS0001425; 1 female, "Big Coppet Key FLORIDA March 21, 1959 G.R. Ferguson | 16593 C.A.F. '61 | N.M.Downie Colln. 1992 Acc. Z-18,343 FIELD MUSEUM", FMNH, ARTSYS0007449; 1 male, 1 female, "FL.MonroeCo. BahiaHondoKey 20-X-1987,R.W. &M.P.Flowers", CWOB, ARTSYS0001158, ARTSYS0001159; 1 male, "Fla.BigPineKey Westenhaver s Cp. VI-

18-1955L& C.W.O'Brien UV [UV is crossed out]", CWOB, ARTSYS0001058; 1 female, "FLORIDA:Dade Co. Big Pine Key 10-11 April 1966 Robert E. Beer", CMNC, ARTSYS0001447; 2 male, "Big Pine Key, Monroe County, FLORIDA | W.H. Pierce 4-V-71", FSCA, ARTSYS0001174, ARTSYS0001175; 1 male, "FL:Big Pine Key 18-III-1972 J.F. Cornell Ex. Palmetto | J.F. Cornell Collection N.C. State Univ.Raleigh | Pachnaeus sp. Det. NFranz 2011", NCSU, [NCSU00]60425; 5 male, "FL:Big Pine Key 18-III-1972 J.F. Cornell Ex. Palmetto | J.F. Cornell Collection N.C. State Univ.Raleigh", [NCSU00]60426, [NCSU00]60427, [NCSU00]60428, [NCSU00]60429, [NCSU00]60430; 1 female, "FLA. Monroe Co. Big Pine Key at night III-26-1973 O'Briens&Kaplan", CWOB, ARTSYS0001059; 1 female, "FLA.Monroe Co. Big Pine Key at night III-26-1973 O'Briens&Kaplan | 11.", CWOB, ARTSYS0007773; 1 female, "FLA. Monroe Co. Big Pine Key III-26-1973 C&L O'Brien& Kaplan", CWOB, ARTSYS0001060; 1 male, "FL,MonroeCounty BigPineKey, VII-18- 1973,C.W.O'Brien blacklight trap", CWOB, ARTSYS0001061; 10 female, "FLA.MonroeCo. BigPineKey VII-18-1973 C.W. O'Brien&Marshall | at night", CWOB, ARTSYS0001095, ARTSYS0001096, ARTSYS0001097, ARTSYS0001098, ARTSYS0001099, ARTSYS0001100, ARTSYS0007766, ARTSYS0007767, ARTSYS0007768, ARTSYS0007769; 16 female, 9 male, "FLA.MonroeCo. BigPineKey VII-18-1973 C.W. O'Brien&Marshall", CWOB, ARTSYS0001101, ARTSYS0001102, ARTSYS0001103, ARTSYS0001104, ARTSYS0001105, ARTSYS0001107, ARTSYS0001108, ARTSYS0001109, ARTSYS0001115, ARTSYS0001116, ARTSYS0001106, ARTSYS0001110, ARTSYS0007760, ARTSYS0007761, ARTSYS0007762, ARTSYS0007763, ARTSYS0007764, ARTSYS0007765, ARTSYS0001111,

ARTSYS0001112, ARTSYS0001113, ARTSYS0001114, ARTSYS0001117, ARTSYS0001118, ARTSYS0007759; 1 male, same data as previous specimens, ASUHIC, ASUHIC0088729; 1 female, “FLA.MonroeCo. BigPineKey VII-18-1973 C.W. O’Brien&Marshall | N.M.Downie Colln. 1992 Acc. Z-18,343 FIELD MUSEUM | Pachnaeus litus Det. (Germ.) C. W. O’Brien 1974”, FMNH, ARTSYS0007455; 1 female, 2 male, “FLA.MonroeCo. BigPineKey VII-18-1973 C.W. O’Brien&Marshall | N.M.Downie Colln. 1992 Acc. Z-18,343 FIELD MUSEUM”, FMNH, ARTSYS0007456, ARTSYS0007457, ARTSYS0007458; 1 female, “FLA.MonroeCo. Big Pine Key X-4-1973 E.F. Riek | Pachnaeus litus det. C.W. O’Brien, 2006”, ASUHIC, ASUHIC0088727; 1 female, “FLA.MonroeCo. Big Pine Key X-4-1973 E.F. Riek | Pachnaeus litus Det. (Germ.) C.W. O’Brien 1976”, FMNH, ARTSYS0007451; 1 female, “FLA.MonroeCo. Big Pine Key X-4-1973 E.F. Riek | L. Magnano BMNH{E} 2014-154 | Pachnaeus litus Det. (Germ) C.W. O’Brien 1976”, NHMUK, ARTSYS0001471; 1 female, “FLA.MonroeCo. Big Pine Key X-4-1973 E.F. Riek | L. Magnano BMNH{E} 2014-154”, NHMUK, ARTSYS0001472; 20 male, 16 female, “FLA.MonroeCo. Big Pine Key X-4-1973 E.F. Riek”, CWOB, ARTSYS0001071, ARTSYS0001072, ARTSYS0001073, ARTSYS0001074, ARTSYS0001075, ARTSYS0001076, ARTSYS0001077, ARTSYS0001080, ARTSYS0001081, ARTSYS0001083, ARTSYS0001084, ARTSYS0001088, ARTSYS0007743, ARTSYS0007744, ARTSYS0007745, ARTSYS0007746, ARTSYS0007747, ARTSYS0007748, ARTSYS0007749, ARTSYS0007750, ARTSYS0001078, ARTSYS0001079, ARTSYS0001082, ARTSYS0001085, ARTSYS0001086, ARTSYS0001087, ARTSYS0001089, ARTSYS0001090, ARTSYS0007751, ARTSYS0007752, ARTSYS0007753,

ARTSYS0007754, ARTSYS0007755, ARTSYS0007756, ARTSYS0007757, ARTSYS0007758; 2 male, 1 female, same data as previous specimens, FMNH, ARTSYS0007452, ARTSYS0007454, ARTSYS0007453; 1 female, same data as previous specimens, ASUHIC, ASUHIC0088728; 1 female, "FLA., Monroe Co. Big Pine Key May 22, 1976 C.W. O'Brien&Marshall | at night", CWOB, ARTSYS0001063; 2 female, 1 male, "FLA.MonroeCo. Big Pine Key June 13, 1977at night C.W.O'Brien", CWOB, ARTSYS0001068, ARTSYS0001069, ARTSYS0001070; 1 female, "FLA.MonroeCo.Big PineKey at night 25 June1980 C.W. O'Brien&GJWibmer", CWOB, ARTSYS0001062; 4 male, 1 female, "Fla: Monroe Co. Big Pine Key VII-23-1984 Coll.E.G. Riley", CWOB, ARTSYS0001066, ARTSYS0007770, ARTSYS0007771, ARTSYS0007772, ARTSYS0001067; 1 female, "Fla: Monroe Co. Big Pine Key VII-25-27-1984 E.G.& T.J. Riley", CWOB, ARTSYS0001064; 1 female, "USA:FL.MonroeCo. BigPineKey,BlueHole 31.iii.85 W.Maddison pine/palmetto/shrubs", CMNC, ARTSYS0001448; 5 female, 4 male, "USA:Florida:MonroeCo. BigPineKey 5.xii.85. R. Anderson/J.O'Hara", CMNC, ARTSYS0001437, ARTSYS0001438, ARTSYS0001439, ARTSYS0001441, ARTSYS0001444, ARTSYS0001440, ARTSYS0001442, ARTSYS0001443, ARTSYS0001445; 1 male, "FL:Monroe Co. Big Pine Key, Watson's Hammock,15.v.90, 90-18,R.S. Anderson hardwd. hamm.", CMNC, ARTSYS0001446; 1 female, "FLA:MonroeCo. BigPineKey,N.End Nov. 1988, trans. for. uv trap, E.Peck", CMNC, ARTSYS0001449; 1 female, "Florida,MonroeCo. Big Pine Key, N.end October1990, E.Peck mangrove-transition UV light trap", CMNC, ARTSYS0001450; 1 female, "FLA:MonroeCo.,Big PineKey, N.end Nov.90,mangrove-HW transition,uv light

E.Peck”, CMNC, ARTSYS0001452; 1 female, “FLA:MonroeCo.,Big PineKey, N.end Aug.91,mangrove-HW transition,uv light E.Peck”, CMNC, ARTSYS0001451; 1 female, “FLORIDA, Monroe Co. Big Pine Key 28-IV-1995 M.L. Nelson”, CWOB, ARTSYS0001065; 1 female, “FLA:MonroeCo.Big TorchKey SW¼, S12 4.VIII-19.XI-85 hammock forrest malaise-FIT,S&JPeck”, CMNC, ARTSYS0001430; 1 male, “FLA:MonroeCo,Big TorchKey,SW½,S12 1.IX-15.XII.86 S&JPeck,86-92 hammock-malaiseFIT | Pachnaeus litus (Germ.) Det. R.S. Anderson 1992”, FMNH, ARTSYS0007467; 1 male, “FLA:MonroeCo CudjoeKey,S20 3.VI.86,J.Browne hammockforest shrubbeating”, FMNH, ARTSYS0007466; 1 male, 2 female, “EvergladesN.P. FLA. Flamingo xi-29-1970 L& C.W.O’Brien”, CWOB, ARTSYS0001152, ARTSYS0001153, ARTSYS0007774; 1 male, “FLA.Everglades N. P.FlamingoPrairie III-27-1973 night O’Briens&Kaplan”, CWOB, ARTSYS0001091; 1 female, “FLA.EvergladesN. P.Flamingo VII-20-1973 C.W. O’Brien | Pachnaeus litus (Germar) det. C.W. O’Brien, 2011”, ASUHIC, ASUHIC0088730; 1 male, “FLA.EvergladesN. P.Flamingo VII-20-1973 C.W.O'Brien”, CWOB, ARTSYS0007775; 1 female, 1 male, “FLA.EvergladesN. P.FlamingoPrairie VII-20-1973night C.W.O’Brien”, CWOB, ARTSYS0001148, ARTSYS0007776; 3 male, 4 female, “FLA.EvergladesN. P.Flamingo VII-20-1973 G.B.Marshall”, CWOB, ARTSYS0001145, ARTSYS0001146, ARTSYS0001149, ARTSYS0001150, ARTSYS0001151, ARTSYS0007777, ARTSYS0007778; 1 male, “FLA.EvergladesN. P.FlamingoPrairie VII-20-1973night G.B.Marshall”, CWOB, ARTSYS0001147; 1 female, 2 male, “FLA.EvergladesN.P. Flamingo 24May1976 C.W. O’Brien&Marshall”, CWOB, ARTSYS0001092, ARTSYS0001093, ARTSYS0001094; 1 male, “FL: Monroe

Co.Everglades Nat.Pk. Flamingo, 12.v.90 90-11, R.S. Anderson", CMNC, ARTSYS0001433; 1 female, "Grassy Key Monroe Co., FLA. VIII-21-1972 R. L. Westcott", CMNC, ARTSYS0001427; 1 male, "FLA.John PennekampSt. Pk.KeyLargo VI-17-1965 | Collectors: L & C.W. O'Brien | Pachnaeus litus (Germ.) Det. 16593 C. W. O'Brien 1973", CWOB, ARTSYS0007740; 1 female, "FLA.John PennekampSt. Pk.KeyLargo VI-17-1965 | Collectors: L & C.W.O'Brien", CWOB, ARTSYS0001137; 1 male, "FLA.MonroeCo.John Pennekamp St.Park 23-V-1976UVtrapCW O'Brien &Marshall", CWOB, ARTSYS0001138; 2 male, "FLA. :Monroe Co., Key Largo Key | CITRUS AURANTIFOLIA", FSCA, ARTSYS0001170, ARTSYS0001171; 1 female, " Key Largo Fla. July | Collector G. Beyer | P. litus F.R.Mason Coll. Germ.", ANSP, ARTSYS0001511; 1 female, 1 male, " Key Largo Fla. July | Collector G. Beyer | [blank green label]", ANSP, ARTSYS0001512, ARTSYS0001513; 1 female, 1 male, "FL:Monroe Co. Key Largo VI/4-7/98 J. Huether", CMNC, ARTSYS0001416, ARTSYS0001417; 1 female, "Fla.4mi.N.Key LargoHwy.1 vi-17-1965L& C.W.O'Brien", CWOB, ARTSYS0001125; 1 male, "Upper Key Largo Monroe Co. Fla. Apr. 25-27 & May 4-6 1978 A E. & D.S. Lewis", CWOB, ARTSYS0001120; 2 female, 3 male, "Fla: Monroe Co. Upper Key Largo VIII-23-24-1984 E.G.& T.J. Riley", CWOB, ARTSYS0001140, ARTSYS0001144, ARTSYS0001141, ARTSYS0001142, ARTSYS0001143; 1 male, "FLA: Monroe Co. Upper Key Largo VI-3-5-1993 | Androw, Brattain, Keeney & Morris,", CWOB, ARTSYS0001119; 1 male, "[blank green square] | [circular white label] Key West. Florida.", NHMUK, ARTSYS0001466; 1 female, "Key West IV Fla | CollHubbard &Schwarz | Pachnaeus opalus Horn nec Oliv.", NHMUK, ARTSYS0001465; 1 male, "Key West S. Florida J. C. Melvill March 1872. | D. Sharp coll. ex Lethierry et al. B.M. 1933-281 & B.M. 1946-336.”, NHMUK, ARTSYS0001464; 2 male, 2 female, “Key West, Florida July3-7,1912 R&H”, ANSP, ARTSYS0001475, ARTSYS0001477, ARTSYS0001476, ARTSYS0001478; 1 female and 1 male “[card-mounted pair, female on the left and male on the right, with the following written on card-mount below specimens] Pachnaeus opalus det. Blatchely Florida | Keywest Fla 3-1-19\ 1[51?](8309) | D. Sharp Coll. B.M.1932-116.”, NHMUK, ARTSYS0001467; 1 male, “LongKeyMonroeCoFla July 13,1912. R.&H.”, ANSP, ARTSYS0001479; 1 male, “FLA.Lower Matecumbe Key,Monroe Co. VI-18-1965 | Collectors: L & C.W.O’Brien”, CWOB, ARTSYS0001131; 2 male, 1 female, “FLA.MonroeCo. Marathon Key VII-26-1984 E.G.Riley”, CWOB, ARTSYS0001164, ARTSYS0001166, ARTSYS0001165; 1 female, “Siepmann Nov 21 ‘31 | Matecumbe Fla | C.N.H.M. 1960 Borys Malkin Coleoptera Colln.”, FMNH, ARTSYS0007472; 1 male, “FLA:MonroeCo MiddleTorchKey 1-30.V.86,S&JPeck hammockforestedge malaise,86-35”, CMNC, ARTSYS0001429; 1 female, “FLA. 2mi.S. OceanReefKey Largoxii-2-1970 C.W.O’Brien”, CWOB, ARTSYS0001123; 1 female, 1 male, “FLA.MonroeCo.Ohio Key, 2mi.E. Bahia HondaKey22-V-1976 CO’Brien&Marshall”, CWOB, ARTSYS0001130, ARTSYS0007742; 1 male, “Rock Harbor Key Largo Fla. Apr. 8 1951 H.&A Howden | LIGHT”, CMNC, ARTSYS0001424; 1 male, “FLA:MonroeCo Sugarloaf Key,Kitching’s NW¼, SE¼, S25, R27E T66S 4.XI.84-3.III.85 S&J Peck FIT malaise”, CMNC, ARTSYS0001428; 1 male, “Fla.MonroeCo. Stock Island VI-18-1965 L& C.W O’Brien”, CWOB, ARTSYS0001128; 1 male, “FL.,Monroe Co. Stock Island 24-XI-1965, UV trap,F.A.Buchanan”, CWOB, ARTSYS0001129; 1 female, “FLA.Upper Matecumbe Key,Monroe Co.VI-18-1965 | Collectors: L & C.W. O'Brien”, CWOB, ARTSYS0007741; 1 female, "FLA:MonroeCo. VacaKey,Marathon 2.VI.1.IX.86,sec1 S&JPeck, hammock malaise-FIT,86-46", CMNC, ARTSYS0001431; 1 male, "Windly Fla. | Siepmann Nov '31 | C.N.H.M. 1960 Borys Malkin Coleoptera Colln. | Pachnaeus opalus 16593. (Oliv)", FMNH, ARTSYS0007470; <u>Orange Co.</u>: 1 female, "Florida, OrangeCo. Lk. Fredrica Area Orlando vi-20-1991 R. W. Hamilton", FMNH, ARTSYS0007469; <u>Palm Beach Co.</u>: 1 male, "County Lakes Delray Beach Palm Beach Co. Fla. February 1, 1991 Vince Golia Black Light", CWOB, ARTSYS0001139; 1 female, "L. Worth Fla | C.N.H.M. 1960 Borys Malkin Coleoptera Colln.", FMNH, ARTSYS0007471; <u>Pinellas Co.</u>: 1 female, "FLORIDA, Pinellas Co. west of Tarpon Lake 11-VI-1996 A.L. Huillet", CWOB, ARTSYS0001132; <u>Polk Co.</u>: 1 male, "Lake Wales, Polk Co., FLA | W.E. Wynn 26-VII-82 | CITRUS PARADISI", FSCA, ARTSYS0001173; **Pennsylvania (locality probably erroneous):** <u>Philadelphia Co.</u>: 1 female, "Philadelph | 1554", NHMUK, ARTSYS0001474.

<u>Cuba</u>: 1 female, "♂[sic] | [green label] 15471 | Antilles Cuba | Fry Coll. 1905.100.", NHMUK, ARTSYS0007436; 2 male, "Cuba | Bowring. 63•47*", NHMUK, ARTSYS0007437, ARTSYS0007438; 2 female, "[red label] Cuba | D. Sharp coll. ex Lethierry et al. B.M. 1933-281 & B.M. 1946-336 | litus,*Germ*.", NHMUK, ARTSYS0007439, ARTSYS0007440; 1 male, "D. Sharp coll. ex Lethierry et al. B.M. 1933-281 & B.M. 1946-336 | Pachnaeus. litus. Germ. Cuba.", NHMUK, ARTSYS0007441; 1 male, "D. Sharp coll. ex Lethierry et al. B.M. 1933-281 & B.M. 1946-336 | Pachnaus ["spretus Sch" crossed out] Cuba", NHMUK, ARTSYS0007443; 1 male, "Sharp Coll. 1905-313. | Pachnāus azurescens 1699 Cuba", NHMUK, ARTSYS0007444; 1 female, "Cuba | Ziegler | litus Germ.", MCZ, [MCZ-ENT

00]529376; 1 male, “Cuba | Deyr. | litus Germ.”, MCZ, [MCZ-ENT 00]529377; 1 male, “Deyr. | Cuba | litus”, MCZ, [MCZ-ENT 00]529378; 1 female, “Deyr. | [green label] Cuba | [green label] Pachnaeus litus Sch.”, MCZ, [MCZ-ENT 00]529379; 1 female, “St. Dom. | Deyr. | azurescens”, MCZ, [MCZ-ENT 00]529359; 1 female, “Cuba”, ANSP, ARTSYS0001516; 2 male, “Poey Collection. | Cuba.”, ANSP, ARTSYS0001517, ARTSYS0001518; 1 male, “Pachnaeus litus Cuba Germar”, ARTSYS0001519, ANSP; 1 female, “Cuba”, ANSP, ARTSYS0007810; **La Habana:** Cotorro: 2 female, 1 male, “Cotorro CUBA | Havana VI-1924 | [blank green label]”, ANSP, ARTSYS0001520, ARTSYS0001522, ARTSYS0001521; Havana: 1 female, “Havana Cuba.Baker | 1905-185. | 3572”, NHMUK, ARTSYS0007434; 1 female, “Havana Cuba.Baker | 1905-185.”, NHMUK, ARTSYS0007435; 9 female, 13 male, “Cuba. | Havana Barbour”, MCZ, [MCZ-ENT 00]529389, [MCZ-ENT 00]529390, [MCZ-ENT 00]529402, [MCZ-ENT 00]529406, [MCZ-ENT 00]529408, [MCZ-ENT 00]529411, [MCZ-ENT 00]529415, [MCZ-ENT 00]529417, [MCZ-ENT 00]529419, [MCZ-ENT 00]529392, [MCZ-ENT 00]529393, [MCZ-ENT 00]529401, [MCZ-ENT 00]529403, [MCZ-ENT 00]529404, [MCZ-ENT 00]529407, [MCZ-ENT 00]529409, [MCZ-ENT 00]529410, [MCZ-ENT 00]529412, [MCZ-ENT 00]529413, [MCZ-ENT 00]529414, [MCZ-ENT 00]529418, [MCZ-ENT 00]529432; 1 male, “Cuba. | Havana T. Barbour | Pachneus sp.”, MCZ, [MCZ-ENT 00]529400; 3 male, “Cuba. | Havana T. Barbour”, MCZ, [MCZ-ENT 00]529391, [MCZ-ENT 00]529405, [MCZ-ENT 00]529405, [MCZ-ENT 00]529416; 4 female, 10 male, “Cuba: vic of Havana. T.Barbour”, MCZ, [MCZ-ENT 00]529394, [MCZ-ENT 00]529395, [MCZ-ENT 00]529427, [MCZ-ENT 00]529429, [MCZ-ENT 00]529420, [MCZ-ENT 00]529421, [MCZ-ENT 00]529422, [MCZ-ENT 00]529423, [MCZ-ENT 00]529424, [MCZ-ENT 00]529425, [MCZ-ENT 00]529426, [MCZ-ENT 00]529428, [MCZ-ENT 00]529430, [MCZ-ENT 00]529431; 2 male, 1 female, "Havana, Cuba | F. C. Bowditch Coll.", MCZ, [MCZ-ENT 00]529441, [MCZ-ENT 00]529443, [MCZ-ENT 00]529442; La Aliansa: 1 female, " „La Aliansa" [sic, including quotation marks] Havana Prov. Cuba. | (J. Cabrera) VI-22 1927", ANSP, ARTSYS0001523; Playa de Jaimanitas: 1 male, "Jaimonitas, Habana, Cuba June 27, 1939 | E. N. Kjellesvig-Waering coll.", FSCA, ARTSYS0001532; 1 female, "Jaimonitas, Habana, Cuba June 27, 19393 | E.N. K[j]ellesvig-Waering coll.", FSCA, ARTSYS0001533; Santiago de las Vegas: 1 male, "Santiago de las Dec 4 25 Vegas, Habana. | Pachnaeus litus Germ.", CWOB, ARTSYS0001514; **Isla de la Juventud:** Nueva Gerona: 1 male, "Nueva Gerona Isle of Pines | July 23 1912 | Carn. Mus. Acc. 4745 | Carnegie Museum Specimen Number CMNH-375,071", CMNH, ARTSYS0001524; 1 female, "Nueva Gerona Isle of Pines | July 31 1912 | Carn. Mus. Acc. 4745 | Carnegie Museum Specimen Number CMNH-375,080", CMNH, ARTSYS0001525; **Matanzas Province:** Bolondron: 1 female, "Bolondron Cuba, Wheeler", MCZ, [MCZ-ENT 00]529478; **Mayabeque Province:** Boca de Jaruco: 1 male, "CUBA: Habana Prov. Bocade Jaruco 7-VI-58 J. Schwartz", CWOB, ARTSYS0001515; nr. El Peru: 1 female, "15 miles SW of Hershey, Habana, Cuba 6-27-39 | E. N. Kjellesvig-Waering coll.", FSCA, ARTSYS0001530; 1 female, "15 miles SW of Hershey, Haba na, Cuba 6-27-39 | E. N. Kjellesvig-Waering coll.", FSCA, ARTSYS0001531; **Sancti Spiritus Province:** between Trinidad and Tropes de Collantes: 1 male, "CUBA: Trinidad to Tropes deCollantes, Las Villas Prov. June 10, 1959 M. W. Sanderson C59-24", CWOB, ARTSYS0007781; 1 female, "CUBA:

Trinidad to Tropes deCollantes, Las Villas Prov. June 10, 1959 M. W. Sanderson C59-24 | Pachnaeus 3”, CWOB, ARTSYS0007782.

Selected observational records of the typical form:

Cuba: Matanzas Province: Ciénaga de Zapata, 22.192942, -81.136728, 21 April 2003, Rich Hoyer (inaturalist.org/people/birdernaturalist), inaturalist.org/observations/71111964.

USA: **Florida**: Alachua Co.: Gainesville, 7001 Interstate 75, 29.590533, -82.361362, 12 June 2019, Ryan Cooke (inaturalist.org/people/ryancooke), inaturalist.org/observations/26879933; Brevard Co.: Cape Canaveral, Port Canaveral, 28.413091, -80.630469, ±65m, 1 February 2020, inaturalist.org/people/cskelton, inaturalist.org/observations/38178846; Melbourne, 28.126504, -80.673814, ±30m, 3 May 2021, Yolanda Svatik (inaturalist.org/people/yoyoyolanda), inaturalist.org/observations/77190243; Melbourne, Sonesta Walk, 28.041405, -80.632761, ±3m, 17 August 2021, Micah Thomas (inaturalist.org/people/micah_thomas), inaturalist.org/observations/91575976; Merritt Island, 28.416723, -80.703376, ±61m, 7 September 2017, Johannes (inaturalist.org/people/johantarzan4600), inaturalist.org/observations/7824116; Merritt Island, 28.362407, -80.69616, ±55m, 16 May 2022, inaturalist.org/people/bugappreciator, inaturalist.org/observations/117373104; Merritt Island, Florida A1A, 28.404801, -80.680684, ±352m, 20 December 2018, Jonathan Schnurr (inaturalist.org/people/jonathanschnurr), inaturalist.org/observations/19120779; Merritt Island, Kennedy Space Center, 28.456573, -80.663846, ±4.71km, 11 October 2021, inaturalist.org/people/rahaman_i_901, inaturalist.org/observations/98930805; Satellite Beach, 28.168316, -80.59702, ±20m, 13 November 2020, inaturalist.org/people/applesaucemeowmeow, inaturalist.org/observations/64819344; West Melbourne, Hiking Trail, 28.061545, -80.643273, ±46m, 5 May 2022, inaturalist.org/people/wendo88, inaturalist.org/observations/118183421; Broward Co.: Davie, Long Key Nature Center, [26.076667,-80.325], 24 September 2009, KJ (bugguide.net/user/view/22692), bugguide.net/node/view/1272003; Davie, 26.084181, -80.240774, ±15m, 4 March 2020, Carly (inaturalist.org/people/carly_c), inaturalist.org/observations/69441260; Deerfield Beach, 26.308603, -80.156383, ±1.55km, 18 September 2021, Eridan Xharahi (inaturalist.org/people/eridanxharahi), inaturalist.org/observations/95322115; Deerfield Beach, 26.318412, -80.099766, ±2.96km, 22 June 2019, Eridan Xharahi (inaturalist.org/people/eridanxharahi), inaturalist.org/observations/27450505; Deerfield Beach, 26.318412, -80.099766, ±2.96km, 22 June 2019, Eridan Xharahi (inaturalist.org/people/eridanxharahi), inaturalist.org/observations/27450554; Deerfield Beach, 26.318412, -80.099766, ±2.96km, 27 July 2019, Eridan Xharahi (inaturalist.org/people/eridanxharahi), inaturalist.org/observations/29648644; Deerfield Beach, 26.318412, -80.099766, ±2.96km, 10 August 2019, Eridan Xharahi (inaturalist.org/people/eridanxharahi), inaturalist.org/observations/30775560; Deerfield Beach, 26.318412, -80.099766, ±2.96km, 10 August 2019, Eridan Xharahi (inaturalist.org/people/eridanxharahi), inaturalist.org/observations/27450576; Deerfield Beach, 26.318412, -80.099766, ±8.54km, 9 March 2019, Eridan Xharahi (inaturalist.org/people/eridanxharahi), inaturalist.org/observations/21117222; Deerfield Beach, 26.318412, -80.099766, ±8.54km, 23 March 2019, Eridan Xharahi (inaturalist.org/people/eridanxharahi), inaturalist.org/observations/21633218; Deerfield Beach, 26.318412, -80.099766, ±8.54km, 1 April 2019, Eridan Xharahi (inaturalist.org/people/eridanxharahi), inaturalist.org/observations/21917948; Deerfield Beach, 26.318412, -80.099766, ±8.54km, 1 June 2019, Eridan Xharahi (inaturalist.org/people/eridanxharahi), inaturalist.org/observations/26217141; Fort Lauderdale, 26.122439, -80.137317, ±11.13km, 8 September 2018, Eridan Xharahi (inaturalist.org/people/eridanxharahi), inaturalist.org/observations/16934824; Fort Lauderdale, 26.122439, -80.137317, ±11.13km, 8 September 2018, Eridan Xharahi (inaturalist.org/people/eridanxharahi), inaturalist.org/observations/16932266; Fort Lauderdale, 26.122439, -80.137317, ±11.13km, 8 September 2018, Eridan Xharahi (inaturalist.org/people/eridanxharahi), inaturalist.org/observations/16932087; Fort Lauderdale, 26.122439, -80.137317, ±11.13km, 24 November 2018, Eridan Xharahi (inaturalist.org/people/eridanxharahi), inaturalist.org/observations/18761213; Fort Lauderdale, 26.122439, -80.137317, ±11.13km, 16 December 2018, Eridan Xharahi (inaturalist.org/people/eridanxharahi), inaturalist.org/observations/19075175; Fort Lauderdale, 26.311129, -80.16341, ±1.91km, 1 September 2018, Eridan Xharahi (inaturalist.org/people/eridanxharahi), inaturalist.org/observations/16103910; Fort Lauderdale, East Fort Lauderdale, 26.148229, -80.106511, ±31m, 14 June 2017, Eridan Xharahi (inaturalist.org/people/eridanxharahi), inaturalist.org/observations/6686224; Fort Lauderdale, NE 22nd Way, 26.199522, -80.1118, ±65m, 22 May 2020, Roseane Souza (inaturalist.org/people/rofllhome), inaturalist.org/observations/46870291; Hollywood, Topeekeegee Yugnee Park, 26.034382, -80.168706, ±17m, 22 March 2019, inaturalist.org/people/daebaktkdjen, inaturalist.org/observations/21483064; Oakland

Park, 4421 NE 16th Ave., 26.182409, -80.125978, ±9m, 12 February 2019, Luiz Puodzius (inaturalist.org/people/puodz), inaturalist.org/observations/20296885; Oakland Park, 4331 NE 16th Ave., 26.181657, -80.125984, ±17m, 30 March 2019, Luiz Puodzius (inaturalist.org/people/puodz), inaturalist.org/observations/21782057; Oakland Park, Central Corals, 26.181898, -80.125994, 26 May 2020, Luiz Puodzius (inaturalist.org/people/puodz), inaturalist.org/observations/47367122; Oakland Park, Central Corals, 26.181874, -80.125926, 11 July 2021, Luiz Puodzius (inaturalist.org/people/puodz), inaturalist.org/observations/86675440; Oakland Park, Central Corals, 26.18189, -80.125991, 24 March 2022, Luiz Puodzius (inaturalist.org/people/puodz), inaturalist.org/observations/109349778; Oakland Park, Central Corals, 26.181862, -80.126045, 4 June 2022, Luiz Puodzius (inaturalist.org/people/puodz), inaturalist.org/observations/120220447; Oakland Park, Central Corals, 26.181937, -80.126051, 19 September 2021, Luiz Puodzius (inaturalist.org/people/puodz), inaturalist.org/observations/95425495; Pembroke Pines, Johnson St., 26.015298, -80.274175, ±54.74km, 11 May 2021, Chris Cody (inaturalist.org/people/tophercody), inaturalist.org/observations/78349852; Pompano Beach, 2222 N Cypress Bend Dr., 26.217697, -80.149742, ±14m, 5 May 2019,Sandra H. Statner (inaturalist.org/people/techgrl18), inaturalist.org/observations/24685971; <u>Collier Co.</u>: 25.935038, -81.071816, ±41.06km, June 2021, inaturalist.org/people/iamnotwithouttoads, inaturalist.org/observations/83648743; [Copeland], 25.952056, -81.362124, ±402m, 2 October 2021, inaturalist.org/people/lisnel, inaturalist.org/observations/97203090; Copeland, 137 Coast Line Dr., 26.061273, -81.404289, ±201m, 23 June 2019, inaturalist.org/people/lisnel, inaturalist.org/observations/27541540; Everglades City, 25.844994, -81.385991, 1 June 2022, inaturalist.org/people/tigertailmiami, inaturalist.org/observations/119769486; Marco Island, [25.9725,-81.728889], 24 February 2014, David E. Reed (bugguide.net/user/view/497), bugguide.net/node/view/898049, bugguide.net/node/view/898050; Marco Island, City of Marco, 25.934394, -81.704174, 29 August 2021, inaturalist.org/people/nancyrose, inaturalist.org/observations/92990228; Naples, 31834–31988 Tamiami Trl. E, 25.911439, -81.366185, 5 July 2017, Pete Corradino (inaturalist.org/people/peteacorr), inaturalist.org/observations/6933430; Naples, East Naples, 26.111631, -81.764592, 10 February 2021, inaturalist.org/people/elspethpierce, inaturalist.org/observations/69384558; Naples, East Naples, 26.115061, -81.758366, ±61m, 22 June 2021, inaturalist.org/people/cnagele, inaturalist.org/observations/84156179; Naples, Golden Gate Estates near the western border of The Everglades, [26.1677, -81.5297], at light at night [in] subtropical hardwood hammock, 10 May 2005, Brian E Womble (bugguide.net/user/view/1002), bugguide.net/node/view/17325; North Naples, 26.304358, -81.835419, 24 July 2016, Luis G Restrepo (inaturalist.org/people/luchogu), inaturalist.org/observations/10763020; Ochopee, Big Cypress National Preserve, 25.859584, -81.03506, ±36m, 12 June 2020, inaturalist.org/people/victorbach, inaturalist.org/observations/49405248; [Picayune Strand State Forest], 26.123889, -81.520833, ±5m, 19 July 2019, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/29194967; <u>Duval Co.</u>: 30.375055, -81.616695, ±29.38km, August 2020, Nathan DeGruchy (inaturalist.org/people/ndegruchy), inaturalist.org/observations/56837011; 30.274826, -81.760173, ±29.38km, April 2022, inaturalist.org/people/cowpokeamerica, inaturalist.org/observations/114218414; Glades Co.: Moore Haven, Herbert Hoover Dikea, 26.980678, -81.08483, ±4m, 8 June 2020, Casey Weissburg (inaturalist.org/people/cmweissburg), inaturalist.org/observations/50490613; Hernando Co.: Brooksville, Cortez Blvd., 28.538509, -82.38362, ±3.19km, 27 June 2021, inaturalist.org/people/hunter5819, inaturalist.org/observations/84726031; Highlands Co.: Avon Park, W Avon Blvd., 27.627763, -81.523675, ±65m, 14 October 2019, Darleana Rojas-Saad (inaturalist.org/people/darleanarojassaad), inaturalist.org/observations/34360256; Venus, Hill Dr., 27.185287, -81.338455, ±6m, 4 August 2021, Brandon Woo (inaturalist.org/people/brandonwoo), inaturalist.org/observations/90055925; Hillsborough Co.: 27.913024, -82.227266, ±29.68km, May 2018, Samantha (inaturalist.org/people/durling), inaturalist.org/observations/12827507; 27.896255, -82.35451, ±29.68km, July 2018, Samantha (inaturalist.org/people/durling), inaturalist.org/observations/14203674; 28.155396, -82.385488, ±29.66km, May 2020, inaturalist.org/people/flbirdbrain, inaturalist.org/observations/46261947; 27.841148, -82.33651, ±29.68km, May 2020, inaturalist.org/people/julievogel, inaturalist.org/observations/45773961; 27.865158, -82.292186, ±29.68km, May 2020, Becca Kust (inaturalist.org/people/bexxmf), inaturalist.org/observations/45279973; 28.092594, -82.49524, ±29.66km, April 2022, Jordan D. (inaturalist.org/people/jurdonnes), inaturalist.org/observations/113277241; 28.008345, -82.549168, 22 April 2022, James Bailey (inaturalist.org/people/silversea_starsong), inaturalist.org/observations/118611821; 28.136379, -82.452325, ±29.66km, May 2022, inaturalist.org/people/schwartz_k_13, inaturalist.org/observations/115847505; Balm, [27.759444, -82.261111], on blackberry, 4

September 2015, Justin Renkema (bugguide.net/user/view/49264), bugguide.net/node/view/1135497; Balm, 27.759474, -82.261202, ±1.92km, 29 March 2012, inaturalist.org/people/guerillafarmer99, inaturalist.org/observations/68327; Brandon, Dominion, 27.95459, -82.269695, ±10m, 27 September 2020, Mikaela (inaturalist.org/people/watkins_m_905), inaturalist.org/observations/60920512; Lake Rogers County Park, [28.11, -82.587], 30 May 2015, Mike Deep (bugguide.net/user/view/3152), bugguide.net/node/view/1076794; Lutz, 28.126056, -82.501546, ±8m, 3 August 2021, Preston J McDonald (inaturalist.org/people/premcdonald), inaturalist.org/observations/89912134; [Palm River-Clair Mel, Marsh Cove Ct.], 27.935789, -82.350825, ±8m, 5 October 2019, inaturalist.org/people/brm85, inaturalist.org/observations/33948577; Riverview, Riverview High School, 27.850278, -82.312974, ±23m, 18 May 2022, inaturalist.org/people/stinkbugs, inaturalist.org/observations/117580770; Tampa, 28.066068, -82.404602, ±5m, 8 June 2018, Nils Tack (inaturalist.org/people/nilstack, inaturalist.org/observations/13334259; Tampa, 28.063594, -82.413507, ±100m, 25 April 2019, Nils Tack (inaturalist.org/people/nilstack), inaturalist.org/observations/25361987; Tampa, 27.950575, -82.457178, ±31.28km, 1 May 2019, Arturo Santos (inaturalist.org/people/aispinsects), inaturalist.org/observations/32918459; Tampa, 28.029172, -82.64124, ±30m, 7 February 2020, Heather Piscione (inaturalist.org/people/hpiscione), inaturalist.org/observations/50538673; Tampa, 28.058657, -82.41755, ±8m, 10 February 2020, inaturalist.org/people/morales_j_004), inaturalist.org/observations/41083886; Tampa, 28.060646, -82.414828, 11 July 2020, Arturo Santos (inaturalist.org/people/aispinsects), inaturalist.org/observations/52766501;

Tampa, 28.060178, -82.410847, 21 September 2020, Arturo Santos (inaturalist.org/people/aispinsects), inaturalist.org/observations/60458558; Tampa, 27.959139, -82.462952, ±162m, 10 May 2022, Liz Gibbons (inaturalist.org/people/whtsnnm), inaturalist.org/observations/116492392; Tampa, 28.08315, -82.459226, ±6m, 9 June 2022, Zakyl Harding (inaturalist.org/people/zakylharding), inaturalist.org/observations/120924866; Tampa, 12480 USF Maple Drive, 28.065073, -82.408409, 25 September 2018, Lauren Ferguson (inaturalist.org/people/lferguson), inaturalist.org/observations/16908931; Tampa, 6902 Eldorado Dr., 28.012575, -82.564087, ±10m, 27 June 2019, inaturalist.org/people/stephaniemarie98, inaturalist.org/observations/27833374; Tampa, 811 E Robson St., 28.0168, -82.451783, ±45m, 14 July 2019, inaturalist.org/people/graceregan, inaturalist.org/observations/28811724; Tampa, Bayport Commons, 28.017028, -82.614472, ±35m, 19 April 2022, inaturalist.org/people/cescag312, inaturalist.org/observations/112090674; Tampa, Benjamin Rd., 28.027158, -82.539987, ±22m, 12 July 2022, inaturalist.org/people/darbi_trash, inaturalist.org/observations/126417468; Tampa, Cypress Suites B, 28.066337, -82.408374, ±6m, 29 August 2018, inaturalist.org/people/bhernandez4, inaturalist.org/observations/16004028; [Tampa], C.W.Y Bill Young Hall, 28.061443, -82.40825, ±1m, 20 September 2021, inaturalist.org/people/attalla_f_007, inaturalist.org/observations/98046299; Tampa, E Fowler Ave., 28.054892, -82.426675, ±42m, 11 September 2021, inaturalist.org/people/sanacore_n_29, inaturalist.org/observations/94429726; Tampa, E Fowler Ave., 28.055025, -82.398987, ±3m, 15 June 2022, inaturalist.org/people/greene_s_008, inaturalist.org/observations/122491982; Tampa, on Tampa Bay, [27.9475, -82.4586], near Mangrove trees, 20 November 2011, Shannon Donavan (bugguide.net/user/view/25127), bugguide.net/node/view/596438; Tampa, Monticello Gardens Pl., 28.074314, -82.415383, ±10m, 29 March 2021, inaturalist.org/people/the_curious_naturalist, inaturalist.org/observations/72465819; Tampa, N 50th St., 28.069058, -82.401878, ±5m, 5 September 2021, inaturalist.org/people/ashcash118, inaturalist.org/observations/93794761; Tampa, New Tampa, 28.110721, -82.419428, ±19.54km, 24 September 2021, inaturalist.org/people/esummerf, inaturalist.org/observations/96296530; Tampa, Picnic Island Park, 27.848162, -82.553572, ±4m, 16 April 2022, Carly Peirano (inaturalist.org/people/carly201), inaturalist.org/observations/113631362; Tampa, Psychology and Communication Sciences and Disorders Lab Building, 28.063877, -82.418596, ±9m, 29 January 2019, inaturalist.org/people/toadkidd, inaturalist.org/observations/19947340; Tampa, Rowlett Park, 28.024878, -82.432199, ±5m, 28 April 2018, inaturalist.org/people/sacforesthills2, inaturalist.org/observations/11613884; Tampa, S Dale Mabry Hwy., 27.926038, -82.506028, ±13m, 16 May 2020, Jeanine B. (inaturalist.org/people/jeanineb1), inaturalist.org/observations/46098319; Tampa, S Holly Ln., 27.926217, -82.49987, ±4m, 16 May 2020, Deva Boone (inaturalist.org/people/devaboone), inaturalist.org/observations/46142411; Tampa, Topgolf, 27.929595, -82.334258, 6 July 2021, inaturalist.org/people/leach, inaturalist.org/observations/85910215; Tampa, Town N Country Alliance, 28.016747, -82.552269, ±5m, 3 June 2018, inaturalist.org/people/lianetdiaz, inaturalist.org/observations/13098871; Tampa, University of South Florida, 28.06155, -82.414245, ±25m, 23 June 2022, inaturalist.org/people/malkeya_f_010, inaturalist.org/observations/123121116; Tampa, University of South Florida, 28.064192, -82.410387, ±65m, 6 February 2020, inaturalist.org/people/rodriguez_s, inaturalist.org/observations/38786937; Tampa, University of South Florida, 28.063593, -82.413302, ±37m, 27 September 2019, inaturalist.org/people/ramosv902, inaturalist.org/observations/34785993;Tampa, University of South Florida, 28.064311, -82.410508, ±65m, 15 April 2019, inaturalist.org/people/annap2, inaturalist.org/observations/22541257; Tampa, University of South Florida, 28.066389, -82.408463, ±65m, 18 September 2018, inaturalist.org/people/sophiaurena, inaturalist.org/observations/16687750; Tampa, University of South Florida, 28.059808, -82.416213, 15 October 2019, inaturalist.org/people/alizadeh_d_007, inaturalist.org/observations/34704162; [Tampa], University of South Florida, 28.058693, -82.413875, ±31.28km, 12 September 2018, inaturalist.org/people/kaylaprejean, inaturalist.org/observations/16463301; [Tampa], University of South Florida, 28.060536, -82.413544, ±173m, 1 February 2019, Rachel Boone, inaturalist.org/people/boone_r_12, inaturalist.org/observations/20131357; Tampa, W Creek Dr., 28.010916, -82.589968, ±22m, 10 June 2021, Katheryn (inaturalist.org/people/entofille), inaturalist.org/observations/82794850; Tampa, Webb Rd., 27.992747, -82.575578, ±13m, 13 May 2022, inaturalist.org/people/nikkidave, inaturalist.org/observations/116840727; Tampa, Westchase Town Center, 28.043159, -82.590624, ±36m, 5 April 2022, inaturalist.org/people/frogwrangler, inaturalist.org/observations/110588212; Tampa, Westshore, 27.950577, -82.543901, ±219m, 14 June 2022, Sallie Miller (inaturalist.org/people/mommothma), inaturalist.org/observations/121782813; Town 'N' Country, Town N County Park, 28.001377, -82.581216, ±3.25km, 28 April 2022, inaturalist.org/people/flika10, inaturalist.org/observations/113287092; University, 28.076033, -82.417869, ±22m, 27 February 2019, inaturalist.org/people/vu_a_006, inaturalist.org/observations/20944769; University, Cross Fletcher, 28.072899, -82.439992, ±1.97km, 16 April 2022, inaturalist.org/people/skemmanuel, inaturalist.org/observations/111692121; Westchase, 28.083747, -82.579186, 6 June 2022, Ashley (inaturalist.org/people/nonandina), inaturalist.org/observations/120513629; [Wimauma, University Of Florida-Gulf Coast Research and Education Center], 27.760287, -82.227674, ±12m, 31 May 2019, Dolly (inaturalist.org/people/campbayou), inaturalist.org/observations/26170339; Indian River Co.: Vero Beach, 1895 Saint Edwards Dr., 27.600297, -80.338463, ±10m, 16 May 2019, inaturalist.org/people/kerryane, inaturalist.org/observations/25227458; Lake Co.: Clermont, Cross Ridge Rd., 28.531389, -81.729446, 15 August 2018, inaturalist.org/people/ritirene, inaturalist.org/observations/15453505; Clermont, 2106 Fish Eagle St., 28.377454, -81.683297, ±5m, 27 April 2019, inaturalist.org/people/mebo311, inaturalist.org/observations/23468324; Lee Co.: Bonita Springs, 27688 Pinecrest Lane, 26.335943, -81.752203, ±22m, 16 June 2017, Perry Everett (inaturalist.org/people/gowander), inaturalist.org/observations/6682848; Cape Coral, [26.639722, -81.9825], 26 July 2010, Simon Rivers (bugguide.net/user/view/43074), bugguide.net/node/view/433165; Cape Coral, [26.639722, -81.9825], 19 August 2011, Don Parsons (bugguide.net/user/view/61832), bugguide.net/node/view/565247; Cape Coral, 26.71613, -81.93792, 26 July 2019, inaturalist.org/people/terryhahn1965, inaturalist.org/observations/29579937; Cape Coral, Chiquita Blvd., 26.585763, -82.007347, ±136.38km, 13 May 2021, inaturalist.org/people/cwalker317, inaturalist.org/observations/78593510; Cape Coral, Sandoval Pkwy, 26.636178, -82.031472, ±5m, 12 May 2020, inaturalist.org/people/puppybird, inaturalist.org/observations/45811600; Cape Coral, SE 35th Terr., 26.587405, -81.943212, 6 September 2020, Richard Stovall (inaturalist.org/people/arctic_mongoose), inaturalist.org/observations/58795516; Cape Coral, Skyline Blvd., 26.622422, -81.991112, ±84m, 18 May 2022, Levi Naylor (inaturalist.org/people/levinaylor), inaturalist.org/observations/117614199; Estero, Andiron Pl., 26.437627, -81.79532, ±6.24km, 28 July 2020, inaturalist.org/people/floridagal, inaturalist.org/observations/54617473; Fort Myers, 19428 Devonwood Cir.,26.457642, -81.790375, ±5m, 26 May 2019, inaturalist.org/people/mom4893, inaturalist.org/observations/25836047; Fort Myers, Gulf Coast Town Center, 26.483997, -81.790117, ±30m, 27 May 2019, inaturalist.org/people/alexiscolbym, inaturalist.org/observations/25896350; Fort Myers, Florida Gulf Coast University, 26.460987, -81.780328, ±4m, 6 May 2021, inaturalist.org/people/elimel, inaturalist.org/observations/77687594; Fort Myers, Parkwoods, 26.567811, -81.881784, ±2m, 3 October 2021, Meg Rousher (inaturalist.org/people/megrousher), inaturalist.org/observations/98395448; Fort Myers,16988–17062 State Road 31, 26.713282, -81.760196, ±82m, 8 September 2017, inaturalist.org/people/spartina, inaturalist.org/observations/7990329; Lehigh Acres, 3101 E 8th St., 26.629445, -81.587083, ±27m, 16 June 2018, inaturalist.org/people/alexiscolbym, inaturalist.org/observations/13508944; Miromar Lakes, 26.484314, -81.788912, ±11m, 10 April 2020, Andrew Durso (inaturalist.org/people/amdurso), inaturalist.org/observations/41856587; Miromar Lakes, 26.47188, -81.762412, 3 May 2020, Mike Kratz (inaturalist.org/people/mike_kratz), inaturalist.org/observations/44810554; Sanibel, 26.439681, -82.037345, ±31m, 9 June 2006, inaturalist.org/people/craigbiegler, inaturalist.org/observations/34077455; Sanibel, Orange Trail, 26.428192, -82.081863, 26 December 2019, Benjamin Burgunder (inaturalist.org/people/benjamin189), inaturalist.org/observations/36976344; Sanibel, W Gulf Drive, 26.428394, -82.102377, ±500m, 30 September 2015, Chuck Sexton (inaturalist.org/people/gcwarbler), inaturalist.org/observations/2104170; Manatee Co.: 27.400345, -82.763261, ±29.73km, December 2021, Ali and Brice (inaturalist.org/people/aliandbrice), inaturalist.org/observations/102723261; 27.509992, -82.67027, 27 May 2022, Sean Patton (inaturalist.org/people/sarasota_manatee_ecoflora_sean), inaturalist.org/observations/119610734; Bradenton, 27.493046, -82.588989, 30 July 2022, inaturalist.org/people/southernnw, inaturalist.org/observations/128594579; Bradenton, 22nd St. W, 27.496227, -82.583884, ±155m, 9 October 2019, inaturalist.org/people/michelleb2654, inaturalist.org/observations/34116140; Bradenton, 444 3rd Ave. W Fshpr., 27.500005, -82.566903, ±4m, 24 June 2018, Andrew Rasmussen (inaturalist.org/people/andrew441), inaturalist.org/observations/16709381; Bradenton, Seventh Ave. W, 27.494162, -82.588888, ±10m, 12 May 2022, Elliot Prout (inaturalist.org/people/elliotprout), inaturalist.org/observations/116698537; Bradenton Beach, Coquina Beach, 27.450941, -82.692365, ±12m, 5 May 2021, Ceallaigh (inaturalist.org/people/ceallaigh99), inaturalist.org/observations/77437328; Lakewood Ranch, 27.440388, -82.43446, ±108.43km, 17 May 2021, Riley Stewart (inaturalist.org/people/riley_stewart), inaturalist.org/observations/81322160; Sun City, [27.678333, -82.478611], 15 September 2009, Michael A. Cruz (bugguide.net/user/view/27935), bugguide.net/node/view/333416, bugguide.net/node/view/333418, bugguide.net/node/view/333420; Marion Co.: Ocala, Bahia Ave., 29.118089, -82.024467, ±9m, 2 May 2020, Noah Frade (inaturalist.org/people/noaboa), inaturalist.org/observations/44600792; Ocala, SW Tenth St., 29.17972, -82.150786, ±22m, 30 June 2022, inaturalist.org/people/mzokan, inaturalist.org/observations/124132999; Martin Co.: Palm City, 27.205242, -80.344092, ±22m, 19 June 2019, A.A. Ohler (inaturalist.org/people/aaohler), inaturalist.org/observations/27300829; Miami-Dade Co.: 25.79388, -80.274258, ±44.74km, 19 March 2018, inaturalist.org/people/elflacomenendez, inaturalist.org/observations/10315277; 25.598595, -80.420723, 19 April 2019, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/22735725; 25.717962, -80.49939, ±4.81km, 25 May 2019, inaturalist.org/people/lisnel, inaturalist.org/observations/25767918; 25.339369, -80.758669, ±27.77km, 13 July 2019, inaturalist.org/people/lisnel, inaturalist.org/observations/28771292; 25.516605, -80.528951, ±29.96km, September 2020, Joshua Anderson (inaturalist.org/people/joshuaanderson1), inaturalist.org/observations/58331837; 25.572825, -80.541816, ±29.96km, April 2021, inaturalist.org/people/mrankinjackson, inaturalist.org/observations/73639497; 25.683674, -80.378315, ±29.94km, June 2021, inaturalist.org/people/coolclouds, inaturalist.org/observations/83550059; 25.430427, -80.416648, ±29.96km, March 2022, Rosario V., inaturalist.org/people/rosariov2, inaturalist.org/observations/108083073; 25.601798, -80.331282, ±29.94km, May 2022, Ruminate Bonilla (inaturalist.org/people/mindfulruminate), inaturalist.org/observations/118347671; Coral Gables, [25.716667, -80.272222], 22 January 2015, Ken Setzer (bugguide.net/user/view/49852), bugguide.net/node/view/1129119; Coral Gables, [25.716667, -80.272222], 22 January 2015, Ken Setzer (bugguide.net/user/view/49852), bugguide.net/node/view/1129119; Coral Gables, 25.665753, -80.278621, ±26m, 11 October 2020, Riley Fortier (inaturalist.org/people/rileyfortierii), inaturalist.org/observations/62333240; [Coral Gables], 25.709631, -80.281095, ±15m, 10 May 2021, Emily Powell (inaturalist.org/people/raindrops), inaturalist.org/observations/78252609; Coral Gables, Coral Gables Section, 25.746281, -80.272961, ±1m, 2 July 2022, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/124504269; Coral Gables, Coral Gables Section, 25.74628, -80.272965, ±1m, 3 July 2022, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/124504268; Coral Gables, Miami Homestead Ave., 25.717867, -80.272103, ±10m, 7 April 2017, inaturalist.org/people/imiguelez05, inaturalist.org/observations/39480622; Coral Terrace, 25.74014, -80.309636, ±15m, 28 May 2021, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/80683800; Coral Terrace, 25.739245, -80.309346, ±23m, 3 June 2021, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/81591772; Cutler Bay, Ridgeland Dr., 25.588647, -80.33912, ±21m, 6 April 2021, inaturalist.org/people/ahlbrandt, inaturalist.org/observations/73160485; Cutler Bay, SW 203rd St., 25.579418, -80.322812, ±1.25km, 2 April 2022, David (inaturalist.org/people/ecovrar), inaturalist.org/observations/110225452; Doral, 25.826649, -80.383329, ±12m, 13 August

2019, Guillermo Azuarte (inaturalist.org/people/guillermoazuarte), inaturalist.org/observations/30767041; Doral, 25.799295, -80.333098, ±31m, 16 May 2016, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/12535051; [Doral], 25.840411, -80.38841, ±48m, 18 May 2018, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/12860579; [Doral], 25.837641, -80.406403, ±25m, 29 August 2020, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/58210383; [Everglades National Park], 25.755279, -80.498896, ±638m, 29 April 2022, inaturalist.org/people/lisnel, inaturalist.org/observations/113773058; [Everglades National Park], 25.39723, -80.636097, ±239m, 11 September 2021, Owen Schneider (inaturalist.org/people/opschneider), inaturalist.org/observations/94515328; [Everglades National Park], 25.760958, -80.497626, ±321m, 26 April 2020, inaturalist.org/people/lisnel, inaturalist.org/observations/44347615; [Everglades National Park], 25.422892, -80.775935, ±8m, 9 December 2019, Kevin Metcalf (inaturalist.org/people/kevinemetcalf), inaturalist.org/observations/36764367; [Everglades National Park], 25.761229, -80.497541, ±237m, 16 February 2019, inaturalist.org/people/lisnel, inaturalist.org/observations/20405454; [Everglades National Park], 25.387528, -80.70752, ±2m, 3 August 2022, Maria Vasquez (inaturalist.org/people/the_hidden_biologist), inaturalist.org/observations/129313457; [Everglades National Park], 25.760031, -80.497541, ±237m, 30 May 2020, inaturalist.org/people/lisnel, inaturalist.org/observations/48042625; [Everglades National Park], 25.753382, -80.497327, ±909m, 30 May 2019, inaturalist.org/people/lisnel, inaturalist.org/observations/26088711; [Everglades National Park], 25.760958, -

80.499258, ±237m, 7 July 2019, inaturalist.org/people/lisnel, inaturalist.org/observations/28387119; [Everglades National Park], 25.761498, -80.498673, ±389m, 17 July 2022, inaturalist.org/people/lisnel, inaturalist.org/observations/127498072; [Everglades National Park, Daniel Beard Research Center], 25.38736, -80.682763, ±2m, 19 May 2022, Maria Vasquez (inaturalist.org/people/the_hidden_biologist), inaturalist.org/observations/117743633; [Everglades National Park, Ernest F. Coe Visitor Center], 25.395575, -80.583744, ±5m, 1 May 2022, Alex Salcedo (inaturalist.org/people/alexsalcedo), inaturalist.org/observations/114365960; Everglades National Park, [Pa-hay-okee Trail], 25.440632, -80.783469, ±12m, 12 May 2017, Riley Pollom (inaturalist.org/people/rileypollom), inaturalist.org/observations/6182847; Everglades National Park, Long Pine Key Nature Trail, [25.4367,-80.7206], 24 October 2021, Jonas Insinga (bugguide.net/user/view/16315), bugguide.net/node/view/2066755; [Everglades National Park, Royal Palms Visitor Center], 25.382053, -80.609495, ±8m, 30 April 2022, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/114535960; Florida City, [25.451389,-80.484444], 15 February 2017, Josh Lincoln (bugguide.net/user/view/71775), bugguide.net/node/view/1350658; Fontainebleau, 25.777362, -80.321383, ±15m, 9 March 2020, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/39819886; Fontainebleau, 25.780221, -80.345491, ±20m, 5 April 2021, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/73082060; Glenvar Heights, 25.699017, -80.312588, 1 May 2022, Ben Machado (inaturalist.org/people/bennypoo), inaturalist.org/observations/115052384; Homestead, 25.43697, -80.553542, ±5m, 27

April 2018, inaturalist.org/people/eel_program, inaturalist.org/observations/11507989; Homestead, [25.468722,-80.477557], in ornamental bush in hotel parking lot at night, 15 July 2018, Brandon Woo (bugguide.net/user/view/42238), bugguide.net/node/view/1561056; Homestead, 37600-37798 SW 207th Ave., 25.414749, -80.525963, 29 January 2018, Joshua Sands (inaturalist.org/people/jcs13), inaturalist.org/observations/9663847; Homestead, Everglades National Park, 25.425795, -80.684525, ±5m, 25 December 2019, Catherine Jones (inaturalist.org/people/rangercatherine), inaturalist.org/observations/37007632; Homestead, Everglades National Park, 25.386842, -80.70848, ±5m, 16 September 2019, Shannon Buttimer (inaturalist.org/people/shannonbuttimer), inaturalist.org/observations/32867999; Homestead, Everglades National Park, 25.393938, -80.689553, ±6m, 29 April 2019, Noah Frade (inaturalist.org/people/noaboa), inaturalist.org/observations/24173024; Homestead, Everglades National Park, 25.76178, -80.764778, 17 July 2021, inaturalist.org/people/scottsuth, inaturalist.org/observations/87468445; [Homestead, Long Pine Key Campground], 25.403682, -80.656452, ±173m, 4 November 2010, Allen Belden (inaturalist.org/people/allenbelden), inaturalist.org/observations/70259737; Homestead, Long Pine Key Campground, 25.397894, -80.656226, 2 December 2016, Judy Gallagher (inaturalist.org/people/judygva), inaturalist.org/observations/4691236; Homestead, Navy Wells Pineland Preserve, 25.439327, -80.506334, ±714m, 15 February 2017, Joshua Lincoln (inaturalist.org/people/joshualincoln), inaturalist.org/observations/5481587; Homestead, Short Key, 25.436838, -80.507864, ±547m, 15 November 2020, inaturalist.org/people/mokperu, inaturalist.org/observations/75380479; Homestead, Seminole Wayside Park, 25.487667, -80.454087, ±4m, 22 April 2022, Noah Frade (inaturalist.org/people/noaboa), inaturalist.org/observations/112406486; Kendale Lakes, 25.690555, -80.412653, ±145m, 1 November 2018, inaturalist.org/people/lisnel, inaturalist.org/observations/18039275; Kendale Lakes, 25.708158, -80.406999, ±3.42km, 26 April 2019, inaturalist.org/people/lisnel, inaturalist.org/observations/23295656; Kendall, 25.693139, -80.370788, ±4m, 1 May 2019, Alex Salcedo (inaturalist.org/people/alexsalcedo), inaturalist.org/observations/33033305; [Kendall], TERRA Environmental Research Institute, 25.69298, -80.370764, ±218m, 13 December 2020, inaturalist.org/people/justin_varela, inaturalist.org/observations/66662796; Key Biscayne, Bill Baggs Cape Florida State Park, 25.676492, -80.155342, ±4m, 13 March 2022, Shane Zigler (inaturalist.org/people/shanezigler), inaturalist.org/observations/108539954; Key Biscayne, Bill Baggs Cape Florida State Park, 25.676363, -80.15538, ±200m, 13 March 2022, inaturalist.org/people/alexmar, inaturalist.org/observations/108532713; Miami, 25.616358, -80.390249, 11 May 2021, Adrian Figueroa (inaturalist.org/people/adrianfigueroa), inaturalist.org/observations/79241636; [Miami], 25.598981, -80.39645, ±207m, 10 September 2021, Shawn (inaturalist.org/people/sauron978), inaturalist.org/observations/94388165; Miami, 25.693991, -80.370786, ±400m, 7 April 2022, inaturalist.org/people/t0257r, inaturalist.org/observations/111143277; Miami, 25.69314, -80.370976, ±5m, 28 April 2022, Alex Salcedo (inaturalist.org/people/alexsalcedo), inaturalist.org/observations/113308940; Miami, 25.693142, -80.369312, 26 May 2022, Sophie (inaturalist.org/people/sg7567), inaturalist.org/observations/118800344; Miami, 25.693165, -80.369289, 31 May 2022, Sophie (inaturalist.org/people/sg7567), inaturalist.org/observations/120265068; Miami, 25.692894, -80.371052, 1 June 2022, Casey Puett (inaturalist.org/people/caseypuett), inaturalist.org/observations/119811943; Miami, 10261 SW 182nd St., 25.600547, -80.357437, ±65m, 26 April 2019, inaturalist.org/people/raquelmartinez, inaturalist.org/observations/21459612; Miami, 14831 SW 148th Street Cir., 25.629137, -80.430878, 18 April 2017, Noah Frade (inaturalist.org/people/noaboa), inaturalist.org/observations/5829779; Miami, 3401 SW 72nd Ave., 25.740708, -80.309889, ±211m, 2 May 2021, inaturalist.org/people/lisnel, inaturalist.org/observations/76673846; Miami, 4949 NE 2nd Ave., 25.820453, -80.188771, ±66m, 6 May 2016, inaturalist.org/people/kberdugo, inaturalist.org/observations/3110309; Miami, 5912–6222 SW 77th Ave., 25.713969, -80.31857, ±7.6km, 4 May 2018, inaturalist.org/people/jharder, inaturalist.org/observations/12137151; Miami, A.D. Barnes Park, 25.73913, -80.310317, ±10m, 29 April 2019, Alyssa Crittenden (inaturalist.org/people/alyssacritters), inaturalist.org/observations/24172133; Miami, A.D. Barnes Park, 25.737417, -80.309261, ±120m, 22 May 2021, Mariam Rodriguez (inaturalist.org/people/mariam_rodriguez), inaturalist.org/observations/79998055; Miami, Biscayne Bay, 25.84938, -80.165026, ±28m, 3 May 2021, Natalie M. (inaturalist.org/people/nasimmb), inaturalist.org/observations/76911993; Miami, Larry and Penny Thompson Park, 25.599922, -80.403503, 2 August 2016, inaturalist.org/people/nicoledominique, inaturalist.org/observations/6861237; Miami, Larry and Penny Thompson Park, 25.60993, -80.392952, ±5m, 26 April 2019, inaturalist.org/people/stinej, inaturalist.org/observations/23128511; Miami, Nixon Smiley

Pineland Preserve, 25.648967, -80.404472, ±5m, 29 April 2022, Brandon Justice (inaturalist.org/people/brandon_justice), inaturalist.org/observations/113489233; Miami, Nixon Smiley Pineland Preserve, 25.651212, -80.4066, ±3m, 20 August 2021, Noah Frade (inaturalist.org/people/noaboa), inaturalist.org/observations/91901028; Miami, Palmetto Lake, 25.627233, -80.352438, ±1.41km, 6 May 2021, Manuel Aguirre-Urreta (inaturalist.org/people/manuel_aguirre_urreta), inaturalist.org/observations/77624966; Miami, SW 102nd Ave., 25.630658, -80.358817, ±12m, 1 September 2021, inaturalist.org/people/helentarrau, inaturalist.org/observations/93464475; Miami, SW106th Ave., 25.734211, -80.367097, ±102m, 8 April 2022, inaturalist.org/people/dainier98, inaturalist.org/observations/110794204; Miami, SW 118th Ct., 25.732662, -80.38672, ±4m, 25 April 2021, Jason Rodriguez (inaturalist.org/people/jason_rod), inaturalist.org/observations/80266109; Miami, SW 124th Ave., 25.60994, -80.392951, ±3m, 26 April 2019, inaturalist.org/people/maggiejarquin, inaturalist.org/observations/23128180; Miami, SW 136th St.,25.639941,-80.44561, ±64m, 30 June 2022, inaturalist.org/people/picasso2001, inaturalist.org/observations/124158082; Miami, SW 152nd St., 25.634372, -80.34011, ±201m, 2 April 2022, Shawn (inaturalist.org/people/sauron978), inaturalist.org/observations/110262928; Miami, SW 199th St., 25.581351, -80.386066, ±1.41km, 30 September 2021, inaturalist.org/people/isacoolsnake, inaturalist.org/observations/96722142; Miami, SW 80th St., 25.693102, -80.369235, ±49m, 23 May 2022, inaturalist.org/people/idunnotm222, inaturalist.org/observations/122374829; Miami, SW 80th St., 25.693178, -80.369355, ±20m, 23 May 2022, inaturalist.org/people/malik_reid, inaturalist.org/observations/118463213; Miami, SW 80th St., 25.693415, -80.369591, ±7m, 7 April 2022, inaturalist.org/people/angelo_moreno55, inaturalist.org/observations/110670819; Miami, SW 80th St., 25.693194, -80.384334, ±5m, 23 June 2021, inaturalist.org/people/ameliagu257, inaturalist.org/observations/84208518; Miami, SW 80th St., 25.693377, -80.368802, ±65m, 28 April 2021, inaturalist.org/people/sebastianhildoer, inaturalist.org/observations/79144292; Miami, SW 80th St., 25.694945, -80.373698, ±993m, 19 April 2021, inaturalist.org/people/shawna123, inaturalist.org/observations/76244643; Miami, SW 84th St., 25.692603, -80.370605, ±10m, 8 June 2022, inaturalist.org/people/lgarriga, inaturalist.org/observations/120832580; Miami, SW 84th St., 25.693022, -80.36992, ±14m, 25 May 2022, inaturalist.org/people/damaryssacasa, inaturalist.org/observations/119239960; Miami, SW 84th St., 25.6929, -80.36998, ±5m, 25 May 2022, inaturalist.org/people/alexsanchezinaturalist, inaturalist.org/observations/118630850; Miami, SW 84th St., 25.692813, -80.369912, ±5m, 15 March 2022, Daniel Diaz (inaturalist.org/people/danieldiaz5), inaturalist.org/observations/108650931; Miami, SW 84th St., 25.692559, -80.370602, ±22m, 5 May 2021, inaturalist.org/people/tomasperez, inaturalist.org/observations/80237427; Miami, SW 84th St., 25.692822, -80.369942, ±65m, 23 April 2021, inaturalist.org/people/isaiahhernandez, inaturalist.org/observations/76656184; Miami, SW 84th St., 25.693192, -80.370187, ±24m, 28 April 2021, inaturalist.org/people/erikamiamigarcia15, inaturalist.org/observations/76687496; Miami, SW 94th St., 25.68379, -80.324803,

±24m, 24 May 2021, Lindsay (inaturalist.org/people/lindsaybm), inaturalist.org/observations/80230811; Miami, Tropical Park, 25.723167, -80.326858, ±7m, 24 April 2019, inaturalist.org/people/alejpalacio, inaturalist.org/observations/69797743; Miami, Tropical Park, 25.725358, -80.3238, ±5m, 30 January 2021, inaturalist.org/people/paulo305, inaturalist.org/observations/68808292; Miami, Vizcaya County Park, 25.744444, -80.210475, ±65m, 6 May 2015, inaturalist.org/people/wendy_viz, inaturalist.org/observations/1460208; Miami, Zoo Miami, 25.60627, -80.400271, ±3.99km, 1 May 2021, inaturalist.org/people/eel_program, inaturalist.org/observations/76150184; Miami, Zoo Miami, 25.61258, -80.400494, ±22m, 30 April 2021, Eli (inaturalist.org/people/eli182), inaturalist.org/observations/75818450; Miami, Zoo Miami, 25.612566, -80.400472, ±9m, 30 April 2021, Lauren Morejon (inaturalist.org/people/lauren_morejon), inaturalist.org/observations/75808263; Miami, Zoo Miami, 25.602992, -80.402833, ±32m, 18 September 2019, inaturalist.org/people/ayaghenai, inaturalist.org/observations/32948779; Miami, 5030 SW 87th Ct., 25.721553, -80.336045, ±1.42km, 2 May 2019, inaturalist.org/people/aliciaxgil, inaturalist.org/observations/24373213; Miami Beach, 25.789986, -80.133781, ±3.86km, 24 January 2010, Paul Celano (inaturalist.org/people/chalupachelano), inaturalist.org/observations/111734403; Nike Missile Base, 25.370552, -80.686406, ±3m, 14 December 2011, John G. Phillips (inaturalist.org/people/johngsalamander), inaturalist.org/observations/15064317; North Miami, 25.910133, -80.137869, 18 April 2017, inaturalist.org/people/esomo003, inaturalist.org/observations/5828683; North Miami, 25.914519, -80.139987, ±5m, 26 April 2019, inaturalist.org/people/briandiaz, inaturalist.org/observations/23189010; North Miami, Oleta River State Park, 25.909825, -80.129683, ±20m, 4 January 2022, Juan de Dios Errazuriz (inaturalist.org/people/juandedioserrazuriz), inaturalist.org/observations/104371481; Olympia Heights, 25.725267, -80.32108, ±15m, 15 April 2019, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/22543977; Olympia Heights, 25.722778, -80.339199, ±3m, 29 October 2019, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/35214728; Olympia Heights, 25.720014, -80.326273, ±4m, 14 March 2021, inaturalist.org/people/nazca, inaturalist.org/observations/71239335; Olympia Heights, 25.725285, -80.321808, 10 June 2022, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/122609030; Olympia Heights, 25.725281, -80.321777, 10 June 2022, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/122609031; Palmetto Bay, 25.615172, -80.328407, ±73m, 24 November 2021, Shawn (inaturalist.org/people/sauron978), inaturalist.org/observations/101864812; Palmetto Bay, 25.62266, -80.341593, ±215m, 22 May 2022, Shawn (inaturalist.org/people/sauron978), inaturalist.org/observations/118154290; Palmetto Bay, SW 152nd St., 25.628881, -80.315697, ±65m, 3 November 2019, Daniel Galindo (inaturalist.org/people/daniel1719), inaturalist.org/observations/35245883; Palmetto Estates, 25.621787, -80.349924, 11 May 2021, Frank Fernandez (inaturalist.org/people/frank_fernandez), inaturalist.org/observations/78319450; Pinecrest, 25.640902, -80.274374, 15 June 2022, inaturalist.org/people/coddoc11, inaturalist.org/observations/121905831; Richmond West, 25.598568, -80.420738, 19 April 2019, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/22735732; South Miami, 5912 SW 63rd St., 25.712071, -80.290065, ±63m, 8 February 2019, inaturalist.org/people/elenaconser, inaturalist.org/observations/20205613; South Miami, 6220 SW 58th St., 25.716453, -80.294572, ±16m, 28 November 2019, inaturalist.org/people/pseudocreobotra, inaturalist.org/observations/36166766; South Miami, Isla Dorada, 25.690722, -80.287893, ±9.26km, 28 June 2020, inaturalist.org/people/lucasmeep, inaturalist.org/observations/51255706; Sunset, 25.696493, -80.349423, ±2m, 30 April 2018, Raul Urgelles (inaturalist.org/people/rockjetty), inaturalist.org/observations/11952496; The Hammocks, 25.662352, -80.458832, ±297m, 16 May 2016, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/12162704; Three Lakes, 25.63447, -80.400149, ±20m, 14 January 2018, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/9514601; Three Lakes, Deerwood, 25.629691, -80.390043, ±32m, 2 January 2021, Alex Salcedo (inaturalist.org/people/alexsalcedo), inaturalist.org/observations/67469372; Three Lakes, Deerwood, 25.629581, -80.390166, ±2m, 21 February 2021, Alex Salcedo (inaturalist.org/people/alexsalcedo), inaturalist.org/observations/70144422; Three Lakes, Deerwood, 25.629599, -80.390026, ±2m, 26 June 2022, Alex Salcedo (inaturalist.org/people/alexsalcedo), inaturalist.org/observations/123633410; Three Lakes, Deerwood, 25.629497, -80.390143, ±4m, 30 July 2022, Alex Salcedo (inaturalist.org/people/alexsalcedo), inaturalist.org/observations/128643088; West End, 25.636451, -80.415977, ±209m, 11 June 2022, Shawn (inaturalist.org/people/sauron978), inaturalist.org/observations/121310430; [West End], 25.750753, -80.45191, ±4m, 15

June 2017, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/6692579; West Kendall, 14752 SW 66th Ter., 25.704442, -80.431463, ±10m, 15 May 2019, Maybel Avila (inaturalist.org/people/maybelavila), inaturalist.org/observations/25195167; Westchester, SW 87 Ave. & SW 32 St., 25.741179, -80.335082, ±349m, 7 May 2020, Ryan Garcia (inaturalist.org/people/ryangarcia), inaturalist.org/observations/55382997; Westwood Lake, Royal Palm Elementary School, 25.72952, -80.37731, ±10m, 13 August 2019, Maria Elena Garcia (inaturalist.org/people/maria856), inaturalist.org/observations/30756285; Monroe Co.: 25.060052, -80.858637, ±30km, October 2021, inaturalist.org/people/lillybyrd, inaturalist.org/observations/99948937; [Bahia Honda Key], 24.661251, -81.27059, ±8m, 14 June 2022, Ryan Fessenden (inaturalist.org/people/fezzgator67), inaturalist.org/observations/122099580; [Big Cypress National Preserve, Mitchell Landing], 25.755538, -80.929133, ±4m, 2 July 2021, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/85617804; [Big Cypress National Preserve, Mitchell Landing], 25.754248, -80.926638, ±70m, 21 April 2022, Logan Crees (inaturalist.org/people/logancrees), inaturalist.org/observations/116784251; Big Pine Key, [24.67,-81.353889], on leaves of a nickerbean [*Guilandina* sp.], 24 February 2010, Jon Sund (bugguide.net/user/view/32853), bugguide.net/node/view/373204; Big Pine Key, 24.709538, -81.382463, 22 November 2020, Steve Collins (inaturalist.org/people/stevecollins), inaturalist.org/observations/65704712; Big Pine Key, 24.679423, -81.355983, ±421m, 30 December 2020, Thomas Irvine (inaturalist.org/people/thomasirvine), inaturalist.org/observations/67337094; Big Pine

Key, 36850 Overseas Hwy., 24.659744, -81.274398, ±202m, 2 December 2019, Judy Gallagher (inaturalist.org/people/judygva), inaturalist.org/observations/36425613; Big Pine Key, 36850 Overseas Hwy., 24.659785, -81.274402, ±202m, 29 May 2020, Terry Raum (inaturalist.org/people/tjraum), inaturalist.org/observations/47909734; Big Pine Key, Bahia Honda State Park Concession, 24.654812, -81.280655, ±5m, 9 October 2021, Sara Burgoa (inaturalist.org/people/sara_lena), inaturalist.org/observations/97702966; Big Pine Key, Bahia Honda State Park Concession, 24.654963, -81.281197, ±6m, 15 October 2021, Judd Patterson (inaturalist.org/people/juddpatterson), inaturalist.org/observations/98378476; Big Pine Key, Bahia Honda State Park Concession, 24.661368, -81.27288, ±887m, 6 November 2021, inaturalist.org/people/lozo, inaturalist.org/observations/100426377, inaturalist.org/observations/100426474; Big Pine Key, National Key Deer Refuge, 24.698608, -81.320596, ±65m, 12 May 2019, inaturalist.org/people/buttonwoodbob, inaturalist.org/observations/25017322; Everglades National Park, 25.1375, -80.937532, ±23m, 27 April 2015, Clarence Holmes (inaturalist.org/people/cholmesphoto), inaturalist.org/observations/26325188; [Flamingo], 25.137356, -80.931614, ±2.12km, 27 May 2022, John Jackson (inaturalist.org/people/shabrobtilus), inaturalist.org/observations/119958602; Key Haven, 24.579164, -81.735261, ±92m, 15 December 2020, Christopher Malcosky (inaturalist.org/people/christophermalcosky), inaturalist.org/observations/66619250; Key Largo, 25.12482, -80.41291, ±139m, 5 May 2020, inaturalist.org/people/lt422, inaturalist.org/observations/45014781; Key Largo, 25.178697, -80.364472, ±4m, 19 March 2022, David Jeffrey Ringer (inaturalist.org/people/djringer), inaturalist.org/observations/108980873; Key Largo, 10750 County Rd. 905, 25.191898, -80.356481, ±205m, 2 December 2021, Judy Gallagher (inaturalist.org/people/judygva), inaturalist.org/observations/102530435; Key Largo, 107801 Overseas Hwy., 25.152834, -80.387398, 20 April 2018, Joshua Sands, inaturalist.org/people/jcs13, inaturalist.org/observations/11218053; Key West, 24.549813, -81.797374, ±15m, on native necklace pod, *Sophora tomentosa* var. *truncata*, 29 January 2021, inaturalist.org/people/michellemularz, inaturalist.org/observations/68769161; Key West, 24.562386, -81.813683, ±65m, 28 July 2021, inaturalist.org/people/moth_moe, inaturalist.org/observations/88943938; Key West, Key West Tropical Forest and Botanical Gardens, [24.57374,-81.74931], 4 August 2017, Melanie Long (bugguide.net/user/view/123036), bugguide.net/node/view/1422800; Key West National Wildlife Refuge, 24.532687, -82.009019, ±15m, 2 August 2018, inaturalist.org/people/swamphiker, inaturalist.org/observations/22158844; Long Key, Long Key State Park, 24.812783, -80.822128, ±74m, 13 November 2020, Miles Rohrer (inaturalist.org/people/miles_rohrer), inaturalist.org/observations/64829203; Marathon, 24.718023, -81.07478, 26 February 2019, Daniel Onea (inaturalist.org/people/dalien), inaturalist.org/observations/20935567; North Key Largo, 25.26194, -80.310616, ±3m, 12 April 2019, Joe MDO (inaturalist.org/people/joemdo), inaturalist.org/observations/22400104; North Key Largo, 25.22669, -80.332886, 9 July 2019, Joshua Sands (inaturalist.org/people/jcs13), inaturalist.org/observations/28558071; North Key Largo, 25.191741, -80.356526, ±15m, 23 January 2020, Judy Gallagher (inaturalist.org/people/judygva), inaturalist.org/observations/37903772; North Key Largo, 25.192052, -80.356538, 24 April 2020, Joshua Sands (inaturalist.org/people/jcs13), inaturalist.org/observations/43234878; [West Summerland

Key, Camp Jackson Sawyer], 24.648281, -81.312119, ±8m, 4 March 2022, Josiah Londeree (inaturalist.org/people/gatorhawk), inaturalist.org/observations/108142548; Orange Co.: Bay Lake, 28.384323, -81.488655, 27 June 2019, inaturalist.org/people/zoology123, inaturalist.org/observations/27763769; Bay Lake, 28.375422, -81.501953, 27 June 2019, inaturalist.org/people/zoology123, inaturalist.org/observations/27766690; Bay Lake, 28.384466, -81.488693, 24 June 2019, inaturalist.org/people/zoology123, inaturalist.org/observations/27628644; Bay Lake, Epcot, 28.368365, -81.547305, ±4m, 30 April 2021, Amanda SeRine (inaturalist.org/people/penny_rabbit), inaturalist.org/observations/75834265; Golden Oak, 28.400249, -81.4935, 22 June 2019, inaturalist.org/people/zoology123, inaturalist.org/observations/27457437; Orlando, 28.572012, -81.33086, 30 August 2021, Sean Rapp (inaturalist.org/people/shintoo), inaturalist.org/observations/93034863; Orlando, 28.571831, -81.3305, 31 May 2021, Sean Rapp (inaturalist.org/people/shintoo), inaturalist.org/observations/81092230; Orlando, 28.6, -81.220001, ±90m, 25 May 2021, inaturalist.org/people/sarafrenzy, inaturalist.org/observations/80294885; Orlando, The Florida Mall, 28.446755, -81.399667, ±4m, 28 October 2020, Seabird McKeon (inaturalist.org/people/sea), inaturalist.org/observations/66414076; Orlando, Lake Baldwin, 28.576502, -81.324617, ±702m, 4 August 2020, inaturalist.org/people/seanhipps, inaturalist.org/observations/55383475; [Orlando, Sheraton Vistana Resort Villas], 28.384897, -81.479543, ±4m, 3 July 2022, inaturalist.org/people/averagewalrus, inaturalist.org/observations/124680633; [Orlando, Sheraton Vistana Resort Villas], 28.384441, -81.479234, ±4m, 2 July 2022, inaturalist.org/people/averagewalrus, inaturalist.org/observations/124504022; [Orlando, Sheraton Vistana Resort Villas], 28.384625, -81.479216, ±4m, 1 July 2022, inaturalist.org/people/averagewalrus, inaturalist.org/observations/124346922; Winter Park, Winter Park Village, 28.600617, -81.364805, ±9m, 23 June 2022, Kaley Kirk (inaturalist.org/people/kaleykirk), inaturalist.org/observations/123091006; Palm Beach Co.: 26.995238, -80.08089, ±29.8km, December 2019, Cody Jackson (inaturalist.org/people/codyjackson), inaturalist.org/observations/36828551; Boca Raton, 26.412738, -80.094155, 21 December 2019, Daniil Davydoff (inaturalist.org/people/vozrozhd), inaturalist.org/observations/36923578; Boca Raton, 26.412463, -80.09387, 17 November 2019, Jay L. Keller (inaturalist.org/people/jaykeller), inaturalist.org/observations/36575590; Delray Beach, 26.470478, -80.080542, 27 February 2020, John Abrams (inaturalist.org/people/john_abrams), inaturalist.org/observations/39303263; Delray Beach, Ventnor Ave., 26.445852, -80.073574, ±65m, 16 May 2020, Lauren Azar (inaturalist.org/people/lauren272), inaturalist.org/observations/46131973; Pasco Co.: 28.268761, -82.491706, ±29.63km, October 2020, inaturalist.org/people/stewarsc, inaturalist.org/observations/63651095; 28.166962,-82.492854, ±29.66km, May 2022, inaturalist.org/people/choksi_r_5, inaturalist.org/observations/123176978; Land O' Lakes, Asbel Estates, 28.299029, -82.503664, ±435m, 15 October 2020, inaturalist.org/people/stewarsc, inaturalist.org/observations/63652815; Trinity, 28.203643, -82.659919, 31 October 2020, Perry Bonjernoor (inaturalist.org/people/lizarddaddy), inaturalist.org/observations/69415545; Yamato Scrub Natural Area, [26.4092, -80.0973], 21 April 2014, Richard Crook (bugguide.net/user/view/54218), bugguide.net/node/view/911658; Zephyrhills, 28.190607, -82.340151, ±4.96km, 3 August 2021, Nikki Paulat (inaturalist.org/people/nikki19), inaturalist.org/observations/98349511; Pinellas Co.: 28.110077, -82.644227, ±29.66km, April 2021, Brianna Steward (inaturalist.org/people/karamatsu), inaturalist.org/observations/74909413; 27.935888, -82.617787, ±29.68km, October 2021, inaturalist.org/people/squidpastry, inaturalist.org/observations/99551056; Bay Pines, 27.812351, -82.780198, 25 June 2021, Michael John Sauer Jr. (inaturalist.org/people/michael2357), inaturalist.org/observations/84487939; Belleair Beach, 27.919764, -82.842072, 11 August 2020, inaturalist.org/people/chris_cline, inaturalist.org/observations/57705051; Boyd Hill Nature Park, [27.733, -82.658], 12 February 2007, Tom Bentley (bugguide.net/user/view/125), bugguide.net/node/view/95410; Clearwater, 27.95635, -82.748565, 22 May 2009, Joseph Connors (inaturalist.org/people/jciv), inaturalist.org/observations/8772130; Clearwater, 27.960339, -82.746513, ±65m, 14 April 2021, inaturalist.org/people/floridamatt, inaturalist.org/observations/74001469; Clearwater, 27.9822, -82.729156, ±46m, 17 June 2022, Jonathan (inaturalist.org/people/capt_jonmorgan), inaturalist.org/observations/122237935; [Clearwater], 29769 Seacol Street, 28.044083, -82.735915, ±191m, 7 March 2022, Danielle Parrott (inaturalist.org/people/danielleparrott), inaturalist.org/observations/108125713; Clearwater, Cypress Point Shopping Center, 28.008447,-82.728875, ±65m, 13 April 2020, Clare Guthrie (inaturalist.org/people/clareguthrie), inaturalist.org/observations/42086334; Clearwater, Firestone Dr., 28.03465, -82.728997, ±5m, 30 May 2022, inaturalist.org/people/markoctilly, inaturalist.org/observations/122257919; Clearwater, Macdonald Dr., 27.966499, -82.705285, ±21m, 26 April 2020, inaturalist.org/people/dulong19, inaturalist.org/observations/43722192; Clearwater, Pinewood Drive, 27.947531, -82.77096, ±440m, 11 July 2022, inaturalist.org/people/jstevenson67, inaturalist.org/observations/125815280; Clearwater Beach, 210 Dolphin Point, 27.980522, -82.819967, ±688m, 16 June 2017, Bridgette Maynard (inaturalist.org/people/bridgette3), inaturalist.org/observations/6686211; Gulfport, [27.750556, -82.708611], on Wild Poinsettia[*Euphorbia heterophylla* L.] no citrus trees in the vicinity, 29 March 2008, bugguide.net/user/view/13874, bugguide.net/node/view/174725, bugguide.net/node/view/174726; Gulfport, [27.750556, -82.708611], 20 June 2019, Patrick Murray (bugguide.net/user/view/86658), bugguide.net/node/view/1689157; Gulfport, 27.741225, -82.706956, 26 May 2020, Alison Northup (inaturalist.org/people/alisonnorthup), inaturalist.org/observations/47747130; Gulfport, 27.741194, -82.706996, ±21m, 26 May 2020, Robby Deans (inaturalist.org/people/hydaticus), inaturalist.org/observations/48340509; Largo, Hetrick Cir. E., 27.867978, -82.832955, ±6m, 16 May 2021, Lewis Marjorie P. (inaturalist.org/people/lewis_marjorie_p_), inaturalist.org/observations/79013575; Palm Harbor, 28.057095, -82.759137, ±8m, 11 May 2020, inaturalist.org/people/obrow, inaturalist.org/observations/45560061; Palm Harbor, 28.111213, -82.75665, ±14m, 13 June 2021, inaturalist.org/people/tmandalios, inaturalist.org/observations/83158448; Pinellas Park, 6361 Elmhurst Dr., 27.874375, -82.724455, ±128m, 17 May 2019, Josh Rae (inaturalist.org/people/jwrae), inaturalist.org/observations/25261022; Pinellas Park, 58th Ave. N, 27.82491, -82.710764, ±651m, 4 May 2020, inaturalist.org/people/libertatemnatura, inaturalist.org/observations/44910332; Seminole, St. Petersburg College—Seminole Campus, 27.857563, -82.798155, 23 May 2019, A. Eryn Mitchell (inaturalist.org/people/eryn_mitchell), inaturalist.org/observations/38066414; [Seminole, Boca Ciega Ridge], 27.844642, -82.811908, ±9m, 31 July 2015, Bret Gardner (inaturalist.org/people/bret3), inaturalist.org/observations/1830578; Seminole, Tom Stuart Cswy.,27.812455, -82.787383, ±4m, 5 August 2022, A. Eryn Mitchell (inaturalist.org/people/eryn_mitchell), inaturalist.org/observations/129546144; South Pasadena, S Shore Dr. S, 27.745355, -82.733672, ±16m, 24 May 2020, Jo Robinson Childers (inaturalist.org/people/jo111), inaturalist.org/observations/47160882; [St. Pete Beach], Corey Avenue, 27.742114, -82.749991, ±200m, 5 December 2020,Chloe (inaturalist.org/people/obnoxious_osprey), inaturalist.org/observations/66147446; St. Petersburg, [27.773056, -82.64], on sea grapes [*Cocoloba uvifera* (L.) L.] at night, 4 April 2008 (bugguide.net/user/view/13873), bugguide.net/node/view/175475; St. Pete[ersburg], [27.773056, -82.64], 28 May 2008, Matt Edmonds (bugguide.net/user/view/8023), bugguide.net/node/view/185845, bugguide.net/node/view/185846, bugguide.net/node/view/185847; Saint Petersburg, 27.780239, -82.633241, ±65m, 12 July 2020, inaturalist.org/people/laszarus, inaturalist.org/observations/52745767; St. Petersburg, 27.767601, -82.640291, ±18.99km, 29 April 2022, inaturalist.org/people/bpauls, inaturalist.org/observations/113760077; [St. Petersburg], 27.769936, -82.690381, ±33m, 13 May 2020, inaturalist.org/people/coltonhomeschool, inaturalist.org/observations/45820870; Saint Petersburg, 1346 17th Ter. N, 27.78837, -82.652755, ±19m, 10 August 2019, Tad (inaturalist.org/people/tnaquin09), inaturalist.org/observations/30567856; Saint

Petersburg, 36th Terr. N, 27.805128, -82.651078, ±30m, 3 October 2021, inaturalist.org/people/ilovebugssomuch, inaturalist.org/observations/97103589; Saint Petersburg, 4530 43rd St. S, 27.727087, -82.689003, ±10m, 29 April 2018, Will Engleby (inaturalist.org/people/all_my_little_boots), inaturalist.org/observations/12470244; Saint Petersburg, Duval Cir., 27.817066, -82.689342, ±5m, 22 February 2021, inaturalist.org/people/eemag, inaturalist.org/observations/69990411; Saint Petersburg, Duval Cir., 27.817024, -82.689326, ±4m, 22 February 2021, Claire Herzog (inaturalist.org/people/ceherzog), inaturalist.org/observations/69990929; Saint Petersburg, Fourth St. N, 27.812725, -82.638472, ±65m, 22 August 2021, Jeanine B. (inaturalist.org/people/jeanineb1), inaturalist.org/observations/92174804; St. Petersburg, Lakewood Estates, 27.730183, -82.654473, ±488m, 19 September 2021, Daedo Baggins (inaturalist.org/people/daedobaggins), inaturalist.org/observations/95460664; Saint Petersburg, Ninth Ave. N, 27.7811, -82.684117, ±357m, 22 September 2020, Karla 'Koala' Alvarado (inaturalist.org/people/kalvaraceae), inaturalist.org/observations/60454702; Saint Petersburg, Pinellas Trail, 27.809222, -82.751749, ±22m, 18 June 2021, inaturalist.org/people/rewild2thrive, inaturalist.org/observations/83563293;Saint Petersburg, Stonesthrow Cir. N, 27.788523, -82.735646, ±24m, 31 March 2022, Steven (inaturalist.org/people/theluckyn00b), inaturalist.org/observations/110014540; Saint Petersburg, Stonesthrow Cir. N, 27.78825, -82.735389, ±24m, 10 May 2022, Steven (inaturalist.org/people/theluckyn00b0, inaturalist.org/observations/118630810; Saint Petersburg, The Dog Bar, 27.770937, -82.664642, ±12m, 12 August 2020, inaturalist.org/people/carlirae, inaturalist.org/observations/56593484; Saint Petersburg, The University of South Florida, 27.760975, -82.633658, ±66m, 27 August 2021, Austin Smith (inaturalist.org/people/austinsmith), inaturalist.org/observations/95951977; Saint Petersburg, Weedon Island State Preserve, 27.844332, -82.611563, ±10m, 23 October 2019, inaturalist.org/people/billiemealey, inaturalist.org/observations/34789135; St. Petersburg, 4601 Dr. M.L.K. Jr. St. N, 27.814164, -82.646576, ±9m, 13 April 2019, inaturalist.org/people/merli95, inaturalist.org/observations/22446006; St. Petersburg, 4601 Dr. M.L.K. Jr. St. N, 27.813975, -82.646587, ±8m, 18 April 2019, inaturalist.org/people/merli95, inaturalist.org/observations/22646205; St. Petersburg, 5101 1st St. NE, 27.819259, -82.632658, ±50m, 9 May 2019, Danielle Parrott (inaturalist.org/people/danielleparrott), inaturalist.org/observations/24969390; St. Petersburg, 800 Jennings Ave. N, 27.804876,-82.645992, ±5m, 25 August 2018, inaturalist.org/people/merli95, inaturalist.org/observations/15884317; St. Petersburg, 875-899 46th Ave. N, 27.814003, -82.646448, ±9m, 28 March 2018, inaturalist.org/people/merli95, inaturalist.org/observations/10481209; St. Petersburg, Bayview, 27.739592, -82.694458, ±10m, 23 June 2021, inaturalist.org/people/skapura_f_018, inaturalist.org/observations/84394332; St. Petersburg, Dr. Martin Luther King Jr. St. N + 46th Ave. N, 27.814164, -82.646355, ±8m, 26 April 2021, inaturalist.org/people/merli95, inaturalist.org/observations/75369866; St. Petersburg, Dr. Martin Luther King Jr. St. N + 46th Ave. N, 27.814156, -82.646396, ±8m, 1 June 2020, inaturalist.org/people/merli95, inaturalist.org/observations/48085099; St. Petersburg, Dr. Martin Luther King Jr. St. N + 46th Ave. N, 27.813964, -82.646449, ±4m, 10 April 2020, inaturalist.org/people/merli95, inaturalist.org/observations/41882143; St. Petersburg, Historic Old Northeast, 27.782529,

-82.632195, ±6m, 29 September 2020, Joseph Duff (inaturalist.org/people/josephduff), inaturalist.org/observations/61274731; Tarpon Springs, 28.14612, -82.756768, ±4.82km, 6 May 2022, inaturalist.org/people/eligreenheart, inaturalist.org/observations/116553539; Tarpon Springs, Ada St., 28.150557, -82.757881, ±41m, 8 May 2021, Anthony Sousa (inaturalist.org/people/kayakant), inaturalist.org/observations/77948692; Treasure Island, 27.7736, -82.772263, ±35m, 9 November 2021, inaturalist.org/people/cowdog, inaturalist.org/observations/100700218; Treasure Island, 27.769194, -82.768991, ±3.36km, 3 April 2021, Chloe (inaturalist.org/people/obnoxious_osprey), inaturalist.org/observations/72893847; Polk Co.: Babson Park, 1001-1399 Hollister Rd., 27.81417, -81.547785, ±200m, 22 July 2021, Tom Palmer (inaturalist.org/people/tpalmer), inaturalist.org/observations/88249914; Inwood, 28.036965, -81.765079, ±2.22km, 29 July 2021, Tom Palmer (inaturalist.org/people/tpalmer), inaturalist.org/observations/89145520; Mulberry, 403 NW 5th Ave., 27.897738, -81.977562, ±16m, 11 August 2017, inaturalist.org/people/keifere, inaturalist.org/observations/21097726; Sarasota Co.: 27.328814, -82.460105, ±29.75km, July 2022, inaturalist.org/people/f0ssilized, inaturalist.org/observations/127292546; Longboat Key, [27.396944, -82.644722], 8 December 2021, Brice C. (bugguide.net/user/view/140880), bugguide.net/node/view/2069574, bugguide.net/node/view/2069575, bugguide.net/node/view/2069576; Longboat Key, 27.334448, -82.583628, ±132m, 7 April 2021, inaturalist.org/people/chaseyb, inaturalist.org/observations/73198971; Osprey, Casey Key, 27.192271, -82.503335, ±381m, 9 June 2021, inaturalist.org/people/leeamos, inaturalist.org/observations/82291591; Sarasota, 27.274054, -82.481133, ±61m, 7 July 2022, Brandon (inaturalist.org/people/bnclay96), inaturalist.org/observations/125253643; Sarasota, 3136 Jennings Dr., 27.299656, -82.507118, ±48m, 23 April 2021, Mike Ostrowski (inaturalist.org/people/mpoinat), inaturalist.org/observations/75217507; Sarasota, Fruitville Rd., 27.336412, -82.463093, ±5m, 25 May 2022, inaturalist.org/people/jesmeister, inaturalist.org/observations/118693682; Sarasota, Indian Beach/Sapphire Shores, 27.385217, -82.563447, ±5m, 24 August 2021, inaturalist.org/people/katieherbert, inaturalist.org/observations/93077053; Sarasota, N Tamiami Trail, 27.391803, -82.562662, ±28m, 13 April 2022, inaturalist.org/people/rubyintherough, inaturalist.org/observations/111301732; Sarasota, New College of Florida, 27.384453, -82.55503, ±9m, 29 April 2022, Cas Alexander (inaturalist.org/people/mossybonez), inaturalist.org/observations/113686894; Sarasota, New College of Florida, 27.385183, -82.557388, ±4m, 20 April 2022, Cas Alexander (inaturalist.org/people/mossybonez), inaturalist.org/observations/112166288; Sarasota, New College of Florida, 27.385195, -82.557433, ±3m, 20 April 2022, Cas Alexander (inaturalist.org/people/mossybonez), inaturalist.org/observations/112187251; Sarasota, New College of Florida, 27.385205, -82.557367, ±3m, 5 April 2022, Cas Alexander (inaturalist.org/people/mossybonez), inaturalist.org/observations/110537122; Sarasota, New College of Florida, 27.385108, -82.55748, ±4m, 5 April 2022, Cas Alexander (inaturalist.org/people/mossybonez), inaturalist.org/observations/109879419; Sarasota, New College of Florida, 27.385402, -82.56449, ±327m, 4 July 2021, inaturalist.org/people/claireayer, inaturalist.org/observations/86108255; Sarasota, New College of Florida, 27.383876, -82.555467, ±65m, 28 March 2021, inaturalist.org/people/claireayer, inaturalist.org/observations/72313496; Sarasota, New College of Florida, 27.385378, -82.558463, ±5m, 28 April 2019, Natali Shafer (inaturalist.org/people/natshaf), inaturalist.org/observations/23778703; Sarasota, Sarasota Commons, 27.34439, -82.50011, ±24m, 26 May 2017, inaturalist.org/people/dgracemartin, inaturalist.org/observations/31028642; Sarasota, Siesta Beach Park, 27.26528, -82.548059, ±36m, 31 December 2021, inaturalist.org/people/akt2, inaturalist.org/observations/104049344; Sarasota, Siesta Key, 27.258203, -82.538392, ±10m, 13 June 2020, David Dettinburn (inaturalist.org/people/david707), inaturalist.org/observations/49495537; Sarasota, The Ringling, 27.381117, -82.561683, ±65m, 9 September 2021, inaturalist.org/people/painted_bunting, inaturalist.org/observations/94230589; Sarasota, Tyrone Ln., 27.303388, -82.508133, ±23m, 29 May 2021, inaturalist.org/people/alibird1, inaturalist.org/observations/80742467; Sarasota, US 41/College Dr. (New College), 27.385332, -82.558565, ±8m, 2 September 2021, inaturalist.org/people/crazyeyes3, inaturalist.org/observations/93374752; South Sarasota, 27.295981, -82.52775, ±51m, 5 May 2020, Sean Patton (inaturalist.org/people/sarasota_manatee_ecoflora_sean), inaturalist.org/observations/44974592; Southgate, S Tuttle Ave. @ Tangelo Dr., 27.30978, -82.514112, ±307m, 27 July 2022, inaturalist.org/people/rhettmva, inaturalist.org/observations/128234991; Turtle Beach, 27.21867, -82.517537, ±5m, 11 November 2018, Nick Cropper (inaturalist.org/people/croppernicus), inaturalist.org/observations/18330189; Vamo, 27.230086, -82.495539, 31 October 2021, Arthur Fleiss (inaturalist.org/people/arthurfleiss), inaturalist.org/observations/99877173; Venice, 1 Indian Ave., 27.092966, -82.441869, ±5m, 25 May 2017, Laura Rodriguez (inaturalist.org/people/laura231), inaturalist.org/observations/6356836; St. Lucie Co.: Fort Pierce, [27.438889,-80.335556], 2006, Sean McCann (bugguide.net/user/view/2098), bugguide.net/node/view/47148; Volusia Co.: Holly Hill, [29.243889, -81.046389], 15 August 2009, Paul (bugguide.net/user/view/28625), bugguide.net/node/view/320507, bugguide.net/node/view/320508; Holly Hill, Centennial Park, [29.2417, -81.043], 11 August 2009, Paul (bugguide.net/user/view/28625), bugguide.net/node/view/318717, bugguide.net/node/view/318718, bugguide.net/node/view/318719; **Georgia:** Chatham Co.: Chatham, 31.978383, -81.130631, ±12m, 7 July 2020, John C. (inaturalist.org/people/casseljs), inaturalist.org/observations/57555283; **Texas:** Brazos Co.: College Station, Texas A&M University, 30.61116, -96.347297, ±65m, 19 October 2020, inaturalist.org/people/jamesraphaelsc, inaturalist.org/observations/63030238.

Other specimens show a reasonably large amount of variation in size, pronotal scale pattern, rostral carina structure, and scale coloration. The following specimens do not match well to the original description, but—for lack of reliable characters with which to distinguish them besides the lack of a notable pale stripe of scales on the pronotum—seem to represent variation within this species and are treated here as such.

100 other atypical specimens examined: Bahamas: North Andros: Maidenhair Coppice: 1 female, “BAHAMAS: Andros Is. Maidenhair Coppice 11-VI-2004 M.C. Thomas BLT”, FSCA, ARTSYS0007811.

<u>Canada</u>: Quebec: <u>Glenfarne (near Kazabazua):</u> 1 male, “Glenfarne, Que. H.H.J. Nesbitt 18-VIII-57.”, CMNC, ARTSYS0007812.

<u>Cuba</u>: 1 female, “♀ | Antilles Cuba | Fry Coll. 1905.100. | B.C.A.,Col.,IV.pt.3. Pachnaeus litus, Germ. | Sp. figured”, NHMUK, ARTSYS0007826; **Artemisa Province:** <u>Alquizar:</u> 1 male, “Alquizar Cuba. 6-10-27 | T. P. R. F. Ent.No.3056 | At light | L. Scaramuzza Collector | Pachnaeus azurescens Sch.”, MCZ, [MCZ-ENT 00]529386; 1 female, “Alquizar Cuba. 6-10-27 | T. P. R. F. Ent.No.3056 | At light | L. Scaramuzza Collector”, MCZ, [MCZ-ENT 00]529357; **Camagüey Province:** <u>Hoyo de Bonet:</u> 1 female, “CUBA: Camaguey near Cubitas, Hoyo de Bonet 97m, 21.59166 -77.78822, IV.2012, CarBio Team, CU-20”, CMNC, WWD019090 / ARTSYS0007820; <u>Jaronu:</u> 1 female, “Jaronú [5?]-10-26 col. [10?]773.”, MCZ, [MCZ-ENT 00]529354; 1 female, “Central Jaronú Cuba V-5-30 | Weeds & grasses | L.C. Scaramuzza Collector”, [MCZ-ENT 00]529491, MCZ; 3 female, “Central Jaronú Cuba V-12-30 | Taken on Citrus | L.C. Scaramuzza Collector”, MCZ, [MCZ-ENT 00]529493, [MCZ-ENT 00]529494, [MCZ-ENT 00]529495; **Ciego de Avila Province:** <u>Baraguá:</u> 1 male, “Baraguá, Cuba VI-21-26 | At light | L. C. Scarramuza Collector | Pachnaeus azurescens USNM Sch.”, MCZ, [MCZ-ENT 00]529352; 1 female, “Baragua, Camaguey Cuba VI-18 1932 Bates and Fairchild”, MCZ, [MCZ-ENT 00]529475; **Cienfuegos Province:** <u>Cayamas:</u> 1 female, “Cayamas Cuba,Baker”, MZLU, ARTSYS0007821; 1 female, “Cayamas Cuba,Baker | MUSEUM PARIS P.Serre 1907 | Pachnaeus litus Germ”, MNHN, ARTSYS0007822; 1 female, 2 male,“Cayamas Cuba,Baker | MUSEUM PARIS P.Serre 1907”, MNHN, ARTSYS0007823, ARTSYS0007824, ARTSYS0007825; <u>Cuatro Vientos:</u> 1 female, 1 male, “CUBA: Cienfuegos: Cuatro Vientos, 2.5km S. to Hotel Serrano, Rio Cabagan

N21.93123, W80.08461, 651m,20 May 2013 G. Zhang [CB_L24] [sic including brackets] | [red label] Photo taken | sp 26”, ASUHIC, ASUHIC0033681, ASUHIC0033685; 1 female, 1 male, “CUBA: Cienfuegos: Cuatro Vientos, 2.5km S. to Hotel Serrano, Rio Cabagan N21.93123, W80.08461, 651m,20 May 2013 G. Zhang [CB_L24] [sic including brackets] | sp 26”, ASUHIC, ASUHIC0033683, ASUHIC0033684; 2.5 km East of Mayarí: 1 male, “CUBA: Cienfuegos: Mayari, 2.5 km E. N21°58’15.56” W80°07’05.81” 860m, 18 May 2013 G. Zhang [CB13_L20] [sic including brackets] | [red label] Photo taken | [light blue label] DNA | EXTRC sp24”, ASUHIC, ASUHIC0033641; 1 female, “CUBA: Cienfuegos Prov. Res. Ecológica Pico San Juan 21.97083° N, 80.11859°W 856 m; MV lights; forest edge 18-V-2013; A.B.T.Smith, A.Deler-Hernández”, CMNC, ARTSYS0007780; 1 male, “CUBA: Cienfuegos Mayari, 1 km E. 21.97114 -80.12172, 866m 18.v.2013, F. Cala Riquelme beating”, CMNC, WWD0111332 / ARTSYS0007813; 1 male, “CUBA: Cienfuegos Mayari, 1.5 km E. 21.97100 -80.11644, 866m 18.v.2013, R.Anderson 2013-020X, hand collections”, CMNC, WWD0100848 / ARTSYS0007814; 1 female, “CUBA: Cienfuegos Rio Cabagan 1.5 km E. 21.93123 -80.08461, 651m 20.v.2013, R.Anderson 2013-026X, hand collections”, CMNC, WWD0101970 / ARTSYS0007815; Pepito Tey (= “Soledad”): 1 female, “Soledad, Cuba 1-VI 1925 Geo.Salt”, MCZ, [MCZ-ENT 00]529463; 1 male, “Soledad, Cuba 4-8 1925 Geo.Salt”, MCZ, [MCZ-ENT 00]529462; 1 female, “Soledad, Cuba 7-VII 1925 Geo.Salt | Pres. by. Imp.Bur.Ent. Brit.Mus 1928-166. | Pachnaeus litus, Germ. Det. G.A.K.Marhsall.”, NHMUK, ARTSYS0007800; 6 male, 2 female, “Soledad, Cuba 9-VI 1925 Geo.Salt”, MCZ, [MCZ-ENT 00]529397, [MCZ-ENT 00]529398, [MCZ-ENT 00]529399, [MCZ-ENT 00]529456, [MCZ-ENT 00]529457, [MCZ-ENT 00]529461, [MCZ-ENT 00]529458, [MCZ-ENT 00]529459; 3 male, 4 female, “Soledad, Cuba Cienfuegos June 1929 Darlington”, MCZ, [MCZ-ENT 00]529499, [MCZ-ENT 00]529501, [MCZ-ENT 00]529504, [MCZ-ENT 00]529500, [MCZ-ENT 00]529502, [MCZ-ENT 00]529503, [MCZ-ENT 00]529505; 1 male, “C[41?] CUBA Soledad 2.VIII.1929. Dr. J.G. Myers | Pres. by Imp.Inst.Ent. Brit.Mus. 1932-565. | Pachnaeus litus, Germ. ♂ Det. G.A.K.Marhsall.”, NHMUK, ARTSYS0007799; 1 female, 1 male, “Limones Seboruco, Soledad, Cienfuegos, Cuba 18-VIII-30 Richard Dow”, MCZ, [MCZ-ENT 00]529466, [MCZ-ENT 00]529467; 2 male, “Central Soledad Cuba I-VII 1932 B.B.Leavitt”, MCZ, [MCZ-ENT 00]529451, [MCZ-ENT 00]529453; 1 male, “Soledad. Sta. Clara Cuba VII-12 1932 Bates and Fairchild”, MCZ, [MCZ-ENT 00]529477; 1 male, “Soledad. Sta. Clara Cuba VII-13 1932 Bates and Fairchild”, MCZ, [MCZ-ENT 00]529476; 1 male, 1 female, “Soledad,Cuba (Cienfuegos) Aug2-12,’34 Darlington”, MCZ, [MCZ-ENT 00]529497, [MCZ-ENT 00]529498; 1 female, 1 male, “Soledad,Cuba (Cienfuegos) V,VI.’39 Parsons”, MCZ, [MCZ-ENT 00]529483, [MCZ-ENT 00]529484; 1 female, “Soledad, Cienfuego Cuba. 6-26-41 Cole | H. & A.Howden Collection | Pachnaeus litus DET. A. HOWDEN See notes”, CMNC, ARTSYS0007801; 1 male, “#82 | Las Villas Prov. CUBA Central Soledad Sugar Plantation, 8 mi ESE Cienfuegos, 16June1951 22°07’ N, 80° 19’ W Kevin W. Marx”, WIBF, ARTSYS0007802; 1 female, “CUBA: Cienfuegos Jardin Botanico Cienfuegos 22.12179, -80.32646, 73m 21.v.2013, R.Anderson 2013-028X, hand collection”, CMNC, WWD0072568 / ARTSYS0007803; 3 male, “Soledad nr. Cienfuegos Cuba 6-20-VIII | N. Banks collector”, MCZ, [MCZ-ENT 00]529506, [MCZ-ENT 00]529507, [MCZ-ENT 00]529509; <u>Pico de San Juan:</u> 1 female, “CUBA: Cienfuegos: Pico San Juan, near peak, N21°59.321' W080°08.795' 1105m, 19 May 2013 G. Zhang [CB13_L20] [sic including brackets] | Pachnaeus sp. 1 det. N.M. Franz 2012 | sp 26", ASUHIC, ASUHIC0015296; 1 male, "CUBA: Cienfuegos: Pico San Juan, near peak, N21°59.321' W080°08.795' 1105m, 19 May 2013 G. Zhang [CB13_L20] [sic including brackets] | sp 26 | [red label] Photo taken", ASUHIC, ASUHIC0033686; 1 male, "CUBA: Cienfuegos: Pico San Juan, near peak, N21°59.321' W080°08.795' 1105m, 19 May 2013 G. Zhang [CB13_L20] [sic including brackets] | sp26", ASUHIC, ASUHIC0033629; 1 female, "CUBA: Cienfuegos P.N. Pico San Juan, road 21.98812, -80.44632 [correct longitude based on locality: -80.14632], 1086m 19.v.2013, R.Anderson 2013-022X, hand collections | Pachnaeus sp. 5 det. R.S. Anderson 2016", CMNC, WWD0072590 / ARTSYS0007816; 1 male, 2 female, "CUBA: Cienfuegos P.N. Pico San Juan, road 21.98812, -80.44632 [correct longitude based on locality: -80.14632], 1086m 19.v.2013, R.Anderson 2013-022X, hand collections", CMNC, WWD0072586 / ARTSYS0007817, WWD0072583 / ARTSYS0007818, WWD0072588 / ARTSYS0007819; **La Habana:** <u>Cotorro:</u> 1 female, "Cotorro CUBA | Havana VI-1924 | [red ink] 592 | Detm. by G.Marshall | [blank green label]", ANSP, ARTSYS0007792; 2 male, 3 female, "Cotorro CUBA | Havana VI-1924 | [blank green label]", ANSP, ARTSYS0007793, ARTSYS0007794, ARTSYS0007795, ARTSYS0007796, ARTSYS0007797; 1 female, "Cotorro CUBA | Havana VI-1924 | Pachnaeus litus, Germ. Det. G.A. K. Marshall | G.A.K. Marshall Coll. B.M. 1950-255.", NHMUK, ARTSYS0007798; <u>Guanabacoa:</u> 1 male, 1 female, "Guanabacoa. Hab. III-28-37 L. C. S. | Feeding on Siguaraya [*Trichilia havanensis* Jacq.; Meliaceae] | Pres. by Imp. Inst. Ent. B. M. 1941-91", NHMUK, ARTSYS0007790, ARTSYS0007791; <u>Havana:</u> 1 male, "Havana Cuba May 21-28, [1893 (see Wickham in Nutting 1895: 70)] Wickham |

F.C. Bowditch Coll. | azurescens Sch.”, MCZ, [MCZ-ENT 00]529361; 2 male, “Havana Cuba May 21-28, [1893 (see Wickham in Nutting 1895: 70)] Wickham | F.C. Bowditch Coll.”, MCZ, [MCZ-ENT 00]529362, [MCZ-ENT 00]529364; 1 male, 1 female, “Havana Cuba May 21-28, [1893 (see Wickham in Nutting 1895: 70)] Wickham | Sharp Coll 1905-313.”, NHMUK, ARTSYS0007783, ARTSYS0007784; 1 female,” [pink lens-shaped label] Havana | litus [illegible word ending in an -A] ger | Pachnaeus litus Germ | PascoeColl 93-60.”, NHMUK, ARTSYS0007785; 1 female, “ MUSEUM PARIS CUBA LA HAVANE P. SERRE 1908”, MNHN, ARTSYS0007786; 1 male, 1 female, “MUSEUM PARIS CUBA LA HAVANE P. SERRE 1909”, MNHN, ARTSYS0007787, ARTSYS0007788; 1 female, “D’. Nodier (Roussel) La Havane | Muséum Paris 1949 Coll. A. Hustache”, MNHN, ARTSYS0007789; **Holguín Province:** <u>Parque Nacional la Mensura:</u> 1 male, “CUBA: Holguin, Mayari P.N. Mensura Pioloto 20.48640 -75.79134, 657m 10.v.2013, R. Anderson 2013-005X, hand collections” CMNC, WWD0100721 / ARTSYS0007809; **Sancti Spiritus Province:** <u>Buenos Aires:</u> 1 male, 1 female, “Buenos Aires, Trinidad Mts. VI.’39 CUBA Parsons &”, MCZ, [MCZ-ENT 00]529485, [MCZ-ENT 00]529486; <u>Condado:</u> 1 male, “CUBA:Sancti Spiritus. 3 km E Condado, Rio Agabama. 10 m. 1 July 1990 J. Rawlins, S. Thompson | Carnegie Museum Specimen Number CMNH-433,632”, CMNH, ARTSYS0007804; **Santiago de Cuba Province:** 1 female, “MUSEUM PARIS CUBA SIERRA MAESTRA GOUPE DU COBRE LOMA DU GATO O DE SANTIAGO FRÈRE LEÓN 1926 | JULIET | AOUT | [221?]”, MNHN, ARTSYS0007805; **Villa Clara Province:** <u>Caibarién:</u> 1 female, “Caibarien, Cuba VI-19-1934 Coll: S.T. Danforth | J. & S. Ramos Collection, UPRM | 18”, ASUHIC, ASUHIC0187524; 1 female, “Caibarien, Cuba VI-19-1934 Coll: S.T. Danforth | J. & S.

Ramos Collection, UPRM | 19”, ASUHIC, ASUHIC0187525; Santo Domingo: 1 female, “Sto. Domingo, Prov. Sta. Clara Cuba VI-18-1934 Coll: S.T. Danforth | 20 | J. & S. Ramos Collection, UPRM | 17 | Pachnaeus litus Buchanan Germar”, ASUHIC, ASUHIC0187523.

Mexico (locality probably erroneous): 2 female, “MUSEUM PARIS MEXIQUE [& CUBA crossed out in pencil] DE BRÉMOND 293-39 | [circular label, green on top, white with writing on bottom] 293-39]”, MNHN, ARTSYS0007827, ARTSYS0007828.

Brazil (locality probably erroneous): 1 sex indeterminate (dermestid damaged), “[green circle] Bresil | MUSEUM PARIS 1949 COLL. A. HUSTACHE”, MNHN, ARTSYS0007829.

Etymology. The name *litus* is a Latin neuter noun in apposition meaning “beach” or “shore”. Germar provided no etymology of this name at time of description, but it presumably refers to some notion of the species having a near-beach distribution. It should be noted that this species doesn’t seem particularly more apt to be found near the beach than most other congeners.

Geographical distribution and chorological affinities. *Pachnaeus litus* (Germar) is apparently native to and occurs throughout Cuba but is likely only established or adventive elsewhere. The Southern Florida population, which appears to be spreading northward as of recently, is virtually identical to typical specimens found in the Havana population and matching well to the original description. The original description by Germar (1824) was based on material from Cuba, and based on 1) the wide range in morphological variation within this species seen in Cuba, 2) the comparatively limited range of morphological variation seen in Southern Florida, and 3) the fact that the most morphologically similar species occur in Cuba and Haiti, I suggest that this species originated on the island of Cuba and that it is not native to Florida as has been suggested by some past authors. Instead, this species was likely first established in Southern Florida sometime between the first establishment of the Old-World taxon *Citrus* L. in the area by the Spanish in the early 1500s to as late as the mid- to late-1800s. However, it is possible—though seemingly unlikely—that the species predates citrus in Florida, having instead been introduced by storm, by rafting, or by pre-Colombian human transport. Horn (1876) said this species was “not rare” in Florida, treating it under the incorrect name of *Pachnaeus opalus* Horn, 1876—a misidentification and not the same taxon as the more northerly ranged native continental species, *Pachnaeus opalus* (Olivier, 1807), which he treated under the name *P. distans* Horn, 1876. Ashmead (1880) claimed to have found it feeding on lime leaves on the Florida Keys “in great quantities”, suggesting it to be established and not simply adventive by the 1870s. The earliest specimen I have seen from Florida is a male deposited in the NHMUK collection that was collected at Key West in March of 1872 by naturalist James Cosmo Melvill (ARTSYS0001464). The earliest unambiguous mention of agricultural impact of the genus comes from Riley (1882), who claims *Pachnaeus litus* (Germar, 1824) to be “injurious to the orange tree”. Past records from Jamaica are mostly questionable, likely being mostly misidentifications of the superficially similar *P. citri* Marshall (van Whervin 1968 and see also discussion under *P. citri* Marshall above), but a single specimen has been recorded from Old Harbor. This species may be established on Grand Bahama, and there are also singleton records from Abaco and Eleuthera. It has been reported from Hispaniola in past (Perez-Gelabert 2008: 136) but I have not seen specimens from the island, and these records may, in fact, represent the very similar and presumably closely related *P. morelli* Reily, sp. nov., or misidentifications of *P. psittacus* (Olivier) or some other, similar entimine. There are also records from Mexico, Brazil, Guyana, Quebec, Texas, and Pennsylvania which may represent a combination of adventive records and erroneous data. This species regularly appears outside of its native and established range, making it of particular concern as a potential crop pest and invader. It may co-occur with many other species but can usually readily be distinguished by the distinctive structure of its elytral bases.

Ruíz Cancino and Coronado Blanco (2002: 111), Ruíz Cancino et al. (2006: 96), and López-Arroyo and Loera-Gallardo (2009: 313) report this species from Tamaulipas. López-Arroyo and Loera-Gallardo (2009: 313) also report it in Tabasco. I know of no reliable specimen records from Mexico for any species of this genus and these records are likely misidentifications. The most probable candidates for these records are one or more members of *Exophthalmus* Schoenherr *sensu lato* for more southerly records in Tabasco—perhaps *E. opulentus* (Boheman in Schoenherr, 1840) or *E. agrestis* (Boheman in Schoenherr, 1840)—and *Compsus auricephalus* (Say, 1824) for more northerly records in Tamaulipas. While records of *Pachnaeus* Schoenherr from the Lower Rio Grande Valley exist in the literature (Anciso et al. 2002: 32), the nearest confirmed record of this species—or any member of the genus—is from Houston, Texas (inaturalist.org/observations/63030238). With this said, considering the propensity of *P. litus* (Germar) to establish outside of its native range, it is not implausible that this species is, in fact, established within some citrus groves in northeastern Mexico.

Biology. *Pachnaeus litus* (Germar, 1824) is historically the most detrimental and presently the most dangerous species of this genus to the citrus industry in its native Cuba, its established Floridian range, and elsewhere globally. This species is well documented to be highly prone to transport with *Citrus* L. and other crop shipments and is regularly intercepted outside of its native range of Cuba and established range of Southern Florida. When this tendency to get moved around is considered in conjunction with its known propensity to jump between hosts as a generalist feeder with a broad dietary spectrum and its history of irruptive population outbreaks, it is clear that this species is of particular concern not just to citriculture but to other horticultural sectors throughout the tropics and subtropics. The record of this species in the agricultural literature is extensive and an exhaustive review of the biology and agricultural history of this species lies beyond the scope of the present manuscript but is greatly needed. Undertaking such an endeavor is problematic, however, due to apparent regular confusion within the literature and on specimen labels of this and similar species, particularly *P. azurescens* Gyllenhal in Schoenherr in Cuba and *P. opalus* (Olivier) in Florida. As such, the following should be viewed as only a preliminary overview of the biology of this species.

Pachnaeus litus (Germar, 1824) has a well-known record as a major to minor pest of *Citrus* L. (Rutaceae; Anonymous 1917: 55, Anonymous 1951: 76-79, Anonymous 1962a: 38, Arteaga Hernandez and Mráček 1984: 12, Ashmead 1880: 61, Baranowski 1960: 197, Beavers and Selhime 1975, Beavers et al. 1980, Beutenmuller 1893: 38, Blatchley and Leng 1916: 118, Brunner et al. 1945: 49, Brunner et al. 1975: 92, Bullock 1985, Bullock et al. 1999, Cañizares Zayas 1963: 31, Cardin 1915: 119, Cook 1906: 160, Cook and

Horne 1908: 11, Cunliffe 1916: 58, Cunliffe and van Hermann 1916: 35, Diaz Montilla et al. 2013, Dolinski and Lacey 2007: 165, Suggars Downing et al. 1991: 584, Duncan et al. 1999, Duncan et al. 2001, Duncan et al. 2003, Ebeling 1950: 492, Estrada 1976, Estrada Ortiz and Auchet Jenkens 1979, Estrada Ortiz 1981, Estrada Ortiz et al. 1981, Fawcett 1915: 198; Futch and McCoy 1993, González Fernández et al. 2010: 202, Grillo and Alvarez 1984, van Hermann 1907: 40, van Hermann 1908: 94, van Hermann 1911: 67, Houser 1909: 53, Hubbard 1885: 133, Knapp 1985, Löding 1945: 141, López-Arroyo and Loera-Gallardo 2009: 313, McCoy 1999: 152, Mestre Novoa et al. 2009: 55, Monteagudo Toranzo et al. 1987: 57, Montes 1978a: 52, Moznette 1921, Pérez and Medina 1999, Pospíšil 1976: 33, Pospíšil 1976: 34 (attracted to odor), Quayle 1938: 322, Rivera et al. 2017, Schroeder and Beavers 1977, Vázquez Moreno et al. 2008: 157, Watson 1918: 240, Watson and Berger 1932: 121, Wolfenbarger 1952: 140, and others). In recent times this species has been treated as a relatively minor pest of citrus (Dolinski and Lacey 2007: 165) and Wolfenbarger (1971) reports that outbreaks of this species tend to be localized and sporadic. However, historical outbreaks have been more severe.

Many of the earliest detailed records of from Cuba of the economic impact of this genus in citrus date to the first few decades of the 20th century. Damage to groves at Estación Experimental Agronómica de Santiago de las Vegas, near Havana, Cuba were repeatedly reported between 1904 and 1911. Cook (1906) called the species “one of the most harmful insects in Cuba”, van Herman (1908) claimed it was “the worst plague the orange grower [had] to contend with in this section of the island” and said that larvae “seem to be everywhere present in the soil, in the orchards, fields and native bush,” Horne (1908) said that it threatened to “ruin most of the citrus groves” planted in Cuba at the time, Houser (1909) claimed that “no other natural condition [had] a greater bearing upon the production of good citrus products in Cuba,” and Orr (1912: 30) called it “by far and away the worst [pest of citrus]… the primary cause of a host of minor troubles” and claimed that hand-picking the beetles from trees was necessary daily.

Van Hermann (1907) reported what may be the first recorded economically important outbreak of this species at Santiago de las Vegas research station near Havana, Cuba. The irruption appears to have been coupled to waterlogging of local citrus orchards by heavy rains from July to mid-October of 1906, only further exacerbated by the 1906 Florida Keys hurricane which crossed Cuba near Havana as a category 4 on October 17 and which was followed by a period of severe drought from late-October to early-April of 1907, with the region seeing less than an inch of rain during this time. Many of the presumably already stressed trees were reported not to have recovered from larval feeding injury.

Serious trouble with this species within citrus in southern Florida seems to have begun around the mid-1910s to early-1920s. Watson (1918) claimed that the Florida population did “considerable damage to the lime groves on the Keys and less to the groves on the mainland.” Wolfenbarger (1952) reported a severe outbreak in lime and orange groves in Southern Florida, claiming major losses of fruit and saying that “grove caretakers reported that the citrus root weevil was worse than they had ever observed.” Another severe outbreak of *P. litus* (Germar) on December 15, 1961, at Tavernier, Florida was reported on key lime in which all 50 trees inspected were infested (Anonymous 1962a). While citrus seems to be preferred, this species is also highly polyphagous and readily jumps between hosts.

Though perhaps only secondary in preference to citrus (Wolfenbarger 1971), this species seems to have a particular liking for avocado (*Persea americana* Mill.; Lauraceae). Moznette (1921: 26) reported severe foliage damage to several avocado trees in 1918, and at a later date (Moznette 1923: 42) said that the species was "very abundant" at multiple localities damaging young growth of the plants, and that some young Guatemalan avocadoes were "completely stripped and the weevils went so far as to gnaw severely into the young shoots." Cardin (1913: 31) calls avocado one of the most favored food sources after citrus and Pérez and Medina (1999) report that larvae and adult produce significant damage in orchards and plantations of the crop in Cuba. The literature also contains several other references to this species as a pest of avocado in Cuba (*e.g.,* Anonymous 1917: 52, Brunner et al. 1945: 130, Brunner et al. 1975: 249, Cardin 1915: 100, Cook and Horne 1908: 14, Houser 1909: 53, McKenzie 1935: 43, Monteagudo Toranzo et al. 1987: 57) and Florida (*e.g.,* Watson 1935: 82, Wolfenbarger 1952: 140, Wolfenbarger 1958: 13, 41, Wolfenbarger 1963: 15, 41).

Houser (1909: 53) reported serious damage to roots of strawberry plants (*Fragaria vesca* L. (Rosaceae)) in Cuba, and a notable outbreak was reported in strawberry fields near Miami in 1920 (Moznette 1921). The literature contains several other mentions of this species as a pest of strawberry in Cuba (Brunner et al. 1945: 79 (as "*litus* (Germ.)?"), Brunner et al. 1975: 150 (as "*litus* (Germ.)?"), Monteagudo Toranzo et al. 1987: 57, Vázquez Moreno 1975: 104) and in Florida (van Emden 1952: 762 (as "sp. (*litus* Germ. ?)"), Wolfenbarger 1952: 140).

Several other tropical fruit crops are also occasionally attacked, including mango (*Mangifera indica* L.; Popenoe 1917: 7 (as *P. opalus* (Olivier) but likely this species), Wolfenbarger 1971), lychee (*Litchi chinensis* Sonn.; Sapindaceae; Anonymous 1941b: 44, Cañizares Zayas 1963: 31, Crane et al. 2005: 7, Deckle 1958: 44), longan (*Dimocarpus longan* Lour.; Sapindaceae; Crane et al. 2016: 5), mamey sapote (*Pouteria sapota* (Jacq.) H. E. Moore & Stearn; Sapotaceae; Cañizares Zayas 1963: 31), and jackfruit (*Artocarpus heterophyllus* Lam.; Moraceae; El-Sawa 1998). However, tropical fruit trees are, by far, not the only targets of *Pachnaeus litus* (Germar).

Cuban agricultural workers have reported issues in past with this this species in root crops such as sweet potato (*Ipomoea batatas* (L.) Lam.; Convolvulaceae; Monteagudo Toranzo et al. 1987) and cassava (*Manihot esculenta* Cranz; Euphorbiaceae; Brunner et al. 1945: 109, Brunner et al. 1975: 203, Cardin 1911: 24, Cunliffe 1916: 58, Monteagudo Toranzo et al. 1987: 57) and also in tobacco (*Nicotiana tabacum* L.; Solanaceae; Brunner et al. 1945: 118, Brunner et al. 1975: 222, Cardin 1915: 165, Houser 1909: 53, Mestre Novoa et al. 2009: 55, Monteagudo Toranzo et al. 1987: 57, Wolfenbarger 1952: 140). Hall (1988: 140) reported a large infestation of several fields of sugarcane (*Saccharum* L. spp.; Poaceae) in Florida during 1987.

In addition to the aforementioned crops, this species has also been reported in association with many other plant taxa including *Ambrosia* sp. (poss. *artemisiifolia* L.) (Asteraceae; Moznette 1921: 26), *Amorpha herbacea* Walter var. *crenulata* (Rydb.) Isely (Fabaceae; Linares and Koptur 2010: 144), *Ananas comosus* (L.) Merr. (Bromeliaceae; Anonymous 1940: 30), *Annona cherimola* Mill. (Annonaceae; Cook and Horne 1908: 14, Houser 1909: 53), *Arachis hypogaea* L. (Fabaceae; Cook and Horne 1908: 14, Houser 1909: 53), *Baccharis halimifolia* L. (Asteraceae; Ashmead 1880: 61, Blatchley and Leng 1916: 118, Hubbard 1885: 133, Palmer and Bennett 1988: 221), *Borrichia frutescens* (L.) DC.

(Asteraceae; Ashmead 1880: 62, Blatchley and Leng 1916: 118, Hubbard 1885: 133), *Brassica rapa chinensis* (L.) Hanelt (Brassicaceae; Anonymous 1941a: 27, Anonymous 1941b: 30, Anonymous 1941b: 41, Anonymous 1943: 19, Anonymous 1943: 25), *Cajanus cajan* (L.) Mill (Fabaceae; Brunner et al. 1975: 47, Monteagudo Toranzo et al. 1987: 57, Pospíšil 1976: 33, Pospíšil 1976: 34 (attracted to odor)), *Capsicum frutescens* L. (Solanaceae; Brunner et al. 1945: 29, Brunner et al. 1975: 52, Monteagudo Toranzo et al. 1987: 57), *Carya illinoinensis* (Wangenh.) K. Koch (Juglandaceae; Cook and Horne 1908: 14, Houser 1909: 53), *Casuarina equisetifolia* L. (Casuarinaceae; McCoy 1999: 152), *Coccothrinax argentata* (Jacq.) L.H. Bailey (Khorsand Rosa and Koptur 2009), *Coccoloba uvifera* (L.) L. (Polygonaceae; Woodruff 1959: 43), *Coffea* L. (Rubiaceae; Cook and Horne 1908: 14, Houser 1909: 53; Pierce 1918: 63) including *Coffea arabica* L. (Rubiaceae; Mestre Novoa et al. 2009: 55), *Conocarpus erectus* L. (Combretaceae; Hall et al 2002 (oviposition on), Jacas et al. 2009: 113, Jacas et al. 2010), *Diospyros kaki* Thunb. (Ebenaceae; Cook and Horne 1908: 14, Houser 1909: 53), *Eucalyptus* L'Hér. spp. (Myrtaceae; Brunner et al. 1975: 139, Mestre Novoa et al. 2009: 55, Monteagudo Toranzo et al. 1987: 57), *Ficus* L. (Moraceae; Blatchley and Leng 1916: 118) including *Ficus retusa* L. (Moraceae; Anonymous 1962b: 418) and *Ficus benjamina* L. (Moraceae; Anonymous 1962b: 418), *Gerbera jamesonii* Bolus ex Hooker f. (Asteraceae; Cruz Borruel et al. 2009), *Gossypium hirsutum* L. (Malvaceae; Rainwater 1941: 17), *Hibiscus sabdarifa* L. (Malvaceae; González García et al. 2008: 27), *Medicago sativa* L. (Fabaceae; García Osés 1910: 63, Pospíšil 1976: 34 (attracted to odor)), *Mucuna pruriens* (L.) DC. (Fabaceae; Cook and Horne 1908: 14, Houser 1909: 53), *Ocimum basilicum* L. (Lamiaceae; Bernal Areces et al. 2012), *Phaseolus lunatus* L. (Fabaceae; Brunner et al.

1945: 134, Brunner et al. 1975: 255, Wolfenbarger 1952: 140), *Phaseolus vulgaris* L. (Fabaceae; Pospíšil 1976: 33, Pospíšil 1976: 34 (attracted to odor)), *Phoenix roebelinii* O'Brien (Arecaceae; Hall et al 2002 (oviposition on)), *Pisum sativum* L. (Fabaceae; Brunner et al. 1945: 142, Brunner et al. 1975: 269, Monteagudo Toranzo et al. 1987: 57), *Quercus* L. spp. (Fagaceae; McCoy 1999: 152), *Rosa* L. spp. (Rosaceae; Cook and Horne 1908: 15, Houser 1909: 53, McCoy 1999: 152), *Senna mexicana* (Jacq.) Irwin & Barneby var. *chapmanii* (Isely) Irwin & Barneby (Fabaceae; Koptur et al. 2015: 7), *Swietenia macrophylla* King (Meliaceae; Timyan 1996: 179), *Swietenia mahagoni* (L.) Jacq. (Meliaceae; Timyan 1996: 179), *Tagetes erecta* L. (Asteraceae; González García et al. 2008: 27), *Triadica sebifera* (L.) Small (Euphorbiaceae; Duncan et al. 2016: 144, Wheeler and Ding 2014: 356), *Vigna radiata* (L.) R. Wilczek (Fabaceae; Monteagudo Toranzo et al. 1987: 57), and *Vigna unguiculata* (L.) Walp. (Fabaceae; Cook and Horne 1908: 14, Houser 1909: 53).

A variety of more ambiguous plant associations exist throughout the literature, including "a large purple morning-glory" (Convolvulaceae; Blatchley 1920: 163), "all sorts of succulent weeds" (Blatchley and Leng 1916: 118), "various shrubs" (Blatchley 1920: 163), and "woody ornamentals" (McCoy 1999: 152). McCoy (1999: 152) reported that the species has 70 known host plant species but provided no list of these taxa.

Pachnaeus litus (Germar) even seems to be voracious enough to feed on plants that are directly detrimental to its own survival, *e.g.*, Cook and Horne (1908: 14) report it feeding on rooster vine (*Aristolochia* L. spp., Aristolochiaceae) in Cuba but say that the plant "seems to have a poisonous effect" on the beetles.

This species has been reported to be eaten by "wild birds" or "insectivorous birds" and "domestic fowl" alike (Cook and Horne 1908: 15, van Hermann 1908: 95) and is a known part of the diet of the northern crested caracara (*Caracara plancus cheriway* (Jacquin, 1784); Falconidae; Morrison et al 2007: 12) in south-central Florida. Larvae are attacked by ants (Formicidae; Cook and Horne 1908: 15, Duncan et al. 1999, Houser 1909: 54), and members of the family Asilidae Latreille, 1802 including *Mallophora scopipeda* (Róndani, 1863) (Horne 1909b: 92; Houser 1909: 55) are reported to take adults. It is known to co-occur with *Artipus floridanus* Horn, 1876 (Curculionidae; Ashmead 1880: 62; Hubbard 1885: 133; Blatchley and Leng 1916: 123; Blatchley 1920: 163) in the Floridian portion of its range.

Members of the families Eulophidae Westwood, 1829, Platygastriidae Haliday, 1833, and Trichogrammatidae Haliday, 1851 are known as potential biocontrol agents for members of the citrus root weevil complex, and several have been tested specifically for use against *P. litus* (Germar) with variable results. A complete and updated review of the literature regarding hymenopteran parasitoids of the citrus root weevil complex is greatly needed but see Peña et al. 2010 for a partial overview. Two of the more promising microhymenopterans deployed for control of *P. litus* (Germar) are the egg parasitoids *Brachyufens osborni* (Dozier, 1932) (Trichogrammatidae) and *Quadrastichus haitiensis* (Gahan, 1929) (Eulophidae).

The egg parasitoid *Brachyufens osborni* (Dozier, 1932) was first described from Puerto Rico from egg masses of *Diaprepes abbreviatus* (Linnaeus, 1758). This species is established in, if not indigenous to, Florida, it is known to cause high mortality in *P. litus* (Germar) (Baranowski 1960: 197, Beavers et al. 1980, Diaz Montilla et al. 2013, Schauff

1987: 33), and has shown potential for control of this species (Beavers and Selhime 1975).

Quadrastichus haitiensis (Gahan, 1929) has been shown to survive on eggs of *P. litus* (Germar) (Beavers et al. 1980, Brunner et al. 1945: 49, Brunner et al. 1975: 92, Jacas et al. 2010, Kipp 1970: 39, Peña et al. 2010, Schauff 1987: 35, Vázquez Moreno et al. 2008: 57, Vázquez Moreno et al. 2008: 190). This species was originally described from egg masses of *Exophthalmus quadrivittatus* (Olivier) from Port-au-Prince, Haiti (Gahan 1929). Early attempts to establish this species in Florida for control of citrus root weevils (Sutton et al 1972, Beavers et al. 1980) were not effective but the species has since been established in Miami-Dade and Broward counties in ornamental plant nurseries and citrus orchards (Jacas et al. 2010).

In Cuba, adults of *P. litus* (Germar) have been reported to be parasitized by a species of *Oestrophasia* Brauer & Bergenstamm, 1889 (= *Cenosoma* Wulp, 1890) (Diptera: Tachinidae; Mandina Hernández and Pérez Perera 1981; Grillo and Alvarez 1984, Vázquez Moreno et al. 2008: 190).

Several entomopathogenic nematode species have been employed against this species, including *Heterorhabditis bacteriophora* Poinar, 1976 (Heterorhabditidae; Duncan et al. 1999, Schroeder 1992), *Heterorhabditis heliothidis* (Khan, Brooks, and Hirschmann, 1976) (Heterorhabditidae; Arteaga Hernandez and Mráček 1984), *Steinernema carpocapsae* (Weiser, 1955) (Steinernematidae; Bullock et al. 1999, Duncan et al. 1999, Schroeder 1992), and *Steinernema riobrave* Cabanillas, Poinar, and Raulston, 1994 (Steinernematidae; Bullock et al. 1999).

This species has been reported to be infected by the fungal entomopathogens *Ophiocordyceps buquetii* (Mont. & C.P. Robin) Spatafora, Kepler & C.A. Quandt (= *Stilbella buquetii* (Mont. & C.P. Robin) Samson & H.C. Evans; Ophiocordycipitaceae; McCoy and Tarrant 1987: 14), *Beauveria bassiana* (Bals.-Criv.) Vuill. (Cordycipitaceae; Montes 1978b: 48, Vázquez Moreno et al. 2008: 136, Vázquez Moreno et al. 2008: 190), and *Metarhizium robertsii* (Metchnikoff) Sorokin (= *Metarrhizium anisopliae* Metchnikoff; Clavicipitaceae; Montes 1978a, Montes 1978b: 48, McCoy and Tarrant 1987: 14, Vázquez Moreno et al. 2008: 136, Vázquez Moreno et al. 2008: 190). *Pachnaeus litus* (Germar) has recently been found to be more highly attracted to citrus plants infected with the bacterial pathogen that causes citrus greening (AKA Huanglongbing or HBL), *Candidatus* Liberibacter asiaticus Jagoueix et al. 1994, than to uninfected plants (Rivera et al. 2017).

***Pachnaeus morelli* Reily, sp. nov.**

Figs. 3.76–3.77, 3.85R, 3.98

Diagnosis. This species is only known from Haiti, where few other members of the genus are known to occur. It can be separated from most congeners by its regular and patternless, rather dull and never glittery, pale mint green coloration, by its densely overlapping pronotal and elytral scales, by its impunctate and unimpressed pronotum, and by its elytral bases being strongly, subangularly, anteriorly projected near middle of each elytron with slight anterior projections that are not distinctly but not dentiform just mediad to the elytral humeri.

This species is most similar to *P. litus* (Germar), to which it is likely closely related, but it can be separated by the subglobose pronotum of males, by the consistent lack of prominent anteriorly directed, dentiform projections on the elytral humeri—though humeri do protrude forward slightly just laterad to humeri in *P. morelli*—and by the consistent lack of paler patches of scales on the pronotum and elytra.

Description. Habitus typical of the genus. Body length 9.5 to 12.5 mm. Body width at elytral bases 4.0 to 5.5 mm. Integument castaneous to piceous. Very densely clothed in a mix of densely overlapping, rather dull, pale mint green to turquoise, oval, appressed scales with many elongate and typically flattened, white to translucent, subappressed scales intermixed. Appressed scales throughout entire body are fairly uniformly pale mint green to turquoise, and this species never has distinct patches or stripes of distinctly paler scales as seen in some other species.

Head typical of the genus. **Occiput** without a median, longitudinal sulcus at base. **Interocular pit** fairly small, round, in some specimens partly overlapped by scales, and with the occiput immediately behind the interocular pit gradually, sinuously rising to notably higher than the level of the epifrons. **Eyes** oval, notably but slightly taller than wide, very slightly protruding laterally from the head. **Rostrum** tricarinate, in most specimens with the median carinae slightly raised and the lateral carinae at most very slightly raised; rostrum comprising a little over half the entire length of the head. **Median rostral carina** as a slightly raised and laterally obliquely sloped mound; laterally densely clothed in appressed scales, denuded in a thin linear swath along the midline which runs from posteromedial margin of the frons to the interocular pit. **Intercarinal rostral spaces**

at most very slightly impressed between median and lateral carinae; very densely clothed in strongly overlapping pale, oval to elongate, appressed to subappressed scales with a few pale, flattened, subappressed to suberect, setose scales intermixed. **Lateral rostral carinae** at most very slightly raised dorsally but typically dorsally obsolete; consistently lower than the peak of the median rostral carina; typically notably defined ventrolaterally and distinctly demarcated from the lateral portion of the epifrons anterior to the eye. **Lateral portion of epifrons anterior to the eye** laterally to slightly obliquely laterally faced, typically slightly convex just ventral to the lateral carinae. **Scrobe** arcuate, not widened posteriorly. **Occipital sutures** laterally opened, short, longitudinal, pit-like foveae that are obscured by overlapping scales at least posteriorly near the eye, but typically throughout most to all of their length. **Frons** rather strongly angularly to curvilinearly declined from epifrons, at most very slightly concavely impressed surrounding the nasal plate; moderately to densely covered in pale, oval to elongate, appressed scales except on the nasal plate. **Nasal plate** slightly raised, nude and typically bearing several long setae set in punctures along the posterior margin, these longer and more concentrated laterally than medially. **Mandibles** apically bearing numerous, long setae surrounding the mandibular scar with a few appressed, elongate scales typically intermixed laterally. **Submentum** about 1.5 times as long as wide, slightly impressed; densely clothed with pale turquoise to mint green, oval, subappressed to suberect scales with pale, moderately long, suberect, setose scales intermixed anteriorly.

Antennae typical of the genus. **Scape** extending to the posterior margin of eye. **Funicle** with last two segments subconical.

Thorax typical of the genus. **Pronotum** typically slightly laterally constricted immediately behind the anterior margin and then, posterior to this, typically curvilinearly expanded to near middle, the posterior half ranging from subparallel sided to curvilinearly narrowing toward the base. In males the pronotum is typically rather strongly dorsally convex, giving the pronota in males a somewhat subglobose appearance. Pronotal disc wholly impunctate. Pronotal collar laterally constricted and delimited by a groove behind the postocular lobe. Pronotal disc without a pair of posteriorly diverging ridges and not notably medially impressed. Clothed in densely overlapping, pale, circular, appressed scales and with many subappressed, short, setose scales intermixed. **Pronotal bases** fairly strongly and somewhat angularly bisinuate to accommodate overhanging elytral bases. **Postocular lobe** small, anteriorly projected as a variably shaped by typically obtusely angular projection; not notably laterally expanded apically. **Postocular vibrissae** clearly visible, moderately long, anterodorsally directed, and longest at the middle of the postocular lobe. **Prosternum** densely clothed in confused, pale turquoise to mint green circular to oval, appressed scales and with many, short, pale, suberect to erect, setose scales intermixed. **Mesoventrite** densely clothed in overlapping, pale turquoise to mint green, circular to oval, appressed scales, these usually notably sparser near the anterior margin. Mesoventrite intercoxal process with many moderately long, setose scales intermixed. **Metaventrite** densely covered in overlapping, pale turquoise to mint green, circular to oval, appressed scales with many short, pale, setose scales intermixed. Distance between mesocoxa and metacoxa a little less than about 1.5 times the diameter of the mesocoxa. **Mesepisternum** densely clothed in overlapping, pale turquoise to mint green, circular to oval appressed scales and with many short, pale, subappressed to suberect, setose scales intermixed. **Mesepimeron** similarly scaled to mesepisternum. **Metepisternum** similarly scaled to mesepimeron. **Scutellar shield** variably shaped, though typically subquadrate to ogival with the posterior margin linearly to curvilinearly narrowed; densely covered in strongly overlapping, pale turquoise to mint green, oval to elongate, appressed scales.

Abdomen with ventrites 1 to 4 very densely scaled with overlapping, pale turquoise to mint green, subcircular to oval, appressed scales with many pale, short, suberect, setose scales intermixed. Ventrite 5 similarly scaled, but apically with shorter appressed scales which are oval to subcircular in preceding ventrites growing increasingly more linear in form and more erect posteriorly and with many, long, pale, suberect, setose scales intermixed near the posterior apex.

Elytra entirely and densely scaled. Elytral striae composed of very small and often difficult to discern, subcircular to oval punctures which are typically heavily overlapped at their edges by surrounding appressed scales. Elytral bases strongly bisinuate, linearly projecting obliquely anteriorly from scutellum to near mid-elytron, concavely curvilinearly recurved posteriorly laterad to this, and with a slight forward projection just mediad to the humeri. Anteriorly directed toothlike projection mediad to elytral humeri absent but this area of the elytral base typically slightly protruding forward. Elytral humeri obtusely angulate.

Legs typical of the genus. **Coxae** moderately to densely clothed in overlapping, pale turquoise to mint green, oval, appressed scales with many pale, elongate, subappressed, setose scales intermixed. **Trochanters** similarly scaled as coxae, but with appressed scales more elongate. **Femora** rather densely covered in pale turquoise to mint green, circular to oval, appressed scales with many moderately long, pale, suberect, setose scales intermixed. **Tibiae** scaled similarly to femora but with scales generally smaller and more elongate, and with at most just a few very small denticles along the ventral side. Protibiae not notably apically bent inward, more or less linear to slightly evenly curved across its entire outer face. Protibial mucro much shorter than half the width of the tibia just proximad to it, not extending notably beyond surrounding setae. **Tarsi** dorsally clothed in mint green, appressed, linear scales. Tarsomere 5 about 1.5 times the length of tarsomere 3.

Male terminalia typical of the genus. **Penis** with temones about 0.59 times the length of the pedon. **Tegmen** about 0.54 times the length of the penis, with manubrium comprising about 0.58 times the total length. **Endophallus** with distal, tubular sclerite in dorsal view subcylindrical, very slightly wider proximally than distally, notably tapered in apical quarter, very slightly laterally expanded near ante-apical quarter, and very slightly widened near the base; slightly shorter than (0.96 times) the width of the pedon adjacent to endophallus; more-or-less straight in lateral view, not bent ventrally, tapered near apex—this more notable dorsally than ventrally, and very slightly dorsally and ventrally expanded near base; about 4.4 times as long as wide and about 0.15 times the length of the pedon; in ventral view with posterior ventral margin truncate. Sac-like proximal portion of endophallus entirely membranous. **Spiculum gastrale** with lateral margins of basal plate convex and obtusely angulate; basal plate about 0.79 times as wide as long, and about 0.29 times as long as the length of the apodeme.

Female terminalia typical of the genus. **Spiculum ventrale** with basal plate about 0.46 times the total length; basal plate at insertion of apodeme lacking a heavily sclerotized angular patch. **Coxites** about 0.57 times the total length of spiculum ventrale. Proximal gonocoxite about 0.76 times as tall as long; distal gonocoxite about 0.88 times as tall as long; distal gonocoxite about 0.65 times the length of the proximal gonocoxite.

Variation. This species shows only slight variability in scale color with some specimens a bit paler and others darker. Females have a pronotum which is not as strongly subglobose as in males but is more trapezoidal in dorsal view.

Material examined.

Holotype by present designation: Haiti: Ouest Department: Port au Prince: male, "Acc. 456-25 Port au Prince, Haiti May 1925. | G.N. Wolcott Coll. | Pres. by Comm Inst Ent B.M. 1981-315 | Pachnaeus sp. unn? In B.M. (5 exx.) Det G.A.K. Marshall.", NHMUK, ARTSYS0001541.

6 Paratypes by present designation: Haiti: Ouest Department: Port au Prince: 1 male, "M. Cameron Journal W.I. 554 | HAITI: [yellow line] Port au Prince. 1-10.v.1908 Dr. M. Cameron B.M. 1936-555.", NHMUK, ARTSYS0001540; 1 female, 1 male, "PORT-AU-PRINCE (HAITI.) | Sharp Coll. 1905-313.", NHMUK, ARTSYS0001534, ARTSYS0001535; 3 male, "PORT-AU-PRINCE (HAITI.) | MUSÉUM PARIS 1952 COLL R OBERTHÜR", MNHN, ARTSYS0001544, ARTSYS0001545, ARTSYS0001546.

6 other specimens: 1 female, “Sharp Coll. 1905-313.”, NHMUK, ARTSYS0001536; 1 male, “Sharp Coll. 1905-313.”, NHMUK, ARTSYS0001537.

Hispaniola: 1 male, “Antilles S.Dom | Fry Coll. 1905.100. | Pachnaeus Psittacus Ol.”, NHMUK, ARTSYS0001538; 1 male, “St Dom | Sharp Coll. 1905-313. | Pachnaeus Psittacus Ol.”, NHMUK, ARTSYS0001539; 1 male, “MUSEUM PARIS 1955 COLL. A. CLERC”, MNHN, ARTSYS0001542.

Haiti: 1 female, “Haïti. | ex. Coll. A. Sallé”, MHNN, ARTSYS0001543.

Etymology. The specific epithet *morelli* is a patronym in honor of the late Jonathan Morell, student of ethnology at the University of Copenhagen and close friend of the author. Jonathan had offered to provide lodging during visits to several European collections but suddenly passed away less than a month prior to time of travel. This name is a Latin noun in the genitive case and is masculine.

Geographical distribution and chorological affinities. This species is known only from Port-au-Prince, Haiti. The only other species definitively known to occur on the island of Hispaniola is the dissimilar, widely distributed, Greater Antillean species *P. psittacus* (Olivier, 1807). Records of *Pachnaeus litus* (Germar) reported by Perez-Gelabert (2008: 136) from Hispaniola may in fact be of this species, as the former is not otherwise known from the island. However, the material examined by Perez-Gelabert has not been examined for the present work.

Biology. Very little is known about this species, but some of the types were collected during the month of May.

***obrienorum* species group**

Diagnosis. This group was erected to contain a single problematic species, *Pachnaeus obrienorum* Reily, sp. nov., which occurs throughout the eastern Bahamas and in Northcentral Coastal Cuba. This species has relatively truncate elytral bases and a convex and medially unimpressed pronotum. At the middle of the pronotal disc there is typically a visible longitudinal median suture, the anterior of which is usually composed of punctures and the posterior usually a linear bare patch, and this suture is often interrupted in a few places or sometimes entirely overlapped by scales. Members of this species typically lack irregular punctation on the pronotum and, if present, punctures are very sparse and shallow and seem to simply represent former scale attachment sites revealed by rubbing. Rostral structure in this species is strongly quadrate and somewhat reminiscent of that seen in *litus* group species, and specifically the *morelli* species subgroup. However, *P. obrienorum* Reily, sp. nov. lacks the raised median rostral carina and the anteriorly projected elytral bases typical of these species.

Many specimens of *P. obrienorum* Reily, sp. nov. possess distinct punctures or bare patches at the pronotal bases adjacent to the fourth elytral interval; however, most populations appear to lack other paired pronotal punctures. The exception to this is specimens from Simm's Settlement, Long Island which consistently possess a pair of paired punctures near mid disc and typically have a secondary, more closely set pair of paired punctures in the posterior sixth of the disc in addition to the bare patches adjacent to the fourth elytral intervals near the pronotal bases. These discal punctures seem to suggest a relationship of this population to other Cuban, Lucayan, and Continental United States species with similarly closely set posterior discal paired punctures, *i.e.,* a tentative [*opalus* species group + *pater* species group] group and possibly also *psittacus* species group (see also the discussion under this taxon and the discussion section on paired pronotal punctures).

It should be noted that there is some question as to whether the Long Island population actually represents a distinct species from other populations, though I have not treated it as such presently. This population, which is only represented by five specimens from a single collecting event, has paler scaling, more prominent erect to suberect rostral scaling, and slightly raised, darker—*i.e.*, more sparsely scaled—odd elytral intervals. Scale coloration and rostral erect scaling vary substantially within other populations of this species, and individuals with notably raised and darker odd elytral intervals are occasionally seen in the New Providence population, though these are never as strikingly striped as in the Long Island population. Compounding the issue, I have encountered very little material in collections from islands between Long Island and other known populations of this species, *i.e.*, Cat Island and the Exumas— and not only of this species but of entimines in general, suggesting perhaps not a gap in actual range but a gap in collecting efforts on these islands. This makes me uncertain whether the seemingly rather slight differences primarily in color and scale pattern seen between the Long Island population and other populations amount to ends of a gradient in form or to distinct species.

***Pachnaeus obrienorum* Reily, sp. nov.**

Figs. 3.40–3.45, 3.85I, 3.99

Pachneus "sp. ?" Leng and Mutchler 1914: 468

Pachnaeus "sp. (Leng & Mutchler 14-468)" Blackwelder 1947: 799

Pachnaeus "n. sp." Turnbow and Thomas 2008: 33

Pachnaeus opalus Wickham in Nutting 1895: 41, 207 (misidentification)

Pachnaeus "(?) *psittacus"* Strong 1933: 228 (misidentification)

Pachnaeus sp. "GZ13" Zhang et al. 2017

Diagnosis. This typically iridescently blue to turquoise scaled, but highly variable, species can be distinguished from similar congeners by its relatively short, strongly quadrate rostrum and by its typically strongly planar epifrons, with lateral carinae at most slightly dorsally raised and median carina at most very slightly raised as a thin line. The epifrons bears a patch of moderately to very dense, suberect, anteriorly directed, setose scales that typically overlap a dense mat of smaller, appressed, oval scales.

This species can readily be separated from the somewhat similar *P. litus* (Germar), which occasionally is collected in the Bahamas and may co-occur within the northern Cuban range of this species, by its rather truncate elytral bases which lack strong anterior projections near mid elytron and which lack an anteriorly directed, dentiform projection on the elytral base just mediad to the humeri. It also differs from most members of this species collected in the Bahamas by lacking a paler, longitudinal stripe of scales dorsomedially on the pronotal disc. This median stripe is typical of specimens of *P. litus* (Germar) collected outside of central to western Cuba, but not consistently present within *P. litus* as presently circumscribed (*e.g.*, Fig. 3.73G–H).

Pachnaeus obrienorum is somewhat similar to the continental United States species, *P. opalus* (Olivier), which has resulted in misidentifications of this species as such in past. These species do not appear to co-occur and *P. obrienorum* Reily, sp. nov. differs by its consistent lack of coarse punctation dorsally on the pronotal disc, by the tubular endophallic sclerite in males slightly laterally expanded subapically in ventral view, and typically by its usually more vibrant and more notably iridescent scales.

Description. Habitus typical of the genus**.** Body length 7.5 to 13.0 mm. Body width at elytral bases 2.5 to 5.5 mm. Integument variable, ranging from rufocastaneous to piceous. Moderately to densely clothed in a mix of typically vibrantly iridescent, variably colored, subcircular to oval, appressed scales with variably dense, white to yellowish, elongate and typically flattened, subappressed to suberect scales intermixed. Elytral scales are typically fairly uniformly colored dorsally, though in some populations, portions of the odd elytral intervals and the interval 10 near the humerus are more darkly and sparsely scaled than other intervals. In some populations, scales nearer the elytral punctures may be slightly paler than those further away. In all populations, elytral intervals 11 and 12 are often noticeably paler colored than other intervals. Pronotum with scales similarly colored to elytra, but usually with distinct and dense longitudinal patches of paler scales dorsolaterally in which the elongate scales tend to be larger and more numerous; in some populations these lateral paler-scaled patches join dorsally into indistinct paler-scaled patches just anterior to the posterior pronotal margin. Legs typically scaled in pale, appressed scales, in some specimens with patches of other colored, typically pale and moderately iridescent, scaling intermixed. Appressed head scales typically grey to off white, except on the epifrons and occiput where they are often bluish green to chartreuse, and with many, white to yellow, elongate, subappressed to erect scales intermixed, especially on the epifrons.

Head typical of the genus. **Occiput** without a median, longitudinal sulcus at base. **Interocular pit** small, round, but in most specimens entirely hidden beneath scales. **Eyes** oval, nearly twice as tall as wide, at most only very slightly protruding laterally from head. **Rostrum** with lateral carinae typically dorsally slightly raised, but not the median rostral carina, this typically giving the epifrons a planar to slightly concave appearance dorsally; strongly boxy and comprising about half the entire length of the head. **Median rostral carina** at most very slightly and very narrowly raised; when visible, usually very slightly wider and very slightly more raised at the anterior extent of the epifrons than posteriorly, though often mostly or entirely obscured by overlapping, appressed scales. **Intercarinal rostral spaces** usually not notably impressed, though in specimens with more strongly raised lateral carinae the entire epifrons may appear somewhat concave; usually densely clothed in overlapping, pale, circular to oval, appressed to subappressed scales with a many large, fairly long, suberect to erect, thick, setose scales intermixed.

Lateral rostral carinae variable, ranging from slightly raised dorsally to obsolete and often dorsally sparsely scaled to entirely denuded; generally, clearly defined laterally and distinctly demarcated from the lateral portion of the epifrons anterior to the eye. **Lateral portion of epifrons anterior to the eye** laterally faced and generally concavely impressed, at least immediately below the lateral rostral carinae. **Scrobe** arcuate, at most only very slightly widened posteriorly. **Occipital sutures** laterally open, elongate and narrowly longitudinal, slit-like foveae which transition anteriorly into a notable, longitudinal, groove-like impression that extends to or near the anterior extent of the rostrum; in many specimens occipital sutures obscured posteriorly by scales. **Frons** usually rather strongly angularly to curvilinearly declined from epifrons, usually fairly planar but with the nasal plate generally projecting from it slightly in lateral view; sparsely to moderately covered in pale, oval, appressed scales with a few pale, elongate, subappressed, scales intermixed, except on the largely denuded nasal plate. **Nasal plate** notably raised, mostly nude but occasionally bearing a few appressed scales posteriorly and typically bearing a few long setae set in punctures along the posterior margin.
Mandibles apically bearing numerous, long setae surrounding the mandibular scar.
Submentum about 1 to 1.5 times as long as wide, generally not impressed, at most very slightly so, its boundary often difficult to make out, especially posteriorly; variably clothed with pale, circular to oval, appressed to subappressed scales with a few short, pale, subappressed, setose scales intermixed.
Antennae typical of the genus. **Scape** extending well behind the posterior margin of eye.
Funicle with last two segments subconical.

Thorax typical of the genus. **Pronotum** somewhat variably shaped, but typically parallel sided or nearly so at the anterior margin, this owing to the relatively large and laterally expanded postocular lobes, sometimes with a very slight constriction behind this visible in dorsal profile, then convexly and curvilinearly expanding to near middle, then relatively parallel sided in the posterior half. Pronotal collar in lateral view laterally constricted and delimited by a wide impression behind the postocular lobe. Pronotal disc without a pair of posteriorly diverging ridges and not notably medially impressed. Clothed in overlapping, pale, usually rather iridescent, circular, appressed scales and with many pale, short, subappressed, setose scales intermixed. **Pronotal bases** only very weakly bisinuate to accommodate the slightly overhanging elytral bases. **Postocular lobe** relatively large; anteriorly projected as rounded to obtusely pointed projection; notably laterally expanded apically and extending ventrally to the level of the prosternal collar, thus leaving a large, open space between the postocular lobe and the head posterolaterally into which the apex of the antennal scape is received in some specimens. **Postocular vibrissae** clearly visible, moderately long, anterodorsomedially directed, and longest near the middle of the postocular lobe. **Prosternum** densely clothed in confused, pale, circular to oval, appressed scales with a few pale, erect, setose scales intermixed. **Mesoventrite** moderately to densely clothed in mostly nonoverlapping, pale, circular to oval, appressed scales, these usually notably sparser near the anterior margin. Mesoventrite intercoxal process with many moderately long, pale, subappressed, setose scales intermixed. **Metaventrite** densely covered in mostly nonoverlapping, pale, circular, appressed scales with many short, pale, subappressed, setose scales intermixed. Distance between mesocoxa and metacoxa about 1.5 times the diameter of the mesocoxa in females and a little more than the diameter of the mesocoxa in males. **Mesepisternum** moderately densely clothed in usually nonoverlapping (but see variation section), pale, circular to subcircular, appressed scales with a few short, pale, subappressed, setose scales intermixed. **Mesepimeron** usually similarly scaled to mesepisternum. **Metepisternum** somewhat similarly scaled to mesepimeron, though in most specimens scales more irregularly sized and generally smaller just behind the anterior margin. **Scutellar shield** variably shaped, though typically subquadrate with the posterior margin rounded; sparsely to moderately covered in pale, oval to subcircular, appressed scales, usually with a few, short, fine, pale, subappressed, setose scales intermixed.

Abdomen with ventrites 1 to 4 moderately to densely scaled with overlapping, pale, circular to oval, appressed scales with many pale, elongate, subappressed scales intermixed. Ventrite 5 similarly scaled, but apically with many longer erect setae intermixed.

Elytra entirely and moderately to densely scaled. Elytral striae composed of small but distinct, round punctures which are usually not overlapped by scales, but see variation section below. Elytral bases only very weakly bisinuate, typically slightly curvilinearly projecting obliquely anteriorly from scutellum to near mid-elytron, nearly truncate laterad to this. Anteriorly directed toothlike projection mediad to elytral humeri absent. Elytral humeri obtusely angulate.

Legs typical of the genus. **Coxae** moderately to densely clothed in overlapping, pale, appressed scales with many pale, elongate, subappressed, setose scales intermixed. **Trochanters** similarly scaled as coxae. **Femora** densely covered in pale, circular to oval, appressed scales with many short, pale, subappressed, setose scales intermixed. **Tibiae**

scaled similarly to femora, but appressed scales smaller and more elongate in general, and with several, small, pointed denticles along the ventral side. Protibiae linear to very slightly apically bent inward. Protibial mucro much shorter than the width of the tibia just proximad to it, not extending notably beyond surrounding setae. **Tarsi** dorsally clothed in pale, typically grey, linear, appressed scales. Tarsomere 5 about 1.5 to 2 times the length of tarsomere 3.

Male terminalia typical of the genus. **Penis** with temones about 0.59 times the length of the pedon. **Tegmen** about 0.55 times the length of the penis, with manubrium comprising about 0.60 times the total length. **Endophallus** with distal, tubular sclerite in dorsal view subcylindrical, slightly tapered near the apex and notably widened near the base; notably longer than (1.33 times) the width of the pedon adjacent to endophallus; nearly straight in lateral view, very slightly curved ventrally near middle and very slightly recurving anteriad to this, slightly tapered near apex; about 5.1 times as long as wide and about 0.19 times the length of the pedon; in ventral view with posterior ventral margin truncate to very slightly concavely arcuate. Sac-like proximal portion of endophallus entirely membranous. **Spiculum gastrale** with lateral margins of basal plate sigmoidal; basal plate about 0.79 times as wide as long, and about 0.30 times as long as the length of the apodeme.

Female terminalia typical of the genus. **Spiculum ventrale** with basal plate about 0.41 times the total length; basal plate at insertion of apodeme lacking a heavily sclerotized angular patch. **Coxites** about 0.58 times the total length of spiculum ventrale. Proximal gonocoxite about 0.53 times as tall as long; distal gonocoxite about 0.93 times as tall as long; distal gonocoxite about 0.52 times the length of the proximal gonocoxite.

Variation. There is a great deal of variation in color and pattern of scaling both within and between populations of this species. While some populations display typical forms when observed in congregate, individuals of most populations often aren't easily diagnosable to the level of population when taken singularly or in smaller series—though there are notable exceptions, *e.g.*, the Long Island population discussed below—and there is a great deal of overlap in shared forms between populations.

The South Bimini population (Fig. 3.44A–B) generally has all elytral intervals densely clothed in overlapping, iridescent, light blue green scales, with overlying sparse, short, setose scales intermixed. The anterior three-quarters or less of the first elytral interval and the anterior half or less of the third, ninth, and tenth intervals are slightly raised and slightly more sparsely scaled in some specimens. In even fewer specimens, intervals four and five near the elytral bases are also raised and slightly more sparsely scaled.

The Andros Island population (Figs. 3.40–3.42) is usually similarly scaled to the South Bimini population but varies in scale coloration substantially, ranging from blue green (Figs. 3.40–3.41) to coppery pinkish purple (Fig. 3.42C–D) to bluish-grey mottled with patches of darker blue (Fig. 3.42A–B). This population also seems to produce a bit more of the bright yellow, waxy exudate which often infills elytral punctures or cakes to setose scales in this species than in the South Bimini population.

The New Providence population (Fig. 3.43) is generally very slightly paler colored than those in South Bimini and Andros. Odd elytral intervals one through nine and interval 10 are generally very slightly raised anteriorly and more sparsely scaled than other intervals through much of their length, giving these a slightly darker appearance. Scales near the elytral punctures tend to be slightly paler than those further away in this population and the pronotum near the posterior margin tends to be paler scaled and often more heavily encrusted in pale yellow waxy exudate than in other populations. This waxy exudate often clogs some of the strial punctures, making them less obvious than in most other populations. A single specimen (Fig. 3.43C–D) is of a darker blue coloration.

The Eleuthera population is similar in form to those from South Bimini, but with all elytral intervals similar, and specimens from this island are generally very slightly darker in scale coloration on average than those in South Bimini.

The north-central Cuban population (Fig. 3.44C–D) is very similar to those from Eleuthera but tends to be slightly larger on average.

The Long Island population (Fig. 3.45) differs notably and substantially from other known populations. It has distinctly blue and off-white striped elytra, with odd intervals one through nine slightly raised and darker scaled than even intervals extending at least as far posteriorly as the declivity and often to the elytral apex. There are also similar dark scaled patches in some specimens anteriorly near the elytral humerus on intervals 10 and 11. Darker areas are sparsely scaled with only appressed, circular, darker, strongly iridescent blue scales, whereas the other intervals are covered in densely overlapping, pale blue and duller, oval, appressed scales overlain by many moderately long, white, subappressed to suberect, setose scales. Owing to the denser scaling of the even elytral intervals in this population, the strial punctures are usually less obvious and slightly smaller. In addition, this population does not appear to produce much of the yellow, waxy exudate seen in some of the other populations the pronotal scale coloration is generally paler than in other populations, and members of this population consistently possess distinct, paired punctures—one consistently present pair near the middle of the elytral disc and, usually, a second, more closely set pair in the basal sixth. The scales on the epifrons in this population are generally denser than in other populations, the scales on the mesepisternum are denser than in other populations and are very densely overlapping, and the scales on the mesepimeron and metepisternum are slightly sparser than those on the mesepisternum.

There are no known specimens of the genus collected from Exuma or Cat Island to date. This may be due to an actual gap in distribution, which would provide further evidence for the notion that the Long Island population constitutes not variation within this species but, instead, a distinct species. However, it is equally, if not more, likely this lack of representation is simply due to limited sampling of this area and not absence of this species on these islands. Whether there is a clear gradient from the less prominently striped forms from New Providence and South Bimini and the rather strikingly striped form on Long Island remains unknown. It may be wise for future workers to re-evaluate this population with the notion that it may be a distinct, though similar and likely very closely related, species in future should additional material from this population become available for study.

Material examined.

Holotype by present designation: <u>Bahamas:</u> North Andros: <u>Forfar Field Station:</u> female, "BAHAMAS: Andros Forfar Field Station 2 June 2001 R Turnbow | Pachnaeus sp. nov. 1 det. C. W. O'Brien 2006", ASUHIC, ASUHIC0088757.

76 Paratypes by present designation: <u>Bahamas:</u> North Andros: <u>Cactus Coppice:</u> 1 male, "BAHAMAS: Andros Island via Cactus Coppice 5-VI-2001 M.C. Thomas, beating", CWOB, ARTSYS0001327; 1 male, same data as previous, FSCA, ARTSYS0001328; Forfar Field Station: 1 male, "BAHAMAS: Andros Forfar Field Station 2 June 2001 R Turnbow | Pachnaeus sp. 1 det. C. W. O'Brien 2001", CWOB, ARTSYS0007603; 8 male, 7 female, "Bahamas: Andros Forfar Field Station 2 June 2001 R Turnbow", CWOB, ARTSYS0007604, ARTSYS0007605, ARTSYS0007606, ARTSYS0007607, ARTSYS0007608, ARTSYS0007609, ARTSYS0007610, ARTSYS0001258, ARTSYS0007611, ARTSYS0007612, ARTSYS0007613, ARTSYS0007614, ARTSYS0001257, ARTSYS0001259, ARTSYS0001265; 1 male, same data as previous, ASUHIC, ASUHIC0088758; 6 female, 8 male, "BAHAMAS: Andros Island Forfar Field Sta., Stafford Creek,2-8-VI-2001 coll. M.C. Thomas", CWOB, ARTSYS0007615, ARTSYS0001273, ARTSYS0001274, ARTSYS0001275, ARTSYS0001276, ARTSYS0001281, ARTSYS0007616, ARTSYS0007617, ARTSYS0001271, ARTSYS0001272, ARTSYS0001277, ARTSYS0001278, ARTSYS0001279, ARTSYS0001280; 5 female, 1 male, same data as previous, FSCA, ARTSYS0001298, ARTSYS0001299, ARTSYS0001300, ARTSYS0001301, ARTSYS0001302, ARTSYS0001304; 1 female, "BAHAMAS: Andros Island Forfar Field Sta., Stafford Creek,2-8-VI-2001 coll. M.C. Thomas | FSCA_0003", FSCA, ARTSYS0001303; 1 female, "BAHAMAS: Andros Island Forfar Field Sta., Stafford Creek,2-8-VI-2001 coll. M.C. Thomas | Pachnaeus sp. #1 det. C.W. O'Brien, 2001", FSCA, ARTSYS0001297; 2 female, "♀ | BAHAMAS, Andros Is. Forfar Res. Sta., VI-2-2001, R. Turnbow", CWOB, ARTSYS0007619, ARTSYS0007620; 3 male, "♂ | BAHAMAS, Andros Is. Forfar Res. Sta., VI-2-2001, R. Turnbow", CWOB, ARTSYS0007618, ARTSYS0007621, ARTSYS0007622; 2 female, 5 male, “BAHAMAS, Andros Is. Forfar Res. Sta., VI-2-2001, R. Turnbow”, CWOB, ARTSYS0001260, ARTSYS0001264, ARTSYS0001261, ARTSYS0001262, ARTSYS0001263, ARTSYS0001266, ARTSYS0001267, ARTSYS0001269, ARTSYS0001270; 1 female, same data as previous, CWOB, ARTSYS0001268; 1 female, 2 male, “BAHAMAS: Andros Isl. Forfar Field Station Stafford Creek | B. K. Dozier 2-9-VI-2001 Collector”, CWOB, ARTSYS0001282, ARTSYS0001283, ARTSYS0001284; 1 female, 1 male, same data as previous, FSCA, ARTSYS0001305, ARTSYS0001306; 1 female, “BAHAMAS: Andros Forfar Field Station 3 June 2001 R. Turnbow”, CWOB, ARTSYS0001285; 1 female, “BAHAMAS: Andros Is. Forfar Field Station 5 June 2004 R. Turnbow”, CWOB, ARTSYS0001286; 1 male, “BAHAMAS: Andros Is. Forfar Field Station 8 June 2004 R. Turnbow”, CWOB, ARTSYS0001287; 1 female, 1 male, “BAHAMAS: Andros Is. Forfar Field Station 22-VII-2006; T.R. Smith beating”, CWOB, ARTSYS0001288, ARTSYS0001289; 1 male, 2 female, same data as previous, FSCA, ARTSYS0001307, ARTSYS0001308, ARTSYS0001309; 1 female, “Andros Is. BAH. Forfar Field Stat 26 June, 1980 JW [& JJ; crossed out] Peaco[ck] Coll. | AT UV LITE | H. & A. Howden Collection”, CMNC, ARTSYS0007710; <u>Stafford Creek:</u> 1 female, “BAHAMAS: Andros Stafford Creek 4 June 2001 R. Turnbow”, CWOB, ARTSYS0001293; 1 female, same data as previous, CWOB, ARTSYS0001294; 2 female, “BAHAMAS: Andros Stafford Creek 5 June 2001 R. Turnbow”, CWOB, ARTSYS0001295, ARTSYS0001296; 1 male, same data as previous specimens, ASUHIC, ASUHIC0088759; 1 male, “BAHAMAS:Andros Island 1-2mi W. Stafford Creek 3-VI-2001 M.C. Thomas”, FSCA, ARTSYS0001330; 1 female, “BAHAMAS: N. Andros Island; vic. Stafford Creek; “Prescott Smith Dr.” [sic, including quotation marks]

24°53'53.6"N, 77°55'59.0"W; (pine frst w/ broadleaf undstry); 160w MV bulb;15-16.vii.2003; J.W. Gruber, J.D. Weintraub *et al.*", ANSP, ARTSYS0007701.

116 other specimens: Bahamas: Andros Island (North Andros, Central Andros, Mangrove Cay, or South Andros): 1 male, "Andros Isl. Bahamas Aug.1-10'04 [H.S.?] Barber | F. C. Bowditch Coll.", MCZ, [MCZ-ENT 00]529541; 1 female, "BWI: Bahamas Andros Is. | AI", FMNH, ARTSYS0007692; **North Andros:** Andros Town: 1 female, "Bahamas.AndrosI.Fresh Crk.AndrosTwnAndrosia. 06.VIII.1987.JBrowne.hi interior coppice shrub& tree sweeping. 87-162J", CMNC, ARTSYS0001395; Captain Bill's Blue Hole: 1 female, "BAHAMAS: Andros Is. Cpt. Bill's Blue Hole 27-VII-2006; T.R. Smith beating", FSCA, ARTSYS0001325; 1 male, "BAHAMAS: Andros Is. Capt. Bill's Blue Hole Central Andros Nat. Pk 27-VII-2006 coll. G.B. Edwards", FSCA, ARTSYS0001326; Jungle Pond: 1 male, "BAHAMAS:Andros Island Jungle Pond 7-VI-2001 coll. M.C. Thomas", CWOB, ARTSYS0001336; Maidenhair Coppice: 2 male, "BAHAMAS: Andros Is. Maidenhair Coppice 10 June 2004 R. Turnbow", CWOB, ARTSYS0001324, ARTSYS0001334; 2 male, "BAHAMAS: Andros Maidenhair Coppice 4 June 2001 R. Turnbow", CWOB, ARTSYS0001331, ARTSYS0001332; 1 female, same data as previous specimens, ASUHIC, ASUHIC0088760; 1 male, "BAHAMAS: Andros Island Maidenhair Coppice 4-VI-2001 M.C. Thomas, beating", CWOB, ARTSYS0001333; East of London Creek: 1 male, "BAHAMAS: Andros Is. 1-2 km. E. London Creek, 5 June 2004 R. Turnbow", CWOB, ARTSYS0001335; Mennonite Farm: 1 female, "Bahamas.AndrosI.Menne- nite'sFarm.31.VII.1987 JBrowne.low interior coppice edge beating (aftern). 87-144J", CMNC, ARTSYS0001394; 1 female, “Bahamas.AndrosI.Menne- nite’sFarm.31.VII.1987 JBrowne.low interior coppice edge beating (aftern). 87-144J | H. & A. Howden Collection”, CMNC, ARTSYS0007708; Owens Town: 1 female, “BAHAMAS: Andros Is.; Owens Town 6-VI-2004 M.C. Thomas”, FSCA, ARTSYS0001310; Rainbow Blue Hole: 1 female, “BAHAMAS: North Andros Island; vic. Fresh Creek, “Rainbow Blue Hole” [sic, including quotation marks] 24° 46' 51.0"N, 77° 51' 46.0" W; (tropical hardwood adj pine forest); 15.June.2004; *leg.* G. Cowper, J.W. Gruber, J.D. Weintraub *et al.*”, ANSP, ARTSYS0007702; Robinson’s Place: 1 male, “Bahamas.AndrosI.SanAndros Robinson’sPlace.JBrowne 10.VI.1987.wet pineland -blk.lt. 87-41J”, CMNC, ARTSYS0007709; Three Creeks Point: 1 female, “Bahamas.AndrosI.3.5mi.E. ThreeCrksPoint.Brier coppice 25.VII.1987. JBrowne.Savannah"tidal flat&salt marshland" beating. 87-127J”, CMNC, ARTSYS0001401; 2 female, 3 male, “Bahamas.AndrosI.3.5mi.E. ThreeCrksPoint.Brier coppice 26.VII.1987. JBrowne.Savannah"tidal flat&salt marshland" beating. 87-127J”, CMNC, ARTSYS0001400, ARTSYS0001405, ARTSYS0001402, ARTSYS0001403, ARTSYS0001404; Uncle Charlie’s Blue Hole: 1 female, “BAHAMAS: Andros Is. Uncle Charlies Blue Hole, 7 June 2004 R. Turnbow”, CWOB, ARTSYS0001290; 1 female, “BAHAMAS: Andros Island Uncle Charlie’s Blue Hole 3-VI-2001 coll. M.C. Thomas”, CWOB, ARTSYS0001291; **Central Andros:** Behring Point Settlement: 1 female, “BAHAMAS: Andros Is. Behring Point 5 June 2004 R. Turnbow”, CWOB, ARTSYS0001292; 1 male, “Bahamas.AndrosI.Behring Pt.BehringPtBeach. 12.VIII.1987.JBrowne. random srch.of beach drift. 87-198J”, CMNC, ARTSYS0001396; Cargill Creek: 1 female, “BAHAMAS Andros Is. Cargill Creek 25-VII-2006; T.R. Smith beating in cut vegetation”, FSCA, ARTSYS0001329; Guardian Blue Hole: 1 male, “BAHAMAS: Andros Is. Guardian Blue Hole 11 June 2004 R. Turnbow | Pachnaeus n. sp. det. C.W. O’Brien, 2006”, CWOB, ARTSYS0001337; <u>Man of War Sound Settlement:</u> 1 male, “Bahamas.AndrosI.Man-O- WarSnd.09.VIII.1987. JBrowne.high interior coppice shrub&tree beating. 87-190J”, CMNC, ARTSYS0001397; 3 male, “Bahamas.AndrosI.Man-O- WarSnd.09.VIII.1987. JBrowne.high interior coppice shrub&tree beating. 87-190J | H. & A. Howden collection”, CMNC, ARTSYS0007704, ARTSYS0007705; ARTSYS0007706; 1 male, 1 female, “Bahamas.AndrosI.Man-O- WarSnd.13.VIII.1987. JBrowne.high interior coppice morng.shrub& tree beating. 87-199J”, CMNC, ARTSYS0001398, ARTSYS0001399; 1 female, “Bahamas.AndrosI.Man-O- WarSnd.13.VIII.1987. JBrowne.high interior coppice morng.shrub& tree beating. 87-199J | H. & A. Howden collection”, CMNC, ARTSYS0007707; **Berry Islands:** <u>Little Harbor Cay</u>: 1 female, “Little Harbor Cay Berry Isl., Bahamas | Charles M. Stevens X-VI-1984 [= 10 June]”, FSCA, ARTSYS0001320; **Bimini:** <u>South Bimini</u>: 1 male, “BAHAMAS; B.W.I. South Bimini June 12 1967 B. K. Dozier | H. & A. Howden Collection | Pachnaeus sp. # 1 DET. A. HOWDEN ‘98”, CMNC, ARTSYS0007703; 1 female, 1 male, “BAHAMAS; B.W.I. South Bimini June 13 1967 B. K. Dozier”, CWOB, ARTSYS0001237, ARtSYS0001238; 1 female, same data as previous, FSCA, ARTSYS0001313; 1 male, “BAHAMAS; B.W.I. South Bimini June 13 1967 B. K. Dozier | H. & A. Howden Collection | Pachnaeus sp. not azurescens DET. at B.M. A T HOWDEN 1973”, CWOB, ARTSYS0001393; 3 male, “BAHAMAS; B.W.I. South Bimini June 14 1967 B. K. Dozier”, FSCA, ARTSYS0001314, ARTSYS0001315, ARTSYS0001316; **New Providence:** 1 female, “New Providence Isl. BAHAMAS: B.W.I. | B. K. Dozier VII-15-1974 coll. | Pachnaeus sp. nov. 1 | det. C. W. O’Brien

2007", FSCA, ARTSYS0001311; 1 male, "New Providence Isl. BAHAMAS: B.W.I. | B. K. Dozier VII-15-1974 coll.", FSCA, ARTSYS0001312; Clifton: 2 female, 1 male, "BAHAMA IS.New Prov.IS. Clifton 22 Sept. 1975 C.W.&L.B.O'Brien", CWOB, ARTSYS0007636, ARTSYS0007637, ARTSYS0007638; 1 male, "BAHAMA IS.New Prov.IS. Clifton 22 Sept. 1975 C.W.&L.B.O'Brien | Pachnaeus sp. nov. det. C. W. O'Brien 1999", CWOB, ARTSYS0001256; Lyford Cay: 6 female, 22 male, "BAHAMA IS.New Prov.Is., Lyford Cay 22-IX-1975 C.W.&L.B.O'Brien", CWOB, ARTSYS0007623, ARTSYS0007624, ARTSYS0007625, ARTSYS0001240, ARTSYS0001252, ARTSYS0001254, ARTSYS0007626, ARTSYS0007627, ARTSYS0007628, ARTSYS0007629, ARTSYS0007630, ARTSYS0007631, ARTSYS0007632, ARTSYS0007633, ARTSYS0007634, ARTSYS0007635, ARTSYS0001239, ARTSYS0001242, ARTSYS0001243, ARTSYS0001244, ARTSYS0001245, ARTSYS0001246, ARTSYS0001247, ARTSYS0001248, ARTSYS0001249, ARTSYS0001250, ARTSYS0001251, ARTSYS0001253; 1 female, same data as previous, CWOB, ARTSYS0001241; 1 male, "BAHAMA IS.New Prov.Is., Lyford Cay 22-IX-1975 C.W.&L.B.O'Brien | ♂", CWOB, ARTSYS0001255; Nassau: 1 female, "Bahamas: New Providence Nassau | 24 June 1897 C.J. Maynard.", MCZ, [MCZ-ENT 00]529540; 1 female, "Nassau, Bahamas. 1907-156.", NHMUK, ARTSYS0007694; Old Fort Bay: 1 male, 1 female, "BAHAMAS ISLANDS: New Providence, near Old Fort Bay 25° 02' 26"N, 77° 30' 08"W 10 June 2013 | On low shrubs after dark, gap at base of forested hill, coll. W. E. Steiner & J. M. Swearingen | sp 95", ASUHIC, ASUHIC0053775, ASUHIC0088786; Orange Hill: 1 female, "BAHAMA ISLANDS: New Providence, Orange Hill, forest off Blake Road 25° 3' 54"N, 77° 27'

14"W 11 June 2013 | mixed forest edge and road cut; coll. W. E. Steiner & J. M. Swearingen", ASUHIC, ASUHIC0088777; **North Eleuthera (see Wickham in Nutting 1895: 207):** 1 female, 1 male, "Eleuthera July 9-15. [1893 (see Wickham in Nutting 1895: 207)] | Bahamas Wickham. | F.C. Bowditch Coll.", MCZ, [MCZ-ENT 00]529546, [MCZ-ENT 00]529543; 1 male, "Eleuthera July 9-15. [1893 (see Wickham in Nutting 1895: 207)] | Bahamas Wickham. | F.C. Bowditch Coll. | Pachnaeus [faded]", MCZ, [MCZ-ENT 00]529547; 1 female, 2 male, "Eleuthera July9-15. [1893 (see Wickham in Nutting 1895: 207)] | Bahamas Wickham. | F.C. Bowditch Coll.", MCZ, [MCZ-ENT 00]529544, [MCZ-ENT 00]529545, [MCZ-ENT 00]529542; 1 female, "Eleuthera | Determ in Wickham | [green dot] | MUSEUM PARIS 1955 Coll. A. Clerc", MNHN, ARTSYS0007695; 1 male, "Eleuthera Isl Bahamas | July,9-15 [1893 (see Wickham in Nutting 1895: 207)] Wickham | 357 | Detm. by G.Marshall | [blank green label], ANSP, ARTSYS0007696; 1 male, "Eleuthera Isl Bahamas | July,9-15 [1893 (see Wickham in Nutting 1895: 207)] Wickham | B | [blank green label], ANSP, ARTSYS0007697; 2 male, 1 female "Eleuthera Isl Bahamas | July,9-15 [1893 (see Wickham in Nutting 1895: 207)] Wickham | B | [blank green label], ANSP, ARTSYS0007698, ARTSYS0007699, ARTSYS0007700; **South Eleuthera:** <u>Rainbow Bay</u>: 1 female, "BAHAMAS, Eleuthera Rainbow Bay 21-28-IV-1984 J.R. Wiley", FSCA, ARTSYS0001317; <u>Rock Sound</u>: 1 male, "BAHAMAS:Eleuthera Rock Sound,20-V- 1993,R2 A4 *Citrus* sp.", FSCA, ARTSYS0001318; 1 male, "BAHAMAS:Eleuthera nr. Rock Sound,20- V-1993,Bahama Survey Team,*Persea americana*", FSCA, ARTSYS0001319; **Long Island:** <u>Simm's Settlement:</u> 1 male, 2 female, "Simm's Long Is. Bahamas VII-36", MCZ, [MCZ-ENT

00]529551, [MCZ-ENT 00]529549, [MCZ-ENT 00]529550; 2 female, “Simm’s Long Is. 8-VIII-36 Bahamas “, MCZ, [MCZ-ENT 00]529553, [MCZ-ENT 00]529552.

Cuba: Camagüey Province: Camagüey: 1 female, “Camaguey, Cuba Col. J. Acuna Julio 20 1923. | Pres. by Imp. Inst. Ent. B. M. 1941-91”, NHMUK, ARTSYS0007693; Reserva Ecológica Limones-Tuabaquey: 1 male, “CUBA: Camagüey: Sierra de Cubitas, Reserva Ecológica Limones-Tuabaquey N21°34.330’ W077°47.540’ 64m, 15 May 2013 G. Zhang [CB 13_L12] [sic, including brackets] Savana | Pachnaeus sp. 3 det. N. M. Franz 2012 | sp 13 | [red label] Photo taken ”, ASUHIC, ASUHIC0033688; 1 female, “CUBA: Camagüey: Sierra de Cubitas, Reserva Ecológica Limones-Tuabaquey N21°34.330’ W077°47.540’ 64m, 15 May 2013 G. Zhang [CB 13_L12] [sic, including brackets] Savana | [red label] Photo taken | sp 13 | ”, ASUHIC, ASUHIC0033687; 1 female, “CUBA: Camagüey: Sierra de Cubitas, Reserva Ecológica Limones-Tuabaquey N21°34.330’ W077°47.540’ 64m, 15 May 2013 G. Zhang [CB 13_L12] [sic, including brackets] Savana | DNA | sp13”, ASUHIC, ASUHIC0033981; 2 female, 2 male, “CUBA: Camaguey, Sierra de Cubitas, Res.Ecol. Limones-Tuabaquey 21.57577 -77.79190, 67m 15.v.2013, R. Anderson savanna, hand collections 2013-103X”, CMNC, WWD0101937 / ARTSYS0001392, WWD0101938 / ARTSYS0001388, WWD0101940 / ARTSYS0001390, WWD0101941 / ARTSYS0001391; 1 male, “CUBA: Camaguey, Sierra de Cubitas, Res.Ecol. Limones-Tuabaquey 21.57577 -77.79190, 67m 15.v.2013, R. Anderson savanna, hand collections 2013-103X | Pachnaeus sp. 6 det. R.S. Anderson 2016”, CMNC, WWD0101939 / ARTSYS0001389; Monte Imias: 1 female, “CUBA:Monte Imias nr. California, Camaguey Prov. June 7, 1959 M. W. Sanderson C59-21 At light”, CWOB, ARTSYS0001363.

Etymology. The specific epithet *obrienorum* is a patronym in honor of Charles W. and Lois B. O'Brien, whose collecting and collection-building provided a significant portion of the material examined in this revision. This name is a noun in the genitive case and is neuter.

Geographical distribution and chorological affinities. This species is known primarily from islands on the Great Bahama Bank, with known collecting localities including South Bimini, Andros, the Berry Islands, Eleuthera, New Providence, and Long Island. It is also known from low-lying areas near the northern central coast of Cuba surrounding the Sierra de Cubitas range. Whether this Cuban population represents a recent—albeit pre-1923 based on specimen data available—introduction into Cuba from islands of the Great Bahama Bank or is a relict population which has resided on Cuba since prior to dispersal of this species into the Great Bahama Bank remains unclear.

This species is not presently known to co-occur with other, similar species but may, in fact, co-occur with introduced populations of *P. litus* (Germar) within the Bahamas and with introduced or native populations of *P. litus* (Germar) and/or *P. azurescens* Gyllenhal in Schoenherr within Cuba. The Little Bahama Bank species, *P. howdenae* Reily, sp. nov. and *P. ivieorum* Reily, sp. nov. have been recorded from Little Harbor Island, Eleuthera and from shipments of citrus purportedly originating in Great Exuma, respectively, and both species may potentially co-occur with this species. However, to their rounded pronotal shape, reduced postocular vibrissae, coarse pronotal punctation, and tan to brown coloration, they are unlikely to be confused with the present species.

Biology. This species has been recorded from both *Citrus* L. (Rutaceae) and Avocado (*Persea americana* Mill.; Lauraceae) in the vicinity of Rock Sound, South Eleuthera and is almost certainly the species reported by Strong (1933) as "on nearly all citrus plants" at Nassau and in the Blue Hills region (near 25.05°, -77.38°), New Providence and by Vaurie (1952) as common on Black Mangrove (*Avicennia germinans* (L.) Stearn; Acanthaceae) and "other trees" at Cavelle Pond, South Bimini. This species has been collected from late-April to late-September by sweeping and beating vegetation and via hand-collecting in a wide variety of low elevation forest and grassland habitats. It comes to lights occasionally and has been collected from beach wrack.

***sommeri* species group**

Diagnosis. This group has been constructed to contain a single species from eastern Cuba, *Exophthalmus sommeri* Munck af Rosenschoeld in Schoenherr, 1840, which expresses many characters atypical of the genus—namely, larger size, more elongate and ventrally curved rostrum with sigmoidal and somewhat laterally located occipital sutures, and heavily denuded elytral and pronotal surfaces that are banded with patches of dense, shaggy scaling. These are characters are, instead, rather typical of the Jamaican *Exophthalmus vittatus* (Linnaeus, 1758) + *E. similis* (Drury, 1773) + E. *impressus* (Fabricius, 1781) clade which Zhang et al. (2017) resolved as sister to *Pachnaeus*. However, endophallic structure (Fig. 3.85S) and presence of distinct tufts of postocular vibrissae arising from small postocular lobes seem to place this species within *Pachnaeus* as presently circumscribed.

It seems possible this lineage may have become established in Cuba after *Pachnaeus* diverged from its sister taxon but before a secondary dispersal event from Jamaica which resulted in other species of *Pachnaeu*s Schoenherr native external to Jamaica. Other non-Jamaican species of *Pachnaeus* are generally more similar in scaling, body shape and size, and rostral structure to known Jamaican species of the genus (*i.e.*, the *citri* species group) and I assume this to be because they are more closely related to these Jamaican taxa than to *P*. *sommeri*.

However, it is also possible this species is simply an aberrant form that exhibits numerous character reversals. This is seemingly less likely in terms of parsimony, but possible given some of the other convergences seen in this genus and related taxa, *e.g., P. gowdeyi* (Marshall) with *Lachnopus* Schoenherr, 1840 and *P. howdenae* Reily, sp. nov. + *P. ivieorum* Reily, sp. nov. with Geonemini Gistel, 1856.

A third alternative possibility is that this species may not actually be native to eastern Cuba but instead established there from a presently or recently occurring but unrecorded Jamaican population of the same species. I believe this to be unlikely but, given the propensity of members of this genus to be transported and become established outside of their native ranges, it is impossible to rule out.

A final possibility is that we (I and past authors) may simply be wrong in treating of postocular and endophallic sclerite characters as genus-level synapomorphies for *Pachnaeus*. While there is evidence which support these characters as synapomorphies for the genus in past morphological work (Franz 2012) and while I believe them to be synapomorphies and diagnostic of the genus, I cannot wholly rule this possibility out either.

I believe this likely Cuban species to be basal to all other species of *Pachnaeus* Schoenherr. I believe it to be derived from a common ancestor to all other species of the genus, and to constitute a clade that is sister to other species of *Pachnaeus* presented herein. This Cuban species was not included in molecular analysis by Zhang et al. (2017), who suggest only a single dispersal event of *Pachnaeus* from Jamaica to Cuba between 6 and 18 MYA and, as such, its exact placement within the genus still remains rather uncertain.

***Pachnaeus sommeri* (Munck af Rosenschoeld in Schoenherr, 1840: 339)**

Figs. 3.78–3.82, 3.85S, 3.100

Pachnaeus sommeri (Munck af Rosenschoeld in Schoenherr, 1840) **comb. nov.**

=*Exophthalmus sommeri* Munck af Rosenschoeld in Schoenherr, 1840: 339 (original combination)

Labram and Imhoff 1851: pl. II.66 + [text]; Mignaux and Jacquelin Du Val in De La Sagra 1855: Tab. 9, fig. 23; Jacquelin Du Val in De La Sagra and Guérin-Méneville 1857: 180; Lacordaire 1863: 120; Gemminger and Harold 1871: 2234; Horn 1876: 100; Monchicourt and Deyrolle 1878: 5; Heyne and Taschenberg 1908: 225, Leng and Mutchler 1914: 469; Sherborn 1930: 6023; Sherborn 1932: 490; Cross and Jefferys 2010: 30

Exophthalmus sommeri “var. β” Munck af Rosenschoeld in Schoenherr, 1840: 339

Infrasubspecific and representing variation in scale patch shape and connectedness.

Exophthalmus sommeri “var. γ” Munck af Rosenschoeld in Schoenherr, 1840: 339

Infrasubspecific and representing variation in scale patch shape and connectedness.

Exophthalmus sommeri “var. δ” Munck af Rosenschoeld in Schoenherr, 1840: 339

Infrasubspecific and representing variation in scale patch shape and connectedness.

Escophthalmus sommeri (Munck af Rosenschoeld in Schoenherr, 1840) sec. Gundlach 1891: 324 [misnumbered as 224] (incorrect subsequent spelling of *Exophthalmus* Schoenherr, 1823)

=*Diaprepes sommeri* (Munck af Rosenschoeld in Schoenherr, 1840) sec. Champion 1911: 180

Marshall 1922: 189; Guenther and Zumpt, 1933: 109 (in part, see below); Blackwelder 1947: 803; O’Brien and Wibmer 1982: 56; Morrone 1999: 127; O’Brien and Kovarik 2001; Peck 2005: 227

nec *Diaprepes sommeri* (Munck af Rosenschoeld in Schoenherr, 1840) sec. Guenther and Zumpt, 1933: 109 (in part)

This error was first pointed out by O’Brien and Wibmer 1982: 56 and addressed in limited detail by O’Brien and Kovarik 2001. References prior to 1840 and all references to works by Pierce do not relate to the present species, but to various junior synonyms of what is now *Diaprepes abbreviatus* (Linnaeus, 1758), primarily *D. sprengeleri* (Linnaeus, 1767) and the corrected form of this incorrect original spelling *Diaprepes spengleri* (Linnaeus, 1767) sec. Fabricius 1775.

Exophthalmus limnas Heyne and Taschenberg 1908: Taf. 29. No. 39
Incorrect subsequent spelling per ICZN 1999, Art. 32.5.1, and also corrected in text (Taschenberg 1908: 225).

This species has a very long history of taxonomic complication and, as such, some of the major issues deserves a thorough explication. The species was first described as a member of the genus *Exophthalmus* Schoenherr by Munck af Rosenschoeld in Schoenherr (1840: 339). Labram and Imhoff (1851: pl. II.66 + [text]) retained this species, along with *Prepodes scalaris* Boheman in Schoenherr, 1840, in *Exophthalmus* Schoenherr, but treated *Prepodes* Schoenherr, 1823 as a distinct genus in which they included mention only of the type species, *Curculio vittatus* Linnaeus, 1758 (Labram and Imhoff (1851: pl. II.69 + [text]).
Lacordaire (1863: 120) then treated *Diaprepes* Schoenherr, *Prepodes* Schoenherr, and *Callizonus* Schoenherr as junior synonyms of *Exophthalmus* Schoenherr, pointing to a lack of distinguishability of these taxa as justification for synonymizing them. He cited the initial placement of *Exophthalmus sommeri* within *Exophthalmus* Schoenherr by Munck af Rosenschoeld as not consistent with generic characters for *Exophthalmus* Schoenherr, 1823—specifically noting that *Exophthalmus* Schoenherr sec. Schoenherr 1834 (on p. 4) possessed (1) antennae moderately long with scape reaching the eyes and

gradually widening distally, with the two basal funicular articles short and obconical, the remaining funicular articles shorter and lenticular, and the club oblong ovate and acuminate, (2) the head behind the eyes elongate and sub-cylindrical, rostrum rather long and dorsally sub-planar at the base, and with rostral apex declined and slightly concave, and (3) eyes rounded and strongly produced. Lacordaire claimed these characters do not apply to *Exophthalmus sommeri* Munck af Rosenschoeld in Schoenherr and said that this species is instead consistent with characters given for *Prepodes* Schoenherr—specifically that this species is consistent the characters mentioned by Schoenherr (1834:16)—of (1) antennae moderately long with scape gradually thickening distally, funicular articles 1 and 2 obconical and subequal in length, the remaining funicular articles shorter and very shortly obconical, and with the club oblong and ovate, (2) the rostrum slightly longer than the head (presumably meaning the head behind the eyes), and more-or-less planar to very slightly convex, and with scrobes arcuate and extending posteriorly to the level of the ventral margin of the eye, and (3) eyes rounded and more-or-less prominent. However, Lacordaire did not explicitly move this taxon from its placement within *Exophthalmus* Schoenherr but his implication was placement within *Prepodes* Schoenherr.

Horn (1876: 100) said this species "should constitute a new genus of Tanymecini" on the basis of its pronounced postocular vibrissae, its more-or-less truncate elytral bases, and its feebly bisinuate pronotal base. However, Horn did not name this proposed new genus and retained this species in *Exophthalmus* Schoenherr.

Champion (1911) said that the unnamed proposed genus suggested by Horn (1876: 100) containing only *Exophthalmus sommeri* Munck af Rosenschoeld in Schoenherr would be (were it a named taxon) a junior synonym of *Diaprepes* Schoenherr and, thus, Champion implicitly moved *Exophthalmus sommeri* Munck af Rosenschoeld, 1840 into *Diaprepes* Schoenherr, 1823 but made no explicit statement of doing so.

Pierce (1916: 464) did not include this species within his treatment of *Exophthalmodes* Pierce, despite comments to the contrary by future authors, *e.g.*, Marshall (1922). This work proposed *Exophthalmodes* Pierce, 1916 as a replacement name for *Exophthalmus* Schoenherr. To justify his replacement name, Pierce incorrectly cited Schoenherr 1826: 115—instead of Schoenherr 1823: c. 1140—as the erection of *Exophthalmus* Schoenherr. Pierce also mistakenly treated *Exophthalmus* Schoenherr as a junior homonym of the French vernacular name “Le g[enre]. Exophthalme” Latreille, 1825: 249, a taxon at time of erection containing what is now *Denticollis linearis mesomelas* (L.) (Coleoptera: Elateridae). This confusion was in part likely caused by Berthold (1827) who provided a German-language translation of Latreille (1825) work with notes, additions, and Latinizations of most vernacular names proposed by Latreille. Berthold, thus, established *Exophthalmus* Berthold, 1827: 336 (=“Le g[enre]. Exophthalme” Latreille, 1825), an invalid junior homonym of *Exophthalmus* Schoenherr which was misinterpreted as being a genus created by Latreille by future authors. Pierce (1916) synonymized *Exophthalmus* Schoenherr by proper means via claiming its type species was a member of *Diaprepes* Schoenherr based on this species having postocular vibrissae, which it does. However, it is now clear this is not a reliable character with which to delimit genera in this group and future authors were correct in subsequently treating *Exophthalmus* Schoenherr and *Diaprepes* Schoenherr as distinct genera. Pierce, in erecting his new genus *Exophthalmodes* Pierce, provided no diagnosis for the genus, but the genus is available because it meets the requirements of Article 12, specifically 12.1, 12.2, and 12.2.5 (ICZN

1999). Ergo: *Exophthalmus* Schoenherr, 1823 is available, its type species is *Curculio quadrivittatus* Olivier, 1807; *Exophthalmodes* Pierce, 1916 is available, its type species is *Eustales opulentus* Boheman in Schoenherr, 1840; and based on preliminary work I have done, both appear to be distinct and valid genera, both differing from *Diaprepes* Schoenherr. Additional revisionary work beyond the scope of this paper is needed to define and delimit all of these taxa.

Marshall (1922: 189) accepted the claim by Pierce (1916) that *Exophthalmus* Schoenherr was preoccupied by a non-existent "*Exophthalmus* Latreille" at face value. Marshall reported that Pierce (1916) stated that Schoenherr's genotype of *Exophthalmus* Schoenherr—*Curculio quadrivittatus* Olivier, 1807—could not be the type species of *Exophthalmodes* Pierce "because it has postocular vibrissae on the prothorax and therefore belongs to the genus *Diaprepes* Schh." and this is, effectively, this is in fact what Pierce claimed, though he was not explicit in the matter. Marshall then claimed that Pierce's establishment of *Exophthalmodes* Pierce, 1916 was "unfortunate" because Pierce selected a species not included in *Exophthalmus* Schoenherr, 1823 in later treatment by Schoenherr (apparently Schoenherr 1834: 4–7)—*i.e., Eustales opulentus* Boheman in Schoenherr, 1840—as the type species of *Exophthalmodes* Pierce. This complaint by Marshall is wholly irrelevant given that *Exophthalmus* Schoenherr and *Exophthalmodes* Pierce are both available genus names and therefore should (!) have distinct type species. Marshall, despite his complaints that the genus *Exophthalmodes* Pierce was not available—he did not use the term available, but this is effectively his claim—nevertheless accepted and used Pierce's new genus name, *Exophthalmodes* Pierce, as valid throughout his work. Marshall then claimed that the validity of Pierce's assignment of *Eustales opulentus* Boheman in Schoenherr as the type species of *Exophthalmodes* Pierce need not even be considered as valid on grounds that Pierce's claim that *Curculio quadrivittatus* Olivier cannot be the type species of *Exophthalmus* Schoenherr because Pierce considered *Curculio quadrivittatus* Olivier, the type species of *Exophthalmus* Schoenherr, to be a species of *Diaprepes* Schoenherr based solely upon Pierce's claim that this species possesses postocular vibrissae—a character which Marshall claims it does not possess. To explicate: Marshall claimed that he thought Pierce wasn't actually looking at *Curculio quadrivittatus* Olivier when he moved *Curculio quadrivittatus* Olivier to *Diaprepes* Schoenherr, but instead that he was looking at *Exophthalmus sommeri* Munck af Rosenschoeld in Schoenherr. Marshall then called *Exophthalmus sommeri* Munck af Rosenschoeld in Schoenherr a member of *Diaprepes* Schoenherr, following Champion (1911).

Note that *Curculio quadrivittatus* Olivier, 1807, the validly designated genotype of *Exophthalmus* Schoenherr does—despite Marshall's claim to the contrary—possess postocular vibrissae and Pierce was probably—despite Marshall's claim to the contrary—actually looking at *Curculio quadrivittatus* Olivier as Pierce originally claimed he was and not at *Exophthalmus sommeri* Munck af Rosenschoeld in Schoenherr as claimed by Marshall. Admittedly, in *Curculio quadrivittatus* Olivier the postocular vibrissae are few, sparse, moderately short, and sometimes difficult to make out, which may be the origin of this confusion on Marshall's part. This species, and many other members of the primarily Hispaniolan *Exophthalmus* Schoenherr, 1823 *sensu stricto*, do have postocular vibrissae, as do some but not all members of the primarily Lesser Antillean *Diaprepes* Schoenherr, 1826, as do all members of *Pachnaeus* Schoenherr, 1826, as do some but not all other continental taxa, and as do many other genera across the subfamily Entiminae.

Like the type species of *Exophthalmodes* Pierce, *Eustales opulentus* Boheman in Schoenherr, 1840: 365, other mainland Central American species treated by Pierce in *Exophthalmodes* Pierce—*i.e.*, *Diaprepes verecundus* Chevrolat, 1833: 16, *Exophthalmus cupreipes* Champion, 1911: 257, *Platyomus carinirostris* Boheman in Schoenherr, 1840: 187, *Exophthalmus vitticollis* Champion, 1911: 256, *Exophthalmus carneipes* Champion, 1911: 257, *Geonemus agrestis* Boheman in Schoenherr, 1834: 291, *Exophthalmus distigma* Champion, 1911: 259, *Exophthalmus scalptus* Champion, 1911: 259, *Eustales impositus* Pascoe, 1880: 427, *Exophthalmus triangulifer* Champion, 1911: 261, *Exophthalmus duplicatus* Champion, 1911: 263, *Exophthalmus caeruleovittatus* Champion, 1911: 264 ("*coeruleovittatus* Champion" (Pierce 1916: 465) is an incorrect subsequent spelling), *Exophthalmus lunaris* Champion, 1911: 266, *Praepodes jekelianus* Jekel and White, 1858: 357, and *Exophthalmus sulcicrus* Champion, 1911: 268—do not have postocular vibrissae.

Hustache (1931), Lona (1938), van Emden (1944), Voss (1954), Kuschel (1955), Vaurie (1961), Alonso-Zarazaga and Lyal (1999), and Franz (2012) did not include explicit mention of *Exophthalmus sommeri* Munck af Rosenschoeld, 1840 in their respective works, leaving its placement within their circumscriptions of the above-mentioned genera uncertain, but I here treat these works to show how these authors treated genus names within these taxa.

Hustache (1931 190) treated *Exophthalmus* Schoenherr as a junior synonym of *Prepodes* Schoenherr and in doing so incorrectly citied Schoenherr 1826 (pp. 115 and 117 for

Exophthalmus Schoenherr and *Prepodes* Schoenherr respectively) as the establishment of both of these genus names.

Lona (1938: 518) and Voss (1954: 200) treated *Exophthalmodes* Pierce as a valid replacement name for *Exophthalmus* Schoenherr, both following Pierce in treating Schoenherr's 1826 work as the establishment of *Exophthalmus* Schoenherr, 1823 and both incorrectly treating *Exophthalmus* Schoenherr as a junior homonym of "Le g[enre]. Exophthalme" Latreille, 1825.

van Emden (1944: 50) seems to have considered both *Exophthalmus* Schoenherr and *Exophthalmodes* Pierce as valid and distinct genera, but also, confusingly, treated *Exophthalmodes* Pierce as a synonym of *Prepodes* Schoenherr elsewhere in the same work (p. 521, in note).

Kuschel (1955: 305) treated *Exophthalmus* Schoenherr as a valid name and did not mention *Exophthalmodes* Pierce.

Vaurie (1961: 14), in her comprehensive overview of the Jamaican members of the genus *Exophthalmus* Schoenherr, 1823 *sensu lato* first addressed in detail (1) the discrepancy in typical citation of Schoenherr 1826 for establishment of *Exophthalmus* Schoenherr, *Diaprepes* Schoenherr, and *Prepodes* Schoenherr, (2) the mistreatment of the French vernacular name "Le g[enre]. Exophthalme" Latreille, 1825 as valid, and (3) pronotal base characters mentioned for distinguishing members of *Exophthalmus* Schoenherr, 1823 *sensu stricto*—*i.e.,* species near *E. quadrivittatus* (Olivier, 1807)—from similar taxa including *Pachnaeus* Schoenherr. Vaurie treated *Exophthalmodes* Pierce and *Prepodes* Schoenherr as synonyms of *Exophthalmus* Schoenherr.

Alonso-Zarazaga and Lyal (1999: 158) treated *Prepodes* Schoenherr as a synonym of *Exophthalmus* Schoenherr and *Exophthalmodes* Pierce as an unjustified replacement name for *Exophthalmus* Schoenherr.

Franz (2012) makes use of both *Exophthalmus* Schoenherr and *Exophthalmodes* Pierce as distinct, although inconsistently exchanging these names within the paper (*e.g.*, "*Exophthalmodes roseipes–Exophthalmodes quinquedecimpunctatus* clade" on p. 519, but elsewhere in the paper these treated as *Exophthalmus* Schoenherr) and the species here included under *Exophthalmodes* Pierce appear to be members of a distinct Greater Antillean clade (*i.e.*, "Eustylini II clade Caribbean", probably =*Tropirhinus* Schoenherr, 1823) including members of *Compsoricus* Franz, 2012 and *Tropirhinus* Schoenherr, not mainland Central American species as Pierce (1916) delimited his genus.

Most recent works treating this species in either *Diaprepes* Schoenherr (O'Brien and Wibmer 1982, O'Brien and Kovarik 2001, Peck 2005) or *Exophthalmus* Schoenherr (Cross and Jeffreys 2010).

Based on my examination of a large number of species within this group, including the type species of *Exophthalmus* Schoenherr, 1823 (*Curculio quadrivittatus* Olivier, 1807), of *Exophthalmodes* Pierce, 1916 (*Eustales opulentus* Boheman in Schoenherr, 1840), of *Diaprepes* Schoenherr, 1826 (*Curculio abbreviatus* Linnaeus, 1758), and of *Prepodes* Schoenherr, 1823 (*Curculio vittatus* Linnaeus, 1758), and based also on available molecular work (Mazo-Vargas 2011, Zhang et al. 2017), it seems that *Exophthalmus* Schoenherr, 1823, *Exophthalmodes* Pierce, 1916, *Diaprepes* Schoenherr, 1826, and *Prepodes* Schoenherr, 1823 are distinct genera. However, additional work is needed to circumscribe and delimit these non-focal taxa.

The authorities “Rosenschoeld”, “Rosenschoeld in Schoenherr”, “Munck”, “Munck in Schoenherr” and various abbreviations of “Rosenschoeld” appear in the literature and all refer to the same author and publication, Eberhard Munck af Rosenschoeld in Schoenherr (1840).

Cross and Jefferys (2010: 30) treated this species as a member of the family Anthribidae Billberg, 1820 while other members of *Exophthalmus* Schoenherr are herein treated as Curculionidae Latreille, 1802, lists the authority “Rausenhauer, 1840” which is likely a misspelling of the name of Wilhelm Gottlob Rosenhauer based on misinterpretation of various abbreviations of Munck af Rosenschoeld’s name from older identification labels—*e.g.*, “Rld.”, “Rosensch.”, “Rosenskj.”—and/or at the end of the original species description—“RLD.”

Diagnosis. This species is readily distinguished from other members of the genus by its unique pattern of patches of shaggy white scaling. Elytral scaling in this species is composed of a longitudinal stripe of elongate, appressed, white, scales along the sutural margin, two large stripes of shaggy white to off-white scales, these often darkened with tan waxy exudate—one of these stripes arising at the middle of the elytral base and the other on the lateral face of the elytron below the humerus, and typically also by similarly shaggy scaled, variably expressed patches located laterally on the posterior portion of the elytra between the large stripes of scales. The elytra are elsewhere mostly denuded, somewhat glabrous, and covered in confused, fine, shallow punctures. The pronotum in this species bears similar, densely scaled patches of shaggy, white to off-white scales, often darkened with tan waxy exudate dorsolaterally and laterally. This species is generally larger than other members of the genus, it has a significantly longer rostrum with median rostral carina obsolete and with irregularly long, mostly ventrally located, and somewhat sigmoidal occipital sutures. It has rather strongly quadrate elytral bases with strongly produced, subrectilinear elytral humeri. The combination of larger size, longer rostrum, and scale pattern make this species superficially similar in appearance to some members of the genus *Diaprepes* Schoenherr *sensu stricto*, hence past taxonomic confusion.

It is also similar to some striped species of *Exophthalmus* Schoenherr, 1823 *sensu stricto*, including similarly patterned Hispaniolan species—*e.g., E. quadrivittatus* (Olivier, 1807) (the type species of *Exophthalmus* Schoenherr, 1823), *E. laetus* (Olivier, 1807), and *E. mannerheimi* Boheman in Schoenherr, 1840—and to the Southeastern Cuban *E. pictus* (Guérin-Méneville, 1847), all of which possess postocular vibrissae. However, these species can readily be distinguished by having at their pronotal base a typically longitudinally linear incision medially which is surrounded on either side by small, dorsally raised, posteriorly expanded lobes. These species also differ by the presence of additional and non-tubular aedeagal sclerites. The aforementioned Hispaniolan species also have shorter and more robust antennae, and they typically have faint but posteriorly obliquely diverging lateral rostral carinae which join with or approach the median carina posteriorly in the interocular space.

This species is also similar to the closely related (Zhang et al. 2017) Jamaican *Exophthalmus impressus* (Fabricius, 1781) and, to an even greater extent of similarity, the typically striped species *E. similis* (Drury, 1773) and *E. vittatus* (Linnaeus, 1758). This group was treated in detail by Vaurie (1961) who recognized several unnamed infrasubspecific varieties within all three species. This group—members of which are known to establish outside of their native range (Thomas 2011)—likely constitutes a natural clade that remains severe need of revision and it is likely that some of Vaurie's varieties represent distinct species on the basis of wide variation in not just scale color (red or orange to white to yellow versus iridescent blue to green) and pattern (variation in elytral stripe placement, number, and length, presence of scattered sparse scaling outside of distinct stripes, and presence/absence of patches of appressed scales on the pronotal bases), but also in scale structure (elytral stripe scales suberect versus appressed, elongate-linear vs. oval, and distal scale margins plumose versus entire) and producedness or lack thereof of pale colored, typically bright red to yellow, sometimes off white, waxy exudate. *Pachnaeus sommeri* Munck af Rosenschoeld in Schoenherr differs from these Jamaican species by its narrower pronotum with less-strongly bisinuate pronotal bases, by its strongly truncate elytral bases with humeri strongly subrectilinear, by its pronounced, elongate tufts of postocular vibrissae arising from a slightly but distinctly produced postocular lobe, and by its endophallus which possesses only a single, long, subconical, tubular endophallic sclerite.

Redescription. Habitus not typical of genus owing to larger and more elongate form, more elongate and curved rostrum, and pattern of patches of dense, shaggy, white to off-white scales and denuded areas; this combination of characters makes this species somewhat similar in form to the eastern Cuban *Exophthalmus pictus* (Guérin-Méneville, 1847), the Jamaican *E. vittatus* (Linnaeus), and members of the widespread Antillean genus *Diaprepes* Schoenherr. Body length 11.0 to 19.5 mm. Body width at elytral bases

4.5 to 7.5 mm. Integument piceous to atrous. Elytra striped, with suture, apex, and lateral margin clothed in white, elongate to setose, appressed scales, and each elytron bearing two thick stripes of very dense, white to off white, subappressed to suberect, shaggy scales, these stripes typically slightly darkened from being heavily encrusted in tan waxy exudate; the more dorsally located of these longitudinal elytral scale stripes sometimes partly or entirely interrupted before middle by an oblique, denuded band; in most specimens with a few scattered patches of similar, white to off white, shaggy scales halfway between these thick stripes of scales in the posterior half; elsewhere mostly denuded and confusedly punctate. Pronotum dorsolaterally and ventrolaterally on each side with four irregular and variably interconnected patches of very dense, white to off white, subappressed to suberect, shaggy scales, these typically heavily encrusted in tan waxy exudate; elsewhere fairly sparsely scaled in at most a few, scattered, white, appressed, setose scales and with much of the underlying, dark integument visible. Head with patches of dense, white, oval to elongate, appressed scales over the eyes; ventrolaterally moderately clothed in white, oval to elongate, appressed scales, and elsewhere rather sparsely scaled except for a very few scattered, whit, appressed, setose scales and with much of the underlying dark integument visible. Legs generally sparsely scaled with much of the underlying integument visible except on dorsal and ventral aspects of femora which bear patches of moderately dense, white, appressed scales. Venter laterally generally densely scaled with patches of white, appressed scales and medially generally sparsely scaled and with much of the underlying integument visible. **Head** rather atypical of the genus owing to the elongate and more curved rostrum and long, sigmoidal occipital sutures and somewhat sigmoidal scrobes. **Occiput** without a median, longitudinal sulcus at base. **Interocular pit** small, circular, sometimes with a slight impression behind the pit but otherwise the interocular area around it usually strongly glabrous and subplanar. **Eyes** subcircular, at most very slightly taller than wide, slightly protruding laterally from head in both sexes. **Rostrum** with dorsal surface subplanar, with only very slight grooves that separate the very slightly raised lateral carinae from the flat to very slightly convex median portion of the epifrons, lacking a distinct central carina; rostrum very long and slightly curved, comprising 2/3 the entire length of the head. **Median rostral carina** obsolete; the middle of the epifrons as a subplanar to slightly convex, finely punctured and heavily denuded subplanar area; mostly nude and with most of the underlying glabrous, dark integument visible; with at most a few, short, white, appressed, elongate to setose scales laterally. **Intercarinal rostral spaces** very narrow; at most very slightly impressed between median area and lateral carinae; sparsely to moderately clothed in white, elongate to oval. appressed, setose scales. **Lateral rostral carinae** at most very slightly raised dorsally; not clearly defined ventrolaterally and not distinctly demarcated from the lateral portion of the epifrons anterior to the eye. **Lateral portion of epifrons anterior to the eye** obliquely laterally faced, subplanar to very slightly concave, slightly but very distinctly impressed just anterior to the eye, giving the anterior margin of the eye a strongly protrusive and somewhat tumescent appearance. **Scrobe** arcuate but usually with a slight curve of the dorsal margin near the posterior extent, giving the scrobe a very slightly sigmoidal appearance, at most very slightly widened posteriorly. **Occipital sutures** ventrolaterally to ventrally open; long, longitudinally sigmoidal, slit-like foveae that are usually somewhat obscured posteriorly by scales. **Frons** slightly curvilinearly declined from epifrons; slightly concavely impressed surrounding the nasal plate; mostly nude except a few appressed, elongate, white scales laterally. **Nasal plate** slightly raised, nude, and typically bearing several long setae set in punctures along the posterior margin.

Mandibles apically bearing numerous, long setae surrounding the mandibular scar.

Submentum about 2 to 2.5 times as long as wide, slightly impressed; moderately densely clothed in pale, suberect, moderately long, setose scales.

Antennae with antennomeres notably more stout than usual, but otherwise mostly typical of the genus excepting the last two funicular segments. **Scape** extending at most as far posteriorly as near the posterior margin of eye, never behind. **Funicle** with last two segments strongly widened and verging on subglobose.

Thorax generally typical of the genus excepting the unique scaling pattern of pale, shaggy scaled patches and heavily denuded areas. **Pronotum** typically slightly laterally constricted immediately behind the anterior margin and then, posterior to this, curvilinearly widening to near middle, then posteriorly typically subparallel, in some specimens very slightly laterally constricted near the pronotal base. Pronotal disc with very fine, shallow, irregularly sized, confused punctures visible in sparsely scaled areas. Pronotal collar laterally constricted and delimited by a groove behind the postocular lobe. Pronotal disc without a pair of posteriorly diverging ridges and not notably medially impressed. Dorsomedially mostly denuded except a few, short, white, appressed, setose scales, these mostly concentrated near the discal midline; dorsolaterally on each side with a pair of irregularly shaped and often connected patches of very dense, white but typically heavily encrusted in tan waxy exudate, subappressed to suberect, shaggy scales and ventrolaterally with a similarly shaggy-scaled pair of variably connected patches;

laterally with the typically somewhat diamond-shaped area between dorsoventral and dorsolateral shaggy-scaled patches mostly denuded except a few, scattered, short, white, appressed, setose scales. Medial, longitudinal, linear mid-discal suture present as a series of irregular punctures, these sometimes joined together into linear impressions in places and often partly overlapped by a few, small, pale, setose, appressed scales. **Pronotal bases** at most only very slightly bisinuate. **Postocular lobe** small, anteriorly angularly projected, not notably laterally expanded apically. **Postocular vibrissae** clearly visible, moderately long, anterodorsally directed, and usually longest at the middle of the postocular lobe. **Prosternum** moderately clothed in confused, white, oval to elongate, appressed scales, with many, moderately long, pale, suberect to erect, setose scales intermixed. **Mesoventrite** moderately to densely clothed in overlapping, white, oval, appressed scales posteriorly; scales notably sparser and smaller near the anterior margin. Mesoventrite intercoxal process with many moderately long, pale, setose scales intermixed. **Metaventrite** laterally with trigonal patches of dense, white but often partly caked in tan waxy exudate, oval to elongate, appressed scales covering the anterodorsal half of the lateral aspect and with a transverse band of moderately dense, pale, oval to elongate, appressed scales along the posterior margin; elsewhere very sparsely clothed in linear, white, appressed scales with much of the surrounding integument visible and with a few short, setose scales intermixed. Distance between mesocoxa and metacoxa about 1.5 times the diameter of the mesocoxa. **Mesepisternum** densely clothed in white, oval, appressed scales and a few short, white, appressed, setose scales intermixed throughout except in a small patch along the ventral margin. **Mesepimeron** similarly scaled to mesepisternum, though scales typically a bit sparser—especially anteriorly—and generally larger and more elongate. **Metepisternum** in anterior, dorsoventrally expanded portion densely covered in overlapping, white, oval, appressed scales and with a few short, white, subappressed, setose scales intermixed, the posterior portion generally bearing only a few subappressed setose scales and occasionally posteriorly with just a few pale, oval, appressed scales intermixed and with much of the underlying, dark, rugose integument visible. **Scutellar shield** somewhat ogival with the posterior margin rounded and the lateral margins usually very slightly laterally constricted in the anterior half; mostly denuded, bearing at most only a few small, fine, white, appressed, setose scales.

Abdomen with ventrite 1 bearing a pair of crescent shaped patches of dense, white, appressed, oval scales behind the metacoxae and a transverse patch of similar appressed scales along the posterior margin near middle, elsewhere very sparsely clothed in white, linear, appressed, scales with much of the surrounding integument visible; ventrite 2 with irregularly shaped patches of dense, white, oval, appressed scales covering most of the lateral quarters to fifths of the ventrite, but ending slightly mediad to the lateral margin, elsewhere very sparsely clothed in white, linear, appressed scales with much of the surrounding integument visible; ventrites 3 and 4 with dense, white, oval to elongate, appressed scales laterally, medially rather sparsely clothed in white, linear, appressed scales with much of the surrounding integument visible; ventrites 1 to 4 throughout with many short, pale, suberect, setose scales intermixed; ventrite 5 in females medially rather densely covered in white, oval to elongate, appressed scales, and laterally rather densely clothed in white, appressed to subappressed, setose scales; ventrite 5 in males medially somewhat sparsely clothed in white, subappressed to suberect, setose scales, and laterally clothed in dense, white, oval to elongate, appressed scales; ventrite 5 in both sexes throughout with many moderately long, pale, suberect to erect, setose scales intermixed.

Elytra with a stripe of densely overlapping, white, appressed, elongate scales along the sutural margin; with two pair of thick, irregular stripes of very dense, white but typically heavily encrusted in tan waxy exudate, subappressed to suberect, shaggy scales—one pair located dorsally and occupying about the middle half to third of the dorsum of each elytron, the other pair located laterally on the epipleura below the elytral humerus; in most specimens with a few, small, scattered, irregular patches of shaggy scales between dorsal and lateral shaggy scaled stripes; with scattered, white, elongate to setose, appressed scales along the lateral margins of the elytra and on the elytral apices; elsewhere mostly nude, with most of the underlying, confusedly punctate and relatively glabrous, dark integument visible. Elytral striae not distinct, with strial punctures entirely hidden by shaggy scaled stripes and not readily distinguishable from other, confused punctures in denuded areas. Elytral bases rather strongly truncate, at most extremely slightly curvilinearly projecting obliquely anteriorly immediately laterad to scutellum and nearly truncate laterad to this. Anteriorly directed toothlike projection mediad to elytral humeri absent. Elytral humeri rounded right angular.

Legs typical of the genus. **Coxae** moderately to densely clothed in white, oval, appressed scales with many pale, appressed to subappressed, setose scales intermixed. **Trochanters** with only a few pale, appressed to subappressed, setose scales. **Femora** dorsally rather densely clothed in white, elongate to oval, appressed scales and with pale, appressed, setose scales intermixed; scaled similarly ventrally but more sparsely; laterally only very sparsely clothed with pale, appressed, setose scales and with much of the underlying integument visible; moderately long, pale, subappressed, setose scales intermixed throughout, these denser where appressed scales are denser. **Tibiae** sparsely scaled in white, appressed to erect, setose scales and with a few, small denticles along the ventral side. Protibiae notably apically bent inward. Protibial mucro much shorter than half the width of the tibia just proximad to it, not extending notably beyond surrounding setae. **Tarsi** dorsally clothed in only pale, appressed to erect, setose scales. Tarsomere 5 about 2 times the length of tarsomere 3.

Male terminalia typical of the genus. **Penis** with temones about 0.62 times the length of the pedon. **Tegmen** about 0.52 times the length of the penis, with manubrium comprising about 0.64 times the total length. **Endophallus** with distal, tubular sclerite in dorsal view subconical, tapered near the apex and slightly widened near the base; notably longer than (1.35 times) the width of the pedon adjacent to endophallus; mostly straight in lateral view, notably tapered—more notably ventrally than dorsally—and slightly upturned ventrally near the apex, and slightly ventrally expanded at the base; about 5.8 times as long as wide and about 0.18 times the length of the pedon; in ventral view with posterior ventral margin very slightly concavely arcuate. Sac-like proximal portion of endophallus entirely membranous. **Spiculum gastrale** with lateral margins of basal plate sigmoidal; basal plate about 0.69 times as wide as long, and about 0.33 times as long as the length of the apodeme.

Female terminalia typical of the genus. **Spiculum ventrale** with basal plate about 0.43 times the total length; basal plate at insertion of apodeme lacking a heavily sclerotized angular patch. **Coxites** about 0.52 times the total length of spiculum ventrale. Proximal gonocoxite about 0.62 times as tall as long; distal gonocoxite about 0.79 times as tall as long; distal gonocoxite about 0.65 times the length of the proximal gonocoxite.

Variation. Munck af Rosenschoeld in Schoenherr (1840) included four unnamed varieties in the original description of this species, “var. β”, “var. γ”, “var. δ”, and an implied but unnamed variety (*i.e.*, “var.” on labels relating to it). Based on examination of images of the type material and other available specimens, these variants appear to constitute a continuum of slight variation in connectedness and size of pronotal shaggy scale patches, variation in interruption of dorsal elytral shaggy scale stripes anterior to mid elytron, and variable rubbing of the sutural white stripe of scales on the elytra. There appears to be a wide spectrum of variation in size, connectedness, and completeness of pronotal patches and elytral stripes within this species.

The specimen listed above from Baracoa, Havana is a bit smaller than the others and lacks scattered patches of pale scaling posteriorly on the elytra between the large, shaggy-scaled stripes, but still appears to be a good match to other known members of this species, these minor differences probably representing individual- or population-level variation.

Material examined.

Lectotype by present designation (Fig. 3.78B): Cuba: unnamed variety male, no data, NHRS Chevrolat collection, NHRS-JLKB 000065523.

4 paralectotypes by present designation (Figs. 3.78–3.79): Cuba: 1 var. γ female, "422.", NHRS Chevrolat collection, NHRS-JLKB 000065522; 1 unnamed variety male, "Cuba | Sommer | [blank orange label] | Var. [label pinned into drawer above specimen]", NHRS Schoenherr collection, NHRS-JLKB 0000 65526; 1 var. β female, "Ins. Cuba. Zetterstedt. | Paratypus [red label] | Var. β. [label pinned into drawer above specimen]", NHRS Schoenherr collection, NHRS-JLKB 000065524; 1 var. δ male, "Ins. Cuba. Germar. | Paratypus [red label] | Var. δ. [label pinned into drawer above specimen]", NHRS Schoenherr collection, NHRS-JLKB 000065525.

Monchicourt and Deyrolle (1878: 5) provide an advertisement in which Felix Monchicourt, with the help of Emile Deyrolle, offers the former's collection for sale at a price of 50,000 Fr., claiming that his collection contains type specimens from collection of Félix Édouard Guérin-Méneville; it is unclear whether these specimens were sold and to whom, it is unclear where these specimens are now, it is unclear if the specimens were in fact types, and—if they are types—it is unclear whether they are the same specimens treated above as the type series or whether additional type specimens exist.

6 other specimens: Cuba: Pinar del Rio Province: Cape San Antonio: 2 female, "Cap: Antonio. Ins: Cuba. Sommeri Rosenskj.", NHMD, ARTSYS0001563, ARTSYS0001565; 1 female, "Mus. Westerm. | E. Sommeri Schon. Cuba Sommer", NHMD, ARTSYS0001564; 1 female, "Cap: Antonio. Ins: Cuba. Sommeri Rosenskj. | Diaprepes sommeri Rld. Kuschel det. 1957", NHMD, ARTSYS0001566; 1 male, "Cuba | Exophthalmus sommeri Rosensch | Exophthalmus sommeri Rosensch.", MZLU, ARTSYS0001562; **Havana:** Baracoa: 1 male, “Baracoa, Ha bana, Cuba 6-29-[19]39 | E.N. Kjellevig-Waering coll.”, ASUHIC, ASUHIC0088779.

Etymology. Rosenschoeld (1840) was not explicit in the etymology of this name and a given name of his “Dom. Sommer” was never stated in the original description of this species, nor have I seen it elsewhere within Schoenherr’s work. The almost certain candidate is Michael Christian Sommer, a banker, merchant, knight of the Order of the Dannebrog, and insect trader of prominence living in Altona. Assuming this to be true, the paralectotype with a label bearing Sommer’s surname was likely obtained, perhaps along with some or all the other type specimens, via sale or trade. It seems unlikely that Sommer, who regularly obtained specimens from the West Indies and other parts of the world in this fashion, captured any of these specimens himself.

Geographical distribution and chorological affinities. This species is known only from extreme western Cuba, ranging from Cape Antonio to around Havana. Peck (2005: 227) reports it from Cojimar, just northeast of Havana based on material in the Gundlach collection. It may co-occur in some areas with the dissimilar *P. litus* (Germar) and *P. azurescens* Gyllenhal in Schoenherr.

Biology. Very little is known about the biology of this species, but the one specimen from Havana examined here was collected in late-June.

Taxa of uncertain identity

"Pachneus citri opalus Germar" sec. Ebeling 1950: 535

Incorrect subsequent spelling of *Pachnaeus* Schoenherr, 1826.

This name refers to either *P. opalus* (Olivier) or *P. opalus* (Horn) (=*P. litus* (Germar, 1824) *sensu stricto*), despite being treated as a subspecies of *P. citri* Marshall and given the authorship of *P. litus* (Germar).

Olivier (1808, No. 83 Charanson, pl. 1, figs. 7a–b) included illustrations of a species which looks to be *Pachnaeus litus* (Germar, 1824). However, there does not appear to be any name applied to these figures anywhere in this work. As such, their identity remains a mystery.

Nonfocal taxa of note

***Pachnaeus scalaris* González Fernández et al., 2010: 183**

This mistake in genus name is probably a reference to the original combination of *Exophthalmus scalaris* (Boheman in Schoenherr, 1840: 349) which was originally placed in the genus *Prepodes* Schoenherr, 1823.

***Pachnaeus albicans* Dejean, 1836: 276**

Nomen nudum as it fails to meet the requirements of Art. 12 (ICZN 1999).

***Pachnaeus personatus* Taschenberg, 1869: 140**

This is perhaps a misinterpretation of label data for Cuban specimens of *P. psittacus* (Oliver) reported from "Mus. Berol."—presumably Berlin. These specimens may be in

Taschenberg’s collection in Zentralmagazin Naturwissenschaftlicher Sammlungen at Martin-Luther-Universität Halle-Wittenberg, or in the Museum für Naturkunde collection in Berlin, or they may have been destroyed during the bombing of Berlin in 1943. However, there is a specimens of *P. psittacus* (Olivier) from ASNP labeled as having been in Poey’s collection (ARTSYS0007416) which is labeled as “Pachnaeus psittacus personatus MB” and might be this material or may have at least been compared with Taschenberg’s specimens.

***Pachnaeus villosus* Sturm *in litteris* sec. Boheman in Schoenherr, 1840: 115**

=*Megalostylus villosus* Chevrolat 1878: liv (original combination)

Name not used as valid when proposed and thus not available as per Art. 11.5 (ICZN 1999).

Chevrolat 1878b: 66 (reprinting of original description)

The original description of *Megalostylus sturmi* Boheman in Schoenherr 1840 includes the name "*Pachnaeus villosus* Sturm *in Litteris*" and treatment of two unnamed varieties (var., β and var. γ) (Boheman in Schoenherr 1840: 115)

Megalostylus villosus Chevrolat is treated as a synonym of *Megalostylus sturmi* Boheman in Schoenherr by Gemminger and Harold (1871: 2226). Champion (1911: 242) follows suit and also suggests the name *Pachnaeus villosus* Sturm as applied only to var. γ in Boheman in Schoenherr (1840).

= *Megalostylus sturmi* Boheman in Schoenherr var. *villosus* Chevrolat, 1878 sec. Blackwelder 1947: 792

Infrasubspecific as Blackwelder (1944: v) expressly treated varieties as distinct from subspecies (see ICZN 1999, Art. 45.6.4).

CHAPTER 4. *GONZO*, A NEW GENUS OF ENTIMINAE (COLEOPTERA: CURCULIONIDAE) TO ACCOMMODATE *PACHNAEUS ROSEIPES* CHEVROLAT, 1876

Pachnaeus roseipes Chevrolat, 1876 (Figs. 4.1–4.3) has been variously treated by past authors as a member of the genera *Exophthalmus* Schoenherr, 1823, *Prepodes* Schoenherr, 1823 and *Exophthalmodes* Pierce, 1916. At time of writing, it is being treated as a member of the genus *Exophthalmus* Schoenherr following treatment as such by Blackwelder (1947: 804); this placement stemming from treatment of *Exophthalmodes* Pierce—apparently a distinct genus restricted to the continental neotropics—as a replacement name for *Exophthalmus* Schoenherr by Pierce (1916).

This glittery-green-scaled, Puerto Rican species with iridescently pink-scaled legs is superficially similar to some members of *Pachnaeus* Schoenherr, but lacks postocular vibrissae, has moderately laterally expanded and somewhat globose eyes, has an epifrons that is usually slightly dorsally tumescently expanded and arcuately convex, has a slight but notable constriction anterior to the eyes, and possesses additional and differently structured endophallic sclerites composed of an anteriorly (=proximally) hooked, tubular, distal (=posterior) endophallic sclerite, a ring-like median sclerite behind this which is apparently joined to the preceding sclerite by membrane, and a pair of elongate, laminar, posterior sclerites joined by a membrane (Fig. 4.3C–D; see also Franz 2012: 540, character 115). The aedeagal apex is relatively bluntly subangular and the pedon is not notably laterally expanded at the ostium (Fig. 4.3A–B).

This species has been treated in both morphological (Franz 2012, 2013) and molecular (Mazo-Vargas 2011, Zhang et al. 2017) analyses in past with differing resultant placements within the Antillean Eustylini. It appears that Franz (2012) did include correctly identified specimens of this species in his cladistic analysis based on available images and description of the rostral structure (Franz 2012: 519, fig. 12 and character 9), and that the specimen pictured in a subsequent paper (Franz 2013: 296) is correctly identified as *Exophthalmus roseipes* (Chevrolat) and is probably the same specimen as included in Franz (2012), and possibly also the same specimen included in available molecular analyses (Mazo-Vargas 2011, Zhang et al. 2017).

The issue of historical uncertainty of generic placement of this species was recently further complicated as it seems that some recent authors have been confused regarding the identity of this species and other similar taxa from Puerto Rico. The specimen figured by Zhang et al. (2017: 227, fig. 1b, row 2, column 2; ASUHIC0071856) is not *Exophthalmus roseipes* (Chevrolat), but instead appears to be an undescribed, similarly scaled species of *Compsoricus* Franz, 2012 from the Luquillo Mountains. However, this figured specimen is apparently also not the specimen which was included in these authors' molecular analysis. The data included in molecular analysis by Zhang et al. (2017)—apparently not derived de novo but instead included directly from sequence data generated by Mazo-Vargas (2011)—is derived from a specimen collected at N 18.45778°, W 66.43528° near Tortuguero Lagoon in Vega Baja, apparently a locality where the *Exophthalmus roseipes* (Chevrolat) has been reported in past (Wolcott 1936: 293, "La Tortuguera"). This locality is not within the known range of superficially similar members of the more montane and inland genus *Compsoricus* Franz.

The specimen included in past molecular analyses (Mazo-Vargas 2011, Zhang et al. 2017) has not been located to date and was not examined for the present work. It is presumably still deposited in the UPRM collection in Mayaguez as reported by Mazo-Vargas (2011). This sequenced specimen is almost certainly correctly identified as *Exophthalmus roseipes* (Chevrolat), which supports placement of *Exophthalmus roseipes* (Chevrolat) as presented within the phylogeny generated by Zhang et al. (2017).

The placement of the specimen sequenced within the phylogeny generated by Zhang et al. (2017) suggests *Exophthalmus roseipes* (Chevrolat) to be sister to the genus *Diaprepes* Schoenherr, 1823. The presence of an anteriorly (=proximally) hooked, tubular, distal (=posterior) endophallic sclerite and a pair of elongate, laminar, posterior sclerites joined by a membrane, both characters shared with members of *Diaprepes* Schoenherr, seem to reinforce this relationship. However, many other characters possessed by specimens of *Exophthalmus roseipes* (Chevrolat) examined in this study—*i.e.*, eyes somewhat strongly laterally expanded; rostrum typically with a slightly transverse constriction dorsally just anterior to eyes and, anterior to this, usually slightly dorsally produced as a raised mound, body vestiture composed of iridescent, appressed, round, green scales; pronotum with disc sparsely punctured to mostly smooth, heavily scaled, and lacking raised bare patches; and presence of a ring-like median endophallic sclerite—do not conform well with other members of *Diaprepes* Schoenherr. Because of this discord in form and because available molecular data (Mazo-Vargas 2011, Zhang et al. 2017) does not suggest *Exophthalmus roseipes* (Chevrolat) as nested within *Diaprepes* Schoenherr, this species is here treated as a member of a distinct genus closely related to *Diaprepes* Schoenherr.

Methods for this chapter follow those used for the preceding chapter on *Pachnaeus* Schoenherr. Type images of *Pachnaeus roseipes* Chevrolat were provided by staff at the Entomological Collections of Naturhistoriska Riksmuseet, Stockholm. Other specimens included in review of this species were sampled from the Charles W. O'Brien collection (CWOB) and ASU Hasbrouck Insect Collection (ASUHIC).

***Gonzo* Reily, gen. nov.**

Figs. 4.1–4.4

Type species by present designation: *Pachnaeus roseipes* Chevrolat, 1876

Diagnosis

Gonzo, gen. nov., comprises a monotypic group of moderately small (5–10 mm long) entimine weevils with iridescent green body scaling and iridescently pink-scaled legs which are restricted to the island of Puerto Rico and found primarily in sandy-soiled areas at low elevation near the north and west coasts of the island. The genus can be distinguished from other, similarly ranged and morphologically similar entimine taxa based on its size and scale color pattern in combination with the following combination of characters: (1) rostrum with a variably pronounced, dorsally raised mount occupying the anterior portion of the epifrons and with rostral dorsum at least slightly dorsally and laterally constricted anterior to the eyes, (2) eyes slightly longer than tall, moderately produced and protruding slightly from the outline of the head in dorsal view, (3) postocular vibrissae absent, (4) pronotal disc rather smoothly sculptured, with at most fine, moderately small punctures, never rugose or with large divots, and lacking a median impression, (5) pronotal disc and elytra consistently lacking paired, denuded, black patches, (6) all elytral intervals densely and evenly scaled, never as alternating, raised ridges or mounds, and even and odd elytral intervals never differentially scaled, (7) elytral declivity with some scattered, short, recurved, setose scales, but never with long, erect, straight setae, (8) apex of pedon bluntly acute and the pedon not laterally expanded at the ostium (Fig. 4.3A–B), and (9) endophallic sclerites composed of a scythiform, tubular sclerite with a small ring-like sclerite anterior (=proximally) to this, and scythiform tubular sclerite dorsally overhung by a somewhat scythiform, laminar sclerite which is connected at its base (=proximally) to a pair of elongate, laminar, laterally to dorsolaterally faced sclerites which extend anteriorly (=proximally) to near the base of the pedon (Fig. 4.3C–D).

Gonzo, gen. nov. and members of the genus *Pachnaeus* Schoenherr, 1826 are somewhat superficially similar, but all similar members of *Pachnaeus* Schoenherr possess distinct postocular vibrissae. The only member of *Pachnaeus* Schoenherr known to occur on Puerto Rico, *P. psittacus* (Olivier, 1807), differs by having pale blue to white scaled legs, head, and venter; distinctly darker, typically iridescent blue to green, and typically somewhat subtrigonal patches of scaling ventrolaterally on the metasternum; and a very long, apically (=distally) narrowed and basally (=proximally) widened—*i.e.*, never proximally narrowed—tubular endophallic sclerite with a mostly-membranous—excepting a n occasionally present sclerotized ventral plate—and generally sac-like proximal (=basal) portion of the endophallus.

Members of the Puerto Rican endemic genus *Compsoricus* Franz, 2012 are readily separated from *Gonzo*, gen. nov., and many other insular Caribbean entimines because they have a pronotal disc with a subtrigonal to teardrop shaped, medial impression dorsally—similar to as seen in *Pachnaeus marmoratus* Marshall and many insular Caribbean members of *Tropirhinus* Schoenherr. Additionally, all species of *Compsoricus* Franz—including both the described species *C. maricao* (Wolcott, 1924) and *C. luquillo* (Wolcott, 1950) as well as an undescribed species of *Compsoricus* Franz from the El Yunque in the Luquillo Mountains, Puerto Rico with which *Gonzo*, gen. nov. has been confused in past—*i.e.*, the specimen pictured by Zhang et al. (2017)—have at least elytral interval 3 notably raised as a longitudinal ridge in at least anterior half, and often many of the other odd elytral intervals differentially raised as ridges or mounds throughout part or all their length.

Many of the characters Franz (2012) lists as diagnostic for *Compsoricus* Franz also apply well to *Gonzo*, gen. nov. These include a chordate labial prementum (Franz 2012: character 3, state 2), a shallow rostral epistoma which is neither sharply angled nor abruptly descending (Franz 2012: character 11, state 0; character 12, state 0), a glabrous patch ventrally at the metatibial apex which lacks appressed lamellate scales (Franz 2012: character 59, state 0), elytra which lack tubercles posteriorly and which have long, posterior projections near the elytral apices (Franz 2012: character 65, state 0; character 67, state 1, "convergently present in the *Compsus cometes*–*Compsus gemmeus* clade, *Exorides* Pascoe, *Tetrabothynus* Labram and Imhoff, and (often less conspicuously) in the *Exophthalmus roseipes*–*Exophthalmus quinquedecimpunctatus* clade"), and an aedeagus which lacks complex, twisted or wound, asymmetrical, anteriorly positioned sclerites (Franz 2012: character 107, state 0).

Franz (2012) reports *Compsoricus* Franz to have a rostrum that is dorsally sparsely covered in scales. While this character does separate both described species of *Compsoricus* Franz from *Gonzo*, gen. nov., which has a rather densely scaled rostrum,-it does not apply well to the undescribed species of *Compsoricus* Franz from the El Yunque in the Luquillo Mountains, Puerto Rico with which *Gonzo*, gen. nov. has been confused in past (Zhang et al. 2017).

Franz (2012) notes that the occipital sutures in *Compsoricus* Franz generally do not extend to the subapex of the rostrum (Franz 2012: character 26, state 0), though there is sometimes a very slight furrow extending from their apical extent to the sub apex in both previously described species of *Compsoricus* Franz and similar applies to *Gonzo*, gen. nov. The occipital sutures are somewhat C-shaped in all members of *Compsoricus* Franz and in *Gonzo*, gen. nov., which helps distinguish them from some superficially similar taxa such as *Pachnaeus* Schoenherr but not from each other, nor from some other similarly ranged, green-scaled taxa such as *Exopthalmus quindecimpunctatus* (Olivier, 1807).

Franz (2012) erroneously claimed that *Compsoricus* Franz lacks an ante-ocular constriction of the rostrum (Franz 2012: character 34, state 0). The presence and prominence of these impressions appears to be variable within both *Compsoricus maricao* (Wolcott, 1924) and *C. luquillo* (Wolcott, 1950), both species ranging from having these impressions wholly lacking to having them distinctly invaginated. These impressions are present in examined specimens of the undescribed species of *Compsoricus* Franz and present, though typically shallow, in *Gonzo*, gen. nov.

Franz (2012) reports *Compsoricus* Franz to have a rostrum with a slight and widely rounded median elevation (Franz 2012: character 16, state 1)—*i.e.*, broadly dorsally mono-carinate and lacking a wide median impression (Franz 2012: character 19, state 0). These characters apply to the previously described members of *Compsoricus* Franz, to the undescribed species of *Compsoricus* Franz, and to many other taxa such as the similar and co-occurring *Pachnaeus psittacus* (Olivier, 1807) and to *Gonzo*, gen. nov.

Both described and undescribed members of *Compsoricus* Franz, as well as *Gonzo*, gen. nov. have a rostrum in lateral profile which is slightly arched and tumescent in the mid region (Franz 2012: character 9, state 1, "Synapomorphy for the *Exophthalmodes roseipes*–*Exophthalmodes quinquedecimpunctatus* clade"). However, in *Gonzo*, gen. nov. this tumescence is typically interrupted just anterior to the eyes by a shallow constriction. This gives the appearance of a raised mound on the epifrons that rises gradually from between the insertions of the antennae to near the anterior extent of the eyes and laterally descends very gradually from a medial highpoint near middle to the lateral margins of the epifrons. This rostral mound is diagnostic for *Gonzo*, gen. nov., but it is variably pronounced within the single species of the genus, ranging from prominent to only very faintly raised. Additionally, the constriction that demarcates this mound posteriorly is often heavily obscured by scaling, making it difficult to interpret, and this raised rostral mound generally tends to be more prominent in females than in males. Members of the closely related (Zhang et al. 2017) genus *Diaprepes* Schoenherr often have a transverse, raised carina dorsally at the intersection of frons and epifrons which might be of shared origin with the raised rostral mound seen in *Gonzo*, gen. nov., but this remains somewhat uncertain.

In *Gonzo*, gen. nov., there is an at most very slightly raised, heavily denuded, thin, longitudinally linear swath along the midline of the epifrons which extends to slightly behind the eyes, whereas in the undescribed species of *Compsoricus* Franz the midline of the epifrons is at most denuded as far posteriorly as to the anterior of the eye, but this denuded swath is less distinct than in *Gonzo*, gen. nov., with at least a few scattered scales partly overlapping it. In other members of *Compsoricus* Franz the rostral dorsum is usually mostly denuded of appressed scales, especially along a rather broad and glabrous swath at midline; however, in both previously described species of *Compsoricus* Franz there are also a few exemplars with sparse, appressed scaling mostly confined to the more lateral portions of the dorsal surface. Rostral appressed scaling, when present in previously described species of *Compsoricus* Franz, is translucent in *C. luquillo* (Wolcott), and typically iridescent green in *C. maricao* (Wolcott).

Franz (2012) reports *Compsoricus* Franz to have the transition of the rostrum to head "abruptly angulate and marked by a circum-capital suture" visible in lateral profile (Franz 2012: character 31, state 1). While this is present as at least a slight constriction behind the eyes in both previously described species of *Compsoricus* Franz, there is some variation in prominence of this constriction within both species. The undescribed species of *Compsoricus* Franz does have a slight constriction posterodosad to the eyes, but this constriction is only very slight, is constrained to lateral aspect of the head behind the eyes, never extending medially into the area of the head posterior to the interocular region, is usually mostly obscured by scaling; however—though there are ventrolaterally curvilinear denuded patches that seem to demarcate the site in both male and female specimens examined, and is never prominently and abruptly angulately constricted as usual in other members of the genus *Compsoricus* Franz. In contrast, while *Gonzo*, gen. nov. has eyes which are slightly expanded laterally from the head, there does not appear to ever be a notable circum-capital constriction posterior to the eyes as typical in *Compsoricus* Franz; however, the area posteroventrad to the eyes widens slightly and gradually up to the eyes, giving a somewhat similarly constricted appearance in dorsal view.

Franz (2012) says that *Compsoricus* Franz has wings with denticles distributed in a linear field along the proximal margin of the anal region (Franz 2012: character 84, state 1; character 85, state 2). These denticles, which are located on the dorsal face of the wing, are present and prominent in both described species of *Compsoricus* Franz but appear to be reduced in size and number, though still present, in the undescribed species of *Compsoricus* Franz. Anal region wing denticles are apparently absent in *Gonzo*, gen. nov.

Franz (2012) reported *Compsoricus* Franz to have an aedeagus with "a single, elongate, ampullate–tubular, centrally positioned endophallic sclerite" (Franz 2012: character 110, state 1; character 111, state 0; character 114, state 1). This tubular endophallic sclerite is proximally (=anteriorly) narrowed or constricted in both described species of *Compsoricus* Franz as well as in the undescribed species, though the exact shape of the sclerite varies between species. It is apically (=distally, = posteriorly) upturned in both previously described species, but not in the undescribed species, but importantly is never distinctly scythiform as seen in *Diaprepes* Schoenherr and *Gonzo*, gen. nov. *Compsoricus* Franz also has a complex of weakly sclerotized patches surrounding this ampulate-tubular sclerite and small, often only very weakly sclerotized patches laterally to dorsolaterally behind this ampulate-tubular sclerite. In Contrast, *Gonzo*, gen. nov. has a tubular endophallic sclerite that is proximally (=anteriorly) hooked, descending ventrally near middle and then recurving upward near the apex from about the proximal (=anterior) quarter, giving the tubular sclerite a somewhat scythiform appearance in lateral profile (Fig. 4.3D). Behind this hooked, tubular sclerite *Gonzo*, gen. nov. has a very small, ring-like sclerite. The scythiform tubular sclerite is overlapped dorsally by a somewhat securiform laminar sclerite which is connected at its base (= anteriorly) to a pair of obliquely-laterally facing, elongate, laminar sclerites which extend anteriorly nearly to the base of the pedon. The combination of a scythiform tubular sclerite apically (=posteriorly) and a pair of elongate, laterally to dorsolaterally oriented, laminar sclerites basally (=anteriorly) is shared between *Gonzo*, gen. nov. and members of *Diaprepes* Schoenherr; however, members of *Diaprepes* Schoenherr do not have the ring-like sclerite anterior (=basal) to the scythiform tubular sclerite and the presence and shape of an anteriorly located laminar sclerite dorsally over the tubular sclerite varies within *Diaprepes* Schoenherr at the interspecific level. These similar endophallic sclerite structures are assumed to be shared due to recent common ancestry of *Diaprepes* Schoenherr and *Gonzo*, gen. nov. as suggested by available molecular evidence (Zhang et al. 2017) which suggests these taxa as sister.

Gonzo, gen. nov. differs from *Diaprepes* Schoenherr by its rather strongly produced eyes, irregular sculpturing of the pronotum which typically possesses at least some raised, glabrous, denuded patches and by the presence of appressed, circular iridescent green scaling covering much of the body in *Gonzo*, gen. nov.—although some Lesser Antillean species of *Diaprepes* Schoenherr have some iridescent blue to green scaling on the elytra and the Puerto Rican *Diaprepes maugei* (Boheman, 1840) occasionally has a few small patches of green scales on elytra and/or legs. Members of *Diaprepes* Schoenherr are also generally significantly larger.

Franz (2012) reported both *Compsoricus maricao* (Wolcott, 1924) and *Gonzo*, gen. nov. to have a spermatheca with collum and ramus "separate, not forming a sharp narrow triangle" (character 140, state 0). This is purported to be in contrast to the primarily South American-*Eustylus*–*Exorides* clade—with some claimed reversals such as in *Compsus argyreus* (Linnaeus, 1758)—in which the collum and ramus are reported to be contiguous, both "short to very short", and with "inner margins straight and angled in a sharp narrow triangle". The ramus is more generally elongated and cylindrical in the insular Caribbean fauna—and this appears to be the case for both described species and the undescribed species of *Compsoricus* Franz and for *Gonzo*, gen. nov.—but typically short to obsolete in most South American taxa in Eustylini Lacordaire, *sensu strictissimo*—*i.e.*, mainland genera with a bicarinate rostrum such as *Compsus* Schoenherr, *Eustylus* Schoenherr, and *Exorides* Pascoe. However, other spermathecal characters such as length of the collum, angle between ramus and collum, shape of the nodulus, amount of sclerotization of the spermatheca, acuteness of the apex of the cornu, and curvature of the cornu often vary substantially both between and within species in the tribe Eustylini Lacordaire, *sensu lato*.

Spermatheca appear to be of somewhat limited use for diagnosis within this group because the range of observed interspecific variation in spermathecal structure—when a large enough series of dissected specimens can be assessed to reliably parse the "noise" of interspecific variation—is often much greater than intraspecific variation between taxa that are seemingly otherwise closely related based on external morphology or molecular evidence. Spermatheca have occasionally been relied on by workers in past to diagnose other entimine taxa, but frequently these diagnoses have been based on rather limited sampling of spermathecae. Though less than ideal, this is understandable given barriers such as limited availability of serial representative material and the time-consuming and tedious nature of dissection work needed to access internal characters even in the absence of replication.

In both *Compsoricus maricao* (Wolcott, 1924) and *C. luquillo* (Wolcott, 1950) the raised elytral intervals are heavily denuded, but this does not apply to the undescribed species of *Compsoricus* Franz, which has all elytral intervals densely and usually rather evenly scaled in round, pale green, iridescent, appressed scales. This is in contrast to *Gonzo*, gen. nov. which has all elytral intervals heavily scaled in appressed, iridescent green scales. *Compsoricus* Franz also differs in having at least some odd intervals at least slightly raised as longitudinal ridges or mounds, whereas intervals are not notably raised in *Gonzo*, gen. nov.

Gonzo, gen. nov. is somewhat similar to the Puerto Rican species *Exophthalmus quindecimpunctatus* (Olivier, 1807)—the latter of which is likely a member of the primarily Hispaniolan genus *Tropirhinus* Schoenherr, 1840 and is likely rather closely related to the type species of this genus, *T. novemdecimpunctatus* (Fabricius, 1775). Both of these species share glittery green, appressed scaling and are similarly ranged. However, *E. quindecimpunctatus* (Olivier) can be separated by its medially impressed pronotal disc, typically green-scaled legs, and by the typically present small, denuded, black, glabrous patches on pronotal disc and elytra—these are variably expressed and sometimes absent, though typically there is at least a pair of denuded patches dorsally on the pronotal disc. These two species also differ in their rostral structure, *Exophthalmus qunindecimpunctatus* (Olivier) having a rostral dorsum with a rather evenly convex median mound on the epifrons and never with a notable constriction anterior to the eyes as seen in *Gonzo*, gen. nov. These two species also differ in endophallic sclerite configuration, with *E. qunindecimpunctatus* (Olivier) having only a single, long, somewhat tubular, straight endophallic sclerite that is gradually widened ante-basally in the anterior (=proximal) half and which has a pair of slightly pointed projections surrounding a long, median, rod-like projection arising from the anterior (=proximal) ventral margin of the sclerite. This contrasts with the complex of multiple sclerites as seen in *Gonzo*, gen. nov.

***Gonzo roseipes* (Chevrolat, 1876), comb. nov.**

Pachneus roseipes Chevrolat, 1876: CCXXVII (original combination, including incorrect original spelling of *Pachnaeus* Schoenherr, 1826 following spelling from Gemminger and Harold 1871)

Bertkau 1876: 424; Bertkau 1878: 216; Lefèvre 1885: 151; Leng and Mutchler 1914: 468

=*Pachnaeus roseipes* Chevrolat, 1876 sec. Rye 1876: 79 (justified emendation)

Stahl 1882: 178; Gundlach 1893: 324 [alternative pagination: “(638)”]; Wolcott 1926: 50; Guenther and Zumpt 1933: 105; van Emden and van Emden 1939: 255

=*Exophthalmodes roseipes* (Chevrolat, 1876) sec. Marshall 1922: 60

Imperial Bureau of Entomology 1922: 391 (review of Marshall 1922); Wolcott 1922: 18–19; Wolcott 1924: 125; Wolcott 1924b: 65; Wolcott 1925: 56; Dexter 1932: 5; Fife 1939: 3, 10; Martorell 1945: 93, 138, 151, 160, 171, 177, 215, 218, 222, 332; Martorell 1945b:

454–457; Woodruff 1959: 6 [alternative pagination: 48]; Franz 2012: 519

Exopthalmodes roseipes (Chevrolat, 1876) sec. Leonard 1932: 125 (incorrect subsequent spelling of *Exophthalmodes roseipes* Chevrolat 1876 sec. Marshall 1922)

=*Prepodes roseipes* (Chevrolat, 1876) sec. Wolcott 1933: 451, 460

Quayle 1938: 322; van Emden and van Emden 1939b: 46; Wolcott 1941: 103

Prepodes (*Exophthalmodes*) *roseipes* Chevrolat sec. Wolcott 1933: 450–451

Wolcott 1933b: 1172; Marshall 1935: 518 ("*Pachnaeus roseipes* Chevr. is a *Prepodes* (*Exophthalmodes*)")

"*Prepodes* (or *Exophthalmodes*) *roseipes* Chevrolat" Wolcott 1936: 292

=*Exophthalmus roseipes* (Chevrolat, 1876: CCXXVII) sec. Blackwelder 1947: 804

Hunt 1952: 19, 32; Wolcott 1950b: 397; Wolcott 1955: 78; Ebeling 1959: 270, 282, 417; Martorell 1975: 11, 47, 55, 62, 64, 66, 72, 81, 94, 124, 137, 141, 142, 257; O'Brien and Wibmer 1982: 57; USDA 1987: 38, 156; Virkki et al. 1990: 406, 414; Virkki and O'Brien 1997: 193, 195, 198; Morrone 1999: 129; SEA 1999: 73; Ducoudray 2006: 166; Perez-Gelabert 2008: 135; Mazo-Vargas 2011: 9, 13, 21, 23, 24, 30, 34, 71; Franz 2012: 513, 515, 516, 519, 532, 540, 545, 547, 550, 556, 557; Franz 2013: 296, 301, 302, 306, 308, 310, 311, 314; Franz and Zhang 2017: 16; Zhang et al. 2017: 227–231 (in part)

Exopthalmus roseipes (Chevrolat, 1876) sec. Franz 2012: 515 (incorrect subsequent spelling of *Exophthalmus roseipes* (Chevrolat 1876)).

Redescription

As in the genus. Moderately small (5–10 mm long) entimine weevils with moderately dense to dense, iridescent, green scaling on head, pronotum, and elytra (Figs. 4.1–4.2). Legs moderately densely clothed in iridescently pink scales, with some of the underlying testaceous integument visible around scales. Venter typically iridescently green scaled as on head, pronotum, and elytra, but in some specimens with some patchy, pink to off white scaling medially. Metasternum scaled similarly to rest of ventral aspect in iridescent, green scales, never with a subtriangular patch of notably darker scaling. Protibia apically more-or-less straight, distally widening slightly; protibial mucro short, not notably extending beyond surrounding setae. Head typical of the tribe. Rostrum with epifrons bearing a variably, but at least slightly, raised mound posterior to the antennal insertions; epifrons generally with a thin, linear, longitudinal denuded swath along the midline. Lateral portion of rostrum anterior to the eye often with a slight, somewhat longitudinally elongate, and often mostly denuded impression. Scrobes arcuate and extending posteriorly to just behind the anterior margin of the eye. Eyes round, slightly longer than tall, and somewhat prominently produced laterally. Scaling immediately surrounding eyes often notably denser than elsewhere on lateral aspect of head. Pronotum with lateral margins somewhat strongly and evenly arcuate in dorsal view. Pronotal sculpture generally relatively smooth, convex, and regular, at most sparsely and finely punctate; never with notably raised rugae, longitudinal ridges, regular denuded patches, or large impressions. Pronotal bases slightly impressed to accommodate the elytral bases. Postocular vibrissae absent and without anteriorly produced postocular lobes. Elytra evenly and rather densely clothed in round, appressed, iridescent, green scales with strial punctures prominent, not heavily overlapped by scaling. Elytral bases subtruncate, lacking notable forward projections excepting a slight sinuosity near middle of each elytron. Elytral humeri subquadrate, not notably produced or expanded. Elytral intervals never notably raised, rather evenly scaled, never with regular patterning or denuded intervals, though a few specimens examined have irregular rubbed patches or pale, irregular tan scale patches that are presumably preservation artifacts. Elytral declivity rather steeply declined; never bearing elongate, erect setose scales. Male genitalia typical of the tribe. Aedeagal apex acutely pointed. Endophallic sclerites comprised of a posterior (=distal), sigmoidal, tubular sclerite and a posterior small, annulate sclerite, the former of which is partly overlain dorsally by a laminate sclerite from the anterior (=proximal) margin of which a pair of elongate, sclerotized struts extend anteriorly (=proximally) (Fig. 4.3). Female genitalia typical of the tribe.

Material examined

Lectotype by present designation (Fig. 4.1): USA: Puerto Rico: female, "290.| [red label] Typus", NHRS, NHRS-JLKB 000027165.

1 paralectotype by present designation (Fig. 4.2): USA: Puerto Rico: 1 male, "[red label] Paratypus", NHRS, NHRS-JLKB 000027166.

Other specimens: USA: Puerto Rico: Municipio de Añasco: 1 female, "Añasco, P.R. IX-22-30| Coll:J.A.Zalduondo [label torn in half through Z]| 367", ASUHIC,

ASUHIC0187436; 1 male, “Anasco, P.R. IX-24-30| Coll: J. Landrón| Exophthalmus roseipes Chev.| J. & S. Ramos Collection, UPRM| 36”, ASUHIC, ASUHIC0187432; 1 male, “Anasco, P.R. IX-24-30| Coll: J. Landrón| 366”, ASUHIC, ASUHIC0187433; 1 male, “Anasco, P.R. IX-24-30| Coll: J. Landrón| 368”, ASUHIC, ASUHIC0187434; 1 female, “Anasco, P.R. IX-24-30| Coll: J. Landrón| 361”, ASUHIC, ASUHIC0187435; 1 female, “Anasco, P.R. 4-27-1936 Coll: J.A. Ramos| J. & S. Ramos Collection, UPRM| 43”, ASUHIC, ASUHIC0187437; 1 female, “Anasco, P.R. 4-27-1936 Coll: J.A. Ramos| J. & S. Ramos Collection, UPRM| 45”, ASUHIC, ASUHIC0187438; 1 female, “Añasco, P.R. V. Pesquera 23-sept-1987 R Dones| 231| Exophthalmus roseipes det. N. M. Franz 2007”, ASUHIC, ASUHIC0187447; Municipio de Arecibo: 2 female, “PUERTO RICOMuelle Arecibo II-8-1969| Collectors L& C.W. O’Brien”, CWOB, ASUCOB0028923, ASUCOB0028924; Municipio de Cabo Rojo: “Faro de Cabo Rojo, P. R. 22-Aug- 1936 Coll: J.A. Ramos. | J. & S. Ramos Collection, UPRM| 44”, ASUHIC, ASUHIC0187442; Municipio de Dorado: 1 female, “PUERTO RICO, Dorado,1983 Niilo Virkki | on avocado & *Citrus sinensis*”, CWOB ASUCOB0028919; 3 male, 1 sex unknown (abdomen missing), “PUERTO RICO Dorado 24-V-1983 N. Virkki”, CWOB, ASUCOB0028905, ASUCOB0028906, ASUCOB0028907, ASUCOB0028908; 8 male, 7 female, “PUERTO RICO Dorado,26-V- 1984,N.Virkki”, CWOB, ASUCOB0028925, ASUCOB0028926, ASUCOB0028927, ASUCOB0028928, ASUCOB0028929, ASUCOB0028930, ASUCOB0028931, ASUCOB0028932, ASUCOB0028933, ASUCOB0028934, ASUCOB0028935, ASUCOB0028936, ASUCOB0028937, ASUCOB0028938, ASUCOB0028939; 1 male, 1 female, “PUERTO RICO, Rd. 165, Dorado,25-II- 1985,N.Virkki | on Dalbergia egastaphyllum”, CWOB, ASUCOB0028917, ASUCOB0028918; 1 male, "PUERTO RICO, Rd. 165, Dorado,25-II- 1985,N.Virkki | on Dalbergia egastaphyllum| 705", ASUHIC, ASUHIC0187459; 1 female, "PUERTO RICO, Rd. 165, Dorado,25-II- 1985,N.Virkki | on Dalbergia egastaphyllum| 703", ASUHIC, ASUHIC0187460; 1 female, "PUERTO RICO, Rd. 165, Dorado,25-II-1985,N.Virkki | on Dalbergia egastaphyllum| 707", ASUHIC, ASUHIC0187461; 1 female, "PUERTO RICO, Rd. 165, Dorado,25-II- 1985,N.Virkki | on Dalbergia egastaphyllum| 708", ASUHIC, ASUHIC0187462; 1 female, "PUERTO RICO, Rd. 165, Dorado,25-II- 1985,N.Virkki | on Dalbergia egastaphyllum| 709", ASUHIC, ASUHIC0187463; 4 male, 4 female, "PUERTO RICO, Rd. 165, Dorado, 4-III 1985,N.Virkki | on Dalbergia egastaphyllum", CWOB, ASUCOB0028909, ASUCOB0028910, ASUCOB0028911, ASUCOB0028912, ASUCOB0028913, ASUCOB0028914, ASUCOB0028915, ASUCOB0028916; 1 female, "PUERTO RICO, Rd. 165, Dorado, 4-III- 1985,N.Virkki | on Dalbergia egastaphyllum| 704", ASUHIC, ASUHIC0187464; Municipio de Isabela: 1 male, "PUERTO RICO: Isabela 9 Nov., 1980 I. Roman| J. & S. Ramos Collection, UPRM| 39", ASUHIC, ASUHIC0187445; 1 male, "PUERTO RICO: Isabela 9 Nov., 1980 I. Roman| J. & S. Ramos Collection, UPRM| 40", ASUHIC, ASUHIC0187446; 1 female, "PUERTO RICO: Isabela – EE AGR. II-71 Restrepo-Mej.| J. & S. Ramos Collection, UPRM| 37", ASUHIC, ASUHIC0187444; 1 male, "PUERTO RICO,Jobos Beach,Isabela, 9-II-1985, N.Virkki on Croton rigidus| 702", ASUHIC, ASUHIC0187458; 3 male, 1 female, "PUERTO RICO,Jobos Beach,Isabela, 26 Aug.1985, N.Virkki on Croton rigidus", CWOB, ASUCOB0028898, ASUCOB0028899, ASUCOB0028900, ASUCOB0028901; 1 male, 2 female, "PUERTO RICO,Jobos Beach,Isabela,29- VII-1985, N.Virkki", CWOB, ASUCOB0028902, ASUCOB0028903, ASUCOB0028904; 1 male, "PUERTO RICO,Jobos Beach,Isabela,29- VII-1985, N.Virkki| 699", ASUHIC, ASUHIC0187456; 1 male, "PUERTO RICO,Jobos Beach,Isabela,29- VII-1985, N.Virkki| 700", ASUHIC, ASUHIC0187457; Municipio de Lares: 1 female, "Lares, general collecting leg. N. Mendoza, X-03-2006 USA Puerto Rico| Exophthalmus roseipes det. N.M. Franz 2007| 552", ASUHIC, ASUHIC0088782; Municipio de Loíza: 1 female "PUERTO RICO Vacia Talega 12-XI- 1985, N.Virkki| Exophthalmus roseipes (Chevr.) det. C. W. O'Brien, 1993| 692:, ASUHIC, ASUHIC0187450; 1 female "PUERTO RICO Vacia Talega 12-XI- 1985, N.Virkki| 693:, ASUHIC, ASUHIC0187451; 1 male "PUERTO RICO Vacia Talega 12-XI- 1985, N.Virkki| 694:, ASUHIC, ASUHIC0187452; 1 male "PUERTO RICO Vacia Talega 12-XI- 1985, N.Virkki| 695:, ASUHIC, ASUHIC0187453; 1 male, 4 female, "PUERTO RICO Vacia Talega, 18-XI- 1985, N.Virkki", CWOB, ASUCOB0028893, ASUCOB0028894, ASUCOB0028895, ASUCOB0028896, ASUCOB0028897; 1 sex unknown (abdomen missing), "PUERTO RICO Vacia Talega 18-XI- 1985, N.Virkki| 697:, ASUHIC, ASUHIC0187454; 1 male, "PUERTO RICO Vacia Talega 18-XI- 1985, N.Virkki| 701:, ASUHIC, ASUHIC0187455; 1 disarticulated male, "PUERTO RICO Vacia Talega, 18-XI 1985, N.Virkki| 698| Exophthalmus roseipes det. N.M. Franz, 2009", ASUHIC, ASUHIC0187465; 1 male, 1 female, "PUERTO RICO Vacia Talega, 23-12- 1985, N.Virkki", CWOB, ASUCOB0028891, ASUCOB0028892; 1 male, 1 female, "PUERTO RICO: Pla. Vacia Talega 29 May 1994 R. Turnbow", CWOB, ASUCOB0028940, ASUCOB0028941; Municipio de Luquillo: 1 male, "Luquillo, P.R. VIII-6-1932 Coll: I. Blanch| J. & S. Ramos Collection, UPRM| 41| Exophthalmus roseipes Chevr.", ASUHIC,

ASUHIC0187426; <u>Municipio de Maricao</u>: 1 female, “Puerto Rico Maricao Jun 24 – 1976 I. Velásquez| 302”, ASUHIC, ASUHIC0187447; <u>Municipio de Mayagüez</u>: 1 male, “Mayaguez,P.R. VI-4- 1932 Coll: MORA| 365”, ASUHIC, ASUHIC0187441; 1 male, “Mayaguez,P.R. VI-14- 1932 Coll: F. MORA| 363”, ASUHIC, ASUHIC0187440; 1 female, “Mayaguez, P.R. VI-1- 1936 Coll: J.A. Ramos| J. & S. Ramos Collection, UPRM| 42”, ASUHIC, ASUHIC0187439; 1 female, “PUERTO RICO: Mayaguez March, 1976 R. Cintrón - Coll| J. & S. Ramos Collection, UPRM| 38”, ASUHIC, ASUHIC0187443; <u>Municipio de Quebradillas</u>: 1 female, “Quebradillas, PR Sept Nov., 1961 JLAmador| 323”, ASUHIC, ASUHIC0187427; 1 male, “Quebradillas, PR Sept Nov., 1961 JLAmador| 324”, ASUHIC, ASUHIC0187428; 1 female “Quebradillas, PR Guajataca 17-III-85 Y. Otero, Col| sweeping [opposite side of label:] Curculionidae| 233”, ASUHIC, ASUHIC0187449; 1 male, “Puerto Rico Quebradillas, Barrio Terranova N 18°28’47”, W 66°60’23” General collecting at night Leg. S. Muñiz [11?]-25-2009| Exophthalmus roseipes (Wolcott, 1924) Det. B. H. Reily 2022”, ASUHIC, ASUHIC0187466; <u>Municipio de San Juan:</u> 1 male, “PUERTO RICO Rio Piedras,Sept. 12,1986,N.Virkki on <u>Andira</u> <u>inermis</u> | Exophthalmus roseipes (Chev.) det. C. W. O’Brien 1995”, CWOB, ASUCOB0028876; 6 male, 7 female, “PUERTO RICO Rio Piedras,Sept. 12,1986,N.Virkki on <u>Andira</u> <u>inermis</u>”, CWOB, ASUCOB0028877, ASUCOB0028878, ASUCOB0028879, ASUCOB0028880, ASUCOB0028881, ASUCOB0028882, ASUCOB0028883, ASUCOB0028884, ASUCOB0028885, ASUCOB0028886, ASUCOB0028887, ASUCOB0028888, ASUCOB0028889; 1 gelatin capsule containing 4 disarticulated specimens; “PUERTO RICO Rio Piedras,Sept. 12,1986,N.Virkki on <u>Andira</u> <u>inermis</u> [+5 identical labels], CWOB, ASUCOB0028890; <u>Municipio de Vega</u>

Baja: 1 male, “Algarrobo, P.R. II 23, 1931| Coll:S.T.Danforth| 362”, ASUHIC, ASUHIC0187429; 1 female, “Algarrobo, P.R. II 23, 1931| Coll:S.T.Danforth| 364”, ASUHIC, ASUHIC0187430; 1 female, “Algarrobo, P.R. II 23, 1931| Coll:S.T.Danforth”, ASUHIC, ASUHIC0187431;

Municipio de Isabela or Municipio de Quebradillas: 1 male, 1 female, “PUERTO RICO II-8-1969 Guajataca L& C. W. O’Brien| Exophthalmus roseipes Chev.”, CWOB, ASUCOB0028920, ASUCOB0028921; 1 female, “PUERTO RICO II-8-1969 Guajataca L& C. W. O’Brien”, CWOB, ASUCOB0028922.

Etymology

The name *Gonzo* is an American English term of uncertain origins that seems to have first appeared in print in the issue 95 of *Rolling Stone Magazine*—published November 11, 1971—in an article written by Hunter S. Thompson under the pen-name Raoul Duke entitled “Fear and Loathing in Las Vegas: A Savage Journey to the Heart of the American Dream” which would later provide the basis of a novel by the same name. Thompson did not provide an explicit definition or origin of the term but would later go on to claim that he had first heard it used by editor Bill Cardosa as “some Boston word for weird, bizarre.” The term was later adopted by Dave Goelz, Jim Henson, and Jerry Juhl for a character by the same name on *The Muppets* for which this genus is named. The muppet character Gonzo, also known as Gonzo the Great, is renowned for its prominent nose—a reference here to the raised tumescent patch at the anterior of the epifrons typical of this genus—and ambiguity of its species—a reference here to the historical ambiguity of placement of the type species. The name is neuter.

Biology

In Puerto Rico, this species has historically been reported primarily from the northern half of the island, particularly near the beach in sandy soiled areas (Tower 1911: 9, Wolcott 1922: 19, Martorell 1945b: 454, Wolcott 1950b: 397–398; see also Fig. 4.4). Adults may be encountered year-round (Wolcott 1922: 19, Martorell 1945b: 457, Wolcott 1955: 78–80). Females lay their eggs in small groups in the leaves of citrus, with egg counts per group small but variable—Tower (1911: 9) reports between 6 to 24 eggs per group while Wolcott (1922: 19, 1955: 78–80) says about 29 per clutch. Upon hatching, the larvae drop to the ground and feed on the roots of nearby plants (Wolcott 1922: 19, Wolcott 1955: 78–80). Adults are voracious and in captivity are reported to eat their own weight in leaves daily (Wolcott 1950b: 398). Wolcott (1933b: 1172) says this species has a preference for oviposition between strips of paper affixed to citrus trees over leaves and refuses to oviposit lay on the leaves in captivity if paper flags are present, suggesting this as a control method for the species and other entimines with similar oviposition habits. Wolcott (1925:56) claims the species can be maintained live in captivity for up to 2 to 3 months. Virkki and O'Brien (1997), building on prior work by Virkki et al. (1990), report karyoformula for this species of 22(2X) for females, 22(X, y) for males, and a male meioformula of 10 + Xy_p.

This species does not appear to be encountered often outside of its native range, but it was intercepted once in New York from citrus originating in Puerto Rico (Hunt 1952: 19, 32). It has been reported from Cuba (Gundlach 1893: 324 [alternative pagination: "(638)"]) and Hispaniola (SEA 1999: 73, Ducoudray 2006: 166, Perez-Gelabert 2008: 135) but the species is not known to occur outside of Puerto Rico and these records are likely misidentifications of other, similar taxa.

This species is well established as a minor pest of *Citrus* L. (Rutaceae) in its native Puerto Rico (Ebeling 1959: 270, 282, Imperial Bureau of Entomology 1922: 391, Marshall 1922: 60, Tower 1911: 9, USDA 1987: 38, Wolcott 1922: 19, Wolcott 1924: 125, Wolcott 1936: 292–293, Martorell 1945b: 454, Wolcott 1950b: 397–398, Wolcott 1955: 78–80, Marotell 1975: 62, 64, 66, Mazo-Vargas 2011: 71), with most more specific reference to orange and grapefruit leaves. There have been notable outbreaks in citrus groves in past, including reported irruptions in January to February and in June 1908 (Tower 1911: 9) and also in June 1931 (Leonard 1932: 125).

To a lesser extent than in citrus, it is also known as a minor pest of cotton (*Gossypium* L., Malvaceae) on the island (Imperial Bureau of Entomology 1922: 391, Marshall 1922: 60, Wolcott 1922: 19 ("las brácetas de las cápsulas del algodon"), Wolcott 1924: 125 ("on injured cotton boll"), Wolcott 1936: 292–293 ("on injured cotton boll"), Wolcott 1941: 103("adults eat cotton leaves"), Wolcott 1955: 78 ("escondiéndose en las brácetas de las cápsulas del algodón"). Fife (1939: 3, 10), Martorell (1975: 124), and Mazo-Vargas (2011: 71) report it specifically from sea-island cotton (*Gossypium barbadense* L.), and the former two (Fife 1939: 10, Martorell 1975: 124) add that it damages leaves, flower bracts, and squares (*i.e.*, young flower buds) by chewing large, circular holes through them and that beetles may be fairly numerous.

The species has also repeatedly been reported to feed on seagrape (*Coccoloba uvifera* (L.) L., Polygonaceae; Wolcott 1924: 125, Wolcott 1925: 56, Wolcott 1926: 50, Wolcott 1936: 292–293, Martorell 1945: 151, Martorell 1945b: 457, Wolcott 1950b: 398, Woodruff 1959: 6 [alternative pagination: 48], Martorell 1975: 72, Mazo-Vargas 2011:

71).Wolcott 1925: 56 said that leaves of this plant have a digestibility of 42.6% for this species of beetle, and claims that one beetle ate 0.399 g fresh leaf over 4 days, or about its own weight daily at 0.0982 g / day. However, he says that beetle dry weight was only 35.7 % wet weight, that of leaf 19 % wet weight, so beetles may, in fact, eat as much as 16.2× their own dry weight monthly, but concedes that dietary composition, longevity, activity, and number and size of eggs laid likely alter food consumption. Wolcott (1926: 50) notes a preference for citrus over seagrape.

It has also been reported from several other plants including *Andira inermis* (W. Wright) DC. (“moca”, Fabaceae; Wolcott 1922: 19, Wolcott 1924: 125, Wolcott 1936: 292–293, Martorell 1945: 93 (as *Andira jamaicencis* (W. Wright) Urban), Martorell 1945b: 457 (as *Andira jamaicencis* (W. Wright) Urban), Wolcott 1955: 78, Martorell 1975: 11, Virkki and O'Brien 1997: 193, 195, Mazo-Vargas 2011: 71(as *Andira jamaicensis* Urb.)), *Cassine xylocarpa* Vent. (Celastraceae; Martorell 1975: 47, Mazo-Vargas 2011: 71), *Chrysobalanus icaco* (L.) L. (“icacao”; Chrysobalanaceae; Wolcott 1924: 125, Wolcott 1936: 292–293, Martorell 1945: 138, Martorell 1945b: 457, Wolcott 1950b: 398, Martorell 1975: 55, Mazo-Vargas 2011: 71), *Conocarpus erectus* L. (Combretaceae; Wolcott 1924: 125, Wolcott 1936: 292–293, Martorell 1945: 160, Martorell 1945b: 457, Martorell 1975: 81, Mazo-Vargas 2011: 71), *Croton flavens* L. (Euphorbiaceae; Virkki and O'Brien 1997: 193, 195 (as *Croton rigidus*)), *Dalbergia ecastaphyllum* (L.) Taub. (“maray-maray”; Fabaceae; Wolcott 1922: 19, Wolcott 1924: 125, Wolcott 1936: 292–293, Martorell 1945: 171, Martorell 1945b: 457, Wolcott 1950b: 398, Wolcott 1955: 78, Martorell 1975: 94, Virkki et al. 1990: 406, Virkki and O'Brien 1997: 193, 195, Mazo-Vargas 2011: 71), *Elaeodendron xylocarpum* (Vent.) DC. (Celastraceae; Martorell 1945:

177, Martorell 1945b: 457, Mazo-Vargas 2011: 71), *Hymenaea courbaril* L. (Fabaceae; Martorell 1945: 215, Martorell 1945b: 457, Martorell 1975: 137, Mazo-Vargas 2011: 71) *Inga vera* Willd. (Fabaceae; Wolcott 1924: 125, Wolcott 1936: 292–293, Wolcott 1941: 103, Martorell 1945: 222, Martorell 1945b: 457, Martorell 1975: 142, Mazo-Vargas 2011: 71), *Inga laurina* (Sw.) Willd. (Fabaceae; Wolcott 1924: 125, Wolcott 1936: 292–293, Martorell 1945: 218, Martorell 1945b: 457, Martorell 1975: 141 (as *Inga fagifolia* (L.) Willd.), Mazo-Vargas 2011: 71 (as *Inga fagifolia* (L.) Willd. ex Benth)), *Ouratea litoralis* Urb. (Ochnaceae; Mazo-Vargas 2011: 71), and *Terminalia catappa* L. (Combretaceae; Martorell 1945: 332, Martorell 1945b: 457, Martorell 1975: 257, Mazo-Vargas 2011: 71). Wolcott (1941: 103) reports it "resting on sugar-cane" (*Saccharum* spp., Poaceae) at Isabela.

Exophthalmus roseipes (Chevrolat) has been reported to be eaten by *Bufo marinus* (Linnaeus, 1758) (Bufonidae) on the North Coast of the island (Dexter 1932: 5), Martorell (1945b: 457) said that it was the "principal natural enemy" of the beetle. Wolcott (1950b: 398) says it is also "doubtless" eaten by birds and "unquestionably" eaten by lizards, both of which are probably correct but seemingly not confirmed. Wolcott (1941: 103) reports it from a fruit fly trap at Palo Seco.

CHAPTER 5. DISCUSSION

At the start of this project, *Pachnaeus* Schoenherr, 1826 was well established to be a monophyletic group. Genus-level synapomorphies of (1) presence of postocular vibrissae and (2) an endophallus composed of a proximal, primarily membranous and sac-like region and a distal (=posterior), tubular endophallic sclerite were established in the literature, though variation in the former caused the exclusion of some members of the genus with highly reduced vibrissae and the later had been tested only within a limited species set of 2 species (Franz 2012). A partial phylogenetic tree based on molecular data existed (Zhang et al. 2017), but its terminals were not identified to the species level. The genus name had been stabilized pro-tempore via application for suppression of the name *Docorhinus* Schoenherr, 1823, and lectotypes of the type species, *Pachnaeus opalus* (Olivier), were designated (Reily and Franz 2019). "Keys"—*i.e.,* a single couplet—existed only for separating the two species historically known to occur in the eastern continental United States, *Pachnaeus litus* (Germar) and *P. opalus* (Olivier) (Adults: Horn 1876, Schwarz and Barber 1922, Woodruff 1962, Woodruff 1979, Woodruff 1981; Larvae: Beavers and Woodruff 1971). Misidentifications within this genus were common in collections and throughout the literature, several junior synonyms based on interspecific variation were in use (*e.g., Pachnaeus azurescens griseus* Gyllenhal in Schoenherr, *Pachnaeus juvenalis* de Zayas, 1988, and *Pachnaeus alayoi* Lopez Castilla), a few aberrant species (*P. sommeri* (Munck af Rosenschoeld in Schoenherr**)** and *P. gowdeyi* (Marshall)) were treated within other genera (*Diaprepes* Schoenherr and

Lachnopus Schoenherr respectively), and virtually no efforts had been made to establish relationships of species below the level of genus.

The O'Brien and Wibmer (1982: 46) catalogue listed 7 species in *Pachnaeus* (*P. azurescens* Gyllenhal in Schoenherr, *P. citri* Marshall, *P. costatus* Perroud, *P. litus* (Germar), *P. marmoratus* Marshall, *P. opalus* (Olivier), and *P. psittacus* (Olivier)) and 1 additional subspecies of *P. azurescens* Gyllenhal in Schoenherr treated as valid ("v. griseus Gyllenhal, 1834") along with 1 synonym for *P. litus* (Germar) ("opalus: of authors [misidentification, not Olivier, 1807]"), 1 junior synonym of *P. opalus* (Olivier) (*P. distans* Horn), and 1 nomen nudum ("glaucus: (Sturm) 1826"); applied to *P. litus* (Germar)).

The subsequent works of Cuban authors de Zayas (1988) and Lopez Castilla (1992) saw the inclusion of two additional species names each (*P. pater* de Zayas, *P. juvenalis* de Zayas, *P. alayoi* Lopez Castilla, and *P. rosadonetoi* Lopez Castilla), bringing the total number of named species to 12. An additional recognized new species from the Bahamas (=*P. obrienorum* Reily, sp. nov.) had been repeatedly reported throughout the literature (Leng and Mutchler 1914: 468, Blackwelder 1947: 799, Turnbow and Thomas 2008: 33) but had never described or named.

For most species of *Pachnaeus* Schoenherr a comprehensive overview of known biology—including known trophic associations, known life history, and recorded collection methods—based on an exhaustive review of the literature and available specimens has been provided. The exception to this being the agriculturally important, generalist feeder and major pest of citrus, *Pachnaeus litus* (Germar).

Identifications within this genus have been plagued in past by a near-absence of keys or other identification resources. The key provided herein represents the first comprehensive key to the genus ever created and the only key to treat members of the genus outside of the continental United States. Prior to the present work, habitus photos have historically been lacking for most species, and even rudimentary drawings are rare within the literature. Past authors have never attempted to provide the reader with pictorial representation of intraspecific variation for any species.

As circumscribed in the present study, the genus *Pachnaeus* Schoenherr, 1826 includes 21 species, 9 of which—excluding the previously undescribed but nevertheless reported *P. obrienorum* Reily, sp. nov. which has here been named and described for the first time—are entirely new to science. Species groups and subgroups have here been created to elucidate hypotheses regarding groups of species presumed to be natural clades within the genus, however these relationships need further testing.

Circumscription of *Pachnaeus* Schoenherr sec. Reily

The following is a list of taxa within *Pachnaeus* Schoenherr, 1826 as presently circumscribed which includes only available names and excludes misidentifications, unjustified emendations, and incorrect spellings. For taxa that have been moved into the genus, the genus of the original combination is cited. Valid names are in bold.

***Pachnaeus* Schoenherr, 1826 sec. Reily**

citri species group

marmoratus species subgroup

***Pachnaeus marmoratus* Marshall, 1916**

***Pachnaeus quadrilineatus* Reily, sp. nov.**

gowdeyi species subgroup

***Pachnaeus gowdeyi* (Marshall, 1926) comb. nov. (*Lachnopus* Schoenherr 1840)**

***Pachnaeus gordoni* Reily, sp. nov.**

eisenbergi species subgroup

***Pachnaeus citri* Marshall, 1916**

***Pachnaeus eisenbergi* Reily, sp. nov.**

andersoni species subgroup

***Pachnaeus godivae* Reily, sp. nov.**

***Pachnaeus andersoni* Reily, sp. nov.**

opalus species group

azurescens species subgroup

***Pachnaeus opalus* (Olivier, 1807) sec. Schoenherr, 1826 (*Curculio* Linnaeus, 1758)**

=*Pachnaeus distans* Horn, 1876

***Pachnaeus azurescens* Gyllenhal in Schoenherr, 1834**

=*Pachnaeus griseus* Gyllenhal in Schoenherr, 1834 pro syn. Morrone 1999

=*Pachnaeus azurescens griseus* Gyllenhal in Schoenherr, 1834 sec. Boheman in Schoenherr, 1840

=*Pachnaeus juvenalis* de Zayas, 1988 **syn. nov.**

=*Pachnaeus alayoi* Lopez Castilla, 1992 **syn. nov.**

howdenae species subgroup

***Pachnaeus howdenae* Reily, sp. nov.**

***Pachnaeus ivieorum* Reily, sp. nov.**

pater species group

***Pachnaeus pater* de Zayas, 1988**

***Pachnaeus rosadonetoi* Lopez Castilla, 1992**

psittacus species group (*incertae sedis*; likely *opalus*, *litus*, or *citri* species group)

***Pachnaeus psittacus* (Olivier, 1807) sec. Chevrolat in d'Orbigny 1847 (*Curculio* Linnaeus, 1758)**

litus species group

costatus species subgroup

***Pachnaeus costatus* Perroud, 1853**

***Pachnaeus maestrensis* Reily, sp. nov.**

morelli species subgroup

***Pachnaeus litus* (Germar, 1824) sec. Schoenherr 1826 (*Cyphus* Germar, 1824)**

=*Chlorima* (*Pachnaeus*) *litus* (Germar, 1824) sec. de Cristofori and Jan 1832

***Pachnaeus morelli* Reily, sp. nov.**

obrienorum species group (*incertae sedis*: likely nr. *opalus* species group)

***Pachnaeus obrienorum* Reily, sp. nov.**

sommeri species group

***Pachnaeus sommeri* (Munck af Rosenschoeld in Schoenherr, 1840) comb. nov. (*Exophthalmus* Schoenherr, 1823)**

=*Exophthalmus sommeri* Munk af Rosenschoeld in Schoenherr, 1840

=*Diaprepes sommeri* (Munck af Rosenschoeld in Schoenherr, 1840) sec. Champion 1911

Overview of historical nomenclatural treatment of species of *Pachnaeus*

The following is a list of all nomenclatural acts regarding members of the genus *Pachnaeus* Schoenherr, 1826 sec. Reily. The abbreviations UE for unjustified emendation, ISS for incorrect subsequent spelling, M for misidentification, OD for original designation, and OC for original combination are employed for the sake of brevity. Valid names are in bold.

***Pachnaeus* Schoenherr, 1826**

Requested to be placed on the Official List of Generic Names in Zoology by Reily and Franz 2019

=*Pachneus* Gemminger and Harold, 1871 (UE)

Pacnaeus Latreille, 1829 (ISS)

Pachnacus Gundlach 1891 (ISS)

Pachneaus Cunliffe and van Hermann 1916 (ISS)

Pachyneus Watson 1938b (ISS)

Pachnaeous Schroeder and Beavers 1977 (ISS)

=*Docorhinus* Schoenherr, 1823

Proposed for suppression for the purposes of the Principle of Priority but not for the purposes of the Principle of Homonymy and requested to be placed on the Official Index of Rejected and Invalid Generic Names in Zoology by Reily and Franz 2019

Cucutis Ashmead 1880: 61 (ISS: *Curculio* Linnaeus, 1758)

Lyphus Gundlach 1891: 331 (ISS: *Cyphus* Germar, 1824)

de Cristofori and Jan 1832 treated *Pachnaeus* Schoenherr, 1826 as a subgenus of *Chlorima* Germar, 1817, a junior synonym of *Chlorphanus* Sahlberg, 1823

***Pachnaeus* Schoenherr, 1826 sec. Reily**

citri species group

marmoratus species subgroup

***Pachnaeus marmoratus* Marshall, 1916**

=*Pachnaeus marmoratus* Marshall, 1916 (OC)

Pachneus marmoratus Marshall, 1916 sec. Imperial Bureau of Entomology 1917 (ISS: *Pachnaeus* Schoenherr, 1826)

Pachnaeus marmaratus Marshall, 1916 sec. Gowdey 1926 (ISS)

***Pachnaeus quadrilineatus* Reily, sp. nov.**

gowdeyi species subgroup

***Pachnaeus gowdeyi* (Marshall, 1926) comb. nov.**

=*Lachnopus gowdeyi* Marshall, 1926 (OC)

Menoetius gowdeyi (Marshall, 1926) sec. O'Brien & Wibmer 1982

Menoetius Dejean, 1821 is suppressed for the purposes of the Principle of Priority but not for the purposes of the Principle of Homonymy and has been placed on the Official Index of Rejected and Invalid Generic Names in Zoology (ICZN 1987)

*nec Lachnopus gowdey*i Girón and Franz 2012 (M: *Lachnopus* sp. nr. *L. aurifer* (Drury, 1773))

***Pachnaeus gordoni* Reily, sp. nov.**

eisenbergi species subgroup

***Pachnaeus citri* Marshall, 1916**

=*Pachnaeus citri* Marshall, 1916 (OC)

Pachneus citri Marshall. 1916 sec. Imperial Bureau of Entomology 1917 (ISS: *Pachnaeus* Schoenherr, 1826)

nec Pachneus citri Marshall, 1916 sec. Jeppson 1989 (M: in part Central American species of unknown identity, in part Floridian species of *Pachnaeus* Schoenherr, 1826)

nec Pachnaeus citri Marshall, 1916 sec. Quayle 1938 (M: *Pachnaeus litus* (Germar, 1824))

Pachnaeus litus (Germar, 1824) sec. Gowdey 1923 (M)

Pachnaeus "probably *distans*" Ritchie, 1916 (M)

Pachnaeus "(sp. near *opalus*)" Gosse 1848 (M; tentative placement, may in whole or in part be *Pachnaeus eisenbergi* Reily, sp. nov.)

Pachnaeus sp. "1" Zhang et al. 2017

Pachnaeus sp. "1 AMV2011a" Zhang et al. 2017 supplemental

***Pachnaeus eisenbergi* Reily, sp. nov.**

andersoni species subgroup

***Pachnaeus godivae* Reily, sp. nov.**

Pachnaeus azurescens griseus Gyllenhal in Schoenherr, 1834 sec. Thomas et al. 2013 (M)

***Pachnaeus andersoni* Reily, sp. nov.**

opalus species group

azurescens species subgroup

***Pachnaeus opalus* (Olivier, 1807)**

=*Curculio opalus* Olivier, 1807 (OC)

Type species of *Pachnaeus* Schoenherr, 1826 by OD

Type species of *Docorhinus* Schoenherr, 1823 by OD

Docorhinus opalus (Olivier, 1807) sec. Schoenherr 1823

Docorhinus Schoenherr, 1823 was proposed for suppression for the purposes of the Principle of Priority but not for the purposes of the Principle of Homonymy and requested to be placed on the

Official Index of Rejected and Invalid Generic Names in Zoology by Reily and Franz 2019.

=*Pachnaeus opalus* (Olivier, 1807) sec. Schoenherr, 1826

Pachnaeous opalus (Olivier, 1807) sec. Schroeder and Beavers 1977 (ISS: *Pachnaeus* Schoenherr, 1826)

Pachnaeus opalescens (Olivier, 1807) sec. Marshall, 1916 (ISS)

Pachnaeus opalis (Olivier, 1807) sec. Habeck 1989 (ISS)

Pachnaeus opilus (Olivier, 1807) sec. Sherborn 1933 (ISS)

Pachnaeus opulus (Olivier, 1807) sec. Drapiez 1842 (ISS)

Pachneus opalus (Olivier, 1807) sec. Gemminger and Harold, 1871 (UE: *Pachnaeus* Schoenherr, 1826)

Pachneus opalis (Olivier, 1807) sec. Tamburo and Butcher 1955 (ISS: *Pachnaeus opalus* (Olivier, 1807); ISS: *Pachnaeus* Schoenherr, 1826)

Pachyneus opalus (Olivier, 1807) sec. Watson 1938b (ISS: *Pachnaeus* Schoenherr, 1826)

nec Pachnaeus opalus (Olivier, 1807) sec. Wickham in Nutting 1895 (M: *Pachnaeus obrienorum* Reily, sp. nov.)

nec Pachnaeus opalus (Olivier, 1807) sec. Horn, 1876: 82 (M: *Pachnaeus litus* (Germar, 1824)) *nec Pachnaeus opalis* (Olivier, 1807) sec. Horn, 1876 sec. Moznette 1921(ISS: *Pachnaeus opalus* (Olivier, 1807) sec. Horn, 1876)

Pachnaeus opalus chrysocollus Dejean, 1836 (nomen nudum)

Pachneus opalus chrysocollis Gemminger and Harold, 1871 (ISS of nomen nudum: *Pachnaeus opalus chrysocollus* Dejean, 1836; UE: *Pachnaeus* Schoenherr, 1826)

Pachnaeus sp. Watson 1938

=*Pachnaeus distans* Horn, 1876

***Pachnaeus azurescens* Gyllenhal in Schoenherr, 1834**

=*Pachnaeus azurescens* Gyllenhal in Schoenherr, 1834 (OC)

Pachneus azurescens Gyllenhal in Schoenherr, 1834 sec. Gemminger and Harold, 1871 (UE: *Pachnaeus* Schoenherr, 1826)

Pachnaeus azurascens Gyllenhal in Schoenherr, 1834 sec. Sorauer 1912 (ISS)

Pachnacus azurescens Gyllenhal in Schoenherr, 1834 sec. Gundlach 1891 (ISS: *Pachnaeus* Schoenherr, 1826)

Pachnaeus azurescen Gyllenhal in Schoenherr, 1834 sec. Cañizares Zayas 1963 (ISS) *nec Pachneus azurescens* Gyllenhal in Schoenherr, 1834 sec. Parsons 1940 (M: *Pachnaeus litus* (Germar, 1824); ISS: *Pachnaeus* Schoenherr, 1826)

=*Pachnaeus griseus* Gyllenhal in Schoenherr, 1834 pro syn. Morrone 1999

=*Pachnaeus azurescens griseus* Gyllenhal in Schoenherr, 1834 sec. Boheman in Schoenherr, 1840

Pachnaeus azurescens "Var. β" Boheman in Schoenherr, 1840

Pachneus azurescens griseus Gyllenhal in Schoenherr, 1834 sec. Gemminger and Harold 1871 (UE: *Pachnaeus* Schoenherr, 1826)

nec Pachnaeus azurescens griseus Gyllenhal in Schoenherr, 1834 sec. Thomas et al. 2013 (M: *Pachnaeus godivae* Reily, sp. nov.)

=*Pachnaeus juvenalis* de Zayas, 1988 **syn. nov.**

=*Pachnaeus alayoi* Lopez Castilla, 1992 **syn. nov.**

Pachnaeus sp. "GZ25" Zhang et al. 2017

Pachnaeus sp. "GZ40" Zhang et al. 2017

"a *Pachnaeus*, allied to *P. opalus*" Wickham in Nutting 1895 (in part, also *Pachnaeus litus* (Germar, 1824))

howdenae species subgroup

***Pachnaeus howdenae* Reily, sp. nov.**

“a fine Otiorhynchid near *Barynotus*” Wickham in Nutting 1895

***Pachnaeus ivieorum* Reily, sp. nov.**

pater species group

***Pachnaeus pater* de Zayas, 1988**

=Pachnaeus pater de Zayas, 1988 (OC)

Pachnaeus sp. “GZ1” Zhang et al. 2017

***Pachnaeus rosadonetoi* Lopez Castilla, 1992**

=Pachnaeus rosadonetoi Lopez Castilla, 1992 (OC)

Pachnaeus sp. “GZ52” Zhang et al. 2017

Pachnaeus sp. “GZ53” Zhang et al. 2017

psittacus species group (*incertae sedis*; likely *opalus*, *litus*, or *citri* species group)

***Pachnaeus psittacus* (Olivier, 1807)**

=*Curculio psittacus* Olivier, 1807 (OC)

=Pachnaeus psittacus (Olivier, 1807) sec. Chevrolat in d'Orbigny 1847

Pachneus psittacus Gemminger and Harold, 1871 (UE: *Pachnaeus* Schoenherr, 1826)

Pachnaeus sp. “GZ38” Zhang et al. 2017

nec Pachnaeus “(?) *psittacus*” Strong 1933 (M: *Pachnaeus obrienorum* Reily, sp. nov.)

litus species group

costatus species subgroup

***Pachnaeus costatus* Perroud, 1853**

=*Pachnaeus costatus* Perroud, 1853 (OC)

Pachneus costatus Gemminger and Harold, 1871 (UE: *Pachnaeus* Schoenherr, 1826)

***Pachnaeus maestrensis* Reily, sp. nov.**

morelli species subgroup

***Pachnaeus litus* (Germar, 1824)**

=*Cyphus litus* Germar, 1824 (OC)

Lyphus litus Germar, 1824 sec. Gundlach 1891 (ISS: *Cyphus* Germar, 1824)

Cephus litus Germar, 1824 sec. New York Entomological Society 1925(ISS: *Cyphus* Germar, 1824)

=*Chlorima* (*Pachnaeus*) *litus* (Germar, 1824) sec. de Cristofori and Jan 1832

=*Pachnaeus litus* (Germar, 1824) sec. Schoenherr 1826

Pachneus litus (Germar, 1824) sec. Gemminger and Harold, 1871 (UE: *Pachnaeus* Schoenherr, 1826)

Pachnacus litus (Germar, 1824) sec. Gundlach 1891 (ISS: *Pachnaeus* Schoenherr, 1826)

Pachneaus litus (Germar, 1824) sec. Cunliffe and van Hermann 1916 (ISS: *Pachnaeus* Schoenherr, 1826)

Pachnaeous litus (Germar, 1824) sec. Schroeder and Beavers 1977 (ISS: *Pachnaeus* Schoenherr, 1826)

Pachnaeus latus (Germar, 1824) sec. Beavers et al. 1980 (ISS)

Pachnaeus litius (Germar, 1824) sec. Moznette 1923 (ISS)

Pachnaeus "*litus* ?" sec. Dejean 1836: 276

nec Pachnaeus litus (Germar, 1824) sec. Gowdey 1923 (M: *Pachnaeus citri* Marshall, 1916)

Thylacites glaucus Sturm, 1826: 202 (nomen nudum)

nec Thylacites glaucus Faust, 1881: 288 (OC of *Xylinophorus glaucus* (Faust, 1881) sec. Faust 1885: 177 (Tanymecini, Piazomiina))

Thylacites Germar, 1817: 341 is suppressed under the plenary power of the ICZN for the purposes of the Principle of Priority but not for those of the Principle of Homonymy (Opinion 1440, ICZN 1987)

Pachnaeus glaucus (Sturm, 1826) sec. Dejean 1836 (nomen nudum)

Pachneus glaucus (Sturm, 1826) sec. Gemminger and Harold 1871 (UE: *Pachnaeus* Schoenherr, 1826)

Pachnaeus opalus (Oliver, 1807) sec. Horn, 1876: 82 (M)

Cucutis opalus (Olivier, 1807) sec. Horn, 1876 sec. Ashmead 1880 (ISS: *Curculio* Linnaeus, 1758)

Pachnaeus opalis (Olivier, 1807) sec. Horn, 1876 sec. Moznette 1921 (ISS: *Pachnaeus opalus* (Olivier, 1807) sec. Horn, 1876)

Pachnaeus citri Marshall, 1916 sec. Quayle 1938 (M)

Pachneus azurescens Gyllenhal in Schoenherr, 1834 sec. Parsons 1940 (M; ISS: *Pachnaeus* Schoenherr, 1826)

Pachneus citri litus (Germar, 1824) sec. Ebeling 1950 (ISS: *Pachnaeus* Schoenherr, 1826; not a specimen-based determination)

"a bluish green weevil of the genus *Atypus*" Cushman1922 (lapsus for *Pachnaeus* Schoenherr, 1826)

"a *Pachnaeus*, allied to *P. opalus*" Wickham in Nutting 1895 (in part, also *Pachnaeus. azurescens* Gyllenhal in Schoenherr, 1834)

Pachnaeus sp. "GZ6" Zhang et al. 2017

Pachnaeus sp. "GZ24" Zhang et al. 2017

Pachnaeus sp. "GZ26" Zhang et al. 2017

***Pachnaeus morelli* Reily, sp. nov.**

obrienorum species group (*incertae sedis*: likely nr. *opalus* species group)

***Pachnaeus obrienorum* Reily, sp. nov.**

Pachneus "sp. ?" Leng and Mutchler 1914

Pachnaeus "sp. (Leng & Mutchler 14-468)" Blackwelder 1947

Pachnaeus "n. sp." Turnbow and Thomas 2008

Pachnaeus sp. “GZ13” Zhang et al. 2017

Pachnaeus opalus Wickham in Nutting 1895 (M)

Pachnaeus “(?) *psittacus”* Strong 1933 (M)

sommeri species group

***Pachnaeus sommeri* (Munk af Rosenschoeld in Schoenherr, 1840)**

=*Pachnaeus sommeri* (Munck af Rosenschoeld in Schoenherr, 1840) **comb. nov.**

=*Exophthalmus sommeri* Munk af Rosenschoeld in Schoenherr, 1840 (OC)

Exophthalmus sommeri “var. β” Munck af Rosenschoeld in Schoenherr, 1840 (infrasubspecific)

Exophthalmus sommeri “var. γ” Munck af Rosenschoeld in Schoenherr, 1840 (infrasubspecific)

Exophthalmus sommeri “var. δ” Munck af Rosenschoeld in Schoenherr, 1840 (infrasubspecific)

Escophthalmus sommeri (Munck af Rosenschoeld in Schoenherr, 1840) sec. Gundlach 1891 (ISS: *Exophthalmus* Schoenherr, 1823)

Exophthalmus limnas Heyne and Taschenberg 1908 (ISS: *Exophthalmus sommeri* Munk af Rosenschoeld in Schoenherr, 1840)

=*Diaprepes sommeri* (Munck af Rosenschoeld in Schoenherr, 1840) sec. Champion 1911

This species was subsequently variously treated by authors as *Exophthalmus* Schoenherr, 1823 (Leng and Mutchler 1914, Sherborn 1930, Sherborn 1932, Cross and Jefferys 2010) or *Diaprepes* Schoenherr, 1823 (Marshall 1922, Guenther and Zumpt 1933, Blackwelder 1947, O'Brien and Wibmer 1982, Morrone 1999, O'Brien and Kovarik 2001, Peck 2005).

nec *Diaprepes sommeri* (Munck af Rosenschoeld in Schoenherr, 1840) sec. Guenther and Zumpt, 1933 (lapsis of *Diaprepes abbreviatus* (Linnaeus, 1758), primarily of the junior synonym *Diaprepes spengleri* (Linnaeus, 1767).

Identity of species of *Pachnaeus* included by Zhang et al. (2017)

The following is a list of names as presently circumscribed which treats species codes given in Zhang et al. 2017. Names are organized as they occur in the phylogeny on p. 229.

***Pachnaeus marmoratus* Marshall, 1916**

Pachnaeus marmoratus Marshall, 1916 sec. Zhang et al. 2017 (correctly identified)

***Pachnaeus citri* Marshall, 1916**

Pachnaeus sp. “1” Zhang et al. 2017

Pachnaeus sp. “1 AMV2011a” Zhang et al. 2017 (as in supplemental material)

***Pachnaeus psittacus* (Olivier, 1807)**

Pachnaeus sp. “GZ38” Zhang et al. 2017

***Pachnaeus pater* de Zayas, 1988**

Pachnaeus sp. “GZ1” Zhang et al. 2017

***Pachnaeus rosadonetoi* Lopez Castilla, 1992**

Pachnaeus sp. “GZ52” Zhang et al. 2017

Pachnaeus sp. “GZ53” Zhang et al. 2017

***Pachnaeus obrienorum* Reily, sp. nov. (Central Cuban population)**

Pachnaeus sp. “GZ13” Zhang et al. 2017

***Pachnaeus azurescens* Gyllenhal in Schoenherr, 1834**

Pachnaeus sp. “GZ40” Zhang et al. 2017

Pachnaeus sp. “GZ25” Zhang et al. 2017

***Pachnaeus litus* (Germar, 1824) (*sensu lato*, Cuban populations)**

Pachnaeus sp. “GZ24” Zhang et al. 2017

Pachnaeus sp. “GZ6” Zhang et al. 2017

Pachnaeus sp. “GZ26” Zhang et al. 2017

New geographical records of note

This study has also revealed several new surprising geographical records for members of the genus. These include a **new state and new national record for Florida, U.S.A. for**

***Pachnaeus azurescens* Gyllenhal in Schoenherr, 1834** and new national records for the **Bahamas for *Pachnaeus litus* (Germar, 1824)**.

Additional critical character systems not sampled by this work

The following is a breakdown of critical character systems not sampled in the present study—but which have become increasingly apparent as useful—and an examination of their potential to resolve remaining taxonomic challenges within this genus and beyond.

Molecular data

Adding unsampled taxa to existing molecular data set (Zhang et al. 2017) may help to resolve some of the issues with relationships between species and species groups within *Pachnaeus* Schoenherr Particularly important are molecular sampling of the Bahamian fauna, inclusion of the native continental species *P. opalus* (Olivier), and inclusion of the either morphologically convergent or basal species (see discussion below) *P. sommeri* (Munck af Rosenschoeld in Schoenherr), though other unsampled taxa (*e.g., P. costatus* Perroud) would be good additions as well.

Resolving variation within *P. litus* (Germar) *sensu lato*—which shows a wide range of variation in color, pronotal scale pattern, rostral median carinal width, and body size—will probably require employment of molecular data as well. Many of the specimens which vary significantly from the typical Havanan/Floridian/adventive form, which is smaller and possesses a pale stripe dorsomedially on the pronotum, are older material from Cuba with limited data. These may not be suitable (or at least optimal) for obtaining sequence data from. As such, resolving this highly variable species/cryptic species group will likely require undertaking a widespread, modern sampling effort within Cuba. Such an effort should include adequate recording of collection data and vouchering of specimens in readily accessible collections, as failure to do these things in past has contributed greatly to the challenge of treating this taxon within the present work.

Endophallic characters beyond sclerites

This study has redemonstrated the importance of endophallic characters within both *Pachnaeus* Schoenherr and other eustyline taxa. Endophallic sclerite characters, it would seem, have good potential for use in delimitation of higher-level taxa (species group, genus, genus complex, subtribe) within Eustylini, and perhaps even neotropical entimines at large. In addition, there are likely to be diagnostic endophallic characters present beyond those of sclerites such as have been included in this work—*e.g.*, inflated membrane shape, smaller elements on the membrane such as papillae or setae, and weakly sclerotized remnants of former large sclerites which are not readily detectable until the endophallus is everted. Several methods to access these characters via eversion of the endophallus have been used in past. van Dam (2014) points out that many of these techniques—or at least those applicable without having to possess living specimens—are complicated by the need for prohibitively good fine motorskills. van Dam proposed a method for greater ease of inflation of the endophallus which involved digestion of non-cuticular tissue in a pancreatin solution at 37°C for 1–2 hours, rinsing in distilled water to remove residual non-cuticular tissue, and transfer to 70% ethanol after which the endophallus is inflated within a low-rimmed petri dish full of ethanol by extending the tegmen and inserting a large-gauge, blunt-tip dispensing needle through the tegminal ring into the base of the pedon then clamping the membrane between tegmen and penis with clay-packed Pierse corneal forceps and injecting K-Y Jelly via syringe. This was attempted for the present study to the precise specifications given in the afore mentioned paper without success—either the endophallus simply would not inflate despite excessive pressure applied, or the setup would dislodge and, often, rip through the pedon.

I would blame the issue wholly on my own sub-par motorskills; however, upon seeking input on the matter from other entimine workers who had attempted to use this technique on their respective taxa (names withheld to protect the innocent) I found that I was not alone. I would like to be explicit that I am not suggesting that this technique "doesn't work"—clearly it does based on images in the original paper—but simply that it did not work for me or select others. To be perfectly transparent in this matter, I also found others who claimed it did work for their non-entimine taxa.

This failure may be for several reasons: the membranes of specimens we were using may not have been in adequate condition being older, dry-mounted material, or the reagents used (most probably in my case the pancreatin) may have been faulty—though it did seem to digest soft tissue adequately based on my interpretation of the specimens, or it may simply be something particular to the morphology of the endophallus of the taxa being studied. Regardless, better understanding of endophallic characters which requires visualization of the inflated endophallus is needed within this genus and other closely related taxa. With recent developments in imaging technology, this may eventually not even require physical dissection of the specimens: 3D imaging via microtomography and 3D modeling is increasingly being applied to historical insect specimens and this may make obsolete the need to dissect and inflate endophalluses in order to access their characters.

Paired pronotal punctures

There are often up to two pairs of transversely paired punctures surrounding the pronotal midline, one anteriorly near mid-disc and often another pair nearer the pronotal base, this latter pair variably more or less far apart than the anterior pair. There is often also another pair dorsolaterally located near the pronotal bases adjacent to the fourth elytral striae, *e.g.,* Marshall (1916: 454) was the first to note these in his description of *P. citri* Marshall, saying “a single pair of punctures shows through the scaling in the middle of the disc, and sometimes a more distant [*i.e.*, more distantly separated] pair behind the middle”. This can be seen in the types (Fig. 3.14A).

However, these seem to be extremely variable, with members of the same species often expressing different numbers and placements, though this does seem promising as a character given that species, when taken in large series, do generally seem to show the same set of placements but with some or all pairs variably absent. For example, when these punctures are present, members of the *howdenae* and *azurescens* groups tend to have the posterior pair of punctures closer together than the anterior punctures while many Jamaican species tend to have either only the median pair or, rarely, the median pair and a more distantly set pair posteriorly I do not know what these punctures are, nor do I have a good concept at this time as to how they correlate with taxa because of the high level of variability observed. I believe the numbers and placements of these punctures may prove useful for testing relationships between clades within this genus.

Punctures near the pronotal base adjacent to the bases of the fourth elytral striae seem to vary a lot at both specific and interspecific levels and don't seem to be as informative for higher groups as those more medially located on the disc.

This character set may prove more accessible and more useful for teneral specimens, pupae, or pupal exuviae. There may also be internal cuticular characters relating to these punctures that are more reliable and these may become more usable for diagnosis with advancing microtomography and 3D modeling techniques.

Future directions

Given the superficial similarity of many species within this group, developing molecular assays for similar and commonly confused species might be a good long-term goal. In terms of priorities, first would seem to be creating a way to rapidly distinguish the morphologically similar pairs *P. azurescens* Gyllenhal in Schoenherr/*P. opalus* (Olivier), *P. citri* Marshall/*P. eisenbergi* Reily, sp. nov., and *P. pater de Zayas*/*P. rosadonetoi* Lopez Castilla. *Pachnaeus litus* (Germar) and *P. obrienorum* Reily, sp. nov. would be good secondary additions on grounds of their broad and often overlapping geographical ranges and lack of "easy" characters to quickly distinguish them—*e.g.*, metasternal darker scaled patch in *P. psittacus* (Olivier) and protibial shape and scaling in *P. marmoratus* Marshall, though these latter two would certainly be good tertiary additions to an assay if possible on grounds of their potential for agricultural impact suggested by the literature and specimens examined, as would other, superficially similar taxa which often seem to confuse identifiers such as *Exophthalmus roseipes* (Chevrolat, 1876), *Exophthalmus opulentus* (Boheman in Schoenherr, 1840), and *Exophthalmus agrestis*

(Boheman in Schoenherr, 1834). Efforts to build molecular assays for some citrus-feeding entimines have been undertaken in past using RFLP analysis (Weathersbee et al. 2003, which included differentiation of egg masses of *P. litus* (Germar) but only from *D. abbreviatus* (Linnaeus)) and more recently using multiplex qPCR (Aguirre et. al 2021, applied to species of *Naupactus* Dejean).

A complete review of the literature regarding *Pachnaeus litus* (Germar)—including specimen-based confirmation of identifications from the historical literature—is needed to better address treatment methodology and biology of this wide-spread, regularly transported, and dangerously pestiferous, generalist species. However, on attempting such an effort, one quickly realizes that the task is complicated to near impossibility by a myriad of challenges. Literature records—particularly those ranging from the 1930s to 1960s, and particularly so for literature originating in Cuba and Jamaica—are often unobtainable due to publication in now-defunct journals or in governmental reports. Even when papers can be found, the literature includes a multitude of nomenclatural issues ranging from misspellings to misidentifications which convolute record data. Specimens are generally not figured in any capacity and literature records frequently lack any information on where (or often even if) vouchered specimens are deposited in collections. There is a general lack of use of unique identifiers in past literature, and older studies often even do not include collection dates, collector names, localities, and/or numbers of specimens examined. Poor labeling practices used in past—*e.g.*, failure to label specimens beyond the level of large-scale geographical regions, failure to provide other aspect of collection data such as collectors and collection dates on labels, or even failure to label specimens in any capacity—further thwart association of specimens with literature records.

Like many of the other agriculturally important genera of the tribe, *Pachnaeus* Schoenherr has seen a good deal of human transport via shipment with exported agricultural goods. In this genus, this has been primarily in association with *Citrus* L. and primarily out of Cuba—*i.e.*, *P. litus* (Germar) being established in Florida and detected elsewhere, *P. azurescens* Gyllenhal in Schoenherr being established in Florida, and *P. psittacus* Perroud likely being established in Puerto Rico and Hispaniola. The Florida-Cuba pest pathway is well established in the literature and, to a lesser extent, so is pest transport from Cuba to neighboring islands such as Hispaniola and Puerto Rico (Penca et al. 2016). Phytosanitary efforts relating to these pathways have historically been complicated by a lack of understanding of Cuban phytosanitary practice and capabilities, to the extent that the nation's phytosanitary practice has been referred to as a "black-box" (Gomez et al. 2020). It seems clear that if we are to prevent future biological invasions, great strides will need to be made in building better cooperation between Cuban and external—particularly US—agencies and that a better understanding of the Cuban entomofauna is desperately needed.

The evolutionary relationships of New-World entimines remain largely unresolved and that applies also to clades within *Pachnaeus*. While the present study lays out a hypothesis regarding the evolutionary relationships of species within *Pachnaeus*, it does not evaluate the characters upon which those hypotheses are built. To do so, one would need to test them via a cladistic analysis. Doing so would add value to the present primarily phenetic study. However, perhaps more important than whether the characters here proposed are or are not informative of clades, is the fact the characters here proposed are diagnostic of species, irrespective of their informativeness of common decent.

Until time of writing, species of *Pachnaeus* were largely unidentifiable. This is evidenced by the fact that misidentifications for this genus are rife in collections and the literature alike. This issue is not restricted to the present genus: there are no reliable keys— and for many groups no keys—for most economically important, New-World entimine taxa, many taxa were last illustrated in drawings dating to the mid-18th to late-19th centuries or never at all, and internal anatomy—*i.e.*, genitalia, which seem to be critical for both identificatory and systematic treatment of these taxa as evidenced by *Pachnaeus*—is almost entirely unknown for most species. As a result, most of these taxa remain unidentifiable to the level of species, if even to the level of genus.

Woodruff (1985) pointed out in his overview of citrus feeding weevil systematics and biology that understanding the biology, ecology, and behavior of any pest is essential to managing it, and that such an understanding is presupposed by first knowing its identity. He suggested that to do so "will require large series of specimens from all geographic areas, from different hosts, and all seasons. These must be prepared, studied and vouchered. Taxonomic studies must involve comparisons with all the relevant holotypes—many of which are scattered and located in European museums." The present study shows this to correct.

Species vary in space and time and members of *Pachnaeus* are no exception, with seemingly wider morphological variation seen within some species than between them—*e.g., P. citri* (Marshal) / *P. eisenbergi* Reily, sp. nov. and *P. opalus* (Olivier) / *P. azurescens* Gyllenhal in Schoenherr, both species pairs for which large series of material had to be evaluated to diagnose. Diagnostic treatment of *Pachnaeus* as provided herein would not have been possible without examination of large series of specimens from as a wide range of localities and collected over a long period of time in order to separate interspecific from intraspecific variation. In addition, types had to be examined to determine the identities of many of the species treated here and, wherein types were not accessible, the body of available evidence upon which to make decisions regarding the identities of species was weakened. As such, collections and the vouchered specimens they housed, types and non-types, were foundational to the present study. Unfortunately, the privilege of traveling across the planet to examine type specimens, as was required for the present study, is simply not available to many entomologists in our world. As such, in the absence of sweeping global socioeconomic and political change—which, as much as I may hope for, I do not greatly expect—a proxy for in-person examination of type material is needed. The present study suggests that photographs can often provide a reasonable, if not perfect, proxy to physical examination of type material, especially when coupled with examination of non-type material.

Broader implications of this work to entimine systematics

The following is an overview of a few of the major implications of the present work with respect to evolutionary trends in Entiminae Schoenherr, 1826.

Convergence of common predator avoidance scale patterns in Eustylini

Disruptive coloration has long been thought to serve as a means of predator avoidance (Thayer 1909) and past studies have suggested that even highly contrasting patterns may confer a selective advantage against predation (Stevens et al. 2006). Highly contrasting patterns (*e.g.*, longitudinal stripes, spots, or irregular marmorated patterns) may serve to break up the outline of an organism such that visual predators interpret a potential prey item as a series of distinct objects. Longitudinally striped forms have arisen at least four times in the present lineage (*i.e.*, *P. costatus* Perroud, *P. quadrilineatus* Reily, sp. nov., select populations (*e.g.*, Sims, Long Island, Bahamas) of *P. obrienorum* Reily, sp. nov., and either in *P. sommeri* (Munck af Rosenschoeld in Schoenherr) or—more likely—in the common ancestor of *Pachnaeus* Schoenherr and its sister taxon the Jamaican *Exophthalmus vittatus* (Linnaeus) + *E. similis* (Drury)+ *E. impressus* (Fabricius) clade). Such striped patterns also appear to have arisen independently several times elsewhere within Eustylini (*e.g.*, some species of *Exophthalmus* Schoenherr, *Compsoricus* Franz, and *Diaprepes* Schoenherr).

Iridescent, green-scaled forms appear to have arisen multiple times across this tribe. This is also common in other more distantly related entimine taxa (*e.g.*, *Hadromeropsis* Pierce, *Phyllobius* Germar, *Polydrusus* Germar, *Chlorophanus* Schoenherr in Sahlberg, and many others) and iridescent green coloration is common outside of Curculionidae. Iridescent green coloration seems to be common in taxa which spend their adult lives feeding within the crowns of living plants and is, perhaps unsurprisingly, likely related to predator avoidance via a strategy of blending in with surrounding foliage. It is unclear whether iridescent green scales seen in many species of *Pachnaeus* share a common evolutionary origin, but it is fairly clear that they are distinctly derived from those in more distantly related taxa (*e.g.*, *Compsus* Schoenherr, *Phaops* Sahlberg, and Central American species currently treated in *Exophthalmus* Schoenherr *sensu lato*) and probably even from more closely related taxa (*e.g., Tropirhinus* Schoenherr, *Compsoricus* Franz, and *Exophthalmus roseipes* (Chevrolat)).

Relationships of the Cuban and Jamaican fauna as a template for broader evolutionary trends

It seems clear based both on available molecular data (Zhang et al. 2017) and the present morphological data—*e.g.*, shared tubular, distal (=posterior) endophallic sclerite structure (Reily, unpublished data) that *Pachnaeus* Schoenherr and the Jamaican *Exophthalmus vittatus* (Linnaeus) + *E. similis* (Drury)+ *E. impressus* (Fabricius) clade are very closely related, and a subsequent review of this presumed sister taxon, for which the name *Prepodes* Schoenherr, 1823 should likely be resurrected, is underway. It seems likely that they shared a common ancestor in Jamaica sometime in the early- to mid-Miocene based on available timetrees (Zhang et al. 2017).

Based on characters shared by *Pachnaeus sommeri* (Munck af Rosenschoeld in Schoenherr) and most species of the Jamaican *Exophthalmus vittatus* (Linnaeus) + *E. similis* (Drury)+ *E. impressus* (Fabricius) clade—*i.e.*, larger and more elongate body form, longer and more curved rostrum, weak to absent rostral carinae, and pattern of stripes of raised, shaggy scales—it seems that this species may represent transitional form preserved after an early dispersal event to Cuba. It also seems likely that the Jamaican members of *Pachnaeus* (=*citri* species group) arose from within Jamaica and that some constituent of this clade is the most recent common ancestor of the more northerly species (=*opalus* species group + *psittacus* species group + *litus* species group) with subsequent saltations out of Cuba into Hispaniola, the Lucayan Archipelago, and the continental United States. Additionally, forward projected elytral bases may indicate close relationship of the *psittacus* species group and *litus* species group, but this remains somewhat unclear.

Plasticity of postocular vibrissae in Entiminae and their value as diagnostic characters

Postocular vibrissae have historically been used as diagnostic characters for higher rank taxa within Entiminae (*e.g.,* traditional use of the presence of postocular vibrissae to diagnose and delimit Tanymecini (Lacordaire, 1863), or as genus-level character for *Pachnaeus* Schoenherr (Anderson 2002: 771, character 48; among other authors)). This is problematic because this character seems to frequently appear and disappear within clades at a variety of different ranks. An excellent example of this is the genus *Diaprepes* Schoenherr: *Diaprepes abbreviatus* (Linnaeus, 1758) and closely allied species always have postocular vibrissae, *Diaprepes maugei* (Boheman in Schoenherr, 1840)—which match well otherwise to other members of the genus in terms of external morphology, *e.g.,* pronotal sculpturing and general gestalt, and in terms of endophallic sclerite structure—consistently lack postocular vibrissae, and *Diaprepes balloui* Marshall, 1916 seem to vary in presence/absence and quantity of Postocular vibrissae within populations. Further complicating this issue is the fact that reduction of postocular vibrissae has often been interpreted as absence. As seen in some taxa within *Pachnaeus* Schoenherr (*e.g., P. howdenae* Reily, sp. nov., *P. gowdeyi* (Marshall)) vibrissae may be difficult to make out or even entirely non-visible without decapitation of the specimen. Large series may help with this issue, allowing enough specimen variation that one or a few might be positioned in such a fashion that the apices of reduced vibrissae peek out from their place of hiding below the pronotal margin, but such series are not always available. The overarching lesson seems to be that a character which applies well for diagnosis of one taxon need not be equally valuable or applicable to another taxon, no matter how closely or distantly related those two taxa are or what taxonomic rank one is working at. Evolution is mosaic and different characters evolve at different rates within different taxa.

Figures

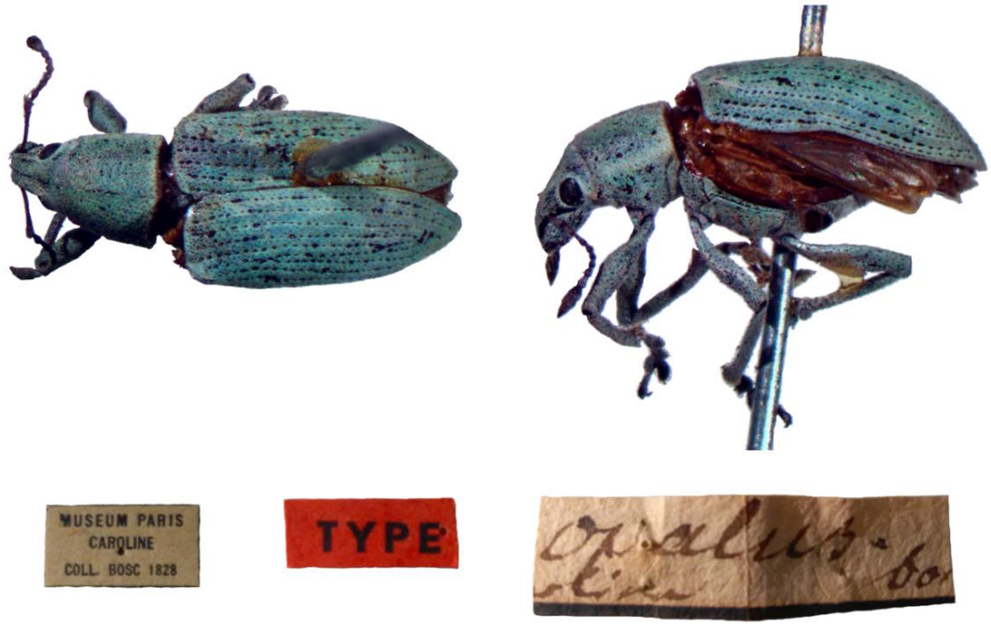

Fig. 2.1. Lectotype of *Pachnaeus opalus* (Olivier, 1807) (♂, MNHN).

Fig. 2.2. Paralectotype of *Pachnaeus opalus* (Olivier, 1807) (♀, MNHN).

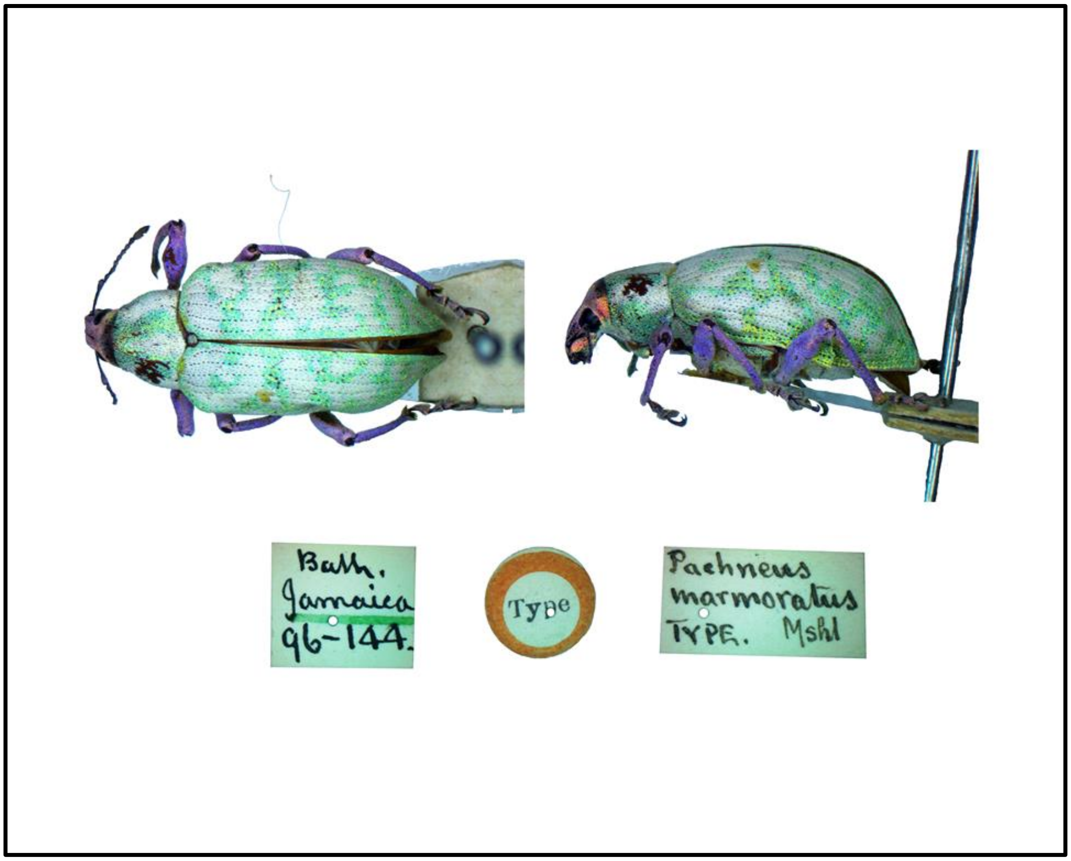

Fig. 3.1. Female lectotype of *Pachnaeus marmoratus* Marshall, 1916.

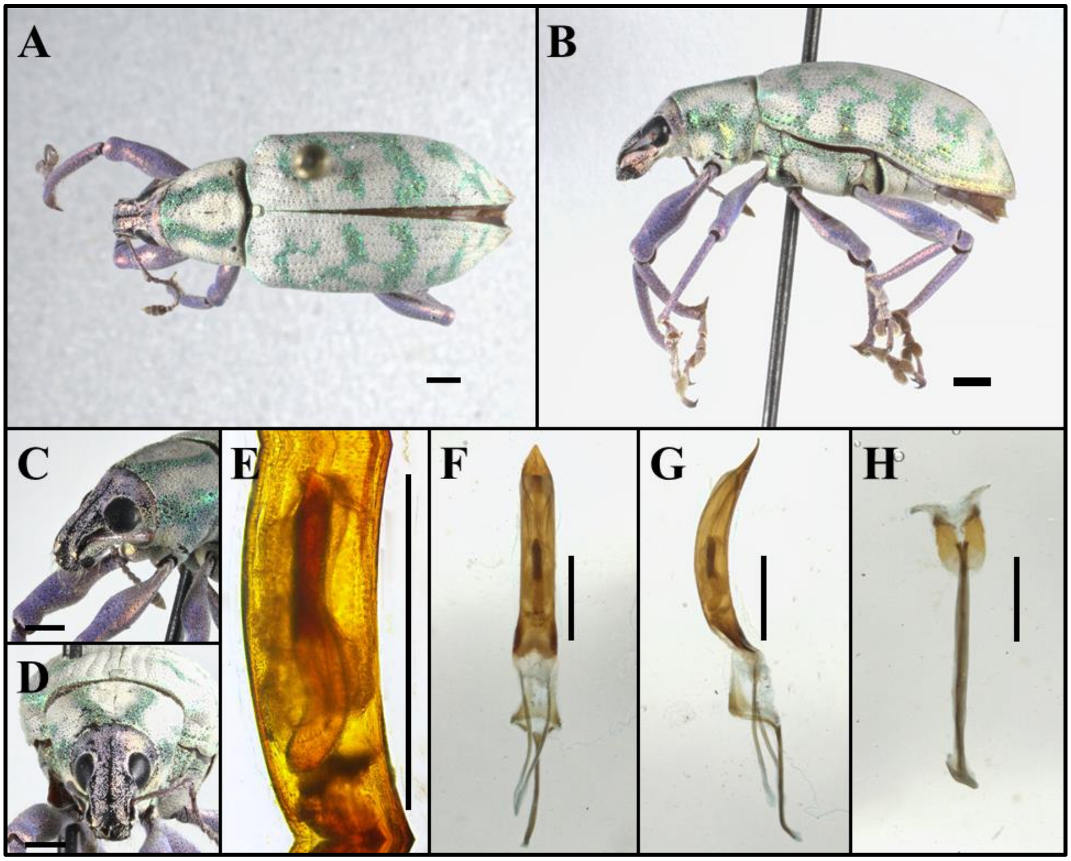

Fig. 3.2. *Pachnaeus marmoratus* Marshall, 1916, male, typical form with a large amount of white scaling. Habitus (ARTSYS0001364), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Male genitalia (ARTSYS0001366), E) endophallus lateral, F) aedeagus dorsal, G) aedeagus lateral, and H) spiculum gastral. Scale bars = 1mm.

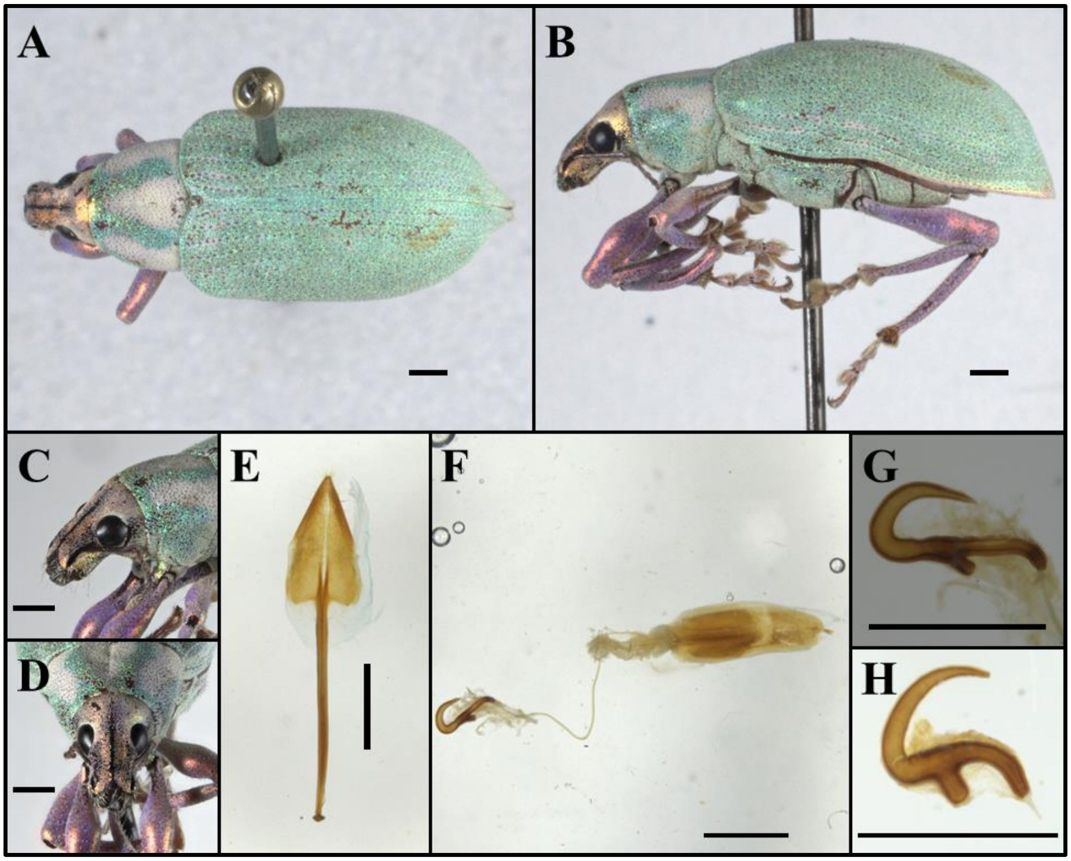

Fig. 3.3. *Pachnaeus marmoratus* Marshall, 1916, female. Habitus, form with green-elytral scaling and white banding laterally on pronotum (ARTSYS0001575), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Female genitalia (ARTSYS0001365), E) spiculum ventrale, F) spermatheca and coxites lateral, and G) spermatheca, H) example of spermathecal variation in the species from a specimen from Hardwar Gap (ARTSYS0001373). Scale bars = 1mm.

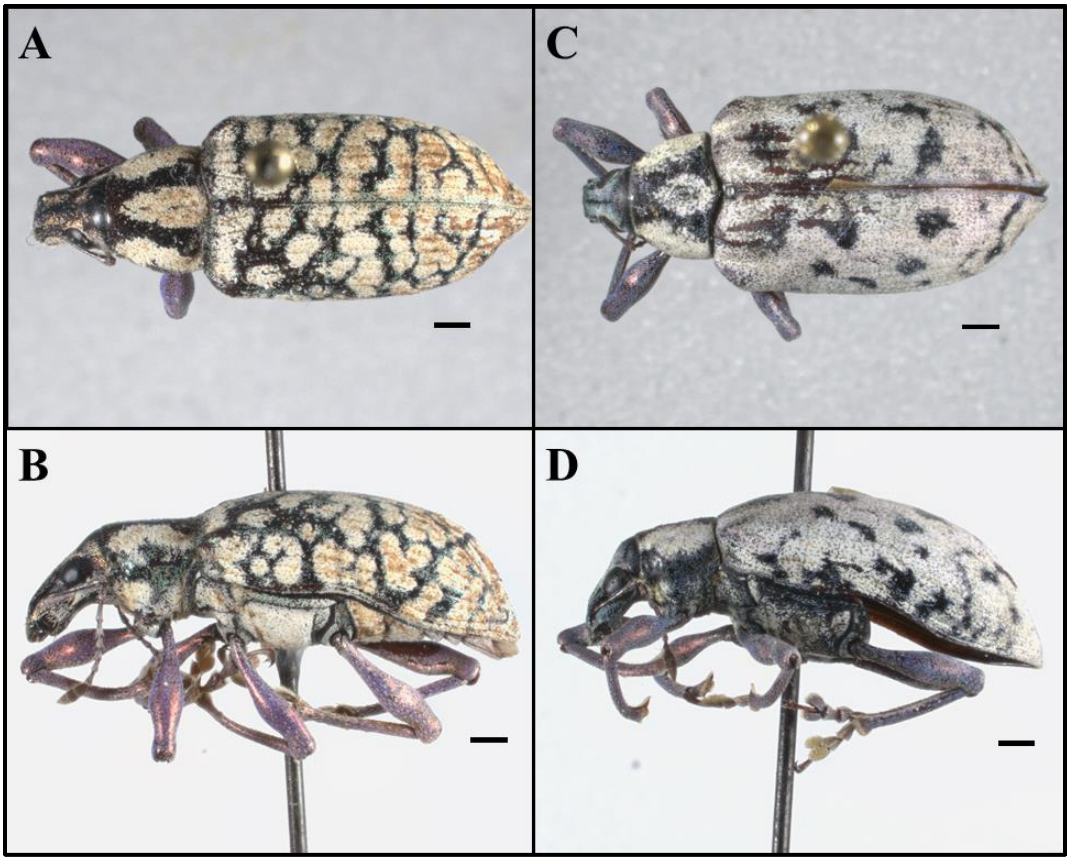

Fig. 3.4. *Pachnaeus marmoratus* Marshall, 1916, form with typically green-scaled areas heavily denuded from Hardwar Gap. Male (ARTSYS0001572), A) dorsal, B) lateral, female (ARTSYS0001373), C) dorsal, D) lateral. Scale bars = 1mm.

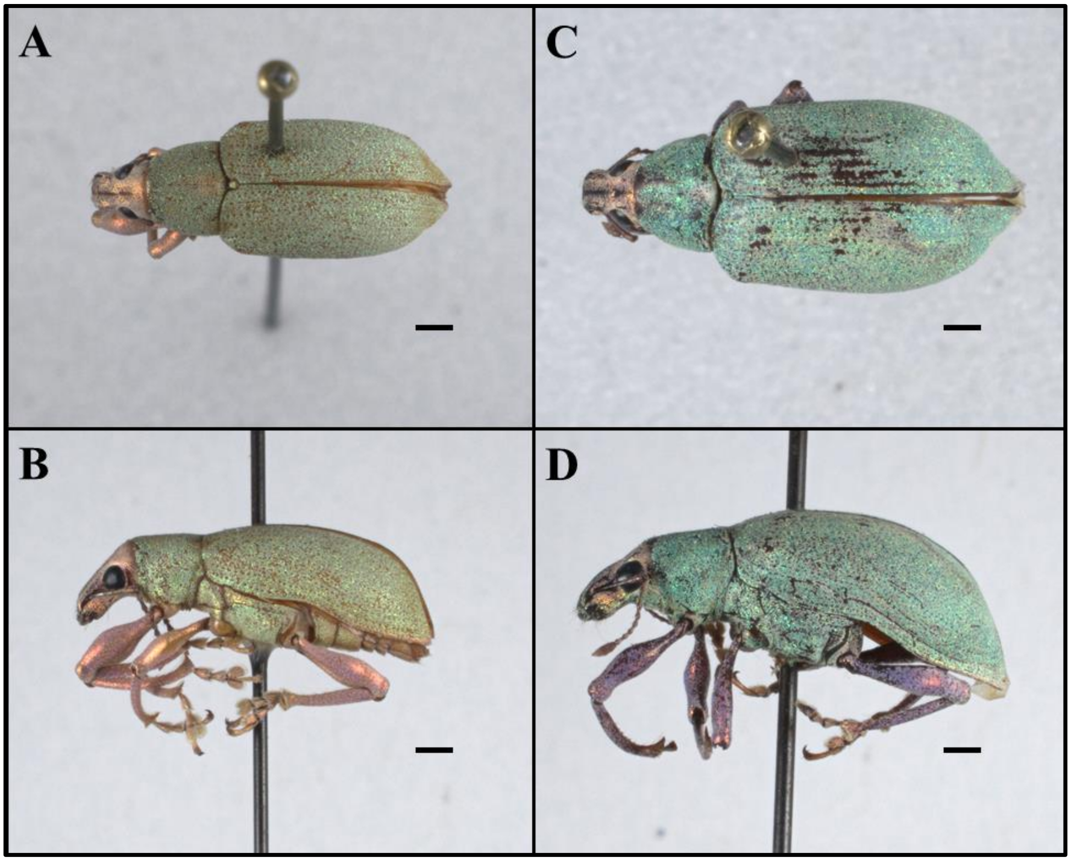

Fig. 3.5. *Pachnaeus marmoratus* Marshall, 1916, form with pronotum and elytra primarily green. Male (ARTSYS0001568), A) dorsal, B) lateral, female (ARTSYS0001367), C) dorsal, D) lateral. Scale bars = 1mm.

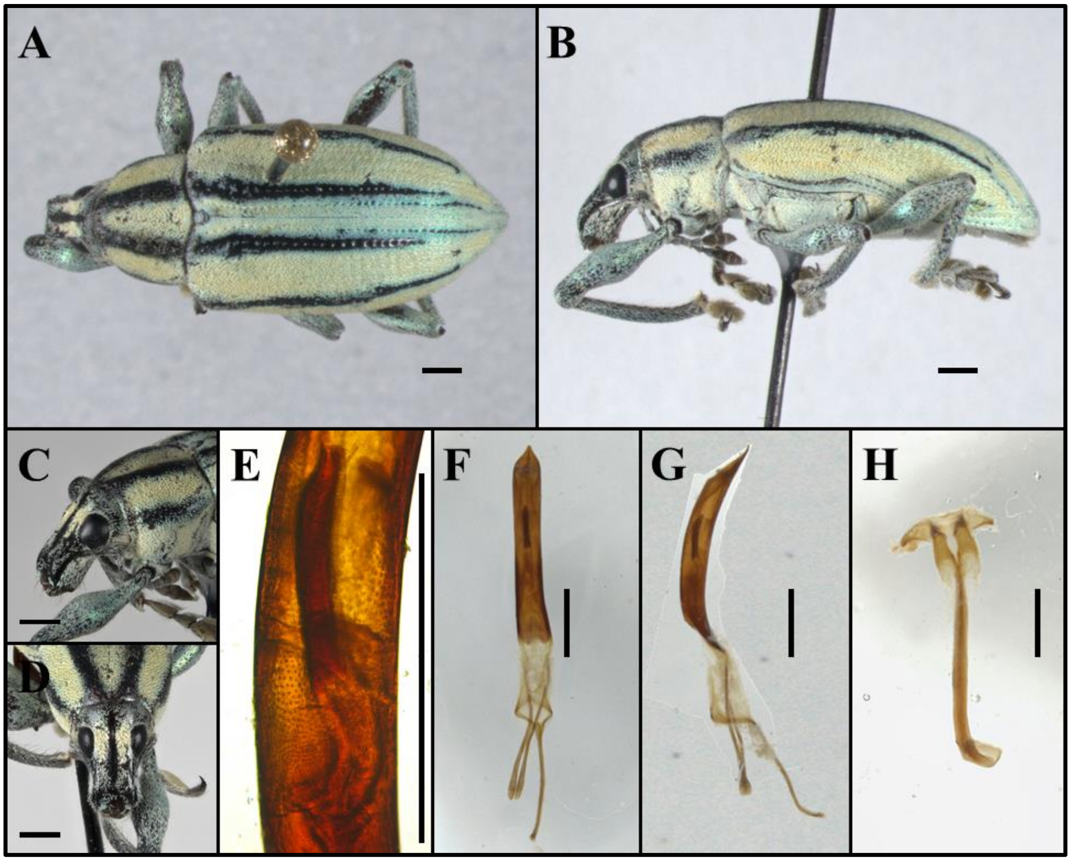

Fig. 3.6. *Pachnaeus quadrilineatus*, sp. nov., male. Habitus (ARTSYS0001559), holotype, A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Male genitalia (ARTSYS0001560), paratype, E) endophallus lateral, F) aedeagus dorsal, G) aedeagus lateral, and H) spiculum gastral. Scale bars = 1mm.

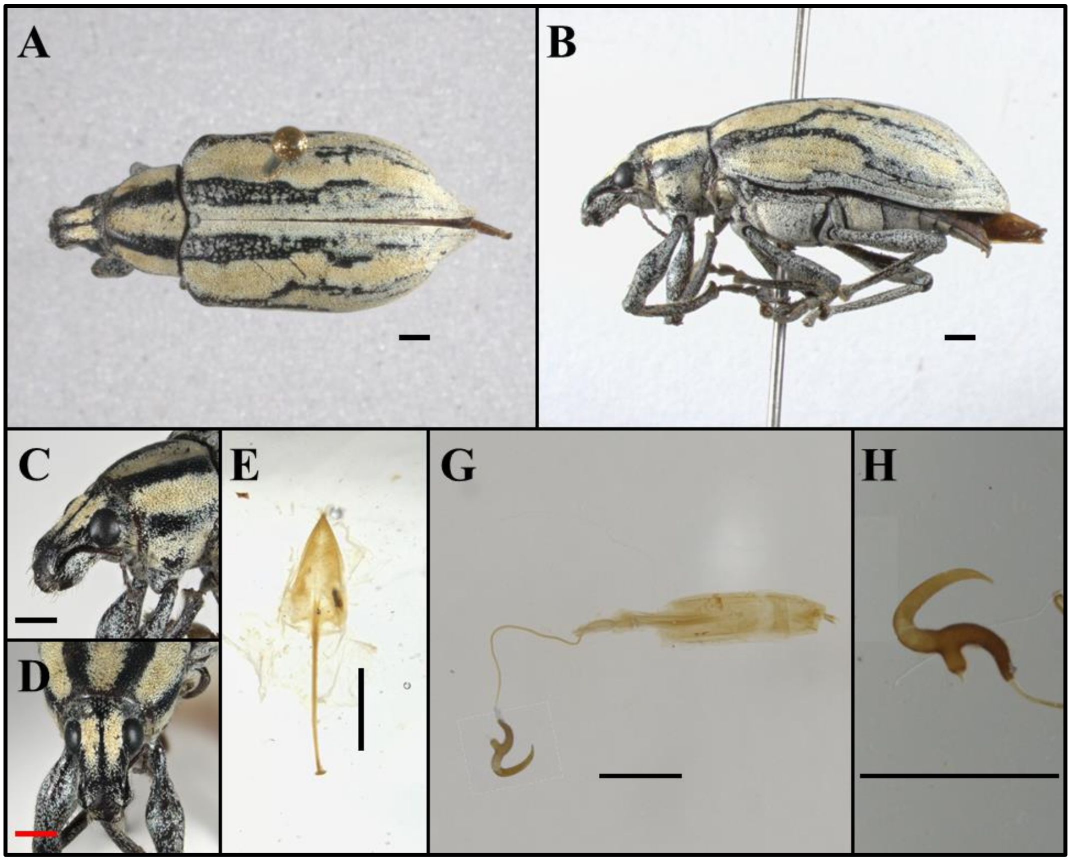

Fig. 3.7. *Pachnaeus quadrilineatus*, sp. nov., female. Habitus (ARTSYS0001558), paratype, A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Female genitalia (ASUHIC0088726), paratype, E) spiculum ventrale, F) spermatheca and coxites lateral, and G) spermatheca. Scale bars = 1mm.

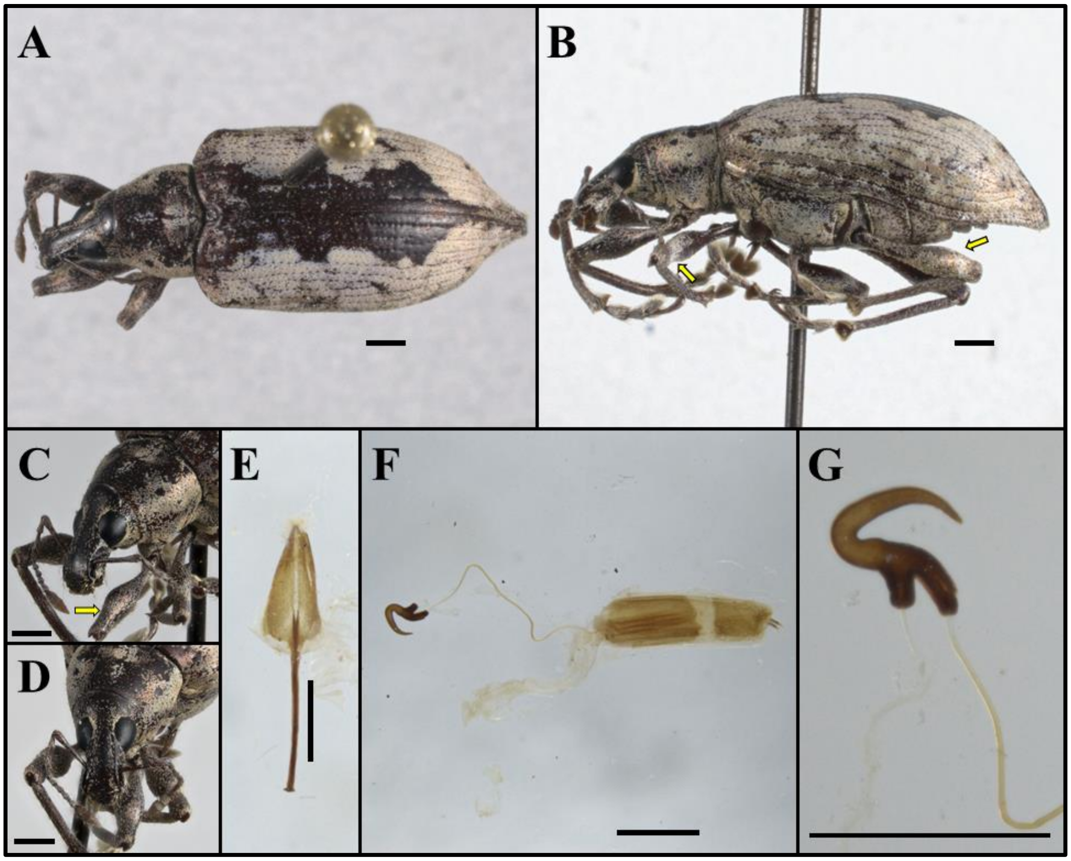

Fig. 3.8. *Pachnaeus gowdeyi* (Marshall, 1926), female, (ARTSYS0007582). Habitus, A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Female genitalia, E) spiculum ventrale, F) spermatheca and coxites lateral, and G) spermatheca. Yellow arrows indicate densely pale scaled femoral patches. Scale bars = 1mm.

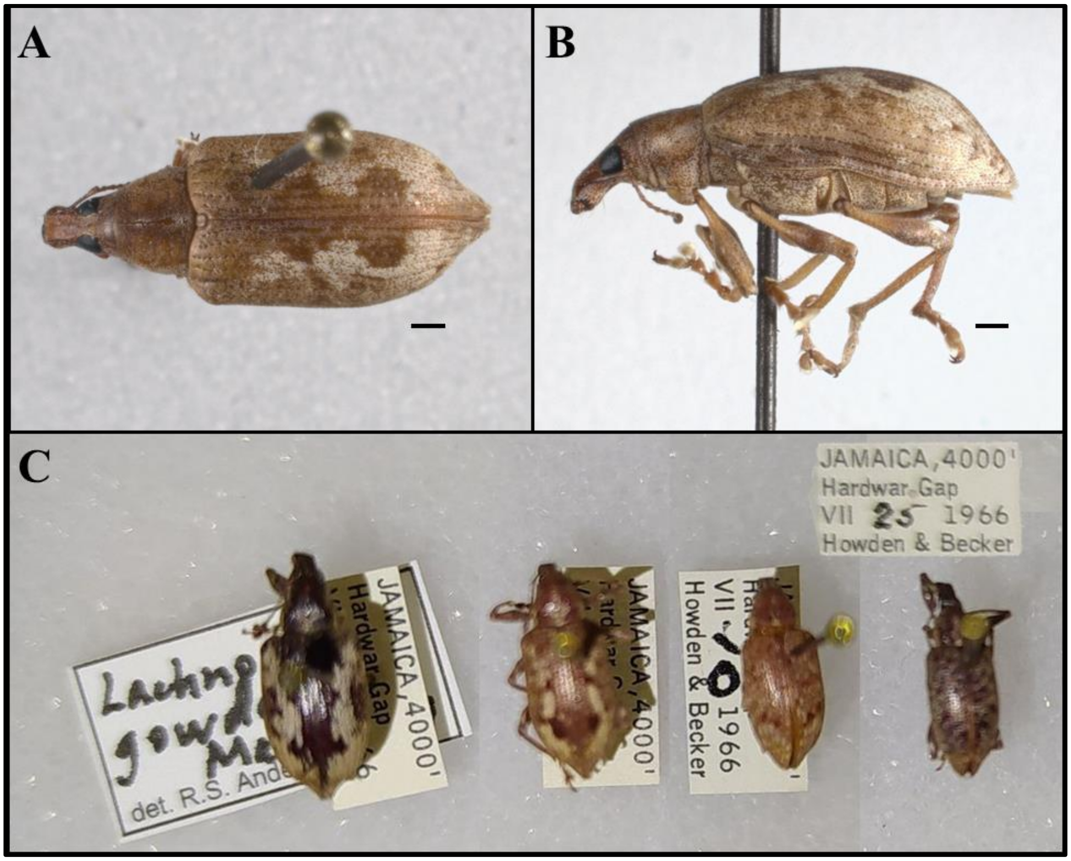

Fig. 3.9. Variation within *Pachnaeus gowdeyi* (Marshall, 1926). Pale integument variant female (ARTSYS0007582), habitus, A) dorsal, B) lateral, (ARTSYS0007580), C) dorsal habitus of two females (left) and two males (right) from Hardwar gap. Modified from image by Jennifer C. Girón Duque. Scale bars = 1mm.

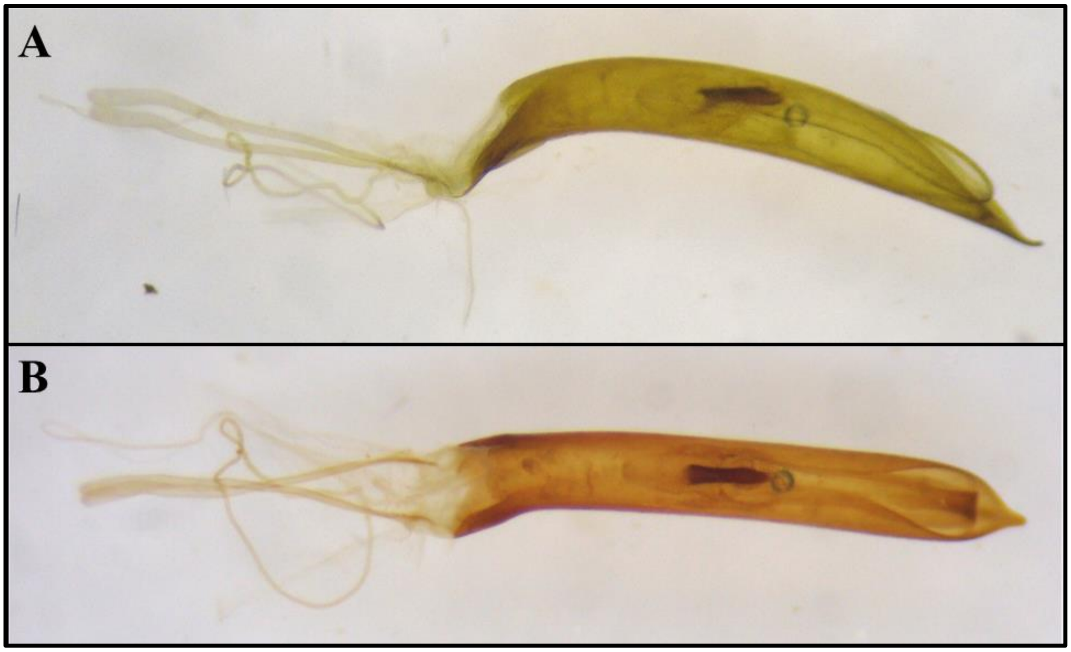

Fig. 3.10. Male genitalia of *Pachnaeus gowdeyi* (Marshall, 1926). Aedeagus A) lateral and B) dorsal. Images by Jennifer C. Girón Duque.

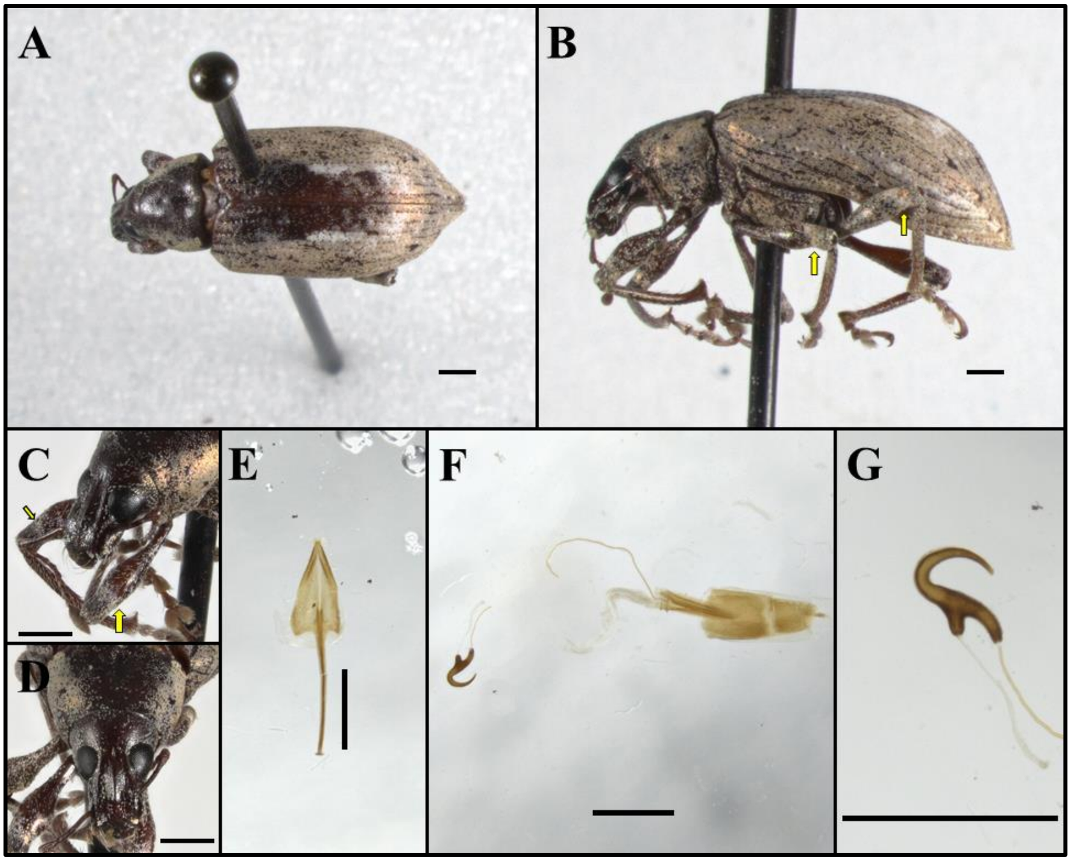

Fig. 3.11. Female holotype of *Pachnaeus gordoni*, sp. nov. (ARTSYS0007558). Habitus, A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Female genitalia, E) spiculum ventrale, F) spermatheca and coxites lateral, and G) spermatheca. Yellow arrows indicate densely pale scaled femoral patches. Scale bars = 1mm.

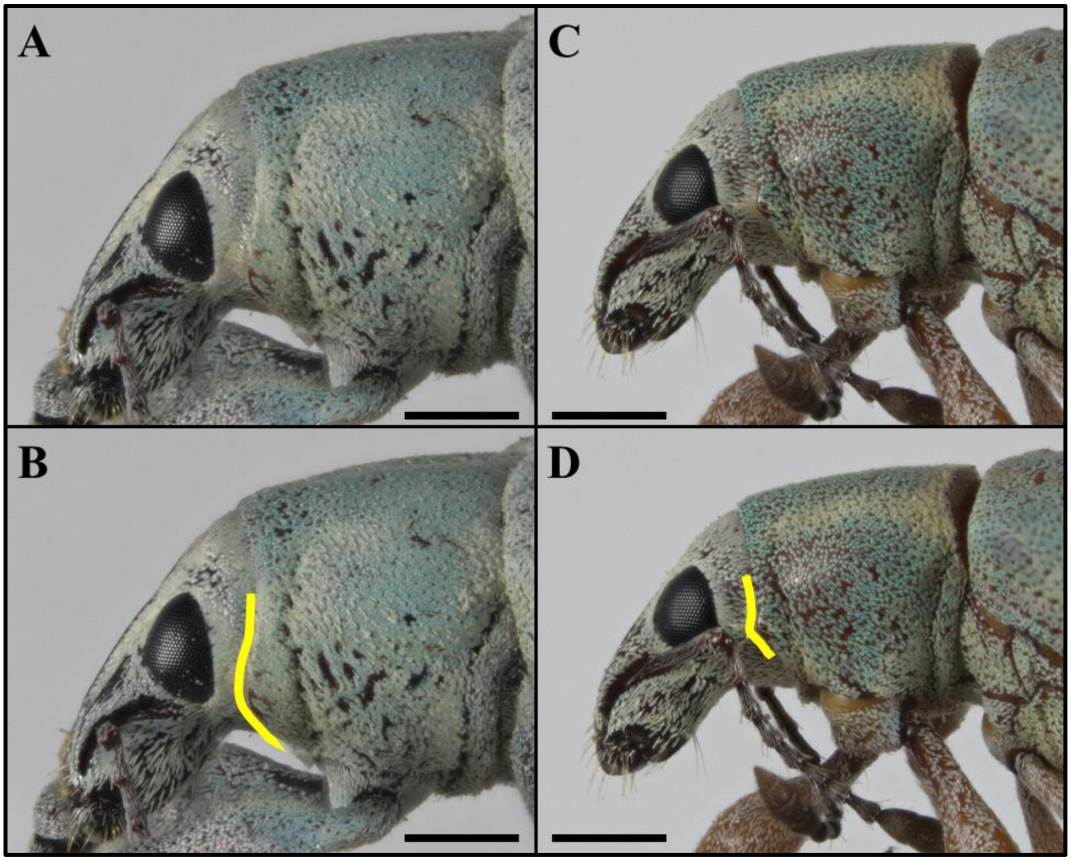

Fig. 3.12. Structure of postocular lobe (yellow) in lateral profile, A, B) *Pachnaeus citri* Marshall, 1916 (ARTSYS0007502), C, D) *Pachnaeus eisenbergi*, sp. nov. (ARTSYS0007592). Scale bars = 1mm.

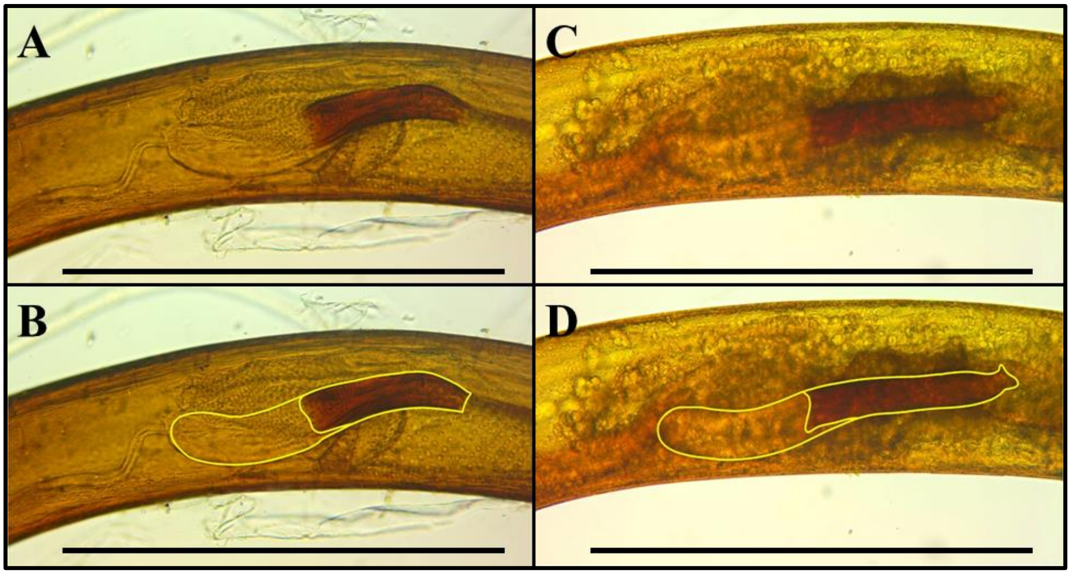

Fig. 3.13. Lateral aspect of aedeagal endophallus (yellow), A, B) *Pachnaeus citri* Marshall, 1916 (ARTSYS0001359), C, D) *Pachnaeus eisenbergi*, sp. nov. (ARTSYS0007599). Scale bars = 1mm.

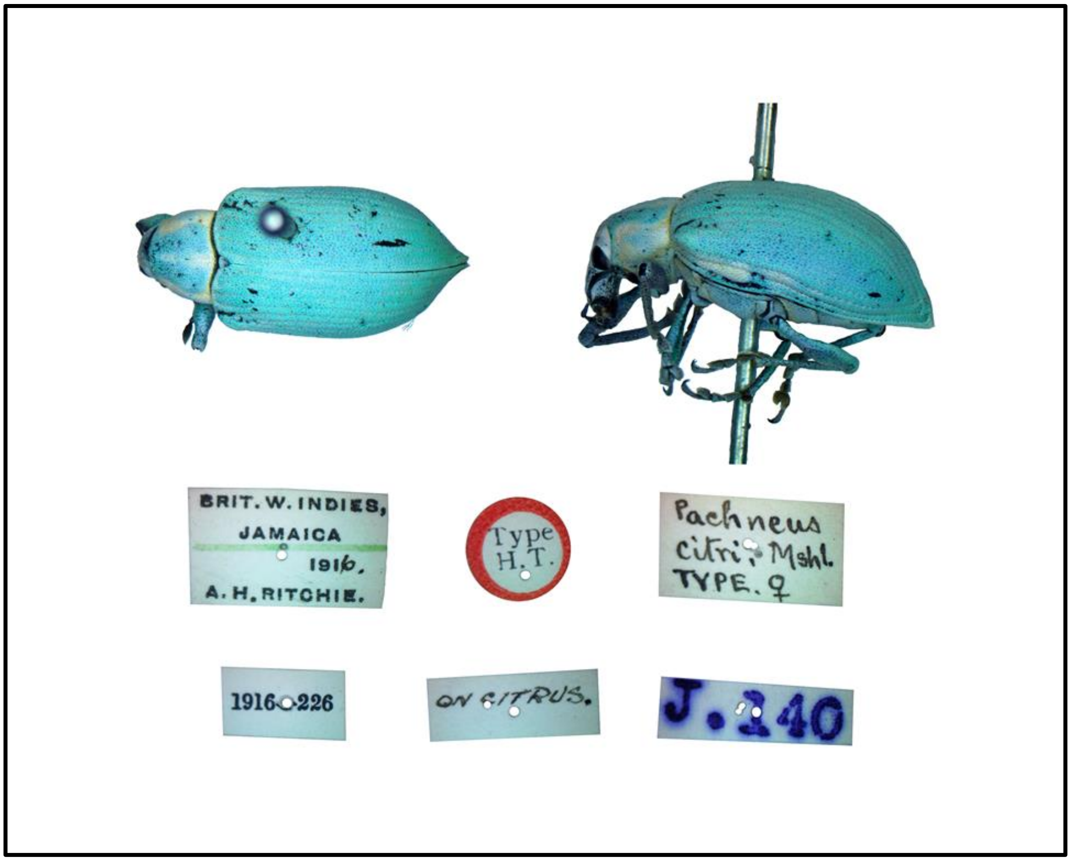

Fig. 3.14. Female lectotype of *Pachnaeus citri* Marshall, 1916.

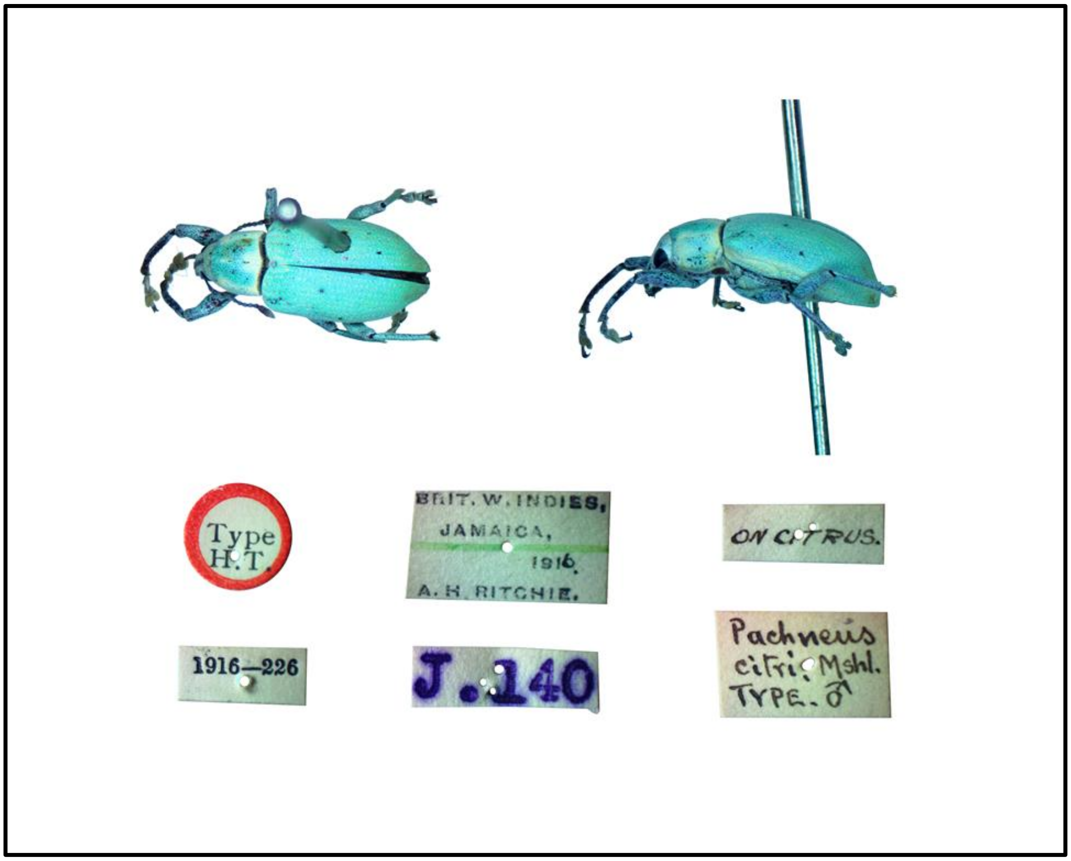

Fig. 3.15. Male paralectotype of *Pachnaeus citri* Marshall, 1916.

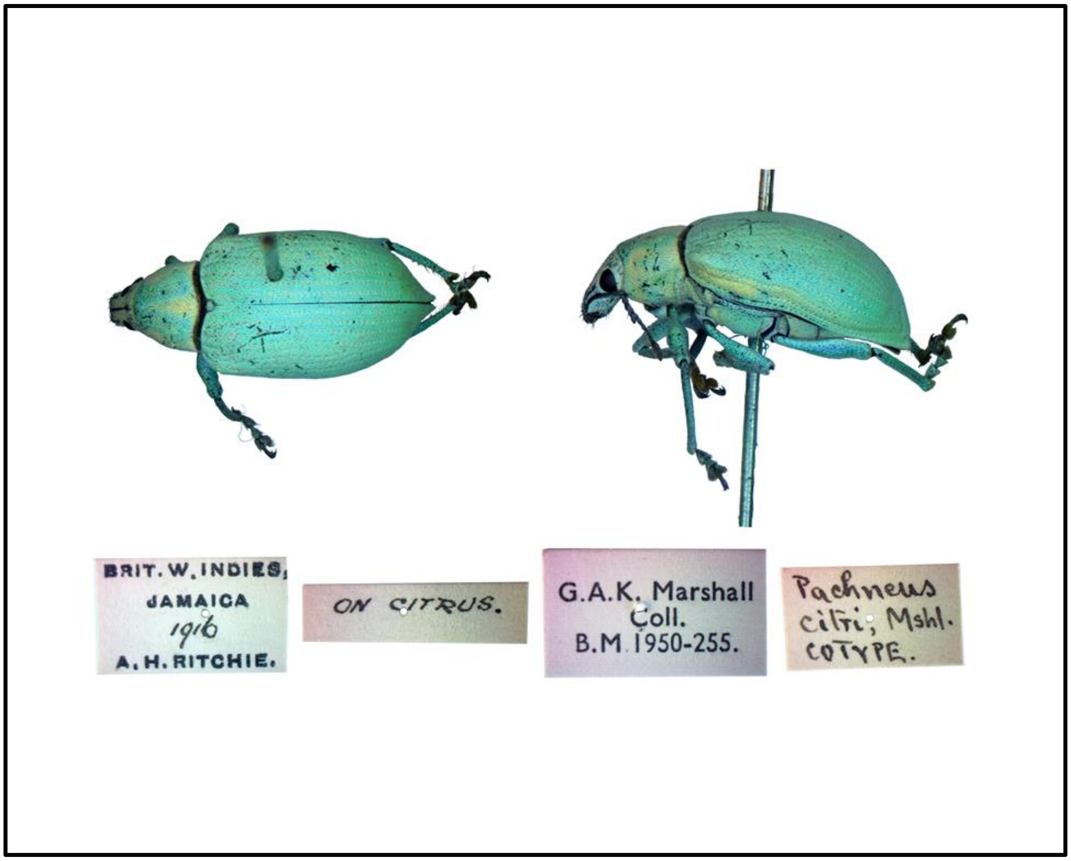

Fig. 3.16. Female paralectotype of *Pachnaeus citri* Marshall, 1916.

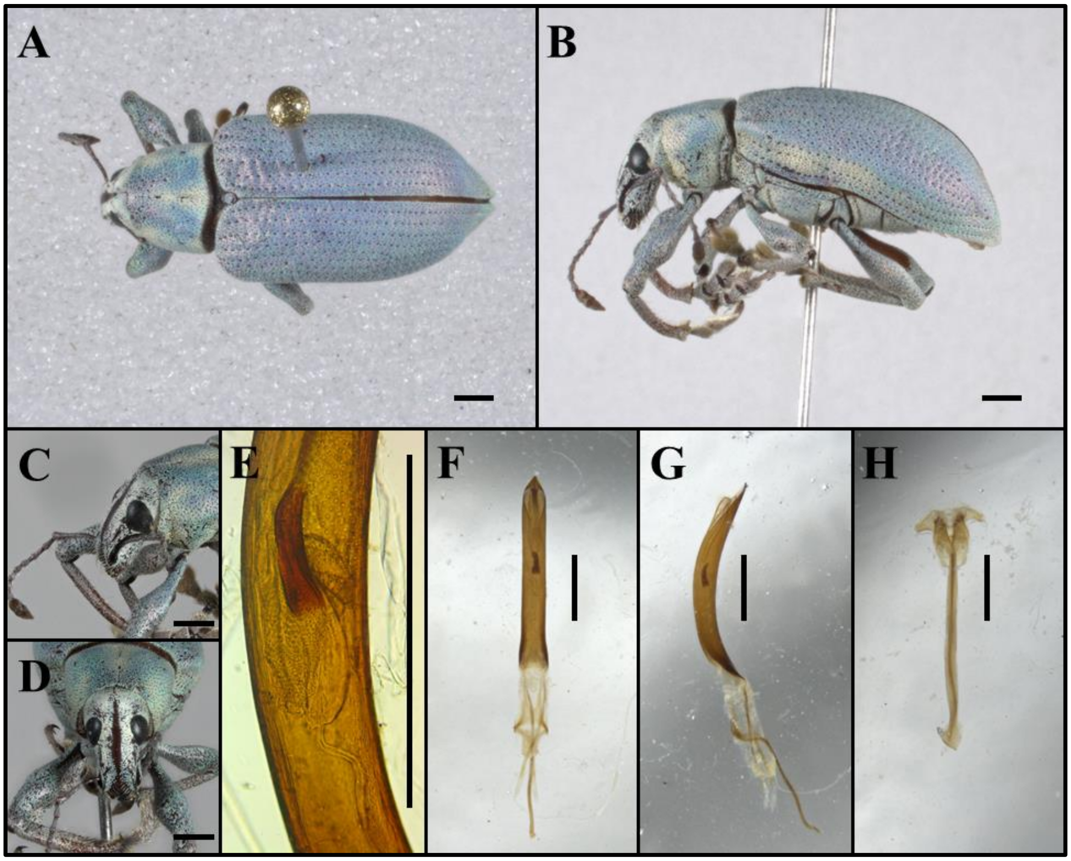

Fig. 3.17. *Pachnaeus citri* Marshall, 1916, male, typical form. Habitus (ASUHIC0088776), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Male genitalia (ARTSYS0001359), E) endophallus lateral, F) aedeagus dorsal, G) aedeagus lateral, and H) spiculum gastral. Scale bars = 1mm.

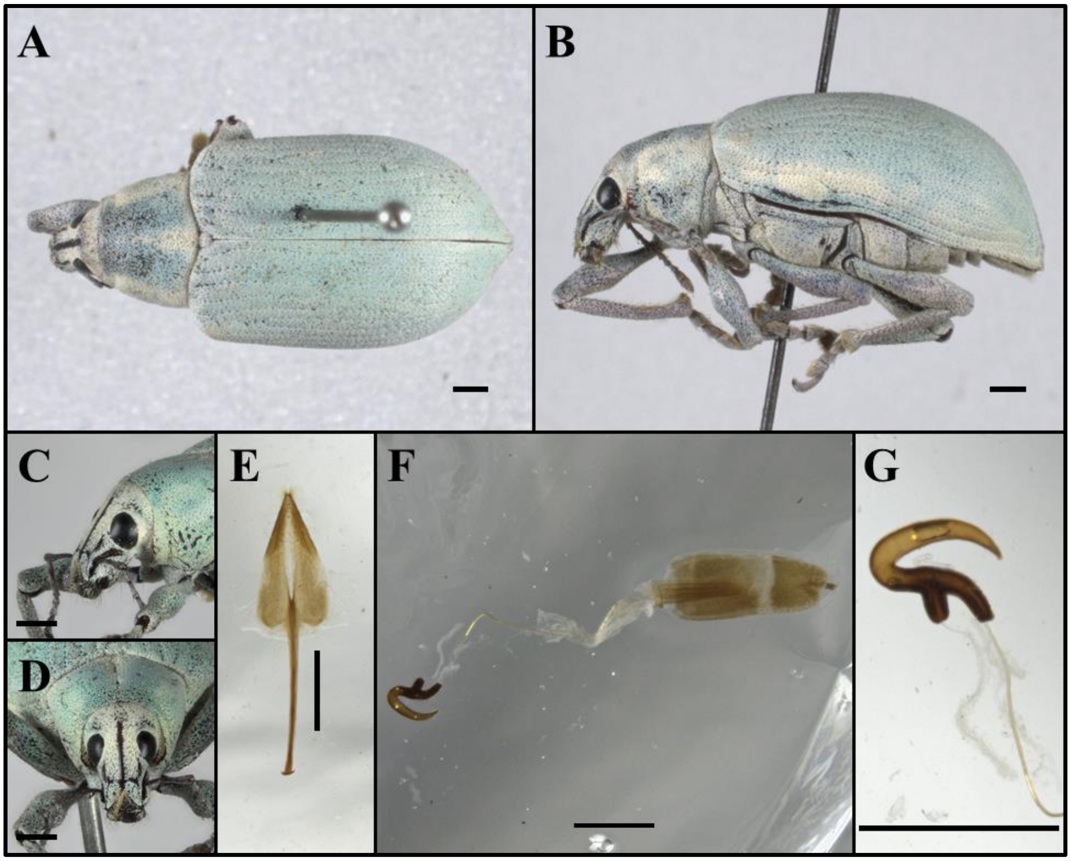

Fig. 3.18. *Pachnaeus citri* Marshall, 1916, female, typical form. Habitus (ARTSYS0007532), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Female genitalia (ARTSYS0001350), E) spiculum ventrale, F) spermatheca and coxites lateral, and G) spermatheca. Scale bars = 1mm.

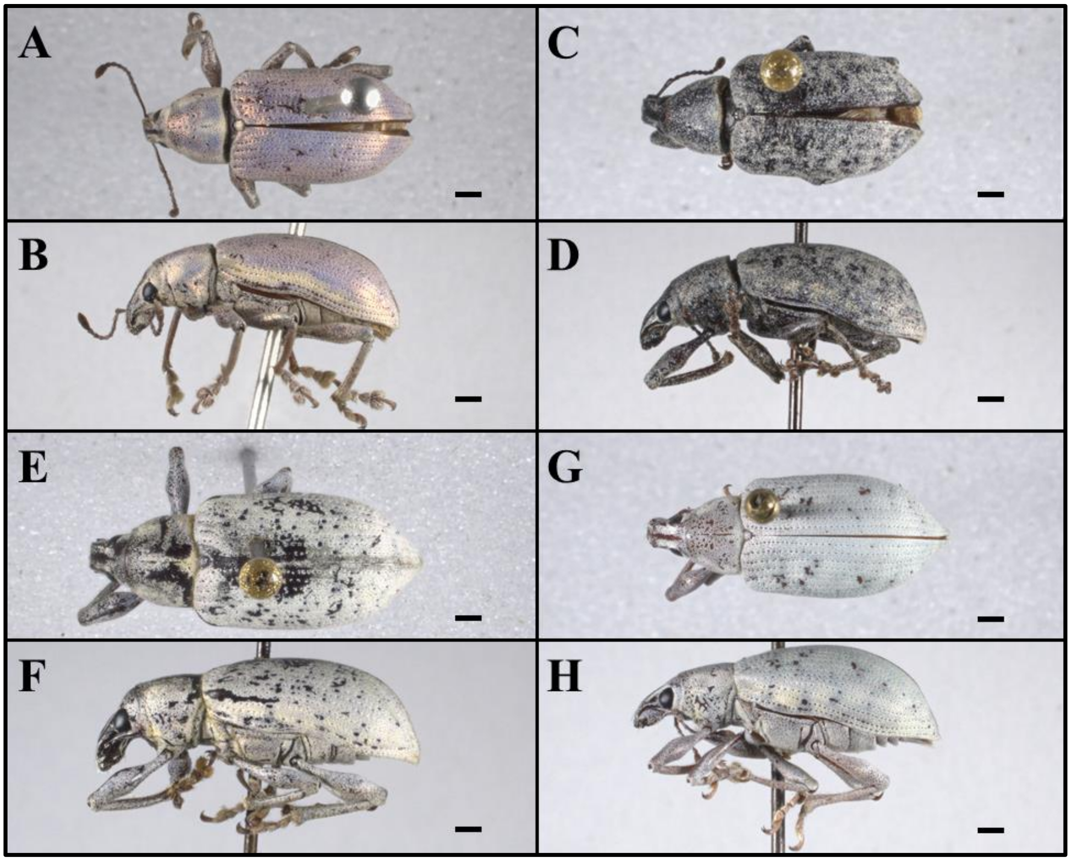

Fig. 3.19. Variation within *Pachnaeus cit*ri Marshall, 1916, A, B) pink-scaled male from Ewarton (ARTSYS0007561), C, D) small, mottled, dark-grey-scaled male from Content Gap, Blue Mountains (ARTSYS0007567), E, F) large, light-grey-scaled male with scattered denuded patches from Content Gap, Blue Mountains (ARTSYS0007568), G, H) pale-blue-scaled female with scattered denuded patches from Whitfield Hall, Blue Mountains (ARTSYS0007570). Scale bars = 1mm.

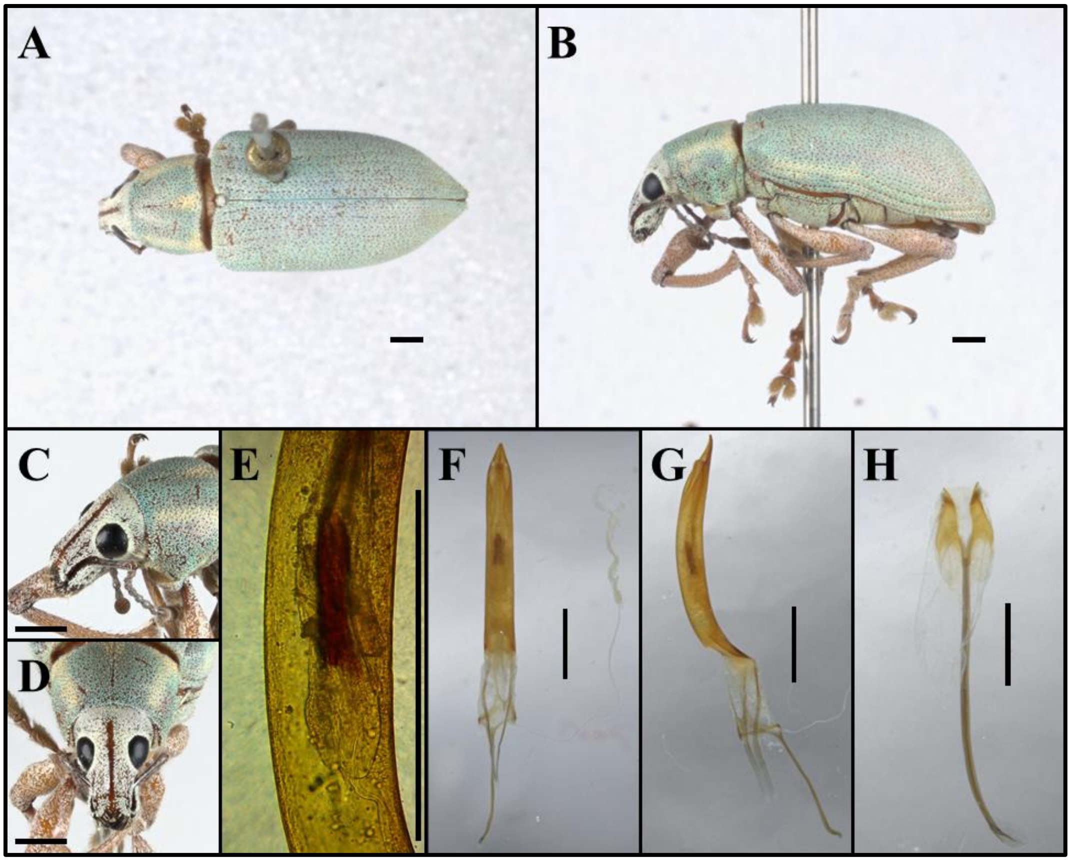

Fig. 3.20. *Pachnaeus eisenbergi*, sp. nov., male. Habitus (ARTSYS0007592), paratype, A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Male genitalia (ARTSYS0007599), paratype, E) endophallus lateral, F) aedeagus dorsal, G) aedeagus lateral, and H) spiculum gastral. Scale bars = 1mm.

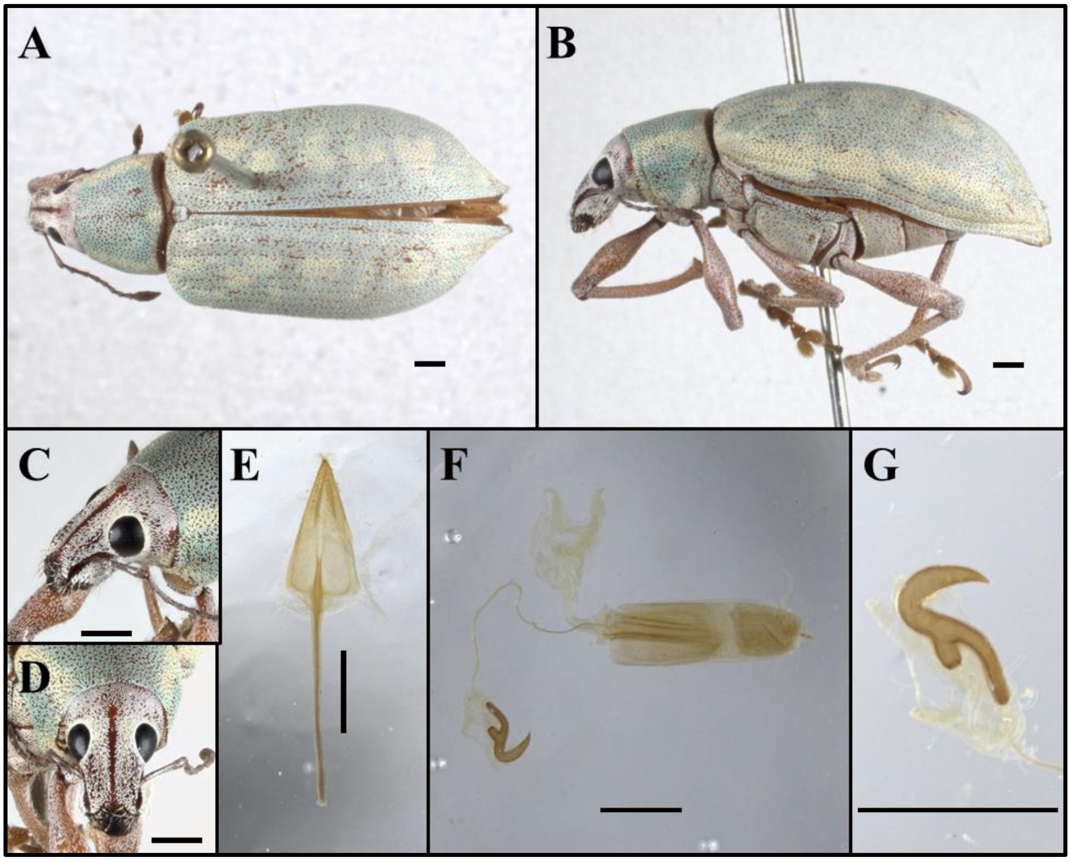

Fig. 3.21. *Pachnaeus eisenbergi*, sp. nov., female. Habitus (ARTSYS0007593), paratype, A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Female genitalia ([MCZ-ENT 00]529516), paratype, E) spiculum ventrale, F) spermatheca and coxites lateral, and G) spermatheca. Scale bars = 1mm.

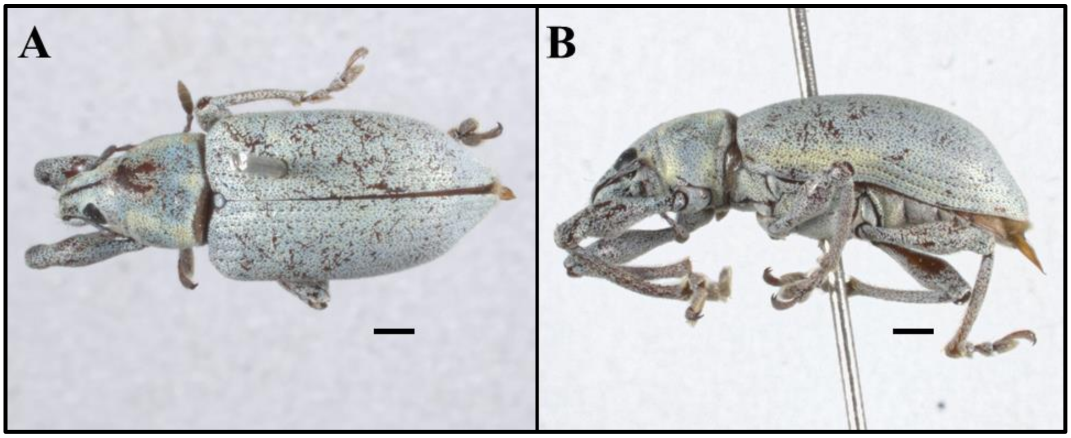

Fig. 3.22. *Pachnaeus eisenbergi*, sp. nov., male, specimen with blue-scaled legs. Habitus (ARTSYS0007595), paratype, A) dorsal, B) lateral. Scale bars = 1mm.

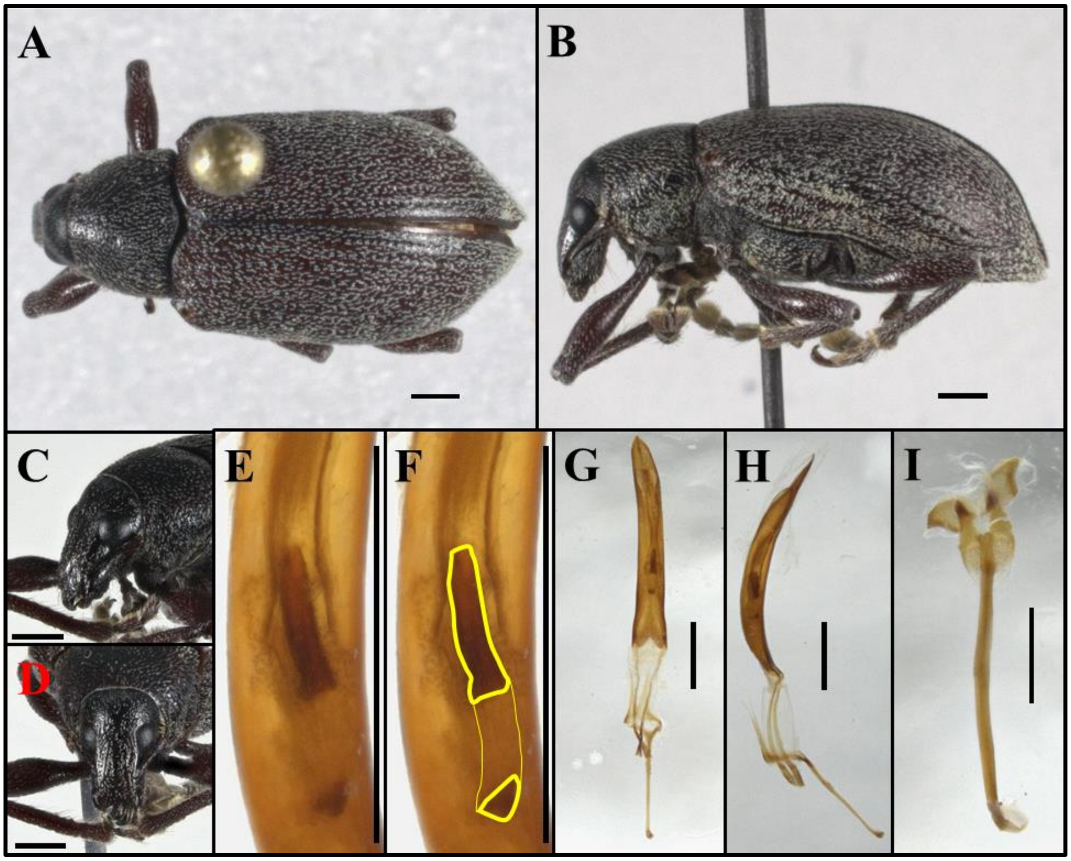

Fig. 3.23. *Pachnaeus godivae*, sp. nov., male. Habitus (ARTSYS0001376), paratype, A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Male genitalia (ARTSYS0001386), paratype, E) endophallus lateral, F) endophallus lateral with sclerites outlined in yellow, G) aedeagus dorsal, H) aedeagus lateral, and I) spiculum gastral. Scale bars = 1mm.

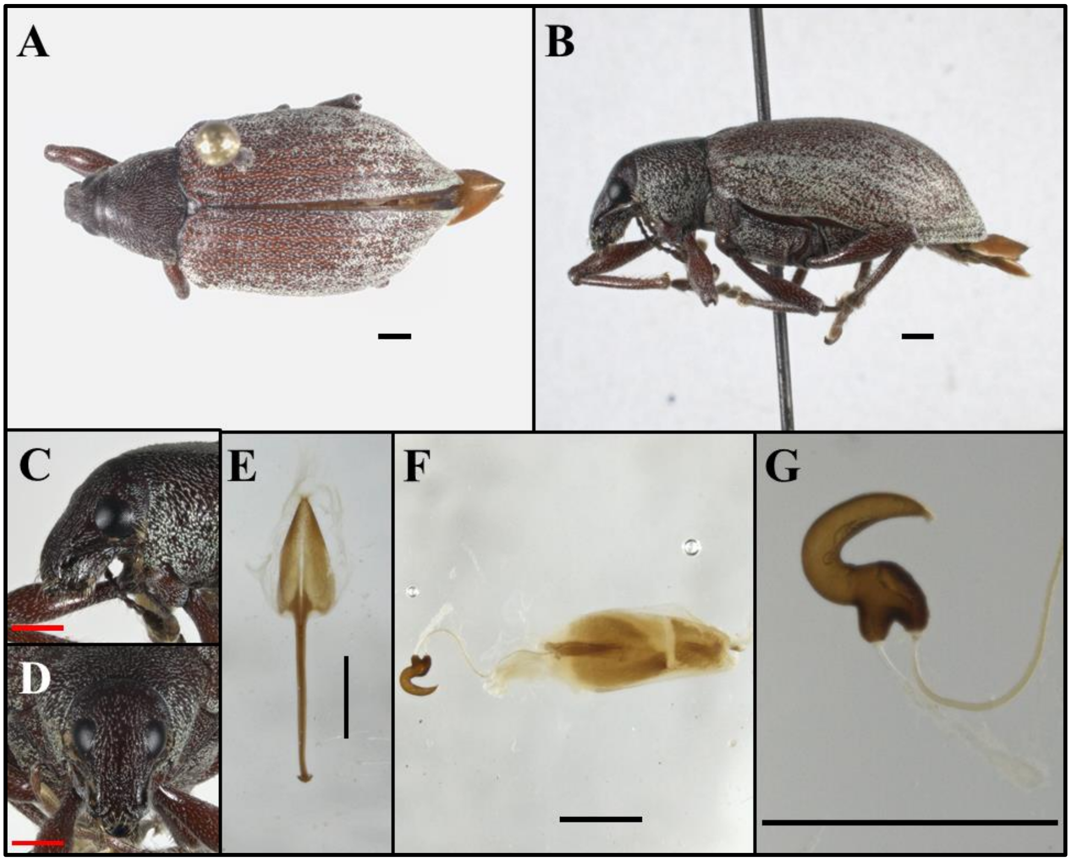

Fig. 3.24. *Pachnaeus godivae*, sp. nov., female. Habitus (ARTSYS0001375), holotype, A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Female genitalia (ARTSYS0001379), paratype, E) spiculum ventrale, F) spermatheca and coxites lateral, and G) spermatheca. Scale bars = 1mm.

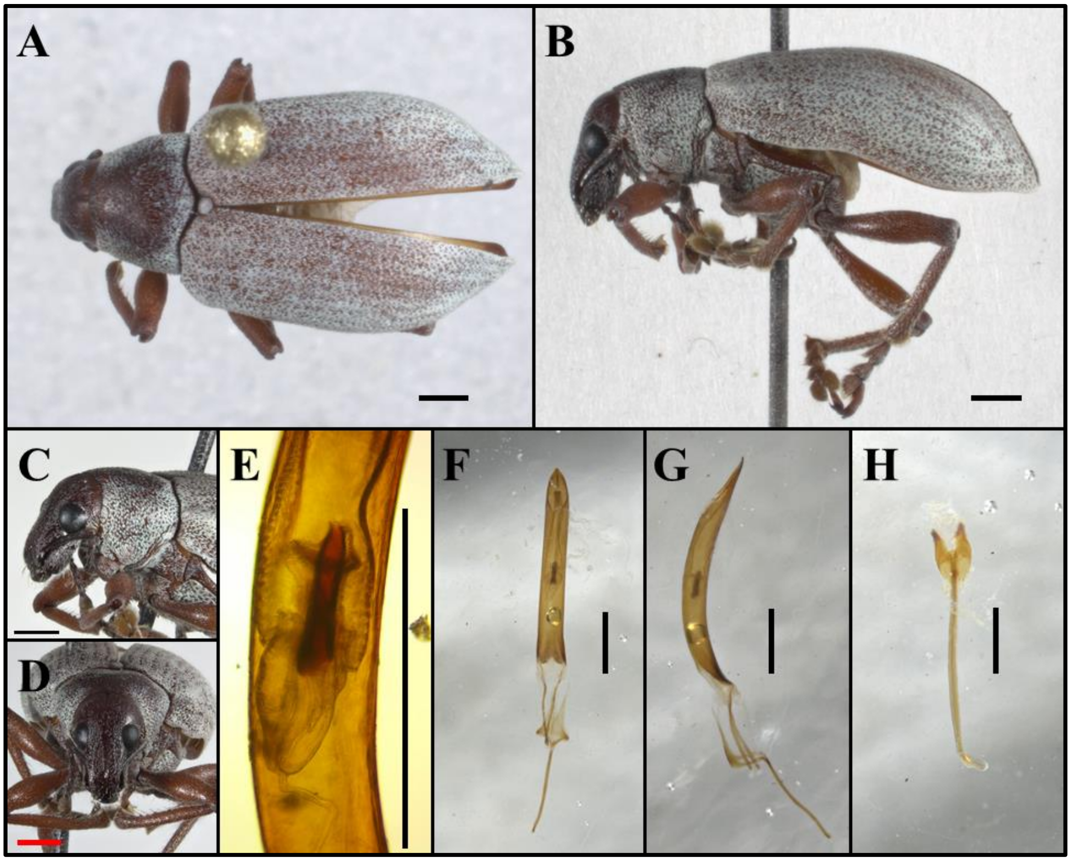

Fig. 3.25. Male holotype of *Pachnaeus andersoni*, sp. nov. (ARTSYS0007583). Habitus, A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Male genitalia, E) endophallus lateral, F) aedeagus dorsal, G) aedeagus lateral, F) spiculum gastral. Scale bars = 1mm.

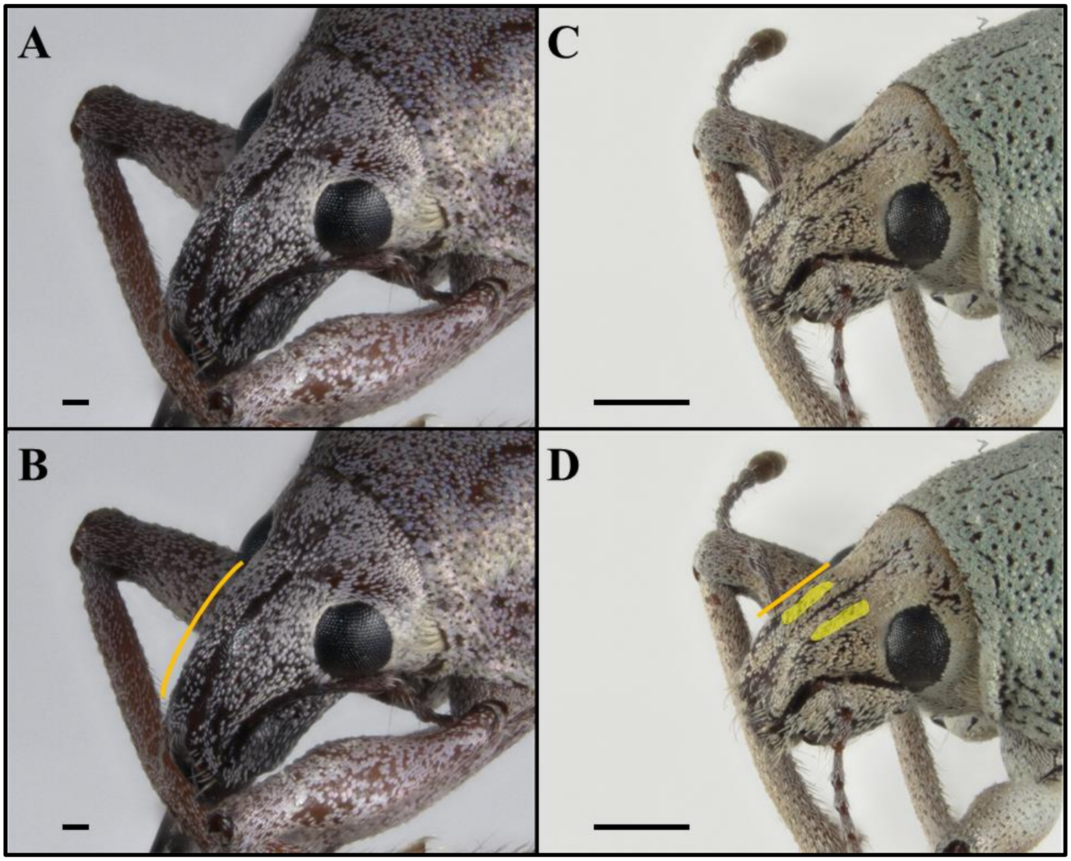

Fig. 3.26. Oblique frontolateral view of rostrum showing the typical curvature of the epifrons (orange) and location of intercarinal impressions, where present (yellow), A, B) *Pachnaeus azurescens* Gyllenhal, 1834 (ASUHIC0033948), C, D) *Pachnaeus opalus* (Olivier, 1807) (ASUHIC0088735). Scale bars = 1mm.

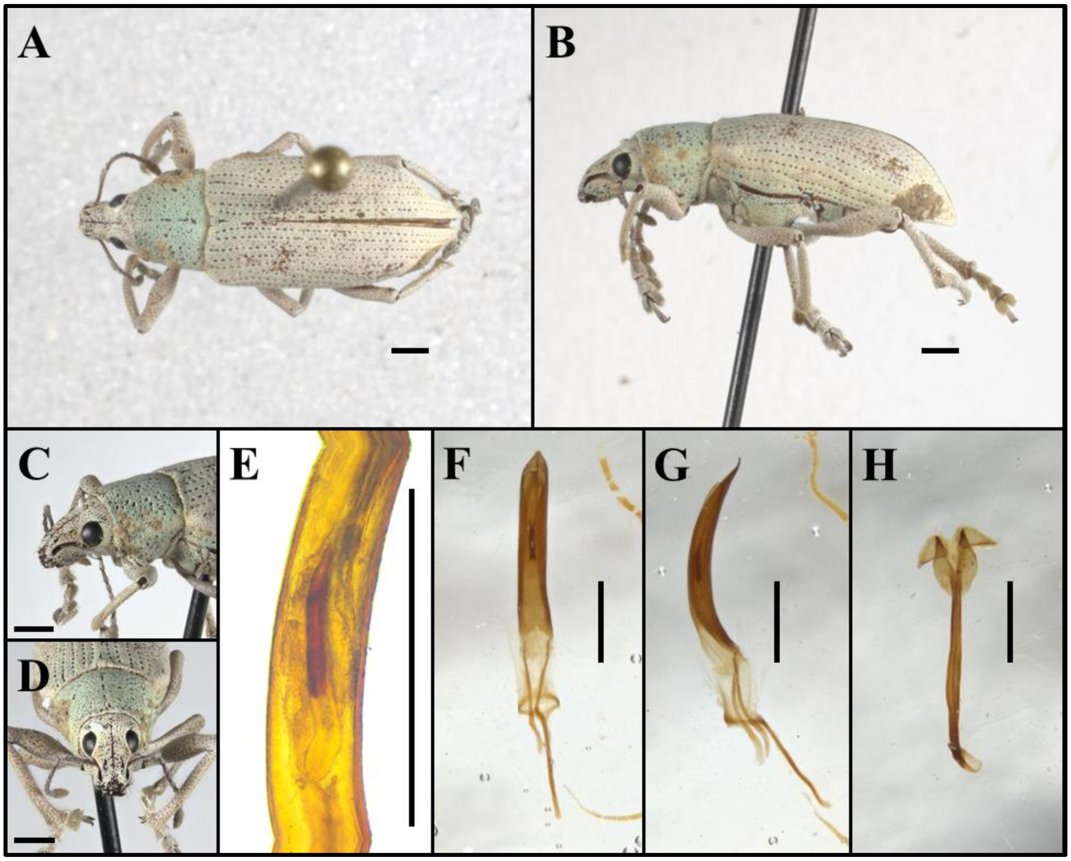

Fig. 3.27. *Pachnaeus opalus* (Olivier, 1807), male. Habitus (ARTSYS0001197), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Male genitalia (ASUHIC0088752), E) endophallus lateral, F) aedeagus dorsal, G) aedeagus lateral, and H) spiculum gastral. Scale bars = 1mm.

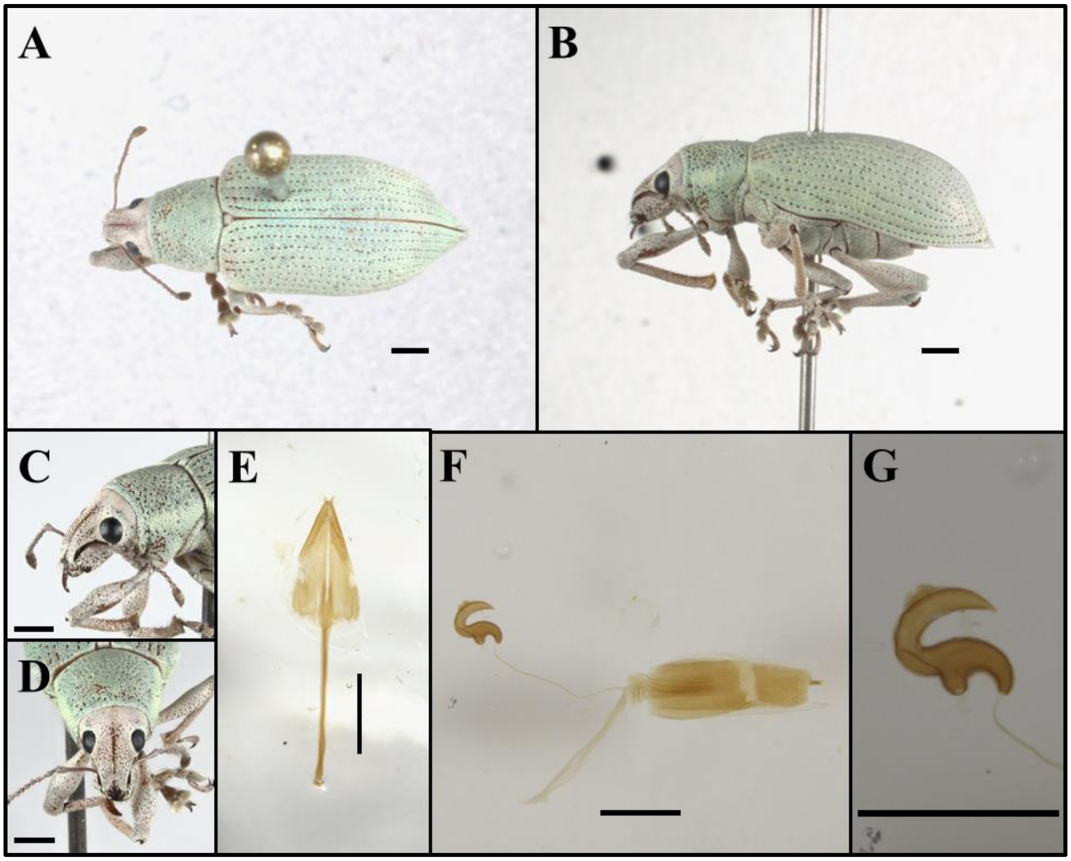

Fig. 3.28. *Pachnaeus opalus* (Olivier, 1807), female. Habitus (ARTSYS0001199), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Female genitalia (ASUHIC0088745), E) spiculum ventrale, F) spermatheca and coxites lateral, and G) spermatheca. Scale bars = 1mm.

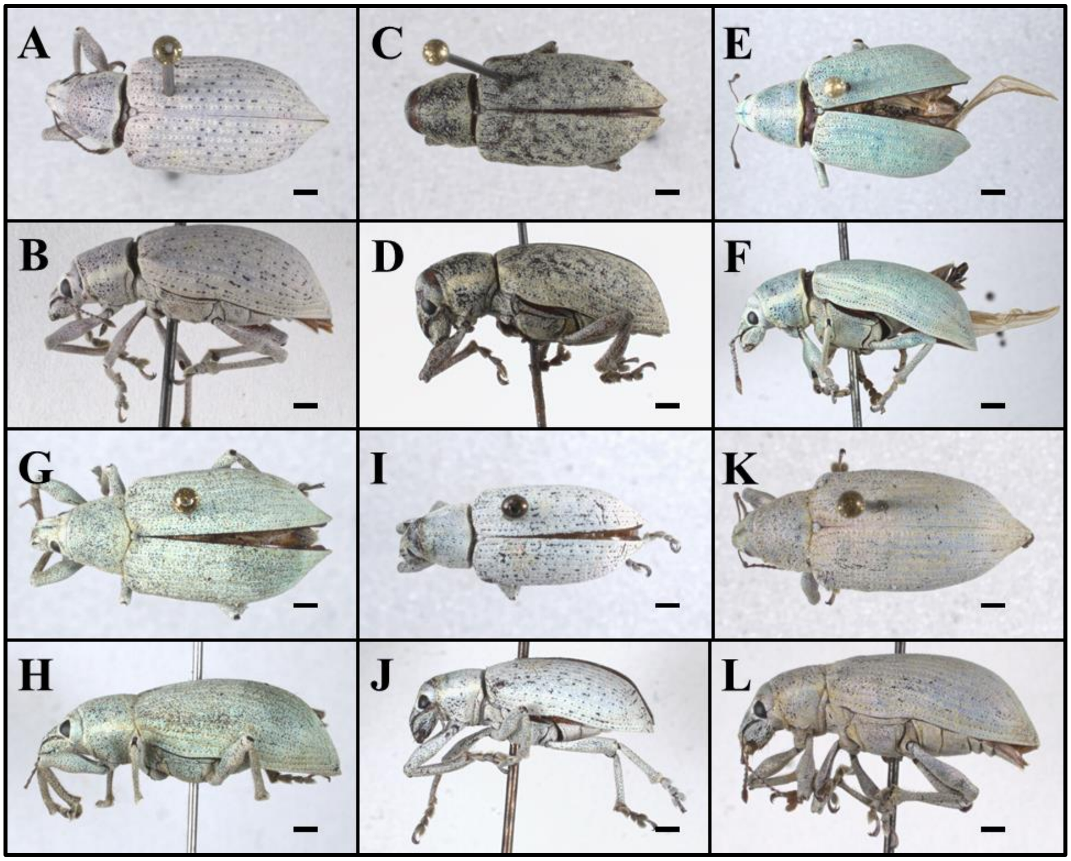

Fig. 3.29. Variation within *Pachnaeus opalus* (Olivier, 1807). Female, Jacksonville, Duval County, FL (ARTSYS0001236), A) dorsal, B) lateral, male, Fort Desoto Park, Pinellas County, FL (ARTSYS0007381), C) dorsal, D) lateral; female, Myakka River State Park, Sarasota County, FL (ARTSYS0007379), E) dorsal, F) lateral; female, Ocean Springs, Jackson County, MS (ARTSYS0001228), G) dorsal, H) lateral; male, Hilton Head Island, SC (ARTSYS0007388), I) dorsal, J) lateral; female, Echols County, GA (ARTSYS0007402), K) dorsal, L) lateral. Scale bars = 1mm.

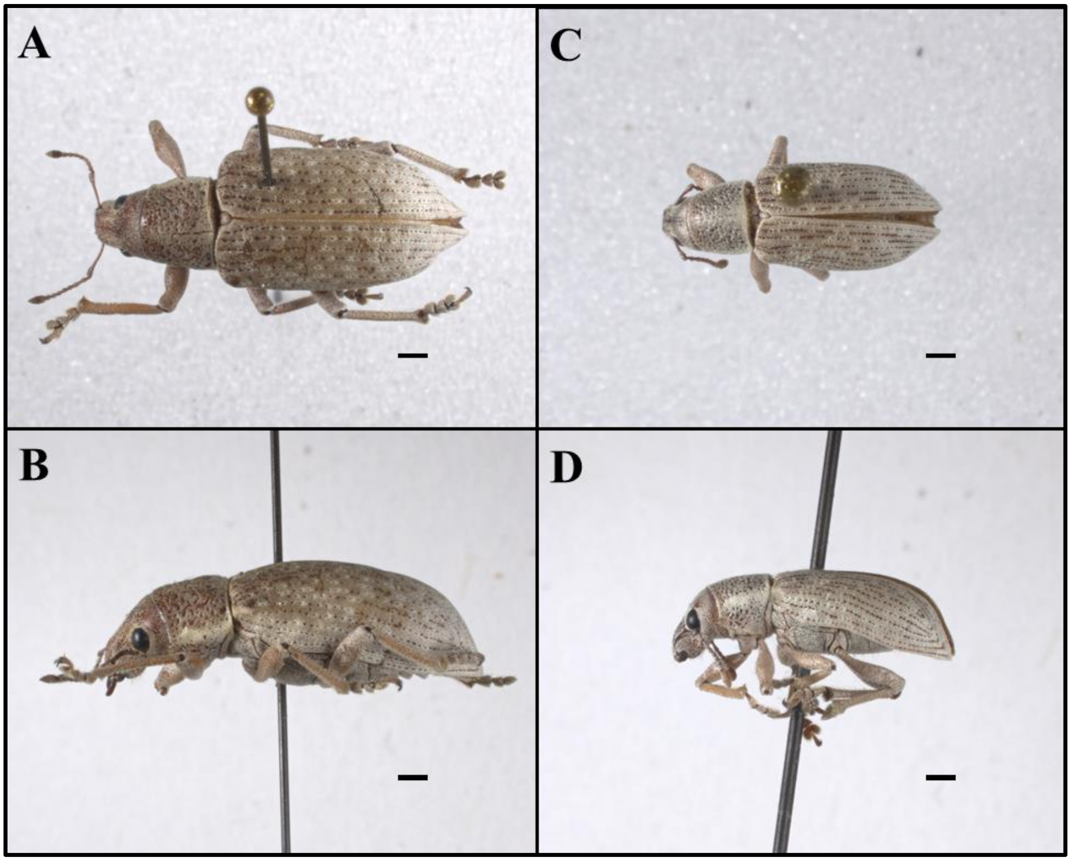

Fig. 3.30. *Pachnaeus opalus* (Olivier, 1807) tan-scaled, elongate form from near Miami, female (ARTSYS0007374), A) dorsal, B) lateral, male (ARTSYS0001222), C) dorsal, D) lateral. Scale bars = 1mm.

Fig. 3.31. Female lectotype of *Pachnaeus azurescens* Gyllenhal, 1834. Modified from images taken by NHRS.

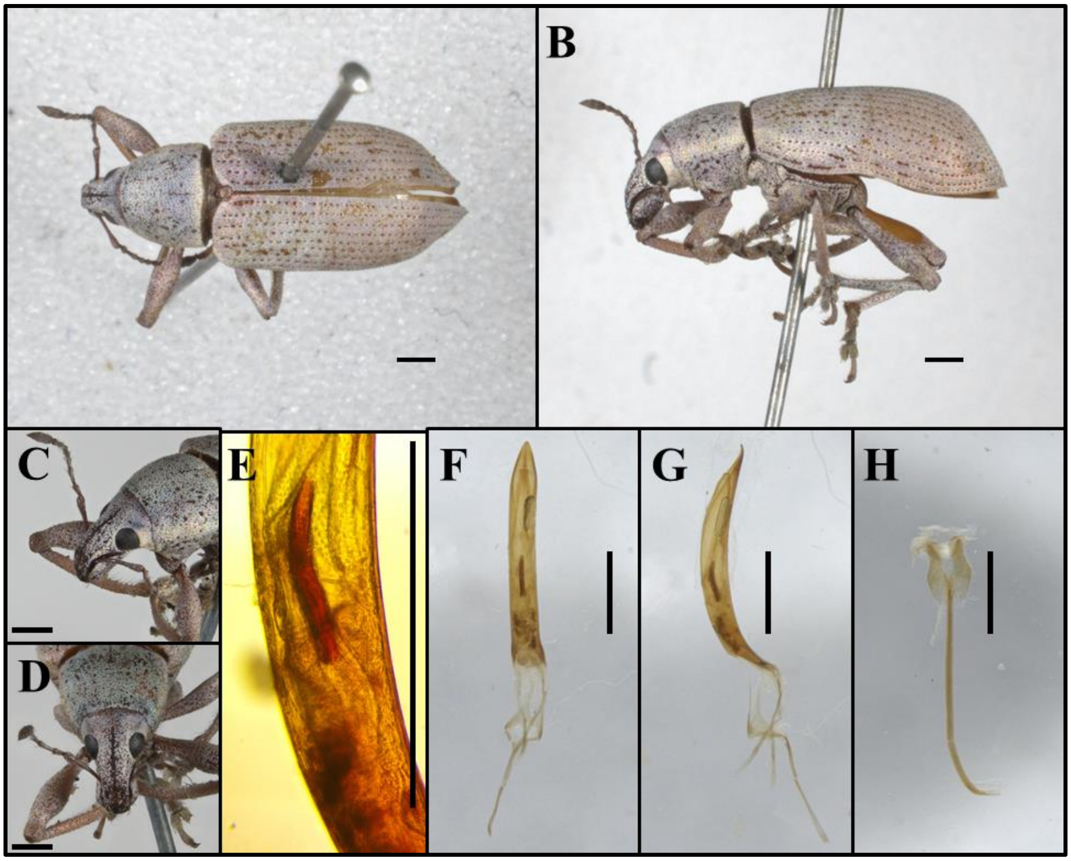

Fig. 3.32. *Pachnaeus azurescens* Gyllenhal, 1834, Havana population, male (ARTSYS0007730). Habitus, A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Male genitalia, E) endophallus lateral, F) aedeagus dorsal, G) aedeagus lateral, and H) spiculum gastral. Scale bars = 1mm.

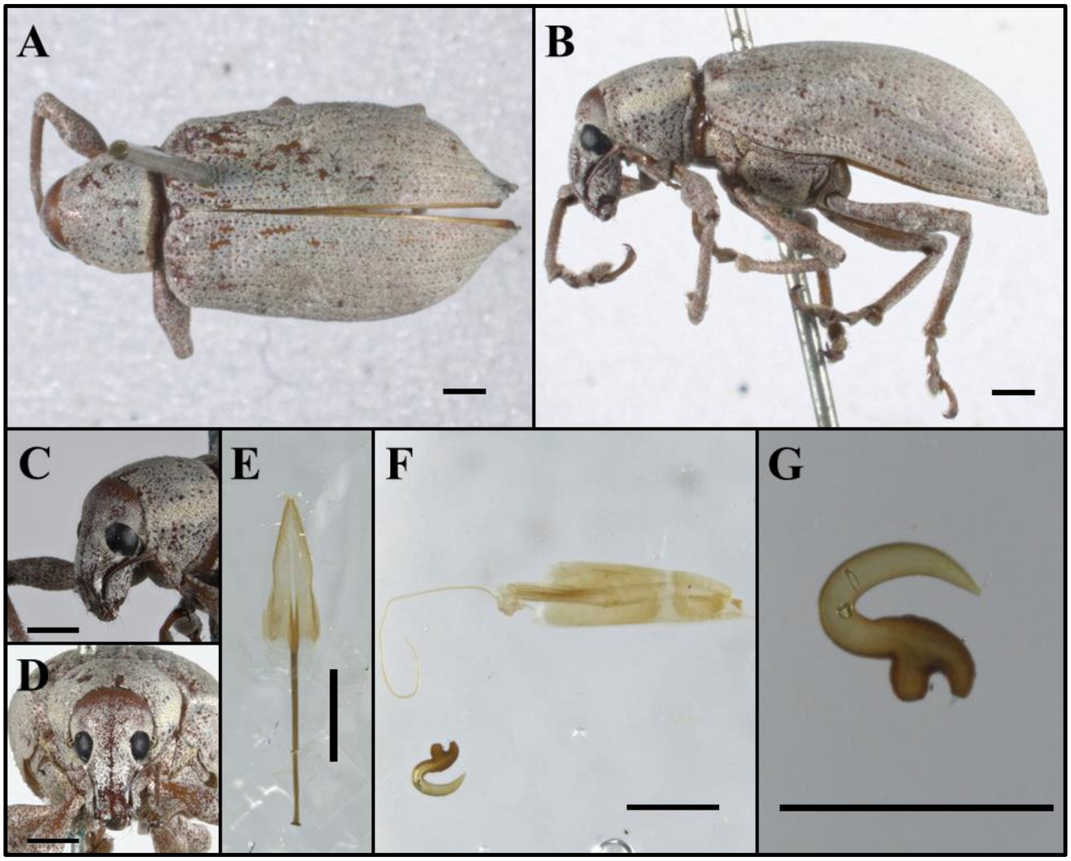

Fig. 3.33. *Pachnaeus azurescens* Gyllenhal, 1834, Havana population, female. Habitus (ARTSYS0007729), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Female genitalia ([MCZ-ENT 00]529363), E) spiculum ventrale, F) spermatheca and coxites lateral, and G) spermatheca. Scale bars = 1mm.

Fig. 3.34. Female lectotype of *Pachnaeus griseus* Gyllenhal, 1834. Modified from images taken by NHRS.

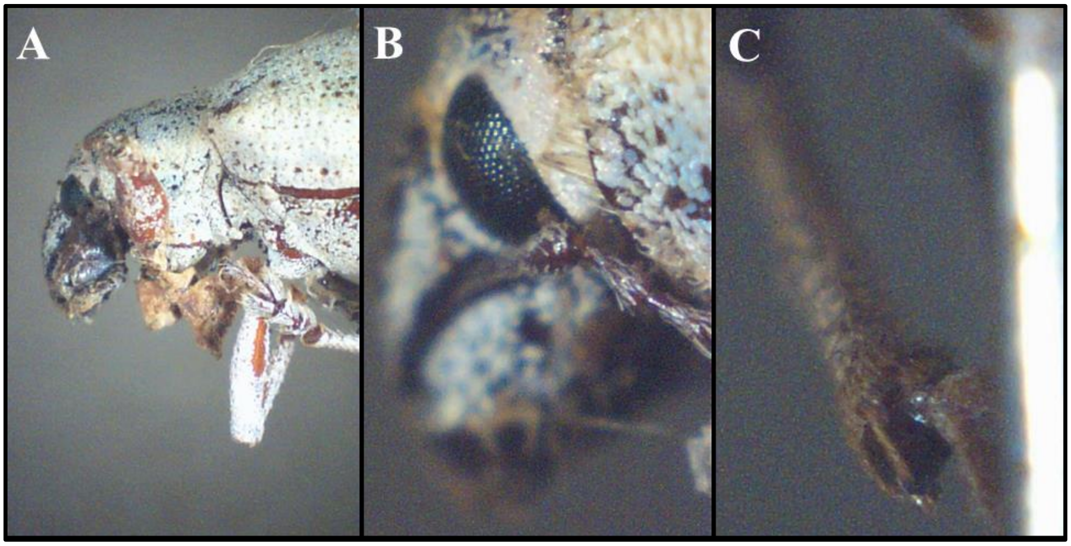

Fig. 3.35. Photos of the holotype of *Pachnaeus juvenalis* de Zayas, 1988 taken by Michael A. Ivie, A) anterior half, lateral, B) closeup of postocular lobe, C) metatibial apex.

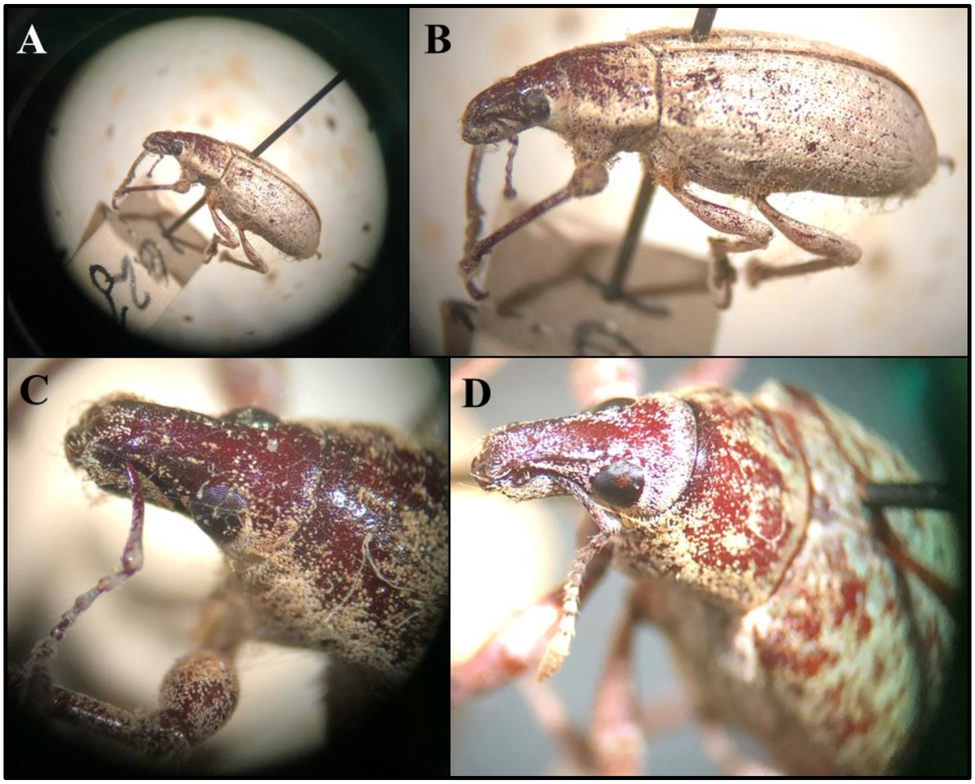

Fig. 3.36. Photos of the type specimens of *Pachnaeus alayoi* Lopez Castilla, 1992 taken by Robert S. Anderson, A–B) holotype oblique lateral, C) closeup of rostrum of holotype, D) closeup of rostrum of paratype showing variation in scale coloration and concavity of the lateral aspect of the rostrum above the scrobe and anterior to the eye.

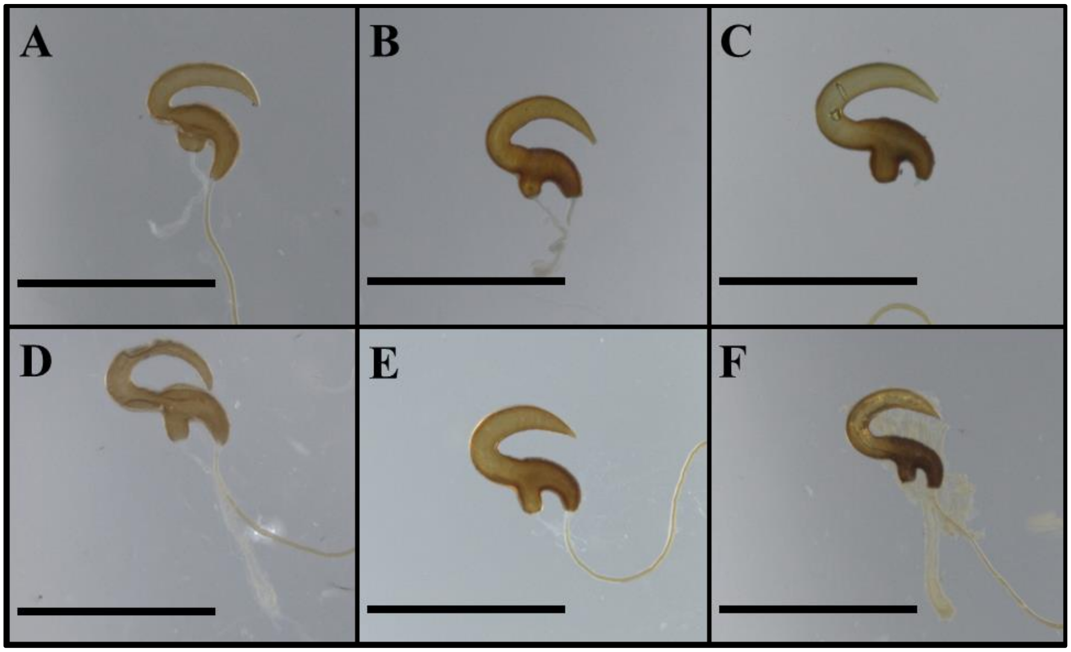

Fig. 3.37. Spermathecal variation within *Pachnaeus azurescens* Gyllenhal, 1834. A) Cienfuegos, Cuba (ARTSYS0007716), B) Florida (ARTSYS0007732), C) Havana, Cuba ([MCZ-ENT 00]52936), D) Isla de Juventud specimen matching well to drawings of *Pachnaeus alayoi* Lopez Castilla, 1992 (ARTSYS0007545), E) Isla de Juventud specimen matching well to drawings of *Pachnaeus azurescens sensu* Lopez Castilla 1992 (ARTSYS0007555), F) Pinar del Rio, Cuba (ARTSYS0007719) Scale bars = 1mm.

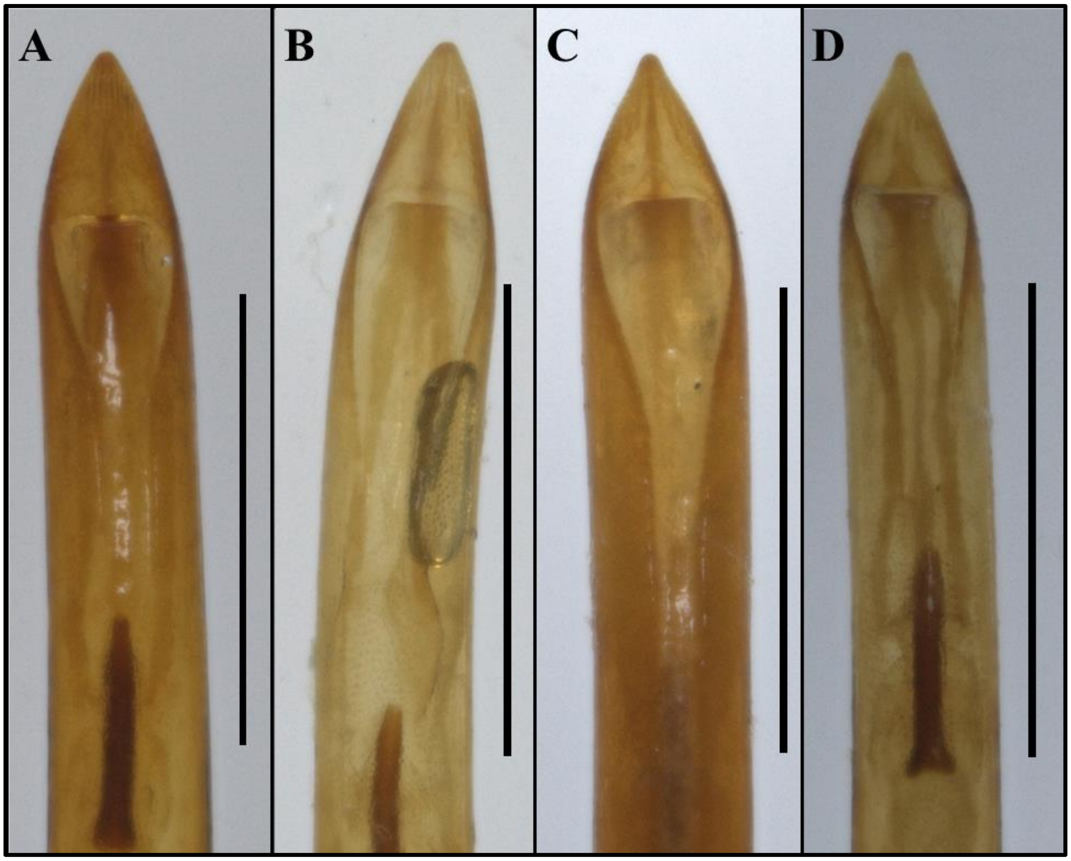

Fig. 3.38. Variation in aedeagal apex structure within *Pachnaeus azurescens* Gyllenhal, 1834, A) Pinar del Rio, Cuba (ARTSYS0007722), B) Havana, Cuba (ARTSYS0007730), C) Cienfuegos, Cuba (ARTSYS0007715), D) Isla de Juventud (ARTSYS0007550). Scale bars = 1mm.

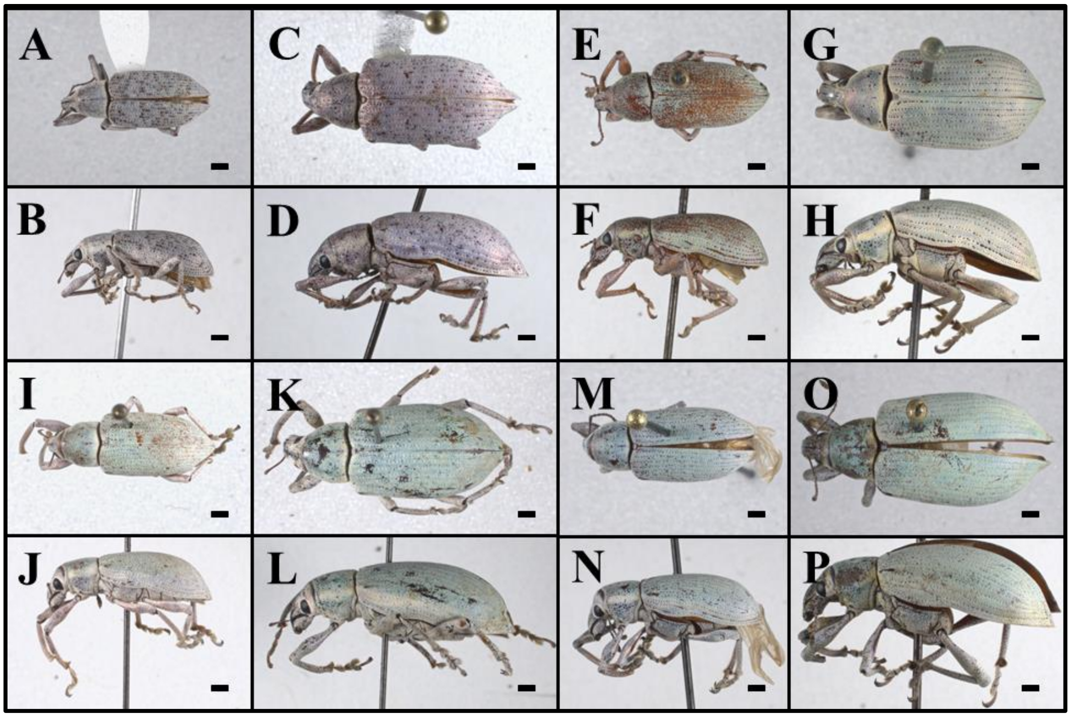

Fig. 3.39. Habitus images of *Pachnaeus azurescens* Gyllenhal, 1834 showing the range of variation between populations. Cienfuegos, Cuba population: A, B) male (ASUHIC0033692), C, D) female (ASUHIC0033948). Central Florida population: E, F) male (ARTSYS0007731), G, H) female (ARTSYS0007732). Isla de Juventud population (=*Pachnaeus juvenalis* de Zayas, 1988): I, J) male (ARTSYS0007547), K, L) female (ARTSYS0007548). Pinar del Rio, Cuba population (= *Pachnaeus alayoi* Lopez Castilla, 1992): M, N) male (ARTSYS0007721), O, P) female (ARTSYS0007717). Scale bars = 1 mm.

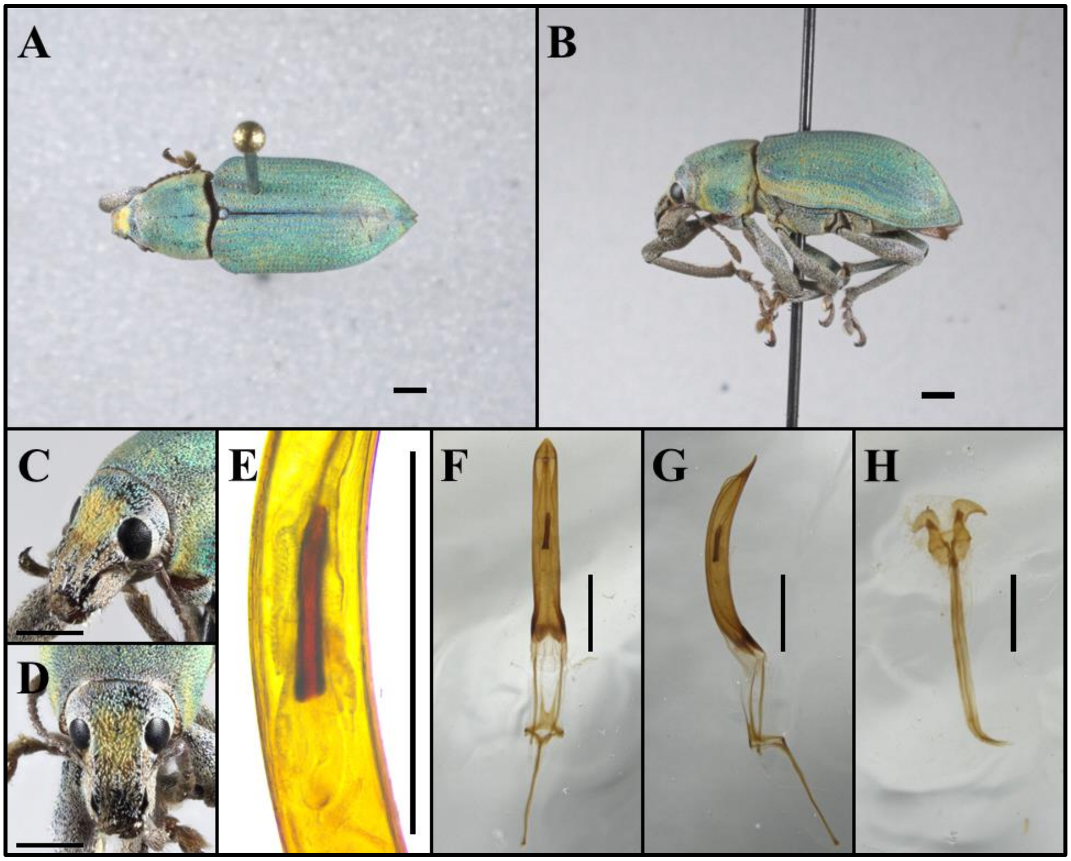

Fig. 3.40. *Pachnaeus obrienorum*, sp. nov., male, Andros Island population. Habitus (ARTSYS0001327), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Male genitalia (ARTSYS0007620), E) endophallus lateral, F) aedeagus dorsal, G) aedeagus lateral, and H) spiculum gastral. Scale bars = 1mm.

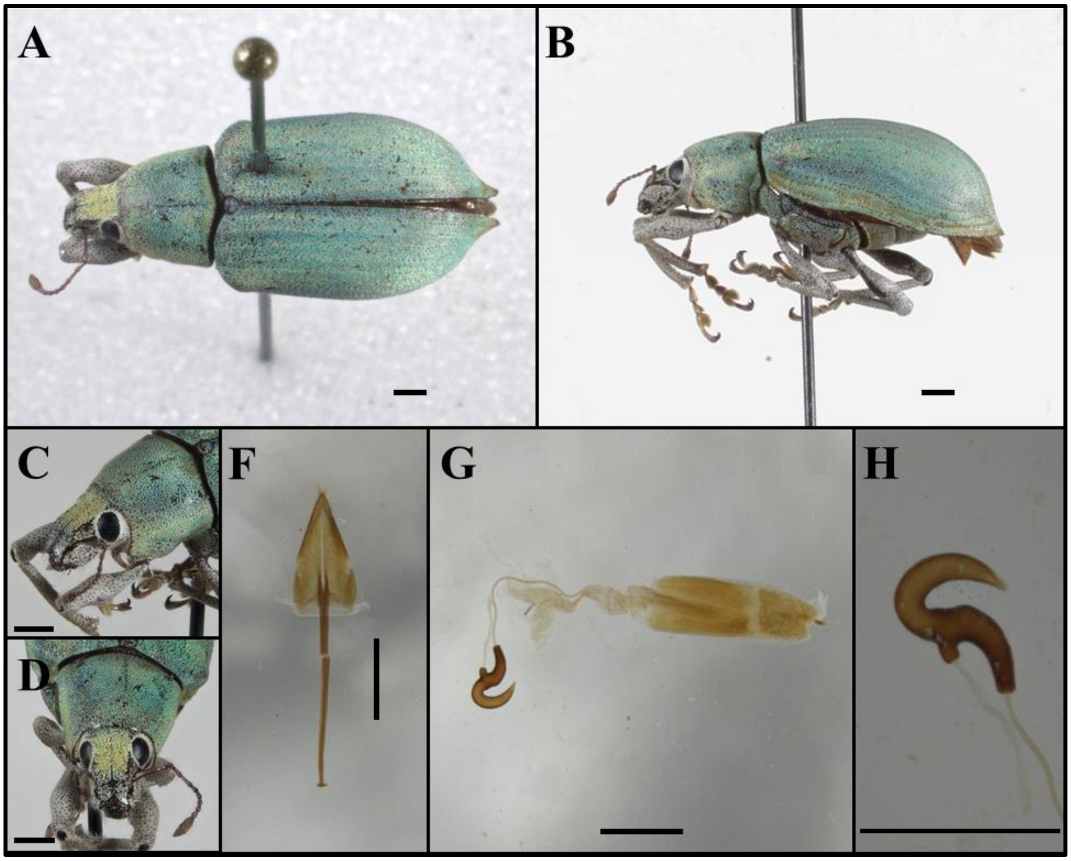

Fig. 3.41. *Pachnaeus obrienorum*, sp. nov., female, Andros Island population. Habitus (ARTSYS0001297), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Female genitalia (ARTSYS0001294), E) spiculum ventrale, F) spermatheca and coxites lateral, and G) spermatheca. Scale bars = 1mm.

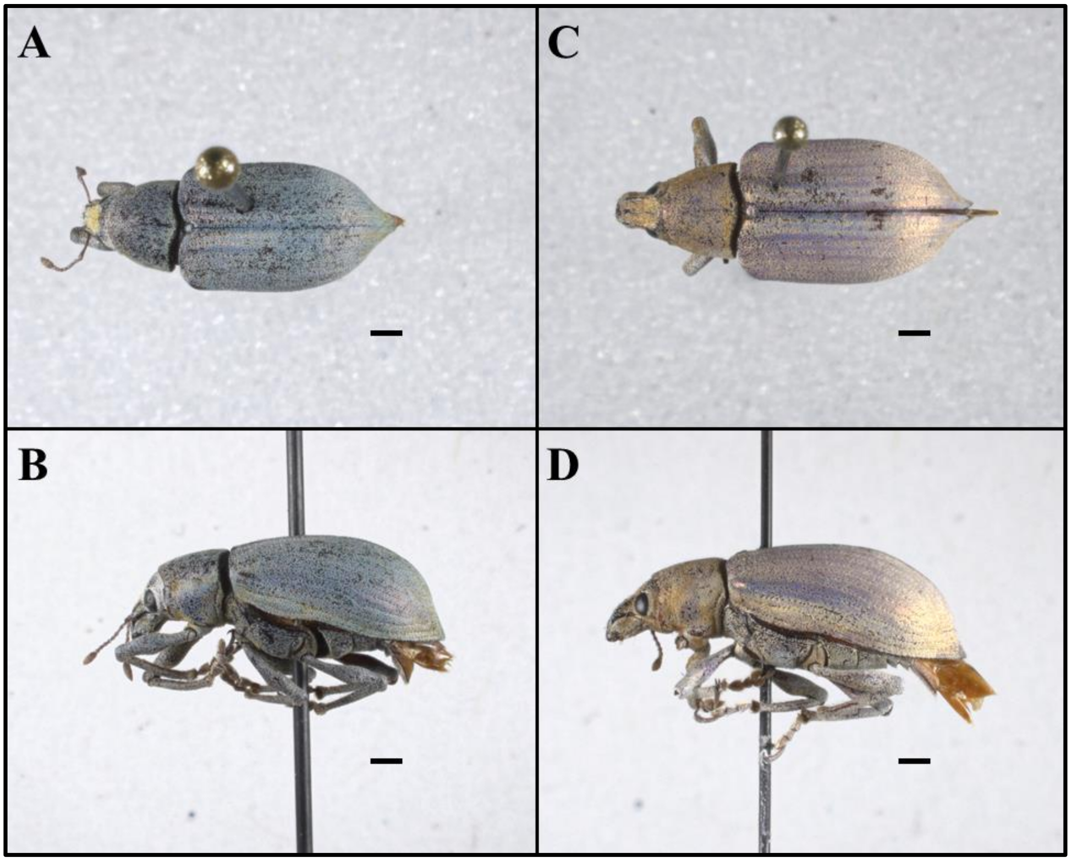

Fig. 3.42. Variation in *Pachnaeus obrienorum*, sp. nov. Female, Andros Island population, dark purperescent specimen (ARTSYS0001308), A) dorsal, B) lateral, female, Andros Island population, cupreous specimen (ARTSYS0001303), C) dorsal, D) lateral. Scale bars = 1mm.

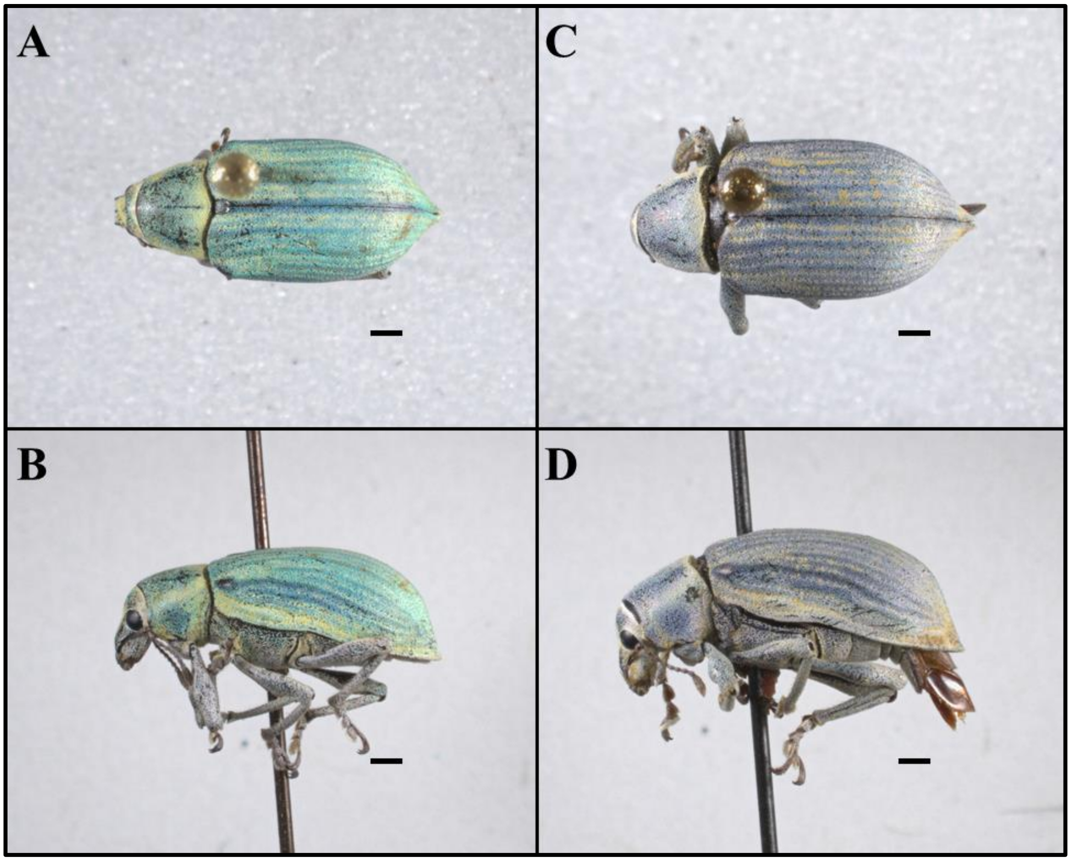

Fig. 3.43. Variation in *Pachnaeus obrienorum*, sp. nov. Female, New Providence, turquoise form with faint stripes (ARTSYS0007637), A) dorsal, B) lateral, New Providence, dark blue specimen (ARTSYS0001311), C) dorsal, D) lateral. Scale bars = 1mm.

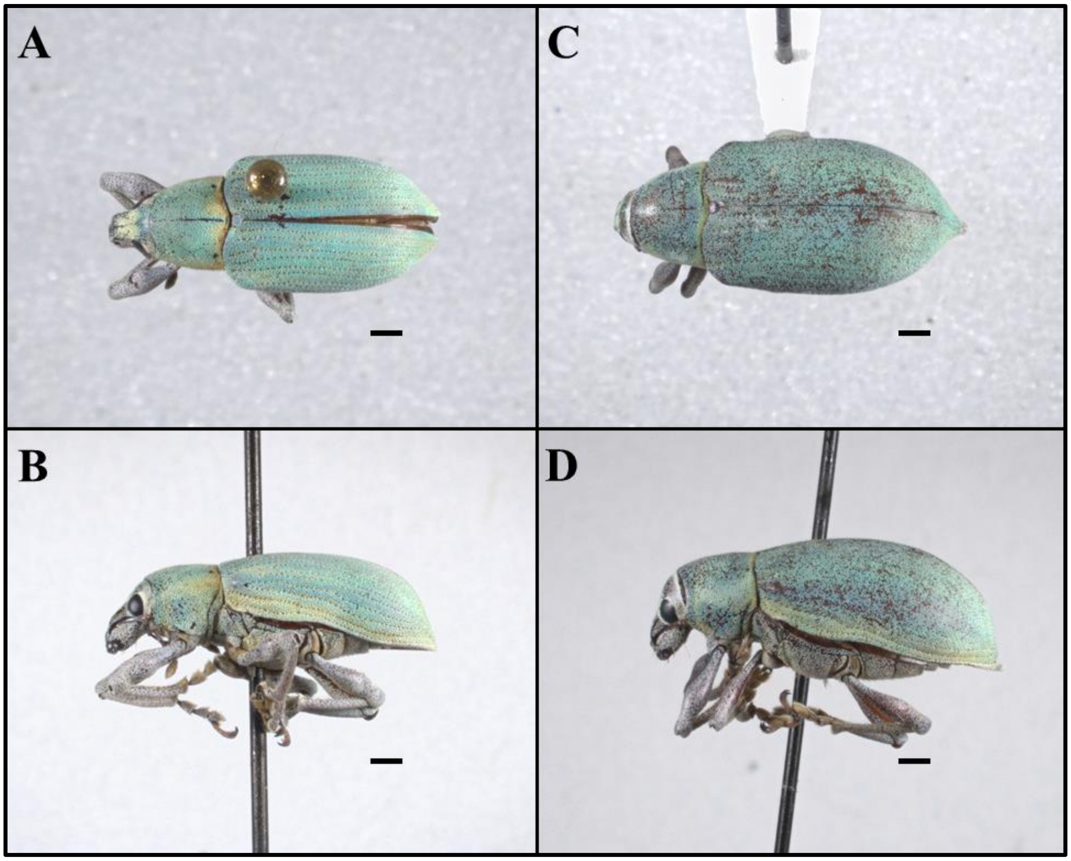

Fig. 3.44. Variation in *Pachnaeus obrienorum*, sp. nov. Male, South Bimini (ARTSYS0001393), A) dorsal, B) lateral; female, Camagüey Province, Cuba (ARTSYS0001392), C) dorsal, D) lateral. Scale bars = 1mm.

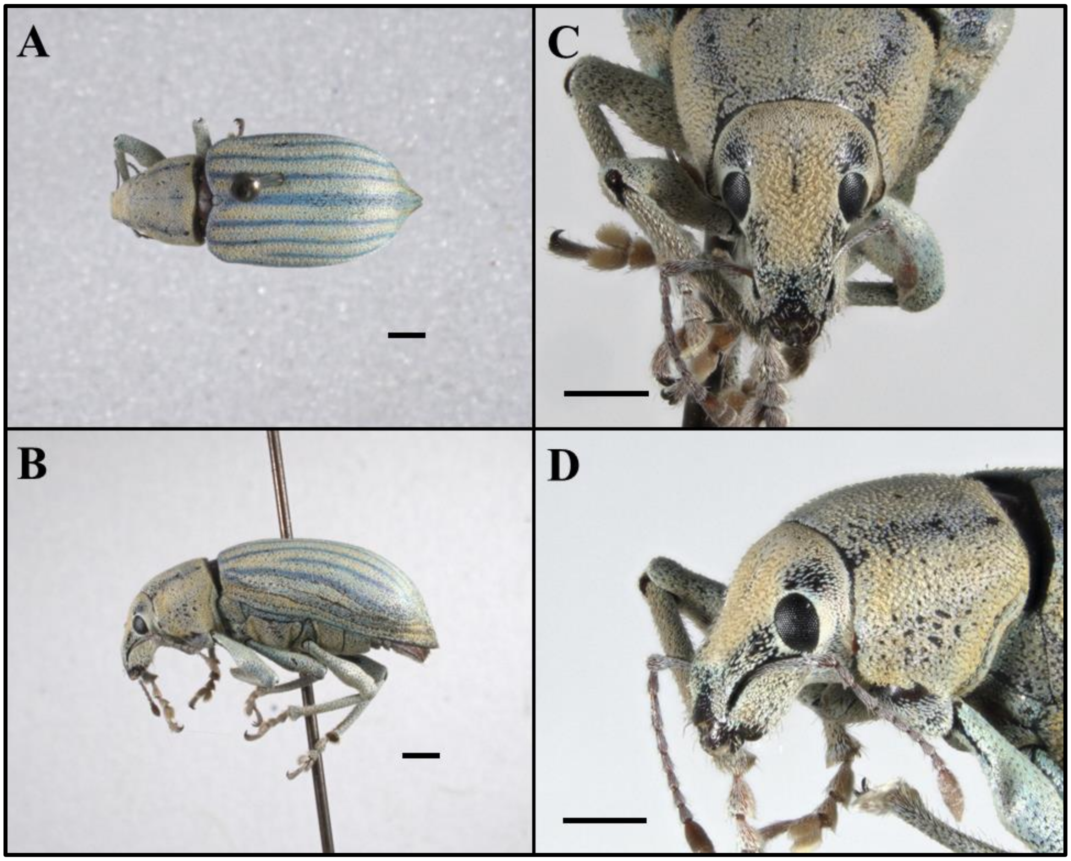

Fig. 3.45. *Pachnaeus obrienorum*, sp. nov., female, distinctly striped form from Simm's Settlement, Long Island ([MCZ-ENT 00]529549), A) dorsal, B) lateral, C) frontal, D) oblique frontolateral. Scale bars = 1mm.

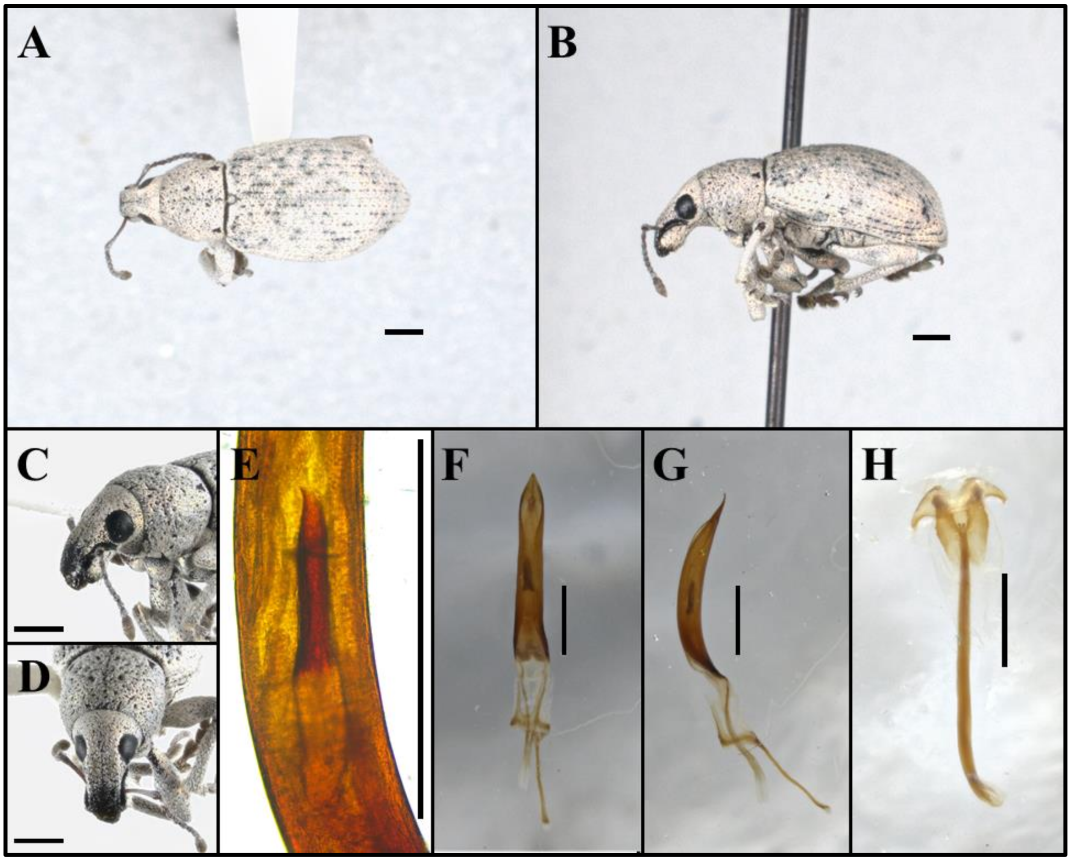

Fig. 3.46. *Pachnaeus howdenae*, sp. nov., male. Habitus (ARTSYS0007660), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Male genitalia (ARTSYS0007689), E) endophallus lateral, F) aedeagus dorsal, G) aedeagus lateral, and H) spiculum gastral. Scale bars = 1mm.

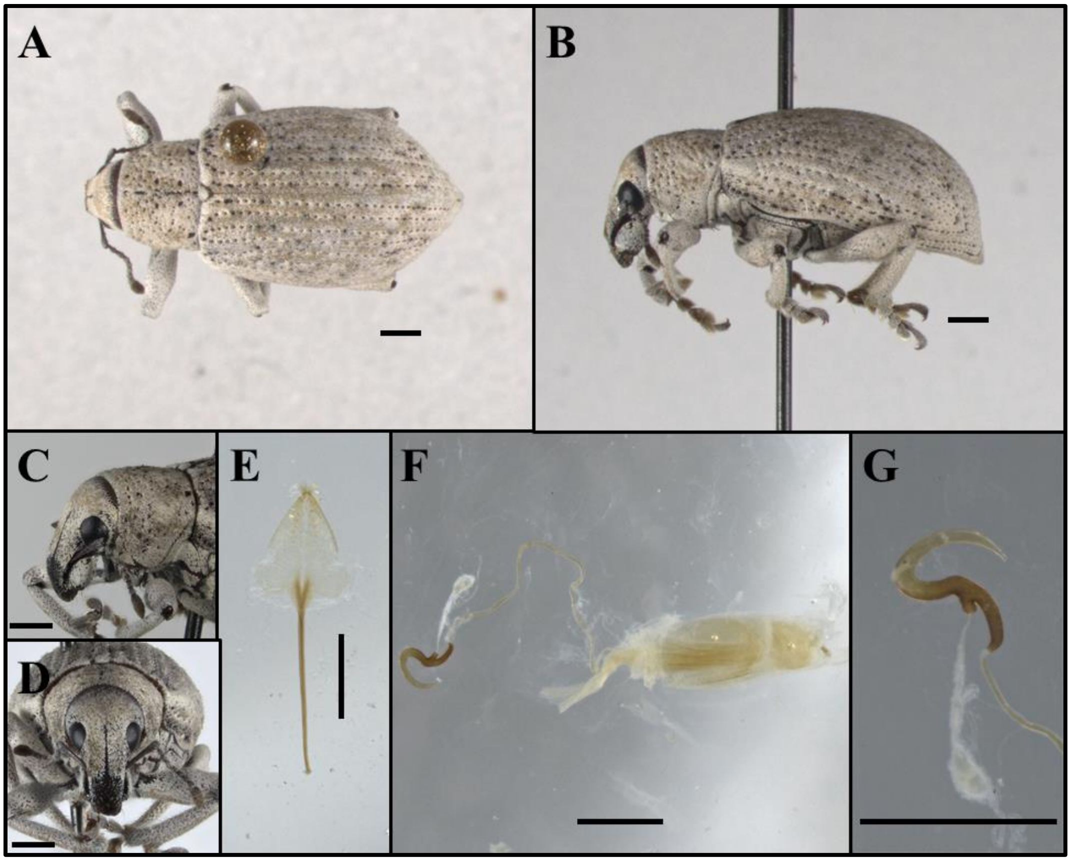

Fig. 3.47. *Pachnaeus howdenae*, sp. nov., female. Habitus (ARTSYS0007650), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Female genitalia (ARTSYS0007655), E) spiculum ventrale, F) spermatheca and coxites lateral, and G) spermatheca. Scale bars = 1mm.

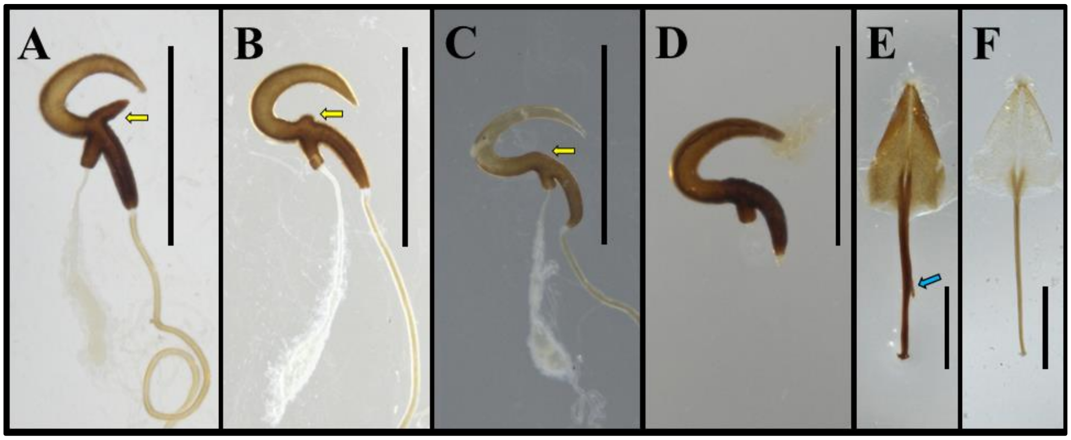

Fig. 3.48. *Pachnaeus howdenae*, sp. nov. Variation in female genitalia. Spermathecae, A–C) Man-O-War Cay, Abaco (ARTSYS0007653, ARTSYS0007656, ARTSYS0007655) D) Grand Bahama (ARTSYS0007678), yellow arrows indicate location of variable expansion of corpus adjacent ramus. Spiculum ventral, E, F) Man-O-War Cay, Abaco (ARTSYS0007653, ARTSYS0007655), blue arrow indicates presumed-aberrant lateral expansion near middle of apodeme as seen in this specimen. Scale bars = 1mm.

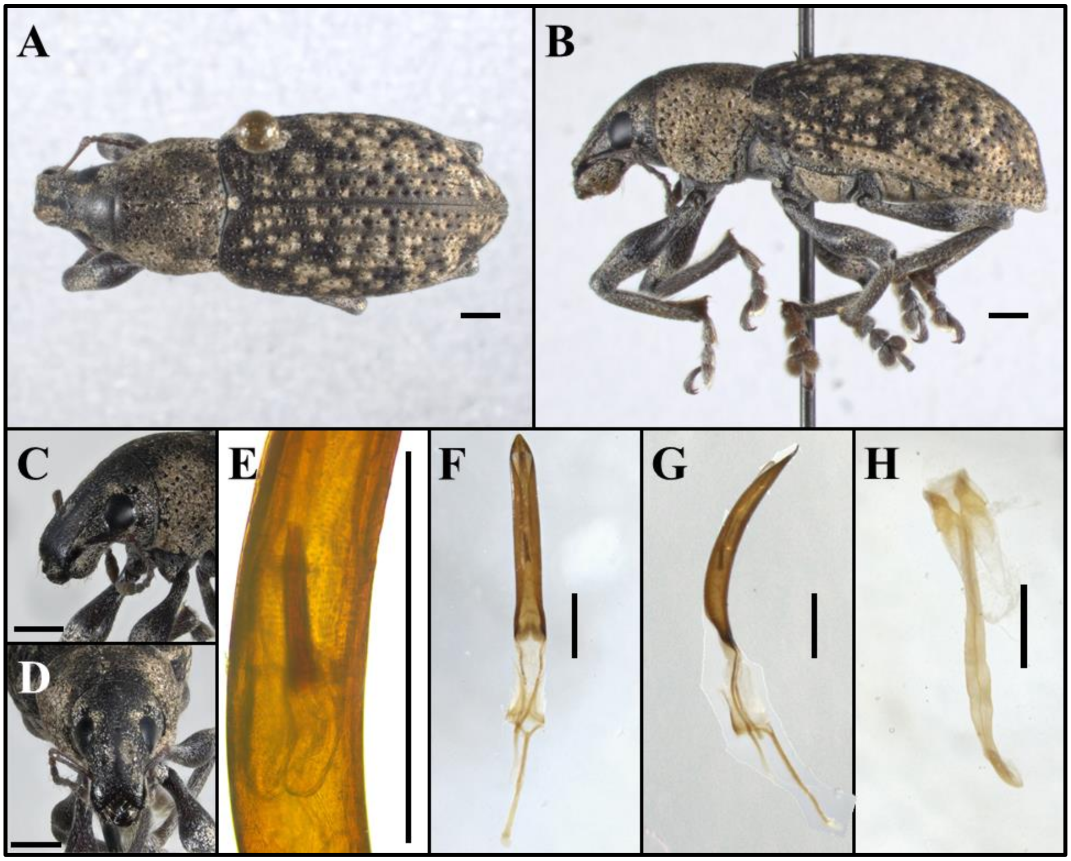

Fig. 3.49. *Pachnaeus ivieorum*, sp. nov., male. Habitus (ARTSYS0007687), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Male genitalia (ARTSYS0007690), E) endophallus lateral, F) aedeagus dorsal, G) aedeagus lateral, and H) spiculum gastral. Scale bars = 1mm.

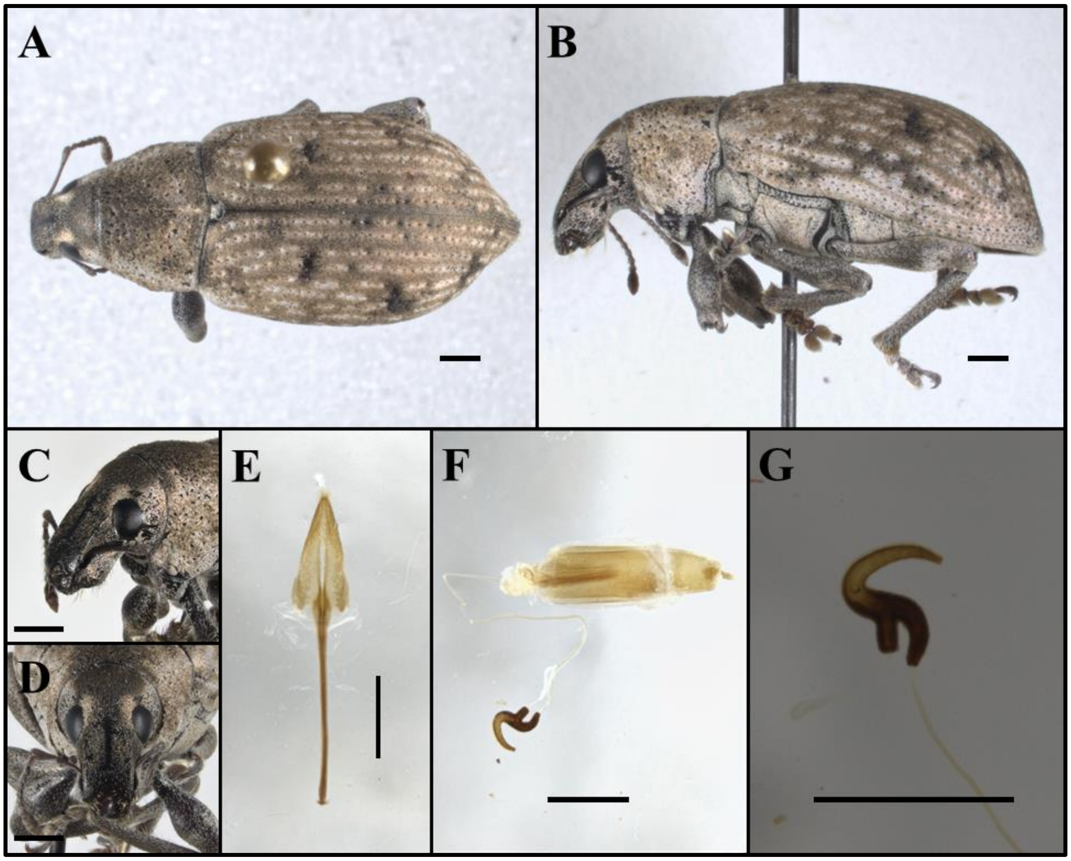

Fig. 3.50. *Pachnaeus ivieorum*, sp. nov., female. Habitus (ARTSYS0007679), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Female genitalia (ARTSYS0007682), E) spiculum ventrale, F) spermatheca and coxites lateral, and G) spermatheca. Scale bars = 1mm.

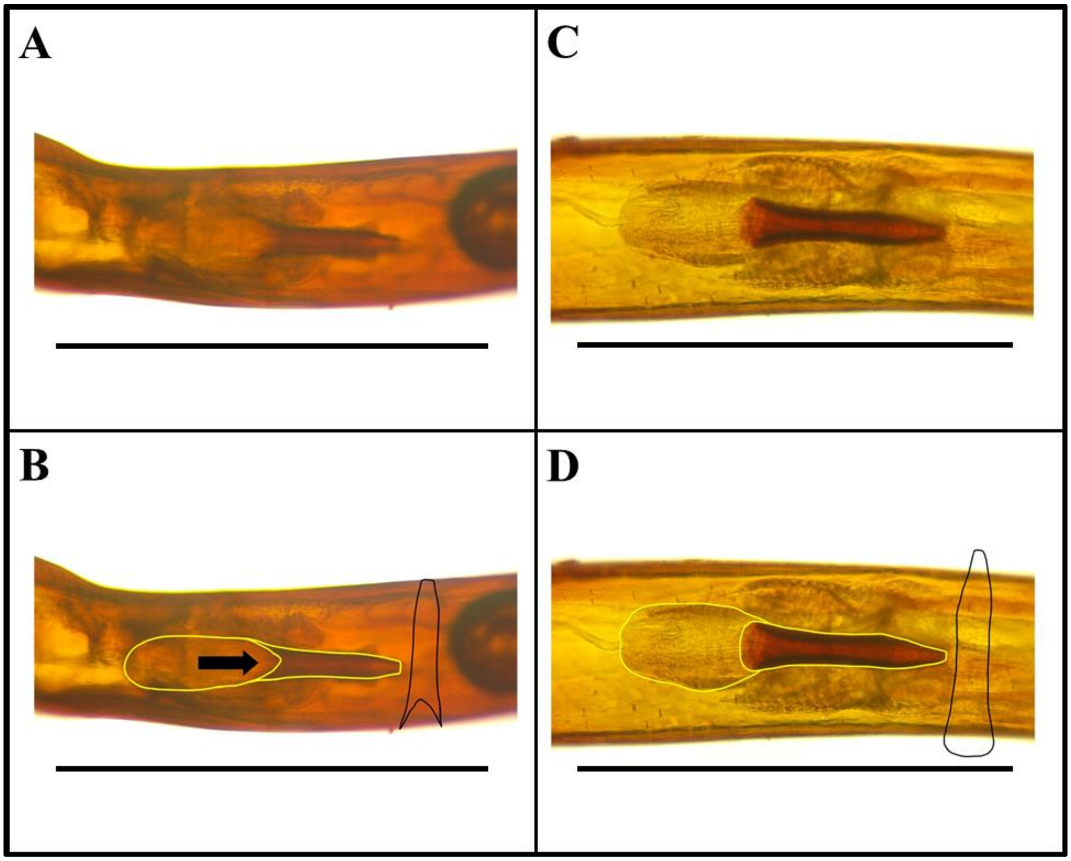

Fig. 3.51. Ventral aspect of endophallic sclerite in A) *Pachnaeus pater* de Zayas, 1988 (ARTSYS0007556), B) same with endophallus outlined (yellow) and outline of tubular endophallic sclerite situated laterally for comparison to width of adjacent portion of penis (black), arrow indicates location of ventral notch in proximal margin of sclerite, C) *Pachnaeus rosadonetoi* Lopez Castilla, 1992 (ASUHIC0088783), D) same with endophallus outlined (yellow) and outline of tubular endophallic sclerite situated laterally for comparison to width of adjacent portion of penis (black). Scale bars = 1mm.

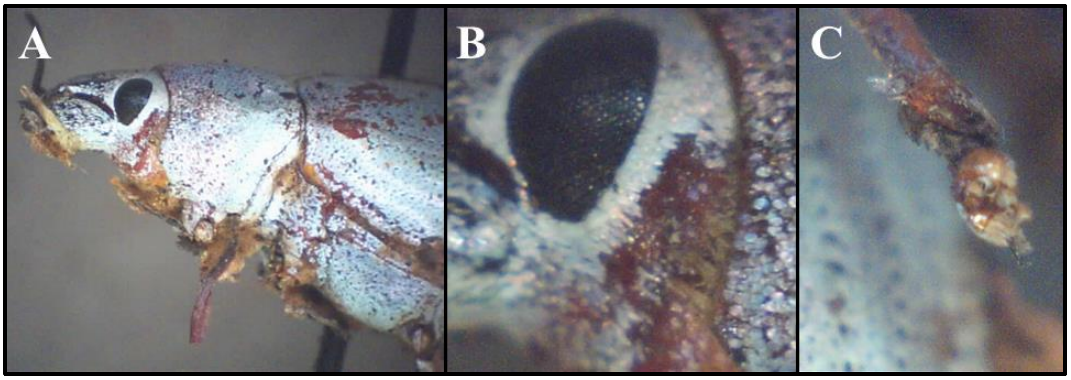

Fig. 3.52. Photos of the holotype of *Pachnaeus pater* de Zayas, 1988, female taken by Michael A. Ivie, A) anterior half, lateral, B) closeup of postocular lobe, C) metatibial apex.

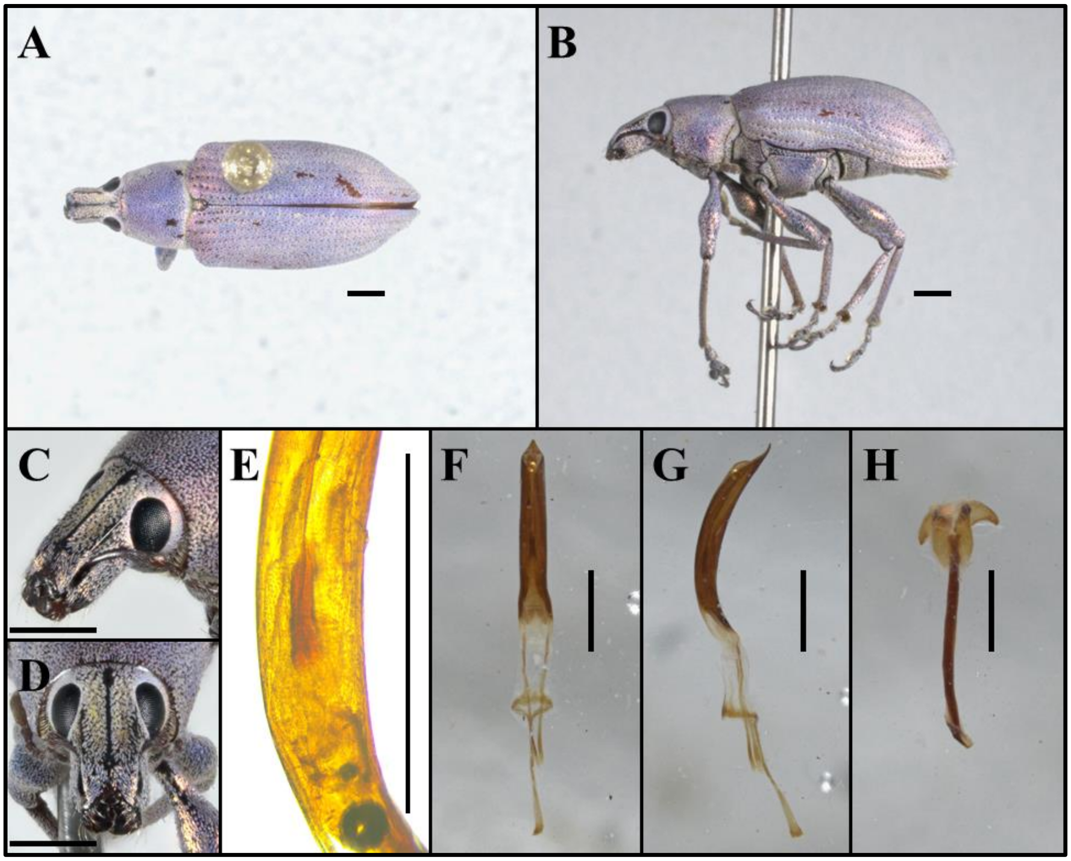

Fig. 3.53. *Pachnaeus pater* de Zayas, 1988, male. Habitus (ARTSYS0007557), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Male genitalia (ARTSYS0007556), E) endophallus lateral, F) aedeagus dorsal, G) aedeagus lateral, and H) spiculum gastral. Scale bars = 1mm.

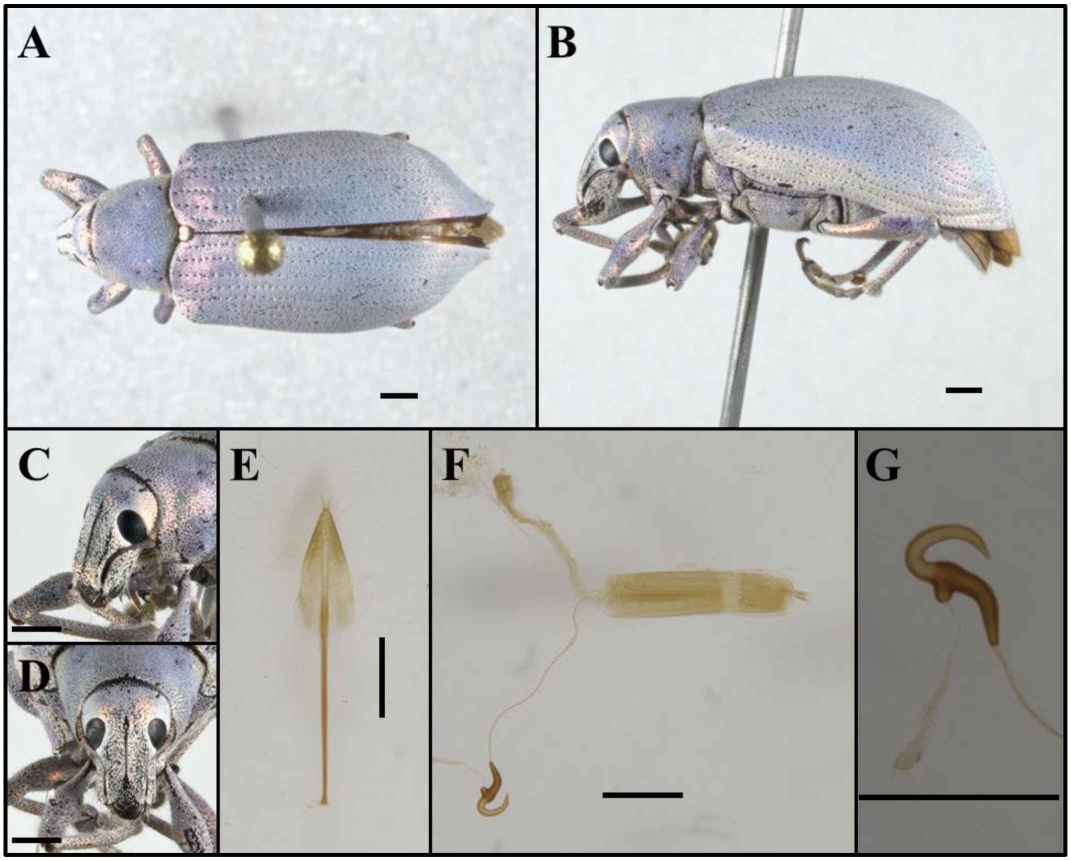

Fig. 3.54. *Pachnaeus pater* de Zayas, 1988, female. Habitus (ASUHIC0033614), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Female genitalia (ASUHIC0033978), E) spiculum ventrale, F) spermatheca and coxites lateral, and G) spermatheca. Scale bars = 1mm.

Fig. 3.55. Photos of the male holotype of *Pachnaeus rosadonetoi* Lopez Castilla, 1992 taken by Robert S. Anderson, A–B) oblique lateral, C) closeup of rostrum.

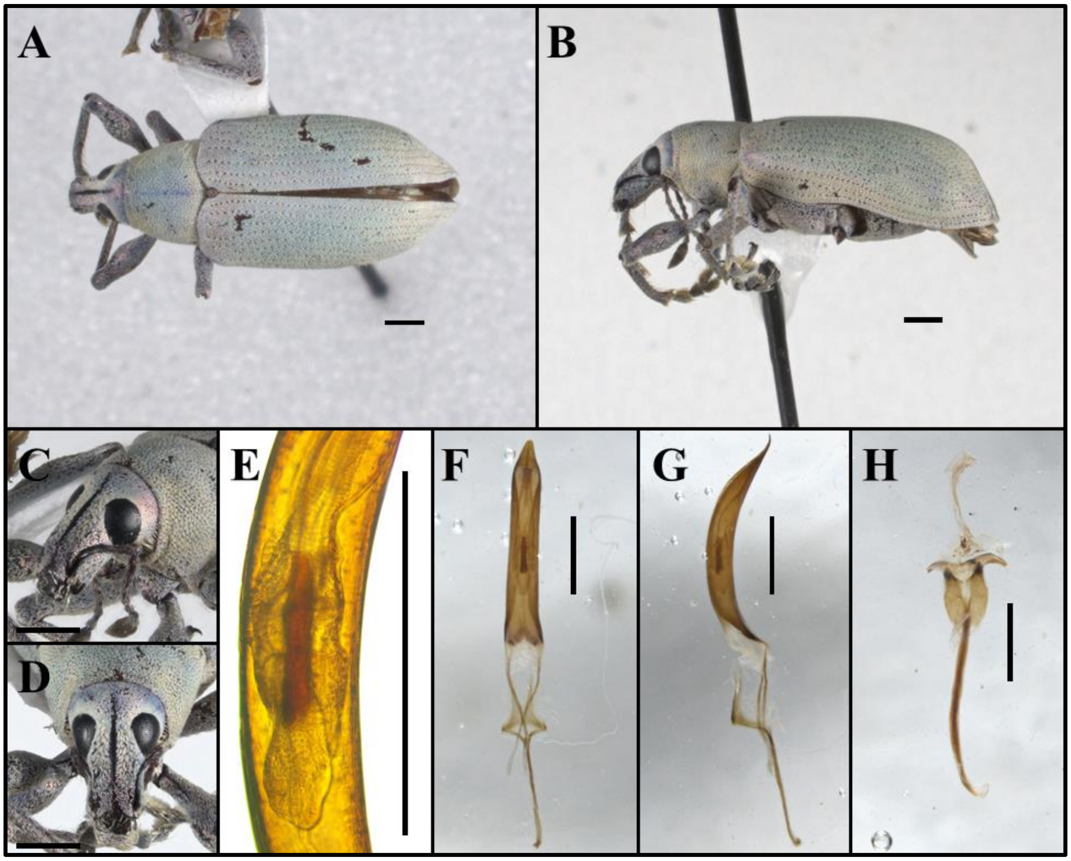

Fig. 3.56. *Pachnaeus rosadonetoi* Lopez Castilla, 1992, male (ASUHIC0088783). Habitus, A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Male genitalia, E) endophallus lateral, F) aedeagus dorsal, G) aedeagus lateral, and H) spiculum gastral. Scale bars = 1mm.

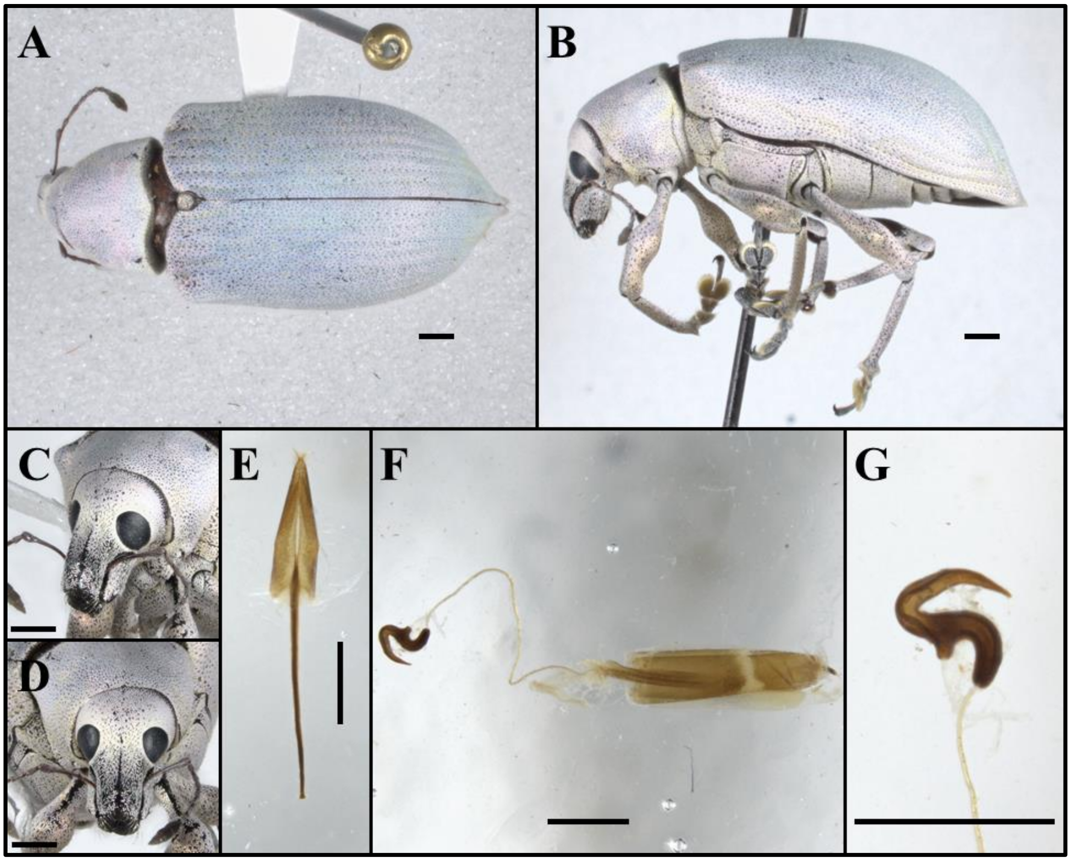

Fig. 3.57. *Pachnaeus rosadonetoi* Lopez Castilla, 1992, female. Habitus (ARTSYS0001387), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Female genitalia (ASUHIC0033675), E) spiculum ventrale, F) spermatheca and coxites lateral, and G) spermatheca. Scale bars = 1mm.

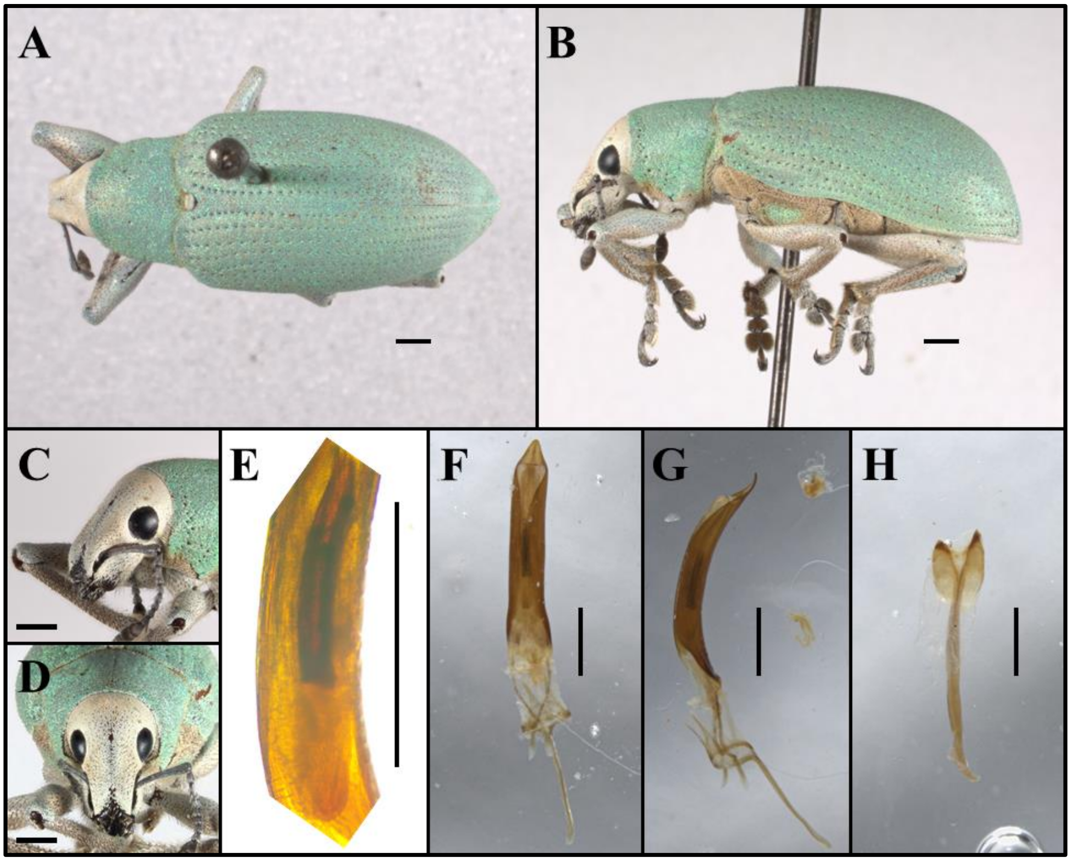

Fig. 3.58. *Pachnaeus psittacus* (Olivier, 1807), male. Habitus ([MCZ-ENT 00]529492), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Male genitalia (ARTSYS0001338), E) endophallus lateral, F) aedeagus dorsal, G) aedeagus lateral, and H) spiculum gastral. Scale bars = 1mm.

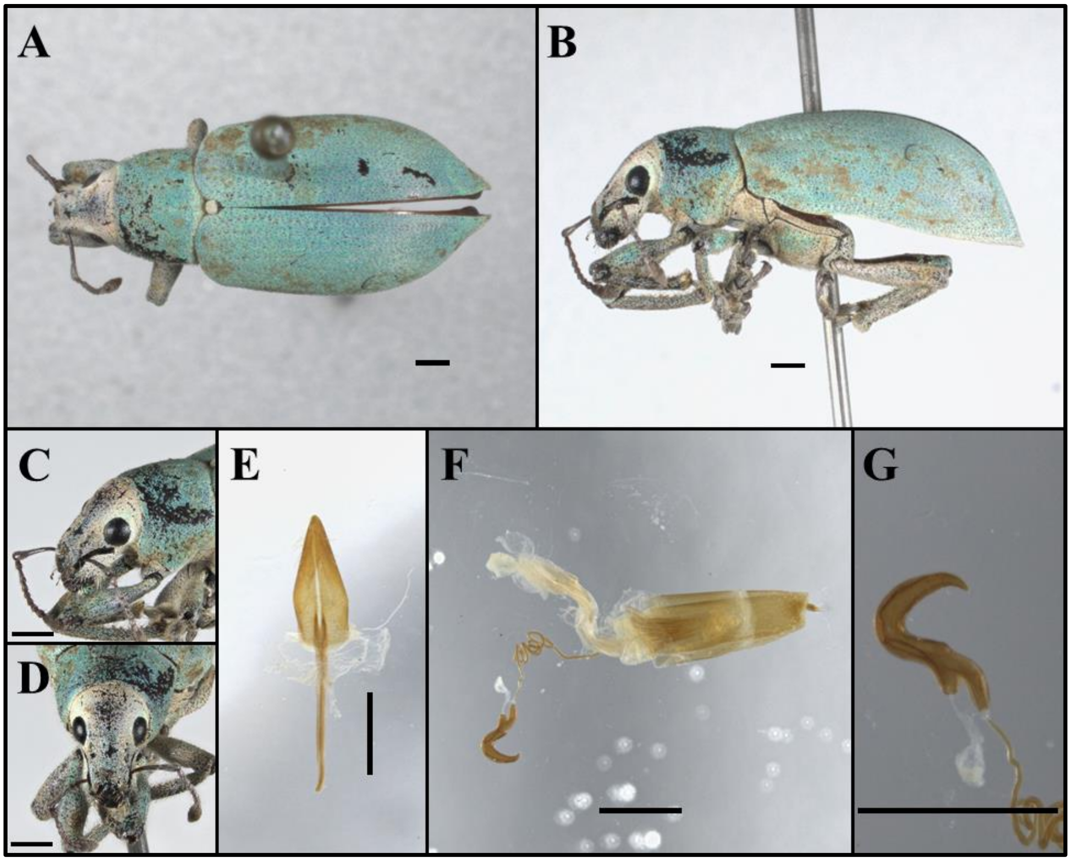

Fig. 3.59. *Pachnaeus psittacus* (Olivier, 1807), female (ARTSYS0001052). Habitus, A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Female genitalia, E) spiculum ventrale, F) spermatheca and coxites lateral, and G) spermatheca. Scale bars = 1mm.

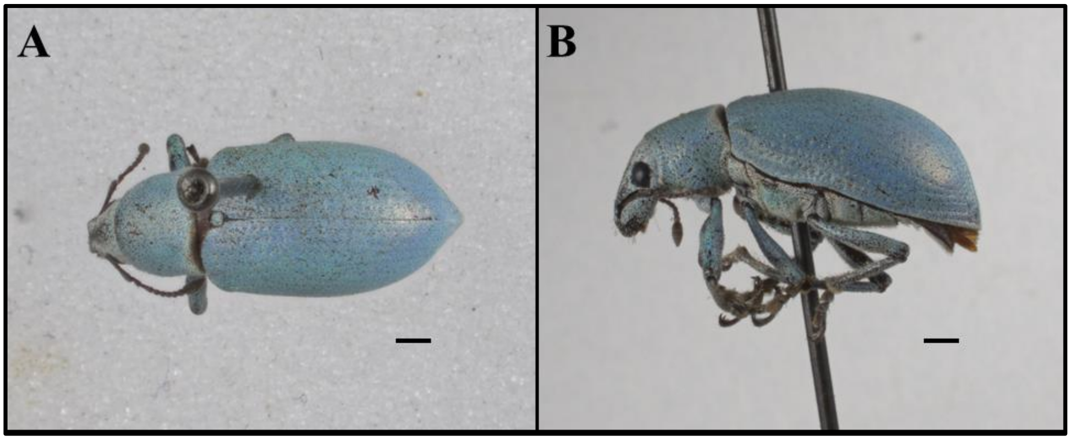

Fig. 3.60. *Pachnaeus psittacus* (Olivier, 1807), female, blue-scaled variant ([MCZ-ENT 00]529358). Habitus, A) dorsal, B) lateral. Scale bar = 1mm.

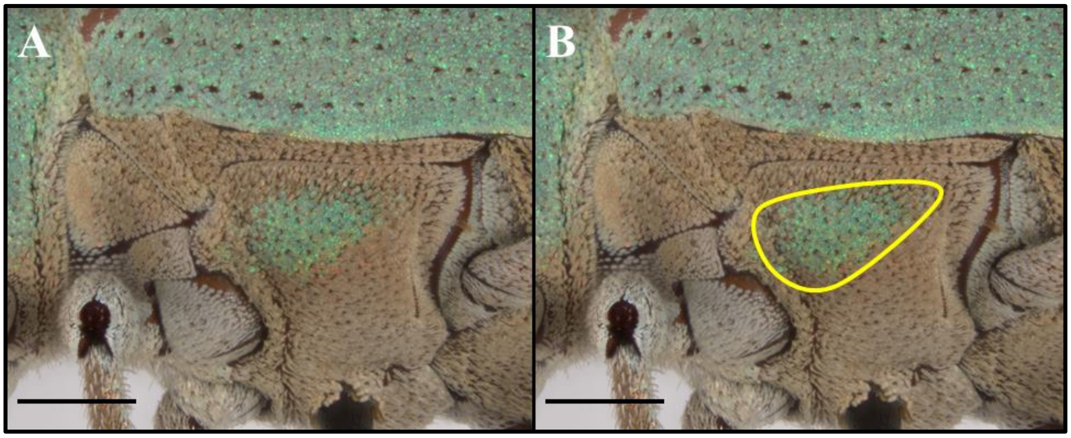

Fig. 3.61. *Pachnaeus psittacus* (Olivier, 1807), lateral aspect of mesothorax ([MCZ-ENT 00]529492), A) darker, typically subtrigonal metasternal scale patch diagnostic of the species, B) same with outline of approximate shape of patch. Scale bar = 1mm.

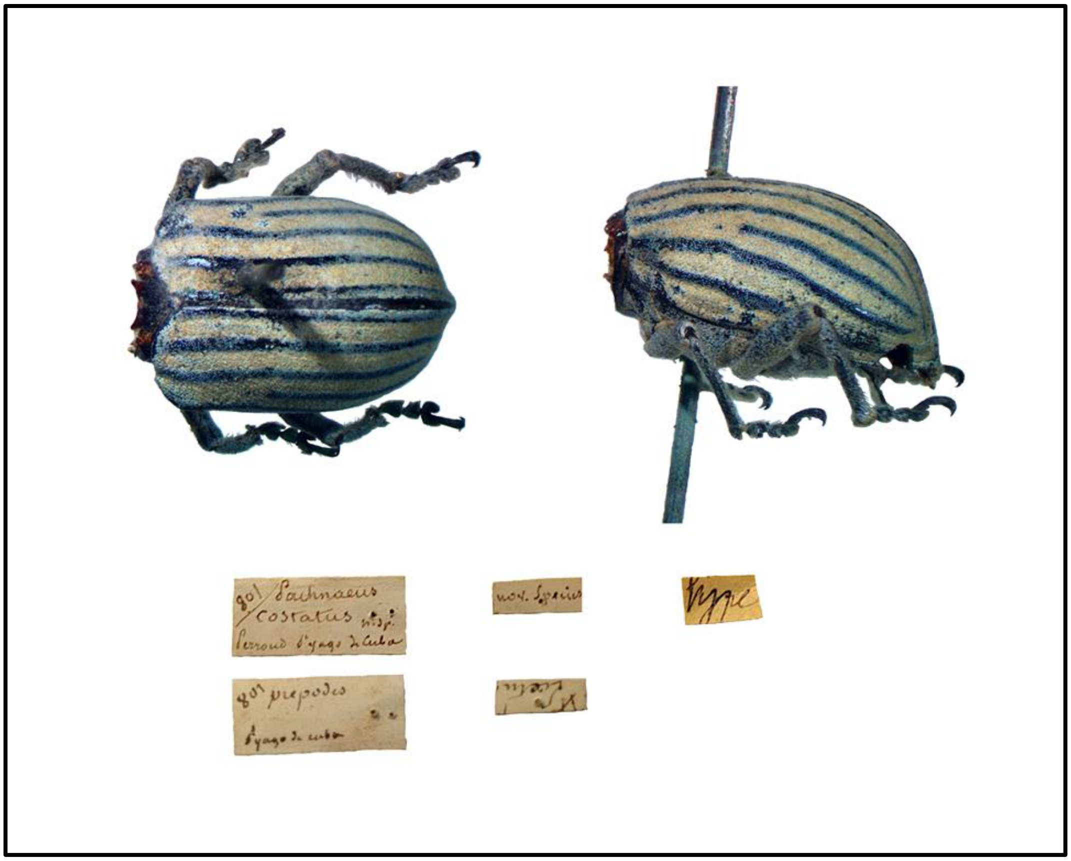

Fig. 3.62. Female lectotype of *Pachnaeus costatus* Perroud, 1853.

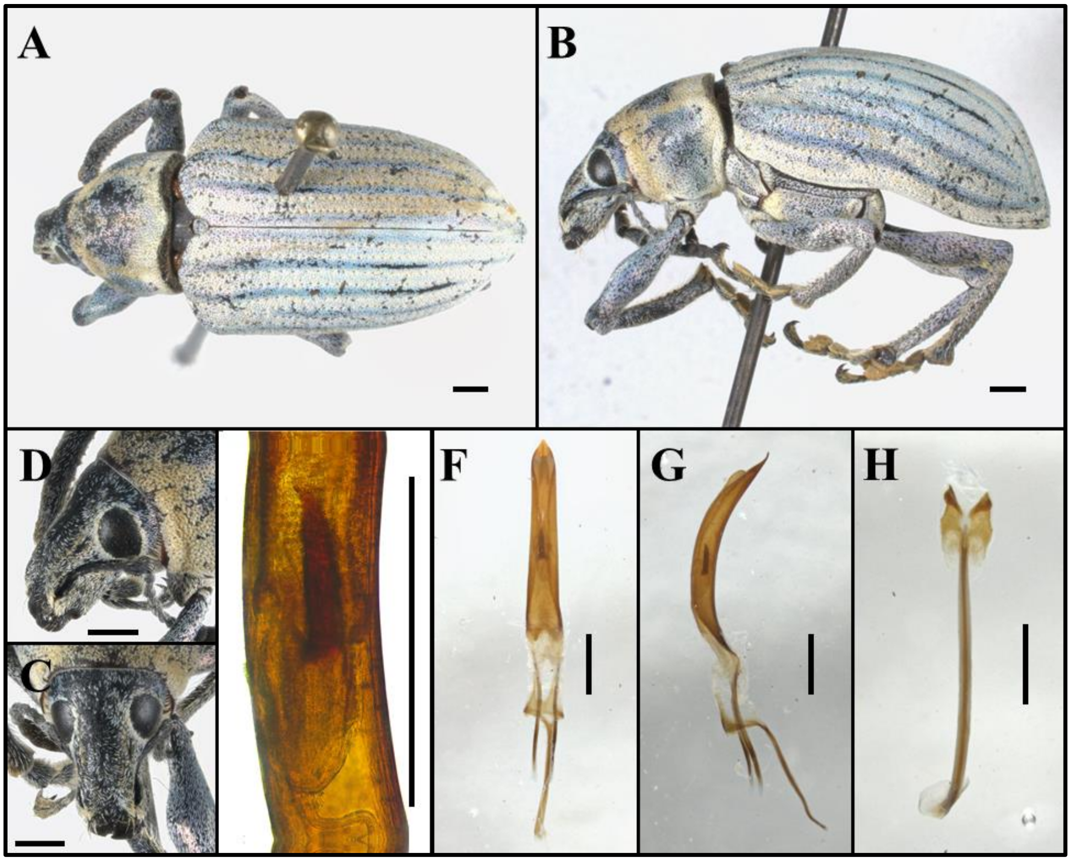

Fig. 3.63. *Pachnaeus costatus* Perroud, 1853, male. Habitus (ARTSYS0001322), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Male genitalia (ARTSYS0001322), E) endophallus lateral, F) aedeagus dorsal, G) aedeagus lateral, and H) spiculum gastral. Scale bars = 1mm.

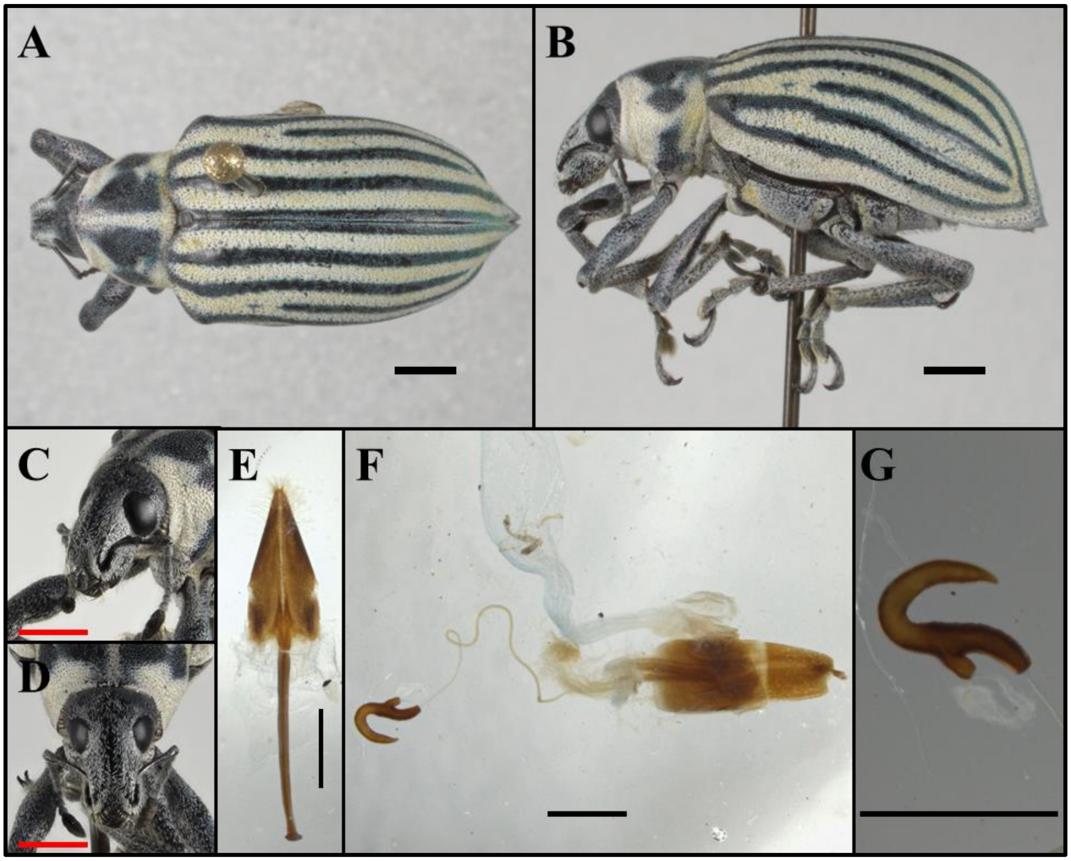

Fig. 3.64. *Pachnaeus costatus* Perroud, 1853, female (ARTSYS0001051). Habitus, A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Female genitalia, E) spiculum ventrale, F) spermatheca and coxites lateral, and G) spermatheca. Scale bars = 1mm.

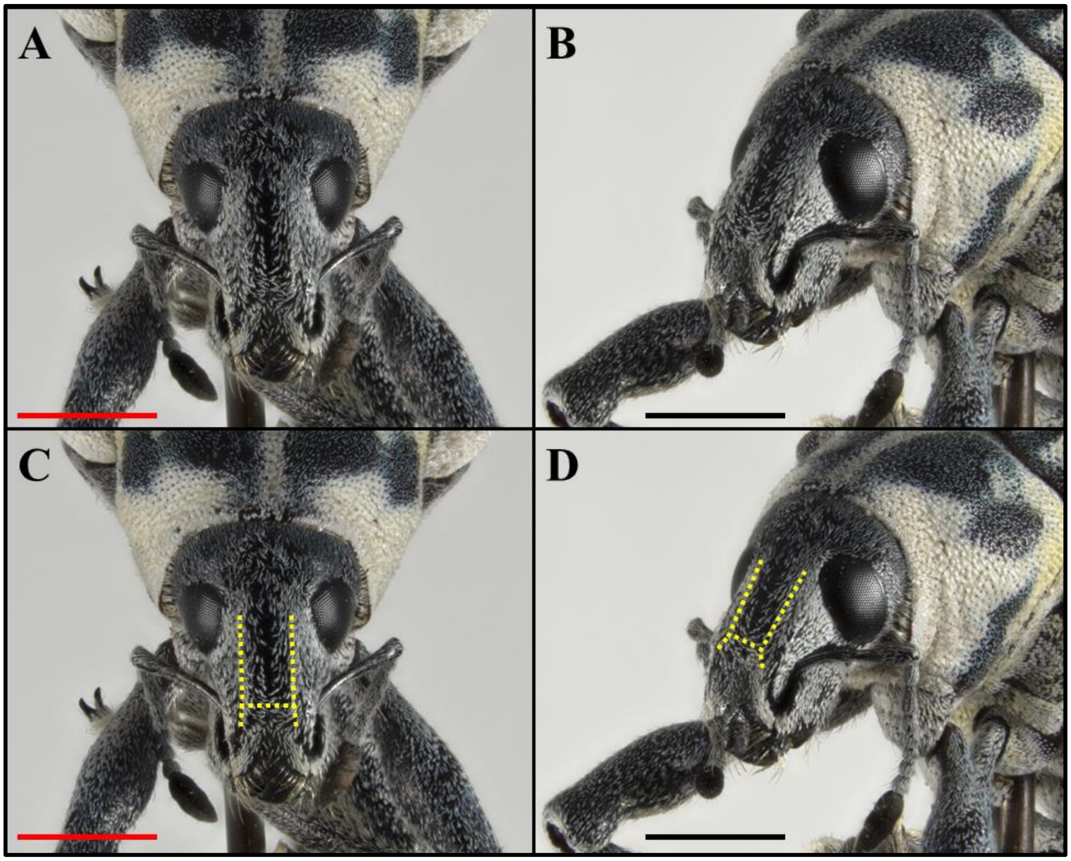

Fig. 3.65. *Pachnaeus costatus* Perroud, 1853, female. Epifrons structure (ARTSYS0001051), A) frontal, B) oblique frontal view. Outline of raised median mound in yellow in C) frontal and D) oblique frontal view. Scale bars = 1mm.

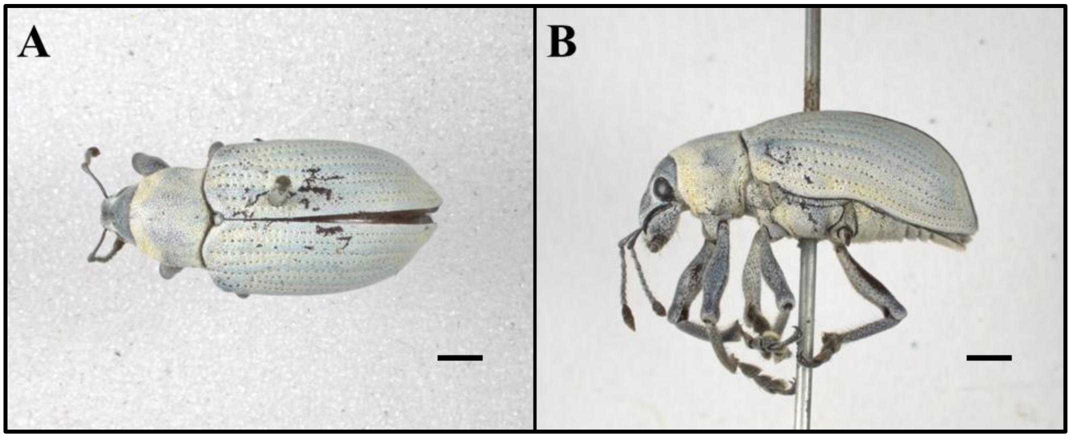

Fig. 3.66. *Pachnaeus costatus* Perroud, 1853, male, heavily scaled form. Habitus (ARTSYS0007409), A) dorsal, B) lateral. Scale bars = 1mm.

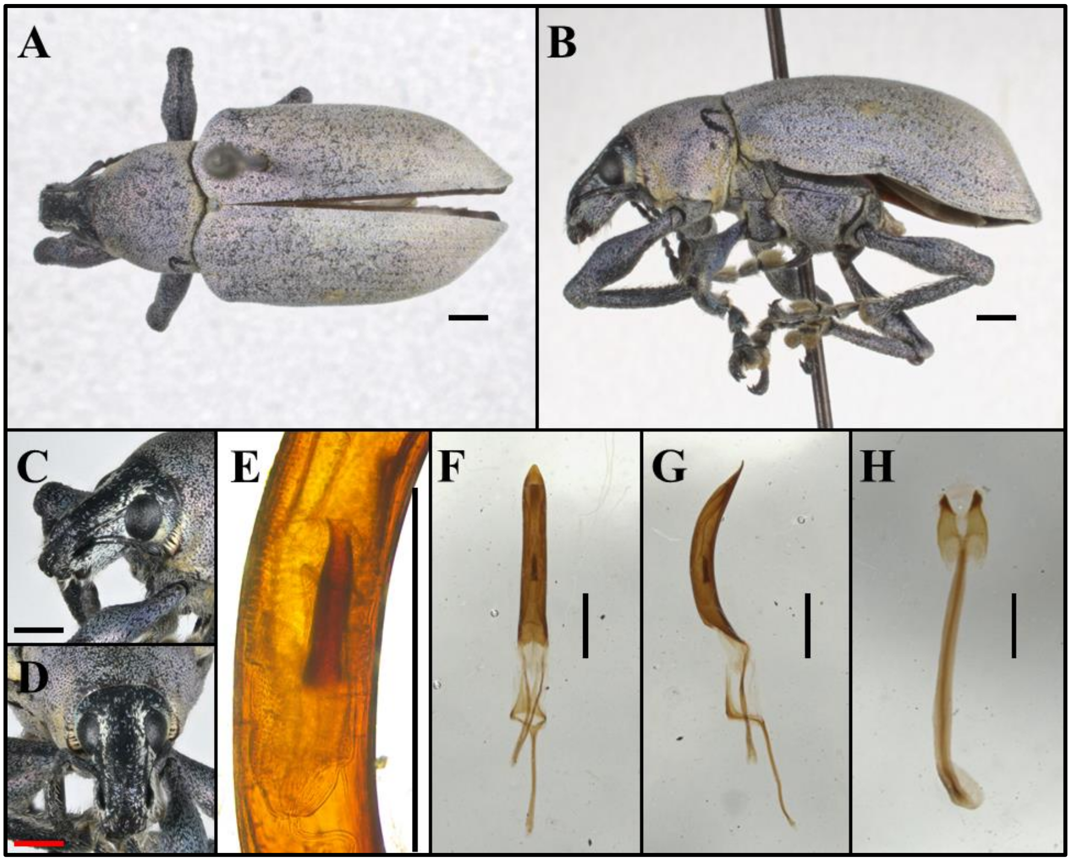

Fig. 3.67. Male holotype of *Pachnaeus maestrensis*, sp. nov. ([MCZ-ENT 00]529449). Habitus, A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Male genitalia, E) endophallus lateral, F) aedeagus dorsal, G) aedeagus lateral, F) spiculum gastral. Scale bars = 1mm.

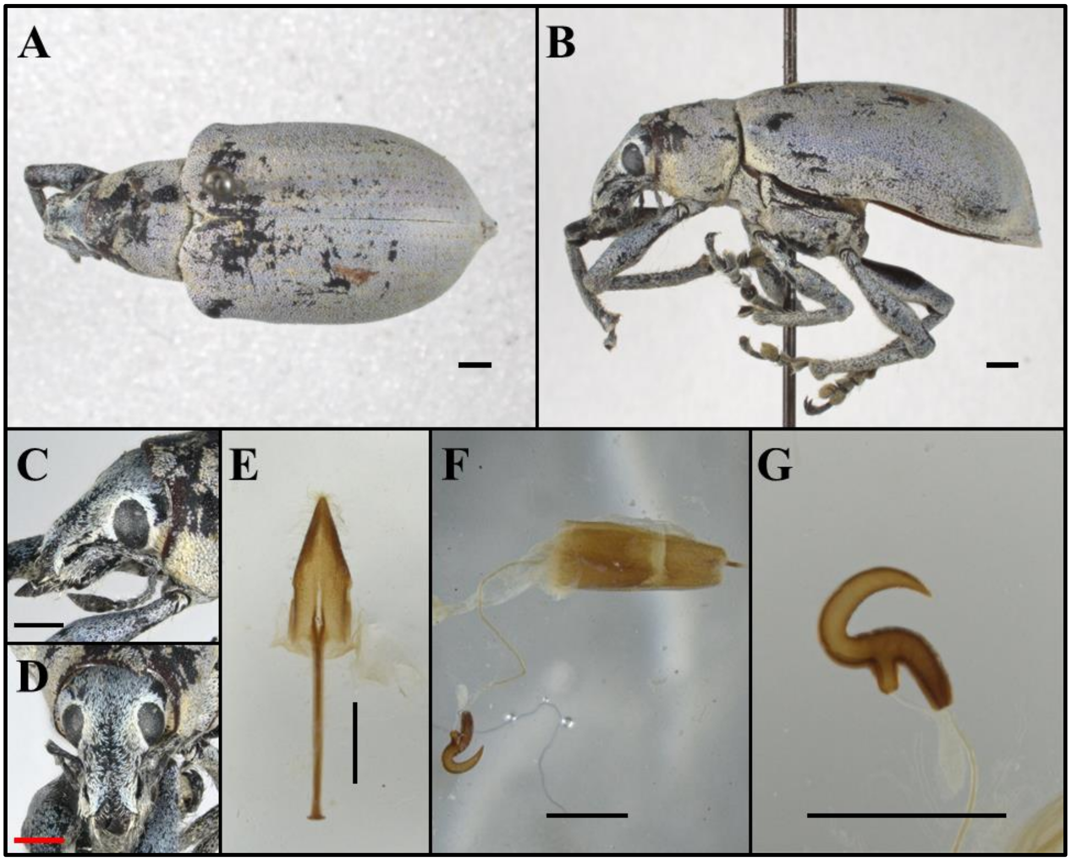

Fig. 3.68. Female paratype of *Pachnaeus maestrensis*, sp. nov. ([MCZ-ENT 00]529450). Habitus, A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Female genitalia, E) spiculum ventrale, F) spermatheca and coxites lateral, and G) spermatheca. Scale bars = 1mm.

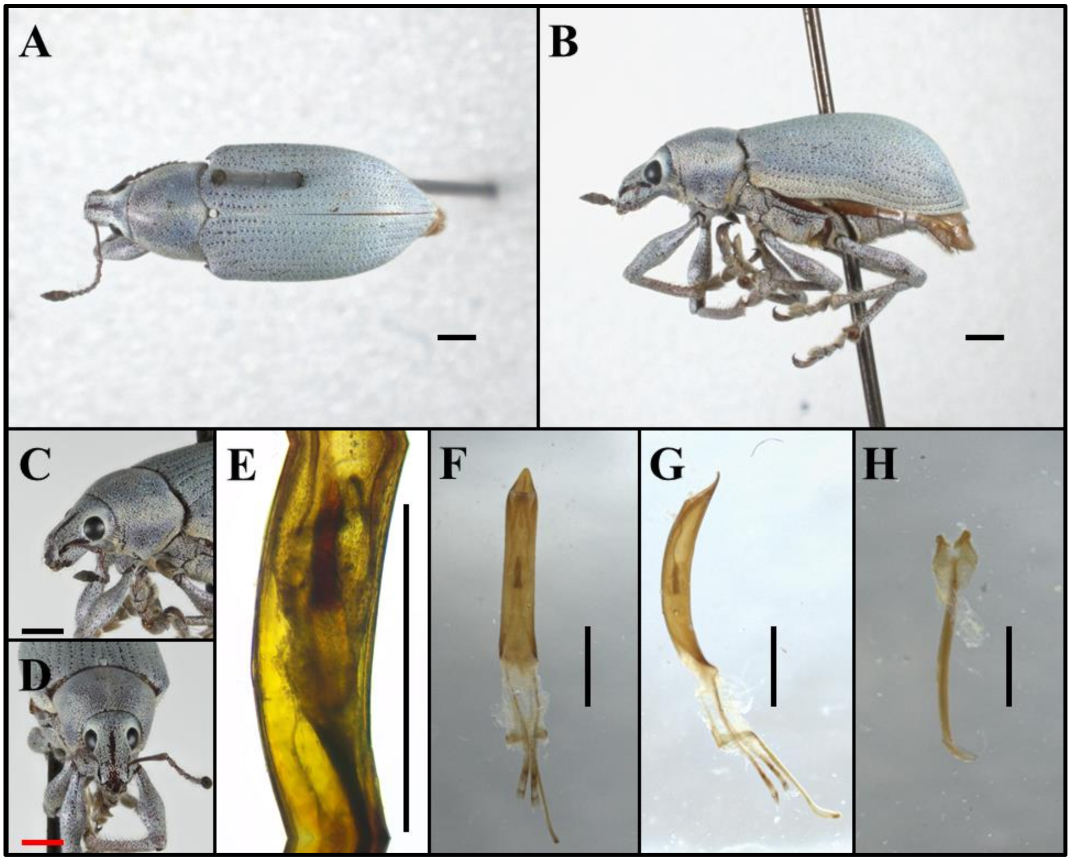

Fig. 3.69. *Pachnaeus litus* (Germar, 1824) *sensu stricto*, male, Havana population. Habitus ([MCZ-ENT 00]529393), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Male genitalia ([MCZ-ENT 00]529404), E) endophallus lateral, F) aedeagus dorsal, G) aedeagus lateral, and H) spiculum gastral. Scale bars = 1mm.

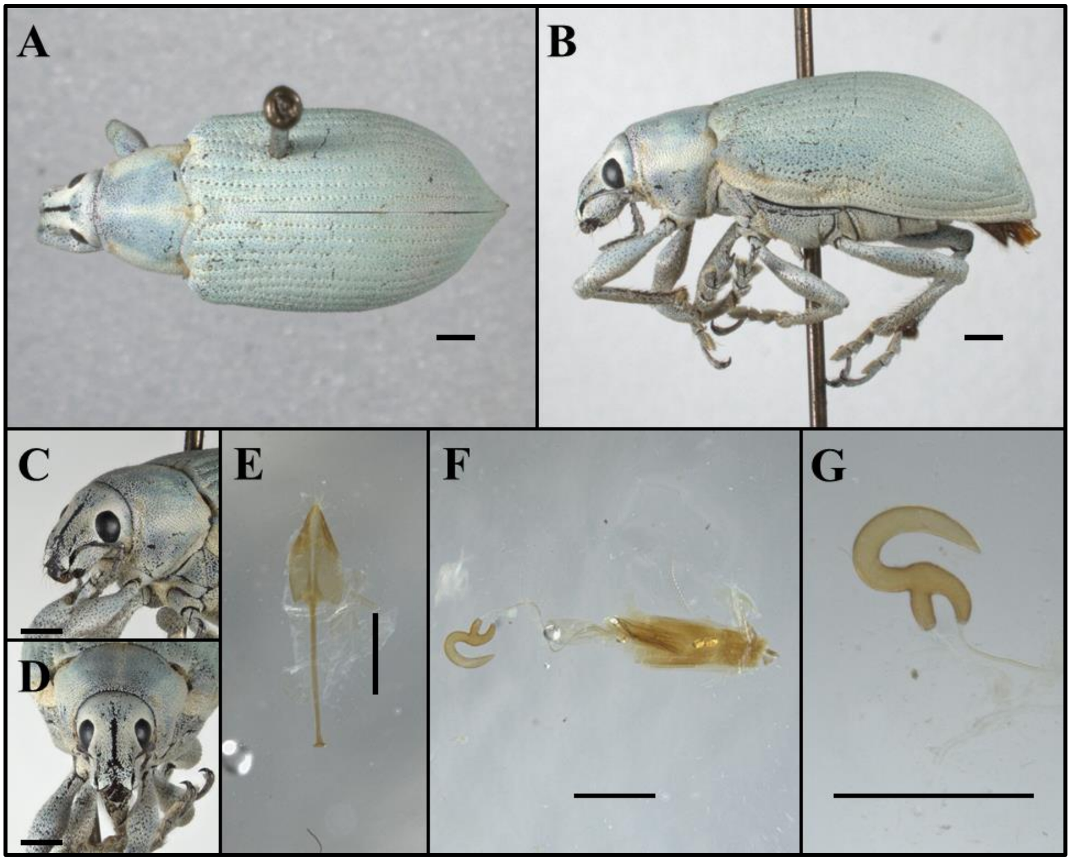

Fig. 3.70. *Pachnaeus litus* (Germar, 1824) *sensu stricto*, female, Havana population. Habitus ([MCZ-ENT 00]529408), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Female genitalia ([MCZ-ENT 00]529415), E) spiculum ventrale, F) spermatheca and coxites lateral, and G) spermatheca. Scale bars = 1mm.

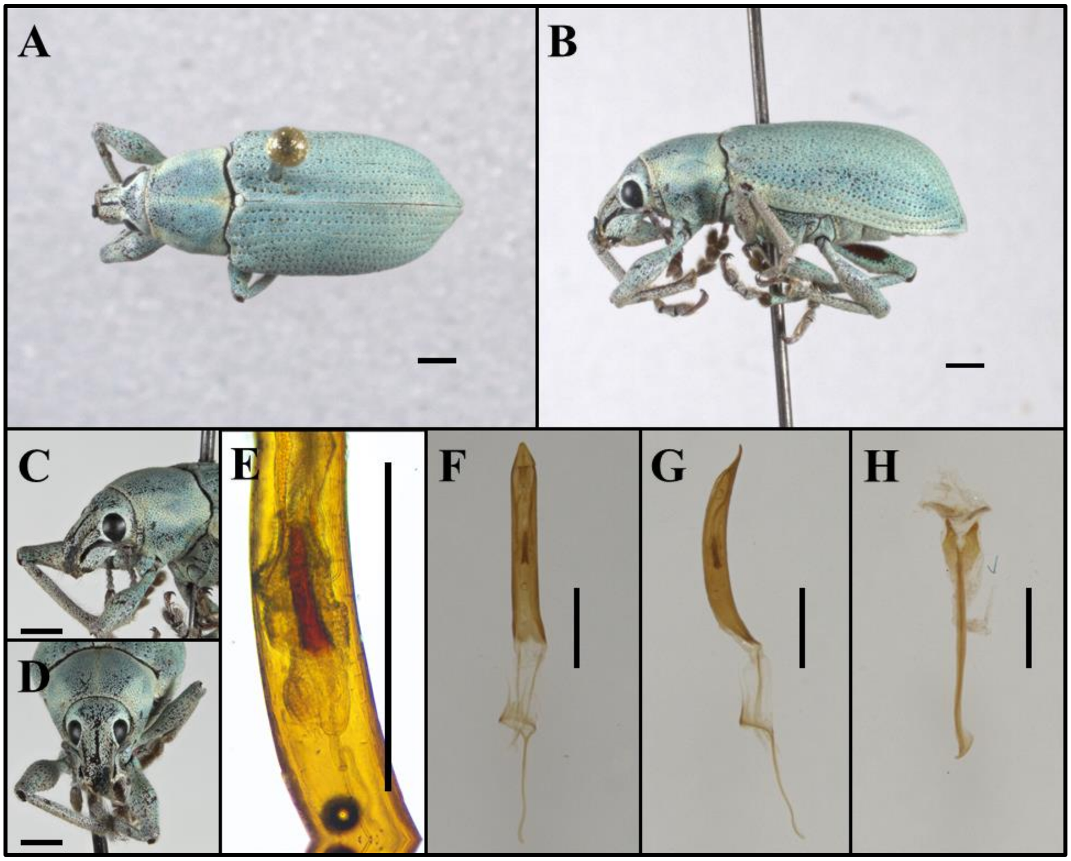

Fig. 3.71. *Pachnaeus litus* (Germar, 1824) *sensu stricto*, male, Florida population. Habitus (ARTSYS0007737), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Male genitalia (ARTSYS0001066), E) endophallus lateral, F) aedeagus dorsal, G) aedeagus lateral, and H) spiculum gastral. Scale bars = 1mm.

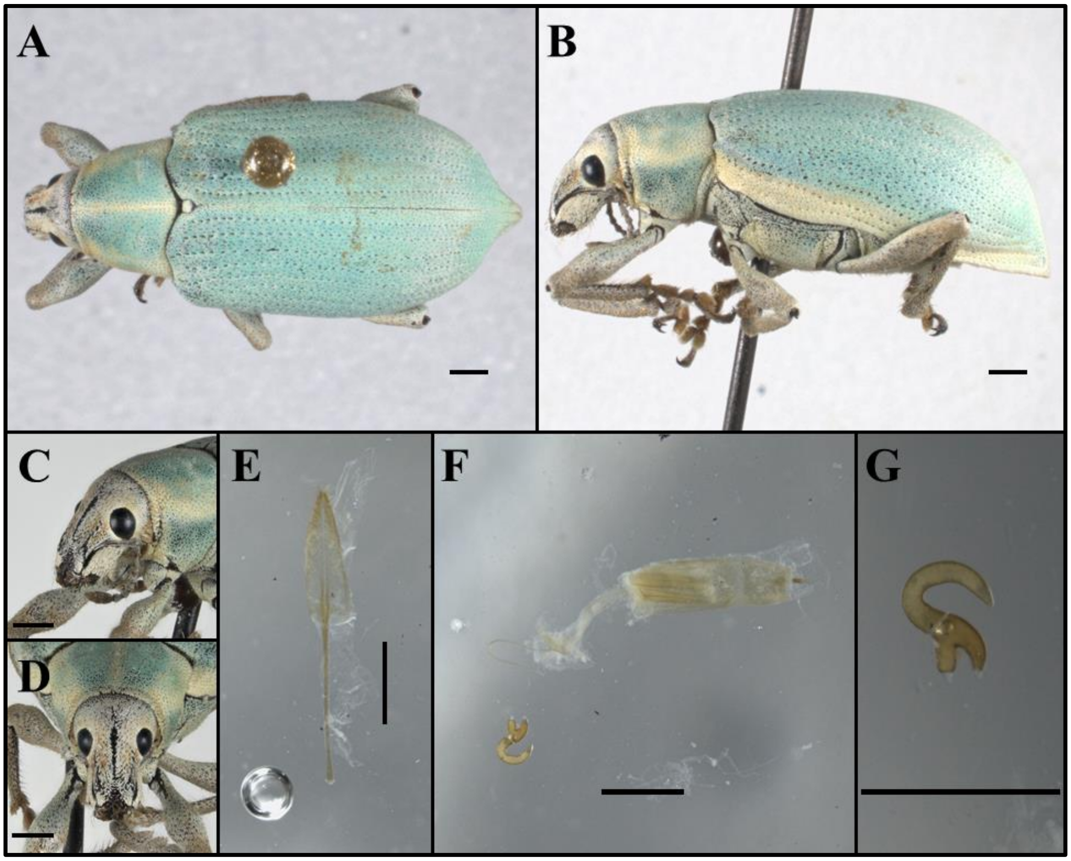

Fig. 3.72. *Pachnaeus litus* (Germar, 1824) *sensu stricto*, female, Florida population. Habitus (ARTSYS0001079), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Female genitalia (ARTSYS0001092), E) spiculum ventrale, F) spermatheca and coxites lateral, and G) spermatheca. Scale bars = 1mm.

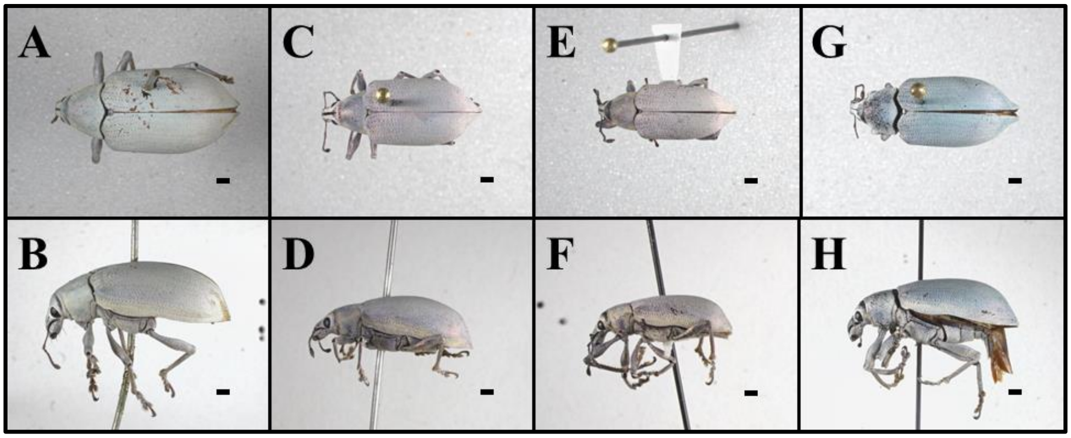

Fig. 3.73. Variation within *Pachnaeus litus* (Germar, 1824). Female specimen of large blue form from Cuba which was illustrated by Champion (1911) in Biologia Centrali-Americana (ARTSYS0007826), A) dorsal, B) lateral; purperescent scaled female from Cuatro Vientos, Cienfuegos Province, Cuba (ASUHIC0033681), C) dorsal, D) lateral; purperescent scaled male from Cuatro Vientos, Cienfuegos Province, Cuba (ARTSYS0007814), E) dorsal, F) lateral; sky blue scaled female with thin median rostral carina from Andros Island, Bahamas (ARTSYS0007811), G) dorsal, H) lateral. Scale bars = 1mm.

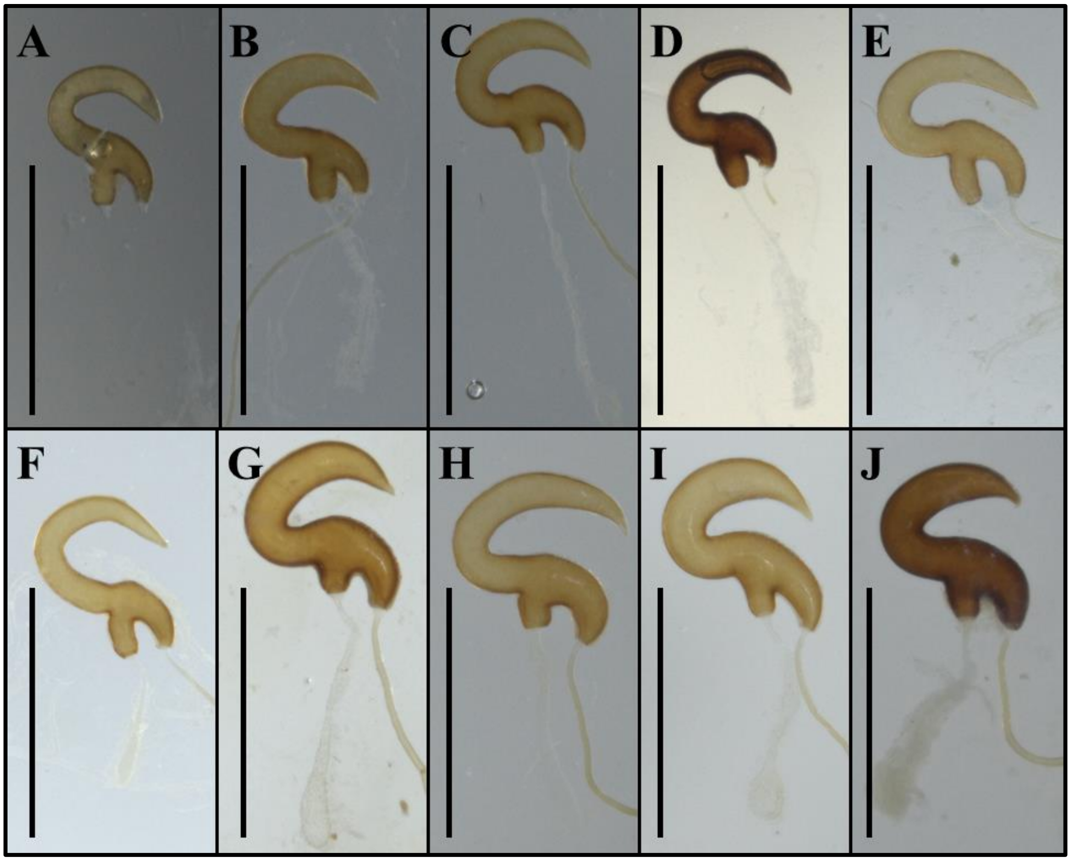

Fig. 3.74. Spermathecal variation in *Pachnaeus litus* (Germar, 1824). A) Flamingo, Florida (ARTSYS0001092), B) Big Pine Key, Florida (ARTSYS0001068), C) Miami, Florida (ARTSYS0001491), D) Lake Fredrica, Florida (ARTSYS0007469), E) Havana, Cuba ([MCZ-ENT 00]529415), F) Playa de Jaimanitas, Cuba (ARTSYS0001553), G) Cotorro, Cuba (ARTSYS0007796), H) Jaronú, Cuba ([MCZ-ENT 00]529493), I) Soledad (= Pepito Tey), Cuba ([MCZ-ENT 00]529505), J) Pico San Juan, Cuba (ASUHIC0015296). Scale bars = 1 mm.

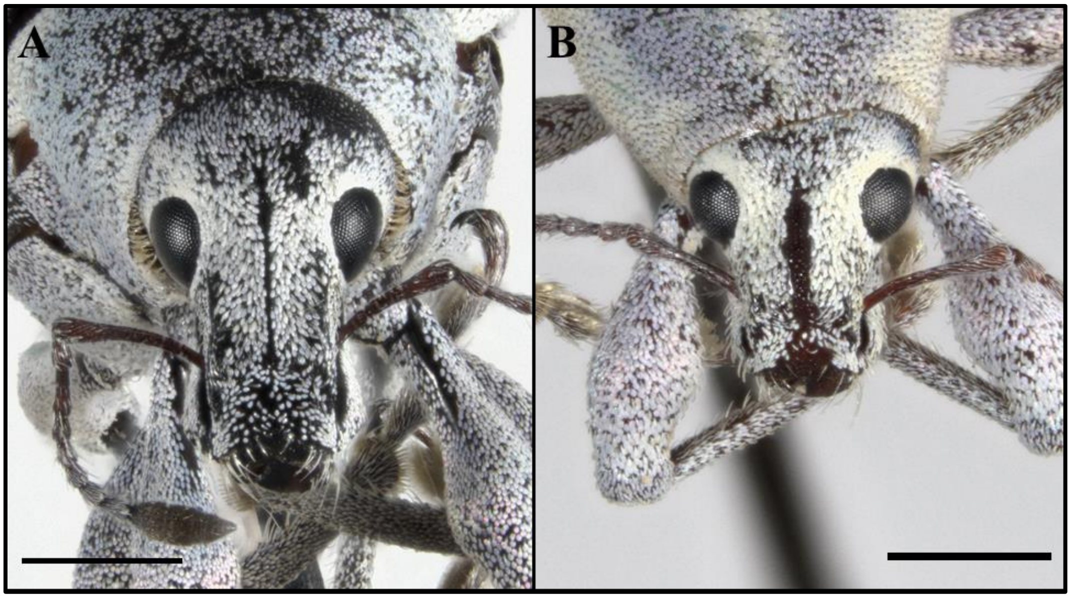

Fig. 3.75. Examples of variation in epifrons structure within *Pachnaeus litus* (Germar, 1824) *sensu lato*. Frontal habitus of A) Andros Island form with thin median rostral carina (ARTSYS0007811), B) typical form with moderately thick median rostral carina ([MCZ-ENT 00]529401). Scale bars = 1mm.

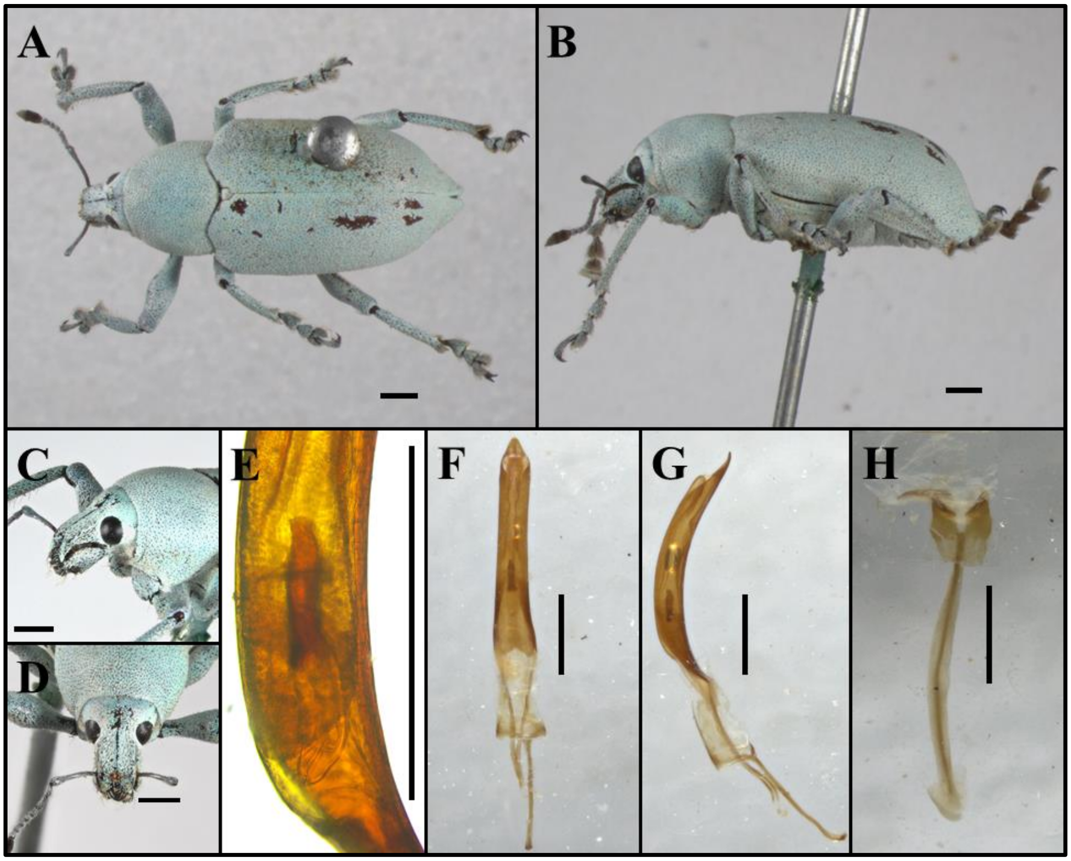

Fig. 3.76. *Pachnaeus morelli*, sp. nov., male. Habitus (ARTSYS0001538), A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Male genitalia (ARTSYS0001541), E) endophallus lateral, F) aedeagus dorsal, G) aedeagus lateral, and H) spiculum gastral. Scale bars = 1mm.

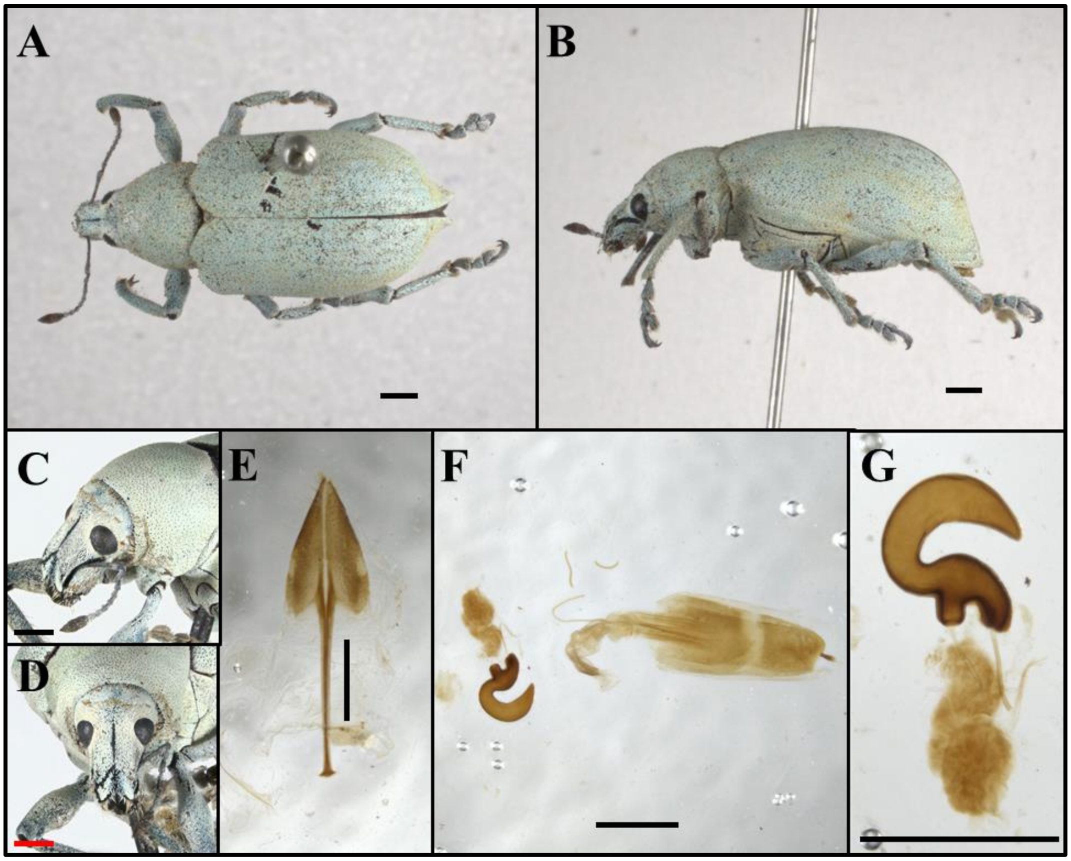

Fig. 3.77. *Pachnaeus morelli*, sp. nov., female (ARTSYS0001534). Habitus, A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Female genitalia, E) spiculum ventrale, F) spermatheca and coxites lateral, and G) spermatheca. Scale bars = 1mm.

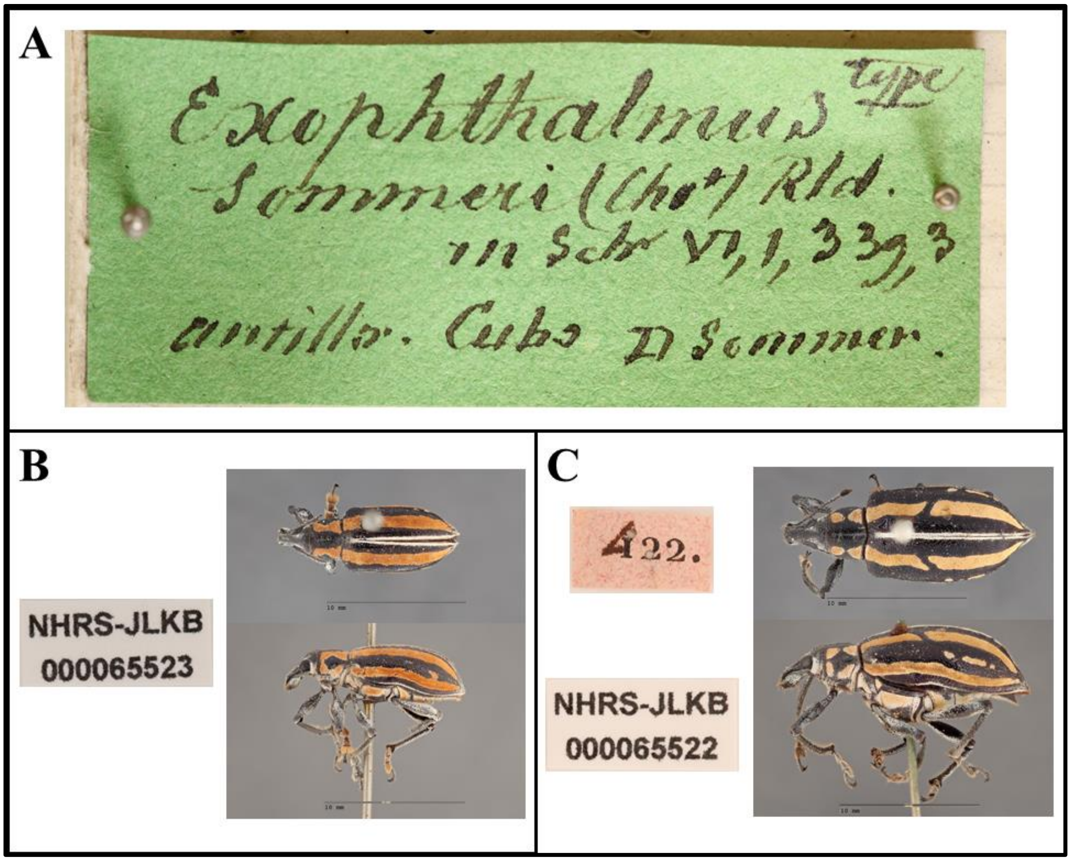

Fig. 3.78. Type specimens of *Pachnaeus sommeri* (Munck af Rosenschoeld in Schoenherr, 1840) from the Chevrolat collection, A) drawer label, B) male lectotype, typical form, C) Female paralectotype, “var. γ” sec. Munck af Rosenschoeld 1840. Modified from images taken by NHRS.

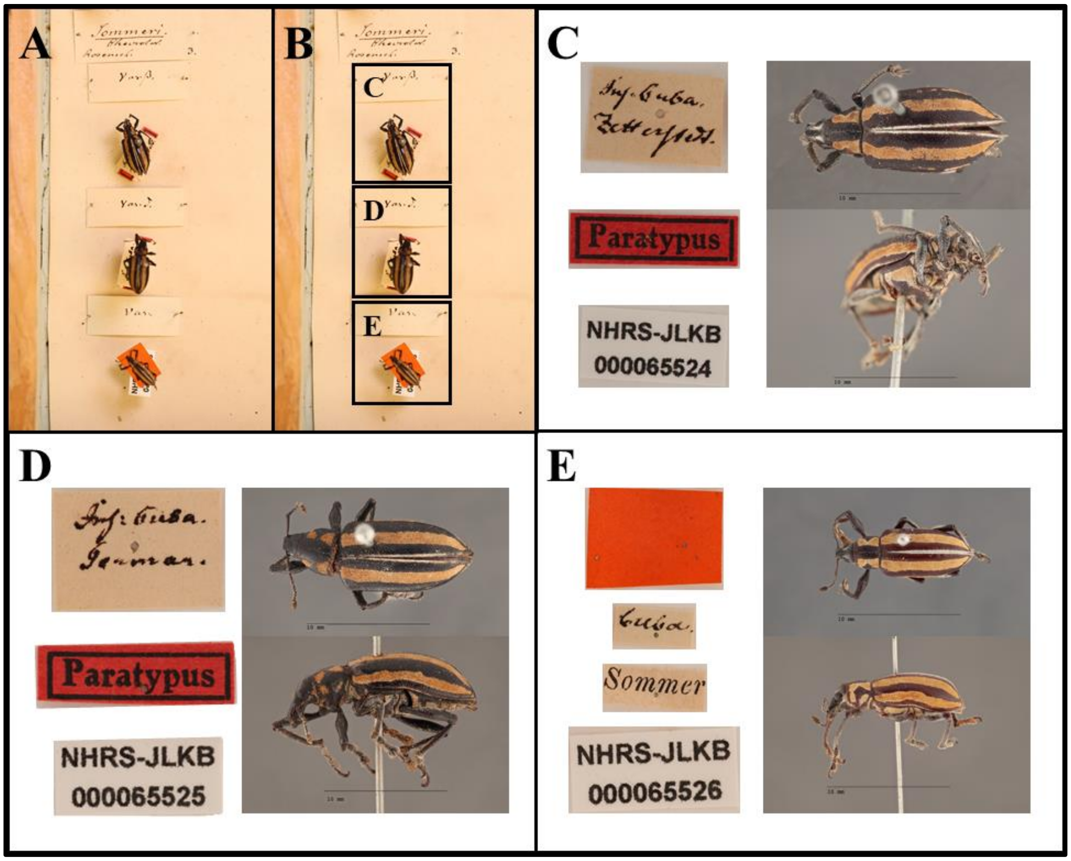

Fig. 3.79. Type specimens of *Pachnaeus sommeri* (Munck af Rosenschoeld in Schoenherr, 1840) from the Schoenherr collection, A, B) drawer labels and positioning of specimens within collection, C) female paralectotype, “var. β” sec. Munck af Rosenschoeld 1840, D) male paralectotype, “var. δ” sec. Munck af Rosenschoeld 1840, E) male paralectotype, typical form. Modified from images taken by NHRS.

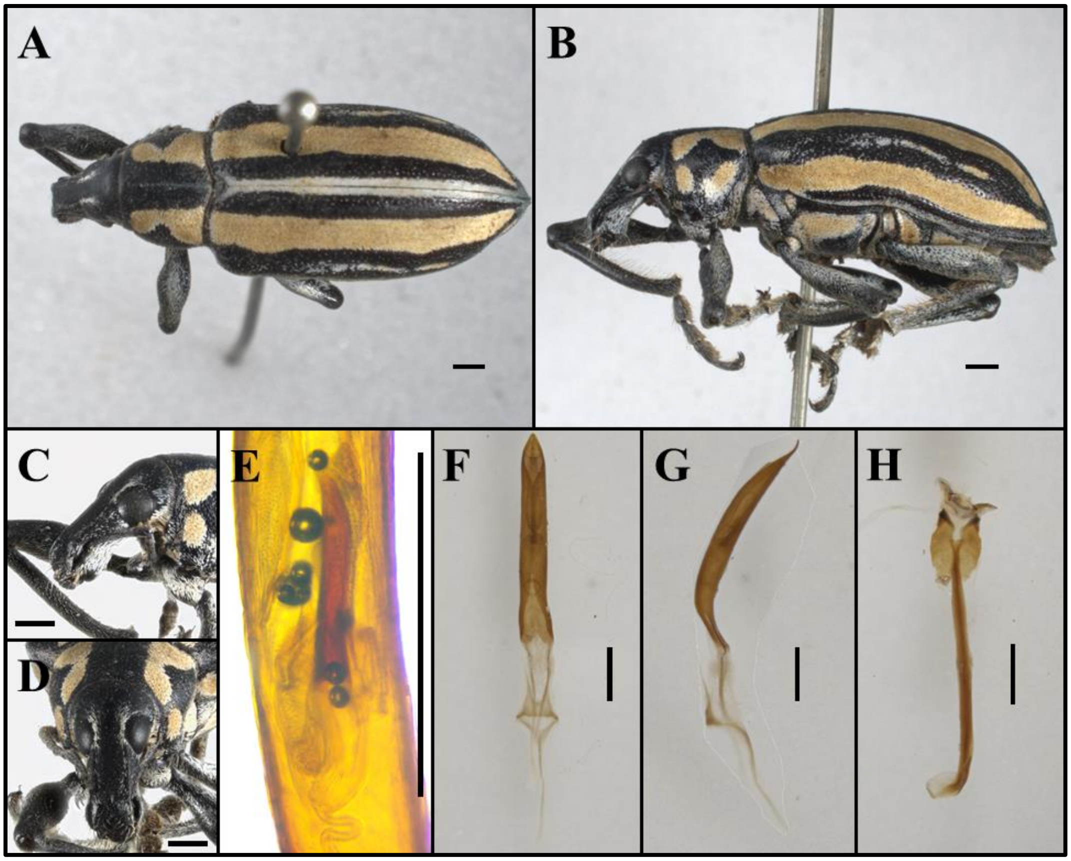

Fig. 3.80. *Pachnaeus sommeri* (Munck af Rosenschoeld in Schoenherr, 1840), male (ARTSYS0001562). Habitus, A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Male genitalia, E) endophallus lateral, F) aedeagus dorsal, G) aedeagus lateral, and H) spiculum gastral. Scale bars = 1mm.

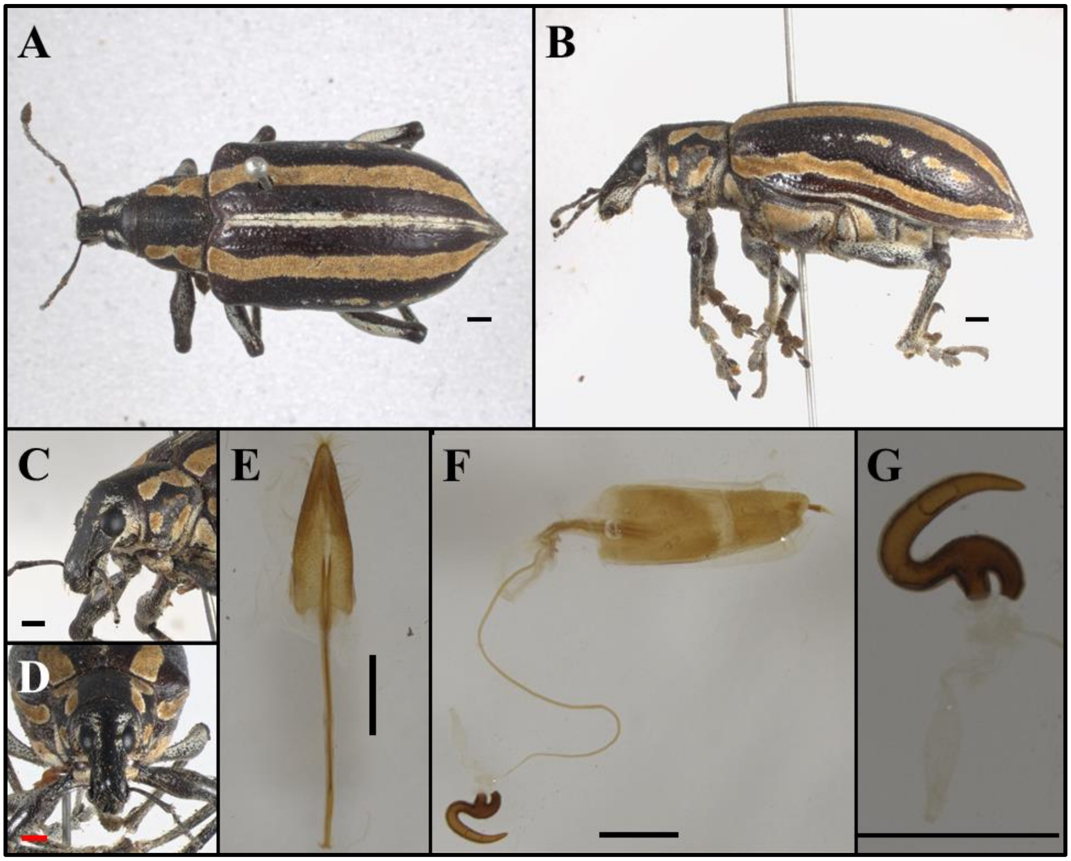

Fig. 3.81. *Pachnaeus sommeri* (Munck af Rosenschoeld in Schoenherr, 1840), female (ARTSYS0001563). Habitus, A) dorsal, B) lateral, C) oblique frontal, and D) frontal. Female genitalia (ARTSYS0001379), E) spiculum ventrale, F) spermatheca and coxites lateral, and G) spermatheca. Scale bars = 1mm.

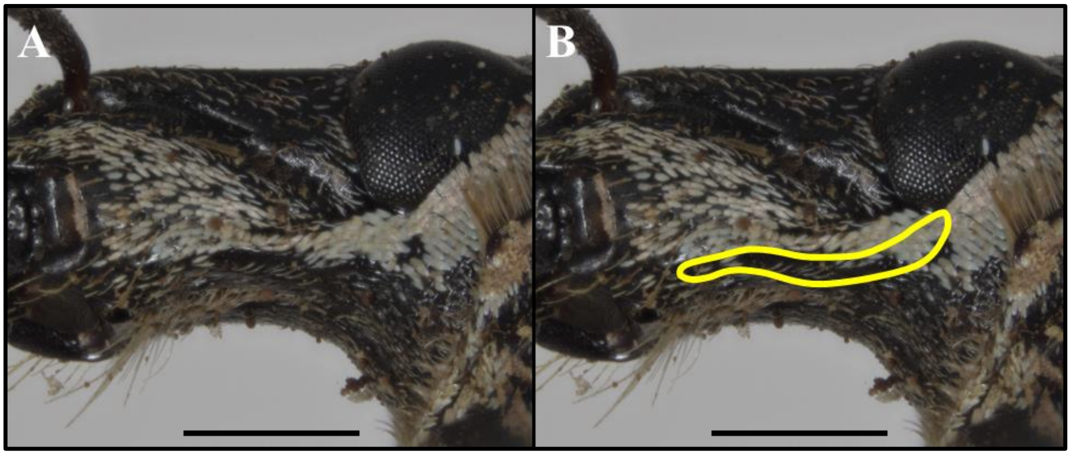

Fig. 3.82. Ventrolateral aspect of rostrum of *Pachnaeus sommeri* (Munck af Rosenschoeld in Schoenherr, 1840), female (ARTSYS0001563) showing long, sigmoidal occipital suture typical of this species. A) habitus, B) position of occipital suture outlined in yellow. Scale bar = 1mm.

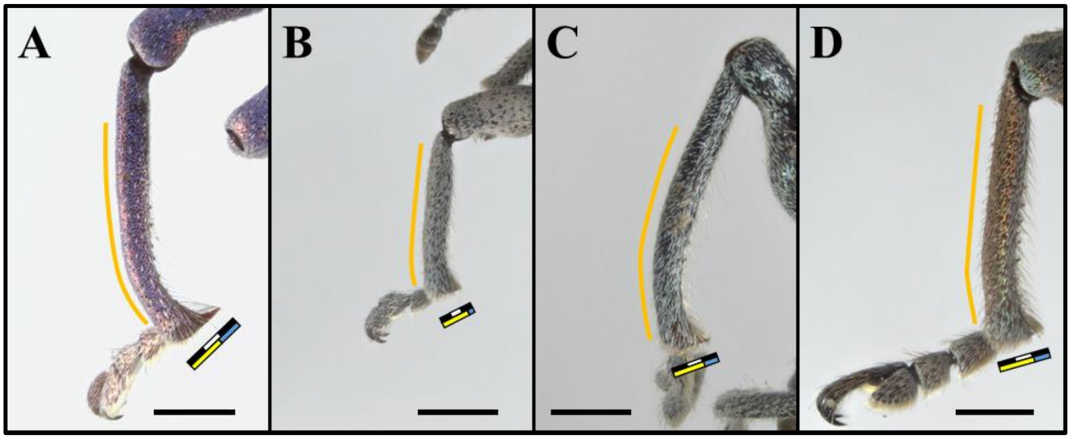

Fig. 3.83. Dorsal aspect of protibiae in A) *Pachnaeus marmoratus* Marshall, 1916 (ARTSYS0001364), B) *Pachnaeus howdenae*, sp. nov. (ARTSYS0007660), C) *Pachnaeus quadrilineatus*, sp. nov. (ARTSYS0001559), D) *Pachnaeus psittacus* (Olivier, 1807) ([MCZ-ENT 00]529492). Orange lines show approximate curvature of protibia, blue bars show length of mucro, yellow bars show width of apex of protibia adjacent to mucro, and black and white boxes are of equal length for comparing relative lengths of blue and yellow bars. Scale bars = 1mm.

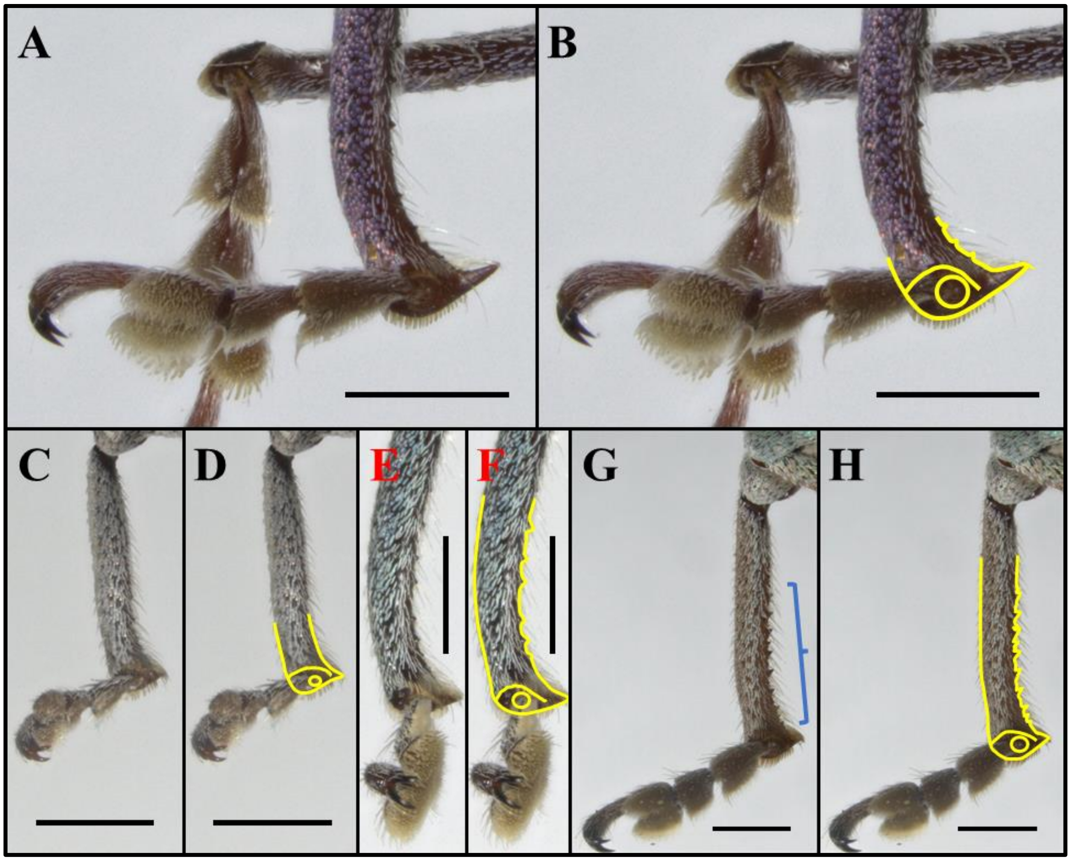

Fig. 3.84. Ventral aspect of protibial apex in A, B) *Pachnaeus marmoratus* Marshall, 1916 (ARTSYS0001364), C, D) *Pachnaeus howdenae*, sp. nov. (ARTSYS0007660), E, F) *Pachnaeus quadrilineatus*, sp. nov. (ARTSYS0001559), G, H) *Pachnaeus psittacus* (Olivier, 1807) ([MCZ-ENT 00]529492), blue bracket indicates region of many, large, densely and irregularly placed denticles typical of this species. Yellow is used to indicate the shape of apex of the protibia, length of the mucro, and position of the tarsal insertion. Scale bars = 1mm.

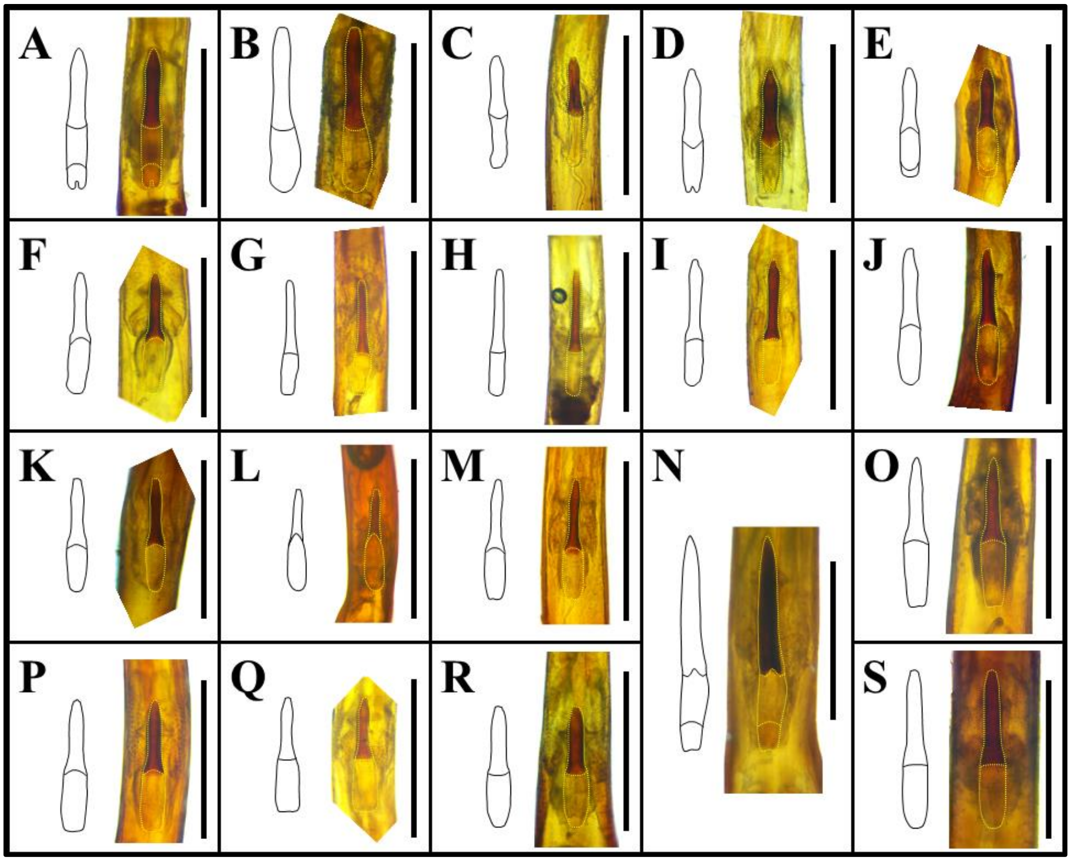

Fig. 3.85. Endophalluses in ventral view, A) *Pachnaeus marmoratus* Marshall, 1916 (ARTSYS0001366), B) *Pachnaeus quadrilineatus* Reily, n. sp. (ARTSYS0001560), C) *Pachnaeus citri* Marshall, 1916 (ARTSYS0001359), D) *Pachnaeus eisenbergi* Reily, n. sp. (ARTSYS0007599), E) *Pachnaeus godivae* Reily, n. sp. (ARTSYS0001386), F) *Pachnaeus andersoni* Reily, n. sp. (ARTSYS0007583), G) *Pachnaeus opalus* (Olivier, 1807) (ASUHIC0088752), H) *Pachnaeus azurescens* Gyllenhal in Schoenherr, 1834 (ARTSYS0007730), I) *Pachnaeus obrienorum* Reily, n. sp. (ARTSYS0007620), J) *Pachnaeus howdenae* Reily, n. sp. (ARTSYS0007689), K) *Pachnaeus ivieorum* Reily, n. sp. (ARTSYS0007690), L) *Pachnaeus rosadonetoi* Lopez Castilla, 1992 (ARTSYS0007556), M) *Pachnaeus pater* de Zayas, 1988 (ASUHIC0088783), N) *Pachnaeus psittacus* (Olivier, 1807) (ARTSYS0001338), O) *Pachnaeus costatus* Perroud, 1853 (ARTSYS0001322), P) *Pachnaeus maestrensis* Reily, n. sp. ([MCZ-ENT 00]529449), Q) *Pachnaeus litus* (Germar, 1824) ([MCZ-ENT 00]529404), R) *Pachnaeus morelli* Reily, n. sp. (ARTSYS0001541), S) *Pachnaeus sommeri* (Munck af Rosenschoeld in Schoenherr, 1840) (ARTSYS0001562). Scale bars = 1 mm.

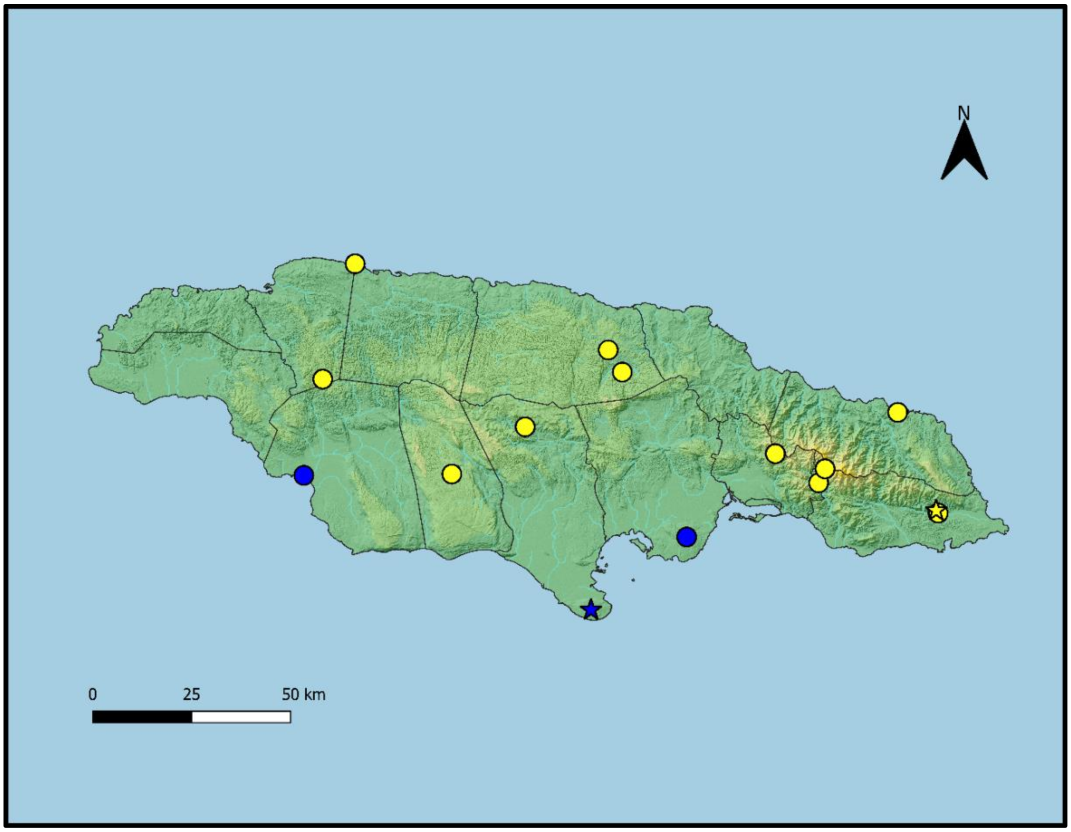

Fig. 3.86. Map of Jamaica showing type localities (stars) and other known collecting localities (circles) of *Pachnaeus marmoratus* Marshall, 1916 (yellow) and *P. quadrilineatus* sp. nov. (blue).

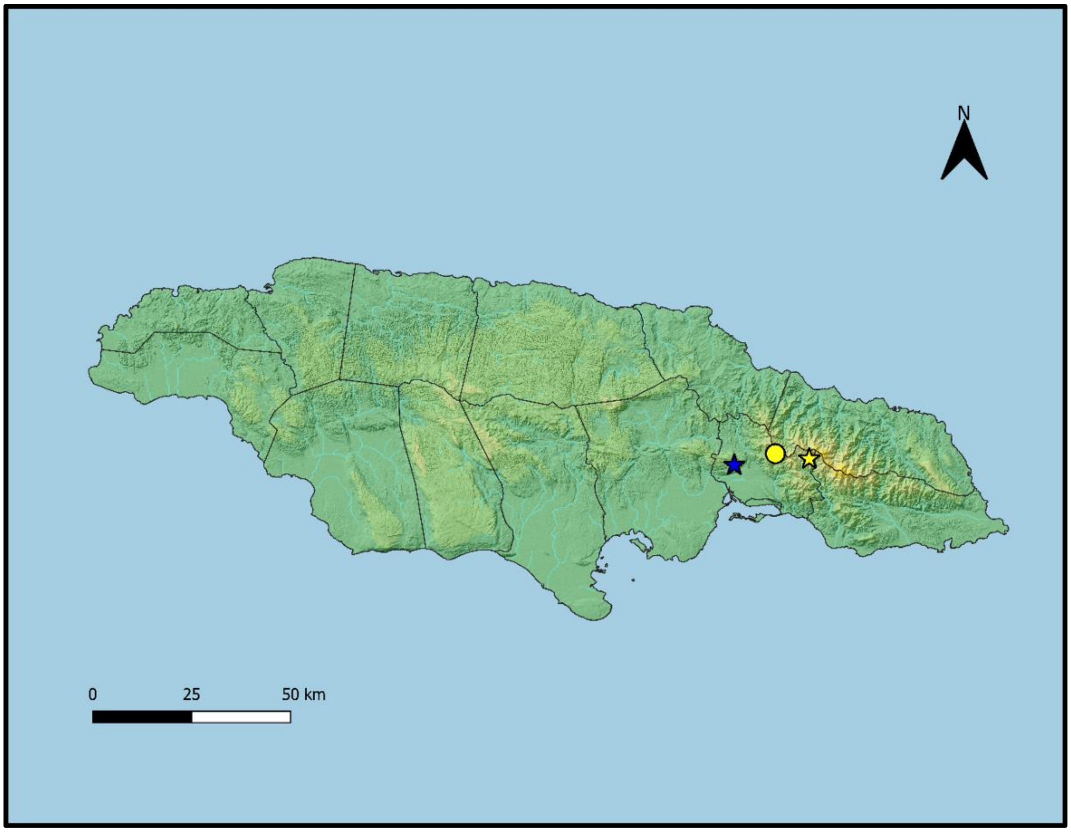

Fig. 3.87. Map of Jamaica showing known type localities (stars) and other collecting localities (circles) of *Pachnaeus gowdeyi* (Marshall, 1926) (yellow) and *P. gordoni* sp. nov. (blue).

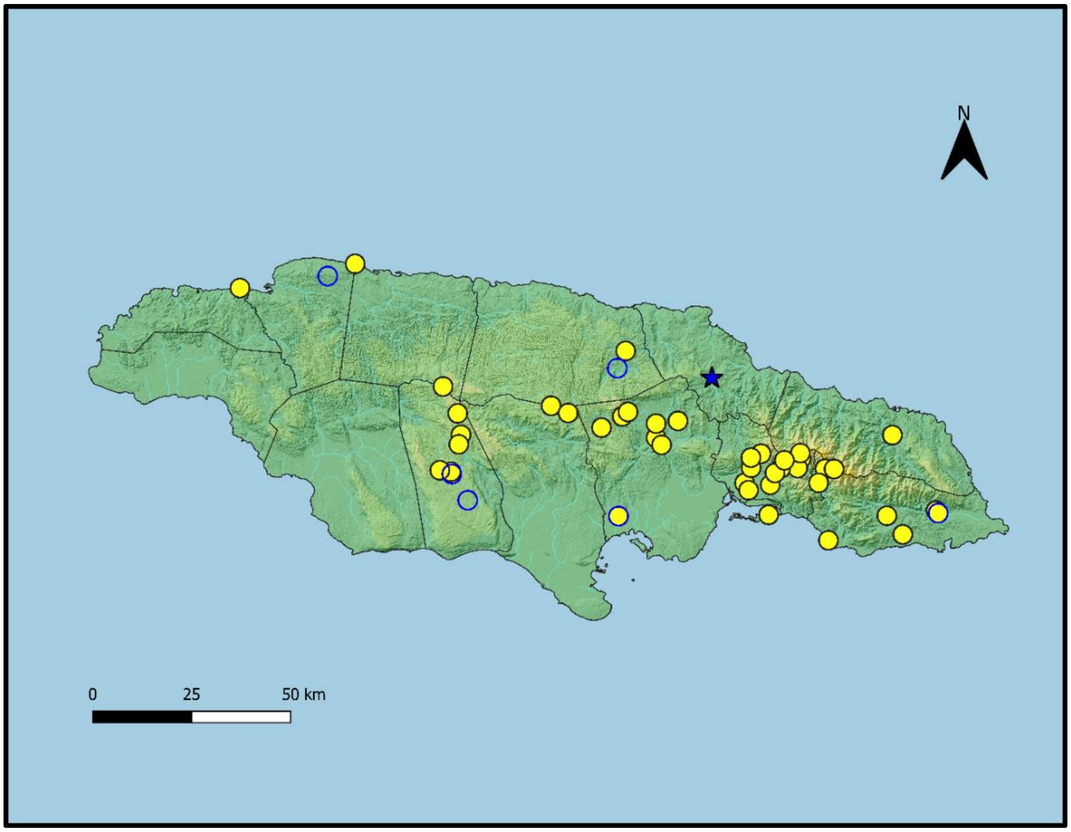

Fig. 3.88. Map of Jamaica showing type localities (stars) and other known collecting localities (circles) of *Pachnaeus citri* Marshall, 1916 (yellow) and *P. eisenbergi* sp. nov. (blue).

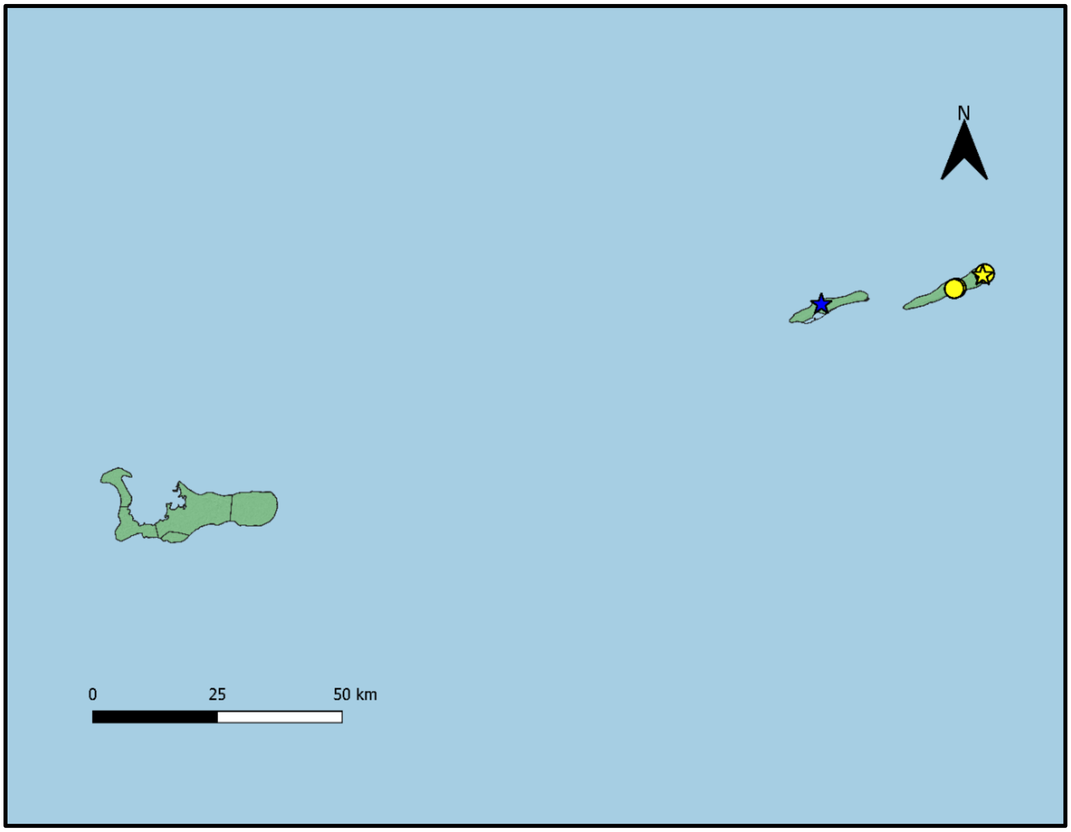

Fig. 3.89. Map of Cayman Islands showing type localities (stars) and other known collecting localities (circles) of *Pachnaeus godivae* Marshall, 1916 (yellow) and *P. andersoni* sp. nov. (blue).

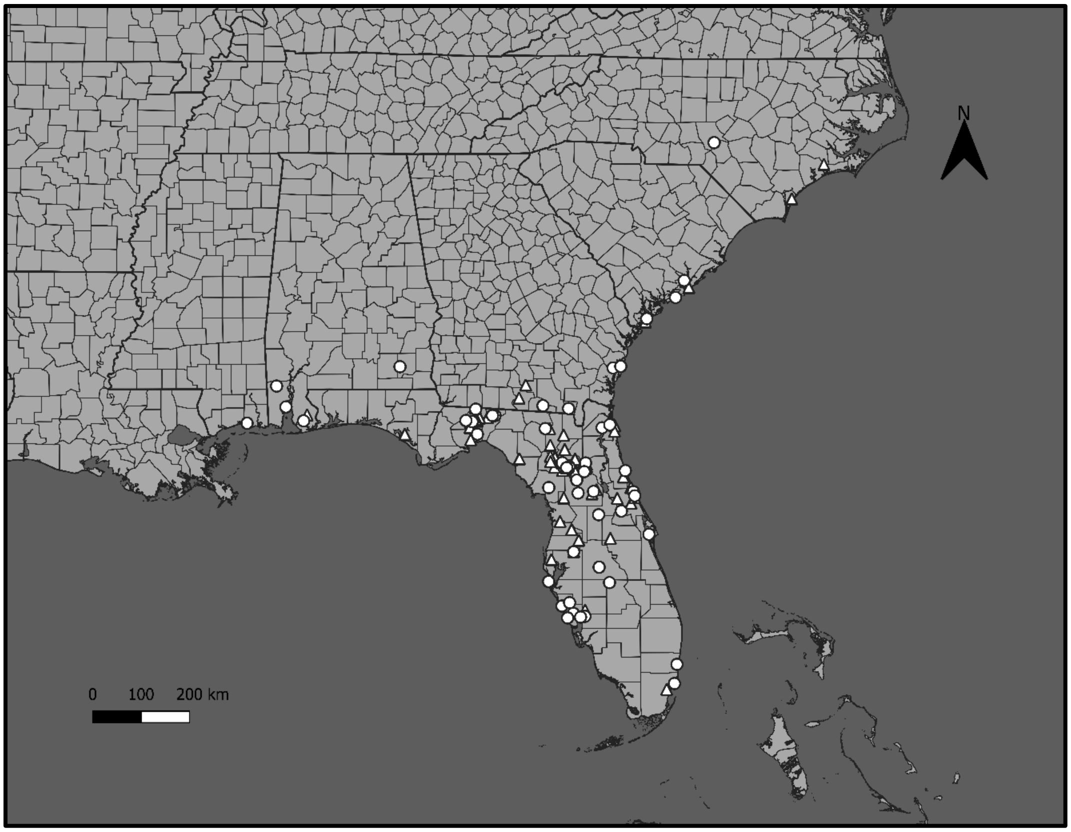

Fig. 3.90. Map of United States and Bahamas showing known collecting localities (circles) and observational records (triangles) of *Pachnaeus opalus* (Olivier, 1807).

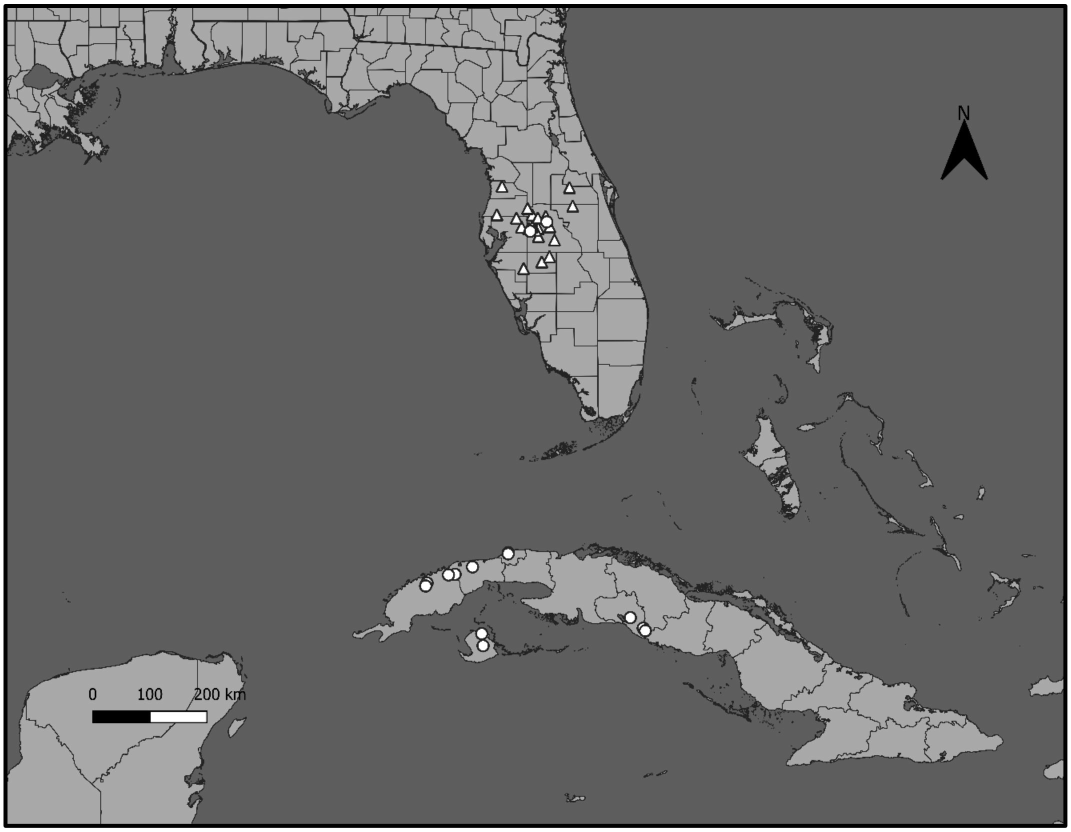

Fig. 3.91. Map showing known collecting localities (circles) and observational records (triangles) of *Pachnaeus azurescens* Gyllenhal in Schoenherr, 1834.

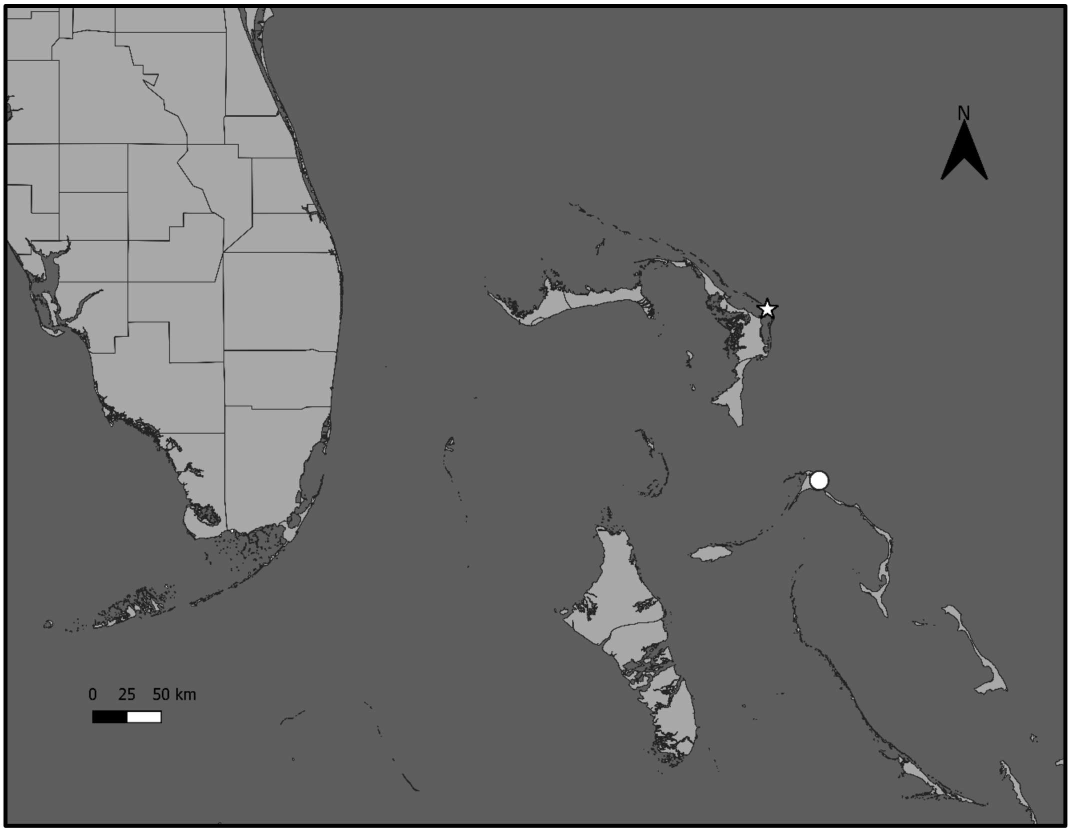

Fig. 3.92. Map of United States and Bahamas showing type locality (star) and other known collecting localities (circle) of *Pachnaeus howdenae* sp. nov.

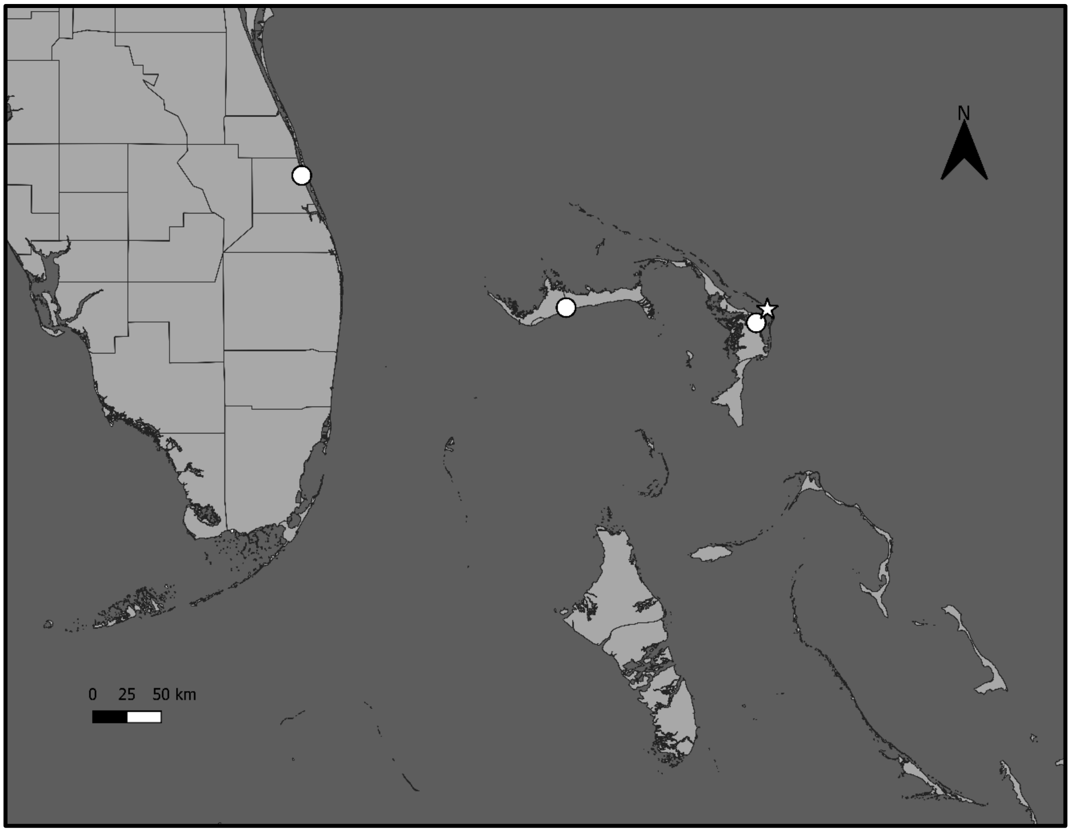

Fig. 3.93. Map of the United States and the Bahamas showing type locality (star) and other known collecting localities (circles) of *Pachnaeus ivieorum* sp. nov.

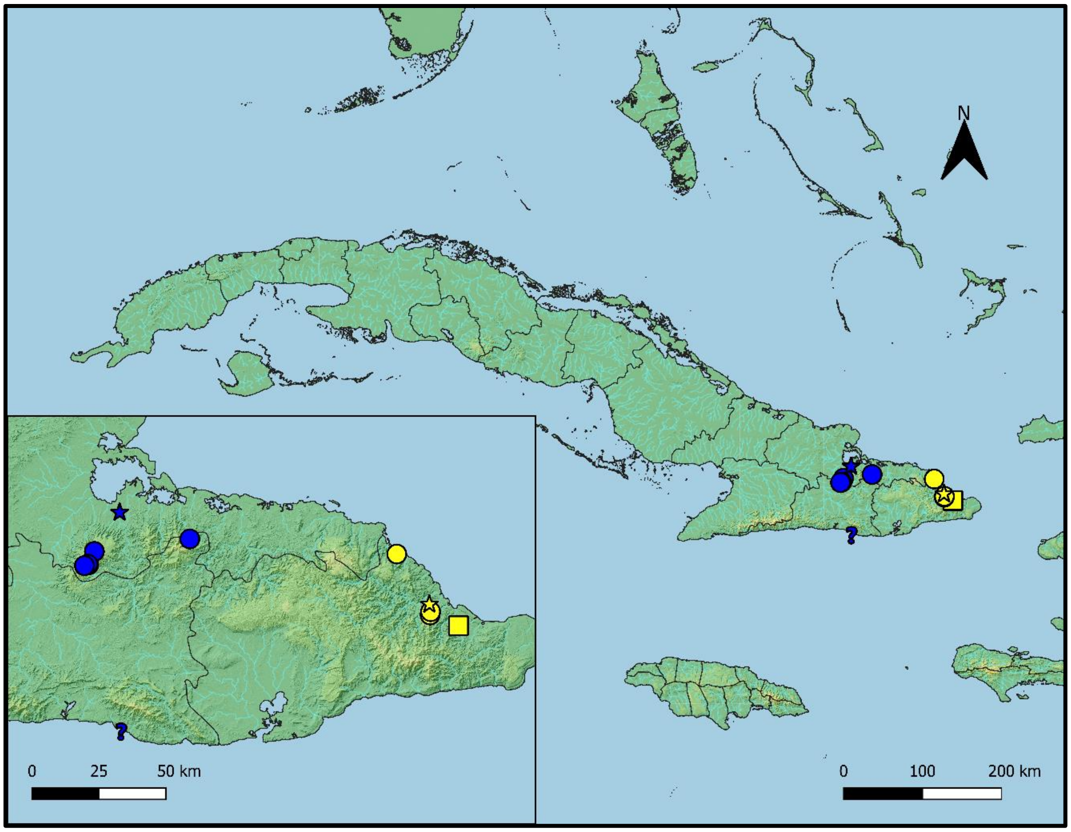

Fig. 3.94. Map of Cuba and surrounding landmasses showing type localities (stars), and other known collecting localities (circles) of *Pachnaeus rosadonetoi* Lopez Castilla, 1992 (yellow) and *P. pater* de Zayas, 1988 (blue). Question mark indicates the reported locality of questionable paratypes of *P. pater* reported by de Zayas in the original description. Square indicates the reported locality of paratypes of *P. rosadonetoi* reported by Lopez Castilla in the original description. Inset shows a closeup of these records within Cuba in relation to surrounding mountain ranges.

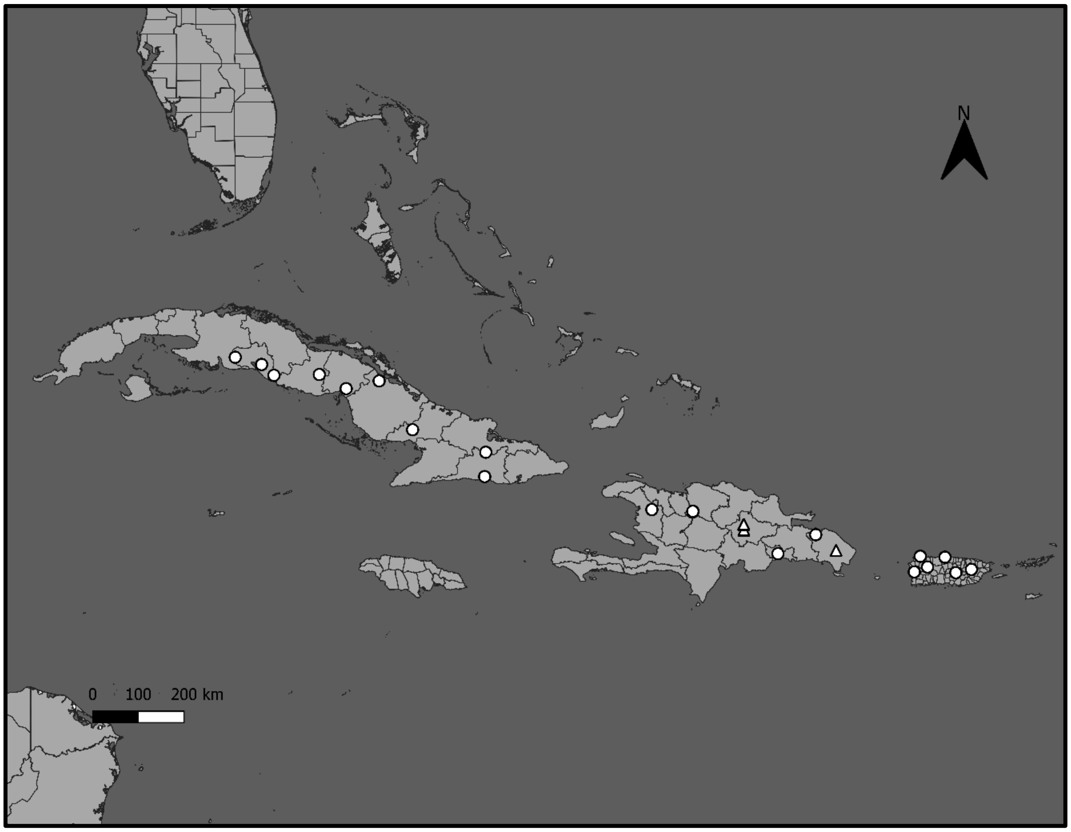

Fig. 3.95. Map of Greater Antilles showing known collecting localities (circles) and observational records (triangles) of *Pachnaeus psittacus* (Olivier, 1807).

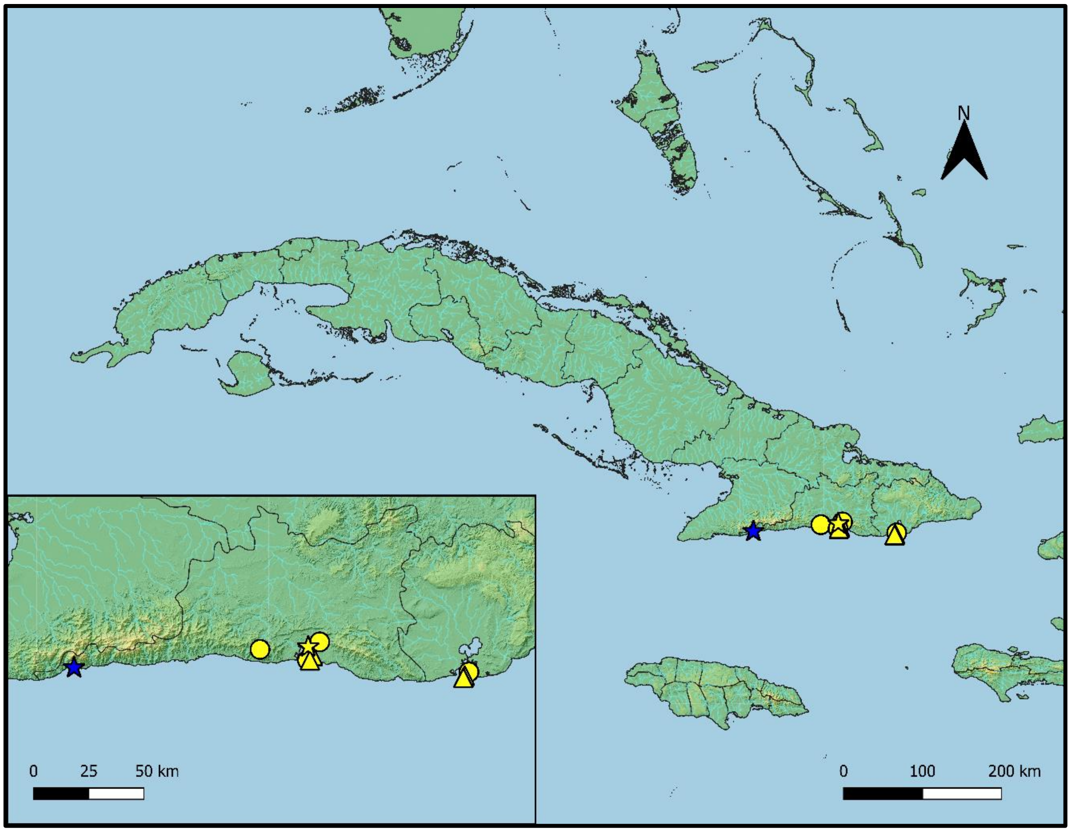

Fig. 3.96. Map of Cuba and surrounding landmasses showing type localities (stars), other known collecting localities (circles), and observational records (triangles) of *Pachnaeus costatus* Perroud, 1853 (yellow) and *P. maestrensis* sp. nov. (blue). Inset shows a closeup of these records within Cuba in relation to surrounding mountain ranges.

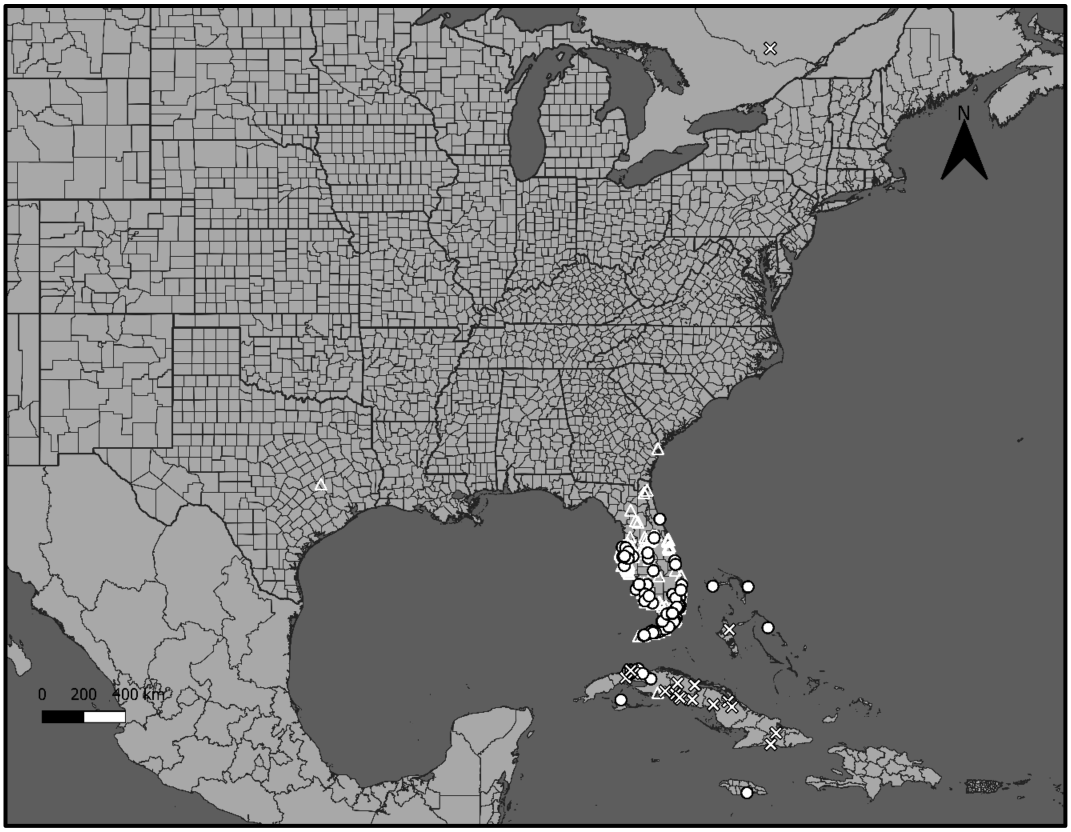

Fig. 3.97. Map showing known collecting localities (circles) and observational records (triangles) of the typical form of *Pachnaeus litus* (Germar, 1824) which bears a white stripe dorsally on the pronotum and collecting localities of atypical specimens (crosses).

Fig. 3.98. Map of Hispaniola showing the type locality of *Pachnaeus morelli* sp. nov.

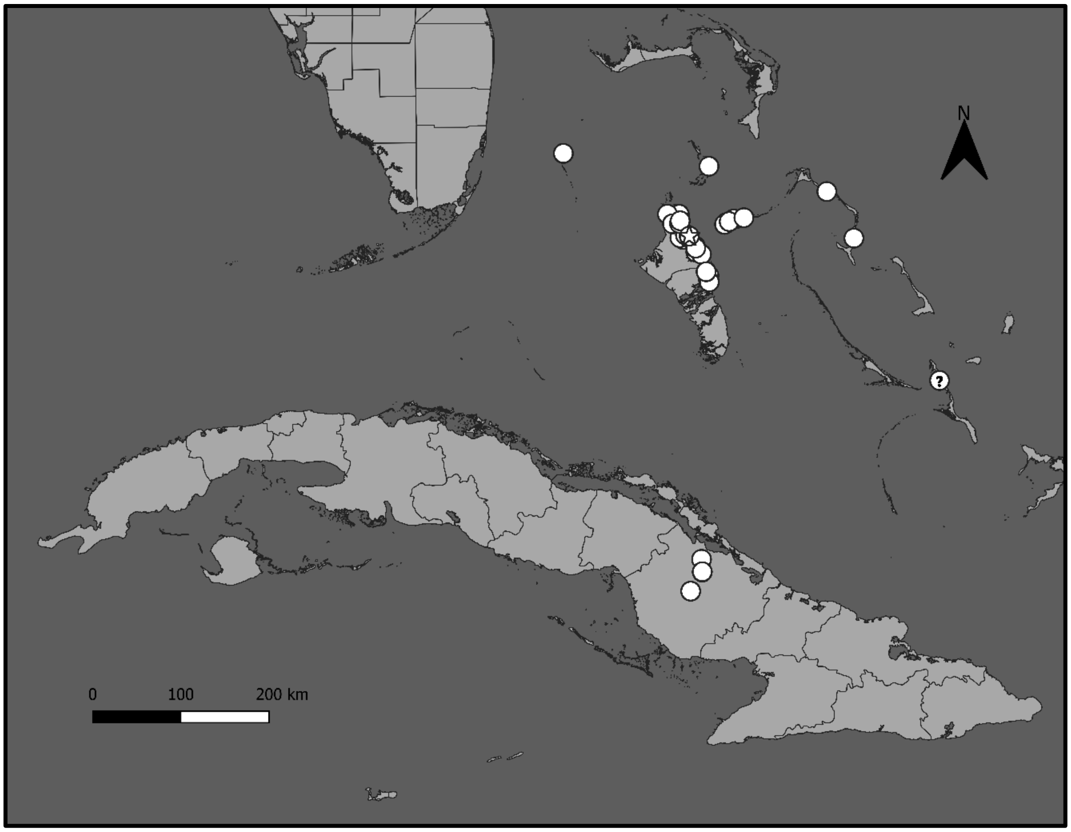

Fig. 3.99. Map of Cuba showing type locality (star) and other known collecting localities (circles) of *Pachnaeus obrienorum* sp. nov. Question mark indicates collecting locality of the striped form from Long Island.

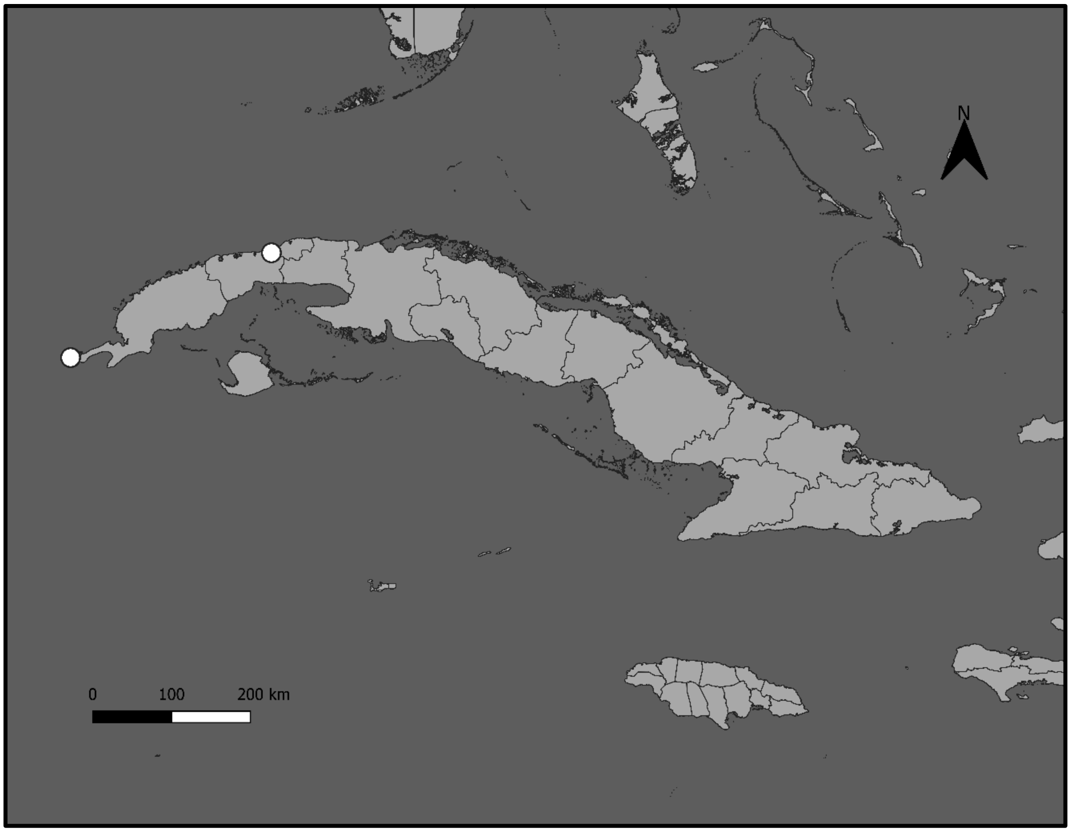

Fig. 3.100. Map of Cuba and surrounding landmasses showing known collecting localities (circles) of *Pachnaeus sommeri* (Munck af Rosenschoeld in Schoenherr, 1840).

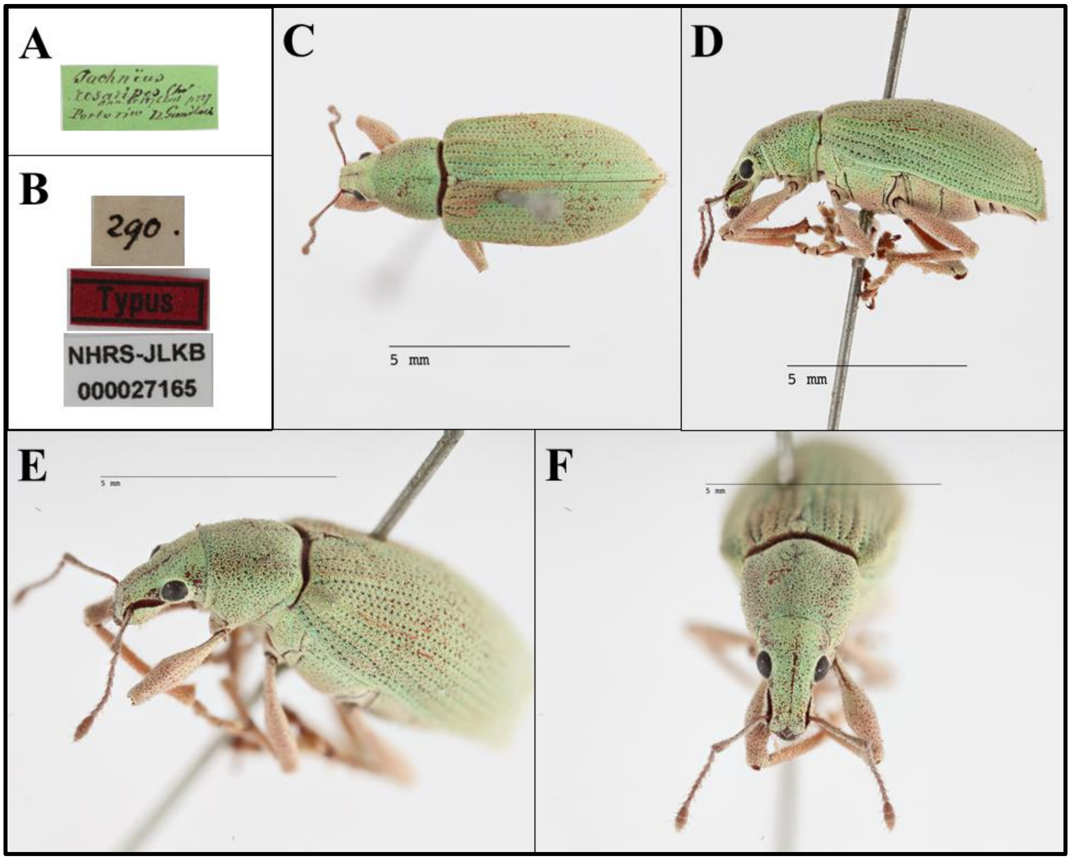

Fig. 4.1. Female lectotype of *Pachnaeus roseipes* Chevrolat, 1876; A) drawer label, B) specimen labels, C) dorsal, D) lateral, E) oblique frontolateral, and F) frontal. Modified from images taken by NHRS.

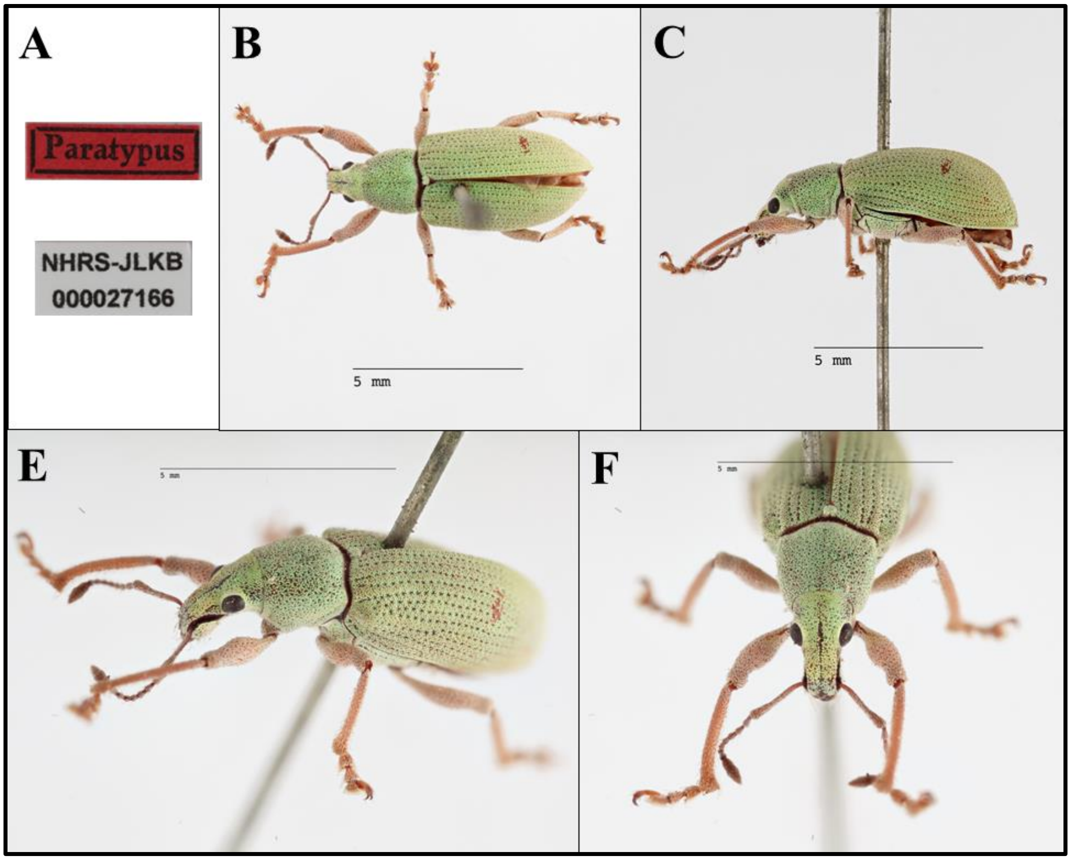

Fig. 4.2. Male paralectotype of *Pachnaeus roseipes* Chevrolat, 1876; A) specimen labels, B) dorsal, C) lateral, D) oblique frontolateral, and R) frontal. Modified from images taken by NHRS.

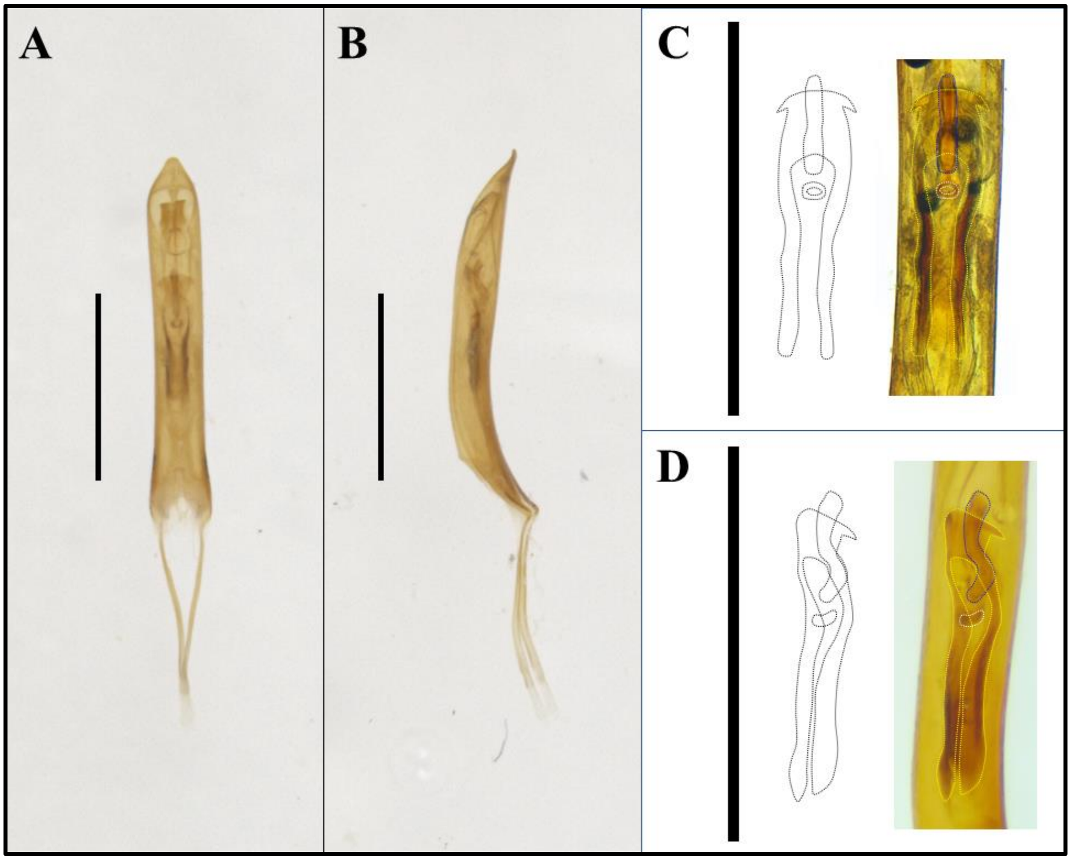

Fig. 4.3. Aedeagus of *Gonzo roseipes* (Chevrolat, 1876) (ASUCOB028881); A) dorsal, B) lateral, C) dorsal closeup of endophallic sclerites, and D) lateral closeup of endophallic sclerites. Scale bars = 1 mm.

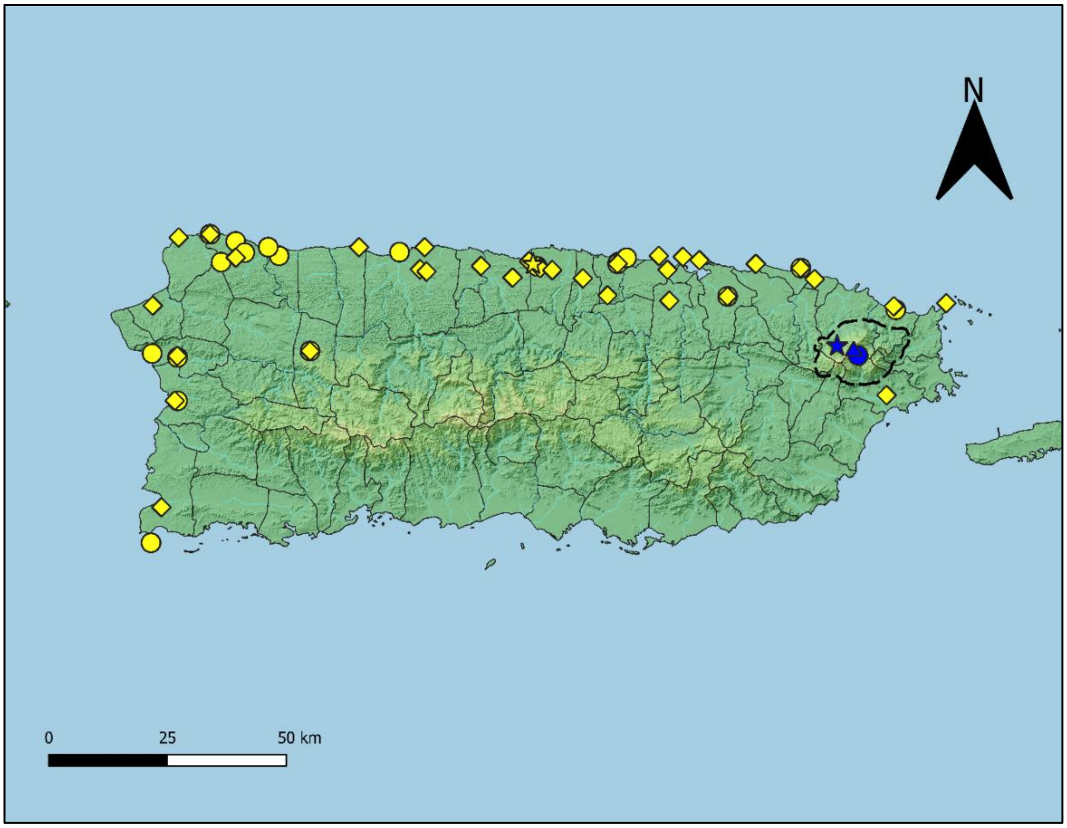

Fig. 4.4. Map of Puerto Rico showing localities for specimen records (circles), iNaturalist records (triangles), literature records (diamonds; from Martorell 1945, Virkki and O'Brien 1997, Wolcott 1924, Wolcott 1936), and specimens sequenced or imaged by Zhang et al. (2017) (stars) of *Gonzo roseipes* (Chevrolat, 1876) (yellow) and *Compsoricus* sp. nov. (blue).

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APPENDIX A

STATEMENT OF PERMISSION FOR USE OF CASE 3792–*PACHNAEUS* SCHOENHERR, 1826 (INSECTA: COLEOPTERA: CURCULIONIDAE): PROPOSED PRECEDENCE OVER OF *DOCORHINUS* SCHOENHERR, 1823

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