



# BACKYARD BIODIVERSITY

A guide to creating wildlife-friendly and  
sustainable gardens

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*This guide will help create gardens and living areas that require fewer resources to maintain. Your gardens can be enjoyed all year round while providing local habitat for biodiversity and helping you reduce food cost by having access to fresh produce right outside your door.*

*The following sections provide a guide to vegetables, flowers, fruits and herbs you can include in your garden to attract specific types of animals to help you become a wild life gardener and increase biodiversity in your backyard.*



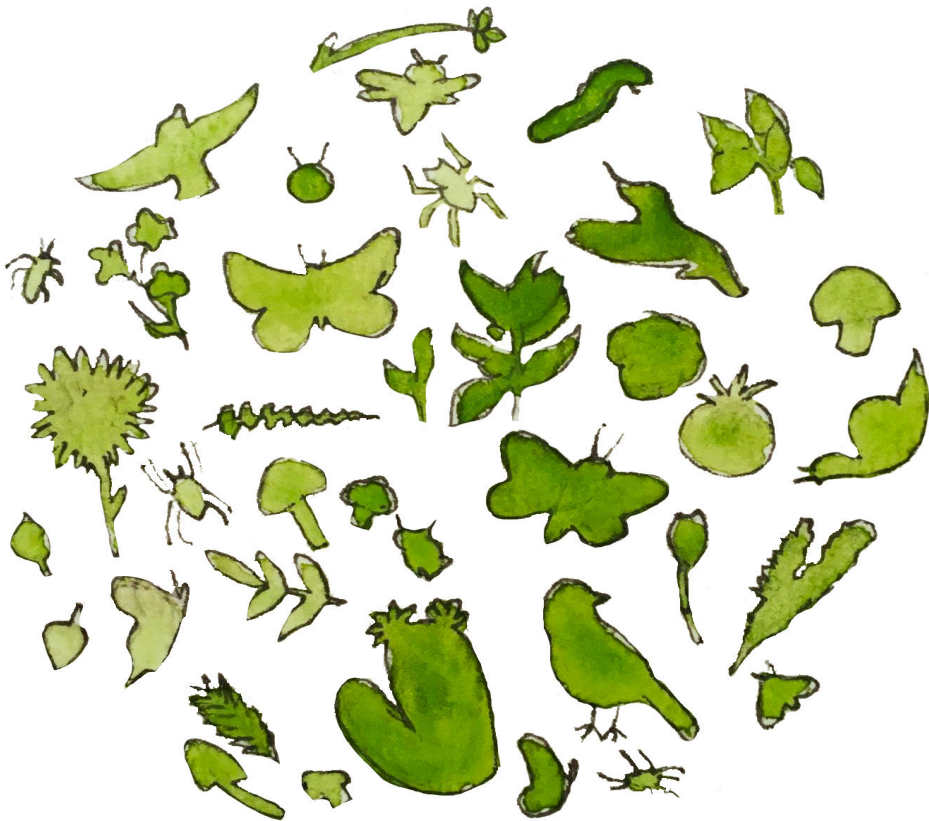
# *Creating a Wildlife-Friendly Garden Supports Biodiversity*

Growing vegetation in your backyard increases the beauty of your property. It also creates spaces for animals like birds, bees, butterflies and insects to live in, helping bring back biodiversity to your neighborhood.

## **What is Biodiversity?**

Biodiversity is all the living things around us: the different species of plants, animals and microorganisms on Earth.

*Gardening can help you connect to nature and increases your happiness and well-being.*



## Why should we care about Biodiversity?

Biodiversity is the foundation for life on Earth and for the essential services provided by ecosystems. These services help maintain a healthy planet for us to live on.

### Ecosystem services

- » Production of oxygen for us to breathe
- » Providing us with clean water
- » Pollination of crops and flowers

## What is pollination?

It is the process in which insects, birds, bees, butterflies, and the wind take the pollen from flowers to help them reproduce and have more plants.

*"What are you taking my pollen for?"*

*"I use it to make new plants!"*

*Every species plays a specific role in a balanced natural ecosystem so protecting every species is important.*



## Threats to Biodiversity


- » Building more houses, buildings, and cities
- » Loss of the habitat where animals live
- » Pollution
- » Bringing species that do not belong to the area
- » Over using resources such as forests, rivers, oceans
- » Destructive practices, such as over fishing
- » Lack of education/ awareness




## Why create a wildlife friendly garden?

### There are many benefits to attracting biodiversity to your backyard

- » It adds beauty to your property
- » Species pollinate plants, giving you more plants in your yard
- » Species control garden pests
- » Species maintain good soil condition
- » Seeing and hearing birds, bees, and butterflies help reduce stress and improve our health.



*Selecting a range of plants that provide flowers or fruit throughout the year, will increase the number of species that visit your garden providing food, medicine and other resources.*





# Attracting Biodiversity

## Why are pollinators important?

Pollinators such as bees, hummingbirds, and butterflies are vital to maintaining the health of an ecosystem and are essential for plant reproduction.

One third of the food we eat, including fruits, vegetables, nuts, grains, and beans need to be pollinated before we can eat it. Without pollinators we wouldn't have food to eat.



Bees

*85% plants exists because of bees*



Butterfly

*1/3 of all food we eat depends on pollinators*

*More than 100 types of crops are pollinated by bees in U.S.-including the clover and alfalfa that feed our cows*



Hummingbird

# Meet Your Pollinators!

## Bees



### You can attract bees by planting:

- » Wildflowers
- » lavender
- » Mint
- » Sage
- » Rosemary
- » Thyme
- » Bee Balm
- » Catnip
- » Fennel
- » Sunflowers

**M**ost effective pollinator. It keeps your garden, vegetables, and fruits growing strong. The more diverse your garden is, the better it will support different bee species, as well as other beneficial insects and animals that are attracted to the beauty and plant variety of your backyard.

### When gardening to attract bees, keep in mind these tips!

- » Plant flowers with a single row of petals, such as Marigold, Sunflowers, Zinnias, and Roses.
- » Plant yellow, white, blue and purple flowers as these colors attract bees.
- » Plant fruits and vegetables that produce fragrant flowers and fruit that are attractive to bees. Some can be berries, melons, squash, cucumbers, and fruit trees, especially cherry trees.

## Butterfly



**B**utterflies add beauty to your garden and also help in pollinating your flowers. If you want to attract butterflies to your yard, make sure you have vegetation that serves the needs of all the life stages of a butterfly, from caterpillars to adults. A good go to plant for this can be milkweed or parsley. These types of plants are called “host plants” and they act as a food source for the caterpillar stages.

### Tips for attracting butterflies

- » Plant host plants to provide butterflies with the nectar and vegetation they need as adults and caterpillars. Butterflies are attracted to flowers that are red, pink, purple, or yellow and that have sweet scents.
- » Plant flowers in the sun: plants should receive full sun from mid-morning to midafternoon.
- » Say no to insecticides: use companion planting to manage pests
- » Provide a place for butterflies to rest: place flat stones in your garden to provide space for butterflies to rest and lie in the sun.
- » Give them a place for puddling: place grainy sand in a shallow pan and then insert the pan in the soil. Keep the sand moist.

### You can attract butterflies to your garden by planting:

- » Lavender
- » Parsley
- » Mint
- » Thyme
- » Dill
- » Bougainvillea
- » Cilantro
- » Zinnias
- » Fennel
- » Common rue



# Birds

## Benefits of attracting birds to your garden:

- » They act as pest Control. Say goodbye to insecticides! Birds act as a natural pesticide by eating pests, including aphids, mosquitoes, spiders and other bugs that can attack your garden.
- » They help pollinate flowers. Hummingbirds that sip nectar are efficient pollinators of garden flowers.
- » They act as weed Control. Some birds such as, finches, towhees and sparrows eat the weed seeds, helping control unwanted plants.
- » They help in wildlife conservation. Cities keep expanding and reducing the habitats available for animals. If you attract birds to your backyard, you are providing them a home and helping in the conservation of these species.
- » They benefit your well-being. Watching birds, interacting with them, listening to their natural sounds, and being outdoors helps reduce stress and promotes happiness and well-being.

## Tips for attracting birds

Incorporate sunflowers, zinnias, marigolds, asters or purple coneflowers to attract american goldfinches, cardinals, finches, chickadees and titmice

- » To attract pollinators such as hummingbirds, plant flowers with sweet nectar and that are pink, red, orange, or purple. Some of these can be: honeysuckle, nasturtium, hibiscus, or cardinal flowers.
- » In the fall, avoid cutting down all the dead stalks in your garden beds. Birds will seek out the remaining seeds all through the winter.
- » Plant fruit-bearing plants, such as, hackberries blueberries, mulberries, or blackberries in the yard or in garden beds to attract mockingbirds, bobwhites, gray catbirds, indigo buntings, woodpeckers, and scarlet tanagers.
- » Having vines provide the perfect cover for birds. In addition, having a pile of fallen branches, dried grass and prunings from your shrubs can offer cover from cats and other predators to smaller birds and attracts ground insects that birds will eat as they scratch away the leaves underneath.
- » Install birdfeeders or create space for nesting by hanging a nest box.







Black-Tailed Gnatcatcher in a Hackberry

Chickadee in a Marigold flower



A Red Cardinal in a nest box

Hummingbirds using a bird feeder



# *You Can Become a Wildlife Gardener Too*

It is more important than ever that we do our part to protect and create habitats for insects, lizards, birds, butterflies and bees. With the right plant choices and some planning, you can start your wildlife friendly garden and support biodiversity.

## **Benefits of growing your own garden**

- » You will save money, time and fuel not driving to the grocery store.
- » It's cheaper than buying food.
- » Organically grown vegetable plants are much healthier and generally taste better.
- » You will become more self-sufficient and less dependent on your local grocery store.
- » Physical activity is good for you.

## **Adopt sustainable gardening practices**

- » Design to suit local conditions. Keep in mind the Arizona weather!
- » Set aside part of your backyard for an edible garden and enjoy fresh vegetables, fruits, and herbs.
- » Use water-wise plants where possible, mulching garden beds, and using tank water for watering plants when necessary.
- » Avoid pesticides or chemicals.
- » Recycle food and garden waste by using a compost bin.
- » Use sustainable, locally sourced, or recycled materials when designing your garden. Avoid rocks, timber and pebbles collected from the wild.
- » Use companion planting for pest control
- » Attract beneficial insects.



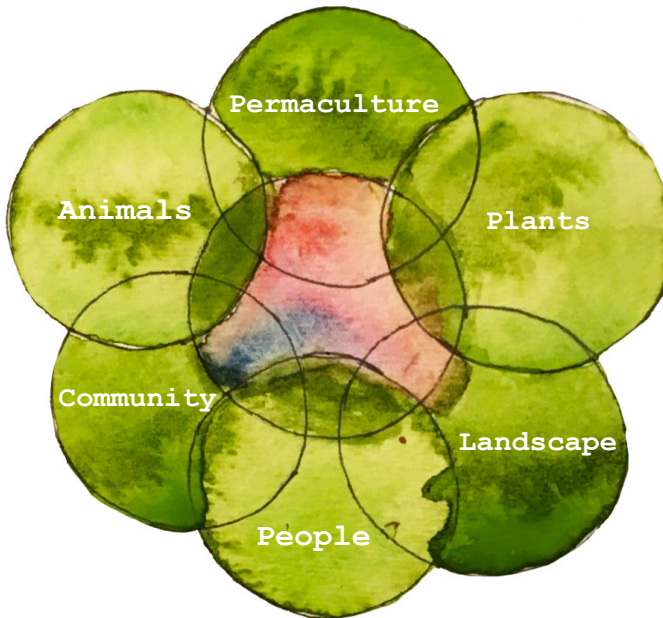
# Designing Your Yard Through Permaculture

## What is permaculture?

It is the integration of animals, plants, landscape, people, and community. It combines gardening with biodiversity in mind, edible landscaping, and plant cultivation into one low-maintenance, self-contained and productive garden ecosystem.

In our own gardens, you should select vegetation that provides or supports some direct yield for people (fresh food, saving money and time) while providing a habitat for local biodiversity.

A permaculture garden provides food and medicinal crops, habitats for animals, , an attractive appearance, and a relaxing atmosphere throughout the year that allows for exercising and meditation which increases our happiness and well-being.



## Why Choose Permaculture?

### Benefits of Permaculture

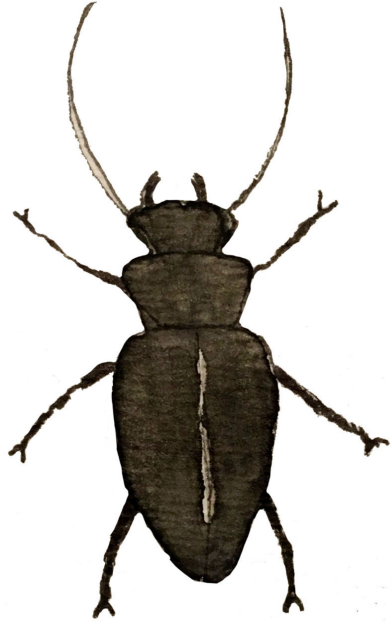
- Reduced cost
- Less waste
- No chemicals/pesticides
- Develops community values

- Increases biodiversity
- Self-reliance
- Promotes Green Living
- Promotes happiness and well-being

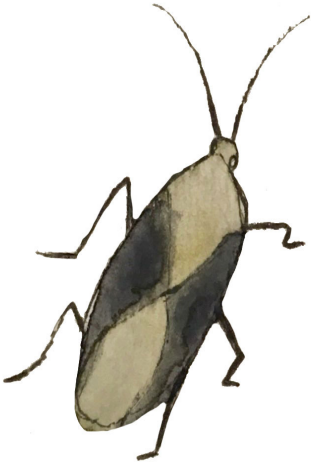
# Targeting pests



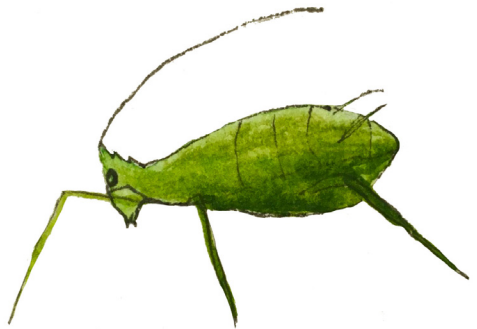
Spider Mites



Beetles



Squash Bugs



Aphids

## Follow these tips for pest control in your garden:

- » Watch for ants on your plants: they can be the first indication that a plant is under attack by aphids.
- » Without bees, broccoli, squash, apples and many other food crops would fail; many other insects perform a service by destroying harmful insects. Ladybugs, for instance, can help control aphids.
- » Remove and destroy infested plants. Don't add them to your compost pile. Removing dead leaves, fallen fruit, and other debris that can provide refuge for pests will help alleviate this issue.
- » Use a homemade insecticide for plants, such as salt spray, mineral oil, or garlic spray.
- » Plant your vegetation in different parts of the garden each year to avoid the pest from coming back. Two of the biggest families to watch out for are the tomato family (tomatoes, peppers, potatoes, eggplant) and the squash family (squash, pumpkin, cucumber, watermelon).
- » Use companion planting



## Most common pests:

Worms

Japanese Beetle

Cabbage Worm

Scales

Leafhoppers

Mealy Bugs





# *What is Companion Planting?*

**P**lanting various kinds of vegetation together in close proximity so that they benefit and help each other grow, improve yield, and fight against pests. For instance, many flying pest insects are confused by the smell of onions, garlic, and French or Chinese marigolds, so planting these throughout the garden helps to control pests.



## **Benefits of Companion Planting**

- » By helping deter pests, this technique can decrease the amount of pesticides and effort it takes to keep your garden pest free.
- » Vegetable companion planting increases the yields of the plants. This means you get more food from the same space.
- » Certain companion plants can attract beneficial insects that feed on common garden pests, like aphids and caterpillars.

# Beneficial Insects That Should be Welcome In Your Garden



### Lacewing Larvae

feed on aphids. Plant dill, coriander, fennel, tansy and dandelion.



### Hover Flies

Feed on many insects, including leafhoppers and caterpillars. Plant daisy and chamomile and mints (spearmint, peppermint, or catnip)



### Parasitoid Wasps

Feed on aphids, caterpillars and grubs. Plant fennel, angelica, coriander, dill, clovers, and rue



### Ground beetles

Feed on ground-dwelling pests. Plant thyme, rosemary, mint

*Don't kill them if you see these in your garden, they help keep garden pests away!*



### Ladybugs

Feed on aphids. Plant garlic, dill, cilantro, parsley, mint, chives, and marigold.

## Mulberry



The tree is fast growing, animal friendly, shade producing, climatically tolerant, abundant and diverse from an edible perspective.

**Attracts:** Catbirds, Cardinals, Purple Grackles, Crested Flycatchers, Woodpeckers, Pigeons, Silkworks, and Insects.

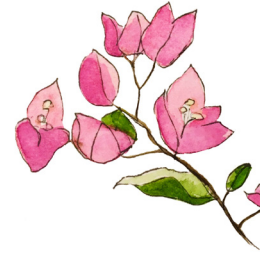
## Wild Sunflower



Wild sunflowers have medicinal benefits and can be used for cooking. It provides shade for less heat tolerant plants like lettuce and cucumber. Planting it near roses or tomatoes will get rid of aphids. Hummingbirds also protect the flower by eating soft-bodied insects like mosquitos and the white fly.

**Attracts:** insects, bees, beetles, hover fly, birds (Northern Cardinal, Lesser Goldfinch, House Finch) and hummingbirds.

## Bougainvillea



Bougainvillea can be grown as a shrub or as a vine against walls or fences for decoration. It is best grown in full sun with minimal shade. Its bright colors help attract pollinating insects and hummingbirds. It also has medicinal value by helping with inflammations, sore throat, and coughing.

**Attracts:** Butterflies, moths and hummingbirds, which often distribute pollen to nearby plants.

## Desert Hackberry



A shrubby tree with thick, leathery leaves and juicy orange berries in summer and fall that are sweet to humans and birds.

**Attracts:**  
Birds: Northern Cardinal, Abert's Towhee, Black-tailed Gnatcatcher.  
Butterflies: Leilia Hackberry Butterfly, Snout butterfly.

## Rosemary



This herb is a good companion plant to cabbage, beans, carrots, broccoli, and hot peppers. It serves as insect control because it repels harmful insects such as bean beetles, cabbage flies, cabbage moths and carrot flies. Rosemary needs exposure to full sun for the best growth. It develops more flavorful oils in strong sunlight than weak sunlight.

**Attracts:** beneficial insects, bees, hummingbirds, moths

## Basil



The strong scent of basil repels many garden pests including mites, aphids, and flies.

Use it as a companion plant for tomatoes and lettuce, as it will repel pests and improve their flavor and growth.

**Attracts:** bees, helping tomato plants to be pollinated.

## Cilantro/ Coriander



This herb can be grown so that you harvest in spring, fall, or winter.

It attracts beneficial insects, such as lacewings, ladybugs, hoverflies, and parasitic wasps that help control pests.

It is a good companion plant for tomato, spinach, basil, mint, and tansy.

**Attracts:** beetles, centipedes, spiders, bees, butterflies.

## Spinach



This herb grows better in cool weather, so for the summer plant it where it will receive a half day of shade.

To avoid pests, some good companion plants are celery, corn, eggplant, cauliflower, and strawberries.

**Attracts:** beneficial insects

## Arizona Grape



This fruit is native to Arizona and thrives in the dry heat. It can grow as a vine. To repel pests by using their scent, some good companion plants to grape are basil, chives, oregano, garlic, mint, rosemary, and onions. To attract bees and repel aphids, beetles, and worms, plant near Hyssop. To repel leafhoppers plant near Geraniums.

**Attracts:** bees, butterflies, birds.

## Oregano



This herb is easy to grow and can be used in natural remedies to prevent a cold or flu. It acts as a host plant for beneficial insects and pollinators, which aid in controlling garden pests.

It is a good companion plant to all vegetables, especially cabbage and cauliflower.

**Attracts:** butterflies (Black Swallow tail), insects (lacewings), bees.

## Lavender



Lavender's aroma attracts pollinators. Its flowers provide pollen and nectar to beneficial insects, such as ladybugs and lacewings, which help in controlling pests like aphids and mealybugs. Lavender is a companion plant to cabbage, cauliflower, and rue. It is also useful in deterring moths from around fruit trees and it will help repel fleas, ticks, and mice

**Attracts:** butterflies, insects, bees, hummingbirds.

## Milkweed



A wildflower known for attracting butterflies. It grows best in full sun and is drought resistant but needs afternoon shade. If you like hummingbirds, black and blue salvia would make a great butterfly weed companion. Birds also benefit from Milkweed by using it as nesting material.

**Attracts:** Monarch Butterfly, Swallowtail butterfly, bees (Bumble Bees and Carpenter Bee), Birds.



## Pomegrante



Grown as a tree, shrub or espaliered against a wall. It requires bees for pollination so plant near herbs or flowers that attract bees, such as dill, cilantro, parsley, mint, basil, thyme, zinnias, and sunflowers.

To repel pests such as aphids, plant near flowers like nasturtium, which attract beneficial insects, such as ladybugs and lacewings.

**Attracts:** Songbirds, Hummingbirds, cardinals, bees

## Guava



A tree that can provide shade, attractive foliage, flowers, and delicious tropical fruits. A good companion planting for this is citrus.

**Attracts:** Hummingbirds, Pigeons, & Bees

## Parsley



This herb does well in both full-sun and part-sun environments. Planting it nearby roses enhances their health and aroma. It attracts hoverflies and wasps, which eat pests, such as aphids, thrips, beetles, and tomato worm-horn. Good companion plant to tomato, chives, peas, onion and chili.

**Attracts:** Black Swallowtail caterpillar.

## Thyme



A drought-tolerant herb that is pollinator-friendly. It makes a good companion plant because its flowers attract honeybees and beneficial insects. It also helps repel garden pests such as cabbage and tomato worms.

**Attracts:** butterflies (Black Swallow tail), insects, and bees.

## Dill



This herb is a good companion plant to cabbage, carrots, tomatoes, fennel, and coriander. It is recommended to plant it along the perimeter of your garden. It attracts beneficial insects, such as honeybees, hoverflies, ladybugs, lacewings, parasitic wasps and the Swallowtail butterfly caterpillars. It also acts as a natural insect repellent against aphids, cabbage looper, spider mites, and squash bugs.

**Attracts:** butterflies, insects, bees.

## Eggplant



Plant this vegetable in raised garden beds to take advantage of the shade the foliage provides to the soil, which will help conserve water. Eggplant is a good companion plant to spinach as it provides it shade. Catnip, grown with eggplant helps keep flea beetles away. Thyme, deters garden moths. Green beans keep away the Colorado potato beetle, reducing the use of pesticides on eggplants. Plant it near peppers, potatoes and tomatoes to enhance flavor and growth.

**Attracts:** butterflies (Black Swallow tail), insects, bees.

## Lettuce



This vegetable helps improve the texture of the surrounding vegetation (e.g., radishes will stay softer longer in the summer). Planting lettuce near beets, carrots, strawberries, onions, eggplant, tomatoes, peas, sunflowers, and coriander enhances their growth. To fight off pests by attracting beneficial insects, such as lady beetles, lacewings, damsel bugs, flower fly maggots, and parasitic wasps plant lettuce near herbs. In addition, chives, garlic, and marigold are good companion plants to lettuce as they repel aphids.

**Attracts:** beneficial insects, birds

## Nasturtium



This edible flower is best grown in full sun to partial shade. Planting it near cucumber and squash improves their flavor and growth. Its strong smell can mask the scent of the vegetables around it. This makes it difficult for pests, such as squash bugs, pumpkin and cucumber beetles, aphids, and potato bugs, to attack. Nasturtium also attracts hoverflies, which will eat aphids from roses or your other vegetables.

Plant near: apples, beans, cabbage, potatoes, pumpkins, radishes, carrots, celery, zucchinis.

**Attracts:** insects, bees (bumblebee), hummingbirds.

## Marigold



Marigold's scent can deter pests, such as beet leafhoppers, Mexican bean beetle, and nematodes by concealing the smell of other vegetables nearby. It also attracts beneficial insects, such as ladybugs, hoverflies, and parasitic mini-wasps that prey on garden pests.

It can enhance the growth of basil, broccoli, cabbage, cucumber, eggplant, kale, potatoes, squash, roses, beans, lettuce, and tomatoes. Planting it near melons and asparagus, deters beetles and their roots act as a natural pesticide producing a chemical that kills pest of many vegetables.

**Attracts:** butterflies, beneficial insects

## Zinnias



The bright color of this flower attracts and benefits pollinators, such as bees and butterflies. The Monarch butterfly uses Zinnias for food and an egg-laying habitat. This flower keeps away tomato worms and cucumber beetles. Planting zinnias near cauliflower will attract ladybugs, which eat the surrounding pests. It also attracts predatory wasps and hover flies, which eat insects that destroy garden plants. They also attract hummingbirds, which eat whiteflies before those flies can damage tomatoes, cucumbers, and potatoes.

**Attracts:** bees, butterflies (Monarch), moths, hummingbirds

## Prickly Pear



This plant's juicy fruit attracts birds in the summer and its flowers attract butterflies and other pollinating insects. Its bloom time falls between May-June. It works well in garden beds.

To encourage the presence of beneficial insects, like parasitic wasps, to aid in pest control plant near dill, chervil, cilantro, and fennel. Nasturtiums also helps in controlling pests like aphids by attracting them to their own flowers.

**Attracts:** Gambel's quail, Curve-bill thrasher, The Trupial bird, Gila woodpecker, doves, mockingbirds, Black-chinned hummingbird, Verdin, Cactus Wren, butterflies, bees.

## Mint



This herb grows best in full sun to partial shade. It blooms from June-September. It attracts predatory wasps and parasitoid flies, such as hover flies. It also helps deter flea beetles, aphids and other pests from kale, radish, cabbage, cauliflower, tomatoes, roses, chili, and eggplant.

**Attracts:** The Western Tiger Swallowtail, The Anise Swallowtail, Pale Swallowtail, Painted Ladies, Red Admiral, West Coast Lady, Gray Hairstreak Butterflies, bees, hummingbirds, and beneficial insects.