



# Pollinators in the Garden

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# What are Beneficial Insects?



- Any number of species of insects that perform valued services like **pollination** and **pest control**.
- Encouraging beneficial insects, by providing suitable living conditions, is a pest control strategy, often used in organic farming, organic gardening or Integrated Pest Management.



# Types of Pollination



- Anthecology is the scientific study of **pollination**
- Insect pollinators include honeybees, solitary bees, bumblebees, mason bees, pollen wasps, ants, bee flies, hoverflies, flies, butterflies, moths, and flower beetles
- Other specialized pollinators include hummingbirds & sunbirds, bats, possums, rodents, and lizards
- Wind also acts as a pollinator



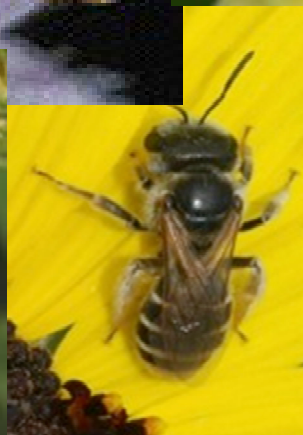
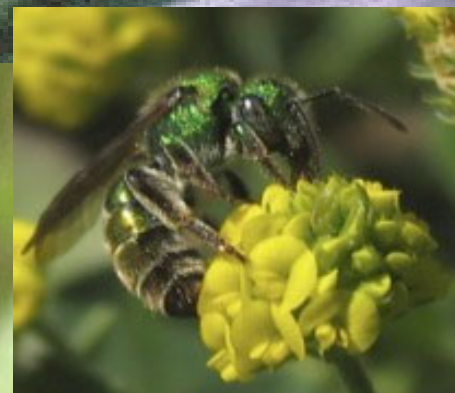


# Benefits of Pollinators

- We depend on pollinators for the gardens we enjoy, many of the plant materials we utilize, and of course the food we eat.
- According to the Earth Day Network, 90 percent of flowering plant species are dependent on insect pollination, and a full 35 percent of global food production is comprised of crops pollinated specifically by bees.
- Beneficial insects are also effective in controlling crop pests such as aphids, mealy bugs, mites, slugs, thrips, and whiteflies that otherwise plague cotton, fruit, and vegetable crops



# Honeybees, Solitary Bees, and Bumblebees







# Honeybee



Honeybees can provide some pollination to many plants, especially non-native crops, but most native plants have some native pollinator that is far more effective at pollinating that species. When honeybees are present as an invasive species in an area, they compete for flowers with native pollinators, which can actually push out the native species.

Fact - Honey bees require water to maintain osmotic homeostasis, prepare liquid brood food, and to cool the hive through evaporation. A colony's water needs can generally be met by nectar foraging as it has high water content. Occasionally on hot days or when nectar is limited, foragers will collect water from streams or ponds to meet the needs of the hive.





# Native Bees

- Native bees include bumble bees, Mason bees and carpenter bees. The nation's buzz about bee decline often forgets these key pollinators.
- A native bee wraps its hind legs around a flower and vibrates its wings to unlock the flower's hidden treasure – pollen. Its fuzzy body coated in yellow, the bee flies off to discover its next pot of gold.
- This technique of shaking the flower's pollen sacs, is called buzz pollination. It's exclusive to wild, native bees and cannot be done by domesticated honeybees.
- These bees are important pollinators of crops such as alfalfa, apples, apricots, carrots, chile peppers, cilantro, citrus, clovers, cotton, cucumbers, lettuce, onions, safflower, sesame, sunflowers, tomatoes, vetch and watermelons







## Mason Bee House



# FIVE STEPS TO CREATING A BEE HAVEN



- **Add Native Plants** – species that belong to the habitat where you live tend to be easy-care for you, and have an already-existing beneficial relationship with your climate
- **DISPOSE OF PESTICIDE, HERBICIDE, OR CHEMICAL FERTILIZER-** switch to enriching your garden beds with compost in the fall rather than applying a powdered fertilizer.
- **ALLOW ONE PEST TO LIVE** - Some are more damaging than others, but the presence of a pest might attract beneficial insects that will gobble the pest up without your having to be directly involve
- **GROW SOME KIND OF FOOD** - Tomatoes or herbs in containers are an easy place to start, but a fruit tree or berry bush can be low maintenance
- **SET UP A MASON BEE HOUSE IN YOUR YARD**





# Other Insect Pollinators



Pollen wasp



Ants



Hover fly



Bee fly



Bumble Flower Beetle

# Butterflies



**Swallowtail**

**Monarch**







Arizona  
Powdered  
Skipper



Painted Lady





**Hummingbird**

**Sunbird**





# Close-up of a Humming-Bird as a Pollinator



# Rodents as Pollinators



- Small mammals such as rodents, shrews, squirrels and even opossums play an important role in pollination of plants



# Bats as Pollinators



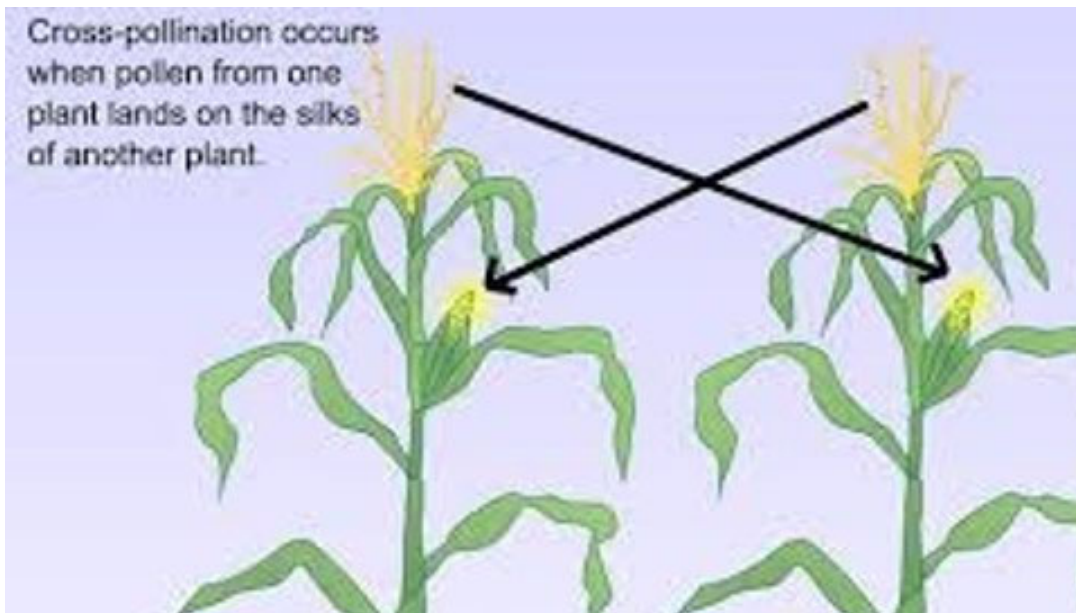
- Bats are critical pollinators for plants of the American Southwest, including agave plants, Saguaro and organ pipe cactus. Pollinating is only part of their job, as one bat can eat more than 600 mosquitoes in a single hour and harmful beetles
- Bats are highly effective animals that can fly like the wind and can carry a significant amount of pollen on their face and fur.



# Wind Pollination



- Many of the world's most important crop plants are wind-pollinated. These include wheat, rice, corn, rye, barley, and oats.
- Trees that are wind pollinated include Alder, Birch, Cottonwood pines, spruces and firs





# Wind Pollination



- The process of the transfer of pollen from one individual plant to another, whereby the pollen is carried by air currents
- Wind-pollinated plants do not have showy flowers, nectar, and scent. Instead, they produce larger quantities of light, dry pollen from small, plain flowers that can be carried on the wind.
- Important characteristics of wind pollinated flowers:
  - Male part of the flowers called the 'stamen' are designed to expose pollen to the wind. The filaments are often long thus exposing the pollen to the air currents.
  - Female parts of flowers (stigma) are long and feathery, and so they are ideally designed to capture the pollen as it is blown on the currents.



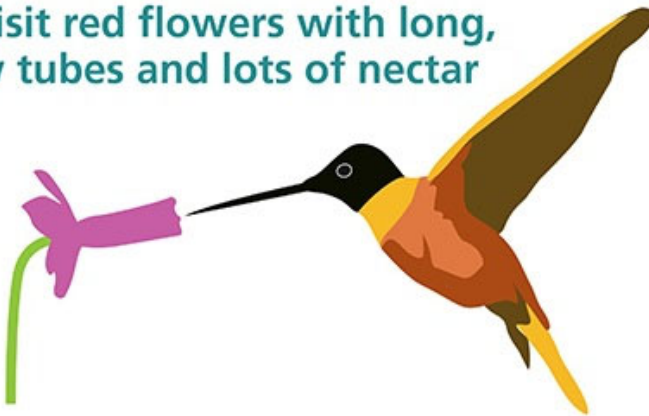
# Pollinator Diversity



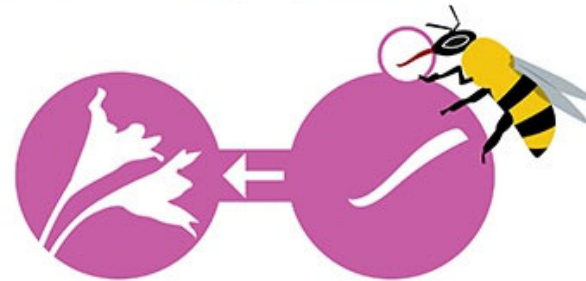
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Diverse farms increase pollinator diversity

Birds visit red flowers with long, narrow tubes and lots of nectar



Bee proboscis length affects foraging choices



Bumblebee buzz frequency used to encourage tomato pollen in greenhouses







# How to Attract Bees

- Plant a diversity of flowering plants that bloom from early spring into the fall.
- Summer/early Fall blooming plants help to keep bees around your vegetable garden when squash, melons, cucumbers and tomatoes are flowering
- An abundance of early and mid-spring blooming plants help to build bee numbers for later in the growing season

*Source: David Salman, Chief Horticulturist, High Country Gardens*



# Plants that Attract Pollinators



**Roses** (genus *Rosa*) are naturally pollinated by insects such as butterflies and bees, by hummingbirds, or through wind transfer  
Note-Bees are unable to harvest nectar and pollen from double flowered roses



# Plants that attract Pollinators



Sunflower –Easy to grow wildflower from seeds that delights adults and birds alike. Annual and easy to grow from seed. Can self-seed readily. Grows between April to October



Autumn Red Sage – Salvia Greggii. Height is 36-48" tall  
A perennial that is a hardy drought tolerant shrub that flowers from spring to fall. This plant is loved by bees and hummingbirds



# Plants (con't)



**Upright coneflower** -*Ratibida columnifera* –perennial *that needs full sun and* has attractive, large flowers with a tall, upright stature. Blooming period lasts up to 2 months and occurs mid summer. This plant can tolerate a wide range of growing conditions







## Plants (con't)

Lavender – *Lavandula*. An herb that is a favorite of pollinators; it smells wonderful and is drought tolerant. Considered the perfect Southwestern plant. Most varieties grow well in zones 5 through 8.



Arizona Milkweed - species found only in AZ, has thin stem and narrow leaves. Blooms from spring to late summer. Likes dry rocky soils and full sun to partial shade. Monarchs love it!





## More about milkweed

- **Milkweed** - The nectar of milkweed flowers is attractive to dozens of insects including bees, wasps, butterflies, moths, and hummingbirds.
- Plantings should be scheduled to coincide with monsoonal moisture. A series of precipitation events capable of establishing seeded species is rare in the arid Southwest, so the availability of supplemental water is an important consideration.
- **Arizona Milkweed (*Asclepias angustifolia*)**
- **Other names:** Narrow-leaf milkweed, slender milkweed
- **Elevational range:** 3,500 to 7,000 feet
- **Flowering time:** May through August
- **Flower color:** White, commonly with a pinkish tinge to the petals
- This is a known monarch host plant.





# Plants (con't)



## **Salvia (*Salvia farinacea*)**

Size: grows from 12" wide to 18-30" high

Bloom: spring through fall

Light: sun to part shade – heat and drought tolerant - low to average water

This is the perfect plant for sunny or shady areas that need a blast of color. Will reseed freely, ensuring plenty of salvias for next year. Best if used in natural landscapes rather than formal flower beds.



**Desert Marigold** a perennial that produces bright yellow flowers from April – Nov. The seeds are eaten by doves, sparrows, and finches. Flower stalks grow up to 18 inches tall and sit above gray-green foliage. It is a short-lived perennial but reseeds itself well and is very drought-tolerant.





# Native Shrubs for Color

- **Native shrubs for mid-to late spring color**
  - *Philadelphus lewisii* 'Cheyenne', Cheyenne mock orange (perfumed flowers)
  - *Mahonia haematocarpa*, Red berry mahonia)
  - *Berberis fendleri*, Fendler's barberry
- **Native Shrubs for summer flowers**
  - *Chamaebatia millifolium*, Fernbush
  - *Caryopteris*, Blue mist spirea (late summer)
- **Native Shrubs for fall flowers**
  - *Chrysothamnus nauseosus*, Rabbit brush



# Providing Habitat for Beneficial Insects



- Grow native plants and maintain habitat diversity
- Grow pollen and nectar producing plants
- Maintain leaf litter
- “Minimize the use of nitrogen fertilizers
- Provide water sources for bees, birds and butterflies



# **If Using Pesticides, Remember to Protect Beneficial Insects**



- Minimize pesticide applications
- When pesticides are used, select those that narrowly target pests
- Only apply pesticides in the evening
- Use pesticides that do not have residual toxicity or that break down quickly (Least Toxic Options)
- Herbicides and fungicides can also be harmful to insects





**Thank You**

**Questions?**

