



## Solitary Bees - Beneficial Pollinators

Solitary bees are common in Arizona but rarely noticed. Solitary bees, as the name implies, nest singly in the soil, soft wood, or plant stems. Ninety percent of all bee species are solitary types which includes leafcutter, digger, mason, carpenter bees and many other bees. More than likely, you would notice the signs of their presence rather than the bee itself. Examples are the circular leaf sections removed by leafcutter bees or small mounds of soil with holes at their center created by digger bees. Solitary bees are not "programmed" to sting people and are not usually aggressive. Their stings are considered mild. A person might be stung if handling one roughly or if one becomes trapped in clothing. Mowing and other outdoor activities can be continued with little problem. Only female bees can sting. All solitary bees pack their nest cells with nectar and pollen to feed the developing larvae. Although solitary bees individually produce nests, sometimes many will nest in close proximity. This is particularly common with digger bees.

**Leafcutter bees** are important native insects of the western United States. They cut circular-shaped pieces of leaves to construct nest cells. Some leafcutter bees are even semi-domesticated to help produce alfalfa seed. Apparently, domestic honey bees are shy about pollinating alfalfa flowers because the flower strikes them in the head when they trip the reproductive structure. However, leafcutter bees seem to take it in stride. Their habit of leaf cutting, as well as their nesting in soft wood or plant stems, often invokes concern among home gardeners. Of course, this concern is unwarranted.

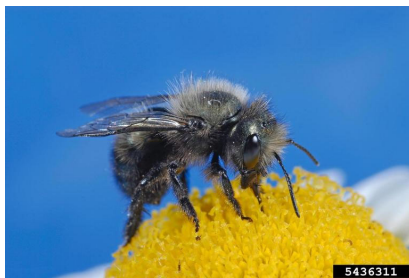


Leafcutter bee (*Megachile* spp., David Cappaert, Bugwood.org).



Leafcutter bee (*Megachile* spp.) damage (Whitney Cranshaw, Colorado State University, Bugwood.org).

**Digger bees** generally prefer nesting in areas with morning sun exposure and well-drained soils containing little organic matter. Burrows are excavated in areas of bare ground or sparse vegetation.



Digger bee (*Andrena* spp., Joseph Berger, Bugwood.org).



Digger bee burrow (*Andrena* spp., Whitney Cranshaw, Colorado State University, Bugwood.org).

**Orchard mason bees**, North American native solitary bees, have been popularized in seed catalogs as pollinators of apples, cherries, and other tree fruits. They are found throughout most of North America. They are usually slightly smaller than honey bees and are a shiny dark blue in color. The actual size of the bee depends largely upon the size of the hole in which it grew. The female uses existing holes in wood for a nest. She chooses holes slightly smaller than a honey bee and is a shiny dark blue in color. The actual size of the bee depends largely upon the size of the hole in which it grew. The female uses existing holes in wood for a nest. She chooses holes slightly larger than her body, usually 1/4 to 3/8 inch in diameter. The bee first places a mud plug at the bottom of the hole. When the female has provided a sufficient supply of food for the larva, she lays an egg and then seals the cell with a thin mud plug. She repeats the process and continues until the hole is nearly full. When finished, she plasters a thick mud plug at the entrance.

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Orchard mason bee (blue orchard bee, *Osmia lignaria*, Scott Bauer, USDA Agricultural Research Service, Bugwood.org).



Blue orchard bee mud plugs, Scott Famous, DoD, Bugwood.org.



Blue orchard mason bee eggs showing cells and food provisions (USDA-ARS, <https://www.ars.usda.gov/pacific-west-area/logan-ut/pollinating-insect-biology-management-systematics-research/docs/blue-orchard-bee/>).

**Carpenter bees** are large solitary bee that resemble bumble bees. Like mason bees, they nest in wood. Male and female carpenter bees overwinter as adults within their old nest gallery. Adults emerge in the spring (April and early May) and mate. There is one generation per year. Gallery construction is a time- and energy-consuming process, and the female will preferentially refurbish an old nest rather than excavate a new one. She bores into the wood perpendicular to the grain for one to two inches then makes a right angle turn and excavates along the wood grain for four to six inches to create a gallery (tunnel). The female excavates the gallery at the rate of about one inch in six days. Like other solitary bees, she creates a series of provisioned brood cells in the excavated gallery. Carpenter bees are often vilified because of their destructive nest-building habits.



Carpenter bee (*Xylocopa micans*, Johnny N. Dell, Bugwood.org).



Carpenter bee gallery, USDA Forest Service - Wood Products Insect Lab, USDA Forest Service, Bugwood.org

**Honey bees** are considered to be beneficial by many. They do provide pollination services for many commercial crops and produce honey which is often harvested. Honey bees are social and live in colonies. However, many people are not aware that all honeybees in North America are introduced and may compete directly with native solitary bees for food resources. Honeybees can be thought of as a form of domestic livestock kept for human benefit.

Solitary bees are important native insects that may become even more important for commercial crop pollination as domestic honeybees face the challenge of Colony Collapse Disorder. We can protect native and domestic bees by limiting our use of insecticides, especially during flowering and in the daytime when bees are active. When choosing to use pesticides, select the least toxic formulation and always read label precautions carefully. Pollinator protection guidance is often provided on pesticide labels.

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Adapted from original Backyard Gardener publications by Jeff Schalau, Agent, Agriculture & Natural Resources, University of Arizona Cooperative Extension, Yavapai County

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