

## PESTS OF PLANTS

These pests can damage various landscape plants in community environments but do not directly affect humans or animals. Some may wander indoors and can cause concern if present in large numbers, or if they bite, cause irritation by their hair, molted skin or secretions, or have other effects. Pests of plants can be grouped in various ways; based on their scientific classification into orders and families; based on their host plants; or based on their mode of feeding into chewing or sap-sucking pests. In this section we will broadly group these pests using the third method, into chewing and sap-sucking pests.

### CHEWING PESTS-BEETLES

Beetles are the most diverse among the insects, as well as among all the other known forms of animals. They belong to the order Coleoptera, which is named after their hard, shell-like front wings or 'elytra'. Most beetles can open these out to reveal their membranous hind wings, which are used in flight. The elytra are fused to form a single shell in some flightless species. Beetles have chewing and biting mouthparts, with well-developed mandibles (jaws) that serve to capture prey, as well as defend them against predators. They occupy a wide variety of habitats and feed on an equally wide range of food material or plant and animal origin. Many species are predatory, and feed on other insects. Parasitic forms also exist. Beetles undergo complete metamorphosis, and their life cycle includes four distinct stages: egg, larva (grub), pupa and adult. Sizes and appearances vary greatly with the species.

Among the beetles, the weevils (also known as billbugs, or snout beetles) are some of the most numerous.

### NOTABLE SPECIES

**Common name(s):** Agave weevil, agave billbug, sisal weevil

**Scientific name, classification:** *Scyphophorus acupunctatus*, **Order:** Coleoptera,

**Family:** Curculionidae.

**Distribution:** Southwest US.



Agave weevil adult (left) and larvae (right)  
Photos: Ursula Schuch, University of Arizona

**Description and ID characters:** Adults are dark greyish black, medium to large sized beetles, about 1 inch in length. They have wings, but rarely fly, and are mostly found walking slowly on the ground or on their host plants.

**Best identifying features:** Pronounced snout in front of the head.

**Pest status:** Pest of agaves, especially those at the end of their life cycle, ready to flower. May occasionally attack other ornamental plants.

**Damage/injury:** Adults bruise the surface of agave leaves to feed and lay eggs. Larvae feed and burrow into the heart of the plant, which soon wilts and declines. The larvae and adults sometimes transmit the bacterium *Erwinia carotovora*, which thrives in the warm, moist environment of the damaged agave leaves and gradually reduces the plant to a foul-smelling, decaying mass.

**Life history:** The females pierce into agave leaves and place their eggs inside the succulent tissue. Larvae are legless, creamy white with a reddish head. They resemble white grubs, but are more fleshy and thicker towards the middle and taper towards the ends, and can grow up to 1 ½ inches in length. Pupation takes place inside the plant. The entire life cycle is completed in 6-12 weeks.

**Common name(s):** Blister beetle

**Scientific name, classification:** *Lytta* spp., *Mylabris* spp., **Order:** Coleoptera,

**Family:** Meloidae. The master blister beetle *Lytta magister*, is a very common southwestern species.

**Distribution:** Worldwide.

**Description and ID characters:**

Large (1 ½ - 2 inches in length), often brightly colored beetles known for their defensive, oily secretion that causes blisters on exposed skin.

**Best identifying features:** Large size, often brightly colored body, in combinations of red, orange or black, metallic green, dark blue and other bright colors or plain black. The master blister beetle is easily identified by its bright orange head, thorax and legs; rough, black elytra and thick black antennae made of saw-tooth-like segments.

**Pest status:** Occasional nuisance pest that can cause painful blisters by its defensive secretions. The adult beetles feed on plant leaves and flowers, and can be pests of certain crop, fodder and landscape plants. Ingestion can cause toxic effects to livestock.

**Damage/injury:** Blister beetles secrete an oily, yellow substance called cantharidin, which is a poisonous chemical that can cause burns and blisters on contact with skin. The beetle releases the chemical from specialized vessels in its legs when alarmed or disturbed. Most predators avoid blister beetles due to their bright warning colors. Accidental ingestion along with plant material can result in significant toxic effects. Some species are pests on fodder crops such as alfalfa, and the adults can get crushed during harvesting, releasing their poisonous chemicals onto the plants. Poisoned fodder can prove lethal to horses, and other livestock.

**Life history:** Eggs are laid in soil, and the hatching larvae burrow through soil to seek out other insect eggs preferably grasshopper or bee eggs, laid in the ground.



Master blister beetle  
Photo: Jeffrey Oliver

Some species are parasitic on other insect larvae and develop on their bodies. Pupation is also in the soil. The adults feed on plants.

**Common name(s):** Cactus longhorn beetle

**Scientific name, classification:** *Moneilema* spp., **Order:** Coleoptera, **Family:** Cerambycidae. *Moneilema gigas* is a common species.

**Distribution:** Southwest US.

**Description and ID characters:** Medium sized, shiny black beetles, 1-1 ½ inches in length, with long antennae, mostly found walking slowly on the ground or on their host plants (cacti). Their elytra (hardened front wings) are fused to form a single hard shell, and therefore they cannot fly.

**Best identifying features:** Shiny black surface, with numerous shallow punctures over the elytra.

Antennae are long and distinctly segmented, with a light gray or white ring towards the middle (on the fourth antennal segment). Thorax has a white border along the top and bottom margins, and two spines projecting laterally, one on each side of the thorax. Legs end in large serrated (saw-tooth-like) tarsal segments.

**Pest status:** Pest of cactuses.

**Damage/injury:** Adults bruise the surface of cactus leaves and feed on the soft and succulent internal content. Chollas and prickly pear cacti are their preferred hosts. Larvae feed and burrow into roots and stems, and damage can result in death of the plant.

**Life history:** The females pierce the base of cactus stems and place their eggs inside the succulent tissue. Larvae are legless, creamy white grubs. Pupation takes place inside the plant or in soil around the base.

**Common name(s):** Paloverde beetle

**Scientific name, classification:**

*Derobrachus geminatus*, Order: Coleoptera, Family: Cerambycidae.

**Distribution:** Southwest US.

**Description and ID characters:** The adults are large dark brown or black

beetles, measuring up to 3 ½ inches in length. They are one of the largest in North America. Larvae are also very large, measuring up to 4 inches in length when mature, pale or greenish-yellow in color, with a dark head. Their thick bodies appear segmented, and are slightly narrow and pointed at the tail end, and broader at the head end.

**Best identifying features:** Large size, dark color, long sturdy antennae, 'collar' of spines on the thorax, prominent mandibles.

**Pest status:** Pest of trees, not a pest of humans.



Cactus longhorn beetle  
Photo: Greg Hume



Paloverde beetle grub  
Photo: Lucy K. Bradley

**Damage/injury:** The larvae (grubs) feed on the roots of several landscape trees and shrubs such as the palo verde, elm, mulberry, citrus, cottonwoods, olives, roses, etc. and can cause mechanical damage to roots, which manifests in the above-ground parts of the trees as dieback, in case of severe damage. They are not reported to transmit pathogenic microbes. Adults are clumsy fliers, usually harmless, but can occasionally bite in self-defense if handled roughly by humans.



Paloverde beetle  
Photo: Robert J. Bradley

**Life history:** The eggs are laid in the soil, near tree bases. The hatching grubs start feeding and boring into tree roots, and live for 2-3 years, during which they can cause significant damage to the tree if they go unnoticed. Pupation takes place in the soil. Adults emerge in summer, with the monsoons. They feed sparsely on nectar or pollen, and only live long enough (about a month) to mate and lay eggs. They get their name from their preferred host – the palo verde tree, *Parkinsonia* spp. The grubs are often found during yard maintenance and can be easily destroyed. Branch dieback and large exit holes (about 1 inch in diameter) around tree bases may indicate beetle activity.

## CHEWING PESTS-BUTTERFLIES AND MOTHS



Moth at rest  
Photo: Donald Hobern



Butterfly at rest  
Photo: Piccolo Namek

Butterflies and moths are some of the most easily recognized insects, with their large, often showy or distinctly patterned wings and their tube-like mouthparts (proboscis) which are kept coiled under their heads when not in use. Appearances vary greatly with species; clear-winged and wingless species exist. Wingspans range from ¼ inch to 10-11 inches. The scale-covered wings are the most characteristic feature of butterflies and moths, from which the name of their order ‘Lepidoptera’ is derived. The wings are thin, membranous folds of skin stretched over a framework of veins, and covered with thousands of minute scales that give each species their distinctive wing patterns. The bodies are also covered with scales. Butterflies and moths, especially species with drab colored wings, are often confused with each other and although they do not belong to discrete groups

within the order Lepidoptera, they can be distinguished for practical purposes by observing certain characters (Table 2). Exceptions to these characters exist.

Adult butterflies and moths are not harmful, and they generally do not cause concerns. Butterflies are mostly active during the day, and rarely come indoors. However, moths are nocturnal, and being attracted to lights they can often be found fluttering around lights. In rare circumstances, when large numbers emerge together, some persons may develop allergic reactions to their wing scales. The larvae or caterpillars of butterflies and moths are mostly the damaging stage, and often cause concerns when they feed on plants. Feeding may result in scraping off green matter from leaves leading to their drying up, or total defoliation which may sometimes lead to death of the plant. Some caterpillars create unsightly webs, some tear up and fold or roll leaves to form their resting places, while some bore into stems or branches of trees and plants. Some species have irritating hairs that may cause allergic reactions on contact with skin.

Table 2. Common distinguishing characters between butterflies and moths

<b>Character</b>	<b>Butterflies</b>	<b>Moths</b>
<b>Time of activity</b>	Daytime	Evening or night
<b>Resting position</b>	Wings held up, close to each other straight over the body	Wings spread out to the sides or folded over the back (tent-like)
<b>Wings</b>	Thin and smooth appearance (due to smaller scales)	Fluffy appearance (due to larger scales)
<b>Coloration</b>	Bright, vivid colors and patterns, often with multiple colors	Drab, uniform colors, plain shades of gray, brown, tan or white, with few patterns
<b>Antennae</b>	Long, slender and tipped with a narrow club	Variiously shaped (feathery, comb-like, or thread-like in some)
<b>Body</b>	Long, slender, smooth and hairless	Short, thick, and furry
<b>Pupa</b>	Chrysalis (enclosed in the final larval skin and no further cover)	Cocoon (spun by the final larval instar before turning into a pupa enclosed by the final larval skin)

All butterflies and moths go through complete metamorphosis, and have four distinct stages in their life cycle; egg, larva (caterpillar), pupa and adult. Eggs are laid on or near their host plants or substrates. The emerging caterpillars feed voraciously and pass through several molts before pupating, and then emerge as adults.

## NOTABLE SPECIES

**Common name(s):** Armyworm, cutworm

**Scientific name, classification:** Different genera, **Order:** Lepidoptera, **Family:** Noctuidae. *Agrotis* spp., *Peridroma* spp. and *Mythimna* spp. are common in the southwest.

**Distribution:** Worldwide.



Armyworm-adult moth (left)-Photo: Whitney Cranshaw;  
caterpillar showing typical curling behavior (right)-Photo: Frank Pears

**Description and ID characters:** The adults are stout, dull brown or straw colored moths, about 1 – 1 ½ inches in length, that can be found fluttering around lights in the summer. Larvae measure up to 2 inches at full growth, and typically curl up when disturbed. They range in color from black, dark brown or dark green with various stripes, spots and bands, and sparse hairs over their bodies.

**Best identifying features:** Large, dull colors on adults; large size and curling behavior of larvae.

**Pest status:** Important pests of lawns and turf, and some garden plants.

**Damage/injury:** The caterpillars can cause significant damage to large areas of turf. Armyworms get their name from their habit of moving and feeding in large groups. Cutworms tend to feed singly or in smaller groups, and cut down grasses and other small plants and seedlings at their base.

**Life history:** The adult moths mate in the summer and lay eggs on the host plants. The caterpillars feed voraciously and pass through 4-5 molts before pupation. They disperse into smaller groups as they mature, and pupate singly. Pupation takes place in or close to the ground.



Armyworm on damaged grass blade  
Photo: North Carolina Forest Service

**Common name(s):** Bagworm

**Scientific name, classification:** Different genera, **Order:** Lepidoptera, **Family:** Psychidae. *Oiketicus* spp. and *Thyridopteryx* spp. are common in the southwest.

**Distribution:** Worldwide.

**Description and ID characters:** Bagworms, as their name suggests, are the caterpillars of bagworm moths that live inside a bag or case that they construct

around themselves, using their silk, bits of plants and other debris. The bags measure  $\frac{3}{4}$  to over  $1\frac{1}{2}$  inches in length.



Bagworm infestation (left); bagworm caterpillar feeding with its head out of the bag (right)-Photos: PA Dept. of Conservation and Nat. Resources-Forestry Archive, Bugwood.org

**Best identifying features:** Bags or cases made by the caterpillars on various landscape plants.

**Pest status:** Occasional pest of landscape shrubs and trees.

**Damage/injury:** The caterpillars feed on the foliage of trees and shrubs. Thujas, junipers and pines are preferred host plants, but they do not usually cause significant damage.

**Life history:** The larvae feed by extending their heads out of the bags but retreat into them when threatened. The entire larval stage is spent inside the bags, which expand as the larvae grow, and pupation also takes place within the bags. Adult males will fly out on emergence, but females are wingless and remain in the bag. They emit a strong pheromone to attract mates, and mating takes place in the bag after which the female dies. The eggs hatch inside her body and the new caterpillars emerging from their mother's bag are transferred to other hosts by wind, on silken threads. When they land on a host, they start building their own bags and the cycle is repeated.

**Common name(s):** Gulf fritillary, passion-vine butterfly

**Scientific name, classification:** *Agraulis vanillae*, **Order:** Lepidoptera, **Family:** Nymphalidae.

**Distribution:** North, Central and parts of South America.

**Description and ID characters:** Adults are medium to large butterflies, with wingspans of about  $2\frac{1}{2}$  - 3 inches.

**Best identifying features:** The upper sides of the wings are orange-brown with black spots and streaks, and a row of open black circles along the rear margin of the back wings. The undersides of the wings are brownish-buff with silvery spots and streaks. Larvae are equally striking, reddish-orange in color, with dark purple or blue stripes and rows of black spines along their backs. The larvae are poisonous and their bright colors serve to ward off predators. The chrysalis is light brown in color and resembles a dry leaf.

**Pest status:** Caterpillars are common pests of passion vine, and other garden plants.

**Damage/injury:** The caterpillars feed on leaves, tender stems and flowers of different garden plants.

**Life history:** Eggs are laid on or near their host plants or substrates. The emerging caterpillars feed voraciously and pass through several molts before pupating, and then emerge as adults.



Gulf fritillary adult (left)-Photo: Bob Peterson;  
Caterpillar (middle)-Photo: David Cappaert; chrysalis (right)-Photo: Katja Schulz

**Common name(s):** Hornworm

**Scientific name, classification:** Different genera, **Order:** Lepidoptera, **Family:** Sphingidae. *Manduca* and *Agrilus* are common genera.

**Distribution:** Worldwide.

**Description and ID characters:** Adults are large sphingid or hawk moths, with wingspans of about 3 ½ - 4 inches. Front wings are mottled with brown, grey and black markings, and back wings are have black, white and brown bands. The body is stout and spindle-shaped, and the abdominal segments can often be clearly distinguished. Larvae are bright green in color, with a distinct horn on the last abdominal segment (which gives them their common name). They can measure up to 3 inches at full growth and are voracious feeders.

**Best identifying features:** Large size and spindle-shaped body of adults. Larvae are also large, bright green with various markings, and have the characteristic 'horn' at the rear end of the body.



Tomato hornworm (top left), tobacco hornworm (bottom left)-Photos: Whitney Cranshaw;  
tomato hornworm adult (right)-Photo: Rick Hall

**Pest status:** The tobacco hornworm (*M. sexta*) and tomato hornworm (*M. quinquemaculata*) commonly attack solanaceous plants such as tomato, tobacco, eggplant, tomatillos, etc. Both species are commonly used as models for biology classes, or as pets. The rustic sphinx (*M. rustica*) is a similar species that attacks several other species of landscape plants. The adults feed on sacred datura blossoms in the desert southwest.

The pink-spotted hawkmoth, also known as sweetpotato hornworm (*Agrilus cingulata*) is a pest of sweet potatoes, as well as petunias, morning glories and moon flowers.

**Damage/injury:** The caterpillars feed on leaves, tender stems and flowers of different garden plants.

**Life history:** Eggs are laid on or near their host plants or substrates. The emerging caterpillars feed voraciously and pass through several molts before pupating, and then emerge as adults.

**Common name(s):** Tent caterpillar

**Scientific name, classification:** Different genera, **Order:** Lepidoptera, **Family:** Lasiocampidae. The Western tent caterpillar *Malacosoma californicum*, desert tent caterpillar *Malacosoma distria* are common in the southwest.



Group of western tent caterpillars (left)-Photo: Franco Folini;  
adult moths, cream-female and brown-male (right)-Photos: Jerald E. Dewey, USDA-FS

**Distribution:** Worldwide.

**Description and ID characters:**

The adults are short, stout brown moths that can be found fluttering around lights in the summer. Larvae are covered with hairs, and get their name from the extensive, dense webbing that they create among branches of trees and plants, which resemble tents. Caterpillars of both species can measure up to 2 inches at full growth, and are seen in the spring.

**Best identifying features:** Western tent caterpillars are dark brown or black, with a row of bright orange spots and smaller blue spots along their backs. Their bodies are covered with long, fine yellow hairs. The caterpillars create large, conspicuous tents across several branch tips in trees. Forest tent caterpillars are black, with a row of white spots along their backs, and a light blue and orange border on either side. Their bodies are covered with long, fine white hairs. Forest tent caterpillars do not create typical ‘tents’, instead they construct dense silken mats close to the tree trunk and rest within them.

**Pest status:** Occasional pest of landscape shrubs and trees.

**Damage/injury:** Tent caterpillars can attack a wide range of landscape trees, and occasionally cause significant damage that warrants control measures.

**Life history:** The adult moths mate in the summer and lay eggs on the host plants. The caterpillars spin the webs and stay within them feeding voraciously. However, they disperse into smaller groups as they mature, and pupate singly.



Tent constructed by western tent caterpillar  
Photo: William M. Ciesla

## SAP-SUCKING PESTS: INSECTS

**Common name(s):** Aphids, plant lice

**Scientific name, classification:** Different genera, **Order:** Hemiptera, **Suborder:** Sternorrhyncha, **Family:** Aphididae.

**Distribution:** Worldwide.

**Description and ID characters:** Tiny, soft-bodied insects that are seen in large aggregations on different plant parts. Sizes range from less than  $\frac{1}{16}$ <sup>th</sup> to slightly over  $\frac{1}{8}$ <sup>th</sup> of an inch. Colors vary with species, hosts and environmental conditions, and can be black, brown, green, yellow or pink.



Green peach aphid  
Photo: Whitney Cranshaw, Bugwood.org

Winged and wingless forms may be present within a species.

**Best identifying features:** Oval or pear-shaped bodies, with thin legs, slender antennae at the head end of the body and two short tubes called ‘cornicles’ at the rear end, piercing and sucking mouthpart (proboscis), which is held flat under the body when not in use.

**Pest status:** Important, economic pest of many plants. Some feed only on specific plants (monophagous), while others feed on hundreds of unrelated species (polyphagous).

**Damage/injury:** Aphids suck plant sap from different plant parts using their needle-like mouthparts, which leads to loss of plant vigor and turbidity. They inject toxic saliva as they feed, causing burn-like symptoms on plant parts. They can also transmit plant viruses that cause various unsightly deformation and discoloration symptoms, and sometimes kill the plant. Like many sap-sucking insects, they secrete honeydew which attracts ants and favors growth of black sooty mold. The ants often protect the aphids from predators to obtain the sweet honeydew. Severe



Healthy and mummified aphids (arrows show mummified individuals)  
Photo: Alton N. Sparks Jr., Bugwood.org

infestations of aphids can cause dramatic yield reduction, stunted growth and economic losses.

**Life history:** Aphids can reproduce sexually and asexually, and the same species can use both means under different environmental conditions. In asexual reproduction the female gives birth to live young, which are essentially clones of their mother.

However, during certain conditions, males and females mate and the females lay eggs. These varied modes of reproduction are one of the reasons for their success, in spite of their delicate, soft bodies and small size. Infestations generally begin with egg laying by winged females that fly to the host plant. These eggs hatch into nymphs, which mature in about a week and produce more nymphs, and thus thousands of aphids are produced in a short period of time. Aphids do not have a pupal stage, they undergo incomplete metamorphosis.

Occasionally, immobile, larger sized bodies may be seen, often with a hard shell-like covering. Some of these may have exit holes. These bodies may be mistaken for pupae, but they are actually dead aphids or 'mummies'. The bodies of these aphids were parasitized by tiny beneficial wasps, whose larvae develop within the aphid body feeding on its contents and soon, the aphid is reduced to hollow shell. The wasp larvae pupate within the mummy and emerge breaking open the shell, leaving an exit hole. Aphid mummies are therefore good signs, meaning that natural enemies are working to control the aphid population on your plants.

However, the mummies are often far exceeded in number by healthy aphids and when the host plants are exhausted, winged adults fly to new host plants and the cycle is repeated.



Aphid mummy with exit hole  
Photo: Sandra Jensen, Bugwood.org

**Common name(s):** Cochineal scale

**Scientific name, classification:** *Dactylopius* spp., **Order:** Hemiptera, **Suborder:** Sternorrhyncha, **Family:** Dactylopiidae.

*Dactylopius coccus* is the most common species.

**Distribution:** Worldwide, in areas where host plants are available. Native to southwest U.S., but distributed to different regions accidentally, or intentionally for commercial production of their red pigment.

**Description and ID characters:** Small, soft scale insects seen in groups on cacti – their preferred host plants. Individual scales are about 1/8 inch in length.

**Best identifying features:** Flat, oval shaped, gray colored bodies, often covered with a flaky, waxy material. Crushing releases a bright red pigment.



A cluster of cochineal scales  
Photo: Frank Vincentz



Crushing cochineal scales releases a red dye  
Photo: Whitney Cranshaw

**Pest status:** Occasional pest of various cacti, sometimes causing economic damage.

**Damage/injury:** Cochineal scales suck sap from different parts of cactus plants. They are particularly found in large clusters on the leaves, in sheltered areas of the plants. Severe infestations can result in the death of the plant.

**Life history:** These scales can reproduce year-round if suitable host plants are available. The males are winged, while the mature females are wingless. After mating, the females lay eggs on the cactus leaves, which hatch immediately. Sometimes the eggs hatch within the female and live young are produced. The young ones (nymphs) secrete long, waxy filaments over their bodies that protects them from drying out. The filaments often get caught in the wind, or attach to other insects or birds that visit the cactus plants and thus help the nymphs to disperse. The nymphs and females contain the red pigment. Males are very short lived, and die soon after mating.

The red pigment produced by cochineal scales is called ‘carmine’, and the insects use it to deter predators. It is widely used by humans as a dye or coloring agent for various purposes, and the insects are commercially reared to harvest their pigment.



Cochineal scale infestation  
Photo: H. Zell

**Common name(s):** Mealybugs

**Scientific name, classification:** Different genera, **Order:** Hemiptera, **Suborder:** Sternorrhyncha, **Family:** Pseudococcidae.

**Distribution:** Worldwide.

**Description and ID characters:** Small, flattened scale-like insects with white mealy covering.

**Best identifying features:** White mealy covering on the body is often fluffy with finger-like extensions. They do not stay immobile like scale insects, and can move slowly.

**Pest status:** Minor pest of many plants, economic pest in some cases. Species attacking only one particular plant (monophagous) or several unrelated plant species (polyphagous) exist.

**Damage/injury:** Suck plant juices from different plant parts, and vector several plant pathogens.

**Life history:** Mealybugs, like aphids, can reproduce sexually and asexually, and their young can hatch from eggs, or by live



Mealybug aggregations  
Photo: US National Collection of  
Scale Insect Photographs

births. Eggs are laid on plant parts and covered with a mealy wax layer for protection. Nymphs of both sexes are flat and scale-like and pass through several stages before becoming adults. Adults males and females do not resemble each other in any way (display extreme sexual dimorphism). Females are the actual ‘mealy bugs’ seen on plants, and retain their nymphal appearance and continue to appear scale-like and wingless. They have functional legs and move about slowly. The males however, lose their scale-like appearance as adults. They resemble small gnats, and develop wings. They are short-lived and are rarely encountered. They do not feed as adults and only live to fly to the females and mate with them. The fertilized females continue feeding and producing more young ones. Their mealy covering protects their soft bodies from drying out and from predators and chemicals. Mealy bugs are greatly favored by the presence of ants that drive off their predators.



Mealybug adult female  
Photo: Charles Olsen, Bugwood.org

**Common name(s):** Psyllids, jumping plant lice  
**Scientific name, classification:** Different genera, **Order:** Hemiptera, **Suborder:** Sternorrhyncha, **Family:** Psyllidae.  
**Distribution:** Worldwide.  
**Description and ID characters:** Small sap-sucking insects, mostly less than 1/4 inch in length. Appearances vary widely with species.



Group of citrus psyllids feeding on citrus leaf (left); closer view of a single adult (right)  
Photos: David Hall, Bugwood.org

**Best identifying features:** Tiny insect resembling a miniature cicada, a large winged aphid, or a psocid. Psyllids, psocids and aphids can occur together on a plant, but psyllids can be distinguished from the others by their strong jumping movements when disturbed, as opposed to running or walking by aphids and psocids. Psocids also have a distinct neck separating their head from the body, and have chewing mouthparts to feed on lichens or other debris; aphids can be



Psocid  
Photo: Jessica Louque



Winged aphid  
Photo: Scott Bauer



Psyllid  
Photo: Whitney Cranshaw

identified by their cornicles, whereas psyllids have sucking mouthparts and feed with their rear end held up.

**Pest status:** Important, economic pest of many plants. Most psyllids are host specific, or feed on closely related plant species. Polyphagous species also exist.

**Damage/injury:** Psyllids suck sap from different plant parts and secrete honeydew, attracting sooty mold and ants. Feeding by large numbers can stunt plant growth, and cause various deformations, die back and premature leaf drop. Toxic saliva injected while feeding causes burn-like symptoms. Psyllids also vector several pathogens causing plant diseases. Of particular note is Citrus greening, also known as *huanglongbing*, which is associated with the presence of a bacterium *Liberibacter asiaticum* vectored by Asian citrus psyllids.

**Life history:** Eggs are laid on various plant parts depending on the species and host. Emerging nymphs pass through 4-5 nymphal stages before becoming winged adults. Development is greatly favored by high temperatures. Nymphs of many psyllids secrete coverings called “lerps”, made of wax and solidified honeydew, over their bodies that protect them from moisture-loss and predators or parasitoids. The structure of these lerps are quite specific to a species and can help identify them.

**Common name(s):** Whiteflies

**Scientific name, classification:** Different genera, **Order:** Hemiptera, **Suborder:** Sternorrhyncha, **Family:** Aleyrodidae.

**Distribution:** Worldwide.

**Description and ID characters:** Tiny, white insects that get their name from the mealy, white coating on their bodies.

**Best identifying features:** Delicate, white, miniature-moth like appearance, seen in groups on undersides of the leaves.

**Pest status:** Important, economic pest of many plants. Some feed only on specific plants (monophagous), while others feed on hundreds of unrelated species (polyphagous).

**Damage/injury:** Whiteflies suck sap from plant leaves using their needle-like mouthparts, which causes leaves to turn yellow, wilt and fall off prematurely. They also secrete honeydew which makes leaves sticky and promotes growth of sooty mold, and also attracts ants that drive off natural enemies of the whiteflies. As they



Potato/tomato psyllid adults  
Photo: Whitney Cranshaw, Bugwood.org

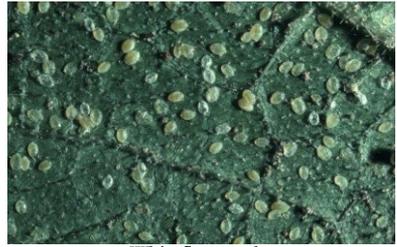


Psyllid nymphs forming lerps  
Photo: Whitney Cranshaw, Bugwood.org



Whiteflies  
Photo: Lesley Ingram, Bugwood.org

feed, they inject toxic saliva into the plant, causing symptoms such as silvering, and distortion of leaves into abnormal shapes. Their biggest impact is caused by transmission of several lethal plant viruses. Small populations of whiteflies are not usually damaging unless combined with virus transmission, but large infestations can destroy plants regardless of virus transmission.



Whitefly nymphs

Photo: Alton N. Sparks Jr., Bugwood.org

**Life history:** Eggs are laid on the undersides of leaves. Immatures called nymphs pass through four nymphal stages. The first nymphal stage (crawler) is barely visible even with a hand lens. They crawl around the leaf surface for a few hours and settle on a spot to feed, remaining immobile for the rest of the larval stage. All the other nymphal stages are oval and flattened like small scale insects. The winged adult emerges from the last nymphal stage. All stages feed by sucking plant juices from leaves and excreting excess liquid as drops of honeydew as they feed. Development is greatly favored by high temperatures.

**Common name(s):** Cicada

**Scientific name, classification:** Different genera, **Order:** Hemiptera, **Suborder:** Auchenorrhyncha, **Family:** Cicadidae. Common southwestern genera are *Cacama*, *Diceroprocta* and *Tibicen*. The desert/Apache cicada *D. apache* is often seen and heard in community environments.

**Distribution:** Worldwide.

**Description and ID characters:**

Medium to large sized insects, about  $\frac{3}{4}$  to 2 inches in length. Their bodies are stout, wider at the head and tapering towards the rear end. Colors vary with the species, most of the southwestern species are shades of gray, brown or black and some have spots or bands colored orange, red or green.

**Best identifying features:** Prominent, bulging compound eyes set wide apart

on the head; clear membranous wings with distinct veins, held closely like a tent over the body. Front wings are longer and the wingspan can measure up to 3 inches. Hind wings are much shorter. Small, bristle-like antennae and 3 small spots arranged in a triangle (ocelli or simple eyes) can be seen at the center of the face, in between the bulging compound eyes.

**Pest status:** Occasional pest of plants, can be a nuisance because of their sounds.

**Damage/injury:** Cicadas can cause damage to certain trees and shrubs by sucking sap, or when they lay eggs. They pierce their needle-like mouthparts into plant twigs and stems and the feeding can result in drying and wilting. The females make



Apache cicada

Photo: Michael J. Plagens

small slits in twigs to lay eggs, and this can also result in some scarring. However, these do not affect plants significantly.

Male cicadas are the loudest insects, and their shrill calls can be heard for several miles. They can be annoying at close distances, but the problem does not last long because cicadas are usually active only for a few weeks of the year.

Cicadas do not bite, sting, transmit diseases, or harm humans in any way.

**Life history:** Adult cicadas are mostly seen in the summer, starting in June. They emerge from their last nymphal stage during this time and their molted skins shaped like the cicadas themselves, can often be seen attached to trees or fallen on the ground. Mating occurs in June-July, and the females lay eggs on twigs of suitable host plants by cutting small slits using their saw-like ovipositors (egg-laying apparatus). The eggs are inserted into these slits. The adults only live for about 3-4 weeks. When the eggs hatch, the nymphs drop to the ground and burrow into the soil. They spend the winter and most of the following spring and even the following 1-2 years as nymphs, feeding on plant roots under the ground. Towards mid-summer, mature nymphs crawl above the ground and on to trees or shrubs, and shed their last nymphal skin and emerge as adults. Most of the southwestern cicadas are 'annual cicadas' because adults from overlapping generations can be seen each summer. Some species in other parts of the country are known to take 13-17 years to complete their life cycles. These are known as 'periodical cicadas', and the adults appear in large numbers after long gaps of 13-17 years.



Cicada shell left behind after adult emergence

Photo: Brian Stansberry

**Common name(s):** Leafhopper, sharpshooter

**Scientific name, classification:**

Different genera, **Order:**

Hemiptera, **Suborder:**

Auchenorrhyncha, **Family:**

Cicadellidae.

**Distribution:** Worldwide.

**Description and ID characters:**

Small to minute insects, about  $\frac{1}{8}$  to slightly over  $\frac{1}{2}$  inch in length.

Sizes and appearances vary with species, often brightly colored.

Wings are mostly colored, and are held closely over the body, giving



Potato leafhopper

Photo: Steve L. Brown

the insect a tubular or almost cylindrical shape. Some species resemble miniature cicadas.

**Best identifying features:** Their bodies are wider near the head and taper towards the rear end, and they often rest at an angle to the surface with their heads raised. Eyes are prominent and bulging. The hind legs have rows of fine spines and are modified for jumping, enabling the leafhoppers to jump away and disappear at the slightest disturbance. They can also move sideways and backwards quite swiftly.

**Pest status:** Occasional pests of garden, landscape and crop plants. Some species are important pests of crops, and also transmit plant viruses and bacteria. The beet leafhopper *Circulifer tenellus*, the common brown leafhopper *Orosius orientalis*, the glassy-winged sharpshooter *Homalodisca vitripennis* and the potato leafhopper *Empoasca fabae* are some important pest species.

**Damage/injury:** Leafhoppers pierce their fine, needle-like mouthparts into plant leaves, stems or other parts and draw out sap. As they feed they also inject their toxic saliva into the plant. Feeding in large numbers can result in yellowing, browning and drying up of plant parts with a scorched appearance referred to as 'hopper burn'. Some species feed on specific plants, but many will attack a wide range of unrelated plants.

**Life history:** Leafhoppers lay their eggs by inserting them into the tissue of their host plants. The young ones (nymphs) also suck sap from their host plants along with the adults.



Glassy-winged sharpshooter  
Photo: Reyes Garcia III, USDA-ARS

**Common name(s):** Agave plant bug, run-around bug

**Scientific name, classification:** *Caulotops barberi*, **Order:** Hemiptera, **Suborder:** Heteroptera, **Family:** Miridae.

**Distribution:** Southwest U.S.

**Description and ID characters:** Minute, swift moving bugs, slightly over 1/8 inch in length, found on succulents such as agaves, in desert environments.

**Best identifying features:** Minute size, dark wings, prominent eyes and distinct triangular shape on the back (magnification may be needed to observe detailed features). Run swiftly to the undersides of leaves on disturbance, giving them their common name, run-around bug.

**Pest status:** Occasional pest of agaves and similar succulents. Severe infestations can lead to death of plant.

**Damage/injury:** The adults and nymphs suck sap from the leaves of the plants using their fine, needle-like mouthparts, leading to minute yellow or tan scars at the



Agave plant bug  
Photo: Michael J. Plagens

point of feeding. Large populations can cause entire leaves to dry up and wither, and sometimes the entire plant can be affected. The bugs can be seen in large numbers on the undersides of the affected leaves.

**Life history:** Populations build up during mid to late summer. Eggs are laid on the undersides of the leaves of the host plants. Adult and nymphs feed voraciously by sucking sap. They will seek new plants when one host is exhausted.



Agave plant showing drying up of leaves (left) due to Agave plant bug feeding; closer view of underside of affected leaf showing the bugs and feeding scars (right)

Photos: Ed Bartlett, Tucson Cactus and Succulent Society, [www.tucsoncactus.org](http://www.tucsoncactus.org)

**Common name(s):** False chinch bug

**Scientific name, classification:**

*Nysius raphanus*, **Order:** Hemiptera,

**Suborder:** Heteroptera, **Family:** Lygaeidae.

**Distribution:** Throughout the US.

**Description and ID characters:**

Small gray or brown bugs, less than 1/4<sup>th</sup> inch, commonly found in turf and other grassy, weedy areas in the spring. They are sometimes mistaken for ticks or other similar pests commonly found in grass.

**Best identifying features:** Tiny size, gray with a slight yellowish tinge, distinct black triangle formed by the scutellum on the back, typical hemipteran wings—partly thickened and partly membranous, appearance in large numbers in dry areas of turf. False chinch bugs can be distinguished from the true chinch bug (*Blissus* spp.), a major pest of turf and grains, by the absence of a conspicuous black patch on the outer wing margin in the latter. False chinch bugs also have broader heads, almost as broad as the thorax, and conspicuous eyes; while the true chinch bugs have narrower, pointed heads.



False chinch bug

Photo: Whitney Cranshaw, Bugwood.org

**Pest status:** Minor pest of turf and landscapes.

**Damage/injury:** These bugs suck the sap from grass blades and inject toxic saliva, leading to yellowing and browning and premature drying. They also attack shrubs, herbaceous plants and occasionally, trees but damage is not usually significant

**Life history:** Overwintering takes place as nymphs and adults, and activity is resumed in early spring. Eggs are laid in the soil or various plants, with a preference for mustards. When weeds dry out in the summer, they move to other irrigated landscape plants and turf. Populations explode after wet springs and summer rains, and they form large aggregations often moving into homes and buildings causing concern to humans.



True chinch bug  
Photo: Graham Montgomery

**Common name(s):** Giant mesquite bug

**Scientific name, classification:** *Thasus neocalifornicus*, **Order:** Hemiptera, **Suborder:** Heteroptera, **Family:** Coreidae.

**Distribution:** Southwest U.S.

**Description and ID characters:** Large, dark brown or black bugs, about 1 ½ inches in length. One of the largest true bugs (Heteroptera) in the southwest U.S. Adults occur in small, loose groups and are slow, clumsy fliers. Nymphs occur in larger, tightly packed groups and are brilliantly colored.

**Best identifying features:** Large size of adults. Head is small, compared to the body. Antennae are dark brown or black at the base, but the top two segments are colored dark orange or red and the second segment from the top has a distinct flattened, leaf-like enlarged area. Legs are black, with dark red patches or bands, femora (thighs) of hind legs are enlarged, with spines along their inner edge. Wings have prominent orange or yellow veins on a dark background.

Nymphs are patterned with vivid red, yellow, white and black and change patterns as they pass through each molt. The leaf-like protuberance on the antennae is present in all stages.

Adults and nymphs occur together on the same trees, and may emit a foul-smelling defensive secretion when threatened.

**Pest status:** Minor pest of mesquites, may also be found on other garden and landscape plants, but causes no damage.



Giant mesquite bug  
Photo: Ursula K. Schuch, UA



Giant mesquite bug nymph  
Photo: Patrick Dockens

**Damage/injury:** Suck sap from tender stems and pods of mesquite trees during the summer and fall, but do not cause major damage to the plants. They are harmless to humans, and do not bite or sting.

**Life history:** Eggs are laid in chains under stems, leaves or loose bark on mesquite trees during late fall. The adults die soon afterwards, and the eggs overwinter and hatch in the spring. The emerging nymphs suck sap from young stems and tender pods, and pass through 5 molts before finally turning into adults in the summer.

**Common name(s):** Stink bug, shield bug

**Scientific name, classification:**

Different genera, **Order:** Hemiptera,

**Suborder:** Heteroptera, **Family:** Pentatomidae.

**Distribution:** Worldwide.

**Description and ID characters:**

Medium to large sized true bugs, sizes range from less than 1/2 to over 1 inch. Colors vary with species, mostly shades of brown or green with markings. They have piercing-sucking mouthparts which are long and needle-like and are held flat and close to the body when not in use.

**Best identifying features:** Shield-like shape, with a large triangle in the middle of their back, which is an extension of the thorax called ‘scutellum’, forewings are hardened towards the shoulders and membranous towards the tips, with the membranous area being seen can be seen beyond the scutellum on the back of the bug. Release a rather strong “buggy” odor when disturbed, thus earning their other common name.

**Pest status:** Important, economic pest of many plants. Some species transmit plant pathogens. Some are predatory, and feed on other small insects and larvae.

**Damage/injury:** Stink bugs attack a variety of plants, including vegetables, ornamentals and fruits. They suck sap from plant parts using their needle-like



Brown marmorated stink bug  
Photo: Susan Ellis, Bugwood.org



Brown stink bug  
Photo: Russ Ottens, Bugwood.org



Green stink bug  
Photo: Susan Ellis, Bugwood.org



Bagrada bug  
Photo: Gevork Arakelian, Bugwood.org

proboscis and these spots appear as small pin pricks, surrounded by a circle of discolored, hard tissue. This disfigures fruits and vegetables, affecting their marketability. The introduced brown marmorated stink bug has recently emerged as a serious pest of different crops. Another introduced species, the bagrada bug is a significant pest of cruciferous vegetables.

**Life history:** Stink bugs have incomplete metamorphosis. Their eggs are laid in carefully arranged rows, on the under sides of leaves of host plants. The hatching nymphs are very similar to the adults, but lack wings and pass through several nymphal stages before finally turning to winged adults. All stages have stink glands and feed voraciously on plant parts. They are likely to invade homes and buildings, often in large numbers, to survive the winter.

## SAP-SUCKING PESTS: NON-INSECTS

**Common name(s):** Mite

**Scientific name, classification:** Different genera, **Order:** Acariformes-Trombidiformes (Subclass Acari/Acarina), **Family:** Different families.

**Distribution:** Worldwide.

**Description and ID characters:** Tiny, often microscopic arthropods with eight legs; some have only four. Appearances vary greatly with families and species.

**Best identifying features:** Need magnification to identify.

**Pest status:** Important pests of various garden, landscape and crop plants.

**Damage/injury:** Mites feed by sucking sap from their host plants, leaving minute scars. In large numbers, they can seriously reduce the photosynthetic ability of plants, lead to yellowing, wilting and drying up of leaves, and ultimately plant death. While feeding, they also inject their toxic saliva into the plant. The irritation caused by their feeding can result in distortion and deformation of the plant parts into abnormal shapes. Many species of mites are highly polyphagous, meaning that they can attack a large number of unrelated host plants, while some prefer certain specific plants.

**Aloe mites *Aceria aloinis*** (Family Eriophyidae) are a common species attacking succulents such as aloes, haworthias and gasterias, and cause the condition known as ‘Aloe cancer’ or ‘Aloe gall’. This can be identified by the deformation of the plant tissue into irregular, swollen structures called galls. The toxic saliva injected by the mites during feeding leads to the plant taking up these abnormal shapes.

**Red spider mites**, also known as **two-spotted mites *Tetranychus urticae*** (Family Tetranychidae) are known to attack hundreds of host plants. They can be commonly seen on different species of Yucca in desert landscapes. Under magnification, they can be seen to have two dark spots on their backs, and their bodies are often red or pink in color. In severe infestations, the affected plant is covered by a fine webbing which is blown about by the wind, and helps to disperse the mites.

**Life history:** Mites lay eggs on their hosts. The hatching young ones undergo several molts and then turn into adults.



Aloe galls by aloe mites (left) and *Opuntia* cactus deformation by two-spotted mites. Photos: J. Kelly and M.W. Olsen, University of Arizona

It is important to note that pests of plants outdoors are much larger in number and exceedingly diverse compared to pests encountered indoors. The few that have been covered in this section do not, by any means form a conclusive list; they only provide some examples of the types of plant pests that might be encountered in desert southwest community environments.

**Sources, further information:**

Common pests and disorders of desert trees

<http://www.aridzonetrees.com/AZTimes%20Horticultural/Common%20Pest%20and%20Disorders%20of%20Desert%20Trees.htm>

Desert beetles [https://www.desertmuseum.org/books/nhsd\\_beetles.php](https://www.desertmuseum.org/books/nhsd_beetles.php)

Pests of landscape plants

<http://ag.arizona.edu/pubs/garden/mg/entomology/sap.html>

Pests in gardens and landscapes

<http://www.ipm.ucdavis.edu/PMG/menu.homegarden.html>

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