
SPIDERS

Integrated Pest Management In and Around the Home and Landscape

Many people fear or dislike spiders but, for the most part, spiders are beneficial because of their role as predators of insects and other arthropods, and most cannot harm people. Spiders that might injure people—for example, black widows—generally spend most of their time hidden under furniture or boxes, or in woodpiles, corners, or crevices. The spiders commonly seen out in the open during the day are unlikely to bite people.

IDENTIFICATION

Spiders resemble insects and sometimes are confused with them, but they are arachnids, not insects. Spiders have eight legs and two body parts—a head region (cephalothorax) and an abdomen. They lack wings and antennae. Although spiders often are found on plants, they eat mainly insects, other spiders, and related arthropods, not plants. Most spiders have toxic venom, which they use to kill their prey. However, only those spiders whose venom typically causes a serious reaction in humans are called “poisonous” spiders. See the sidebar: Spider Bites. Common spider families are described in Table 1.

Black Widow Spider

The black widow spider, *Latrodectus hesperus* (Fig. 1), is the most common harmful spider in California. Venom from its bite can cause reactions ranging from mild to painful and serious, but death is very unlikely and many symptoms can be alleviated if medical treatment is obtained. Anyone bitten by this spider should remain calm and promptly seek medical advice; it is helpful if the offending spider can be caught and saved for identification.

The typical adult female black widow has a shiny black body, slender black legs, and a red or orange mark in the shape of an hourglass on the underside

of the large, round abdomen (Fig. 2). The body, excluding legs, is $\frac{5}{16}$ to $\frac{5}{8}$ inch long. Only the larger immature female and adult female spiders are able to bite through a person’s skin and inject enough venom to cause a painful reaction.

The adult male black widow is one-half to two-thirds the length of the female, has a small abdomen, and is seldom noticed. The male black widow does possess venom, but its fangs are too small to break human skin. The top side of its abdomen is olive-greenish gray with a pattern of cream-colored areas and one light-colored band going lengthwise down the middle. The hourglass mark on the underside of the abdomen typically is yellow or yellow-orange and broad waisted. The legs are banded with alternating light and dark areas. Contrary to popular belief, the female black widow rarely eats the male after mating but may do so if hungry. Like males, young female black widow spiders are patterned on the top side. In the early stages they greatly resemble males but gradually acquire the typical female coloration with each shedding of the skin. In intermediate stages they have tan or cream-colored, olive-gray, and orange markings on the top side of the abdomen, a yellowish orange hourglass mark on the underside, and banded legs.

Webs and Egg Sacs. The web of the black widow is an irregular, tough-stranded, sticky cobweb mesh in which the spider hangs with its underside up. During the day it often hides under an object at the edge of the web or stays in a silken retreat in the center. The black widow may rush out of its hiding place when the web is disturbed, especially if egg sacs are present. The egg sacs are mostly spherical, about $\frac{1}{2}$ inch long and $\frac{5}{8}$ inch in diameter, creamy yellow to light tan in color, opaque, and

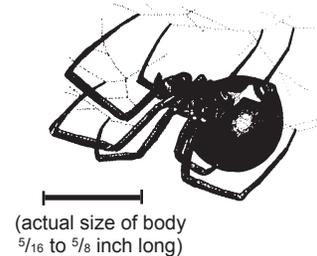


Figure 1. Adult black widow spider.

tough and paperlike on the surface. A female may produce several egg sacs. Tiny, young black widows, which are nearly white in color, disperse to new locations by ballooning and infest new areas.

Where the Spiders Live. Black widow spiders occur in most parts of California. They and their associated webs usually are found in dark, dry, sheltered, relatively undisturbed places such as among piles of wood, rubbish, or stones; in culverts, hollow stumps, and old animal burrows; in garages, sheds, barns, crawl spaces, utility meter boxes, and outhouses; and sometimes among plants. People are most likely to be bitten when they disturb the spider while they are cleaning out or picking up items in such places. A sensible precaution is to always wear gloves and a long-sleeved shirt when working in

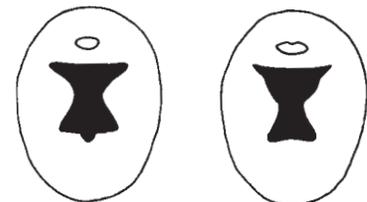


Figure 2. Two variations of hourglass markings of black widow spider.

Spider Bites

Unlike mosquitoes, spiders do not seek people in order to bite them. Generally, a spider doesn't try to bite a person unless it has been squeezed, lain on, or similarly provoked to defend itself. Moreover, the jaws of most spiders are so small that the fangs cannot penetrate the skin of an adult person. Sometimes when a spider is disturbed in its web, it may bite instinctively because it mistakenly senses that an insect has been caught.

The severity of a spider bite depends on factors such as the kind of spider, the amount of venom injected, and the age and health of the person bitten. A spider bite might cause no reaction at all, or it might result in varying amounts of itching, redness, stiffness, swelling, and pain—at worst, usually no more severe than a bee sting. Typically the symptoms persist from a few minutes to a few hours. Like reactions to bee stings, however, people vary in their responses to spider bites, so if the bite of any spider causes an unusual or severe reaction, such as increasing pain or extreme swelling, contact a physician, hospital, or poison control center (in California, the number is 1-800-222-1222).

Sometimes a person may not be aware of having been bitten until pain and other symptoms begin to develop. Other species of arthropods whose bites or stings may be mistaken for that of a spider include ticks, fleas, bees, wasps, bedbugs, mosquitoes, the conenose (kissing) bug (*Triatoma protracta*), deer flies, horse flies, and water bugs (*Lethocerus* spp.).

For first aid treatment of a spider bite, wash the bite, apply an antiseptic to prevent infection, and use ice or ice water to reduce swelling and discomfort. Bites or stings from a variety of arthropods can result in an itching wound. Rather than scratching, if necessary, try to relieve the itch with medication. Scratching can break the skin and introduce bacterial infection, which you or even a physician may mistake for an arachnid bite. If you receive a bite that causes an unusual or severe reaction, contact a physician. If you catch the critter in the act, save it for identification, preserve it (or whatever parts of it remain), and take it to your county UC Cooperative Extension office. If no one there can identify it, ask that it be forwarded to a qualified arachnologist.

areas that have been undisturbed for a time and where there are good hiding places for spiders.

Effects of the Bite. The symptoms of a black widow bite are largely internal; little more than local redness and swelling may develop at the bite site. The internal effects may range from mild to severe. Pain tends to spread from the bite to other parts of the body and muscular spasms may develop. In severe cases the abdominal muscles may become quite rigid. Other effects can include profuse sweating, fever, increased blood pressure, difficulty breathing and speaking, restlessness, and nausea. Typically, the pain and other symptoms reach a maximum within a day of the bite, then gradually subside over the next 2 to 3 days.

Most people who are bitten spend a few hours under observation by a physician but do not develop symptoms severe enough to require treatment. Small children, the elderly, and persons with health problems are likely to suffer some of the more severe consequences of the bite. Black widow bites are fairly common in California.

Yellow Sac Spider

The common, house-dwelling agrarian sac or yellow sac spider, *Cheiracanthium inclusum*, is a small spider that spins a silken sac web in the corners of ceilings and walls, and behind shelves and pictures; it is also commonly found outdoors in shrubbery. This spider is light yellow and has a slightly darker stripe on the upper middle of the abdomen (Fig 3). The eight eyes of this spider are all about equal in size and arranged in two horizontal rows (Fig. 4).

Yellow sac spiders can be seen running on walls and ceilings at night and quickly drop to the floor to escape if they are disturbed. Bites usually occur when the spider becomes trapped against a person's skin in clothing or bedding. It is estimated that sac spiders are responsible for more bites on people than any other spider. Typical symptoms of a bite include initial pain, redness, and sometimes swelling.

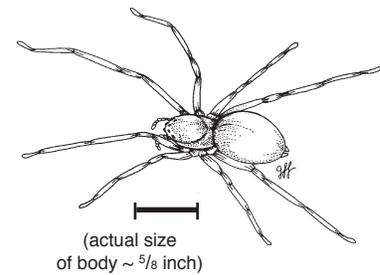


Figure 3. Adult yellow sac spider.

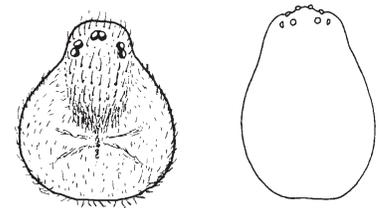


Figure 4. Head region of recluse spider (left) and yellow sac spider (right). Note the arrangements of the eyes: the recluse spider has six eyes arranged in three pairs and the yellow sac spider has eight eyes arranged in two rows of four.

Recluse Spiders

Recluse spiders of the genus *Loxosceles* include the well-known brown recluse spider, *L. reclusa*, which does not occur in California. While the brown recluse has occasionally been brought into California in household furnishings, firewood, and motor vehicles, it does not reside in the state. However, populations of another recluse spider, the Chilean recluse spider (*L. laeta*), were found in Los Angeles County in the late 1960s. In its native Chile it is known to have a bite that is toxic to humans. The native recluse spider of California (*L. deserta*) is found in the desert regions of southern California and neighboring states. Its bite can cause problems, but it is not as toxic as that of the Chilean recluse. In any case, bites from the desert recluse are rare and no bites from the Chilean recluse have ever been recorded in California despite its presence in heavily populated urban areas. Both the native desert recluse spider and the Chilean recluse spider occur principally in the drier areas of southern California.

Recluse spiders can have a violin-

shaped mark (with the neck of the violin pointing backward) on the top side of the head region (cephalothorax). However, the mark is not always distinct, so it should not be used as an identifying character. A unique feature of recluse spiders is their six eyes, arranged in pairs in a semicircle (Fig. 4), which can be seen with the use of a good hand lens. Most other spiders have eight eyes.

All recluse spiders make large, irregular, flattened, cobweb-type webs with thick strands extending in all directions. These spiders avoid light, are active at night, and tend to build their webs in out-of-the-way places. Chilean recluse spiders may be found indoors in boxes, in corners, behind pictures, in old clothing hanging undisturbed, and in other similar places. Desert recluse spiders appear outdoors where they may be found under rocks or wood.

More detailed information on these spiders is available in *Pest Notes: Brown Recluse and Other Recluse Spiders*, listed in the References section.

Other Spiders

In addition to the species mentioned above, there are only a few other species of spiders in California that may on occasion bite humans. (Remember, if the bite of any spider causes an unusual or severe reaction, contact a physician).

One kind of **red and black jumping spider**, *Phidippus johnsoni*, may bite if it is disturbed, but the bites are usually not serious. The female spiders are black with red on the top side of the abdomen whereas the males are all red. These spiders range in size from $\frac{1}{4}$ to $\frac{1}{2}$ inch long.

Tarantulas are long-lived spiders that occupy burrows in the ground during the day but often come out at night to hunt insects near the burrow. They commonly are feared because of their large size and hairy appearance. Some poisonous tarantulas occur in tropical parts of the world, but the bites of California tarantulas are not likely to be serious—at worst, they are similar to a

bee sting. However, because of the variety of tarantulas sold in the pet trade industry, there is a spectrum of venom potencies among these creatures. These spiders range from 1 to 2 inches in body size.

The **hobo spider**, *Tegenaria agrestis*, also called the aggressive house spider, is a common spider in the Pacific Northwest. It builds funnel-shaped webs in dark, moist areas such as basements, window wells, wood piles, and around the perimeter of homes. It is a large (1 to $1\frac{3}{4}$ inch, including legs), fast-running brown spider with a herringbone or multiple chevron pattern on the top of the abdomen. The hobo spider has not been documented in California, but it has expanded its range from the Pacific Northwest to northern Utah, Wyoming, and Colorado. Although it has been stated as being a poisonous spider, recent research is challenging the original data that elevated this spider to medical importance. See *Pest Notes: Hobo Spiders*, listed in the References section.

One spider frequently found indoors is the **common house spider**, *Achaearanea tepidariorum* (Fig. 5), which makes a cobweb in corners of rooms, in windows, and in similar places.

Another is the **marbled cellar spider**, *Holcnemus pluchei*, which was introduced into the state in the 1970s and has since displaced the once common **longbodied cellar spider**, *Pholcus phalangioides* (Fig. 6), a long-legged spider that resembles a daddy-longlegs. These spiders are only marginally capable of biting humans because their fangs are too short to pierce people's skin; they primarily cause problems by producing messy cobwebs.

Various kinds of small hunting spiders may wander indoors and occasionally, rather large, hunting-type spiders are discovered in homes or garages. Often these are fully grown wolf spider or tarantula males that have reached maturity and are searching for females. When these spiders are wandering, one or more may accidentally get indoors. New houses and other structures in developments may be invaded by wolf spiders that have lost their usual out-

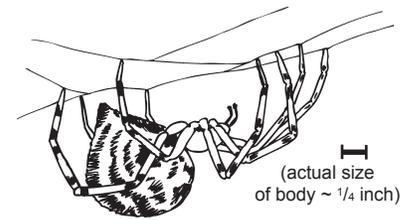


Figure 5. Adult common house spider.

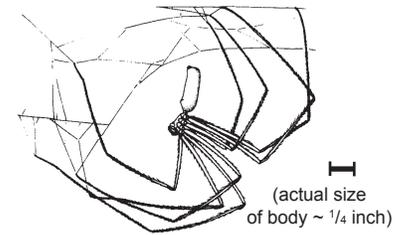


Figure 6. Adult longbodied cellar spider.

door living places. The more insects that exist inside a building, the more likely it is to have spiders living there. Usually spiders are most abundant in fall following the first few rains of the season. Immature and adult female burrow-living spiders sometimes wander for a time during the rainy season if they have had to abandon wet burrows.

MANAGEMENT

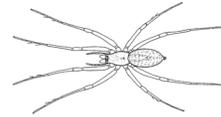
Remember that spiders are primarily beneficial and their activities should be encouraged in the garden. Pesticide control is difficult and rarely necessary. The best approach to controlling spiders in and around the home is to remove hiding spots for secretive spiders such as black widows and regularly clean webs off the house with brushes and vacuums.

Prevention and Nonchemical Control

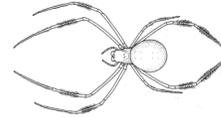
Spiders may enter houses and other structures through cracks and other openings. They also may be carried in on items like plants, firewood, and boxes. Regular vacuuming or sweeping of windows, corners of rooms, storage areas, basements, and other seldom used areas helps remove spiders and their webs. Vacuuming spiders can be an effective control technique because their soft bodies usually do not survive

Table 1. Common spider families in North America.**Agelenidae, funnel weavers or grass spiders**

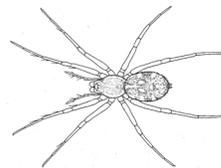
Sit-and-wait predators feed during the day and night on the ground in most types of vegetation, including low-growing plants and trees. Spin funnel-shaped webs, often with several-inch-wide, flat extension covering plants or soil. The spider waits in the hole of its web. When it detects vibrations from an insect that flew or walked into the web, the spider runs out, captures and bites the prey, then carries it back into the funnel to be eaten. Webs on low vegetation become conspicuous in morning light after collecting dew. Funnel weavers have six or eight eyes, all about the same size, arranged in two rows. About 300 species in North America.

**Araneidae, orb weavers or garden spiders**

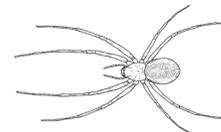
Feed on insects that fly, fall, or are blown into web. Elaborate silken webs are spun in concentric circles. Spiderlings often make symmetrical webs; mature spiders may spin a more specialized design that is helpful in identifying certain species. The spider rests at the center of its web or hides in a shelter near the edge, waiting for prey to become entangled. Orb weavers generally have poor vision and rely on web vibrations to locate and identify prey. About 200 species in North America.

**Clubionidae (including Corinnidae), sac spiders or twoclawed hunting spiders**

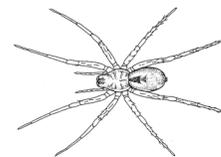
Stalk and capture prey that is walking or resting on surfaces. They spin silken tubes or sacs under bark, among leaves, and in low plants or on the ground, where they hide during the day or retreat after hunting. Commonly are nocturnal, medium-sized, pale spiders with few markings. About 200 species in North America.

**Linyphiidae (=Microphantidae), dwarf spiders**

Prey on insects that fall, walk, or land in their web. Diurnal (day active) spiders occurring in the plant canopy and among litter on the ground. They produce sheetlike webs on the surface of plants or soil and are common in some field and vegetable crops. Most are relatively small. Several hundred species in North America.

**Lycosidae, wolf spiders**

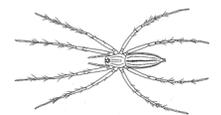
Prey on insects that are walking or resting on the ground. Actively hunt in the open during the day and night, often observed on the ground in litter and on low vegetation. Can occur in burrows and under debris on soil. Instead of spinning webs to catch prey, make a small, thick web where they rest. Have a distinctive pattern of eyes: four small eyes in front in a straight row, one middle pair of larger eyes, and one rear pair of widely spaced eyes on top of the head. They have long hairy legs. They are usually black and white or strongly contrasting light and dark, which can make them difficult to discern unless they are moving. About 200 species in North America.



eyes

Oxyopidae, lynx spiders

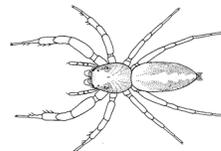
Stalk and capture resting or walking insects. Active hunters with good vision. Most have spiny legs and a brightly colored body that tapers sharply toward the rear. They have four pairs of eyes grouped in a hexagon. About 2 dozen known species in North America.



eyes

Salticidae, jumping spiders

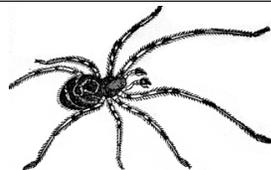
Day-active hunters in plants or on the ground. They make no web; instead they stalk and pounce on prey by jumping distances many times their body length. Jumping spiders have a distinctive pattern of eyes in three rows: the first row of four eyes, with large and distinctive middle eyes; a second row of two very small to minute eyes; and a third row of two medium sized eyes. They usually have an iridescent, metallic-colored abdomen and black carapace. About 300 species in North America.



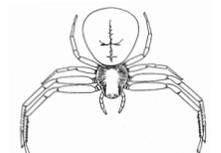
eyes

Theridiidae, cobweb, cobweb weaver, or combfooted spiders

Feed on insects that walk or fly into their webs. Almost always found hanging upside down by their claws in irregularly spun, sticky webs, waiting for prey. The spider is usually concealed in a corner of the web, in a silken tent, or behind debris. This group includes the black widow spider, which produces relatively thick silk that feels rough and sticky. They generally have a soft, round, bulbous abdomen and slender legs without spines. Over 200 species in North America.

**Thomisidae, crab spiders or flower spiders**

Stalk and capture insects walking or resting on surfaces. Diurnal hunters that do not spin webs. Front two pairs of legs are enlarged and extend beyond the side of their flattened body, making them look like tiny crabs. Their small eyes occur in two slightly curved rows, with the top row often much wider than the lower row. Over 200 species in North America.



eyes

this process. Indoors, a web on which dust has gathered is an old web that is no longer being used by a spider.

Individual spiders can also be removed from indoor areas by placing a jar over them and slipping a piece of paper under the jar that then seals off the opening of the jar when it is lifted up.

To prevent spiders from coming indoors, seal cracks in the foundation and other parts of the structure and gaps around windows and doors. Good screening not only will keep out many spiders but also will discourage them by keeping out insects that they must have for food.

In indoor storage areas, place boxes off the floor and away from walls, whenever possible, to help reduce their usefulness as a harborage for spiders. Sealing the boxes with tape will prevent spiders from taking up residence within. Clean up clutter in garages, sheds, basements, and other storage areas. Be sure to wear gloves to avoid accidental bites.

Outdoors, eliminate places for spiders to hide and build their webs by keeping the area next to the foundation free of trash, leaf litter, heavy vegetation, and other accumulations of materials. Trimming plant growth away from the house and other structures will discourage spiders from first taking up residence near the structure and then moving indoors. Outdoor lighting attracts insects, which in turn attracts spiders. If possible, keep lighting fixtures off structures and away from windows and doorways. Sweep, mop, hose, or vacuum webs and spiders off buildings regularly. Insecticides will not provide long-term control and should not generally be used against spiders outdoors.

Chemical Control

Typically pesticide control of spiders is difficult unless you actually see the spider and are able to spray it. There are various insecticides available in retail outlets labeled for spider control, including pyrethrins, resmethrin, allethrin, or combinations of these products. If you spray a spider, it will

be killed only if the spray lands directly on it; the spray residual does not have a long-lasting effect. This means a spider can walk over a sprayed surface a few days (and in many cases, a few hours) after treatment and not be affected. Control by spraying is only temporary unless accompanied by housekeeping. It is just as easy and much less toxic to crush the spider with a rolled up newspaper or your shoe or to vacuum it up. Sticky traps offer a noninsecticidal way to remove spiders from your home as long as you can place the traps where pets and curious children can't tamper with them.

Sorptive dusts containing amorphous silica gel (silica aerogel) and pyrethrins, which can be applied by professional pest control applicators only, may be useful in certain indoor situations. Particles of the dust affect the outer covering of spiders (and also insects) that have crawled over a treated surface, causing them to dry out. When applied as a dustlike film and left in place, a sorptive dust provides permanent protection against spiders. The dust is most advantageously used in cracks and crevices and in attics, wall voids, and other enclosed or unused places.

REFERENCES

- Akre, R. D., and E. P. Catts. 1992. *Spiders*. Pullman: Wash. State Univ., Cooperative Extension Publ. EB1548.
- Hedges, S. A., and M. S. Lacey. 1995. *Field Guide for the Management of Urban Spiders*. Cleveland: Franzak and Foster Co.
- O'Connor-Marer, P. 2006. *Residential, Industrial, and Institutional Pest Control*. Oakland: Univ. Calif. Div. Agric. Nat. Res. Publ. 3334.
- Vetter, R. S. Oct. 2009. *Pest Notes: Black Widow and Other Widow Spiders*. Oakland: Univ. Calif. Div. Agric. Nat. Res. Publ. 74149. Also available online, www.ipm.ucdavis.edu/PMG/PESTNOTES/pn74149.html.
- Vetter, R. S. Jan. 2008. *Pest Notes: Brown Recluse and Other Recluse Spiders*. Oakland: Univ. Calif. Div. Agric. Nat. Res. Publ. 7468. Also available online, www.ipm.ucdavis.edu/PDF/PESTNOTES/pnbrownrecluse.pdf.
- Vetter, R. S. June 2006. *Pest Notes: Hobo Spiders*. Oakland: Univ. Calif. Div. Agric. Nat. Res. Publ. 7488. Also available online, www.ipm.ucdavis.edu/PDF/PESTNOTES/pnhobospider.pdf.
- Vetter, R. S., G. K. Isbister, S. P. Bush, and L. J. Boutin. June 2006. Verified bites by yellow sac spiders (genus *Cheiracanthium*) in the United States and Australia: Where is the necrosis? *Amer. J. Trop. Med. Hyg.* 74 (6): 1043-1048.
- Vetter, R. S., and D. Ubick. Jan. 2008. *Pest Notes: Zoropsis spinimana, A Mediterranean Spider In California*. Oakland: Univ. Calif. Div. Agric. Nat. Res. Publ. 74143. Also available online, www.ipm.ucdavis.edu/PMG/PESTNOTES/pn74143.html. ❖

For more information contact the University of California Cooperative Extension in your county. See your telephone directory for addresses and phone numbers.

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WARNING ON THE USE OF CHEMICALS

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Pesticides applied in your home and landscape can move and contaminate creeks, rivers, and oceans. Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits or vegetables ready to be picked.

Do not place containers containing pesticide in the trash or pour pesticides down sink or toilet. Either use the pesticide according to the label or take unwanted pesticides to a Household Hazardous Waste Collection site. Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Household Hazardous Waste Collection site nearest you. Dispose of empty containers by following label directions. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

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