Widow Spiders and their Relatives

Integrated Pest Management for Homes, Gardens, and Landscapes

There are two species of widow spiders in California, the western black widow and the brown widow. Both are in the genus *Latrodectus* and are characterized by a similar body shape, reclusive habit, and irregular cobwebs.

The western black widow, a native species, is widespread, and is the spider posing the greatest potential envenomation threat to humans in the western United States. It is well known in many localities, and nonprofessionals can identify it easily.

In the first decade of the 21st century, the non-native brown widow became established in southern California. Although it isn't nearly as dangerous as the black widow, it causes alarm because of the reputation of its relative.

BLACK WIDOW SPIDERS

Several species of black widow are common in North America, but in the western United States the only species present is the western black widow, *Latrodectus hesperus*. Its habitat ranges from British Columbia and Alberta to Mexico and throughout the Rocky Mountains to the western portions of the Great Plains.

In California, it is a common desert spider that can survive very hot, dry conditions. However, black widows also can be found in mountainous terrain above 5,000-foot elevation in Southern California, where snow covers the ground every winter. Outside California, western black widows are common in urban Colorado, in central and eastern Washington state, and in southern British Columbia.

Because the holes, cracks, crevices, trash, and clutter associated with human structures provide ideal habitat for the western black widow, these spiders are often very common around homes, barns, outbuildings, and rock walls. In such supportive habitats, mature females can be found every few feet and sometimes within inches of each other.

Identification

A mature female western black widow spider (Figure 1) is about ½ inch (13 mm) in body length, and has a rounded abdomen and very characteristic coloration. She is shiny jet black all over her body and legs, except for a red pattern on the underside of the abdomen, which looks, in perfect specimens, like an hourglass. Some specimens have a brownish or plum-colored tinge, but usually these are females that are so well fed that the black-pigmented abdomen has been stretched until it looks brown instead of black.

The red hourglass varies in appearance; it can be two perfect triangles with points merged to make a perfect hourglass, two triangles separated by a space, a triangle and a small bar, minimal or almost imperceptible red coloration, or, on rare occasions, completely absent. The false black widow, which is discussed below, is chocolate brown and never has red coloration, although many people frequently mistake it for a black widow.

As easy as it is to identify an adult female black widow, the immatures, looking nothing like the mother (Figure 2), can be difficult to recognize. When black widow spiderlings emerge from their egg sac (Figure 3), they have tan legs and a tan cephalothorax (the body part to which the legs attach), while the abdomen is mostly white with a few black spots.

Figure 1. Mature female western black widow spider.

Figure 2. Immature female western black widow spider.

Figure 3. Western black widow spiderlings and egg sac.

As the spider grows, the background coloration of the abdomen becomes olive-gray or tan; and there is a

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longitudinal white stripe on the top of the abdomen and diagonal stripes on the flanks, with a small black dot at the uppermost portion of each diagonal stripe.

As the spiderlings continue to grow larger, they molt, like all spiders, in order to shed their restrictive exoskeletons. With successive molts in females, the white stripes become thinner, the olive-gray or tan coloration darkens toward black, and eventually the spider acquires its well-known black coloration. Some mature females retain one or two conspicuous, indented white lines on the front surface of the abdomen that look like a corporal's chevrons.

In the youngest spiders, the space where the hourglass develops starts off being a whitish shield. As the spider grows and molts several times, the color of this shield turns from white-yellow to orange-red and changes from a shield with a thick middle portion to an hourglass with a thin, tapered middle.

In contrast to the female, the male black widow (Figure 4) retains the coloration of the juvenile. After it matures, it stops eating and its abdomen shrinks (its only task at this point is to mate). The male still retains one longitudinal abdominal stripe and a set of diagonal flank stripes on each side of the abdomen. The males are much smaller than the females in body length, although sometimes their legs are almost as long as those of the adult female.

One more color variation involves the longitudinal stripe that runs up the middle of the top surface of the abdomen in immature black widows; sometimes it has a vivid red stripe within the confines of the white border. This coloration can cause anxiety for anyone who isn't familiar with widow immatures, because they might incorrectly identify it as the Australian redback widow spider, which has red markings on the top but otherwise is uniformly black rather than mottled as an adult. Redback widow spiders are not found in North America.

Figure 4. Mature male western black widow spider.

Figure 5. Black widow spider and egg case.

Egg Sac

The egg sac of the western black widow is yellowish and teardrop-shaped, tapered at the top and bulbous at the bottom (Figure 5). The margins of the sac are well defined (as opposed to some spider egg sacs, which look like fluffy cotton balls, making it difficult to determine exactly where the egg sac starts). The egg sac covering is very tough and difficult to rip apart.

A female western black widow typically lays about 300 eggs per sac. Because females can store sperm from their only mating, they can produce more than 10 egg sacs without subsequent matings and without a decrease in the number of eggs or a reduction in the percentage of eggs that will successfully hatch into spiderlings.

Habitat

The western black widow is found in populated areas almost everywhere in California. Although they can be found in homes, black widows typically nest outside, around the home in holes and crevices, and within clutter. In garages, they usually make webs by doors, near vents, and in other places where insects may pass by. Because most people don't tolerate large numbers of insects in their living spaces, widow spiders usually won't find sufficient prey to survive inside homes.

Black widows are shy spiders that seek retreats, such as holes between bricks or spaces around pipe penetrations in walls, where they can hide during the day and then come out at night. In natural settings, you can often find them in rodent burrows and crevices in rock faces. The spider makes a web of tangled silk extending from this retreat hole.

The web doesn't have a very recognizable pattern, although it does have vertical support threads above and below the central areas where the spider sits while it waits for prey at night. The lower support threads also alert the widow to the presence of a prey item blundering into the web.

In most cases, a widow spider will seek a retreat near the ground as the home base for her web, which connects to the retreat, allowing the spider to emerge to catch both flying and crawling prey at night, usually within three feet of the

ground. However, some spiders will make a retreat well above ground level, such as in the eave of a house, and then drop down 10 or more feet before building their web.

Widow spiders come out at dusk. After making improvements to their existing web, they take up a position in the middle, their underside facing upward, to wait for prey. Any large disturbance of the web that indicates something larger than a prey item causes the spider to quickly move toward the safety of its retreat.

The silk of a mature black widow is very strong. If you run your finger through the web of a large spider, the result is an audible ripping sound. Black widow silk is so strong that during World War II, it was used to make crosshairs for gun sights.

Medical Aspects

Bites from black widow spiders are quite rare, even where these spiders are very common. In the unlikely event of an actual bite from a black widow, the bite itself is painless or may feel like a little pinprick. Almost all medically important black widow bites are from the adult female, which is much larger than the male. The female also has stronger biting muscles and a larger venom reserve. At the site of the bite, there may be a little red mark or red streaking away from the bite. Within an hour, other symptoms may start to appear.

Bite victims might suffer from some but not all of the following symptoms:

- Rigid stomach muscles, which some medical professionals have misdiagnosed as appendicitis
- Sweating, sometimes of just the bitten body part, such as a bite to the hand that results in only the arm sweating profusely
- Pain that can be local, radiating, or regional
- Urine retention
- Numbness, agitation, fever, and patchy paralysis (less common)

Another sign of envenomation is that bite victims will sometimes move or rock back and forth incessantly to try to lessen the pain from the venom injection process.

Although these are the most severe manifestations of black widow bites, symptoms most often merely resemble those of the flu. Black widow bites don't cause conspicuous swelling, necrosis, or deterioration of tissue around the bite.

As a neurotoxin, the venom of a black widow affects the nerve-muscle junction in the body. Normally, the body's neurons work like a light switch: they make the muscle turn on and then off again so that the muscle can relax and be ready to contract again if needed. The venom causes the muscle to repeatedly contract. It would be like flipping on a light switch and not being able to turn it off again.

If bitten, seek medical attention immediately. You can place a cold pack on the bite to relieve the pain. An antivenom for black widow bites is available that works for all species that have been tested worldwide. Response is fast, and bite victims can go from intense pain back to normal in 30 minutes.

The antivenom is based on horse serum, so physicians need to monitor for anaphylactic shock. American physicians are somewhat reluctant to use antivenom for this reason and might prefer to have the bite victim simply endure the symptoms, which can be similar to those of a bad flu episode and usually dissipate in a few days.

BROWN WIDOW SPIDERS

The brown widow spider, *Latrodectus geometricus*, is found worldwide in subtropical habitats. It probably originated from Africa, or possibly from South America.

In North America, the brown widow was found only in Florida for many decades, where it remains rather common. However, in the first decade of the 21st century, the spider began appearing elsewhere, from Texas throughout the Gulf Coast states and up the Atlantic coast into South Carolina.

While they were expanding in the southeastern United States, brown widows started being discovered in great numbers in Southern California, where they have caused great concern within the general public. Initial news reports exaggerated the impact of the brown widow. However, unlike that of the black widow, the bite of this spider is not much more toxic to humans than that of other common spiders.

Figure 6. Mature female brown widow spider.

Table 1. Features used to distinguish brown widows from immature black widows.

Feature	Brown widow	Black widow (immature)
Black spots on lateral abdominal stripes	large; squarish	small, elliptical
Hourglass	bottom half larger	top half larger
	rough margins	crisp, straight margins
White markings on front of abdomen	not continuous	continuous

Identification

Mature female brown widows are smaller than mature female western black widows, being about 3/8" in body length (10 mm). The normal brown widow spider coloration is a mottled collection of tan, brown, and gray (Figure 6). It has a lengthwise stripe halfway up the back side of the abdomen with two isolated dots in front of it and diagonal stripes on the side, somewhat similar to immature western black widow spiders (see Table 1). However, the usual background coloration of the brown widow is more of a tan, as compared to the western black widow, in which background coloration is more olive-gray. Male brown widows are much smaller [body length: 3/16 inch (4 to 5 mm)] than other widow spiders and therefore might be overlooked or misidentified (Figure 7).

There is, however, great variation in brown widow coloration. Spiders can vary from almost white (Figure 8) to almost black (Figure 9). When brown widows are very dark, though, this coloration is closer to a flat black than a shiny black like that of a mature black widow female.

A mature brown widow female looks very similar to an immature western black widow, thus some skill is needed to identify the two accurately. However, the brown widow egg sac, as described in the next paragraph, is distinctive and a much surer way to confirm the species.

Egg Sac

The egg sac of the brown widow spider has protuberances of silk all over its surface (Figure 10), resembling a very large pollen grain. The sac is so characteristic that it can be used to verify the presence of brown widows even if the spiders themselves are not seen.

Brown widows produce about 130 eggs per egg sac and are able to make 20 or more egg sacs in a lifetime, sometimes multiple sacs within a short time period. Female brown widows can be collected with several simultaneously-developing egg sacs.

Figure 7. Male brown widow (right) and a female brown widow (left).

Figure 8. Light-colored brown widow spider.

Figure 9. Dark-colored brown widow spider.

Figure 10. Brown widow spider-egg sacs.

Habitat

The habitat of the brown widow is similar in many respects to that of the black widow. They generally reside in cluttered areas outside, such as woodpiles, but you will also find them in more exposed areas, such as on chain-link fences where black widows normally would not be found. They are also extremely common in the nooks and crannies on the undersides of inexpensive plastic patio furniture. Brown widow spiders make irregular webs of strong silk, similar to those of western black widows.

Both black widows and brown widows are almost never found in homes. In garages, black widows are common but brown widows are not. Outside and around the home, both spiders are very common.

The brown widow appears to be displacing the black widow in some of its habitats, especially in urban areas. Southern California residents frequently mention that they used to have a few black widows, but now only can find brown widows (and in greater numbers). In a study published in 2012, brown widows outnumbered black widows in urban areas; such as around homes, in parks (especially under playground equipment), in zoos, etc.

The same study, however, reported that brown widows were not found in natural areas in southern California (such as in chaparral and coastal sage scrub habitat) and were rare around agricultural buildings. Brown widows were occasionally found in agricultural crops such as citrus, apple, and avocado trees as well as in corn stalks, bird-of-paradise leaves and other plants, but most

of these finds were in vegetation associated with small home gardens rather than large commercial properties.

As of 2016, brown widows were well established from Santa Barbara to the San Bernardino area and south to Mexico. Established populations have not yet been found north of the Los Angeles Basin, in the Central Valley, or in the desert areas (which may be inhospitable for them due to the arid climate).

Although unsubstantiated reports of brown widows occurring north of the Los Angeles - Santa Barbara region (such as in the San Francisco Bay area) have been made for years, submitted spiders have been immature black widows, *Steatoda* (false black widow) spiders of several species, or orbweavers. However, it is possible that the brown widow is continuing to expand its range in California.

Medical Aspects

The bite of the brown widow is much milder than that of the western black widow. In a study in Africa, the most common symptoms in 15 verified bites were that the bite hurt when it happened and that there was burning pain at the bite site. None of these patients developed the typical dynamic symptoms of black widow envenomation. Despite these observations, there is one American record of a verified bite where the patient developed more severe symptoms and required hospitalization.

Although its venom is at least as potent as black widow venom (drop for drop, as tested in mice), the brown widow is smaller and likely injects much less venom during a bite. In addition, bites to people are unlikely since brown widows, when disturbed, typically pull their legs close to the body, drop from their web, and play dead.

Figure 11. False black widow spider (adult female).

The recent arrival of the brown widow in Southern California is not a cause for alarm. In fact, if the brown widow is indeed displacing the more toxic black widow, there actually might be a reduction in spider bite risk as compared to previous decades.

Figure 12. False black widow egg sac.

OTHER RELATED SPIDERS

False Black Widow

The false black widow spider, *Steatoda grossa*, (Figure 11) is not a true widow spider; however, it is in the same family, Theridiidae, as widow spiders and can easily be confused with them. It shares the same rounded-abdomen body form and web-making traits. It is slightly smaller than a mature western black widow spider [body length: 3/8 inch (10 mm)], chocolate brown in color, and never has red coloration on its belly.

The false black widow is a European immigrant that has become extremely common in Pacific Coast homes from San Diego to British Columbia, with isolated finds in Alaska. Unlike black widows, false black widow spiders thrive indoors, especially in washrooms, inside cupboards and underneath appliances, furniture and cabinets.

False black widows make an egg sac (Figure 12) that looks like a cotton ball with indistinct margins. Unlike black widow spiders, false black widow spiderlings are dark like their mothers when they emerge.

Figure 13. *Steatoda nobilis*, a species of false black widow spider recently established in Southern California, the San Francisco Bay area, and the Monterey area.

Because they are common in homes, false black widows are more frequently involved in bite incidents than black widow or brown widow spiders. They have mild venom, and bites may cause symptoms similar to those of yellowjacket wasp stings: initial burning pain followed by minor localized swelling around the envenomation site. When black widow antivenom mistakenly has been used on false black widow bites, it appeared to eliminate the venom's effects.

Noble False Widow Spider

In 2011, *Steatoda nobilis* was discovered in Southern California. Like the false black widow, this spider is a European native. Mature females can reach 5/8 inch (14 mm) in body length, which is significantly larger than the false black widow.

Instead of being uniformly colored on the top surface of the abdomen as is the false black widow, *Steatoda nobilis* usually has a light tan pattern somewhat resembling a house with two windows and a domed roof (Figure 13). However, in some specimens, only the remnant tip of the "roof" is exhibited. There is also a broad, tan band on the front-facing surface of the abdomen.

This spider was first found in Ventura County. It is now widespread in coastal San Diego County, Monterey, and the San Francisco Bay area. Isolated finds

have occurred in Los Angeles and Santa Barbara.

Bites from this species are not considered to be medically significant. There have been two recorded bites from the spider, with minor symptom development, but because of its large size, it has the potential to hurt merely from fang penetration. This spider will probably continue to spread throughout coastal California.

MANAGEMENT

Minimizing sites around the home where spiders may hide, such as clutter, woodpiles, and heavy ground cover, is essential for reducing widow spider populations. However, it is not practical to eliminate these spiders completely. Both widow species will continue to re-infest treated areas.

Regularly vacuuming or sweeping windows, corners of rooms, storage areas, and other seldom-used areas helps remove spiders and their webs. Vacuuming spiders can be an effective control technique because their soft bodies usually don't survive this process.

In the garage, keep items such as gardening clothes and gloves in bags closed with zipper-locks or twist ties. Store seasonal items such as sports gear, camping gear, winter clothes or holiday decorations in boxes that can be taped shut and placed off the floor away from walls in order to exclude spiders. When cleaning up clutter in garages and other storage areas, be sure to wear gloves to avoid accidental bites.

Other areas to check carefully include children's toys or playhouses made of molded plastic that have open spaces facing downward where spiders can crawl in. Additional favored habitats of widow spiders include picnic tables, trash can grips, lawn chairs, plant pots with curled lips, and other outdoor objects with sheltered lips or crevices.

Be careful that you do not carry spiders indoors on items such as plants, firewood, and boxes. Stack woodpiles away from your house, and never pick up pieces of wood unless you are wearing gloves.

Eliminate places for spiders to hide and build their webs by keeping areas near building foundations free of trash, leaf litter, and accumulations of other materials.

Outdoor lighting attracts insects, which in turn attract spiders. If possible, keep lighting fixtures pointed off structures and away from windows and doorways. Sweep, mop, hose, or vacuum webs and spiders off buildings regularly. Insecticides do not provide long-term control.

Because widow spiders are nocturnal, a nonchemical method of eradication is to search for them at night with a flashlight and kill them with a shoe or rolled up newspaper. If you are concerned about wildlife and feel comfortable doing so, you can remove individual spiders from indoor areas by placing a jar over them and slipping a piece of paper underneath to seal off the opening when you lift the jar. Release the spider about 100 feet from your home into a natural area. Brown widows may not survive in natural areas but on the other hand, they are an invasive, non-native pest species and should not be there anyway.

One aspect that makes controlling widow spiders difficult is that they, like many spiders, exhibit a behavior called ballooning. When the spiderlings are very small, on warm days when there is an updraft, they climb to the top of a fence post or piece of vegetation, raise their abdomens into the air, and release a small filament of silk. When the updraft currents overtake the forces of gravity, the spiderling is carried into the air to another location. This may only be a few feet away, or it could be miles. Ballooning spiderlings have been captured at 10,000 feet from the ground and 200 miles offshore. Because spiderlings will be dropping down on your property continually, eliminating them will be a task that needs to be done repeatedly throughout the year.

Chemical Control

Typically, control of spiders using pesticides is difficult. Various insecticides are registered for control of spiders; including pyrethrins, pyrethroids, and combinations of these products.

Curiously, most of these registered pesticides are water-based while the silk of spider egg sacs repels water. In a 2016 study, water-based insecticides sprayed on brown widow egg sacs provided no significant effect on the egg contents. However, when petroleum-based products were used, the pesticide was readily carried past the silk outer layer and killed the egg sac contents.

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