

The Black Widow Spider



Courtesy: Karen Vail, UTE & PP

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CREDITS

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The Black Widow Spider

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Entomology and Plant Pathology

INTRODUCTION

Araneophobia, or an irrational fear of spiders, is common among people in the United States. Few other spiders are as apt to make people uncomfortable as is the black widow. Black widow spiders are very numerous in nearly all parts of the U.S., but cases of reported bites are rare. For the most part, black widows live peacefully in close proximity to humans with little contact. Although both male and female black widow spiders are highly venomous, according to our knowledge, no reports of bites from the males have been recorded.

DESCRIPTION

Widow spiders belong to the order Araneae (spiders) and the family Theridiidae, the comb-foot spiders or cobweb weavers. There are five species of widow spiders in the United States. The brown widow, *Latrodectus geometricus* C. L. Koch, and the red widow or red-legged widow, *L. bishopi* Kaston, are found only in Florida. The three other black widow spiders are the southern or common black widow, *L. mactans* (Fabricius), the northern black widow *L. variolus* (Walckenaer) and the western black widow *L. hesperus* Chamberlin & Ivie. Both the northern and the southern black widows are found in Tennessee, with the southern species being most common.

The body of the female adult black widow spider (northern and southern) can reach 1½ inches with the legs fully extended. The northern black widow female is generally larger than the southern black widow spider, but both can have an abdomen well over half an inch in diameter if their food supply is

plentiful. The widow spiders have eight eyes arranged in two rows of four and their vision is quite poor. The black widow appears shiny and hairless to the naked eye. The body ranges from a deep glossy black to an occasional dark brown to reddish brown. The underside of the abdomen has a distinct red or orange hourglass shape (**Figure 1**) in the southern black widow, while in the northern black widow the hourglass appears split in the middle. In immature individuals, the color is variable (**Figure 2**) and the hourglass may be white or missing entirely. Males, generally considered harmless to vertebrates, are generally about half the size of females with yellow or red spots or bands on the back or sides (**Figure 3**).



Courtesy: Karen Vail, UT E & PP

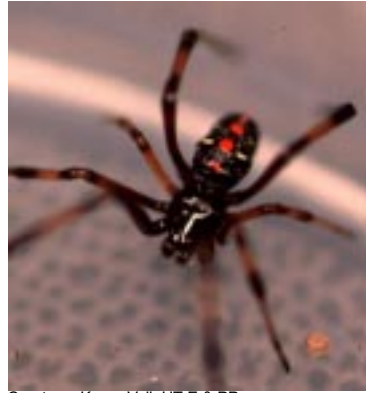
Figure 1. The hourglass marking of an adult female black widow, *Latrodectus* sp.



Courtesy: Karen Vail, UT E & PP

Figure 2. An immature female *Latrodectus* sp.

Figure 3. An immature male *Latrodectus* sp.

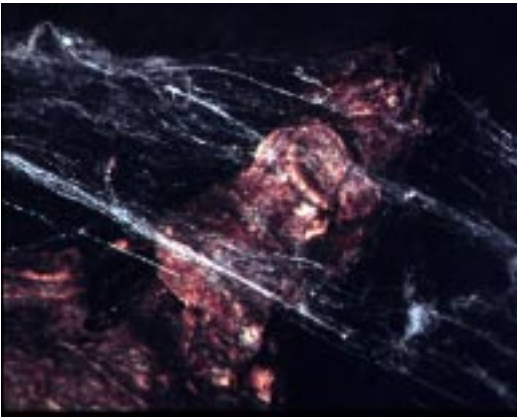


Courtesy: Karen Vail, UT E & PP

BIOLOGY

Habitat:

The southern black widow prefers dark, sheltered areas. In nature, the females construct webs in hollow logs and under loose bark or stones, in small trees and under bushes. Humans have provided additional suitable habitat in the form of crawl spaces under houses; firewood piles; under boards and furniture; inside boxes; in seldom-worn shoes; and behind and under debris, drainage pipes, false ceiling areas, out-houses, sheds, barns, well houses and root cellars. Northern black widow females tend to make their webs in the branches of trees.



Courtesy: Karen Vail, UT E & PP

**Figure 4.
Webbing of a
Latrodectus sp.**

The Web:

Southern black widow females build non-symmetrical, irregular mesh webs (**Figure 4**), usually in corners, on ceiling edges or other nooks and crannies. The spider builds a retreat, usually near the top of the web and often funnel-like. The northern black widow female often builds a thick, dome-shaped retreat near the ends of branches in trees and the rest of the web radiates out over the branch from that part.

Females of both species will remain in the retreat unless alerted by movement in the web or the need to repair the web. The web serves as the “eyes” of a black widow, since she probably cannot discern much more than light or dark. As she hangs inverted in the snare, she is in contact with all major sections of her web. When potential prey disturbs an area, she will run out to that section. Further movement by the prey will help her pinpoint the location of the prey. She is highly aware of everything going on in her web and is capable of attack in any portion of it with great speed. If the web is contacted by something of superior force like a bird or a human finger, the spider will usually try to escape the web, not attack.

Feeding:

Black widow spiders are formidable predators that feed on live insects, other spiders and arthropods, as well as on other members of their species. They will take insects from half the size of a house fly up to large prey like cicadas and scorpions many times their size. If live prey are not available, they will feed on dead insects. The female, once alerted to the prey through its struggles in the web, makes a quick descent to the prey. Once the front legs, held out like feelers, contact the hapless insect, the spider will spin around and begin to put out silk rapidly, weaving it around the prey with comb-like structures located near the tips of her hind legs. When the spider feels the prey has been sufficiently subdued, she will approach it and deliver one or two short bites, followed by more wrapping with silk. Later she will deliver more short bites before the final long bite or bites. While her meal is being prepared, she will retire to the retreat for a short period while the venom and digestive juices work their way through the insect, paralyzing and breaking down the tissues. Later she will feed on the insect, sucking out the pre-digested liquid and leaving an empty husk.

Mating:

The widow spiders get their name from the females' supposed eating of the male after mating. Actually, the great majority of males get away. In a study using 18 males, only two were killed by females. This happened after each of the males had already successfully mated with a female a week before. Males can mate at least three times with different females, though the actual number is probably higher.

An adult male recognizes that he has found a female by pheromones impregnated in her web. Upon contact, the male begins cutting and reforming the female's web into sheets, strands and ball shapes held together by his silk. All the while, he vibrates his abdomen in such a way as to placate the female, placing her in a "trance." After a period of about an hour, the male will approach the female and attempt to mate. If repulsed, as he usually is, the first one or two times, he will go back to cutting and web rearrangement for a time before trying again.

Since the female "sees" through her web, having poor sight, the male has "blinded" her. By now the male is aware of the web's construction, but the female is in foreign territory. The female may eventually allow the male to begin mating and he does so by cautiously approaching, tapping the female constantly with his first pair of legs and pedipalps before spinning a light mesh of silk around the female called the "bridal veil." Should the female decide to attack, the "bridal veil" will detain her for a very short time, even less than one second, but this will usually be enough for the male to drop quickly out of danger. The male will then insert his pedipalps and inseminate the female. This is the point of highest danger for the male if the female decides to attack, since the male may need some time to extract his pedipalps from the female. After mating, or in some cases after being sufficiently discouraged by the female, the male leaves the web to search out other females.

Life Cycle:

Outdoors, black widows mate and spin egg sacs mostly during the warmer months. If kept indoors at room temperature, they will mate, produce young and grow steadily throughout the year. Females have lived for three years and males for up to one year in the laboratory. During mating, sperm is placed into

the female's spermatheca, an organ that will store the sperm for extended periods. The female will fertilize her eggs as they are passed into the eggsacs that she will spin over the next few months.

A female will produce about five to 10 eggsacs, each usually having between 150 and 250 eggs. The eggs hatch in the eggsac and the spiderlings go through a molt before emerging about four weeks later. The newly freed spiderlings are cannibalistic and usually disperse quickly by ballooning, a process in which spiderlings elevate their abdomen and play out silk until their buoyancy is enough to carry them off on the air currents. Spiderlings at this stage can slip through window screening with ease. The small spiderlings are harmless to humans.

DISTRIBUTION

The common or southern black widow is present in all counties of Tennessee. The northern black widow is also present but less obvious. The northern black widows' range extends from eastern Texas to Florida, north through New England and southeast Canada. The southern black widow occurs from eastern Texas through Kansas, north through southern New England to Florida and the entire southeastern states. The western black widow extends from western sections of Texas, Oklahoma and Kansas, north to the western Canadian provinces, throughout the western states to the Pacific coast.

VENOMOUS BITES

The venom of the black widow spider is a neurotoxin and alters the structure and function of nerve terminals without producing any significant local reaction. The primary component of the venom has been termed a "α-Latrotoxin." It is a 130,000-molecular weight protein that affects calcium metabolism at nerve terminals.

No pain is associated with the bite. Clinically, generalized pain occurs one to eight hours following envenomization with no skin lesions. In pets, there may be a blanched region surrounded by an erythematous (red) zone. The characteristic crampy

abdominal pain may be associated with pain in the flanks, thighs or chest and confused with acute appendicitis, renal stones or acute myocardial infarction. Sweating, diaphoresis, nausea and vomiting accompany most bites. The severity of bites depends on the degree of envenomization and age of the patient. The original reports, which suggest a human mortality rate of 5 percent, were not well documented, and the true incidence is probably much lower. Only four human deaths were officially attributed to black widow spider bites in the United States from 1960-1969. However, cats are exceptionally sensitive, with fatality rates estimated as high as 90 percent. Appropriate treatment by a physician is predicated on an accurate diagnosis and positive identification of the spider.

CONTROL

Sanitation:

Reducing black widow populations around structures involves two steps:

1. Changing the environment so it is less attractive to spiders.
2. Finding and destroying spiders.

Use the following measures to control spiders around structures:

- Eliminate spiders and discourage their return by routinely cleaning the house. Spiders, webs and egg sacs can be removed effectively with a vacuum cleaner, broom or duster such as a *Webster*.
- Reduce clutter in closets, garages, basements, attics, crawl spaces and outbuildings to make these quiet, undisturbed areas less attractive to spiders. During this cleanup, it is helpful to wear protective clothing such as long sleeves, long pants, boot, gloves and a hat. A pest control technician was bitten when a spider ran under his glove and upon reaching a tight spot, stopped and bit the technician. A situation like this could possibly be avoided if gloves are taped to the sleeve and socks taped to the pants.
- Use glue boards or sticky traps placed against edges near entry points into the structure (doors, windows, garage doors and crawlspace vents) to catch and detect spiders.
- Inspect and clean outdoor shutters, placing an emphasis on the areas behind the shutters.

- Use yellow “bug” lights or sodium vapor lights to attract less insects and subsequently less spiders to the structure.
- Spiders often congregate around the outdoor perimeter of a structure and tend to move indoors as winter approaches. Reduce migration indoors by moving firewood, building materials and debris away from the foundation. Trim or remove trees, vines or tee limbs from touching the side of the structure.
- Black widows prefer closed, dark places such as water meter compartments and crawl spaces, so barriers constructed to inhibit entrance to these areas are of value. Seal possible entry points into the structure. Pipe penetrations through the foundation can be sealed with steel wool or copper mesh followed with an expandable foam. Caulking can also be used in these locations. Doors and windows can be sealed with weather stripping or door sweeps. Ensure window, crawlspace and vent screens are tight-fitting and without holes. See Extension PB1303, **Managing Pests Around the Home**, for more suggestions on pest-proofing the home.

Chemical Control:

Since the vast majority of spiders and other arthropods are either harmless or beneficial, treat only if you have a black widow infestation. Apply insecticides to the habitats frequented by these spiders when you detect an infestation. Repeat the applications at intervals specified on the label as needed to eliminate the spider infestation.

To further impede spider entry into the home, a barrier spray of insecticide can be applied around the base of the house and possible entry points such as door thresholds, garage and crawlspace entrances and foundation vents. Synthetic pyrethroids (bifenthrin, cypermethrin, cyfluthrin, deltamethrin, lambda-cyhalothrin,) can be applied and may need to be reapplied throughout the summer. Bayer Advanced Home Indoor and Outdoor Insect Killer (cyfluthrin) and Ortho Home Defense Perimeter and Indoor Insect Killer (bifenthrin) are available to the general public. Wettable powder or microencapsulated (“slow-release”) formulations are particularly effective.

LITERATURE

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Precautionary Statement

To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store, or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed ***by the label***.

Disclaimer Statement

Pesticides recommended in this publication were registered for the prescribed uses when printed. Pesticide registrations are continuously being reviewed. Should registration of a recommended pesticide be canceled, it would no longer be recommended by The University of Tennessee. Use of trade or brand names in this publication is for clarity and information; it does not imply approval of the product to the exclusion of others which may be of similar, suitable composition, nor does it guarantee or warrant the standard of the product.

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