



Spiders and Scorpions

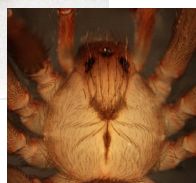
That Affect Human Health

Spiders and scorpions are probably some of the most feared arthropods and a cause of entomophobia (fear of insects), arachnophobia (fear of spiders) and delusory parasitosis (the feeling that insects or arthropods are crawling, biting or burrowing in the skin when no arthropod is involved). However, spiders and scorpions are important in nature and beneficial to humans because they feed on insect pests of crops, livestock, stored products and other commodities. While all spiders are equipped with biting jaws and venom for killing a prey, the majority cannot physically bite people or rarely come into contact with people. In Kansas, there are few species of spiders and scorpions that are of public health significance.

Spiders

Brown recluse spider

The brown recluse spider (*Loxosceles reclusa*) (Figure 1) is the most abundant poisonous spider of public health importance in Kansas. A bite of this spider in some cases can cause a necrotic lesion where the skin and flesh around the bite break down. This creates an open sore for several days and often leaves a scarred pit that is typically ½ inch in diameter. In a very small number of cases, poison from a brown recluse causes life-threatening systemic illness involving various internal organs.



Figures 1 and 2. Brown recluse spider and close-up of violin-shaped marking.

Brown recluse spiders vary in the color of their legs and abdomens. The legs of some, especially young ones, are nearly straw-colored. Most have medium brown, cocoa-colored legs. There are no spots or differently colored bands on a brown recluse's legs or abdomen. The abdomen of a brown recluse spider may be straw-colored, pinkish gray, pale- to medium-brown, or (in older individuals) nearly slate gray. The unvarying identifying marker on all brown recluses, regardless of gender, age or size, is a dark, violin-shaped pattern on the front part of the body (Figure 2). The neck of the violin points toward the abdomen. The pattern stands out distinctly against the lighter-colored background that is nearly the same color as the legs of the spider. The same identifying pattern is used to identify even the juvenile, which may have a leg spread of only about ¼ inch.

The brown recluse spider's natural geographic distribution includes an area from the Gulf of Mexico north, covering the eastern two-thirds of Texas, Oklahoma and Kansas, and an area eastward to southern Indiana, western Kentucky, Tennessee and western Georgia (Figure 3). Probably most, if not all, homes and buildings in the area of natural distribution are infested with brown recluse spiders. Records show new homes with infestations — either the spiders were present on building materials, invaded the home during construction or were moved into the new home in boxes or furniture. Older buildings are often most heavily infested, especially where settling, swelling and shrinking of materials, or other influences of aging have created cracks and crevices, and where decades of living have resulted in accumulations of stored items and clutter.

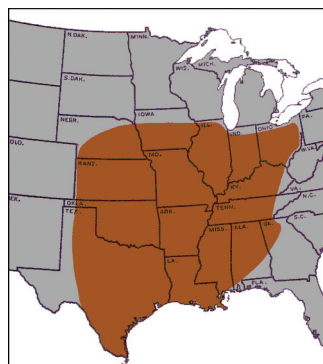


Figure 3. Geographic distribution of the brown recluse spider (USDA Leaflet No. 556).

Because people move and transport goods continuously, occasionally a home outside the spider's native region becomes infested. These spiders survive winters in the entire region, but they are more abundant outdoors in the southern half than they are in Kansas, Missouri and Kentucky. In the warm, humid region where they naturally occur, they seem to select habitats that are especially warm and dry. For instance, in most homes there are more of them in attics and upstairs rooms on the south and west sides of the house than in basements or rooms on the north and east sides. They are most common indoors where air movement and light are reduced such as in closets, behind drawers, under and behind furniture, under, behind or in boxes, or beneath dirty clothing or towels on the floor.

These spiders are active at any temperature between 40° and 110°F, and are probably most active between 70° and 100°F. Places where brown recluse spiders occur outside the home or business structures are characteristically protected from wind, rain and bright sunshine, and are relatively undisturbed by humans and other mammals. They may be found beneath loose bark on trees, in scrap piles and stacks of lumber, in rock piles and caves and in barns, storage buildings and garages.

Brown recluse spiders require from 8½ to 15 months to develop from egg to adult, averaging about 11 months. After becoming adults they typically live for one to 2½ years. Even in homes that are warm throughout the winter, these spiders are generally inactive from late September through March. Insect prey is relatively scarce that time of year, so they don't waste energy searching for it. Adult brown recluses may mate as early as February, but most mate in May, June or July. More than 80 percent of eggs are laid during these months. Eggs are laid in sacs of webbing attached to a wall, cardboard box or other surface. Often, the top of the egg sac is poorly formed and the eggs are visible. The typical number of eggs in a sac is about 40 to 50, but there can be as many as 100. Some females may produce as many as five egg sacs in their lifetime, but two or three is more typical. Eggs hatch between 3½ and six weeks after being deposited. Newly hatched spiderlings stay close to the nest and to the female who continues to guard them for the first few weeks. Then they begin to wander in all directions, while still very tiny. When a brown recluse spider rests in one site for several days, such as after feeding on prey or while preparing to lay eggs, it constructs an irregular jumble of webbing. Such webs are seldom seen because they are located in wall voids or other out-of-sight places, but they are sometimes found in closet corners, near the floor or ceiling, or inside or beneath furniture. Brown recluse spiders do not use their webs to catch prey. Rather, they hunt away from webs at night. When brown recluses are seen crawling in the daytime, it is usually because something has disturbed them.

Control

The foundation of brown recluse control is good housekeeping, tight construction and providing for good air circulation. Eliminate all clutter. Where possible, seal storage boxes and bags. Place stored items in stacks several inches apart and away from the wall. Frequent cleaning of all areas helps you locate

and destroy spiders before they reproduce. Apply tight-fitting trim or caulking to eliminate cracks or crevices through which spiders or insect prey may enter a room from within the wall voids. Seal all cracks and crevices on the building's exterior.

In Kansas, the number of brown recluse spiders inside many homes is greater than the number in a similar-sized area outside. But external caulking and repairing keeps out other kinds of spiders, keeps out insects that provide prey for indoor spiders, and keeps outdoor populations of brown recluse spiders from re-infesting a building from which they have been (nearly) eliminated.

Brown recluse spiders have a daily rhythm of activity. From daylight until dark they are inactive behind baseboards or other areas where they are difficult to find. About an hour or two after dark they can be most easily seen and usually have not yet moved far from their resting places. Make thorough inspections of each room between 9 and 10 p.m. using a flashlight to see in poorly lighted areas. Destroy any brown recluse spiders you see — swat or step on them, or use a quick-acting household spray containing pyrethroids (e.g. resmethrin, pyrethrin, tetramethrin, cyfluthrin) to knock them down and then kill them. Wherever you see one, search the floor and wall within a few feet of that site to see if you can eliminate a hiding place or point of entrance.

Glue traps are effective for monitoring and offer some control of brown recluse spiders. They can be purchased at many grocery, hardware or general stores. Place them strategically on floors close to walls or corners in closets and cabinets, beneath sinks or behind furniture. Consider pets and small children in determining the use and placement of sticky traps. Not only will they catch a lot of brown recluse spiders and other crawling insects, but the relative number of them caught from week to week will help you determine whether control efforts are working. One brand of sticky traps is called CATCHMASTER.

Many insecticidal products have spiders listed on the label, but they seldom kill spiders that are not sprayed directly. In other words, even sprayed materials that leave residues effective against cockroaches or sowbugs for two or three weeks are not effective against brown recluse spiders once spray has dried. Insecticidal dusts probably provide the best control of spiders, including the brown recluse.

Bites from the brown recluse most commonly occur when they hide in a garment that someone puts on. Some bites occur when a spider crawls into a bed and is squeezed by a person rolling or turning while asleep. Despite implementing all reasonable control efforts to destroy brown recluse spiders, some may survive. Without becoming unduly frightened by them, the chances of family members being bitten can be reduced by routinely employing certain habits:

- Pull cribs and beds away from the wall.
- Keep bedclothes from hanging all the way to the floor.
- Look on both sides of a towel before drying with it.
- Look in and shake shoes before putting them on.
- Shake clothing (especially if it has been hanging or in a

closet for even a day or two) and look down the sleeves and legs before getting dressed.

If bitten, try to save the spider (even if it is somewhat destroyed) and have it identified by the doctor or entomologist. Your local K-State Research and Extension agent can usually identify this species of spider if the doctor cannot. Apply an ice pack to the bite area and go to the doctor immediately. Do not apply camphor, phenol or other household disinfectants. Doctors differ about procedures to use to minimize the effects of brown recluse bites, but they all agree that getting to the doctor early helps in diagnosis, and starting treatment early is important.

Initial pain and tissue reaction are not always the same. Victims may have no reaction at first or may immediately feel stinging and pain. Intense pain may last from two to eight hours. The amount of venom injected by the spider and the victim's sensitivity determine the seriousness of the bite.

A small blister often forms at the bite, and a large area around the bite becomes red and swollen. Some victims experience nausea, stomach cramps, joint stiffness and fever. Tissue in the infected area often peels away, resulting in an ulcerous sore that gradually fills with scar tissue (Figure 4). Wounds are slow to heal, sometimes taking six to eight weeks.



Figure 4. Necrotic lesion approximately 10 days after brown recluse spider bite.

In the event that a bite occurs and one has not seen the spider, examine the bite mark closely. If it is a spider bite, two separate "fang" marks should be visible about $\frac{1}{16}$ inch apart. A biting fly (deer or stable fly), a bedbug, a bloodsucking conenose (kissing bug) or some other insect likely caused a bite if only one puncture is present. Or it may be a sting or a thorn puncture. Consider these possibilities when diagnosing a possible brown recluse bite and treatment. Several skin conditions may resemble the sloughing, ulcerous stage of a brown recluse bite. These include a fungal infection from a thorn (sporotrichosis), impetigo, infected acne, unusual reaction to some other biting arthropod and outward signs of serious ailments such as kidney problems or diabetes. The bite victim who knows the cause was a brown recluse can at least rule out other unpleasant possibilities.

Black widow and northern widow spiders

Two other spider species of medical importance in Kansas are the black widow spider (*Latrodectus mactans*) and the northern widow spider (*L. variolus*). These are found throughout Kansas and belong to a family of spiders called cobweb weavers or tangled web spiders. Loose, unsightly webs made by members of this group are commonly found in undisturbed sites such as window wells, cellars, crawl spaces, garages and infrequently cleaned buildings. Widow spiders also inhabit hollow logs and stumps, abandoned animal burrows, spaces beneath fallen fence posts, in piles of dead tree branches or other debris.

A female widow spider's body is about $\frac{1}{2}$ to $\frac{3}{16}$ inch long, with a large, bulbous, shiny, black abdomen marked with red. The black widow has a distinct red hourglass-shaped spot on the underside of the abdomen and usually a red spot just above her spinnerets, which are short, finger-like pro-



Figure 5. Black widow spider.

jections near the tip of her abdomen (Figure 5). The northern widow spider is similarly marked but the hourglass is usually broken into two separate spots with no other red markings. The legs of both species are long, black and slender. Males are much smaller, slender-bodied, and have three or four red or yellow spots on each side of their abdomen. The female widow spider usually is found hanging upside down in her loose, tangled web. She encloses 200 to 260 eggs in a round, off-white, silken egg sack and guards it until the young hatch. Normally, the female widow spider is shy and nocturnal, seldom leaving her web. Widow spiders are not aggressive and can be subjected to considerable provocation without attempting to bite. They may, however, rush out and attack when their webs are disturbed or if they are accidentally trapped in clothing or shoes.

Widow spider venom contains a neurotoxin, and the bite usually causes an immediate, sharp pain followed by a burning sensation, localized swelling and redness. Pain may become intense after an hour or two and last for up to two days. The victim may experience aching cramps in the abdomen, shoulders, back, chest and limbs. Abdominal muscles may become rigid. Other symptoms may include headache, nausea, tremors, weakness, salivation, difficulty speaking, swollen eyelids, breathing problems and a slight rise in temperature. The degree of severity depends on the sensitivity, health and size of the victim. Small children and the elderly are often the most severely affected.

If a person has been bitten by a widow spider, keep the bite victim calm and under observation. Immediately take the victim to a doctor or emergency room. If the spider can be safely captured, take it to the doctor for verification of the type of bite. The bite victim may need to be hospitalized. Fatalities are uncommon and healthy victims usually recover quickly. Control measures are the same as those for brown recluse spider.

Yellow house spider

The small spider, *Chiracanthium mildei*, also known as the yellow house spider, is found in and around buildings in eastern Kansas. A close relative, *C. inclusum*, may also occur there. Their presence in more arid parts of Kansas is questionable. The body of adults is $\frac{1}{2}$ to $\frac{3}{8}$ inch long. The abdomen is pale yellow to whitish or greenish. The fore part of the body and the legs are brown. These spiders build irregular webs in corners of buildings and furniture, in electrical breaker boxes, and in motor chambers of washers, dryers, refrigerators or beneath

appliances. They seldom leave their webs and do not often bite people. When they do, their venom causes a wound similar to that of a brown recluse spider bite but less severe. Control measures are the same as for brown recluse spider.

Scorpions

Scorpions are long and the body ends in a narrow, tail-like structure with a curved stinger (Figure 6). The stinger delivers neurotoxic venom to paralyze larger prey. The front pair of a scorpion's appendages are enlarged and equipped with pincers, similar to those of a crab or crayfish, which are used to hold prey for stinging and feeding. Scorpions also sting in self-defense.



Figure 6. *Centruroides vittatus*, a scorpion common in Kansas.

Scorpions hold their tails curled upward over their backs. To sting, the tail and stinger are thrust back and downward, injecting toxin through the stinger into the victim. Scorpions search at night for insects and spiders to eat, and to find mates. Indoor problems with scorpions are most frequently encountered where homes or other buildings are located close to outcroppings of rock layers. In their nightly wanderings, scorpions readily enter man-made structures. Crevices around foundations and beneath doors may even be attractive to them as places to hide. In Kansas, indoor encounters with scorpions are most frequent from mid-August through October.

Centruroides vittatus is the only species of scorpion known to occur in Kansas and it may be found throughout the state. A pale yellow species with brown markings, it seldom exceeds 2½ inches in length (Figure 6).

The venom of native Kansas scorpions is relatively low in toxicity to humans. The effect of a sting from this scorpion resembles that of a sting from a bee or wasp. The sting site becomes swollen, and a burning sensation may extend beyond

the sting site. Sensitivity to the venom depends somewhat upon the age and health of the victim. Occasionally, more severe reactions may occur, including agitation, slurred speech, tightening of the throat, muscle twitching and elevated temperature. If these symptoms appear, the victim should be taken to a doctor at once.

Various species of large scorpions are imported from other continents and sold in pet stores as novelty pets. Often, they are given frightening-sounding names such as "Death Stalker" or "Black Death" while the pet store personnel may claim that the scorpion is harmless. In fact, such personnel and their suppliers are seldom knowledgeable about scorpions. The novelty pets may indeed include some species whose venom is lethal to humans. Should a person be stung while handling an exotic scorpion or one from the southern or southwestern United States, take the victim to a doctor immediately. As with spiders, if the scorpion can safely be taken to the doctor with the victim, it may help the medical staff determine the correct treatment.

Control

Good sanitation is the best method of control. Scorpions may be attracted indoors where water is available, but they also will hide in shoes, clothing and bedding. The native Kansas scorpion is not a good climber and cannot climb smooth walls, but it can crawl up draperies, bed covers, other fabric and textured surfaces. Remove piles of trash, unused lumber and boxes from in and around the home. Wear leather gloves and be careful when moving items near objects where spiders or scorpions may be hiding. Examine and shake items of clothing from closets or storage areas before putting them on.

Try to prevent scorpions from entering homes. Caulk openings around pipes and conduits and eliminate cracks around foundations, doors and windows. Locating all points of entry may require trial and error as well as determination. Caulking and sealing from the inside of each room prevents scorpions that may be in wall voids from entering living space. If a structure or outdoor environment is infested with scorpions, it may be helpful to search for them at night using an ultraviolet lantern or "black light." Scorpions glow in such light in contrast with surroundings, and can be destroyed.

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