

Colorado Insect of Interest

Scorpions of Colorado



Figure 1. *Centruroides vittatus*, the common striped bark scorpion

Class: Arachnida

Order: Scorpiones

Families, Species and Common Names of Scorpions Present in the State:

Buthidae, *Centruroides vittatus* (Say) - Common striped bark scorpion

Caraboctonidae (Iuridae), *Hadrurus spadix* Stahnke - Northern desert hairy scorpion

Vaejovidae, *Paruroctonus boreus* (Girard) - Northern scorpion

Description and Distinctive Features: With a narrowed tail-like abdomen, tipped with a stinger, and greatly enlarged pedipalps that form claws, scorpions (Figures 1, 3, 4, and 5) are readily recognizable animals. The chelicerae (mouthparts) (Figure 2) are similarly claw-like, although much smaller, and used to rip prey. Also on the head is a pair of simple eyes at the midline and 2-5 pairs along each side.

Adults of the common striped bark scorpion (Figure 1) average about 2.5 inches when fully extended. Body color varies from yellowish to light brown for adults, with immature scorpions tending to be lighter. Light bands cross the body and a V-shaped dark area on the head surrounds the eyes. The pedipalps/claws and “tail” (telson) are slender, particularly in the males.

The northern scorpion (Figure 3) is also a moderate sized species with adults typically about 1.5-2.0 inches long. It is generally pale yellow to orange brown colored with a duskier back. Adult males tend to be substantially smaller than females.



Figure 2. Chelicerae of *Hadrurus spadix*, the giant desert hairy scorpion. Photograph courtesy of David Walters

The northern desert hairy scorpion is (Figure 4), by far, the largest scorpion found in the state and can have a fully extended body length of 5 inches. Appendages are light colored but the back is dark.



Figure 3. *Paruroctonus boreus*, the northern scorpion

Distribution in Colorado: Three species of scorpions are confirmed to occur in Colorado. The **northern scorpion** (*Paruroctonus boreus*) occurs throughout the counties along the Utah border and is a species with the most northerly distribution of any scorpion, reaching into southern Alberta. Also present on the West Slope, but in more limited areas such as Dinosaur National Monument, is the **northern desert (black) hairy scorpion** (*Hadrurus spadix*). The **common striped bark scorpion** (*Centruroides vittatus*) is widespread in southeastern Colorado, with 1-70 about its most northern range. This species is the most common scorpion that occurs in the US, ranging from New Mexico to Tennessee and is present in much of northern Mexico.

Life History and Habits: All scorpions are nocturnal predators of various arthropods. Spiders, grasshoppers, and stink bugs are some common prey items, although the northern desert hairy scorpion is large enough to occasionally capture small rodents and other vertebrates. Prey are grasped in the large claw-like pedipalps (chelae) and drawn to the mouth of the scorpion where they are ripped apart by their chelicerae, the small mouth opening allowing consumption of only liquids and small solid particles of food. The stinger is not normally used for prey capture by most scorpions, but is employed by the common striped bark scorpion to help subdue larger prey. The northern scorpion and northern desert hairy scorpions usually establish a burrow retreat and tend to forage within a couple dozen feet of the burrow. Common striped bark scorpions range more widely in search of prey.



Figure 4. *Hadrurus spadix*, the northern desert (black) hairy scorpion



Figure 5. An immature stage of *Centruroides vittatus*, the common striped bark scorpion

Birth of the northern scorpion usually occurs around August. The common striped bark scorpion has been observed with new young from May-September, although in the cooler climate of Colorado it is likely to be giving birth during a more limited period of June-August. Young scorpions are born live by the mother and then carried on her back through the first molt. Litter size varies, in part due to the nutrition of the mother. A range of 34-52 young is reported for the northern scorpion; 13-47 for the common striped bark scorpion.

The young (Figure 5) leave the mother after about one week and then forage on their own. As they develop they go through a total of 5-6 molts before reaching the adult stage. The northern scorpion likely becomes mature in about 2 years; the common striped bark scorpion requires 3-4 years. These scorpions can live another 2-3 years as an adult.

Scorpion mating is highly stylized with a sequence of behaviors and mating is indirect, with the male producing an external spermatophore that he guides the female to pick up. In the common striped bark scorpion the female initiates the mating, making abrupt advances and retreats to a potential mate that it encounters. A receptive male then responds with a back and forth rocking moving known as “juddering”. This is followed by “clubbing”, striking the other scorpion with the tip of the abdomen, but without stinging. The scorpions then clasp each other with their pedipalp claws and draw near enough to engage in a “cheliceral massage” - a scorpion version of a kiss.

The scorpion pair engage in a long “dance” (the promenade a deux), turning about and moving back and forth. This may go on for 5 minutes to many hours. Towards the end the male spreads the fan-like pectens on the underside of the abdomen and deposits a large, elongate sperm-containing spermatophore. The dance continues and ultimately the female is guided to the spermatophore, which she draws into her body. The female then breaks away.

A similar mating sequence is thought to occur with the northern scorpion, with some slight variations. In that species it is the male that makes the first approach and also makes the abrupt escape after mating. Prior to the deposit of the spermatophore he has a sand scraping behavior, likely to better prepare the site for spermatophore deposition. During the promenade a deux the female may do a head stand and after the two separate engages in a swaying motion.

Mating can occur throughout the warm season. Fertilization of the eggs may not be immediate after acquisition of the spermatophore and gestation of fertilized eggs prior to giving birth may take up to 8 months.

The stinger of scorpions is used primarily for defense. Among the Colorado species this can be felt as a sharp, often burning pain. However, usually this rapidly dissipates within an hour and is no more painful than a bee or wasp sting. No species that occur in the state have venom associated with dangerous complications. The closest such medically important scorpion is the Arizona bark scorpion, *Centruroides sculpturatus*, which occurs in the Sonoran Desert region of southern Arizona.

When looking for scorpions during the day they are usually found under loose rocks, dead wood, dried cattle manure and other protective sites. Areas near stream beds/riverways are often more likely to support highest populations of northern scorpions and the common striped bark scorpion.

Scorpions can also be collected at night, taking advantage of an unusual feature. The exoskeleton of scorpions has a chemical structure that causes it to fluoresce upon exposure to ultraviolet light. Using “black lights” the scorpions will glow and can be located.

Pseudoscorpiones: Arachnids sometimes mistaken for scorpions

Another group of arachnids sometimes mistaken for miniature scorpions are the pseudoscorpions (Order Pseudoscorpiones) (Figure 6). These animals similarly possess prominent claw-like pedipalps but have a blunt abdomen and no stinger.

Pseudoscorpions are considered to be more closely related to spiders (Araneae) than to scorpions (Scorpiones). Ones that occur in Colorado are quite tiny, only about a 1/3-inch long or so.



Figure 6. Pseudoscorpion