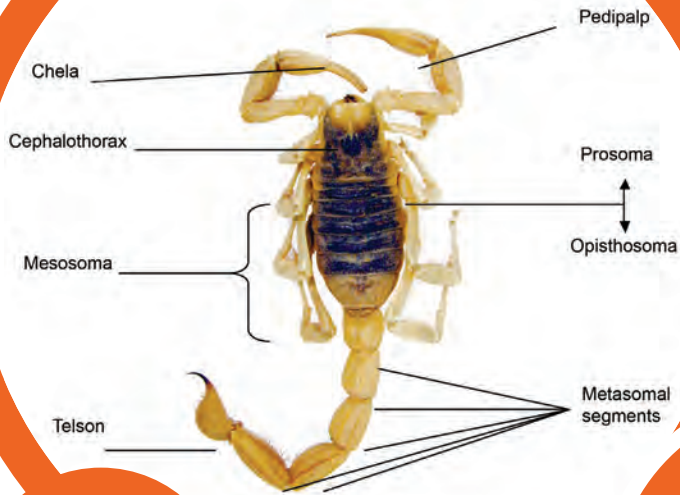


# Scorpions in Arizona



Desert Hairy Scorpion  
(*Hadrurus arizonensis*)

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Scorpions have long been of interest to humans primarily because of their ability to give painful and sometimes life threatening stings. Scorpions are also an important and beneficial component of many ecosystems and they are one of the oldest known terrestrial arthropods. Fossil scorpions found in Paleozoic strata 430 million years old appear very similar to present day species. There are currently 1400 recognized species of scorpions worldwide. Scorpions have an elongated body and a segmented tail that is tipped with a venomous stinger. They have four pairs of legs and pedipalps with pincer-like pincers on the end, which are used for grasping.

## RANGE AND HABITAT

Scorpions are commonly thought of as desert animals, but in fact, they occur in many other habitats, including grasslands and savannahs, deciduous forests, montane pine forests, intertidal zones, rain forest and caves. Scorpions have even been found under snow-covered rocks at elevations of over 12,000 feet in the Himalayas of Asia.

## DESCRIPTION

As arachnids, scorpions have mouthparts called chelicerae, a pair of pedipalps, and four pairs of legs. The pincer-like pedipalps are used primarily for prey capture and defense, but are also covered with various types of sensory hairs. The body is divided into two main regions, a cephalothorax and an abdomen. The cephalothorax is covered above by a carapace (or head shield) that usually bears a pair of median eyes and 2 to 5 pairs of lateral eyes at its front corners (a few cave and litter-dwelling scorpions are completely eyeless). The abdomen consists of 12 segments: the seven wider segments closest to the cephalothorax are called the

mesosoma and the last five narrower segment forming the metasoma. At the end of the metasoma is the telson, which is a bulb-shaped structure containing the venom glands and a sharp, curved stinger to deliver venom.

## BEHAVIOR

Scorpions are nocturnal or diurnal, predatory animals that feed on a variety of insects, spiders, centipedes, and other scorpions. The larger scorpions occasionally feed on vertebrates, such as small lizards, snakes, and mice. Prey is detected primarily by sensing vibrations with the comb-like pectine organs that also sense textures of the surfaces they walk on and serve as chemoreceptors that can recognize other scorpions of the same species. The pedipalps have an array of fine sensory hairs that sense air-borne vibrations; the tips of the legs have small organs that detect vibrations in the ground. Most scorpions are ambush predators who detect prey when it comes within reach.

Although they are equipped with venom for defense and prey acquisition, scorpions themselves fall prey to many types of creatures, such as centipedes, tarantulas, insectivorous lizards, snakes, birds (especially owls), and mammals (including shrews, grasshopper mice, and bats). As with many predators, scorpions tend to forage in distinct and separate territories, returning to the same area each night. They may enter homes and buildings when their territory has been disrupted by construction, tree removal, irrigation, or floods, etc.

Scorpions have many adaptations for desert living. Most are active at night, and spend their days where it is cool and moist under rocks, wood, tree bark or in burrows. Although scorpions can be seen drinking directly

from water reservoirs, they derive most of their water from their food (although this varies by species). As with most arthropods their activity is linked to temperature. Generally speaking, scorpions are active if nighttime temperatures are above 70°F. They tend to be less active during winter and the hottest part of the summer during daylight hours.

## LIFE CYCLE

The sperm from the male is contained within a structure called a spermatophore. The sperm is deposited by the male on a surface over which the female is pulled. The female draws the sperm into her genital pore, that is located near the front ventral (under) side of her abdomen.

Scorpions have a long gestation period (from several months to over a year, depending on species) in which the young develop as embryos in the female. The young are born live and ascend their mother's back. She assists them by making a "birth basket" with her folded legs to catch them as they are born and to help them climb onto her back. A few Old World species do not form birth baskets.

On average, a female gives birth to about 25-35 young. They remain on her back until they molt for the first time. The white colored young have been seen to climb down off the mothers back, molt then return to the mothers back for another 4-5 day before leaving for good, usually within one to three weeks after birth. Once they climb down, they assume an independent existence, and periodically molt to reach adulthood. The average scorpion probably lives three to five years, but some species may live up to 25 years.

## SCORPION VENOM

The venom of scorpions is used for both prey capture, defense and possibly to subdue mates. All scorpions do possess venom and can sting, but their natural tendencies are to hide and escape. Scorpions can control the venom flow, so some sting incidents are venomless or only mild envenomations. Scorpion venoms are complex mixtures of neurotoxins (toxins which affect the nervous system) and other substances; each species has a unique mixture. Despite their bad reputation, only one



species in the western U.S. (the bark scorpion, *Centruroides sculpturatus*) and about 25 others worldwide have venom potent enough to be considered dangerous to humans.

The world's most dangerous scorpions live in North Africa and the Middle East (species in the genera *Androctonus*, *Buthus*, *Hottentotta*, *Leiurus*), South America (*Tityus*), India (*Mesobuthus*), and Mexico (*Centruroides*). In some of these areas, scorpion stings may be a significant cause of death, but reliable data on human mortality are not readily available. Some studies suggest typical mortality rates up to about 4% in hospital cases, with children and the elderly being most susceptible. Death by scorpion sting, if it occurs, is the result of heart or respiratory failure some hours after the incident. During the 1980's Mexico averaged about 800 deaths each year. However, in the past 20 years, there have been no reported fatalities in the U.S. due to scorpion stings.

## THE BARK SCORPION

About 40-60 species occur in Arizona, although many are undescribed. The previously mentioned bark scorpion (*Centruroides sculpturatus*) is the only species in Arizona of medical importance.

In the U.S., the bark scorpion is found in southeastern California, Arizona, Nevada, southern Utah, and southwestern New Mexico. Small populations have been found in northern California and the state of Colorado. It is also found throughout the Baja Peninsula and western Sonora in Mexico. The typical "bark" or "crevice" scorpion is encountered in a variety of situations. It is most commonly found under rocks, logs, tree bark, and other surface objects. The bark scorpion (1-3 inches in length) is the most commonly encountered house scorpion. They are common throughout many habitats but almost always in rocky areas. Bark scorpions may over-winter in aggregates (groups) of 20-30. The bark scorpion is also one of relatively few species that are able to climb vertical walls, but do not make it far across a horizontal ceiling.

The venom of the bark scorpion may produce severe pain (but rarely swelling) at the site of the sting, numbness, frothing at the mouth, difficulties in breathing (including respiratory paralysis), muscle twitching, and convulsions. Death is rare, especially in more recent times. Antivenin is available for severe cases. Envenomation of children (under 9 year of age) or people with hypertension should be considered serious and immediate medical help sought (dial 911). Certain people, however, may be allergic to the venom and can experience life-threatening side effects when stung (as occurs with bee stings). No cases of anaphylaxis have been reported in Arizona.

The Arizona Poison Control and  
Drug Information Center

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## BLACK-LIGHTING

Scorpions fluoresce or glow under ultra-violet light so they are easy to find with the aid of a portable, hand-held black-light during the night. Nighttime scorpion hunting is a lot of fun, but make sure that you wear boots and have long tongs if you want to capture the scorpions to move them. Powerful black-lights can be ordered from the internet or weaker ones can be obtained from pet stores and electronic retailers. Never look directly at an ultraviolet light, damage to the eye may occur.

Once located, collect the scorpions using long forceps and keep them in a sealable, sturdy container. As these wonderful creatures are such a benefit to our environment please consider collecting and releasing the scorpions into the natural desert rather than killing them. Chemical pesticide spraying during the day is largely ineffective against scorpions.

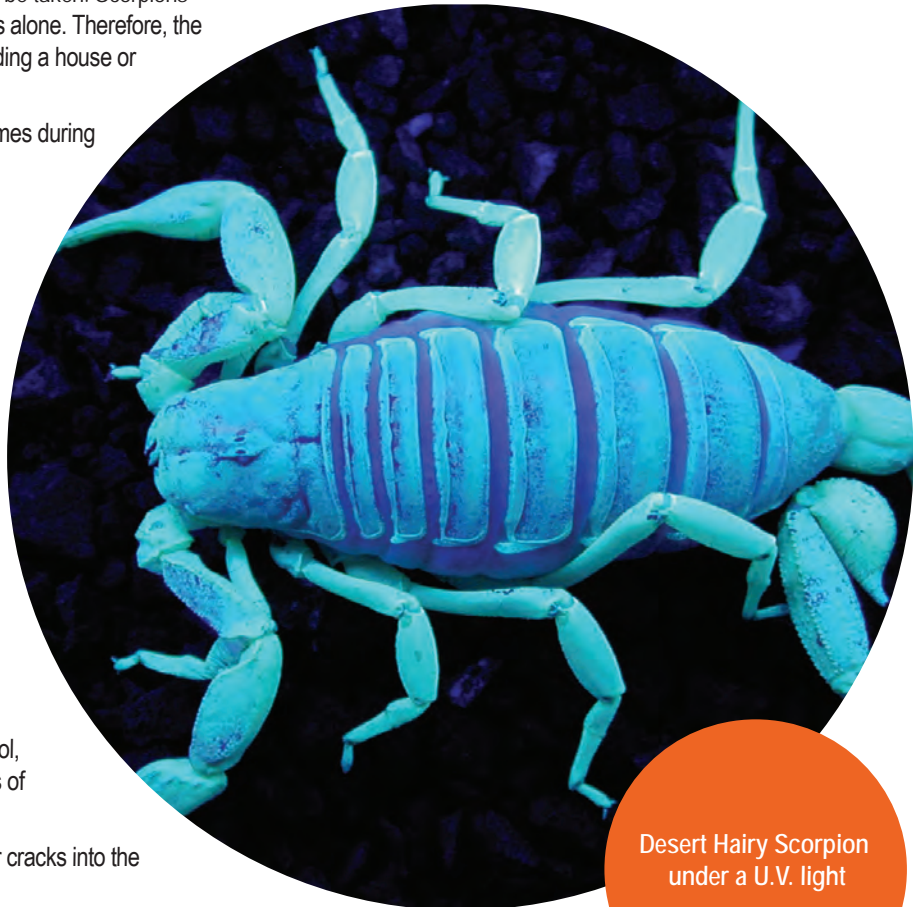
## ADDITIONAL INFORMATION

Gouge, D., K. Smith, C. Olson, and P. Baker. 2001. Scorpions. University of Arizona Cooperative Extension Publication #AZ1223. 7 pp. (<http://ag.arizona.edu/pubs/insects/az1223.pdf>).

## MANAGEMENT OF SCORPIONS

High numbers of scorpions can become a problem under some circumstances. Pest-proofing of the home is an essential first step. If a reduced population is desirable several steps can be taken. Scorpions are almost impossible to manage with insecticides alone. Therefore, the first control strategy is to modify the area surrounding a house or structure:

- Conduct ultra-violet light collections several times during the summer between 8-11 p.m.
- Remove all harborages such as: trash, logs, boards, stones, bricks and other objects from around the building.
- Keep grass closely mowed near the home. Prune bushes and overhanging tree branches away from the structure. Tree branches can provide a path to the roof for scorpions. Minimize low growing ground cover vegetation.
- Store garbage containers in a frame that allows them to rest above ground level.
- Never bring firewood inside the building unless it is placed directly on the fire.
- Install weather-stripping around loose fitting doors and windows.
- Plug weep holes in brick veneer with steel wool, pieces of nylon scouring pad or small squares of screen wire.
- Caulk around roof eaves, pipes and any other cracks into the building.
- Keep window screens in good repair. Make sure they fit tightly in the window frame.
- Stucco cinder-block walls.



Desert Hairy Scorpion  
under a U.V. light