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## Biters, Stingers, and Itchers

When I first moved to southern Arizona, I quickly realized that there are plants and animals here that protect themselves very well. It seems as if every plant has spines and thorns on it somewhere. Also there are scorpions, black widows, rattlesnakes, and Gila Monsters. I felt like I had moved to a very unwelcoming land. However, I quickly realized that these same plants and animals are remarkable in their adaptations to survive the harsh desert environment. This class delves into the inhabitants of southern Arizona that can bite, sting, poison, and poke or make us itch.

### Biters

These animals inject venom into their victim by modified teeth or, in the case of spiders, chelicerae. We often refer to these structures as fangs. Venom has many components, mostly proteins, peptides, and enzymes. The effects of venom on the victim vary, depending on the type of venom. All venoms work in one similar manner- they interfere with the normal biochemistry of the victim.

In North America, there are three groups of biting animals that are venomous, snakes, spiders, and the Gila Monster. The Gila Monster is one of only two venomous lizards in the world, the other being its cousin, the Mexican Beaded Lizard. These lizards have grooved teeth in the rear of the mouth that conduct venom from glands in the lower jaw into the victim by capillary action. Gila Monsters bite and hang on tenaciously, allowing venom to enter the victim. The venom these lizards produce is potent, similar to that of elapid snakes (cobras, for example). It is primarily neurotoxic in function and results in severe pain, rapid drop in blood pressure, and swelling. Gila Monster bites are rarely fatal.

Elapid snakes are those with fixed fangs in the upper jaw. They include cobras, kraits, most Australian snakes, and coral snakes. Southern Arizona is home to one species, the Sonoran Coral Snake (*Micruroides eurythanus*), a secretive burrowing snake that is not often encountered. These small slender snakes are about the width of your pinky. Due to their small size and small fangs, they have difficulty biting humans. Their venom, however, is a very potent neurotoxin.

Rattlesnakes, in the genera *Crotalus* and *Sistrurus*, have moveable fangs in the upper jaw and possess the most advanced adaptations for prey capture of any snake. Among the adaptations these snakes possess are heat-sensing pits between the nostril and the eye that detect the body heat of prey, allowing these snakes to strike with amazing accuracy. Rattlesnake venom is a complex concoction of neurotoxins, hemotoxins, and myotoxins. There are 13 species of rattlesnake in Arizona.

Avoiding rattlesnake bites is straight-forward. You must be alert when in rattlesnake country. Remember that these snakes do not always rattle before striking. If you come upon a rattlesnake, give it plenty of room. Do not antagonize it- many rattlesnake bites are the result of individuals harassing the snakes. Rattlesnakes are extraordinary animals that deserve our admiration and respect. They help keep rodent populations under control



around homes and farms. An encounter with a rattlesnake is a thrilling experience that is not soon forgotten.

Black widows (*Latrodectus sp.*) are famous for their appearance, possession of venom, and habits of females often eating males following mating. These spiders are shy nocturnal spiders that are often found in garages, sheds, carports, and debris piles. They are easily identified by their shiny jet black bodies with the red hourglass markings on the underside of their abdomen. Luckily for us, widows sit upside down in their webs, making the red markings easy to see. Black widow venom is a neurotoxin. Bites produce severe pain, high blood pressure, nausea, and other symptoms.

The recluse spiders (*Loxosceles sp.*) are also known as violin spiders for the violin-shaped marking on their cephalothorax. These spiders are found under rocks and other debris, garages, homes, and other human structures. It is unclear if the most famous of these spiders, the Brown Recluse (*L.reclusa*) occurs in Arizona. What is clear is that other members of the genus are found here and should be regarded as venomous also. Unlike many other venomous animals, the venom of these spiders is a cytotoxin, which acts by destroying tissue. The result of a bite is an ulcerating wound that is quite slow to heal and may leave permanent scarring.

## Stingers

This is another group of venomous animals but differs from the previous group in injecting their venom with structures other than their teeth- telsons, modified ovipositors, or some other device.

Scorpions are some of the desert's most recognizable animals. They possess pedipalps that look like claws on a lobster and a long thin 'tail' that ends in a stinger. The final segment of the abdomen, called the telson, houses the venom gland and the stinger, more precisely called the aculeus. Scorpion venom is neurotoxic. There are about 50 species of these arachnids in Arizona. Only one, the bark scorpion (*Centruroides exilicauda*) is medically significant. Bark scorpions are distinguished by the long thin pedipalps and tail. Stings from this species are painful, producing symptoms such as loss of coordination, drooling, slurred speech, abdominal pain and cramping and others. If stung by a bark scorpion, the victim should seek medical attention. The stings from other scorpions are painful, like a wasp sting, but do not require a trip to the doctor.

The Giant Desert Centipede (*Scolopendra heros*) is also capable of delivering a painful sting. Actually, the sting of this animal is more technically a pinch, because it is delivered by the modified first pair of legs. These appendages, called gnathosomes, are pincer-like in form and attach to venom glands. The pinch of a giant centipede is painful but not dangerous.

Bees, wasps, and ants comprise the insect order Hymenoptera. Many of these insects are notorious for their stinging ability. In these insects, the stinging apparatus is the modified ovipositor, a structure used in other insects for laying eggs. Only females possess ovipositors, so only females can sting. Honey Bees have a barbed stinger that, once



deployed, remains in the victim. The bee then flies off, ripping the entire apparatus from her body. She will die shortly thereafter. Wasps and ants do not have barbed stingers and can sting a victim repeatedly. Ants add insult to injury, for they bite and sting at the same time! Unless there is an allergic reaction to the venom, most stings by these insects, though painful, are not serious.

There are several caterpillars that possess bundles of spines on their backs that are also capable of delivering a painful sting. One of the most frequently encountered such caterpillars are those of buck moths (*Hemileuca sp.*). These caterpillars often feed on the foliage of palo verdes. My basic rule when it comes to caterpillars is if it looks like it means business, leave it alone. Proper identification is important in preventing an unpleasant encounter.

### **Itchers**

Encounters with these plants and animals, through contact with foliage or as the result of an immune reaction to a bite, results in itching. The most famous plants that induce itching are poison ivy, poison oak, and poison sumac. All parts of these plants contain urushiol, which is the cause of the red itching rash that makes these plants infamous. Here in Arizona, we only have to worry about poison ivy, which can be common in along mountain streams. The bites of various insects produce red welts that often itch, including mosquitoes, bed bugs, horse flies, midges, and cone-nosed bugs. Some of these insects are also important as vectors of disease, including malaria, West Nile Virus, encephalitis, and others. Chiggers are mites that are quite common in grassy areas during the monsoon season. Walking through dense grasses at this time of year often results in red welts that make you itch like mad. Chigger larvae penetrate skin with their mouthparts; releasing salivary secretions that kill and digest host cells. It is the immune reaction to the onslaught that causes the itching.

### **Poisoners**

Poisonous animals and plants contain toxins in their bodies that must be ingested in order for them to work. Toads are a good example of a poisonous animal. The skin glands produce sticky, white toxins that can have fatal effects on dogs and other animals if they are ingested.

Many plants are poisonous, including some garden plants such as oleander, lantana, and others. Common poisonous desert plants include sacred datura (*Datura wrightii*), desert tobacco (*Nicotiana obtusifolia*), bluestem prickly-poppy (*Argemone pleiacantha*), and milkweeds (*Asclepias sp.*). No plant or mushroom should be eaten unless it is positively identified by an expert and is safe to consume.



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