WILD Kids

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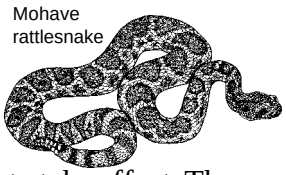
The Value of Venom

"Wildlife adapts to its environment in ways that enable it to survive and maintain its numbers."

In order to survive, wildlife must find food and avoid predators. Some species of wildlife have adapted to using venom as a way of obtaining food, and as a defense against predators. Venom is a very valuable commodity. Because it requires a great deal of energy to produce, it is used sparingly. In fact, most venomous animals can control the amount of venom that is delivered, injecting only the amount necessary to overcome prey of a given size. When threatened, venomous animals will usually first try to escape, hide, or use warning displays (e.g., rattle, hiss, expose teeth), before using venom as a last resort.

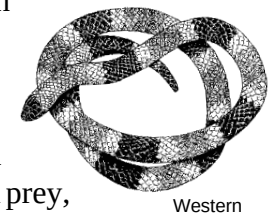
Venoms are made up of complex chemicals, mostly proteins, that are produced and stored in a venom gland. Muscles surrounding the venom gland squeeze venom through a duct, then through fangs or a stinger into the intended victim. Not all venoms are the same. They may contain hemotoxins (hemo=skin, toxins=poisons) which cause tissue damage, neurotoxins (neuro=nerve), or cardiotoxins (cardio=heart). Each species of venomous animal has a special type of venom and delivery system that is best suited to its lifestyle.


Mohave rattlesnake

Rattlesnakes inject venom through two hollow fangs located in the upper jaw. They strike and release, then wait for the venom to take effect. The venom is fast acting, so the prey doesn't travel far. Rattlesnakes have heat sensing pits, located between the eye and nostril, which they use to track down the dead or dying prey. In addition to immobilizing prey, venom contains chemicals that start digestion of the prey tissue, from the inside out.

The venom of the Mohave rattlesnake is the most toxic of all Arizona rattlesnakes. It contains powerful neurotoxins which act on the central nervous system, affecting the heart and lungs. All rattlesnakes bear live young (they don't lay eggs). The young are fully equipped with fangs and venom.

Coral snakes inject venom through two small fangs in the upper jaw. They prey on small snakes, including other coral snakes. Unlike rattlesnakes that strike and release, coral snakes bite and hold prey, releasing additional venom as they chew.


Western coral snake

The Western coral snake has venom that is 2 to 3 times more potent than that of the Western diamondback. However, due to its small size and short fangs the amount of venom released is quite small, and coral snakes have difficulty piercing human skin. The coral snake has warning coloration (bright colors) which may serve as a signal to other animals that it should be avoided.

The Gila monster is a slow-moving lizard that feeds on reptile and bird eggs, and young birds and mammals. Its venom is not used for obtaining food, but is "defensive venom." The venom glands are located in the bottom jaw. As the Gila monster chews, venom moves up through venom ducts located next to grooved venom-conducting teeth. Unlike rattlesnakes, which occasionally have dry bites (no venom injected), Gila monsters deliver venom with each bite. Gila monsters are immune to large amounts of their own venom and are resistant to rattlesnake venom.

Gila monster

All spiders have venom that is injected through hollow fangs. The venom has two primary functions; to subdue prey and to begin the digestion process. Only the bite of the black widow and Arizona brown spider are life-threatening to people. The Arizona brown spider venom contains hemotoxins which cause tissue damage. The venom of the black widow spider contains neurotoxins which cause muscle pain and respiratory distress. Neither of these spiders is aggressive and bite only when molested.

Scorpions deliver venom through a stinger located at the end of the tail, or *telson*. Prey is grasped with the pincers, then paralyzed or killed with the stinger. If molested, scorpions will sting repeatedly. The bark scorpion is the only scorpion with venom that is life-threatening to people.

Bees, wasps, and some ants deliver venom through a stinger. Ants use venom to kill small creatures to eat, and as a defense against intruders. Field ants (medium size black, red or brown ants) bite, then curl up their abdomen to spray formic acid into the bite wound.

Wasps are predators that use venom to subdue their prey (insects and spiders), but will sting in self defense. Wasps have a hypodermic-like, smooth stinger that slides out after the wasp stings, and can be used repeatedly. Only female wasps sting, males do not have a stinger. Wasp are beneficial because they prey on many agricultural and garden pests, and also pollinate some plants. An interesting type of wasp, the *tarantula hawk*, measures up to two inches in length. The female tarantula hawk seeks out a tarantula, paralyzes it with a sting, then drags the tarantula underground. The wasp deposits a single egg on the paralyzed tarantula. When the egg hatches (in 3-5 days), the larva feeds on the tarantula, eventually killing it.

Bees use their stings and venom only for defense. When a honey bee stings, its barbed stinger and the attached venom sac is left behind in the victim. The European honey bee is necessary for the pollination of various flowers and food crops. It was introduced to North America by early European immigrants.

Africanized honey bees have recently appeared in parts of Arizona. They look like honey bees, but become much more aggressive when defending their hive or colony, and may attack without warning. The sting of a single Africanized honey bee is no more powerful than that of a European honey bee, but victims may receive hundreds of stings.

Fact or Fiction ?

There are many myths and misconceptions about venomous animals. Read each statement. Is it fact or fiction (false)? You can use the following resources to find out which statements are true: Venomous Animals of Arizona by Robert L. Smith; Venomous Reptiles of Arizona by Lowe, Schwalbe, & Johnso;, Western Reptiles and Amphibians by Robert C. Stebbins (A Peterson Field Guide); and Gila Monster: Facts and Folklore of America's Aztec Lizard by David E. Brown. Check the library and internet for other resources.

1. Tarantulas of the Southwest are very aggressive and have venom that is dangerous to humans.
2. Gila monsters must roll over to deliver venom.
3. All venomous snakes have triangular shaped heads.
4. The Gila monster is venomous because it has no anus, and thus its digestive waste products must be voided through the mouth, thereby contaminating the teeth with poison.
5. The black widow gets it name from the female spider's habit of consuming the male after mating.
6. You can tell the age of a rattlesnake by the number of rattles on the tail.
7. Some species of rattlesnake are protected under Arizona law and cannot be captured or killed.
8. Rattlesnakes must be coiled before they can strike.
9. The smaller the scorpion, the more powerful its venom.
10. The nonvenomous kingsnake preys on rattlesnakes.
11. Rattlesnakes appear to be immune to moderate amounts of each other's venom.