

Vipers found to not have the fastest strike after all

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Western Diamondback Rattlesnake, *Crotalus atrox*, Family: Viperidae, Location: Germany, Ulm, Zoological Garden. Credit: H. Krisp /Wikipedia

(Phys.org)—A trio of researchers with the University of Louisiana at Lafayette has found that contrary to folklore, vipers are not the clear

champions when it comes to how fast they can strike. In their paper published in the journal *Biology Letters*, David Penning, Baxter Sawvel and Brad Moon described a study they carried out with three types of snakes and high speed video cameras, and what they learned by doing so.

Everyone knows that rattlesnakes, cobras and many other vipers can strike very quickly—it is their primary means of both defense and prey capture. But non-venomous [snakes](#) strike as well, usually as a means to catch quick-reacting prey, such as mice or other rodents. But, the research trio wanted to know, is the viper strike really faster than other kinds of snakes? To find out, they obtained three snakes: a western diamond-backed rattlesnake, a western cottonmouth and a Texas ratsnake.

Ratsnakes are commonly found on ranches and farms, often hiding in hay bales or stacks. They come in a variety of colors and have several different types of markings which because of their size, sometimes causes them to be confused with rattlesnakes. They are actually quite harmless to humans, tending to strike only at small objects, such as rats and mice. In their experiments, the researchers set up each of the three snakes in front of high-speed cameras and then teased them into striking with a stuffed glove. Slowing down the action allowed the researchers to time how fast each of them was able to strike and bite the glove. They found that the rattlesnake had an average strike speed of 2.95 meters per second, the cottonmouth 2.98 m/s and the ratsnake 2.67 m/s. While the vipers did technically best the ratsnake, the researchers suggest that the difference was small enough to count their results as a tie.

The researchers noted that to achieve such speeds so quickly all three snakes experienced very fast acceleration of their heads, averaging 190 m/s^2 —more than that experienced by human fighter pilots. The trio also compared strike speeds against prey response times and found that the snakes reached their targets in just 50 to 90 milliseconds—typical prey,

they note, have been found to activate muscle reactions very quickly as well, from 14 to 151 milliseconds, which explains how it is that the snakes are able to land a hit more often than not on such swiftly reacting targets. The researchers also note that the blink of an eye typically lasts on average 220 milliseconds, which means those who blink are likely to miss a snake [strike](#).

More information: David A. Penning et al. Debunking the viper's strike: harmless snakes kill a common assumption, *Biology Letters* (2016). [DOI: 10.1098/rsbl.2016.0011](https://doi.org/10.1098/rsbl.2016.0011)

Abstract

To survive, organisms must avoid predation and acquire nutrients and energy. Sensory systems must correctly differentiate between potential predators and prey, and elicit behaviours that adjust distances accordingly. For snakes, strikes can serve both purposes. Vipers are thought to have the fastest strikes among snakes. However, strike performance has been measured in very few species, especially non-vipers. We measured defensive strike performance in harmless Texas ratsnakes and two species of vipers, western cottonmouths and western diamond-backed rattlesnakes, using high-speed video recordings. We show that ratsnake strike performance matches or exceeds that of vipers. In contrast with the literature over the past century, vipers do not represent the pinnacle of strike performance in snakes. Both harmless and venomous snakes can strike with very high accelerations that have two key consequences: the accelerations exceed values that can cause loss of consciousness in other animals, such as the accelerations experienced by jet pilots during extreme manoeuvres, and they make the strikes faster than the sensory and motor responses of mammalian prey and predators. Both harmless and venomous snakes can strike faster than the blink of an eye and often reach a target before it can move.

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