The Evolution of Snake Teeth to Perfectly Fit their Prey

Daniel Kenneth*

Department of Ecology, University of Michigan, Ann Arbor, Michigan, USA

***Corresponding author:** Email: danieal@ken.edu.us

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Review Article

The fangs of venomous snakes are one of nature's most terrifying and fascinating structures. Snakes utilise these needle-like fangs to penetrate their prey and administer deadly poison. With over 3000 species of snakes in our globe, we wondered if their fangs were all the same. Or, as we see in other animal species, are their fangs shaped differently depending on what they eat? To find out, we looked at the three-dimensional shape of snake fangs in 81 different species and discovered that fangs have evolved to fit the snake's chosen food, which ranges from hard-shelled crabs to fuzzy mammals. The results of our research have been published in the journal Evolution [1].

Vipers, atractaspidids, elapids, colubrids, and homalopsids are five large families of venomous snakes that can be found all over the world. Each of these families "developed" their fangs and venom delivery mechanisms individually during evolution, resulting in minor variances. Colubrids and homalopsids have grooved fangs all the way to the rear of their mouths, whereas vipers and atractaspidids have long tubular fangs that flip out when they strike. Elapid snakes have short tubular fangs that are anchored to the jaw. In the mammalian kingdom, variations in tooth morphology due to nutrition are prevalent. Herbivores have ridged molars to grind down leaves, roots, and other plant stuff, while carnivores have bladed cheek teeth to rend flesh [2].

The types of prey that venomous snakes hunt differ. Some hunt tiny mammals like mice, others fish, prawns, or crabs, while still others target reptiles and even other snakes. There are also generalists, who will eat practically anything they can get their hands on. With the exception of the unusual atractaspidids, we investigated the three-dimensional form of fangs from 81 snake species from four families. We were able to illustrate how fang morphology is directly linked to prey preference by assessing differences in the strength and sharpness of the fangs. Fangs of animals that seek tougher prey, such as lizards and crabs, are more robust and blunt, whereas in species that prefer softer prey, such as mice, they are more thin and sharp-tipped. Furthermore, we discovered that fang morphology exhibited “evolutionary convergence”: distantly related species with the same diet have fangs that are more similar than closely related species with different diets [3].

Knowing what meals each type of snake like can be beneficial to both snakes and their victims in the future. Most vulnerable snake species in Australia are threatened by habitat degradation, which may result in their inability to catch their preferred prey. We can now determine which group of prey they prefer by looking at their fangs. If we needed to relocate snakes, we might utilise this information to find a suitable habitat with its preferred food. Analysing the fangs of ancient snakes can reveal which animals they most likely hunted and how their environment would have appeared. Knowing the fang shapes of prehistoric snakes can help explain why there is such a wide range of fang shapes today, and how this variation supported the survival of some of nature's most specialised predators. Understanding how fang shape differs can also help us create better protective apparel, which is important given the harm snakes can offer to humans. We can design better choices of materials that truly protect against snake bites by examining how quickly different fangs penetrate textiles and other materials [4,5].

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