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Tongue-sticking: Tongue behavior of arboreal colubrids during gap crossing

Tongue movement in snakes has been previously attributed to chemo- and mechanosensation characterized as a sweeping, vertical oscillation of the tongue, followed by the tongue being pulled back into the mouth to allow particle transfer to sensory organs. In previous studies, flying snakes (Chrysopelea) have been observed to protrude their tongue without oscillation in the context of locomotion. Do close relatives of flying snakes also exhibit this behavior? To investigate this question, we recorded the tongue behavior in close relatives (Ahaetulla prasina, Dendrelaphis pictus, caudolineatus, and formosis) as well as less related species (Dryocalamus subannulatus, Boiga cynodon, drapiezii, and nigriceps, Lycodon capucinus) as they traversed gaps. The setup consists of two artificial branches oriented horizontally and suspended 118 cm off the ground. Each snake completed four trials, recorded on four GoPro Hero4 cameras, crossing gaps of 0%, 15%, 30%, and 45% of the snake's snout to vent length. Among these species, only the close relatives of flying snakes (Ahaetulla and Dendrelaphis spp.) exhibited the presence of a tongue protrusion variant when crossing a gap. This behavior followed an oscillation, stick, oscillation (OSO) pattern. Generally, the tongue stick could be characterized by a rigid proximal half of the tongue while the tines show variable motion. The other species tested did not show any signs of tongue stick behavior. All snakes in this study were caught and examined at the University of Brunei Darussalam. This research was supported in part by the National Science Foundation (NSF) under grant numbers 1922516 and 2027523.

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