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Body flattening in a close relative of flying snakes, Dendrelaphis pictus

Flying snakes (Chrysopelea) are the only snakes that have been observed to use dorsoventral flattening while locomoting: they expand their ribs, allowing for more surface area and enabling it to glide. However, not all species have been observed closely for the presence of this behavior. Recently, we observed possible dorsoventral flattening in a closely related species to flying snakes, specifically in Dendrelaphis pictus, commonly known as the painted bronzeback. Although it cannot glide, Dendrelaphis pictus is capable of a similar behavior to Chrysopelea: jumping. Does D. pictus use dorsoventral flattening when jumping? To determine if D. pictus utilize dorsoventral flattening, they were incentivized to jump using a horizontal gap-crossing setup, and recorded with multiple cameras to examine the body before they jumped. We found that the anterior body flattened in 4 specimens tested. To compare this behavior to rib movement during breathing, we also conducted recordings of the snake while breathing at rest in a tank. While D. pictus has been observed using dorsoventral flattening, it differs significantly to that of Chrysopelea: D. pictus only appear to pulsate in and out of dorsoventral flattening, and only in one part of the body. This could explain why Dendrelaphis are not able to generate sufficient aerodynamic forces to glide from tree to tree. This study demonstrates that some traits specific to gliding may have evolved prior to gliding in flying snakes. This research was supported in part by the National Science Foundation (NSF) under grant numbers 1922516 and 2027523.

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