Reproductive Investment in Female Copperheads (*Agkistrodon contortrix*) at the Extreme of Their Northern Range: Do Large Females Produce Large Progeny?

Female investment in reproduction may entail trade-offs, i.e. energetic tradeoffs between current and future reproductive investment; neonate size versus neonate number and frequency of reproduction versus energy allocated at each reproductive event. Trades-offs may be more pronounced in ectotherms because their morphology, physiology, behavior, and reproduction are strongly tied to the environment, particularly in higher latitudes or elevations. While larger neonates have been shown to have better performance and higher survival rates, female viviparous snakes typically produce more neonates rather than larger neonates as female body size increases. We tested the hypothesis that increase in female body size results in the production of larger neonates, rather than more neonates, in northern populations of viviparous snakes (*Viperidae: Agkistrodon contortrix*) where ingress to hibernation occurs shortly after parturition (thus strong selection on neonate survival). Contrary to our hypothesis, an increase in female body size in *A. contortrix* does not result in larger neonates. Rather, larger females produce more neonates consistent with previous studies. Because thermal dependence of embryonic development is widespread among squamate reptiles, female copperhead snakes in northern latitudes may be constrained from producing larger neonates, (perhaps by extending gestation length), due to decreasing environmental temperatures in late summer months.

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The Effect of Prey Type on Foraging Behavior in Pigmy Rattlesnakes (*Sistrurus miliarius*)

Pigmy rattlesnakes are dietary generalists that consume amphibians, reptiles, mammals and centipedes. We investigated foraging in pigmy rattlesnakes in laboratory feeding trials using Ground Skinks (*Scincella lateralis*) and Florida Blue Centipedes (*Hemiscelopendra marginata*). We videotaped 15 field-collected snakes in 16 centipede and 15 skink trials. Rattlesnakes envenomated centipedes significantly more often than skinks and in 62.5% of trials centipedes were consumed, whereas, skinks were eaten in only 26.7% of trials. There was no statistically significant difference in mean time to first strike between prey species. However, there was a trend towards shorter mean strike distance in centipede trials. Venom acted more slowly in centipedes resulting in a significantly longer mean period between the strike and the prey’s last locomotion as well as a longer period between the strike and the initiation of ingestion of the prey. It also took snakes significantly more time to complete ingestion once it was started for centipedes than skinks. Unlike skinks, centipedes were frequently consumed while still alive and by the midbody region rather than head first. Head elevation was exhibited by rattlesnakes approaching centipede prey significantly more frequently than when approaching skinks. Many of the observed differences in foraging behavior appear to result from centipedes low susceptibility to rattlesnake venom and their potent retaliatory strikes. The behavioral plasticity exhibited by pigmy rattlesnakes in foraging may be crucial to their success as generalist predators.

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