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Cannibalism Among Rattlesnakes Helps Females To Recover After Birth

ScienceDaily (Feb. 19, 2009) — Spanish, American and Mexican researchers have produced the first quantitative description of cannibalism among female rattlesnakes (*Crotalus polystictus)* after monitoring 190 reptiles. The study has shown that these animals ingest on average 11% of their postpartum mass (in particular eggs and dead offspring) in order to recover energy for subsequent reproduction.

Rattlesnake in Mexico (Crotalus polystictus). (Credit: Estrella Mociño / SINC)

The lack of information about cannibalism in rattlesnakes (*Crotalus polystictus*) led researchers to start a study in 2004, which they continued for three years in central Mexico, where this species is endemic. They measured "cannibalistic behaviour" among 190 females, which had 239 clutches of eggs, and determined that this phenomenon is justified by "enabling the mother to recover and regain strength".

"A cannibal rattlesnake female can recover lost energy for reproduction without having to hunt for food, a dangerous activity that requires time and expends a great deal of energy," Estrella Mociño and Kirk Setser, lead authors of the study and researchers at the University of Granada, along with Juan Manuel Pleguezuelos, tell SINC.

The study, published in the latest issue of the journal Animal Behaviour, shows that cannibalism in this species is an evolutionary result of its feeding behaviour, since its prey is dead for some time before being eaten by the snake. "Viperids in general are prepared to eat carrion, and for this reason it is not so strange that they consume the non-viable sections of their clutches after going through the great energy expenditure caused by reproduction," says Mociño.

The research team say this behaviour can be explained by four biological factors - the day of the birth (females that give birth at the end of July are more likely to be cannibals, since they have less time to feed and prepare themselves to reproduce again), the proportion of dead babies per clutch, the level of maternal investment (the larger the brood, the greater the chance that it will contain non-viable elements, which she will eat), and stress caused by being in captivity (the researchers maintained the females in captivity for an average of 21 days).

Of all the females, 68% consumed part or all of their dead offspring, and 83% of these ate them all, and waited little time to do so (around 16 hours), although some ate them "immediately after giving birth", adds Mociño. The rest (40%) of the females "did not display cannibalistic behaviour".

According to the scientists, cannibalism is "not an aberrant behaviour, and is not an attack on the progeny", since it is not the same as parricide or infanticide as it does not involve live elements. It simply recovers some of what the snake invested in the reproduction process, and prepares it to reproduce once again.

Snakes can distinguish between dead and live offspring

The scientists showed there was a low risk of the snakes eating healthy offspring, which look very similar to dead ones for the first two hours after emerging from their membranes. During the study, only one female ate live babies.

"In comparison with mammals or birds, snakes are not as maternal, but the study shows that they also display behaviour that has evolved, and that helps the female and her offspring to reproduce and grow successfully," say Mociño and Setser.

Crotalus polystictus is categorised as a "threatened species" according to the Official Mexican Regulations on protection of native species of wild flora and fauna in Mexico. Limited habitat, urban expansion and the growth of agriculture are the main threats to the snake.

To date, the scientists have marked more than 2,000 individuals of this species, which range in length on average from 50cm to 90 cm, and which display different survival strategies from many other rattlesnakes in the north of Mexico and the United States.

This reptile has a very rapid reproduction rate, suggesting that it is experiencing a high death rate caused by external factors. As well as contributing to scientific knowledge about animal cannibalism from an evolutionary perspective, the scientists hope that publicising these results will "lead to human beings being less aggressive towards these snakes".

Journal reference:

. Mocinodeloya et al. **Cannibalism of nonviable offspring by postparturient Mexican lance-headed rattlesnakes, Crotalus polystictus**. *Animal Behaviour*, 2009; 77 (1): 145 DOI: 10.1016/j.anbehav.2008.09.020

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