

Female frogs identify own offspring using inner GPS

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In the brilliant-thighed poisonfrog, the males transport the tadpoles to nearby water bodies. Credit: Andrius Pašukonis

The ability to recognize own offspring and provide preferential care is difficult for the poison frog *Allobates femoralis*. According to a study

conducted by Vetmeduni Vienna, male and female frogs have different strategies for offspring discrimination. Females remember the exact location where they laid their eggs and exhibit preferential behavior toward their own clutches. Males assume that all offspring in their territory are their own. The study was published in the journal *Animal Behaviour*.

The brilliant-thighed poison frog *Allobates femoralis* is a ground-dwelling species inhabiting the tropical forests of South America. Males guard large territories in which females lay their eggs on fallen leaves. After three weeks of development, the tadpoles are generally transported on the backs of the males to the nearest body of water. "Females only do so when the male is not in his territory at this time," explains Eva Ringler from the Department of Comparative Cognitive Research at the Messerli Research Institute of Vetmeduni Vienna.

Own offspring should come first

Tadpole transport has its risks. The tadpoles will only survive if they are transported to a body of water at the right time. During transport, males leave their territory unguarded and risk territorial loss to rivals. Females, on the other hand, must discriminate their own [clutch](#) from a number of unrelated clutches. And on the way to the water, predators abound.

"Transport therefore only makes sense when the risk that is taken serves the survival of one's offspring," says Ringler. This assumes, however, that *A. femoralis* can identify its own offspring. "Especially interesting was whether there is a difference between male and female behaviour," Ringler says.

Males play it safe

In a series of three terrarium trials, the researchers observed whether the

frogs would transport only their own or also unrelated tadpoles. In the first test, males and females were presented only with an unrelated clutch. In the second test, an unrelated clutch was added to the terrarium of an individual that already had its own clutch. In the third test, the researchers exchanged the positions of the frog's own clutch and a foreign clutch to see whether frogs recognize the clutch itself or remember the location of oviposition.

The tests showed that a majority of male frogs transported both their own as well as foreign clutches. They simply let all tadpoles present wiggle onto their back. The parental strategy of [males](#) apparently follows the rule of "my territory, my tadpoles". Males therefore seem to forego the challenge of differentiation entirely.

Females remember the position of their clutch

The female strategy is quite different. They do not transport unrelated tadpoles. The females did not transport foreign tadpoles when they knew the position of their own clutch. But if the researchers switched the position of the female's own clutch with another one, they only transported the unrelated clutch. This shows that, even weeks later, females remember the exact position where they laid their eggs. When they take over the tadpole transport, they choose the correct clutch based on its location.

Simple rule vs. inner GPS

The behaviour of the frogs in the study also indicated different cost/benefit calculations. Males, owing to their territorial behaviour, follow a simple rule. They assume that all clutches in their territory are theirs. Males therefore have a low risk of neglecting their own offspring. Their behaviour even offers unrelated tadpoles an increased chance of

survival.

Females have a much higher risk of transporting a foreign clutch and neglecting their own. In their desire to transport only their own clutch, the [female frogs](#) rely on their inner GPS. "Further research is needed to clarify just how the [females](#) remember the exact location of oviposition in the dense rain forest," Eva Ringler concludes.

More information: Eva Ringler et al, Sex-specific offspring discrimination reflects respective risks and costs of misdirected care in a poison frog, *Animal Behaviour* (2016). [DOI: 10.1016/j.anbehav.2016.02.008](#)

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