

# Time of Day Tempers Tadpoles' Response to Predators

August 10 2006

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To a tiny tadpole, life boils down to two basic missions: eat, and avoid being eaten. But there's a trade-off. The more a tadpole eats, the faster it grows big enough to transform into a frog; yet finding food requires being active, which ups the odds of becoming someone else's dinner.

Scientists have known that prey adjust their activity levels in response to predation risk, but new research by a University of Michigan graduate student shows that internal factors, such as biorhythms, temper their responses.

Michael Fraker, a doctoral student in the laboratory of ecology and evolutionary biology professor Earl Werner, will present his results Aug. 10 at a meeting of the Ecological Society of America in Memphis, Tenn.

Fraker studied tadpoles of the green frog (*Rana clamitans*), which normally feed more at night, to see whether their responses to predatory dragonfly larvae differed with time of day.

"Green frog tadpoles, like many other aquatic animals, assess predation risk indirectly by sensing chemicals released by their predators into the water," Fraker said. Typically, the tadpoles respond to such cues by swimming down to the bottom, seeking shelter and remaining still. In his experiments, Fraker exposed tadpoles in a tank to the chemical signatures of dragonfly larvae for one hour during the day and one hour at night. Then he recorded their swimming and feeding activity during and after exposure. Both during the day and at night, the tadpoles

initially responded similarly to the chemical cues, showing the typical plunge in activity. But at night they returned to feeding more quickly than during the day.

"My interpretation of these results is that green frog tadpoles behave more conservatively in response to a predator chemical cue during the day because predation risk may still be fairly high and the tadpoles are going to feed very little anyway. That means the growth rate-to-predation risk ratio is low. At night, the ratio is higher because that's when the tadpoles do most of their feeding. This favors a quicker return to their pre-cue activity levels."

Considering biorhythmic activity patterns in predator-prey studies is something of a new slant, Fraker said. "The main implication of my results is that prey behavior can be influenced by both external factors---the chemical cues released by the predators---and internal factors such as circadian rhythms. This is important for understanding the mechanisms of prey behavior, which need to be identified in order to make long-term predictions about the effects of prey behavior in ecological communities."

Source: University of Michigan

Citation: Time of Day Tempers Tadpoles' Response to Predators (2006, August 10) retrieved 27 April 2024 from <https://phys.org/news/2006-08-day-tempers-tadpoles-response-predators.html>

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