

Fear of predators may be a bigger killer than the predators themselves

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(PhysOrg.com) -- When biologists consider the effects that predators have on their prey, they shouldn't just count the number of individuals consumed. According to a University of Rhode Island ecologist, they must also examine the effects of fear.

URI Assistant Professor Evan Preisser said that fear of being eaten can reduce population densities as much or even more than the actual quantities of individuals killed by predators.

“Prey are far from helpless victims of predators,” said Preisser. “They employ a wide array of defensive strategies to protect themselves. But the costs of these strategies may have a larger impact on their population than the direct effect of being eaten.”

To avoid being consumed by a predator, many prey species will spend more time hiding and less time eating. This can lead to a lower body mass, reduced reproduction rates, fewer offspring, and a lower rate of survival.

Preisser notes that fire ants, for example, are highly successful at finding resources, but they are “totally freaked out” by a species of parasitoid fly that lays its eggs inside the ants, which ultimately kills them.

“If one of these flies comes along, all the ants will hide and remain hidden for a really long time,” he said. “Research by Donald Feener at the University of Utah has shown that the flies actually have a very low

success rate at killing the ants because the ants are so good at hiding. They spend so much time in hiding, however, that the whole ant population becomes weaker.”

Preisser also points to research conducted by Oswald Schmitz at Yale University documenting that grasshoppers can be so afraid of wolf spiders that they will starve to death rather than come out of hiding and feed in the presence of the spider.

In a research paper published in the journal PLoS ONE in June, Preisser and Daniel Bolnick of the University of Texas-Austin found that the presence of a predator reduces prey feeding rates and overall activity rates by 57 percent and 45 percent, respectively, among species living in aquatic ecosystems and by 45 percent and 34 percent among those in terrestrial ecosystems.

“Just the simple presence of a predator can increase the mortality of prey species by as much as five percent,” Preisser said.

The URI ecologist is the guest editor of an upcoming special, three-article feature on “nonconsumptive predator effects on prey dynamics” in the September issue of Ecology, the journal of the Ecological Society of America. The articles were written as a result of a working group convened by the National Center for Ecological Analysis and Synthesis to examine the topic, which Preisser and Bolnick co-chaired.

In his introduction to the feature, Preisser wrote that fear-based, nonconsumptive effects of predation “may extend a predator’s reach far beyond its grasp.”

Provided by University of Rhode Island

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