Science NOW UP TO THE MINUTE NEWS FROM SCIENCE

A Cheap Imitation Is Sometimes Best

by Elsa Youngsteadt on 21 June 2011, 4:03 PM | Permanent Link | 0 Comments

The animal kingdom is full of fakes: tasty butterflies that look like toxic ones, harmless flies that look like bees, and spiders that look like ants, to name a few. It's all a big ploy to avoid being eaten. Some species sport less-convincing disguises than others, and the existence of these obvious fakes is a puzzle.

ENLARGE IMAGE

Almost. *Phrurolithus* spiders (*right*) are imperfect mimics of *Lasius* ants (*inset*).
Credit: Stano Pekár

Intuitively, natural selection should drive all mimics toward "increasing perfection," to better deceive their predators, says Thomas Sherratt, an evolutionary ecologist at Carleton University in Ottawa. "There shouldn't be any imperfect mimics out there." But sloppy mimics abound, and theorists have tried to explain them. They may confuse predators by looking simultaneously delicious and dangerous, for example. Or maybe they evolve to resemble several distasteful species at once, averaging the appearance of all of them rather than copying one precisely.

All of these explanations "take a very simplistic view," says Stano Pekár, an arachnologist at Masaryk University in Brno, Czech Republic. They assume that mimics evolve to avoid only one category of predators: sharp-eyed hunters that really hate the bad-tasting "originals." In fact, Pekár says, other predators could push mimics to evolve different evasive strategies, keeping their disguises forever flawed.

Tricks! An ant-hunting spider normally eats ants such as this *Aphaenogaster* species. Although it also springs for the imperfect ant mimic *Liophrurillus flavitarsus*, the latter proves harder to catch.
Credit: Stano Pekár

More Science News Videos

Pekár had this idea while studying three species of European spiders, each of which looks like a different kind of ant. The spiders run alongside the ants in their foraging trails and resemble the insects in size and color. They even hold two of their eight legs in front of them like antennae. At first, the spiders fooled Pekár. But he quickly learned to spot them among the scurrying ants: The spiders have shorter bodies, run in quicker bursts, and bob their rear ends up and down when they pause.

Pekár says the mimicry probably helps the spiders avoid becoming lunch. Many animals steer clear of ants because they're often spiny and bad-tasting, he notes, and one alarmed ant can rouse hundreds of its colony members to a biting, stinging defense. But there's a catch: Some predators *like* eating ants. Where those species are common, being too much like an ant might get a mimic into trouble.

To test the idea that the spiders' incomplete disguises might result from trying to outwit disparate types of predators, Pekár and his team brought a menagerie of ants and spiders into the lab. They staged one-on-one confrontations between predators and prey in petri dish arenas. The results confirmed that, despite their imperfections, the mimics are pretty good at tricking ant-hating predators. Two species of spiders that ordinarily hunt other spiders, and did so successfully in the lab, killed less than one-fifth of the ant mimics.

ScienceNOW. ISSN 1947-8062

But, as the researchers predicted, a really good ant costume could also be a liability. The best of the three mimics, *Micaria sociabilis*, fell prey to ant-hunting spiders in nearly half of the trials—about five times more often than did the two sloppier mimics. The ant-hunters hesitated to attack mimics in the first place, and when they did, the bad mimics ran away faster.

Ultimately, the precision of a mimic's disguise will depend on the mix of predators in its environment, Pekár and his team conclude in the July issue of *The American Naturalist*. An exposed habitat with lots of sharp-eyed, ant-hating predators will push mimics toward a more perfect masquerade. But hunters that specialize on ants or have poor vision could spur the evolution of other traits, such as fast running, at the expense of exact mimicry.

"It's a nice idea," says retired Swiss arachnologist Rainer Foelix, but he isn't sure how important the effect will turn out to be in nature. The lab results suggest that one group of spiders could reward mimicry whereas the other penalizes it, but it's not yet clear how important those particular spiders are to the mimics in their natural habitat—especially compared with other predators such as birds.

Still, the very notion that multiple predators could shape mimicry is "exciting," Sherratt says. "It's a new idea for why imperfect mimicry can exist." Sherratt studies hoverflies, a group of flies that resemble bees and wasps to various degrees. His results support a different explanation, namely, that the sloppy mimics evolve to copy several bees at once and don't match any of them perfectly. But he says that Pekár's multiple-predator hypothesis might play a role too. "It's really given us something to think about."

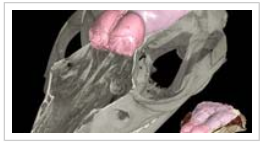
*Follow **Science**NOW on Facebook and Twitter*

Posted in Evolution | Zoology

Related Articles

MAY 25, 2011
Who You Callin' Shrimp?

MAY 23, 2011
Lousy Flies Explain Weird Evolution of Pigeon Pests



MAY 19, 2011
Mammals' Big Brains Began With a Sniff