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Strange eating. Horned lizards (top) have a mucus-producing region in the back of their throats (bottom left) that helps them incapacitate stinging harvester ants (bottom right).

CREDITS: WADE SHERBROOKE; KURT SCHWENK

How to Eat a Nasty Ant

By Greg Miller
ScienceNOW Daily News
 29 September 2008

Call it an acquired taste. Horned lizards in the American West live almost entirely on a diet of harvester ants that are armed with a venomous sting and powerful mandibles for biting. How the lizards swallow this dangerous delicacy without getting their innards torn up has been a mystery. Now, scientists have found the answer: The lizards incapacitate the ants with gobs of mucus before swallowing them whole.

Exactly why the lizards prefer harvester ants isn't clear, but they probably don't have a lot of options in their arid habitat, says evolutionary biologist Kurt Schwenk of the University of Connecticut, Storrs. What is clear, Schwenk says, is that the ants aren't very nutritious. Their exoskeleton is made of indigestible chitin, and their bodies contain a dash of formic acid, presumably to cause a foul taste in a predator's mouth.

Still, a hungry horned lizard will eat them by the hundreds. Schwenk says the lizards hunt for columns of foraging ants and then pick the ants off one by one with their darting tongues. That's not their unusual habit, though: Whereas most lizards chew their food, Schwenk had noticed that horned lizards don't. High-speed videos of lizards noshing in his lab revealed that they use their tongues to grab and swallow their prey in one fluid motion. Schwenk wondered why.

Meanwhile, biologist Wade Sherbrooke at the American Museum of Natural History's Southwestern Research Station in Portal, Arizona, had been investigating the lizards' feeding habits by cutting open the stomachs of fresh road-kill specimens. Not surprisingly, the lizards had been gorging on harvester ants. But he'd also found that each ant was encased in a ball of mucus.

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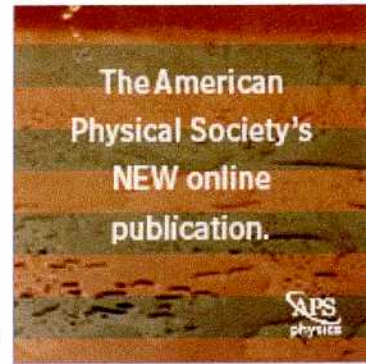
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The two researchers teamed up to investigate further. Back in the lab, Schwenk examined tissue samples from dead lizards. "I noticed what looked like a shag carpet at the back of the throat," he says. The tiny fingerlike protuberances turned out to be loaded with mucus-producing cells. These structures didn't exist in dozens of other lizard species Schwenk examined, including several that feed on less dangerous ants, suggesting that they are a specialization for neutralizing harvester ants. Sherbrooke and Schwenk report their findings in the October issue of the *Journal of Experimental Zoology*.

Schwenk says the lizard's strategy seems to be to grab an ant, get it to the back of the throat, and coat it with mucus as quickly as possible. Schwenk explains the trick with an unsavory thought experiment: "Imagine a ball of mucus in your hand," he says. If you rub your hands back and forth, the mucus acts like a lubricant. But flick your hand sharply to try to fling it off and--well, good luck. For a flailing ant, the mucus is a deadly trap. For a hungry lizard, it's just the coating to get a nasty insect down the hatch.

"It's bizarre and fascinating," says Nate Kley, an evolutionary biologist at Stony Brook University in New York. Some mammals, including anteaters, use sticky mucus to trap ants on their long tongues, Kley says, "but as far as I know, actually balling up and incapacitating venomous ants is absolutely novel." The next step will be to figure out how the lizards manage to wrap up the ants so quickly and neatly. Coordinated movements of the tongue and other muscles may help, Kley says.



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