

TRAP-JAW ANTS: Set for Prey



Death comes quickly for victims of the trap-jaw ant, one of nature's most remarkable predators. A sudden, piercing blow from giant mandibles often signals the end of battle. In the Costa Rican rain forest an *Acanthognathus* ant only a tenth of an inch long defends her nest against a pseudo-scorpion. Probing with her antennae, the ant stabs at the enemy with her oversize jaws, driving it from a hollow twig.

Had the intruder been a springtail, the trap-jaw ant's only prey, it would have been killed for hungry nest mates. An ant larva wraps around just such a feast. *Acanthognathus* ranks among the most unusual of several hundred species of trap-jaw ants.

ARTICLE AND
PHOTOGRAPHS BY
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CRACKING OPEN twig after twig, my colleague John Tobin and I (left, at right), along with zoologist Stefan Cover, scoured the rain forests of Costa Rica and, later, Trinidad. Our goal: the rarely seen *Acanthognathus teledectus* and related ants, which nest inside hollow twigs. Colonies are scarce. We found only seven after searching tens of thousands of twigs.

Those we did find were tiny, with only four to twenty adults. Most other ants nest by the hundreds or thousands and a few by the millions. Like all ant species, these ants form female societies. Males are produced as needed; after they fertilize a queen, they die.

This colony's queen walks along the inside edge of a split twig (left bottom). Her enlarged mid-section alone marks her as royalty; her elaborate mandibles look like those of her offspring. These ants cannot efficiently tunnel through soil or rotting wood, as do most ants. Thus, when a new queen starts a colony, she settles into the ready-made shelter of a twig and hunts for herself. As soon as she has reared her first daughters—from eggs to voracious larvae to metamorphic pupae to worker adults—she gives up foraging. Most likely she never leaves the nest again.

Acanthognathus ants hunt alone, stalking the ubiquitous but agile springtail—the rabbit of the insect world—with jaws cocked (top right). As the ant closes in, sensitive hairs along her mandibles detect the prey, triggering the long jaws to snap forward. Pronged tips puncture the victim. Grasping the springtail (middle right), the ant then

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thrusts her abdomen forward and injects venom into her victim with her stinger. The springtail, stunned, hangs limply. Returning to the nest (right), the worker ant carries her booty high off the ground, ensuring that even if the springtail revives it will not free itself by flinging the ant skyward with a snap of its furcula, or "tail."

Harvard zoologist Mark W. Moffett wrote about marauder ants in the August 1986 *GEOGRAPHIC*.



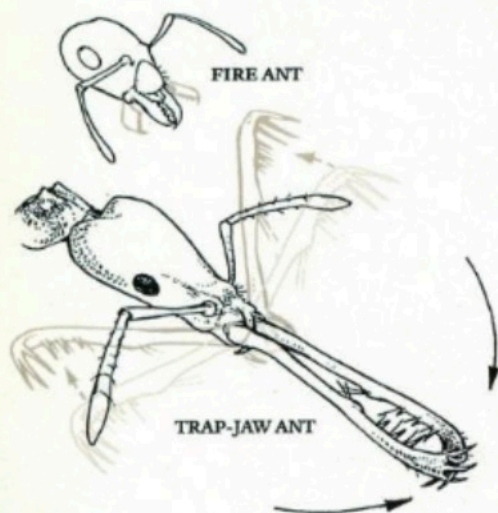


DIAGRAM BY JOHN DAWSON

WATCHING a colony move to a new nest one day, I saw an ant choose *not* to use her lethal jaws. Surprised by a larger *Leptogenys* ant, part of a looming column of aggressive foragers, the trap-jaw worker quickly dropped the larva in her care and smeared droplets of venom across the enemy's face. The dark ant recoiled (below) and tried frantically to clean herself. The worker escaped with the larva.

The same jaws that can pierce the chitinous armor of most enemies can also gently cradle soft-skinned ant young like this

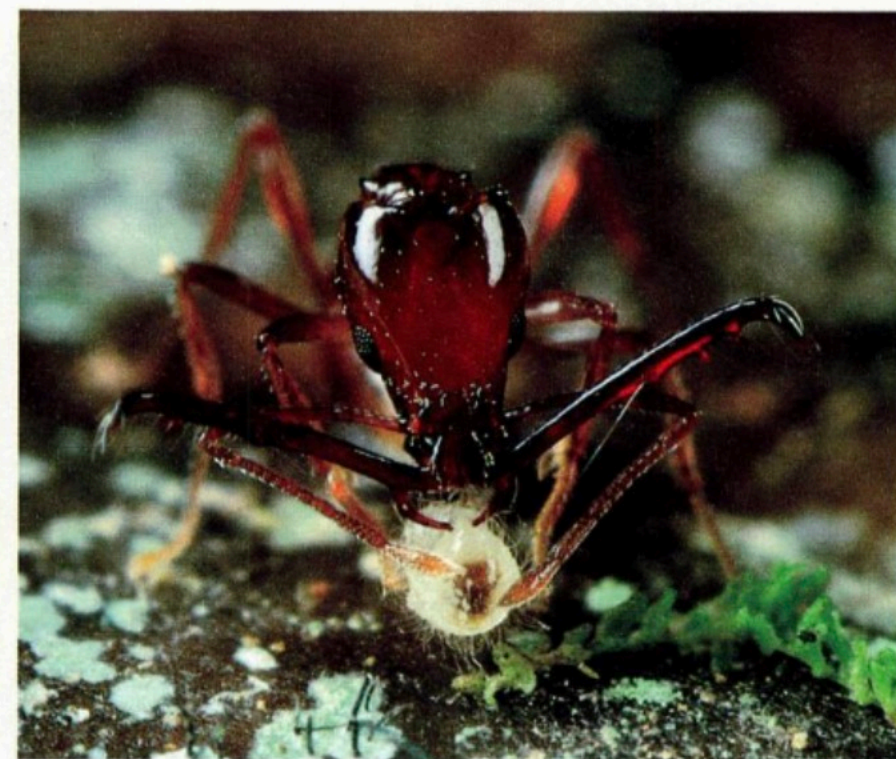
pupa (top right). Translucent "arms" will become mandibles.

Most ants have simple mandibles with limited mobility (diagram, left). Those of *Acanthognathus*, complete with trigger hairs and teeth, are able to snap together from roughly 180 degrees apart. They can also be swung back even wider to reveal smaller outgrowths similar to the jaws of most other ants. With these a trap-jaw worker can lift a small larva (middle right) or an egg. When doing so, the long jaws flail uselessly.

For *Acanthognathus* the short jaws also make quick work of

chewing springtails (bottom right) so they can be licked clean of body juices, a task all ants must perform since they can swallow only liquids. The ant on the right, having snared a springtail, presents it to another ant.

Feeding is much harder for *Myrmoteras*, another trap-jaw ant I've studied. This ant, lacking short jaws, must walk back far enough to tear food with her long jaws, then move forward to eat, back again to tear, and up again. The dual jaws of *Acanthognathus* cut through such complications.





TRAP-JAW ANTS hold no monopoly on elaborate weaponry. That became clear to a forager (above) when she happened upon a termite soldier defending a column of its nest mates. Besides hooked jaws, the soldier sports a nozzle it can use to shoot down enemies with a gluey stream.

Among ants ornate mandibles have evolved independently in numerous species. Many of these are trap-jaw ants belonging to a group called the dacetines. We know *Acanthognathus* ants only from Latin America, but less dramatic dacetines inhabit climates as far north as New England. One of my favorites, *Daceton armigerum*, nests in the trees of South America. The workers of this species exhibit polymorphism, specialized physical castes. In a Venezuelan nest (right) a tiny, brood-tending minor rides piggyback on a major nearly half an inch long. The majors, along with

intermediate-size medias, forage for prey high in the jungle canopy, their jaws powered by muscles housed in lobes at the back of their heads.

I have long admired trap-jaw ants. Studying the fragile nests of *Acanthognathus*, I was

reminded why. There is simplicity behind their complex design. The colonies live on what each ant carries, unaided, to the nest. Since their prey leaps at any disturbance, they need a weapon that also serves as forklift. The answer: a set of trap jaws. □



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