

# Research yields new details about trap-jaw ants

May 9 2017, by Matt Shipman

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The head and mouthparts of a trap-jaw ant 2nd instar larva. Credit: Adrian Smith

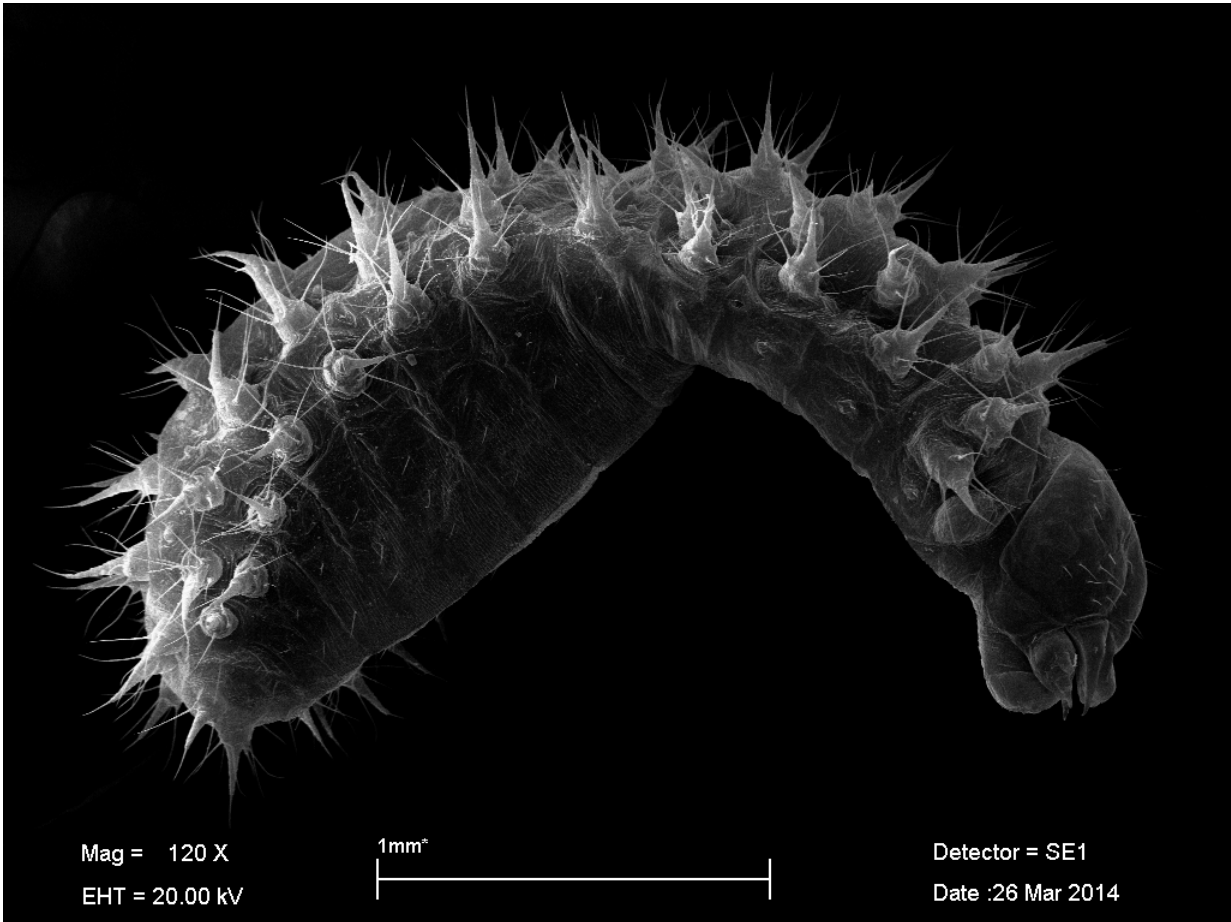
Trap-jaw ants, with their spring-loaded jaws and powerful stings, are

among the fiercest insect predators, but they begin their lives as spiny, hairy, fleshy blobs hanging from the ceiling and walls of an underground nest. New research provides the first detailed descriptions of the larval developmental stages of three species of *Odontomachus* trap-jaw ants.

"This research provides foundational knowledge which enables future research questions on developmental trajectories, such as when an individual might switch from developing into a worker to developing into a queen," says Adrian Smith, a research assistant professor at NC State University and head of the Evolutionary Biology & Behavior Research Lab at the North Carolina Museum of Natural Sciences.

"Beyond furthering our understanding of these social insects, the work also offers us a little more insight into how the natural world works," says Smith, who co-authored a paper on the research. "We think that's inherently valuable and, as the images associated with this research show, nature can be visually fascinating."

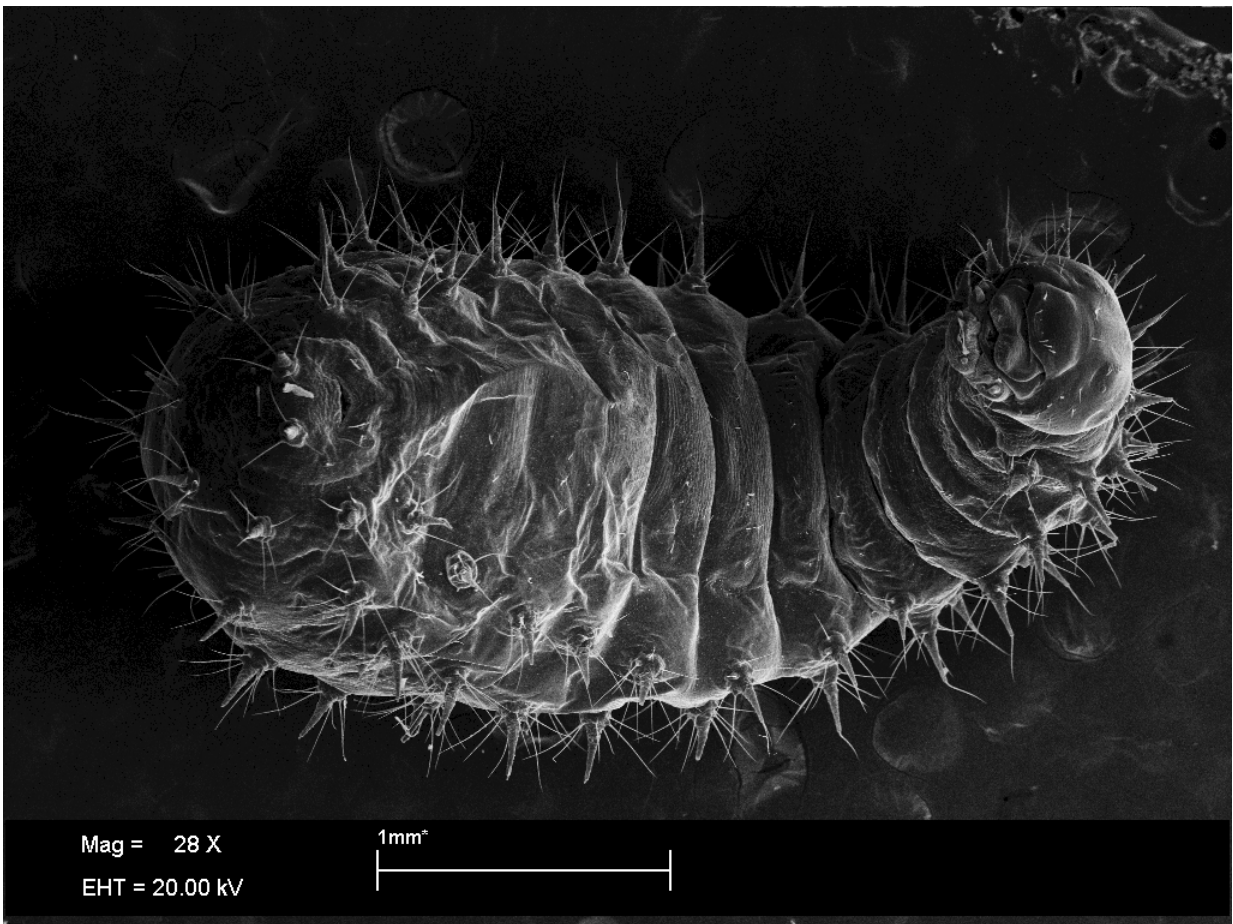
While there are nearly 16,000 described species of [ants](#), less than half of one percent of those have had their developmental stages, from egg to adult, described. The number of larval stages in insects can be variable, however the new study finds that trap-jaw ant workers go through three stages of larval development.



A profile view of a second instar trap-jaw ant larva. Credit: Adrian Smith

This research determined the number of larval developmental stages, or instars, by measuring hundreds of larval head widths and body lengths and by identifying stage-specific anatomical features through scanning electron microscopy. These images revealed an amazing complexity of body parts such as four "sticky doorknobs" on the backs of first and second instars, used to adhere the larvae to nest walls and ceilings, complex "frustrum with spire" hairs of second and third instars, and silk-spinning "pseudopalps" of third instar larva.

Beyond providing the first categorization of larval stages for these ants, surprising results from the work include discovery of the "sticky doorknobs" which were previously studied in only one other ant species, developmental anomalies such as the appearance of additional doorknob protuberances, and the discovery of a larval parasite found in the gut of a third instar larva.



A top-down view of third instar trap-jaw ant larva. Credit: Adrian Smith

All original electron microscope images are freely available through CC BY 4.0 license here: [dx.doi.org/10.17632/ssj7tytwzn.1](https://doi.org/10.17632/ssj7tytwzn.1)

The journal article, "[Larvae of trap-jaw ants, \*Odontomachus Latreille, 1804\* \(Hymenoptera: Formicidae\): morphology and biological notes](#)," is published in the journal *Myrmecological News*.

**More information:** [DOI: 10.17632/ssj7tytwzn.1](https://doi.org/10.17632/ssj7tytwzn.1)

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