

**OR197**

*Macroevolution of Trap-jaw Ants in the genera Anochetus and Odontomachus*

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Mandibles are an important trait in the evolutionary success of ants, and are the primary structures they use to physically interact with their environment during activities like foraging, predation, food processing, defense, nest excavation, and brood care. Although these essential functions constrain their morphology, ant mandibles display a remarkable amount of diversity, with some of the most extreme specializations found among trap-jaw ants in the genera *Anochetus* and *Odontomachus*, whose spring-loaded mandibles snap shut at some of the fastest speeds ever recorded for an animal movement. These rapid mandible movements are used to capture fast or dangerous prey (e.g. springtails or chemically defended termites), and to escape from predators. Trap-jaws may be an example of a key morphological innovation, a trait that allows an organism to interact with its environment in a novel way and may lead to increased ecological and species diversification. We used phylogenetic comparative methods to answer the following questions about diversification and mandible evolution in this lineage of trap-jaw ants: (1) What is the closest living non-trap-jaw ant relative to *Anochetus* and *Odontomachus*? (2) Are *Anochetus* and *Odontomachus* monophyletic sister groups? (3) Is trap-jaw performance (speed and force) correlated with species diversification? We constructed a time-calibrated molecular phylogeny for 90 species of *Anochetus* and *Odontomachus* based on two mitochondrial and four nuclear genes. This phylogeny was then used to infer patterns of trap-jaw evolution, examine the relationship between trap-jaw morphology and performance, and measure correlations between trap-jaw performance and diversification rate. Together our results provide insight on how a morphological innovation has influenced the patterns of species distribution in a remarkable social insect.