

New research constructs ant family tree

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Temnothorax rugatulus. Credit: Arizona State University

Anyone who has spent time in the tropics knows that the diversity of species found there is astounding and the abundance and diversity of ants, in particular, is unparalleled. Scientists have grappled for centuries to understand why the tropics are home to more species of all kinds than the cooler temperate latitudes on both sides of the equator. Several hypotheses have been proposed to explain the higher species numbers in the tropics, but these hypotheses have never been tested for the ants, which are one of the most ecologically and numerically dominant groups of animals on the planet.

New research by [evolutionary biologists](#) Dr. Corrie Moreau of Chicago's [Field Museum](#) and Dr. Charles Bell of the University of New Orleans is helping answer these questions. Their findings are presented this week in

the journal *Evolution*.

The scientists used [DNA sequence data](#) to build the largest ant tree-of-life to date. This tree-of-life, or family tree of ants, not only allowed them to better understand which [ant species](#) are related, but also made it possible to infer the age for modern ants because information from the [fossil record](#) in the form of geologic time was included in the research.

This ant tree-of-life confirmed an earlier surprising finding that two groups of pale, eyeless, subterranean ants, which are unlike most typical ants, are the earliest living ancestors of the modern ants. The time calibrated ant tree-of-life showed that the ants found on the planet today can trace their evolutionary origins back to between 139 and 158 million years ago – during the time the dinosaurs walked the Earth (a finding in line with previous studies).

But why are there more species of ants in the tropics? To explain this pattern of higher [species diversity](#) for many tropical organisms, biologists have used the analogies of the tropics acting as a "museum" or "cradle" for speciation. In the case of the museum analogy, the tropical climates have more species because this is where the oldest groups persist throughout evolutionary time. The converse of this explanation is that the tropics are a cradle where new species are more likely to be generated.

To better understand where on the planet the ants arose and if any single geographic area was more important for their [evolutionary origins](#), Moreau and Bell reconstructed the biogeographic history of the ants. These analyses found that the Neotropics of South America were vital to the deep and continued evolutionary origin of the ants. This finding suggests that for the ants the rainforests of the Neotropics are both a museum, protecting many of the oldest ant groups, and also a cradle that continues to generate new species.

As ants are one of the most ecologically important groups of terrestrial organisms, these findings suggest that protecting the rainforests of the Neotropics are vital to the health and success of both the ants that live in them and all the other animals, plants, fungi, and microbes worldwide that rely on ants to survive.

Provided by Field Museum

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