Unpeaceful co-existence: How strengths and weaknesses maintain biodiversity in an ant community

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Ants swarm over a large cricket that must be defended and cut up to be returned to the nest. Credit: photograph by F. Adler

Many species of ants scavenge for the same kinds of food. Why then doesn't the single most efficient species drive the others to extinction? A research group based at the University of Utah conducted a detailed study of ants in the mountains of southeastern Arizona to identify exactly how they manage to share the same environment. The study appears in the March issue of the *American Naturalist*.

They found that some species are better at finding food resources (dead crickets left by researchers) while others are better at defending them. This so-called dominance-discovery tradeoff is complicated by the size

of the cricket because small crickets can be collected so quickly that defense is unimportant.

For both large and small crickets, two ant species are adept at both finding and defending resources, and would be predicted to outcompete the others because they violate the tradeoff. But it is precisely these ants that are beset by parasitoid flies which lay their eggs specifically on these types of ant, eventually causing a gruesome death by decapitation. When the target ants see the flies hovering around, they run away and are unable to effectively defend resources.

Using mathematical models, the team showed that this combination of factors is indeed sufficient to explain how five of the six most common species manage to survive, with the sixth remaining a bit of a mystery.

"Just like people, different ants have different strengths and weaknesses, and these differences allow them to coexist, although not peacefully," says Ed LeBrun. "Developing a quantitative understanding of the mechanisms by which species coexist is essential to knowing how to preserve biodiversity," adds Fred Adler. "Our quantitative approach should be useful in modeling the potential success or failure of invasive ant species," concludes Don Feener.

Source: University of Chicago

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