When industrious ants go too far

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Nature is full of mutually beneficial arrangements between organisms—like the relationship between flowering plants and their bee pollinators. But sometimes these blissful relationships have a dark side, as Harvard biologist Megan Frederickson describes in an article for the May issue of The *American Naturalist*.

Generally, the relationship between ants and plants is a great example of biological mutualism. Myrmecophyte plants—otherwise known as ant-plants— often provide home for several species of ants. The plant shelters ant colonies in hollow spaces in its limbs or leaves. The ants, in turn, protect the plant against threats from other insects or encroaching vegetation. The ants get a home; the plant gets protection—everybody wins.

But sometimes the delicate balance is tipped toward one partner or the other.

In her article, Dr. Frederickson describes the tumultuous relationship between the ant-plant C. Nodosa and the ant species A. octoarticulatus. The relationship between these two species is much like that of other ants and ant-plants, until it comes time for the plant to reproduce. When Nodosa begins to flower, the ants attack the buds, lopping them off before they get a chance to spread seeds. The ant, in effect, sterilizes its gracious host. Ingrates.

So what do the ants have to gain from this?

"When researchers first described this intriguing behavior over a decade ago, they suggested that perhaps the ants destroy flowers to promote the growth of their host plants, much as gardeners prune roses to encourage the growth of their rose bushes," Frederickson says. The larger the plant, the more living space the ants have.

To test this assertion, Frederickson measured the growth rate of sterilized and non-sterilized Nodosa plants. Sure enough, the sterilized plants grew faster, providing more space for ants to inhabit.

Octoarticulatus ants are taking advantage of a trade-off between reproduction and growth. Since the plant is sterilized, and no longer allocating resources to reproduction, those resources are re-routed into growth—and more living space for ants.

So in this relationship, the ant wins, and the plant appears to have lost.

So does this mean that octoarticulatus is really a parasite rather than a mutual partner? That's hard to say, according to Dr. Frederickson. Nodosa plants generally live about 77 years, while ant colonies only live seven to 14 years. Perhaps, Frederickson says, octoarticulatus helps Nodosa plants survive and grow until another ant species—one that doesn't sterilize its host—comes along and allows it to reproduce.

More information: Megan E. Frederickson, "Conflict over Reproduction in an Ant-Plant Symbiosis: Why Allomerus octoarticulatus Ants Sterilize Cordia nodosa Trees," *The* American Naturalist May 2009.

Source: University of Chicago (news : web)