

How ants tame the wilderness: Rainforest species use chemicals to identify which plants to prune

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This is a Peruvian *Pseudomyrmex triplarinus* ant. Credit: Dr. Tiffany Weir

Survival in the depths of the tropical rainforest not only depends on a species' ability to defend itself, but can be reliant on the type of cooperation researchers discovered between ants and tropical trees. The research, published in *Biotropica*, reveals how the ants use chemical signals on their host tree to distinguish them from competing plant species. Once a competing plant is recognised the ants prune them to defend their host.

The species of plant inhabiting ant *Pseudomyrmex triplarinus* are found in the Peruvian rainforest and as researchers from Colorado State

University found out, they have evolved a [symbiotic relationship](#) with *Triplaris americana* trees, receiving shelter and sustenance in return for defence.

"The [ants](#) inhabit hollow channels inside the tree and aggressively fight off any invaders including other plants, yet how these ants recognise their host tree compared to other plants has not been studied," said lead author Dr Tiffany Weir. "We found that the ants distinguish between their host trees and encroaching species through recognition of the plant's surface waxes."

From the Tambopata National Reserve in Peru Dr Weir, and Dr. Jorge Vivanco, the team's leader, used a creative set of experiments to demonstrate how ants inhabiting the branches of *T. americana* trees recognise species-specific chemical signals embedded in the leaf surface.

Species of grass and fern were harvested from the area and replanted around several *T. Americana* trees which hosted ants. The team then monitored ant pruning behaviour of these competing species for five weeks.



This is an example of a leaf from an invasive species being pinned to a host tree to provoke the defense reaction of the ants. Credit: Dr. Tiffany Weir

Detached leaves from several trees, including *T. americana*, were then attached to [host trees](#) with a sewing pin. Daily records revealed that more leaves belonging to non-host plants were removed by the ants.

A similar experiment looked at removal of filter papers coated with surface waxes that had been extracted from host tree leaves compared with papers coated with waxes from a closely related species, *T. poeppigiana*. The ants more aggressively attacked papers coated with the *T. poeppigiana* extracts demonstrating both the extremely high degree of specificity for their host tree and that the chemical signal allowing them

to accurately distinguish their host from other plants is present in leaf surface waxes.

The team also found that even during rainy periods when ant activity was minimal they still defended their host tree if disturbed. This included attacking ants from a neighbouring nest if they ventured too close to the tree.

"Researchers have observed pruning behaviour in ants before, and the explanations for this type of behaviour range from limiting competition to [host plants](#) to preventing foliar bridges between the host tree and other plants that would allow invading ant species access to the colony," concluded Weir. "However, this is one of the first studies to examine the specificity and [chemical signals](#) involved in this particular ant-plant interaction."

Provided by Wiley

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