

# In Florida study, nonnative leaf-litter ants are replacing native ants

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*Pheidole navigans*, a South American leaf-litter ant now found in Florida. Credit: Alex Wild, alexwild.com (used with permission)

A new look at decades of data from museum collections and surveys of leaf-litter ants in Florida reveals a steady decline in native ants and

simultaneous increase in nonnative ants—even in protected natural areas of the state, researchers report.

The study tracked leaf-litter ant abundance from 1965 to 2019. Nonnative ants represented 30% of the 177 ground-dwelling species detected in surveys across the state in later years, the team reports. Their dominance grew most notably in southern Florida, where nonnatives increased from 43% to 73% over the decades studied. The nonnative ants are most likely arriving with goods transported to Florida from around the world.

Reported in the journal *Current Biology*, the findings point to a potential future devoid of native ants, the researchers said.

"Leaf-litter ants tend to be very small, just a few millimeters in length, so moving through soil, leaves and other litter is like climbing over hills for them," said University of Illinois Urbana-Champaign evolution, ecology and behavior professor Andrew Suarez, who led the research with Douglas Booher, a research entomologist with the U.S. Department of Agriculture Forest Service; and Corrie Moreau, a professor of entomology and of ecology and evolution at Cornell University. "Many of them are small specialist predators, like trap-jaw ants of the genus *Strumigenys*, which are solitary hunters that specialize in catching small arthropods like springtails."

These ants rely on the litter that accumulates under trees and other plants, Suarez said. "These communities are sensitive to [habitat loss](#), especially the loss of canopy trees," he said. "They also are very susceptible to heat and water stress, as they require humid environments."

While native and nonnative leaf-litter ants share many traits and likely perform some of the same [ecosystem services](#), the science is still

unsettled as to whether the invasives will fill the same niches, the researchers said. Future studies should examine whether certain ecological functions are lost when [native ants](#) decline.



Study lead author Douglas Booher, a research entomologist with the USDA Forest Service. Credit: Brian L. Fisher

"Our biggest worry is that the loss of a few [key species](#) that act as specialized predators or seed-dispersers could have ecological consequences for these already threatened ecosystems," Booher said.

Native leaf-litter ants differ from the invaders in at least one significant trait, the researchers found. The team tested how well the ants tolerated



sharing their nests with individuals of the same species from other nests.

"We collected more than 300 live ant colonies and set them up in artificial nests," Booher said. "By marking individuals of the same species from different colonies and introducing them to one another, we evaluated if workers from different colonies were adopted or excluded."

Most of the nonnative workers adopted conspecific worker ants from different colonies, but most natives rejected the outsiders, the team found.

This difference seems to give nonnative ants an advantage, Booher said. By accepting and cooperating with ants from various nests, nonnative ants "effectively act like a single unified colony over a large landscape," he said.



U. of I. ecology, evolution and behavior professor Andrew Suarez, left, and Cornell University evolutionary biologist and study co-author Corrie Moreau collect samples. Credit: Brian L. Fisher

There are still many more native than nonnative leaf-litter ants in Florida, but the nonnative ants "are becoming more abundant and common," Booher said. "This concerning trend has increased steadily over the past 54 years. Across all regions of Florida, nonnative species have doubled in collection frequency."

The research highlights the importance of [museum collections](#) for understanding species diversity and loss, Moreau said. "Only through comparing past [species diversity](#) and abundance with current data can we really understand how biodiversity is changing through time," she said.

"While we are starting to appreciate just how bad insect declines are globally, we often don't have species-level data for many groups," Suarez said. "By looking at trends for individual species over long periods, we can get an idea of the possible ecological consequences of these patterns."

**More information:** Douglas B. Booher, Six decades of museum collections reveal disruption of native ant assemblages by introduced species, *Current Biology* (2023). [DOI: 10.1016/j.cub.2023.03.044](https://doi.org/10.1016/j.cub.2023.03.044). [www.cell.com/current-biology/fulltext/S0960-9822\(23\)00332-9](https://www.cell.com/current-biology/fulltext/S0960-9822(23)00332-9)

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