

Insect diversity: Team looks at effects of non-native plants on herbivores

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insect communities than their non-native counterparts, but a University of Delaware study shows that non-native plants are compounding the problem of declining species diversity by supporting fewer herbivores across landscapes.

The research was conducted by UD alumna Karin Burghardt and Doug Tallamy, professor of entomology in the University's College of Agriculture and Natural Resources, and published in a recent issue of *Ecology Letters*.

To conduct the study, the researchers planted imitation yards with different common gardens of both native and non-native tree species and collected data over a three-year period, measuring the herbivore communities and species found on those plants.

They compared native trees to non-native trees that had no close native relative and to non-natives that are closely related to the native community.

Within the distantly related group, they found that herbivores were less diverse when they looked at individual non-native tree species, and as they moved from one non-native [tree species](#) to another, they found similar species of herbivores using those trees.

"You get this compounding effect where you have a lower diversity of herbivores per tree but then you also are getting more similar species as you move between trees species and among sites, so you end up with even less diverse communities than you would expect," said Burghardt.

They found this to be especially true of non-[native plants](#) that had no close native relative.

"There is this group of species of non-natives that do not have any close

native relatives at all. These non-natives support more generalized and redundant herbivore communities than the native plants that they're potentially replacing on landscapes," said Burghardt, who added that this is especially true for young herbivores that use the plants for food.

Tallamy said that finding young herbivores on a plant is a good indication of how that plant is supporting the local ecosystem, as opposed to finding adults, which could be on a plant for a number of reasons, such as resting or looking for a mate.

"The relationship between the adult and food is far weaker than the relationship between immatures and food, so when you find adults on the non-natives, it doesn't mean that much. When you find immatures, that's what you should be measuring," Tallamy said. "Those are the plants that are creating those immatures and so we do get significant differences between the immatures that are using native plants versus the immatures using non-natives."

When it comes to non-native plants that are congeners—non-native plants with a close native relative, such as Norway maple and red maple—the researchers found that those seem to support herbivore populations across sites more similar to those on natives than the non-native plants that have no native relatives at all.

Tallamy said that few unique species were found on these non-native congeners, as most species found were also living on their native relative.

He also stressed that that native plants always do the best job per tree of supporting herbivore communities when compared to their non-native counterparts. This study expands the understanding of that fact by looking at whether that lower per tree diversity is magnified further by non-natives hosting more similar communities across trees species and locations.

Burghardt said the goal of the research was to understand how the composition of the plants that homeowners plant in their yards affects herbivore communities.

"If you think about it, you're driving around the suburban environment, and every time a new development goes in, you have a lot of decision making happening as to what plant [species](#) are going to be planted around those properties," Burghardt said. "If we do all that landscaping with non-native plants, are we limiting the wildlife and conservation support system that could be available within that given plot of land? What the gardens we constructed for the study are trying to replicate are landscaping decisions that people might make if they wanted to support native insect communities that in turn support much of the diversity around us."

More information: *Ecology Letters*, [onlinelibrary.wiley.com/doi/10.../ele.12492/abstract](https://onlinelibrary.wiley.com/doi/10.1111/ele.12492/abstract)

Provided by University of Delaware

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