ANIMALIA

Squashing lantern flies isn't enough. Here's how to kill them.

For years, officials asked people to crush invasive spotted lantern flies. But as the pest continues to spread, some researchers say it's time to send in the birds.



By <u>Dino Grandoni</u>

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We're at war and we're losing.

Sure, everyone is doing their part: stomping, squashing and squishing the enemy on sight. Yet the spotted lantern fly, an invasive insect, continues to eat its way through more than a dozen states and counting along the East Coast and in the Midwest.

For years, officials in states where the lantern flies have taken hold have asked ordinary citizens to crush the bugs, but the country is still ceding ground to the invasive species, whose voracious appetite for plants is causing millions of dollars in damage a year to farms, particularly vineyards.

Native to Southeast Asia, the insect is spreading its wings across the world — in Japan, in South Korea and, over the past decade, in the United States. The pest has yet to reach Europe, but scientists worry it's only a matter of time.

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So, some researchers say, it's time to recruit allies in the fight against lantern flies.

It's time to send in the birds.

The spotted lantern fly is not alone. Around the world, invasive species have hitched a ride between the continents with the help of humans and

are <u>exacting a staggering cost on society</u>, destroying crops and depleting native fisheries people need for food.

Though lantern flies have thrived in large part because they lack natural predators in North America, amateur birders and professional biologists have increasingly noticed that native birds are learning to munch on the bugs. Now entomologists and ornithologists want to figure out how to encourage more avians to eat more insects.

"Birds have always been our natural allies against pests," said Allison Cornell, an ornithologist at Pennsylvania State University at Altoona.

But the lantern fly has its own ally in the fight: its favorite tree, which may be giving it a secret weapon.

A bird blitzkrieg

It's hard to miss a spotted lantern fly. Donning streaks of ruby red and Dalmatian-like black spots on its white wings, the inch-long insect isn't trying to blend in. Instead, it seems to have evolved its conspicuous coloration to send a warning to potential predators: Don't eat me, or else.

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That led Anne Johnson, a Ph.D. student at Pennsylvania State University, to wonder what exactly it's warning against. "You can't be that pretty without backing it up."

To see what, if anything, was willing to eat lantern flies in the United States, Johnson set up a Facebook page called <u>"Birds Biting Bad Bugs"</u> in 2020, when lots of people were spending time at home looking out their windows during the pandemic. Spreading the word among gardeners and birders, she asked for photos and videos of lantern flies becoming lunch for some lucky bird.

"In particular did the bird just attempt to eat the insect but then dropped it, or did it finish eating it?" she wrote on Facebook. "Did it spit out the wings, but eat the rest?"

The carnage poured in: images of chickadees, cardinals and dozens of other species crushing the insects in their beaks. Spiders, mantises and even mammals were caught clutching half-consumed lantern flies, too.

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"My dog (70lbs) ate a spotted lantern fly and was ill for about 12 hours," someone wrote on Facebook. "He appeared to have stomach issues from it."

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Like when a new restaurant opens in a neighborhood, lots of animals were willing to try the lantern fly. But in the nearly 1,300 predation events reported through Facebook from New York to Virginia between 2020 and 2022, Johnson and her colleagues noticed birds were picky eaters.

Spotted lantern flies eat almost any plants, but their favorite is one called the tree of heaven, a deceptively named broad-leaved plant. The tree is an invasive species also from Asia that grows rapidly and produces pungent chemicals that discourage the growth of other plants. Johnson and her colleagues found that birds often avoided lantern flies on trees of heaven — or at least plucked the wings off before eating them, they reported in <u>their study</u> published last year in the Bulletin of Entomological Research.

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Did lantern flies that ate the toxic trees taste bitter to the birds? Scientists working with lantern flies suspected as much.

"They smell really bad," said Kelli Hoover, an entomology professor at Penn State who worked with Johnson. "When lantern flies have been feeding on tree of heaven, and they die, and you collect them, within a couple of days they stink to high heaven."

So Johnson and her colleagues cooked up two meals of suet for wild birds — one made of crushed lantern flies that had eaten tree of heaven and another composed of lantern flies that had not. Chickadees and other birds showed a clear preference for the latter. So, too, did house wrens when given the choice between cups full of nymphs that had and hadn't munched on the tree.

'We need to do everything we can'

Widespread removal of trees of heaven, which have fanned out coast to coast in the United States, may encourage more birds to prey on more lantern flies as birds observe and learn from one another, said Daniel Strömbom, a mathematical biologist at Lafayette College in Pennsylvania.

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In <u>a study</u> published last month in the journal Royal Society Open Science, Strömbom used a mathematical model to show that birds will begin eating lantern flies when fewer than 30 percent of the insects had eaten from the tree of heaven. "You don't have to eradicate the tree. But the more you can reduce its presence in an area, the faster and the more likely the social learning process is to take off."

An applied mathematician by training, he was prodded by his students to look into the lantern fly. "It was all over campus," he said, "all over town."

But eradicating the diabolical tree is no easy matter. Cutting them down isn't enough, since they sprout back. In many cases, the plant need to be treated with herbicide.

It is "so, so, so expensive to remove it," said Julie Urban, a Penn State evolutionary biologist. "It might help, but I think that that's a really complex thing to try to do."

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Strömbom agreed that, tree or no tree, birds alone won't win the war against lantern flies. "There will not be one silver bullet for this," he said. But he added, "we need to do everything we can."

Cornell, the ornithologist, said full eradication of the tree of heaven is impossible, but local removal efforts would still be a boon to communities.

"This plant is everywhere, so we're not going to completely remove it," Cornell said. "But it's something that could be done on a local scale in, say, neighborhoods or on a farm to try and increase the likelihood of birds in that area learning to recognize spotted lantern fly as a food item."

There are other steps homeowners dealing with lantern fly infestations can take to call in a bird blitzkrieg, including installing birdbaths, birdhouses and bird feeders. "Anything you can do to attract birds to your yard," Hoover said, "it never hurts."

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And, of course, there's still good old stomping.

"If you don't stomp it, you might spread it because it moves with humans," Urban said. But she added that, as a scientist who has spent much of her career studying the anatomy of the strangely beautiful bug, she has a hard time squishing them herself.

"That's the thing. I can't smush them," Urban said. "There's too much to learn. ... They're little freaks."

This article is part of Animalia, a column exploring the strange and fascinating world of animals and the ways in which we appreciate, imperil and depend on them.



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