

# A wing and a prayer: Chickens, praying mantises among likely enemies of invasive lanternflies

March 16 2021, by Amy Duke

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This image of a praying mantis eating a spotted lanternfly was taken by citizen scientist Danielle Morris Duffy. Her photo is one of many helping entomologists at Penn State zoom in on native species that might feed on lanternflies. Credit: Danielle Morris Duffy

Potential predators of the spotted lanternfly are being brought into focus thanks to shutterbugs who have captured images of birds, insects, mammals and even fish consuming the invasive planthopper.

Their snapshots are helping researchers at Penn State zoom in on [native species](#) that might feed on the destructive pest, which first was discovered in the U.S. in Berks County in 2014, and since has spread to at least 34 Pennsylvania counties and to surrounding states.

Of the 660 photos and observations submitted to scientists in the College of Agricultural Sciences, chickens and praying mantises are heading for a photo finish in the race to eat the spotted lanternfly, according to Anne Johnson, a doctoral candidate in entomology. She is conducting the study with Kelli Hoover, professor of entomology.

"The overwhelming response to our request demonstrates what we suspected—that native predators may play a larger role in spotted lanternfly control than may have been assumed previously, perhaps giving us more biological options to help manage this pest," she said.

However, Johnson cautioned that while the results of this study look promising, more research is needed to substantiate the impacts native predators will have on lanternfly populations.

Hoover explained that because the spotted lanternfly is a non-native insect, it did not arrive in the U.S. with its natural enemies to keep its numbers in balance, unlike in its native environment of Asia, where several predators, including parasitic wasps, devour it. However, importing new species to the U.S. as a control measure requires numerous studies on environmental impact and regulatory approval, which is a lengthy process.

In the meantime, Johnson and Hoover are conducting their field and lab

experiments to find species in the U.S. that will prey on spotted lanternflies. Last fall, through news and social media outreach, the researchers asked residents in the spotted lanternfly quarantine zone to upload relevant photos or sightings to the Facebook page, Birds Biting Bad Bugs. The notifications came pouring in not long after.

"We didn't expect to receive as many reports as we did or for the project to attract as many people as it did," Johnson said. "Most of the responses were from Pennsylvania, but we also received reports from other areas impacted by the spotted lanternfly, particularly New Jersey."

Leading the bird predators is the chicken, with cardinals, catbirds, blue jays and the tufted titmouse rounding out the top five. In the arthropod category, the praying mantis takes the top spot as the most reported [predator](#); yellow jackets, orbweaver spiders, wheelbugs and ants also were strong contenders.

There were a few surprises among the reports, including sightings of squirrels, bats, frogs, goldfish and a garter snake ingesting lanternflies.

"Being that these species also are predators, it makes sense," Hoover said.

The past year's research focused on predation of the adult stage of spotted lanternflies; currently, the scientists are gathering data on predation of eggs and nymphs. "We are grateful for the support we have received so far and are eager to have citizen-scientists continue to help us to advance our work."

Other aspects of the research will focus on whether the spotted lanternfly's preferred diet—*Ailanthus altissima*, known as tree of heaven—influences how it might taste to birds. The researchers theorize that the chemicals in tree of heaven might cause the insect to have a

"bitter" flavor, especially in later life stages when the pest is eating profusely and has gained the characteristic warning colors of red and black.

"Bright colors inform potential predators that they taste bad, just like we see with the orange and black warning colors of monarch butterflies," Hoover said.

There also is the potential that eating spotted lanternflies, particularly those that have fed on tree of heaven, could be toxic to predators. While the citizens' observations currently do not support this notion, with many reporting no difference in behavior following predators' [lanternfly](#) consumption, Johnson and Hoover plan to delve further into the theory.

The researchers anticipate having a report ready for publication this fall. For now, they believe their preliminary findings—which Johnson will present at the Eastern Branch of the Entomological Society of America's meeting this month—could help homeowners this season.

"I recommend homeowners take steps to attract these predators because they will help to control not only spotted lanternflies but other pests, too," Johnson said. She pointed to the Penn State Extension website for information on how to attract beneficial birds and insects.

Provided by Pennsylvania State University

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