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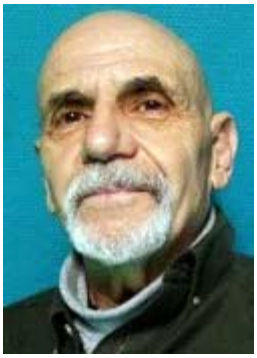
Study Sheds Light on Spotted Lanternfly's Life History in North America

LISA JUNKER 23 HOURS AGO 1 COMMENT

Spotted lanternfly (*Lycorma delicatula*). Photo credit: Lawrence Barringer, Pennsylvania Department of Agriculture, Bugwood.org.

By Ed Ricciuti

Its name implies it is a fly (in the order Diptera*), but it is really a planthopper (in the infraorder Fulgoromorpha*) and a colorful one at that, flashing a dazzling pattern of black, yellow and red as an adult, seen best when its wings are open. The invasive spotted lanternfly *(Lycorma delicatula*) is a little beauty, but it also is a beast of a problem: spreading from Pennsylvania, where it appeared on 2014, into nearby states, threatening crops such as almonds, apples, blueberries, cherries, peaches, grapes, and hops, as well as hardwoods such as oak, walnut, and poplar.



Ed Ricciuti

Concern over its invasion has sent scientists scrambling to learn more about this insect to help combat it, and new research (https://doi.org/10.1093/ee/nvz123) published in the journal *Environmental Entomology* is a major step in that direction. It contains new findings on its reproductive biology, host preference, and other life history elements that could help pest managers know when in its life cycle to target various control measures.

The paper focuses partly on pinpointing the surfaces, or "substrates," upon which female lanternflies prefer to lay eggs. "Nobody knew exactly how many things can be used by females to lay eggs," said author Houping Liu, Ph.D., of the Pennsylvania Department of Conservation and Natural Resources. "We want to document all oviposition substrates in the field so effective quarantine regulations can be put in place. If we can figure out the preferred substrates by females during oviposition, we can focus our resources on those substrates for lanternfly management."

Potential Impact

Not a problem in its native China because of predators and other natural controls, the spotted lanternfly is a serious pest where invasive. Typical of planthoppers, it chews into stems and branches of plants to suck out sap, causing wilting, leaf curling, and dieback. To make matters worse, like aphids, it excretes sugary honeydew that feeds the growth of black sooty mold, which discolors and weakens plants.

"If allowed to spread in the United States, this pest could seriously impact the

country's grape, orchard, and logging industries," warns the United States Department of Agriculture.

Spotted lanternfly (*Lycorma delicatula*). Photo credit: Houping Liu.

Research published previously in the *Journal of Economic Entomology* (https://doi.org/10.1093/jee/toz259) indicates that the spotted lanternfly could become established in most of New England and the mid-Atlantic states as well as parts of the central U.S. and the Pacific Northwest.

A poor flier that usually locomotes on its own by hopping, the spotted lanternfly usually spreads in the form of egg masses hitchhiking on infested items moved by people. Since it deposits its waxy, yellow-brown egg masses on smooth surfaces, living and non-living, it is as likely to lay its eggs on smooth pieces of yard furniture and vehicles as on tree trunks.

While exploring the life history of the lanternfly in Pennsylvania from 2015 to 2016, Liu found that females laid eggs on 24 different substrates, ranging from trees to metal fence posts. His research supported observations that suggest the tree-of-heaven is the preferred host, like the lanternfly in China. "A host removal program that is concentrated on tree-of-heaven could be very important as this tree serves as one of the primary hosts for *L. delicatula* throughout its life cycle," writes Liu. "However, other substrate types … near tree-of-heaven within the habitat should also be examined carefully since *L. delicatula* does not need to lay eggs on tree-of-heaven to ensure offspring success."

Liu's research showed that black birch, black cherry, and sweet cherry were also important egg-laying sites. Curiously, only 23 percent of eggs from tree-of-heaven hatched, whereas 79.6 percent of eggs from black locust hatched after

two months of incubation. Larger egg masses—most contained more than 50 eggs—appeared on the two cherry species, while eggs laid on black locust were most likely to hatch. He cautioned that control programs should check even infrequently used surfaces.

Liu also examined the number of eggs per mass and density of masses on various surfaces. "Egg mass density is thought to be related to oviposition preference shown by females. Greater density should be found on preferred substrates," wrote Liu.

Insights into Control

Liu found that adults feed for two months before laying eggs. During the study, adults appeared first in late July, with eggs discovered by early October. Various trees were important food sources during the development of the lanternfly. Black cherry, sassafras, and white ash were only used by the 1st instars, whereas flowering dogwood and oriental bittersweet were fed upon by both the 1st and 2nd instars. Probably because it and the lanternfly share the same native origin, the tree-of-heaven is used by all stages of the insect's development.

Based on his research, says Liu, chemical control of the spotted lanternfly should target adults before females begin to lay eggs. "An integrated approach with selective host tree removal, focused mechanical control, targeted chemical control, and potential biological control could potentially bring *L. delicatula* populations under control in North America," he writes.

** Correction: This post originally referred to the order Diptera and the infraorder Fulgoromorpha as families. The post has been corrected. Entomology Today regrets these errors and thanks the ESA members who contacted us to request these corrections.*

Read More

"Oviposition Substrate Selection, Egg Mass Characteristics, Host Preference, and Life History of the Spotted Lanternfly (Hemiptera: Fulgoridae) in North America (https://doi.org/10.1093/ee/nvz123)"

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Ed Ricciuti (http://www.edwardricciuti.com/) *is a journalist, author, and naturalist who has been writing for more than a half century. His latest book is called* Bears in the Backyard: Big Animals, Sprawling Suburbs, and the New Urban Jungle (Countryman Press, June 2014). *His assignments have taken him around the world. He specializes in nature, science, conservation issues, and law enforcement. A former curator at the New York Zoological Society, and now at the Wildlife Conservation Society, he may be the only man ever bitten by a coatimundi on Manhattan's 57th Street.*

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Research News

Ed Ricciuti, Houping Liu, Lycorma delicatula, spotted lanternfly

1 Comment »

What in the world is happening to the scientific standards of my Society, the Entomological Society of America? I had to stop reading this post after the first lines because of sophomore level errors. It is our accepted convention that "lanternfly" would refer to a non-Dipteran flying insect whereas "fruit fly" would apply to a Dipteran species. This should not have to be explained to anyone after taking a basic entomology course. Fulgoromorpha is clearly not a family name as it does not end in "…idae". Fulgoromorpha is an Infraorder within the Suborder Auchenorrhyncha. The spotted lanternfly is in the family Fulgoridae. Errors such as this are unacceptable and seriously undermine our credibility. In a recent issue of the Journal of Insect Science, the article written by Cerda et al. referred to the Aphididae as being in the order Homoptera. It has long been accepted that the Homoptera is not valid as an order and that the proper designation is Hemiptera, WE must do a better job in accurately communicating the results of our science in both technical and popular writing.

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