Tiny Wasps Protect High-Value Crops

SCOTT BAUER (K7867-1)

A quarter-inch-long parasitic wasp, *Peristenus digoneutis,* prepares to lay an egg in a tarnished plant bug nymph.

Tarnished plant bug, *Lygus lineolaris*.

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When John Chapman (a.k.a. Johnny Appleseed) was planting apple trees in the northeastern United States during the late 18th and early 19th centuries, he relied on adequate sunlight, moderate rainfall, and hardy tree stock for his orchards to flourish.

Today, American apple growers in the Northeast still owe much to rain, sun, and rootstock, but some also benefit from a tiny parasitic wasp called *Peristenus digoneutis*.

The wasp, which is native to Europe and harmless to humans, was introduced into the United States in 1979 by William H. Day, an entomologist at ARS' Beneficial Insects Introduction Research Laboratory in Newark, Delaware. Its mission? To battle one of the fiercest pests of crops in North America—the tarnished plant bug, also known as *Lygus lineolaris*.

L. lineolaris is a pest of fruits, vegetables, crops grown for seed, tree seedlings, and cotton. It costs farmers billions of dollars every year in control costs and crop losses. In apple trees, for instance, an adult tarnished plant bug will puncture an immature fruit and suck on its sap. As the apple grows, it may become deformed at the bug's feeding site.

Day explains, "Many affected apples end up so blemished or misshapen that they can't be sold or can only be sold at a low price—for cidermaking, for example."

Day introduced and established *P. digoneutis* in alfalfa fields in northern New Jersey in the late 1970s and early 1980s. Although tarnished plant bugs don't usually harm alfalfa, they feed and multiply in alfalfa fields. When the alfalfa's cut for hay, the bugs fly off and infest other crops.

Since their introduction, the beneficial wasps have helped control plant bug populations throughout the Northeast. The female wasps sting young plant bug nymphs and lay tiny eggs in them; about 10 days after the wasp larvae hatch, they kill the nymphs.

For nearly 20 years, Day has been monitoring three tarnished plant bug-infested alfalfa fields in northwest New Jersey. He found that over the past 10 years, the beneficial wasp reduced the plant bug's numbers by 65 percent in these fields. During the same period, damage by the tarnished plant bug to apples in New Hampshire—where the wasp is also present—was reduced by 63 percent.

The parasitic wasp can also help fruits other than apples. Through field sampling, Day and a collaborator have found the wasp parasitizing 30-63 percent of tarnished plant bug nymphs in strawberries.

Day is continuing his monitoring efforts, but he hopes to interest other researchers in studying the wasp's effects in the northeastern part of North America. He's stationed in Delaware, but the wasp is thriving only north of New York City.—By **Amy Spillman,** formerly with ARS.

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