STEPHEN AUSMUS (D1068-1)

Testing Biocontrols for Peach Pests

Lesser peachtree borer, *Synanthedon pictipes*.

STEPHEN AUSMUS (D1066-19)

At the Southeastern Fruit and Tree Nut Research Laboratory in Byron, Georgia, entomologists Ted Cottrell (left) and David Shapiro-Ilan examine damage caused by the lesser peachtree borer.

Peaches are a significant part of the South's fresh-produce industry. But since several insect pests pose serious threats to southern peach orchards, growers must often resort to costly pesticides to protect their fruit.

At ARS's Southeastern Fruit and Tree Nut Research Laboratory in Byron, Georgia, entomologists David Shapiro-Ilan and Ted Cottrell are seeking environmentally friendly alternatives. In cooperation with Russ Mizell at the University of Florida and Dan Horton at the University of Georgia, the ARS researchers are evaluating two tiny, soil-dwelling nematodes as possible biological controls.

Plum curculio, *Conotrachelus nenuphar,* is a tiny, snout-nosed beetle and major pest of stone fruits, including peaches. Adult insects damage peaches through feeding on and laying eggs in the fruit, resulting in characteristic crescent-shaped wounds on the fruit. Infested fruits often fall prematurely and are unmarketable. Later, mature larvae emerge from the fruit and develop in the soil, completing the insect's life cycle.

Shapiro-Ilan and Cottrell found that soil applications of the nematode *Steinernema riobrave* can suppress plum curculio larvae by 78 to 100 percent. "Nonfeeding infective juvenile nematodes seek out larval hosts," says Shapiro-Ilan. "When one finds a larva, it penetrates its body. Once inside, it releases a bacterium that multiplies rapidly and kills the host. The nematode then reproduces while feeding on the bacteria and insect tissues."

Curbing Airborne Marauders

Stone fruits are also plagued by clear-winged moths such as the peachtree borer, *Synanthedon exitiosa,* and the lesser peachtree borer, *S. pictipes*. Another beneficial nematode, *St. carpocapsae,* is virulent to both closely related hosts.

With peachtree borers, field applications of the *St. carpocapsae* nematode achieved high levels of borer control. That's in part because the nematodes were protected

from desiccation (drying) and ultraviolet damage by their subsoil environment.

"We found that a single application of *St. carpocapsae* provided 88-percent suppression when applied to mature peachtree borer infestations in springtime," says Cottrell. "And in a recent field trial, three applications of *St. carpocapsae* during the peachtree borer's fall egg-laying season completely suppressed all damage."

Though they knew from laboratory studies that the lesser peachtree borer is also highly susceptible to *St. carpocapsae,* Shapiro-Ilan and Cottrell realized that its control would be more difficult. That's because lesser peachtree borers attack trees aboveground, feeding in galleries within trunks and limbs.

"Initially, we just applied nematodes to lesser peachtree borer wounds, and—as expected—the nematodes failed to cause any significant suppression," says Shapiro-Ilan. But the researchers then found that when nematodes were given adequate protection, they provided a high level of borer control.

To achieve that protection, they applied *St. carpocapsae* nematodes to tree wounds and then covered the wounds with moisture-holding bandages. "In our first trial," says Cottrell, "we saw 100-percent borer suppression just 5 days after treatment."

This suggests that further research will help peach growers make significant headway against these troublesome pests.—By **Sharon Durham,** ARS.

This research is part of Crop Protection and Quarantine, an ARS national program (#304) described on the World Wide Web at www.nps.ars.usda.gov.

David Shapiro-Ilan and Ted Cottrell are with the USDA-ARS Southeastern Fruit and Tree Nut Research Laboratory, 21 Dunbar Rd., Byron, GA 31008; phone (478) 956-6444 [Shapiro-Ilan], (478) 956-6448 [Cottrell], fax (478) 956-2929, e-mail david.shapiro@ars.usda.gov, ted.cottrell@ars.usda.gov. ✸

When protected, the nematodes provided a high level of borer control.

STEPHEN AUSMUS (D1067-5)

Technician Rebekah Long sprays beneficial nematodes onto a tree wound to control lesser peachtree borer. Technician Chris Paulsen prepares to apply a bandage to protect the nematodes and prolong their survival.