

Special delivery: Nematode-infected insect cadavers

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A custom-made machine for packaging mealworms infected with beneficial nematodes could improve the delivery, timing and use of the wormlike organisms as biological control agents.

The machine is the result of a cooperative research and development agreement involving US Department of Agriculture (USDA) scientists and Southeastern Insectaries, Inc., of Perry, Ga.

The *Heterorhabditis* and *Steinernema* nematodes being used can infect and kill a wide array of insect [crop pests](#), including Japanese beetles, vine weevils, root borers and fungus gnats. About 10 years ago, entomologist David Shapiro-Ilan and colleagues with USDA's Agricultural Research Service (ARS) and Virginia Polytechnic Institute and State University showed that the nematodes performed best when applied in the dead bodies of the insect hosts used to mass-produce them. Pest control is then achieved by the [nematode](#) progeny that emerge from the insect cadavers. ARS is USDA's principal intramural scientific research agency.

A technical hurdle that's kept the insect-cadaver approach from gaining widespread commercial acceptance is the tendency of some commonly used host insects to rupture or stick together during storage, transport and application.

Southeastern Insectaries owner Louis Tedders came up with a solution, namely, packaging the insects in masking tape. He also devised a

[prototype device](#) to automate the process, which ARS scientists Juan Morales-Ramos and Guadalupe Rojas in Stoneville, Miss., subsequently refined.

Using off-the-shelf parts, for example, they built a device to mechanically sort mealworms by size, with the biggest ones chosen for placement in shallow dishes where nematodes could infect them. After a few days, a [mechanical arm](#) reaches in and places the dead, infected mealworms between strips of masking tape at the rate of one insect every two seconds. Eventually, an entire roll is formed, allowing for easy storage, transport and application to pest-infested soils.

Shapiro-Ilan's laboratory tests of the insect-cadaver taping system showed no adverse effects on the nematodes' survival and pest-control ability. Indeed, 15 days after application, nematodes from the taped cadavers killed up to 78 percent of small hive beetles and 91 percent of root weevils used in the tests.

More information: Read more about this research in the November-December 2011 issue of Agricultural Research magazine.

[www.ars.usda.gov/is/AR/archive ... nov11/insect1111.htm](http://www.ars.usda.gov/is/AR/archive...nov11/insect1111.htm)

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