Insect Virus Targets the Proverbial Worm in the Apple

By Jan Suszkiw
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A virus that infects and kills codling moth larvae can offer fruit growers an insecticide alternative for fighting the pest, Agricultural Research Service studies suggest.

ARS entomologists Lawrence Lacey and Steven Arthurs conducted tests in 2003 at four Washington State apple orchards, where they sprayed trees with the *Cydia pomonella* L. granulovirus. The treatment killed moth larvae for up to 14 days, with 94 percent becoming infected within the first few days of application. All infected larvae died shortly thereafter. Lacey and Arthurs, with the agency's Fruit and Vegetable Insect Research Unit at Wapato, Wash., reported their findings in the journal *Biological Control*.

Besides apples, codling moths attack walnuts, pears and other fruit. The larvae damage the fruit by boring deep inside it, ruining marketability.

Until integrated approaches to controlling codling moths were adopted in the Pacific Northwest--including use of sex pheromones to disrupt the moths' mating--the standard defense was to spray orchards with insecticide. But such spraying is costly, ecologically worrisome and dangerous to beneficial insects. Although heavy infestations of codling moths may still necessitate insecticide use, moderate infestations can be subdued by combining biocontrol agents with mating disruption or other measures.

Researchers have studied the granulovirus for 30 years, thoroughly documenting its safety, host specificity and biocontrol potential. Even so, fruit growers have been slow to use it. Lacey attributes this to formulation, quality and other problems tied to early granulovirus products, including their rapid degradation by sunlight.

The recent study compares the persistence and effectiveness of three new or improved formulations, which the manufacturers registered for use on apples, pears, walnuts and plums. The key is timing the applications of granulovirus so they prevent larvae from penetrating the fruit too deeply. Infected larvae die in five to 10 days, but the granulovirus poses no threat to humans, other mammals or non-host insects.

ARS is the U.S. Department of Agriculture's chief scientific research agency.