

Biological Control

Using Mulches to Improve the Efficacy and Persistence of Insect Specific Nematodes for Control of Overwintering Codling Moth

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Abstract: The overwintering stage of codling moth (CM), cocooned larvae within hibernacula, is a difficult stage to kill using most conventional approaches. In the fall, winter, and early spring this stage represents the entire CM population and is virtually a captive audience if an effective means of control could be harnessed against it. The elimination or reduction of the CM at this time would provide significant protection to fruit early in the following growing season. Entomopathogenic nematodes are capable of controlling overwintering cocooned CM larvae when moisture is maintained and temperatures are 60°F and above. Sustained moisture that is favorable for nematode survival is enhanced in orchards where mulch such as wood chips is placed beneath trees. Applications of infective juveniles (IJs) of two commercially available species of nematodes, *Steinernema carpocapsae* and *S. feltiae*, were made in an experimental orchard using a backpack sprayer and rates of 0.4 and 1 billion IJs/acre. Mortality of sentinel cocooned CM larvae in mulch plots was significantly higher than that in bare ground plots. At the lower rate *S. carpocapsae* produced significantly lower mortality in larvae in mulch plots than *S. feltiae*. Application of the higher rate resulted in fair control of CM larvae by *S. feltiae* in the bare ground plots ostensibly due to its more rapid host-seeking ability. In the mulched plots both EPN species produced significantly higher mortality in CM larvae than in bare plots.