

Eco-friendly regulation of the box tree pyralid, especially with entomopathogenic nematodes

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The box tree pyralid *Cydalima perspectalis* (Walker 1859) is an invasive alien moth from East Asia which occurs in Central Europe since 2007. It is an insect pest on plants of the genus *Buxus*, causing serious damage. Because of the rapid spread in Germany and nearby countries like Switzerland, one part of this study was testing different ways of eco-friendly regulation with commercially available beneficials and biological control agents.

In addition to host acceptance and search performance tests with *Trichogramma* wasps in the laboratory, the susceptibility of *C. perspectalis* larvae to three entomopathogenic nematode (EPN) species was investigated by using a bioassay system. *Steinernema carpocapsae* was the most effective nematode which produced mortalities ranging from 80 to 100% at four concentrations (25, 50, 100, 200 EPN/larvae). Also *Steinernema feltiae* produced high mortalities, whereas the treatment with *Heterorhabditis bacteriophora* only low mortality rates brought forth. The infectivity of various larval instars (2nd and 4th) by *S. carpocapsae* demonstrated a mortality of 100% at 50, 100 and 200 EPN/larvae for both larval instars. On the other hand entomopathogenic nematodes are not effective against pupae of *C.*

perspectalis. The susceptibility of *C. perspectalis* larvae under natural conditions in the laboratory was carried out on box trees. After application of *S. carpocapsae* with a pressure sprayer could be shown a mortality of 95%, despite the formation of type-specific webs. One experiment was applied to determine the persistence of *S. carpocapsae* on the foliage of box trees. After the application in the field, treated branches were sampled and fed to *C. perspectalis* larvae, followed by incubation in the laboratory. Even after 16 h of exposure, the resulting rate of insect mortality was 95%. First field experiments on infested box hedges were carried out with *S. feltiae*. The experiments point out free-eating larvae generally can be infected and above all, larvae in winter cocoon are not susceptible to infection.

This study has shown that under laboratory conditions *S. carpocapsae* is a suitable biological control agent for *C. perspectalis*, but the experimental conditions in field such as the time of application and the application rates used to be optimized.