CONTROL OF THE BROWNTAIL MOTH IN MAINE WITH A BACULOVIRUS

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The browntail moth, *Euproctis chrysorrhoea*, was introduced into the United States at Somerville, MA near Boston in 1867. By 1913 it was present in all of New England as well as Nova Scotia and Brunswick, Canada. From 1913 until the 1960s the range of the browntail moth decreased until it was present only on Cape Cod, MA and in the Casco Bay area of Maine from Portland to Bath. Population densities have fluctuated in these locations over the years but recently rose to levels that caused severe defoliation in 1998-2002. High levels of mortality caused by *Entomophaga aulicae* occurred in 2002 and 2003 in Maine. In contrast *E. aulicae* was not active in Massachusetts and the browntail moth population has built up to a high level.

A baculovirus (*Euproctis chrysorrhoea* nucleopolyhedrovirus, EcNPV) that infects the browntail larvae has been found in browntail moth populations England, central Europe, Russia, and in the United States. We performed studies in the spring and fall of 2003 to determine whether the EcNPV could be used as an effective browntail moth control agent in populations present in Maine. EcNPV produced in browntail moth larvae during the summer of 2002 was used for these studies. EcNPV was added to a lignosulfonate-based formulation to a final concentration of 2.5 x 10^6 polyhedra/ml and applied to test trees at a rate of approximately 5 x 10^{12} polyhedra/ha. Larvae were collected from 10 test apple trees and two control apple trees prior to virus application, and were reared until death or pupation. Five test trees were sprayed on May 7, 2003 and an additional five trees were treated on May 20, 2003. The same formulation and application rate were used in an application performed on September 8, 2003 to branch tips on oak, cherry, and hawthorn trees containing newly formed winter webs. Larvae were collected 1, 2, 3, and 4 weeks after the May 7 and May 20 applications and reared until death or pupation. Larvae were collected 1 and 2 weeks after the fall virus application and reared until death or the reformation of the winter web. Webs were collected 7 weeks after the fall application, opened, the number live and dead larvae counted, and the dead larvae were inspected microscopically for the presence of EcNPV.

No virus mortality was observed in the pretreatment larvae collected prior to the May 7th and May 20th virus applications. EcNPV mortalities ranging from 75-85 % were found in larvae collected from trees treated on May 7, and EcNPV mortalities ranging from 82-88 % were found in larvae collected 1-3 weeks after the May 20th virus treatment. An average mortality of 50% was found in larvae collected 4 weeks after the May 20th virus application; however, these data were compromised by a high level of *E. aulicae* present in the larvae. Mortality levels of an average of 62% and 55% were found in larvae collected 1 and 2 weeks, respectively after the September 8th virus application. Mortality on larvae collected from oak and cherry trees were similar ranging from 70% to 82% and 60% to 80%, respectively. In contrast, mortality in larvae collected from hawthorn was less, ranging from 30% to 35%. An average of 94% of the larvae were alive in the control webs collected 7 weeks after the September 8th virus application, and no virus was found in the dead larvae. In virus-treated nests an average of 60% of the larvae were alive, and 77% of the dead larvae contained EcNPV. However, the virus-treated webs contained 68% fewer larvae compared to the control webs. If the reduction in the number of larvae was due to virus mortality outside of the web and that number was included with the larvae found with EcNPV then the total virus induced mortality would be approximately 78%. Additional webs will be collected in the winter of 2004 and the larvae reared in the spring to assess levels of EcNPV mortality in the surviving larvae.

Overall, these results suggest that the EcNPV could be an effective browntail moth control agent. Spring application of EcNPV gave very high levels (85% mortality) of browntail moth control. Fall application of EcNPV gave good (40%) levels of control; however, once the final results are obtained in 2004 the fall application may prove to be the most effective time for treatment.