New York State Integrated Pest Management Program

# BIOLOGICAL CONTROL OF GRAPE POWDERY MILDEW USING TYDEID MITES YEAR 2-1999

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## Summary

*Uncinula necator*, the causal agent of grape powdery mildew, is the most destructive pathogen of grapes worldwide, and is a particularly serious pest in the Northeastern US. There has been considerable interest, but limited success, in finding biological approaches to managing grape powdery mildew. Recently, we have discovered a fungus-feeding mite (*Orthotydeus lambi*) that is able to effectively suppress the development of powdery mildew on wild riverbank *grape (Vitis riparia*). However, can these mites provide biological control of powdery mildew in vineyard situations? The objective of this multi-year research project is to assess the relationship between grape species/cultivar, tydeid mite abundance, and incidence and severity of powdery mildew under a common vineyard setting.

In our first season (1998) we successfully established, at the Geneva Experiment Station, over 700 rooted cuttings comprising 5 genotypes of *V. riparia*, 2 cultivars of *V. labrusca*, 3 cultivars of *V. vinifera*, and 5 *V. vinifera* interspecific hybrid cultivars. Vines were assigned to the following treatments: 1) receive *O. lambi* and no fungicides, 2) receive *O. lambi* and a fungicide active against powdery mildew, or 3) no *O. lambi* and no fungicides. *Orthotydeus lambi* became established on all grape species.

In 1999 our specific objectives were: 1) To continue our assessment of the relationship between grape species/cultivar, abundance of *O. lambi*, and incidence and severity of powdery mildew under a common vineyard setting and 2) To assess the impact of insecticides and fungicides on *O. lambi*. *Orthotydeus lambi* overwintered successfully in 1998 and were present at moderate densities throughout the 1999 field season. Grape genotype had a large and significant influence on density of *O. lambi* with the greatest density achieved on some of the *V. riparia* clones and hybrids and the lowest densities achieved on *V. labrusca* cultivars. Overall, domatia size was strongly and positively correlated with *O. lambi* density. Powdery mildew leaf infections were slow to develop in 1999 across all treatments and genotypes. However, by the end of the season substantial levels were achieved, especially on susceptible genotypes. Tydeid mites suppressed leaf infection by an average of 50% for the evaluation conducted in July and 25% for the evaluation conducted in September. For both census dates, however, there was substantial variation among genotypes. The percentage decrease in leaf infection associated with the presence of tydeid mites was significantly and positively related to domatia size. Powdery mildew on fruit was extremely low across all grape genotypes and treatment combinations and therefore, was not quantified.

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