Validating a Phenology-Based Degree-Day Model to Improve Timing for Grape Berry Moth Management.

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The goal of this project is to validate the use of a temperature-driven phenology model to time the application of insecticide for the control of grape berry moth (GBM), the key insect pest of grapes in the eastern United States as well as to inform the New York grape industry of its existence. This multi-state project used replicated plots in vineyards in the Finger Lakes and Lake Erie Regions of New York, the Lake Erie Region of Pennsylvania and the Southwestern region of Michigan. The use of a temperature driven Phenology model to time insecticide applications for grape berry moth has been shown to have the potential to decrease the number of applications from three to two when compared to the conventional timings provided by the Grape Berry Risk Assessment Protocol.

Grape Berry Moth (GBM) is the key insect pest of grapes in the eastern United States due to loss from the larval stage feeding directly on developing berries and also to loss associated with secondary rots that use the feeding wounds as an avenue for berry infection. The Grape Berry Moth Risk Assessment (GBMRA) Protocol developed by Hoffmann and Dennehy in the late 1980's has become the conventional means of grape berry moth management in New York State. (A complete description of the protocol can be found at: http://nysipm.cornell.edu/publications/grapeman/files/risk.pdf The GBMRA protocol worked well for many years. However, late season damage started to become a problem in the late 1990s and the GBMRA has proved to be less effective at determining the need for later season applications. With the first spray based on the timing of the bloom period, which is driven by temperature, the other spray timings are based on calendar dates with no correction in years that are much warmer or colder than average.

The degree day (DD) requirements (use of daily high and low temperatures to determine heat accumulation) for development of each generation of grape berry moth has been investigated under laboratory conditions (Tobin et al. 2001, 2003). Based on these data we estimated that the number of degree-days for GBM to develop from eggs to egg-laying adult females is approximately 810 DD (0F) using a base temperature of 47 0F. Using bloom date to start the collection of DD, a phenology model would predict the start of the second generation at 810 DD after bloom and the third generation at 1620 DD after bloom. This model has been tested at a few isolated sites but has not undergone evaluation under commercial vineyard conditions. Working in cooperation with Greg Loeb, Department of Entomology, NYSAES, Geneva and Juliet Carroll, NYS IPM Program the phenology based degree-day model, and supporting text to aid a user in the decision making process was created on the NEWA website. Bloom for the various growing regions in the Lake Erie region were recorded and used as the biofix to start the model. Training in the use of the model was presented at a NEWA meeting at CLEREL, at the Lake Erie Regional Grape Program (LERGP) Industry Field Rep meeting and at Coffee Pot meetings held weekly

across the Lake Erie region. Results of the model were reported weekly through the growing season via the LERGP Crop Update

The grape berry moth Phenology based Degree-Day model was made available during the 2010 growing season through the Network for Environment and Weather Applications (NEWA) web site. Results from the model were used in weekly reports in the Lake Erie Regional grape Program electronic newsletter *The Crop Update* as well as during discussions at weekly Coffee Pot meetings held throughout the growing season. As this was the first year the model was available and being validated in small research blocks there is no impact data for on-farm implementation.