

A STRATEGIC SCREENING PROGRAM FOR IR-4 REGISTRATION OF INSECTICIDES IN GRAPE: 2003 REPORT

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The overall goal of this project is to maintain an effective set of insecticide options for insect control in Michigan vineyards, and to carefully evaluate the effectiveness of new products.

2003 OBJECTIVES

1. Evaluate promising insecticides for control of insect pests of MI vineyards, with a focus on PLH.
2. Conduct IR-4 residue testing to develop data needed for registration of new insecticides in grape.
3. Continue renovation of the TNRC vineyard to improve its relevance to Michigan viticulture.

Objective 1. Evaluate promising insecticides for grape production.

Grape berry moth. This trial was designed to determine the potential of the new insecticides V 10 112, Assail, Avaunt, Capture and the organic program (Trt 3) for GBM control. Insecticides were applied to mature (21 year old) 'Concord' grape vines (Vineyard I) at the Trevor Nichols Research Complex (TNRC) near Fennville, MI with an FMC 1029 airblast sprayer calibrated to deliver 50 gpa at 2.5 mph. Treatments were applied to single 42 foot-long rows of 7 vines arranged in a randomized complete block design with four replications and buffer rows separating all plots. Fungicides were applied to all plots. Drift was reduced by using a cardboard 'donut' over the fan to reduce airflow. As the canopy in the vineyard increased, the hole in the 'donut' was enlarged to ensure spray penetration. Applications of test materials were made on 2 Jul (GBM egg hatch), 16 Jul (egg hatch + 14d), 14 Aug (egg hatch), 28 Aug (egg hatch + 14d), 5 Sep, 11 Sep, and 15 Sep. GBM evaluations were made on 5 Aug and 23 Sep by examining 25 clusters per replicate for damage. Sept 23 (pre-harvest) data are presented in Table I.

All treatments provided good control of first generation grape berry moth, though only the high rate of Assail was effective. Control of generations 2 and 3, which tend to overlap, were evaluated on 23 Sep. The synthetic pyrethroid Capture, the high rate of Assail, Avaunt, and Imidan provided the best control compared to the untreated check. VI0112 (Dinotefuron), Danitol, Intrepid and the organic program all showed some effect, but were not statistically different than the untreated check. We know from other studies that Intrepid and Danitol are both very active on the grape berry moth, but we suspect that the residual activity of these compounds were not sufficient at one spray per generation.

Japanese beetle. This trial was designed to help determine the potential of the new insecticides Assail and Capture for JB control. Insecticides were applied as described above to 5 year old 'Niagara' grape vines. The test materials were applied when beetle populations were increasing in the vineyard on 22 Jul. JB evaluations were made on 23 Jul (1 DAT), 25 Jul (3 DAT), 29 Jul (7 OAT), and 5 Aug (14 OAT) by conducting a 2 min search per plot for the presence of live beetles in the canopy, and then randomly picking 10 leaves per plot and estimating the percentage of leaf surface damaged.

All of the treatments provide significant activity on Japanese beetle up to 7 days post application, but only Danitol, Sevin and Assail maintained control out to 14 days. From this and past studies pyrethroids (e.g. Oanitol), carbamates (e.g. Sevin) and organophosphates (e.g. Im~dan) tend to have strong direct lethal effects on the beetles, whereas the neonicotinoids (e.g. Assail) are initially lethal, but rely on antifeedant activity for long term foliage protection. Rapid grape vegetative growth as well as the high and constant immigration of JB makes this kind of field trial difficult to evaluate.

Potato leafhopper. Insecticides were applied to newly planted potted Niagara grape vines at the Trevor Nichols Research Complex located in Fennville, MI on July 24, 2003. A standard 1 oz/acre rate (0.0284 g per plant in 2 oz of water and 0.8 ml of the surfactant Latron B 1956 was also added) of Provado 75WP was applied to the grape vine foliage using a hand-held sprayer. Admire at a 48 oz/acre rate (1.4 ml per plant in 1 pint of water) was applied by a soil drench. Single vines were arranged in a greenhouse in a completely randomized design with five replications. A fully expanded older leaf and an immature leaf on each vine were selected to place the clip cages (3/4" in diameter by 1/4" in height) containing five leafhoppers on each vine, to measure the effect of growth dilution on the activity of the insecticide treatments. The first run of this trial had high mortality in the untreated vines, due to heat stress. The experiment was re-run on July 22, and leafhoppers were placed on the leaves before exposing them to vines on July 23 (24 hour residue) and July 30 (8 day residue). Leafhoppers were placed in clip cages made of 3/4" PVC pipe, fine mesh screen, and metal hair clips. They were then placed on the selected older and younger leaves on the vines. Leafhoppers were exposed to the leaves for 24 hours, and then clip cages were opened to measure leafhopper mortality.

A combination of environmental conditions and difficulty optimizing our bioassay resulted in high mortality in the untreated check throughout most of the study. Because of this we are intending to repeat the work in 2004. However, the 2003 results were encouraging with high (80-100%) levels of control at 24 h and 8 days after pesticide applications. The validity of these trends and determination of a definitive length of residual activity remains to be confirmed.

Objective 2 IR-4 residue testing. Both PI's on this project attended the National IR-4 Food Use Workshop during 2003 to represent the industry's needs. This meeting is the primary venue at which new products for minor crops are released by manufacturers and where IR-4 priorities are set. At this meeting, we helped to push the priorities of the grape industry for new residue testing projects. No new residue projects were conducted in grape this year, but we expect more in the future.

Objective 3. Renovation of the TNRC vineyard. A new trellis and training system is being established in the main insecticide testing vineyard, to change from the old head kniffen system to the top-wire cordon system. In late winter 2003, research station and MSU Entomology staff were joined by 6 growers and leaders of National Grape Coop. at a pruning day. The Niagara vineyard was pruned to industry standards, and advice was given on the continuing transfer to the new training system in the Concord vineyard where insecticide testing is conducted. We expect to complete the transfer during the 2005 growing season.

Communication Activities, Accomplishments, and Impacts.

Results from these insecticide trials will help Michigan grape growers be prepared for effectively controlling insect pests if they occur. Results from this project will be presented at winter meetings at the Great Lakes Expo, Northwest Michigan Orchard Show, SW Michigan Grape Days, and at numerous on-farm presentations during the growing season. They also form the basis of our recommendations of new products in MSUE's publication, The Fruit Pest Management Guide.

Funding Partnerships

Funding for this project is matched with funding from the agrochemical industry for conducting the insecticide trials. The Fruit Hill Growers, National Grape Cooperative and the MI Grape Society all provided assistance with the renovation costs of the vineyards.

Please contact Dr. Isaacs (email isaacsr@msu.edu or 517-355-6619) for information on other insecticide tests on rosechafer, grape leafhopper, and grape berry moth during 2003.