

SERA014 Progress Report 2005

Integrated Production Systems for Grapes in Arkansas and Missouri University of Arkansas Department of Entomology Research/Extension Projects

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Demonstration and Verification of Best Management Practices for Wine Grape Production in the Ozark Mountain Region

In July 2005, Keith Striegler, Andy Allen and I received funding for this project Missouri Wine Advisory Board and Viticulture Consortium-East. A poster was developed about this grape project and displayed at the Grape Field Day on 8 June in Mountain Grove, Missouri. Presentations on insect pest management (Donn Johnson and Barbara Lewis) and viticulture practices (Andy Allen and Keith Striegler) were discussed and

demonstrated at grape field days to demonstrate grape best pest management practices in Arkansas and Missouri: Crown Valley Winery in Ste. Genevieve, Missouri had 16, 25 and 32 growers, respectively, on 17 May, 14 June and 26 July; St. James Winery in St. James, Missouri had 7, 18 and 15 growers, respectively, on 18 May, 15 June and 27 July; Stone Hill Winery in Hermann, Missouri had 12, 20, 13 growers, respectively, on 18 May, 15 June and 27 July; Les Bourgeois Winery in Rocheport, Missouri had 15, 25 and 22 growers, respectively, on 19 May, 16 June and 28 July; and the Wiederkehr Winery in Altus, Arkansas and Gay Vineyard in Hindsville, Arkansas had about 10 growers at each site on 4 May, 3 June and 18 July.

Demonstration Sites. In 2005, we had best grape management demonstration sites in Altus and Hindsville, Arkansas and in St. James, Ste. Genevieve, Hermann and Rocheport, Missouri. At each site, growers recorded weekly counts from three grape berry moth pheromone traps. Grape berry moth traps were set out on 1 April along the vineyard perimeter and moved into the vineyard interior in late May. Growers inspected 100 to 300 clusters during each generation of grape berry moth to determine the proportion of clusters damaged by grape berry moth (threshold of 2% damaged clusters). In July, each grower began monitoring a grape root borer pheromone trap. The purpose was to teach the growers about the grape root borer adult emergence pattern in their vineyard and how to count pupal skins to assess the proportion of vines infested with grape root borer. The populations noted in 2005 for grape berry moth and grape root borer will be used to identify appropriate vineyards in Arkansas and Missouri where mating disruption will be demonstrated.

The season total of grape berry moths captured in pheromone trap in vineyards varied considerably relative to risk (increased with percentage of vineyard adjacent to woods): 27.3 (low risk) at Ste. Genevieve, 129.4 (high risk site) at Hermann, 88 (moderate risk) at Rocheport and 402 (high risk by shed) and 150 (moderate risk by tower) at St. James in Missouri where 507 moths were caught before mid May compared to 261 moths thereafter; and 241.5 (high risk where 169) and 34 (low risk where 28 were caught after mid May) at Hindsville and 29 (moderate risk) at Altus in Arkansas where

178 moths were caught before mid May versus to 126 moths thereafter. All vineyards reported less than 1% cluster damage due to feeding by grape berry moth larvae. The grape root borer pheromone trap catches were extremely low this year. A total of 31 moths were captured at Ste. Genevieve, 11 at Hermann, 0 at Rocheport and 8 at St. James in Missouri compared to Arkansas growers that reported 5 moths at Hindsville and 0 at Altus. One hundred vines were inspected in each of the four Missouri vineyards. A total of only two grape root borer pupal skins were found under the vines in early September.

The growers also noted which blocks had problems with grape phylloxera or various grape diseases. A WatchDog 450 Data Logger weather station (Spectrum Technologies, Inc., Plainfield, Illinois) recorded data at ½ hr intervals in the Hindsville vineyard from 5 May to harvest including: air temperature, leaf wetness, % RH and rainfall recorded. These data were used to practice running models for predicting risk of disease (black rot, botrytis and downy and powdery mildew) or calculating daily degree-days used to track grape berry moth development through the season. In Altus, Arkansas, and each vineyard in St. James, Ste. Genevieve, Hermann and Rocheport, Missouri a Hobo® Pro logger was in place to record temperature at ½ hr intervals. This data was periodically downloaded and inserted into an Excel spreadsheet. Daily maximum and minimum temperature and rainfall data for select grape growing counties in Missouri (<http://agebb.missouri.edu/weather/stations/>) and daily maximum and minimum temperatures for grape growing zones in Arkansas. (<http://www.aragriculture.org/weather/download.asp>) were used to generate graphs of cumulative degree-days for grape berry moth (developmental base 47.14°F and upper threshold of 93°F). Each graph had predicted periods of grape berry moth hatch (spray periods) for each generation in each grape-growing county in Arkansas and Missouri. This information was available on the Arkansas/Missouri Fruit IPM website at: <http://comp.uark.edu/~dtjohnso/>. This site also had specific vineyard trap catch data and management recommendations on perimeter versus full vineyard insecticide sprays.

Green June Beetle (GJB). The first flight of GJB near vineyards in Arkansas was observed on 29 June in Clarksville, on 3 July in Springdale and on 15 July in Hindsville. The GJB were still flying on 1 September. Weekly, 3ml of either volatile blend TRE#8706 or TRE#9722 (Trécé Inc., Adair, Oklahoma) were added to either brown wicked bottles (29 June to 19 July) or Trécé floral lure cup dispensers (19 July to 1 September). A randomized block design consisted of two untreated traps and three replicates of each volatile blend attached to either of two trap designs: big metal GJB trap with 18" yellow metal vanes connected to 1' diameter x 18" high metal funnel that empties into the opening of a 1 gallon plastic milk jug; or yellow Japanese beetle (JB) Jumbo traps with funnel opening enlarged to accommodate GJB adults. Eight big metal traps were set out 1m above ground in Clarksville on 29 June, in Springdale on 3 July, and in Hindsville on 15 and 29 July. On 19 July, eight yellow JB Jumbo traps were set out 1m above ground in Hindsville baited with Trécé floral lure cup dispensers. Over a three week period, the total trap catch from Clarksville and Springdale was 74.7 GJB in traps baited with TRE#8607 and 4.3 GJB in traps baited with TRE#9722. From 15 July to 1 September in Hindsville, the average catch from nine traps baited with TRE#8607 was 1,298 GJB compared to 178 GJB in traps baited with TRE#9722. Overall, the TRE#8607 blend in Trécé floral lure cup dispensers in JB Jumbo traps was much more attractive to GJB adults than was the TRE#9722 blend or either blend in the larger yellow metal vane traps.

Japanese beetle. In 2005 in NW Arkansas, adult JB flight began on 1 June in Springdale, Arkansas. We totaled weekly counts of adults per JB Jumbo trap in six sites in NW Arkansas and five vineyard sites in Missouri: in Arkansas we caught 55 JB in Berryville; 62,663 in southwest Fayetteville; 45,852 in UA-Farm in north Fayetteville; 86,364 in the Gay vineyard in Springdale; 33,100 in Hindsville; 91,394 in Elkins; and in Missouri we caught 3,868 in Ste. Genevieve; 12 in Purdy; and 0 in St James, Hermann and Rocheport.

A study was conducted to determine if any treatments could prevent or reduce JB feeding damage of grape foliage. Three treatments were applied to six-vine plots (4 replicates) in a randomized complete block design in an abandoned 'Concord' vineyard

in Springdale, Arkansas. On 19 July, 100 leaves on each vine were assessed for percentage foliar feeding damage by JB.

The percentage foliar damage ($LSD_{0.05} = 2.02$) for each treatment was:

- **5.2% D** on vines where foliage was sprayed with 50 lb Surround (kaolin clay) per acre on 2 June (1st beetle flight) and re-applied after each rain on 14, 20 June and 2 and 19 July;
- **10.3% B** on vines receiving a trunk drench of 4.7 oz of Bayer Advanced Tree and Shrub (1.47% ai imidacloprid) per vine (averaged 6" trunk circumference) on 1 June;
- **8.3% C** on vines receiving a trunk drench of 0.41 oz of Bayer Admire 2F (21.4% ai imidacloprid) per vine on 14 June; and
- **23.1% A** on untreated vines

Publications or Newsletters or Presentations:

Johnson, D. T. 2005. History and management of green June beetle and Japanese beetle. Mid-America Viticulture and Enology Center, Southwest Missouri State University-Mountain Grove Campus, Vineyard and Vintage View Spring 20(1): 7-9 (<http://mtngrv.smsu.edu/GrapeNewsletter/V3Spring05.pdf>).

Williamson, J. R. and D. T. Johnson. 2005. Effects of grape berry moth management practices and landscape on arthropod diversity in grape vineyards in the southern United States. HortTechnology 15: 232-238.