Integrated Production Systems for Grapes and Japanese Beetles in Arkansas

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This was the third year for a county agent project in table grapes. In Searcy, a first-year abandoned vineyard (used 200 Isomate-GBM/acre in 2001) had a good fruit crop in 2003. Twelve grape root borer (GRB) pheromone bucket traps (1 trap/2 acres) were evenly distributed in the vineyard. The hypothesis was that that mass trapping GRB males would lessen the number of larvae per vine in subsequent years. In 2002 and 2003, these 12 traps captured a season total of 700 and 384 GRB male moths, respectively, and the vineyard had about 0.08 larvae/vine in 2002. Note, the GRB has a 2-year life cycle so there are even and odd year broods. In 2003, the season total average trap catch was only 7.3 GBM and cluster damage was 9% in perimeter and 1.5% in interior on 2 July (harvested usually on 17 July).

In Judsonia, a 6-acre 'Sunbelt' and 'Mars' vineyard had GBM emergence (trap catch) starting on 10 April 2003, peaking at 11.7 moths/trap on 24 April. However, a season total of 7.7 GBM/trap were captured after 10 Exosex auto-confusion dispensers (Exosect Ltd., UK) per acre were hung from top trellis wires on 4 June and 0% in interior. Biweekly trap catch was below 1 GBM/trap from 16 June until 12 August when 4 GBM were caught. Cluster damage by GBM in the perimeter was 3.3% on 4 June. By 12 August, it was 22.9% in the perimeter and 7.3% in the interior. Similarly, an adjacent insecticide treated block had GBM cluster damage of 10% in the perimeter and 2.5% in the interior on 16 June. By 12 August, damage had increased to 15.1% in perimeter and 5.5% in interior. From 17 June to 25 August (harvest), catch totaled 15.3 GBM/trap.

In Lowell, a 14 acre 'Concord' vineyard had a first trap catch of 137 moths/trap on 18 April with >100 moths/trap weekly through 14 May. On 13 June, 10 Exosex-GBM dispensers per acre were hung from the top wire. After Exosex placement, the biweekly trap counts totaled < 1.5 GBM/trap until 14 August when they increased to 3.5 GBM/trap. This grower applied two insecticide sprays in late May and early June and another on 3 July (sprayed top wire to control Japanese beetle). On 2 July, that block had >39% cluster GBM damage in the perimeter and 7.5% in center. By 27 August, damage increased to 68% in perimeter and 17% in the interior. In the adjacent 4 acre 'Concord' vineyard managed with insecticide only, the cluster damage was 48% in perimeter and 8.5% in interior on 11 July and 39% in perimeter and 14% in interior on 27 August. *Exosex dispensers may need to be in perimeter vines to improve effectiveness*.

In 2003, a three-year abandoned table grape vineyard in Bald Knob had a season total of only 7 GBM/trap, but no fruit were present.

A young vineyard in Hindsville (second harvest) had peak trap catches per generation of 0.6 GBM on 5 May, 5 GBM on 20 June, and 3 GBM on 6 August with a season total of 17.7 GBM/trap. Several insecticide sprays were applied in June, July and August. GBM

trap count above 1 GBM/trap threshold was used to time insecticide sprays. On 8 July, GBM cluster damage was 26% in the perimeter and 1% in the center but by 27 August, damage was 0% in both the perimeter and interior (damaged berries fell off).

M.S. thesis in progress by Joe Williamson titled, "Factors that affect arthropod abundance and diversity in vineyards."

Joe is tabulating data on arthropod abundance and diversity in the seven vineyards or blocks mentioned above. This is his second year collecting pit fall trap samples and the first year of malaise trap samples. He has sorted most arthropod specimens to order. Now he is calculating and comparing vineyard arthropod abundance and diversity as affected by several management programs: 1 or 3 years abandoned; using weekly GBM trapping to time insecticide sprays combined with Exosex-GBM dispensers; and calendar or phenology-based applications of pesticides. He will be reporting his findings at the national Entomological Society of America meeting in October.

Grants Funded:

1) "Grapevine moth monitoring and mating disruption in grapes in Armenia," funded by USDA/MAP-Armenia (*not reported here*)
2) "Implementation of integrated production systems for bunch grapes," third year funding by the University of Arkansas Extension IPM Group as a Diversified Pilot County IPM Grant. The objectives included: to disseminate grape IPM information in a timely manner to grape growers and county agents; to become familiar with the WatchDog Disease weather station and SpecWare 6.0 software for insect and disease prediction (validate the Spotts model for predicting black rot infection periods and see use the codling moth model which is very similar to that of the grape berry moth); to assess efficacy of auto-confusion of grape berry moth using Exosex dispensers and mass trapping of grape root borer.

Japanese beetle (JB) was first detected in Lowell and Fayetteville in 1997. By 2002, this beetle was defoliating grape vineyards in Lowell and the UA-Fayetteville farm. In 2003, adults were observed from 17 June until mid August in Fayetteville. These adults defoliated plants from Fayetteville to Bella Vista. Crop damage included: apple, blackberry, grape, peach, plum, and soybean. The many urban landscape ornamentals attacked were rose, birch, crab apple, crape myrtle, elm, American Linden, pin oak and others. Wild grapes and sassafras were also severely defoliated by JB. By mid July, the shelves in most garden centers in NW Arkansas were sold out of JB traps and JB adult insecticides. Dr. Dan Potter (entomologist) at the University of Kentucky said that the leading edge of the JB expansion west tends to produce extremely high population levels, as observed in Arkansas for the last two years. The population eventually becomes quite variable (unpredictable) due to natural enemies. Fleming (1972, USDA Tech. Bull. 1449: 129pp.) showed that it took 15 to 27 years for JB to spread over a whole state.

A JB planning meeting was held in Clarksville, AR on 27 August. Those attending included: University of Arkansas researchers and extension specialists; extension agents from Benton, Crawford, Johnson and Washington Counties; and members of the Arkansas State Plant Board and USDA Plant Protection Quarantine in Arkansas. This group agreed that citizen education about JB was to be their key effort. Toward this goal, the UA Extension has two new leaflets on JB identification (MP-399) and management (FSA7062). In addition, extension personnel will set up a JB information booth with extension and USDA leaflets on JB at both the Arkansas turf and nursery industry shows in January 2004.

In May, Extension personnel will compose an article to go in Janet Carson's gardening column in AR newspapers.

The UA Extension leaflet FSA7062 outlines the best JB management program. It stresses that landscapers plant JB-resistant plant material and restrict preventive sprays to susceptible plants. In grapes, Danitol at rate of 10.6 ounces/A worked much faster than Sevin against adult JB and is registered on apple, grape and pear. In addition, Dr. Gerald Musick noted Merit (Imidacloprid) applied once to the soil of susceptible plants four to eight weeks before adult JB emergence suppressed JB foliar feeding all season.

The JB trap must be held 3' above the ground and placed at least 100 feet from any susceptible plants. A grape grower noticed that the JB dual lure by Trece Tanglefoot caught more JB adults than did the Spectracide Bag-A-Bug combo lure. At the UA-Fayetteville farm, a 1/2-time person was required from early July to mid August to keep the 50 JB traps emptied once or twice daily.

Literature indicates entomopathogenic nematode, *Heterorhabditis bacteriophora*, is recommended for control of Japanese beetle larvae. Nematodes take two to five days to kill the grubs and require that the soil remain moist (well-watered). Milky spore powder contains the bacterium, *Bacillus popillae*. The powder is applied to turf, grubs ingest bacteria that germinate, infect gut and enter the blood. It takes two to four years for the bacteria to become established before they significantly suppress the JB population.

Publications or Newsletters:

Johnson, D.T. 2003. Implementation of integrated production systems for bunch grapes. The Arkansas Fruit Grower 10 (2): 7-8.

Johnson, D.T. 2003. New and potential grape insect pests: Japanese beetle and multicolored Asian lady beetle. Proc. OK and AR Hort. Industries Show 22: 138-139.

Johnson, D. T., B. A. Lewis, K. Striegler and S. Wesson. 2002. Demonstration of a grape IPM. Proc. OK and AR Hort. Industries Show 21: 187-190.

D. Johnson, K. Striegler, Lewis, B., C. Lake and P. Spradley. 2003. Crop Profile for Grapes in Arkansas. http://pestdata.ncsu.edu/cropprofiles/docs/ARgrapes.html

Lorenz, G, D Johnson, D. Lander, D. Blackburn, D. Johnson, D. Steinkraus. *Popillia japonica* Newman: a new pest in Arkansas. University of Arkansas Cooperative Extension Service MP-399.

Shanklin, D, K. Loftin and J. Hopkins. 2003. Common questions about Japanese beetles in Arkansas. University of Arkansas Cooperative Extension Service FSA7062. (See: http://www.uaex.edu/Other_Areas/publications/HTML/FSA-7062.asp).

Williamson, J., D. Johnson, B. Lewis and K. Striegler. 2003. Pest management effects on arthropod diversity in grape systems. Proc. OK and AR Hort. Industries Show 22: 140-142.