Small Fruit News

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In this Issue:

Research Reports

'Fry' Muscadine Grape Response To Different Pollinizers

D. Scott NeSmith
Department of Horticulture
University of Georgia

Muscadine grapes (*Vitis rotundifolia* Michx.) are grown in both large commercial vineyards and backyard settings throughout the southeastern U.S. A number of muscadine cultivars are available (Himelrick and Dozier, 1993; Krewer et al., 1999), but many desirable ones for fresh fruit are only pistillate (have only female flower parts). 'Fry' is a pistillate cultivar that is considered a standard throughout the Southeast; however, growers have had some concern of proper selection of a pollenizer cultivar to plant with 'Fry'. Muscadine fruit set is generally low, and growers want to ensure that they have a good pollenizer planted with their more desirable pistillate cultivars.

Little published information is available on the effects of pollen source on fruit set and fruit weight of muscadine grapes. Research with other small fruit crops such as blueberry (*Vaccinium corymbosum* L.) has indicated that fruiting can be influenced by pollen source (Huang et al., 1997; Lyrene, 1989). Due to the lack of information concerning pollen source influence on muscadine, and because of grower concerns over pollinator choices, this research was conducted to examine the possible influence of pollen source on fruit set, fruit weight, and fruit development period of 'Fry' muscadine grape.

A single 7-year-old 'Fry' vine was selected for the pollination experiment at the Georgia Experiment Station vineyard in Griffin, Ga. Flower clusters of 'Fry' having 12 or more flowers were bagged 10 to 14 days prior to flower opening. Flowers of cultivars selected for pollen sources were also bagged. In both cases, an excess number of flowers were bagged to ensure quality clusters were available for pollination. Six cultivars were used as pollen sources: 'Carlos', 'Cowart', 'Magnolia', 'Nesbitt', 'Southland', and 'Triumph'. Also, an open-pollinated 'Fry' control was used. For each cross, six flower clusters were used. The bagged flowers were monitored 2 to 3 times weekly, and when both the 'Fry' female flower and the flower of the pollen source were at anthesis (at least 50% of flowers in a cluster open), pollen was applied to the 'Fry' flowers. The previously bagged flower cluster from the pollen source was detached, and the shedding pollen was brushed all around the selected 'Fry' flower cluster. The pollen-source flower cluster was then placed in the bag with

the 'Fry' flower cluster and was shaken further. The bags were left in place for another four weeks, and then were removed. The open pollinated control clusters were tagged for identification, but were never bagged.

The number of flowers in each 'Fry' cluster were recorded at pollination. Also, the dates of individual pollinations were recorded. All pollinations were made between 20 June and 8 July, 1997. The clusters were tagged at pollination and were harvested individually as they ripened (at least 50% ripe fruit as determined by color). The number of fruit per cluster was recorded at maturity. Individual fruit weight was determined for the samples, and fruit development period (FDP) was calculated from date of pollination and date of harvest.

'Fry' x 'Southland' only set 6.2% of the fruit, as compared to 29% for the open pollinated 'Fry' (Table 1). Also, there was a trend for inferior fruit set when using 'Magnolia', 'Nesbitt', and 'Triumph' as pollen sources. 'Fry' pollinated with 'Carlos' and 'Cowart' had fruit set equal in magnitude to the open-pollinated control. Fruit weight data indicated 'Fry' x 'Triumph' fruit were significantly smaller than fruit of 'Fry' x 'Cowart', 'Fry' x 'Magnolia', and the open pollinated 'Fry'. There was a trend for small fruit with the 'Fry' x 'Carlos' cross. There were no significant differences in length of FDP, although the means for FDP ranged from a low of 72 days for 'Fry' x 'Southland' to a high of 82 days for 'Fry' x 'Carlos'.

Table 1. Fruit set, fruit weight, and fruit development period (FDP) of 'Fry' muscadine grape in response to different pollen sources.

Pollen source	Fruit set (%)	Fruit weight (g)	Fruit development period (days)
Carlos	20.7	8.4	82
Cowart	23.4	10.6	79
Magnolia	9.4	10.3	77
Nesbitt	11.7	10.1	78
Southland	6.2	9.7	72
Triumph	15.8	7.5	81
Open-pollinated	29.0	10.5	79

This experiment was only a preliminary examination of the possible influence of pollen source on fruit characteristics of muscadines. The results indicated differences in fruit set and size in response to pollen source, thus, additional research should be conducted in this area. The findings would have practical usage for growers in designing strategies for planting vineyards. The current results indicate that 'Cowart' is a good pollen source for 'Fry', when fruit set, fruit weight, and FDP are all considered. Currently, this planting combination is common in Georgia, and this research supports continuation of the combination. These findings also suggest that 'Southland' is likely a poor choice for pollinating 'Fry'. The optimum pollenizer for a pistillate muscadine cultivar such as 'Fry' would be one that has a high degree of marketability of its own, and that would pollinate the pistillate cultivar well.

References

Himelrick, D.G. and W.A. Dozier, Jr. 1993. Commercial muscadine and bunch grape production guide. Circ. ANR-774. Alabama Coop. Ext. Ser. Auburn University, Ala.

Huang, Y.H., C.E. Johnson, G.A. Lang, and M.D. Sundberg. 1997. Pollen sources influence early fruit growth of southern highbush blueberry. J. Amer. Soc. Hort. Sci. 122: 625-629.

Krewer, G., M. Hall, D.S. NeSmith, D. Horton, H. Scherm, P. Sumner, T. Tyson, and G. Westberry. 1999. Commercial muscadine culture. Bulletin 739. Univ. of Georgia College of Agric. and Environ. Sciences. Athens, GA.

Lyrene, P.M. 1989. Pollen source influences fruiting of 'Sharpblue' blueberry. J. Amer. Soc. Hort. Sci. 114: 995-999.

Pests and Diseases

Anthracnose of Strawberry Alert

Phillip M. Brannen
University of Georgia

For those strawberry producers growing plug plants, there has been a major emergency this fall, since many strawberries tips, and subsequently plugs, were infected with irregular or anthracnose leaf spots. North Carolina had been reporting the irregular leaf spot disease since late August, and we observed it in Georgia plugs in mid-September. We received two samples from Georgia plug operations on the same day (one digital and one physical sample), and both were showing symptoms of irregular leaf spot, caused by *Colletotrichum acutatum*. Most of the problem plants were propagated from tips obtained from Ghesquiere Farms, Ontario, Canada. Even if producers did not initially observe anthracnose or irregular leaf spot symptoms in their plugs, they should continue to check their plants for anthracnose (after transplanting as well), even if the plugs were received from other sources.

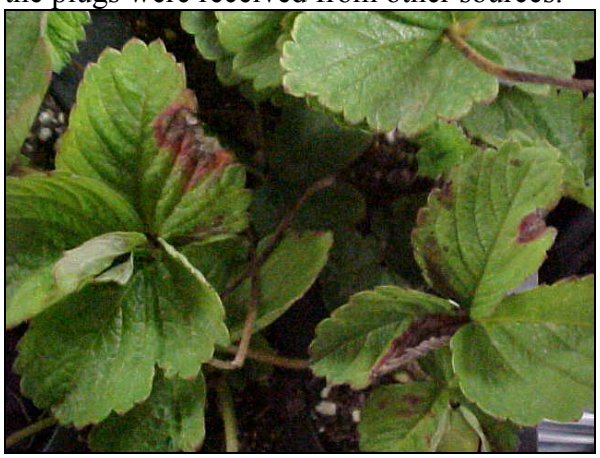

Figure 1. Irregular leaf spot lesions observed on plug plants from Georgia (sample submitted by Mark Shirley, county agent in Jackson County; symptoms observed two weeks after tips were placed in plugs).

Figure 2. Symptoms of irregular leaf spot observed by Greg Sheppard, county agent in Lumpkin County, Georgia (submitted through DDDI).

Irregular leaf spot lesions, caused by *Colletotrichum acutatum*, are generally described as "dark brown, almost black, dry areas which form on the margins and tips of leaflets." These lesions have irregular borders, hence the disease name (see Figures 1 – 3). Unlike many lesions, these spots do not continue to expand as the leaf develops, remaining limited to the leaf margin. However, the lesions are significant, since they provide an inoculum source for infection of subsequent leaves, flowers, and fruit (anthracnose fruit rot).

Figure 3. Additional DDDI photograph of symptomatic plants submitted by Greg Sheppard

Conidia are cylindrical (cigar-shaped with pointed ends; see Figures 4-5). For county agent offices with microscopic capabilities, the conidia can be found after incubating symptomatic

leaves for 24 hours in a moist chamber (plastic bag with moist paper towel). Conidia may be readily found in lesions which are moist from mist irrigation. Spores are rather small, so best viewing is conducted at 400X magnification.

Figure 4. Spores of *Colletotrichum acutatum* (400X; photograph submitted by Greg Sheppard, county agent in Lumpkin County, Georgia).

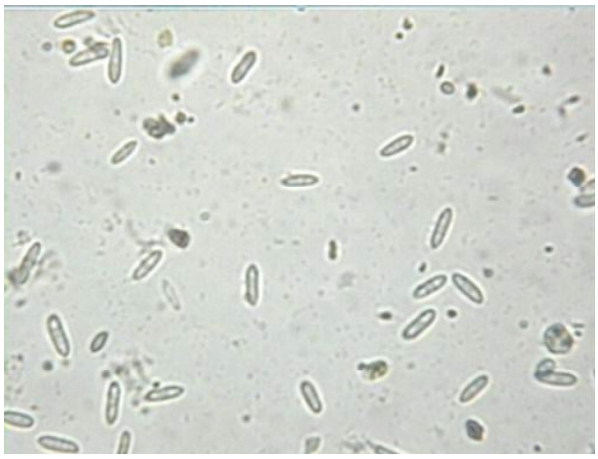

Figure 5. Additional digital image of *Colletotrichum acutatum* spores submitted by Greg Sheppard.

If you suspect that you have irregular or anthracnose leaf spots, submit a sample with your county agent for confirmation. Also, ask them for local recommendations.

Reference

SMITH, B.J. 1998. Anthracnose leaf spot and irregular leaf spot. pp. 24-25. in J.L. Maas (ed.), Compendium of Strawberry Diseases. The American Phytopathological Society, St. Paul, MN.

Strawberry Insect Update

Kenneth A. Sorensen
North Carolina State University

Black cutworms have been reported feeding on strawberry plugs in North Carolina. Black cutworms are one of several species of cutworms that are voracious in the spring and again in the fall. They do well with cool, but not cold temperatures (Yes , they are a hardy species). Theylike moist soils with succulent vegetation. They often dig a hole near some plants and cut leaves and later consume in the safe confines. Drenches of Sevin (somewhat slow), or Lannate (fast acting) or Lorsban (slow but with long residual) are suggested. Use a good soaking volume of water and apply in the evening. Be alert for fresh cut leaves, holes in the ground and damaged plants. This is also a good time to be alert for fire ant mounds and use insecticide drenches or even better to use Clinch baits (complete mound destroyed after 30 days).

Stay alert for aphids, whiteflies and mites on plants. Monitor populations and keep records. Consider spot treatment with a miticide after the plants have been watered in well. This is true if hot, dry fall weather occurs. And also if you plan to use row covers. Select miticide based on what miticides have been used previously. Also consider the use of predatory mites if you are marketing "ecoberries"! See you and any specimens you can bring to the Strawberry EXPO.....Mite and insect identification & management breakout session on Monday, Nov.10 from 3- 4 pm.

For more information visit our websites:
IPM NCSU - http://ipmwww.ncsu.edu/
ENT NCSU - www.cals.ncsu.edu/entomology

Happy Hunting!

Agent Training on Strawberry Anthracnose

Tom Monaco
Head of SRSFC Steering Committee
North Carolina State University

The Southern Region Small Fruit Consortium invites you to attend a special agent training on anthracnose of strawberries on November 11, 2003. The half day session will be held in conjunction with the Southeast Strawberry Expo which is being held at the Sheraton Imperial Hotel in the Research Triangle Park, North Carolina November 9-11, 2003. To attend the training you will need to register for the Expo at a reduced rate of $45 which will allow you to attend all the educational sessions on Nov. 10 and 11. To attend the agent breakfast scheduled for 7 a.m. preceding the agent training on Nov. 11, you will need to pay an additional $10. Registration info can be found at http://www.ncstrawberry.com/ under the Southeast Strawberry Expo. Go to the agent registration form which includes the option of the $10 breakfast.

Topics to be covered in this session include breeding for anthracnose resistance; biology of anthracnose; diagnostic techniques; control measures; and trouble shooting. The session will run from 8 a.m. through 12:30 p.m. with 11:00 a.m.-12:30 p.m. restricted to pre registered agents only. We have set a maximum of 40 agents for this training thus you need to register as soon as possible. This agent training is sponsored by the Southern Region Small Fruit Consortium and the Southeast Strawberry Expo. Contact Tom Monaco at tom_monaco@ncsu.edu or 919-515-6963 if you need additional information.

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From the Plant Problem Clinics…

Meg A. Williamson, Clemson University Plant Problem Clinic

Shown below is a summary of small fruit disease samples received from the clinics in Georgia (GA), North Carolina (NC) South Carolina (SC), and Tennessee (TN) between June and September, 2003.

			NUMBER OF OCCURENCES			
HOST	**DIAGNOSIS**	**CAUSAL ORGANISM**	**GA**	**NC**	**SC**	**TN**
Blackberry	Anthracnose	*Colletotrichum gloeosporioides*		1		
	Cane and Leaf Rust	*Kuehneola uredinis*		1		
	Cane blight	*Coniothyrium fuckelii*		1		
	Cane blight/canker	*Coniothyrium* sp.		1	1	
	Cane dieback	*Colletotrichum* sp.	1			
	Crown Gall	*Agrobacterium tumefaciens*		1		
	Double Blossom	*Cercosporella rubi*		3	1	
	Leaf spot	*Cercospora* sp.	2			
	Virus	undetermined		1	1	1
	white drupelet disorder	solar radiation				4
Blueberry	Cane dieback	*Colletotrichum* sp.	1			
	Canker/dieback	*Botryosphaeria* sp.	1	1	1	
	Leaf rust	*Pucciniastrum vaccinii*	1			1
	Leaf spot	*Macrophoma* sp.	2			
	Leaf spot	*Phoma* sp.	1			
	Leaf spot	*Septoria* sp.	2			
	Root rot	*Phytophthora* sp.	1	1		1
	Root rot	*Phytophthora/Rhizoctonia* spp.	1			
	Root rot	*Pythium* sp.	1			
	Root rot	*Pythium./Rhizoctonia* spp.	4			
	Root rot	*Rhizoctonia* sp.	2			
Bramble, unspecified	Raspberry leaf spot	*Sphaerulina rubi*		1		
Fig	Anthracnose	*Colletotrichum gloeosporioides*		1		
	Dieback	*Nectria* sp.	1			
	Leaf deterioration	*Colletotrichum/Alternaria spp.*	1			
Grape	Anthracnose	*Sphaceloma* sp./*Elsinoe ampellina*		1		2
	Black Rot	*Guignardia bidwellii*		1		6
	Downy Mildew	*Plasmopara viticola*	1	1	1	
	Leaf spot/ blight	*Pseudocercospora vitis*	1		1	
	Leaf spot	*Phaeoramularia* sp.	1			
	Root Rot	*Phytophthora* sp.		1		
	Sour rot complex	complex of organisms				1
Grape, Muscadine	Angular Leaf Spot	*Mycosphaerella angulata*		1		
	Black Rot	*Guignardia bidwellii*		1	1	
	Powdery mildew	*Oidium* sp.	1			
Raspberry	Root rot	*Phytophthora* sp.				1
Strawberry	Anthracnose	*Colletotrichum acutatum*		15		5
	Anthracnose	*Colletotrichum fragariae*		2		
	Anthracnose	*Colletotrichum gloeosporioides*		1		
	Anthracnose leaf spot	*Colletotrichum* sp.			1	
	Angular Leaf Spot	*Xanthomonas fragariae*		2		
	Crown Rot	*Phytophthora cactorum*		7		
	Crown Rot	*Phytophthora* sp.				5
	Downy Mildew	*Peronospora potentillae*				
	Leaf blotch	*Gnomonia* sp.			1	
	Leaf spot	*Hainesia lythri*				1
	Phomopsis Blight	*Phomopsis* sp.		2		
	Gray Mold	*Botrytis cinerea*		1		