Proc. Fla. State Hort. Soc. 116:8-10. 2003.

MUSCADINE VINE DIEBACK: EMERGING PROBLEM AND POSSIBLE CONTROL MEASURES

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Additional index words. Vitis routondifolia, shoots, leaves, infection, vine survival

Abstract. **Increasing numbers of muscadine dieback incidents have been found in north Florida and south Georgia vineyards in recent years. Symptoms such as dying of new shoots (one or both arms), or entire vines were observed. A case survey in a north Florida commercial vineyard with five cultivars indicated that the disease is a new threat to muscadine grapes (*Vitis routondifolia* Michx or *Vitis routondifolia* Small). Up to 100% of vine infection that resulted in 17% mortality, was observed in some important cultivars. The possible treatments for preventing this disease are discussed.**

Muscadine grapes (*Vitis routondifolia* Michx or *Vitis routondifolia* Small) are generally known to have a high degree of resistance or tolerance to pests and diseases commonly found in bunch grapes (Olien, 1990). However, studies have indicated that several diseases exist on muscadine grapes, such as Pierce's Disease (PD), black rot, angular leaf spot, ripe rot, bitter rot, and macrophoma (Chen et al., 2000). Among them, dieback or dead arm has been found in increasing numbers of muscadine vineyards in the north Florida and south Georgia area.

The disease appears in spring when new shoots grow out. The typical symptom is necrosis and dying back from the tips of new shoots (Fig. 1). Weak and stunted shoots with shortened internodes may easily be seen among the affected plants at the beginning of growth (Fig. 2). The leaves usually are small, misshaped and distorted at first. As the disease advances, necrosis will appear on the leaves, and shoots eventually die back from the shoot tips (Fig. 3). Dark, wedged-shaped cankers developing in the woody vascular tissue (Fig. 4) is an important diagnostic symptom. This may be easily observed from the cross cutting surface of an affected arm or branch. Symptoms may be found in a few new shoots, one arm or an entire plant (Fig. 5), randomly distributed in the vineyard. Shoots growing from the lower portion of unaffected area are healthy.

This disease is believed to be caused by the fungus Botryosphaeria (*Fusiccocum* spp.). If left untreated, the fungus will

Fig. 2. Stunted shoot growth (right) in comparison of a healthy shoots (left).

Fig. 1. Die back of muscadine shoots.

This research is funded in part by Florida Viticulture Advisory Council.
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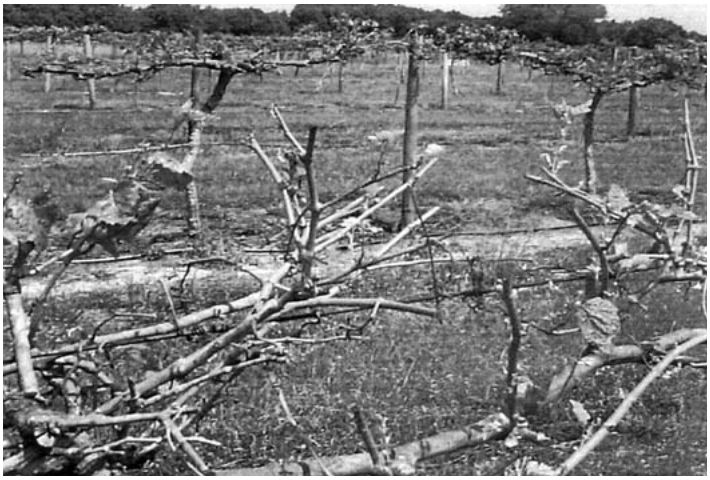

Fig. 3. Dead shoots, stunted shoot growth, small and misshaped leaves are evidences of the disease.

work its way down the trunk, and eventually kill the entire vine (Fig. 5).

Material and Methods

In a 10-year old commercial muscadine vineyard, a large amount of vine dieback was found in early spring, 2001. Five cultivars, 'Carlos', 'Fry', 'Southern Home', 'Supreme', and 'Triumph', with a total 765 vines, were distributed around the 15 acre vineyard. The vines were scored for the disease in the end of May 2001, during the later blooming period. The visual check was according to the following stands: 0 = no symptoms; 1 = 1 ~20% shoot infection; 2 = 21 ~40% shoot infection; 3 = 41 ~60% shoot infection or half a cordon was infected; 4 = 61 ~80% shoot infection or one whole cordon was infected or dead, while the other cordon may be healthy; 5 = more than 81% shoot infection, or two whole cordons were infected or dead. The survival from the disease was surveyed in the spring of 2002.

Fig. 4. Dark, wedged-shaped canker developed in the wood vascular.

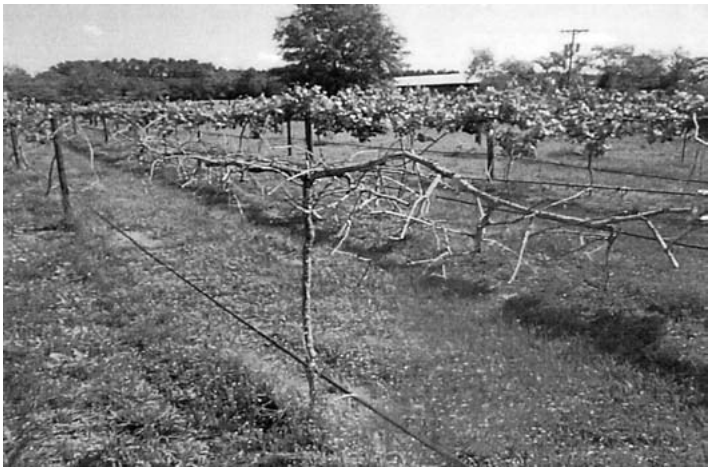

Fig. 5. A dead vine caused by the disease.

Results and Discussion

All the cultivars were found to be susceptible to the disease, but the infection was different among the cultivars. The infection rates were 100% for 'Fry' and 'Southern Home', 70% for 'Carlos', 39 and 60% for 'Triumph' and 'Supreme', respectively. The average severity ranged from 1.0 to 3.3. 'Triumph' showed the lowest infection while 'Fry' was the highest (Table 1). Vine survival during the next growing season was different among the five cultivars. 'Carlos', with a 1.8% dead rate, showed the highest survival rate. In contrast, 17.3% dead vines were found in 'Fry'. The more severe the disease score, the higher the vine fatality. For example, the overall vine disease score of 'Carlos' and 'Triumph' were 1.6 and 1.0, and their fatality rates were 1.8% and 3.6%, respectively. More susceptible cultivars 'Fry' (3.3), 'Southern Home' (2.6), and 'Supreme' (2.3) resulted in 9% to 17% grape vine fatality (Table 1).

It is generally believed that the infection of muscadine dieback primarily occurs through pruning wounds, and dead infected wood are important pathogen carriers. Therefore, wound protection, cross infecting prevention, and eradication of infected wood are critical in control of the disease. Dipping pruning equipment in 10% bleach during winter pruning proved to be effective and simple in preventing cross contamination of the vines. In the diseased vineyard, eliminating the infected and dead portion of grape vines, spraying of fungicides immediately after pruning, and before the next rain, should help provide good protection from the disease.

Table 1. The survey of incidents, severities and vine survivals of muscadine grapes.

Cultivar	Total #	Infected #	Infection %	Severity	Dead #	Dead %
Carlos	213	150	70.4	1.6 c	4	1.8
Fry	81	81	100.0	3.3 a	14	17.3
S. Home	11	11	100.0	2.6 b	1	9.1
Supreme	182	110	60.4	2.3 b	25	13.7
Triumph	278	270	38.8	1.0 d	10	3.6

In general, Benlate 50WP may be applied at 2 lbs/acre with 30 gal water by air blast sprayer, or 1 oz/gal water by hand sprayer (directed at cut wounds).

Infected vines should be cut back to a healthy point that is about 2-3 internodes below the infected area. When arms or trunks are infected, rejuvenating the plants with suckers is a better choice.

In summary, dieback seems to be a new threat to muscadine grape industry. Avoiding contamination, cleaning infected wood, and chemical protections are necessary for the infected vineyard. Selecting more tolerant cultivars in disease prevailing areas is important. Studies on the pathogen and long term management are necessary in the future.

Literature Cited

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