ROOTSTOCK VARIETY INFLUENCE ON PIERCE'S DISEASE SYMPTOMS IN GRAFTED CHARDONNAY (*VITIS VINIFERA* L.) GRAPEVINES

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INTRODUCTION

Rootstocks are already widely in use in viticulture to manage damage from soil-borne pests and provide adaptation to particular soils. Grape rootstocks can impact the symptom expression of diseased scions in at least one disease (fanleaf degeneration). In other crops, rootstock variety has been reported to impact expression of *Xylella fastidiosa* diseases in scions (He et al. 2000, Gould et al. 1991). Pierce (1905) reported that rootstock variety affected expression of "California vine disease" (now known as Pierce's disease) in grape. Grape rootstock trials in Mississippi showed a large effect of rootstock trial on vine longevity in a region recognized for high Pierce's disease pressure (Loomis 1965, 1952, Magoon and Magness 1937). If grape rootstocks could contribute Pierce's disease resistance or tolerance to their scions, this would be a major benefit to viticulture in Pierce's disease prone areas. Elite wine, juice, and table grape varieties could be grown in areas where viticulture is currently restricted to Pierce's disease resistant and tolerant varieties whose consumer appeal is low.

OBJECTIVES

1. Evaluate the impact of rootstock variety on expression of Pierce's disease symptoms in the scion.
2. Assess any relationship between Pierce's disease symptoms on ungrafted rootstocks and the expression of Pierce's disease on susceptible scions grafted to those rootstocks.

RESULTS AND CONCLUSIONS

Chardonnay (*Vitis vinifera*) vines grafted on nine rootstocks and own-rooted Chardonnay vines were planted in Tallahassee, Florida in the vineyard of the Center for Viticulture, Florida A&M University in the spring 2001 planting season (Table 1). Ungrafted vines of the same nine rootstocks plus St. George were planted at the same location. The vineyard site has a high incidence of Pierce's disease and glassy-winged sharpshooters inhabit the site. Pierce's disease (PD) symptoms were evaluated on August 6 and October 25, 2002 for Chardonnay vines and August 6, September 9, and October 10, 2002 for ungrafted rootstocks. Symptoms on leaves were assessed and vines given a numerical score from 0 to 5, with 0 representing no symptoms, 1 = minor symptoms up to 15% of leaves with marginal necrosis (MN), 2 = 15-30% of leaves with MN, 3 = 30-50% of leaves with MN, 4 = 50-75% of leaves with MN, 5 = over 75% of leaves with MN or vine dead. There were four replicates for grafted vines and five replicates for ungrafted rootstocks. Each replicate consisted of two vines of the same treatment, either grafted to the same rootstock or the same rootstock variety ungrafted. The mean score of the two vines is recorded as the score for that replicate.

Chardonnay vines showed symptoms on all rootstocks (Table 1). Every Chardonnay vine showed symptoms at some level. Symptoms were more severe than in 2001 and increased in average severity from the first to the second screening regardless of the rootstock. Apparent vine death was widespread by October 25. It is likely that *Xylella fastidiosa* established in these vines in 2001, with initial PD symptoms in that year and more severe symptoms in 2002 as PD progressed. The preliminary results indicate that none of the rootstocks evaluated provides amelioration of symptoms sufficient for fruit production under these conditions.

Ungrafted vines of rootstock varieties exhibited a range of symptom levels (Table 1). Ramsey and St. George showed the fewest PD symptoms overall. Although the first screening found other rootstock varieties had less severe symptoms than Ramsey and St. George, those varieties showed a marked increase in symptoms as the season progressed. In 2001 Ramsey and St. George showed relatively more severe PD symptoms; it may be that these varieties are more susceptible when young and increase in resistance with plant age. O39-16 vines showed relatively few PD symptoms in 2001, reflective of the highly PD resistant *Vitis rotundifolia* parentage in this variety. In contrast, in 2002 O39-16 showed severe PD symptoms. The population of bacteria, level of inoculation, or cultural or climatic conditions could be impacting the PD symptom expression in O39-16. At the experimental vineyard site, PD pressure is sufficiently high that even some muscadine grapevines (*Vitis rotundifolia*) show PD symptoms. However, these muscadine vines do not succumb to PD, but recover. It may be that the O39-16 vines will recover in a similar manner. Loomis (1952, 1965) reported that a different rootstock with *V. vinifera* and *V. rotundifolia* parentage extended the life of susceptible scions in Mississippi, but even Chardonnay on O39-16 showed severe PD symptoms in this trial.

Additional rootstocks grafted to Chardonnay and Cabernet Sauvignon were planted in spring 2002 to further investigate the possible influence of rootstock on PD expression. The rootstocks Dog Ridge, 161-49C, and Lenoir are of special interest. Dog Ridge and 161-49C have been reported as increasing vine longevity in areas of high PD pressure (Loomis 1952, 1965). Pierce (1905) suggested Lenoir as a rootstock to manage this disease.

Table 1. Symptom expression in grafted Chardonnay scions, own-rooted Chardonnay, and ungrafted rootstocks. 0 = absence of symptoms, 5 = 75-100% of leaf area symptomatic.

Grafted Chardonnay, by rootstock variety	Mean Symptom Expression			Ungrafted rootstocks, by variety	Mean Symptom Expression			
Screening date (2002)	Aug 6	Oct 25	Sum		Aug 6	Sep 9	Oct 10	Sum
O39-16	3.4	4.9	8.3	Ramsey	1.6	1.0	1.3	3.9
5BB	3.8	4.6	8.4	St. George	1.2	1.3	1.6	4.1
3309C	3.8	4.8	8.6	101-14	0.7	1.7	2.8	5.2
Ramsey	3.9	4.9	8.8	5C	1.4	1.5	2.9	5.8
5C	3.9	4.9	8.8	110R	1.6	1.5	2.8	5.9
101-14	4.0	5.0	9.0	5BB	1.0	1.8	3.5	6.3
Own-rooted	4.6	5.0	9.6	44-53M	2.0	1.8	3.3	7.1
44-53M	4.6	5.0	9.6	O39-16	1.1	2.7	3.4	7.2
Freedom	4.6	5.0	9.6	Freedom	2.6	2.8	4.3	9.7
110R	4.8	4.9	9.7	3309C	2.6	3.1	4.1	9.8

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