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 (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 (Magoon and Magness 1937, Loomis 1952, 1965). 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. To evaluate the impact of rootstock variety on expression of Pierce's disease symptoms in the scion.
2. To 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 September 5, October 5, and October 26, 2001 for Chardonnay vines and September 5 and October 26, 2001 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. 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. It is premature to make conclusions about the longer-term impact of rootstock on scion health, however. 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. Additional scoring of symptoms in the grafted vines will be needed to determine if there is an effect of rootstock variety. Symptom evaluation will occur in the spring and fall of subsequent growing seasons.

Ungrafted vines of rootstock varieties exhibited a range of symptom levels (Table 1). Some O39-16 vines did not display symptoms of Pierce's disease, and this rootstock characteristically had less severe PD symptom expression. In contrast, Ramsey and St. George showed more severe PD symptoms. Interestingly, St. George has been considered to be PD tolerant under some conditions. The population of bacteria, level of inoculation, or cultural or climatic conditions could be impacting the PD symptom expression in St. George in this situation. The low level of symptom expression in O39-16 is consistent with the parentage of this rootstock. O39-16 is a *V. vinifera* x *V. rotundifolia* cross and may have derived its resistance to PD from *V. rotundifolia*, which is often regarded as being highly resistant to PD. Loomis (1952, 1965) reported that a different rootstock with *V. vinifera* and *V. rotundifolia* parentage extended the life of susceptible scions in

Mississippi. Correlations of symptom expression in ungrafted rootstocks and scions on those same rootstocks would be premature at this time.

Additional experiments are planned to further investigate the possible influence of rootstock on PD expression in susceptible scion varieties. More rootstocks will be grafted to Chardonnay, including Dog Ridge, 161-49C, Lenoir, Tampa, Florilush, Blue Lake, Lake Emerald, MidSouth, Daytona, and Miss Blanc. Dog Ridge and 161-49C have been reported as increasing vine longevity in areas of high PD pressure (Loomis 1952, 1965). Lenoir was suggested by Pierce (1905) as a rootstock to manage this disease. Tampa and Florilush are rootstocks developed in Florida, which are known to survive ungrafted in the face of high PD pressure. Blue Lake, Lake Emerald, MidSouth, Daytona, and Miss Blanc are scion varieties developed in the southern U.S. that are tolerant or resistant to PD. In addition to Chardonnay on these rootstocks, Cabernet Sauvignon will be grafted on all twenty rootstock varieties. The additional rootstock varieties will also be planted ungrafted to evaluate correlation of symptom expression in grafted scions and ungrafted rootstocks.

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 (2001)	Sept 5	Oct 5	Oct 26		Sept 5	Oct 26
44-53M	2.0	3.7	4.5	**O39-16**	1.13	1.6
5C	2.0	2.5	3.9	**5C**	1.3	1.4
3309C	2.3	2.6	3.6	**Freedom**	1.4	2.8
O39-16	2.3	2.4	3.7	**3309C**	1.5	2.3
110R	2.3	3.3	4.3	**5BB**	1.8	2.3
Ramsey	2.4	3.1	4.0	**101-14**	1.8	2.2
Freedom	2.5	2.8	4.2	**44-53M**	1.9	2.7
Own-rooted	2.6	3.7	4.4	**110R**	2.3	3.1
5BB	2.9	2.4	4.0	**St. George**	2.4	1.9
101-14	2.9	3.4	4.5	**Ramsey**	2.7	2.9

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