

GRAPE ROOTSTOCK VARIETY INFLUENCE ON PIERCE'S DISEASE SYMPTOMS IN CHARDONNAY

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ABSTRACT

Chardonnay is a *Vitis vinifera* scion variety that is susceptible to Pierce's disease (PD). We are evaluating the effect of rootstock variety on PD symptom expression in Chardonnay grown in an experimental vineyard at Weslaco, Texas with high natural PD pressure and abundant vectors, including glassy-winged sharpshooter. The rootstocks under evaluation are Dog Ridge, Florilush, Tampa, Lenoir, and Freedom. Natural *Xylella fastidiosa* (*Xf*) infection is permitted to test the effect of rootstock variety on PD in the Chardonnay scions. Vines grafted on Dog Ridge are much larger than on other rootstocks, which are similar in size; PD symptoms in vines grafted on Dog Ridge were the lowest observed amongst the rootstocks.

LAYPERSON SUMMARY

Rootstocks that reduce Pierce's disease (PD) symptoms of the scion could be one way to reduce damage from PD without changing scion varieties or clones. Rootstocks have been reported to reduce PD symptoms, but have not definitely been shown to provide or confer sufficient protection against PD to be recommended as a PD management tool. We are evaluating several rootstocks in a PD prone area, the Lower Rio Grande Valley of Texas. Chardonnay (PD susceptible) vines grafted on Dog Ridge rootstock were the largest in the trial and had the fewest PD symptoms.

INTRODUCTION

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

The Rio Grande Valley is an excellent location for the field evaluation of PD resistant plant germplasm and PD management techniques. Many insect vectors of *Xf* are native to the region, including the glassy-winged sharpshooter. Susceptible grapevine varieties are infected naturally with *Xf* in the vineyard and demonstrate characteristic PD symptoms and decline. The Rio Grande Valley is similar to many viticultural regions in California; the region is flat, irrigated, and supports multiple types of crops (citrus, grains, vegetables) in close proximity. The Rio Grande Valley is an ideal test environment due to heavy PD pressure, with abundant vectors and inoculum, in contrast to many other locations, especially California, which demonstrate substantial cycling of PD incidence. The USDA Agricultural Research Service Kika de la Garza Subtropical Agricultural Research Center in Weslaco, Texas is located in the heart of the Rio Grande Valley and provides an ideal experimental location for the evaluation of PD management practices, including rootstock evaluation.

Five rootstocks are being evaluated in this project. Freedom is a complex interspecific hybrid developed as a root-knot nematode resistant rootstock by the USDA ARS, Fresno, California (Clark 1997); its parentage includes *Vitis vinifera*, *V. labrusca*, *V. x champinii*, *V. solonis*, and *V. riparia* (Garris et al. 2009). Freedom is widely used in California viticulture. Dog Ridge is a *V. x champinii* selection recognized for its nematode resistance and resistance to PD, but it is rarely used as a rootstock. Lenoir, most probably a *V. aestivalis*/*V. vinifera* hybrid, was used historically as a rootstock and presently is cultivated as a wine grape in PD prone regions (including some parts of Texas) (Galet 1988). Tampa (Mortensen and Stover 1982) includes a *V. aestivalis* selection and the juice grape Niagara (a *V. labrusca* hybrid) in its parentage. Florilush (Mortensen et al. 1994) is a selection from the cross Dog Ridge x Tampa. Both Florilush and Tampa were selected by the University of Florida as PD resistant rootstocks for bunch grapes. PD resistance is necessary for rootstock mothervines to thrive in Florida, so the PD resistance of Florilush and Tampa should not be construed necessarily as contributing to the PD response of the scions.

OBJECTIVE

To evaluate the impact of rootstock variety on expression of PD symptoms in naturally infected PD susceptible *Vitis vinifera* scion varieties Chardonnay.

RESULTS AND CONCLUSIONS

Grafted vines of Chardonnay on five rootstocks (Freedom, Tampa, Dog Ridge, Florilush, and Lenoir) were planted at the Kika de la Garza Subtropical Agricultural Research Center in Weslaco, Texas in July, 2006. Evaluation of PD response of the vines began in 2007. Experimental vineyard establishment was good and several vines flowered and fruited in 2007 and 2008.

Symptoms on leaves were assessed in October 2008. Percent leaves with marginal necrosis symptom of PD were determined for each vine. Dormant pruning was conducted in January, 2009, and the weight of prunings of each vine, head trained and spur pruned, was collected.

Table 1. Marginal leaf necrosis and dormant pruning weight of vines by rootstock

Rootstock	Number of vines	Mean % leaves with marginal necrosis, Oct. 2008	Weight of dormant prunings, Jan. 2009, kg
Florilush	7	7.0	0.41
Freedom	9	9.0	0.41
Lenoir	10	4.4	0.46
Tampa	10	5.0	0.48
Dog Ridge	10	3.2	1.08

Preliminary results (**Table 1**) indicate that Chardonnay vines grafted on Dog Ridge were the largest and had the least PD symptoms. Additional years of vineyard observations will be necessary before making rootstock recommendations based on vineyard performance. In the Lower Rio Grande Valley at the USDA ARS research vineyard, vines are not demonstrating downy mildew or black rot or more than slight powdery mildew infection; PD remains the chief disease in the research vineyard.

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