'DOG RIDGE,' A SUPERIOR GRAPE ROOTSTOCK FOR FLORIDA

J. A. MORTENSEN

IFAS Agricultural Research Center
Leesburg

Abstract. **Two rootstock trials, one involving 5 and the other 6 scion cultivars were conducted at Leesburg between 1963 and 1971. 'Dog Ridge' was superior to 4 other rootstocks in soil previously planted with grapes and to 10 other rootstocks in soil not previously in grapes. Scions grafted on 'Dog Ridge' had greater fruit production, trunk circumference, and shoot vigor than the same scions grafted on other rootstocks. 'Dog Ridge' cuttings rooted well and grew vigorously in the nursery. It was compatible with all scion cultivars grafted on it and the percentage of successful unions was high. 'Dog Ridge' is resistant to Pierce's disease and parasitic nematodes, but is susceptible to rust and to freeze damage occurring before onset of dormancy.**

Use of rootstocks for grapes in Florida dates back to 1889, when Neal (12) described a heavy incidence of root-knot on *Vitis vinifera* L. and *V. aestivalis* Michx. By grafting to native species such as *V. cordifolia* Michx, he obtained superb growth free of root-knot. Clones of *V. champini* Planch. native to Texas were selected before 1900 by Munson and used as rootstocks (11). One of his most outstanding *V. champini* cultivars was 'Dog Ridge,' later proven to be resistant to Pierce's disease (7) and to parasitic nematodes (3, 4). 'Dog Ridge' was outstanding in rootstock tests in several states (2, 3, 4, 5, 6, 8, 9); however, in Florida decline and death of cultivars grafted on *V. champini* occurred after only 2 years of vigorous scion growth (5). By contrast, 'Lake Emerald' has made vigorous growth as a replant in Florida vineyards (13) and merits testing as a rootstock.

The purpose of this research was to compare the performance of 'Dog Ridge' with that of other rootstocks at the Agricultural Research Center, Leesburg, and to explain the previous failure of 'Dog Ridge' in Florida.

Florida Agricultural Experiment Station Journal Series No. 4664.

Materials and Methods

In order to test rootstocks on soil previously planted with grapes, 5 rows of 5-year-old vines were removed in 1963, and the same rows were planted with 5 different rootstocks: 'Dog Ridge' (*Vitis champini*), 'Black Spanish' (*V. bourquiniana* Munson) 'Lake Emerald' (*V. simpsoni* Munson cv. 'Pixiola' x 'Golden Muscat'), W380 (sister of 'Lake Emerald'), and W1521 ((*V. smalliana* Bailey x *V. lincecumi* Buckley) x 'Lake Emerald'). All except 'Black Spanish' were grafted in 1964 with 5 different scions in 2 replications (1 plant each): 'Norris,' 'Stover,' 'Blue Lake,' FES A3-34, and FES A3-60. 'Black Spanish' was not grafted until 1966 because of slow growth. Two rooted cuttings of each of the 5 scion cultivars were planted in the same rows for comparison.

On land not previously cropped with grapes, a 90-plant rootstock test was planted in December 1964. The original planting included the following rootstocks: 15 plants each of 'Lake Emerald' and W380; 6 plants each of Meyer 56-153-2, 'Dog Ridge,' A4-62, 'Black Spanish,' 3309 (*V. riparia* Michx. x *V. rupestris* Scheele), C5-24, 'Duval' (*V. simpsoni*) (4 plants, plus 2 plants of A1-32), Fla. 449 (*V. smalliana* x *V. lincecumi*), 'Mantey' (*V. shuttleworthi* House), and 'Norris.' Three of the rootstocks were discarded after 1965: Meyer 56-153-2 (poor graft unions); A4-62 and 3309 (poor vigor). In their places were set 6 plants each of USDA 22, C4-46, and D7-4. Also, 6 plants of W380 were replaced by D4-133 in order to test the latter. Each rootstock cultivar was grafted in February 1966 with 6 different scions: D2-136, D3-79, D4-176, D5-10, D5-164, and D5-167.

Data on vine vigor, fruit yield, trunk circumference, and weight of prunings were recorded from date of planting until 1971.

Results and Discussion

In land previously planted with grapes, scions on 'Dog Ridge' had the highest fruit yield over a 6-year period (Table 1), and also the most years when more than 5.5 lb. of fruit per vine (2 tons per acre) was harvested (Table 2). Scions on 'Dog Ridge' were also the most vigorous as measured by the number of years in a 7-year period when prunings exceeded 2 lb. (Table 2). Replant-

Table 1. Mean fruit yields (lb per vine) for a 6-year period in a rootstock test in old vineyard soil (1966-1971)

		Scion					
Rootstock	Rep.	Blue Lake	Stover	Norris	A3-34	A3-60	Mean[z]
Dog Ridge	A	7.4	8.4	4.4	4.3	5.3	6.6 a
	B	9.6	7.5	14.5	3.1	1.5	
W380	A	13.0	8.9	10.7	1.5	0.1	4.6 ab
	B	0.0[x]	1.8	4.1	4.4	1.7	
Lake Emerald	A	4.9	0.6	9.2	0.0	2.6	2.5 b
	B	3.3	4.0	0.6	0.0	0.2	
Black Spanish	A	7.8	0.0	0.3	0.0	0.0	1.9 b
	B	2.3	5.0	1.0	0.6	2.1	
Ungrafted[y]	A	10.1	0.0	1.5	0.0	0.0	3.2 b
	B	17.4	0.0	2.9	0.0	0.0	

[z] Means followed by the same letter not significantly different at the 5% level.
[y] Plants from rooted cuttings of the various scions.
[x] Graft unsuccessful each time it was attempted.

Table 2. Mean number of years with fruit yields (6 years) over 5.5 lb per vine (2 tons per acre) or vine pruning weights (7 years) over 2 lb per vine in a rootstock trial in old vineyard soil.

		Scion					
Rootstock	Yields	Blue Lake	Stover	Norris	A3-34	A3-60	Rootstock mean[z]
Dog Ridge	Fruit	5.0	4.5	4.0	2.0	1.5	3.4 a
	Wood	3.5	5.0	2.5	2.5	3.5	3.4 a
W380	Fruit	3.0	3.0	3.0	1.0	0.0	2.0 ab
	Wood	2.5	4.5	2.0	0.0	0.0	1.8 b
Lake Emerald	Fruit	2.5	1.0	2.5	0.0	1.0	1.4 b
	Wood	2.5	1.5	3.0	0.0	1.0	1.6 b
Black Spanish	Fruit	1.5	1.0	0.0	0.0	0.5	0.6 b
	Wood	1.0	1.0	1.0	0.0	0.0	0.6 b
Ungrafted[y]	Fruit	4.0	0.0	0.0	0.0	0.0	0.8 b
	Wood	3.0	0.0	0.0	0.0	0.0	0.6 b

[z] Means followed by the same letter not significantly different at the 5% level.
[y] Plants from rooted cuttings of the various scions.

Table 3. Mean fruit yields (lb per vine) for a 5-year period in a rootstock test in new vineyard soil (1967-1971).

Rootstock	Scion selection						Rootstock mean[z]
	D2-136	D3-79	D4-176	D5-10	D5-164	D5-167	
Dog Ridge	3.7	10.4	8.7	7.9	0.6	9.2	6.8
C5-24	8.7	5.7	0.0	11.4	0.6	6.3	5.5
Norris	11.8	3.8	1.7	5.5	0.0	7.6	5.1
W380	1.3	2.0	15.4	3.6	6.4	2.5	4.9
Duval	--	1.6	6.5	8.6	2.8	--	4.9[y]
Lake Emerald	6.2	2.5	2.1	10.7	0.0	2.8	4.5
Lake Emerald	0.0	2.4	0.8	19.3	0.8	2.5	
Lake Emerald	1.1	11.6	4.3	--	--	--	
Fla. 449	4.7	2.6	3.3	5.7	0.0	2.1	3.1
A1-32	3.8	--	--	--	--	1.1	2.5[x]
Black Spanish	8.8	1.8	0.0	0.0	0.0	3.5	2.4
Mantey	2.1	5.3	0.0	0.4	0.0	6.0	2.3
C4-46	0.0	5.8	0.0	5.5	0.6	0.7	2.0

[z] Differences not significant at the 5% level.
[y] 4 plants only.
[x] 2 plants only.

ing vacancies in Florida vineyards with 'Dog Ridge' can be recommended because of this outstanding growth in previously planted soil. W1521 grew as vigorously as 'Dog Ridge' in old vineyard soil but failed to make unions when grafted, so no yield data were obtained. Pierce's disease caused subnormal growth on 20% of the scions grafted on 'Dog Ridge,' 70% on W380 and 'Lake Emerald,' and 100% on 'Black Spanish.' Ungrafted 'Dog Ridge' is highly resistant to Pierce's disease, whereas the other rootstocks in the test occassionally develop symptoms as ungrafted vines.

In land not previously cropped with grapes, scions on 'Dog Ridge' were outstanding in fruit

Table 4. Mean dormant pruning weights (lb per vine) for a 4-year period in a rootstock test in new vineyard soil (1968-1971).

Rootstock	Scion selection						Rootstock mean[z]
	D2-136	D3-79	D4-176	D5-10	D5-164	D5-167	
Duval	--	0.8	2.4	1.4	3.6	--	2.1[y]
Dog Ridge	1.9	2.4	3.5	2.0	0.7	1.5	2.0
Lake Emerald	4.8	0.7	0.7	3.6	0.0	0.6	1.5
Lake Emerald	0.0	1.2	1.0	2.7	1.1	0.2	
Lake Emerald	0.5	3.6	1.8	--	--	--	
W380	0.9	0.8	3.6	0.6	1.8	1.1	1.5
Norris	4.4	1.3	0.6	1.2	0.0	1.4	1.5
A1-32	2.1	--	--	--	--	0.9	1.5[x]
C5-24	3.3	1.7	0.1	2.2	0.7	0.7	1.4
Fla. 449	1.9	1.6	2.0	1.5	0.1	0.5	1.3
Mantey	1.3	1.8	0.0	0.3	0.4	1.3	0.9
C4-46	0.5	1.2	0.6	1.6	0.5	0.2	0.8
Black Spanish	2.9	0.8	0.1	0.1	0.0	0.3	0.7

[z] Differences not significant at the 5% level.
[y] 4 plants only.
[x] 2 plants only.

yields (Table 3) and second highest among 11 grafted rootstocks in weight of prunings removed (Table 4). Scions on 'Dog Ridge' increased more in trunk circumference between 1970 and 1971 than the other rootstocks (data not shown), indicating superior sustained vigor of scions grafted on it. Scions grafted on 'Dog Ridge,' W380, 'Norris,' and 'Lake Emerald' had less severe Pierce's disease symptoms than scions grafted on the other rootstocks in the trial. The superiority of 'Dog Ridge' as a rootstock in Florida soils (Fig. 1) corroborates the favorable results reported with this rootstock in South Carolina (5), Georgia (2), Mississippi (6, 8), Texas (9), and California (3, 4). Previous failures with *V. champini* in Florida (5) can be explained by the use by Florida growers of scion cultivars now known to be susceptible to Pierce's disease (10).

'Dog Ridge' was reported as difficult to root from cuttings in California (4), but nursery tests comparing 'Dog Ridge' and 'Lake Emerald' at Leesburg gave 90% and 56% rooting in 1970 and 100% and 63%, respectively, in 1971 (1). Thus, high rooting percentage and vigorous growth were characteristic of 'Dog Ridge' in Florida soils provided the cuttings were properly callused prior to planting. In contrast to the incompatibility of W1521 with scions grafted on it, 'Dog Ridge' stocks made good graft unions with the 11 different scion cultivars used in the 2 experiments.

Yields from ungrafted 'Blue Lake' were higher than from 'Blue Lake' grafted on 'Dog Ridge' or any other rootstock (Table 1). Grafting of 'Blue Lake' is thus unnecessary and unprofitable since it produces better on its own roots. The possible use of 'Blue Lake' as a replant stock for vineyard vacancies and as a nematode-resistant rootstock should be explored.

'Norris' yielded better on 'Dog Ridge' rootstock than on its own roots in old vineyard soil (Table 1), indicating a need for grafting 'Norris.' 'Norris' was better as a rootstock than as a scion (Tables 3 and 4) because its growth as a scion was limited by its susceptibility to anthracnose.

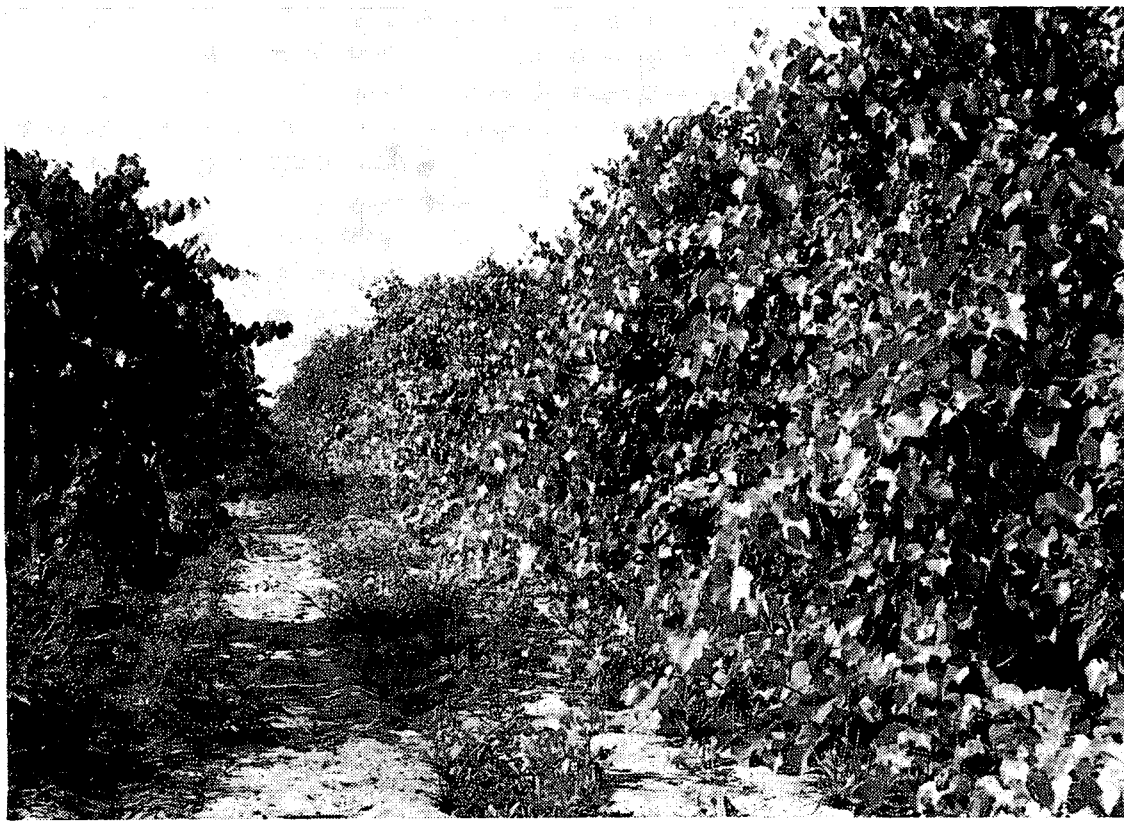

Fig. 1. Ungrafted 'Dog Ridge' vines (right) grow vigorously with minimum care at Agricultural Research Center, Leesburg.

Fig. 2. Six-month-old scions on 'Dog Ridge' rootstock planted at Agricultural Research Center, Leesburg in February 1971. (Grafts made February 1972, photo taken August 1972).

'Dog Ridge' is susceptible to grape rust, caused by *Physopella vitis* (Thum.) Arth., which rarely has required fungicidal control at Leesburg. It may be important in other locations. When freezes occur in November or early December there may be damage to immature shoots of 'Dog Ridge' because of its tendency for late defoliation. However, mature wood is rarely affected.

In a vineyard of 'Dog Ridge' planted in 1971 at Leesburg the stocks were large enough to graft in February 1972. By June 1972 the scions had reached the trellis wire (Fig. 2), with promise of some fruit production in 1973.

Literature Cited

1. Balerdi, C. F. 1971. Unpublished data, Agricultural Research Center, Leesburg, Florida.
2. Cowart, F. F., and E. F. Savage. 1944. An evaluation of certain grape varieties for use as rootstocks. **Proc. Amer. Soc. Hort. Sci.** 44:315-318.
3. Harmon, F. N., and Elmer Snyder. 1956. Comparative value of four rootstocks for Sultanina grape in rootknot nematode-infested soil. **Proc. Amer. Soc. Hort. Sci.** 67:308-311.
4. Lider, Lloyd A. 1960 Vineyard trials in California with nematode-resistant grape rootstocks. **Hilgardia** 30(4): 123-152.
5. Loomis, N. H. 1943. Rootstocks for grapes in the South. **Proc. Amer. Soc. Hort. Sci.** 42:380-382.
6. _____, 1952. Effect of fourteen rootstocks on yield, vigor, and longevity of twelve varieties of grapes at Meridian, Mississippi. **Proc. Amer. Soc. Hort. Sci.** 59:125-132.
7. _____. 1958. Performance of **Vitis** species in the South as an indication of their relative resistance to Pierce's disease. **Plant Dis. Reptr.** 42(7):833-836.
8. _____. 1965. Further trials of grape rootstocks in Mississippi. **Proc. Amer. Soc. Hort. Sci.** 86:326-328.
9. Mortensen, E. 1939. Nursery tests with grape rootstocks. **Proc. Amer. Soc. Hort. Sci.** 36:153-157.
10. Mortensen, J. A. 1966. Comparative growth and yield of ten grape varieties sprayed intensively for insect and disease control. **Proc. Fla. State Hort. Soc.** 79:390-395.
11. Munson, T. V. 1909. Foundations of American grape culture. T. V. Munson & Son, Denison, Texas.
12. Neal, J. C. 1889. The root-knot disease of the peach, orange and other plants in Florida due to the work of Anguillula. **Div. of Entomology, U.S.D.A. Bul.** 20: 1-31.
13. Stover, L. H. 1951. Breeding has produced better grape varieties for Florida. **Proc. Fla. State Hort. Soc.** 64:269-271.