



Fig. 1. The effect of differential placement of April 17, 1963, soil-injected hydrated dolomitic limestone on leaf Ca and Mg of McIntosh Apple trees.

slurries this practice may be of value when rapid Ca and Mg uptake response to the lime is desired.

This study was designed primarily to see if Ca and Mg response could be effected by slurry soil injections into

active root zones. The inside treatment of 20 lb. of hydrated dolomite and the dripline treatment of 50 lb. per tree were approximately equivalent on a soil volume basis. Although no other differential treatment rates were used, it is suggested that higher rates of application would be more effective.

#### Literature Cited

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## Performance of Muscadine Grapes (*Vitis rotundifolia* Mich.) in Central Florida<sup>1</sup>

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Some people consider muscadines as the most satisfactory of all fruits for the home garden in the south (1). An increasing interest in muscadine culture in Florida is indicated by growers who have planted them for commercial production, and by others who plan vineyards for the near future. Therefore, information on the performance of muscadine varieties in central Florida is valuable for potential growers, and for research and extension personnel.

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A muscadine grape evaluation program was begun at the Watermelon and Grape Investigations Laboratory in 1959. Varieties from the breeding programs of the Crops Research Division of the U.S. Department of Agriculture and the Georgia and North Carolina Agricultural Experiment Stations were planted in 1959 ('Bountiful' in 1961), and data were taken in 1967 from 2 or 3 plants of each clone. Nine varieties were included in this study. Vines were grown on a single wire trellis at spacings of 12 feet in the row and 10 feet between rows.

Fifteen to 30 berries were used to determine berry characteristics. The number of berries per cluster was counted on 12 to 20 clusters from each arm. Thickness of the fruit skin was

measured on fifteen 1/2-inch diameter skin discs after drying on a paper towel for 5 minutes. Skin weight was determined by weighing these discs.

Ripeness was determined subjectively by color and is reported as the per cent ripe fruit in the center section of both arms. Soluble solids and pH were determined with a Zeiss hand refractometer and a Beckman Zeromatic pH meter. Titratable acidity (as % tartaric acid) was determined from 20 g of juice titrated to pH 7 with a 0.1N sodium hydroxide solution. The following formula was used: % tartaric acid =

$$\frac{\text{eq. wt. tartaric acid} \times N \text{ of NaOH} \times \text{ml. of NaOH} \times 100}{1000 \times \text{wt sample}}$$

Table 1. Vine and fruit characteristics of muscadine grapes at Leesburg, Florida, 1967.

	Southland	Chief	Higgins <sup>1</sup>	Magoon	Hunt <sup>1</sup>	Bountiful	Dulcet <sup>1</sup>	Dearing	Topsail
Yield per vine (lb)	24.2	21.6	15.7	13.3	9.7	6.0	3.5	2.6	1.8
Color	Black	Black	Pink	Black	Black	Black	Black	Bronze	Bronze
No. berries per cluster	7.2 (5-10)	8.1 (5-14)	6.9 (3-17)	6.0 (3-12)	4.8 (2-10)	5.9 (3-9)	8.1 (3-16)	7.8 (4-11)	4.6 (3-7)
Wt. per berry (gm)	5.70	4.02	8.10	3.63	4.83	3.31	3.08	3.43	6.10
Cercospora Leaf spot <sup>2</sup>	2.0	2.3	2.3	3.0	2.0	3.0	2.0	2.0	1.0
Berry size, length/ width (cm)	2.14/ 2.05	1.98/ 1.81	2.65/ 2.30	1.87/ 1.76	2.17/ 1.94	1.87/ 1.73	1.75/ 1.60	1.89/ 1.74	2.15/ 2.03
No. seeds per berry	3.3 (3-4)	3.6 (3-4)	1.7 (1-3)	3.7 (3-4)	3.0 (1-4)	3.0 (2-4)	2.6 (1-4)	3.4 (2-4)	2.4 (1-4)
Skin Thickness (mm)	0.80	0.78	0.83	0.79	0.67	0.54	0.75	0.78	0.81
Wt. of 1/2" skin disc (gm)	0.11	0.10	0.15	0.09	0.07	0.07	0.10	0.10	0.11
Ripeness %, August 1	42.7	14.4	4.5	13.4	68.8	14.8	9.9	0.0	0.0
Tenacity (gm) <sup>3</sup>	166	133	338	186	266	117	458	160	—
Soluble solids (%)	16.1	15.8	14.6	18.4	16.0	13.7	16.3	17.6	17.7
pH	3.0	2.8	3.3	3.0	3.1	2.9	3.0	3.0	—
Titrateable acidity (%)	0.48	0.56	0.30	0.31	0.40	0.51	0.41	0.39	—
Flavor <sup>4</sup>	8.0	7.5	7.0	10.0	7.0	6.0	7.0	8.0	9.5
Vigor <sup>5</sup>	6.5	7.5	9.0	4.0	10.0	6.0	9.0	9.0	9.5

<sup>1</sup>Pistillate variety, requires interplanted pollinator; other varieties are hermaphroditic.

<sup>2</sup>Arbitrary scale: 1, none; 3, moderate; 5, severe (1968 data).

<sup>3</sup>Fruit retention force: grams of pull required to detach fruit (1968 data).

<sup>4</sup>Arbitrary scale: 1, poor; 5, medium; 10, excellent.

<sup>5</sup>Arbitrary scale: 1, poor; 5, medium; 10, very vigorous.

Characteristic of the nine tested varieties are summarized in Table 1. 'Southland' and 'Chief', recent introductions by the USDA, had yields of 24.2 and 21.6 pounds per vine, respectively. Intermediate in yields were 'Higgins', 'Magoon', and 'Hunt', with yields of 15.7, 13.3, and 9.7 pounds, respectively. 'Bountiful', 'Dulcet', 'Dearing', and 'Topsail' had yields ranging from 6.0 to 1.8 pounds. Vines of the latter three varieties tend to be very vigorous and perhaps were either pruned too severely or responded to fertilizer applications by producing excessive vegetative growth.

'Higgins', 'Southland', and 'Topsail' had the largest berries as measured by weight or size. 'Dulcet' had the smallest fruit and 'Southland' the roundest.

Seediness was related to self-fertility, with more seeds and more uniformity in seed numbers in self-fertile than in pistillate varieties. 'Higgins' had the largest berries and the lowest mean seed number.

Skin thickness was not necessarily related to ease of eating. For example, 'Higgins' had the thickest skin, but the texture of the pulp was relatively tender and easy to eat. 'Dearing' had a skin of medium thickness but the texture of the

pulp was tough, making it difficult to eat. Skin thickness appeared to be directly related to fruit size. 'Higgins' had the largest berries with the thickest skin and 'Bountiful' had one of the smaller berries with the thinnest skin.

Earliest ripening were 'Hunt' and 'Southland', and the latest were 'Dearing' and 'Topsail'. 'Hunt' and 'Southland' produced most of their ripe fruit from August 1 to 9. All varieties were ripe by the end of August. Fruit retention force (tenacity) was related to ripeness and variety. 'Dearing' and 'Bountiful' berries detached readily; berries of 'Dulcet' and 'Higgins' were strongly attached, and those of other varieties were intermediate.

'Magoon', 'Dearing', and 'Topsail' had the highest per cent soluble solids, and 'Bountiful' and 'Higgins' the lowest. Soluble solids, pH, and titrateable acidity varied considerably among varieties. Desirable flavor was associated with high soluble solids and low titrateable acidity ('Magoon'), and poor flavor with low soluble solids and high titrateable acidity ('Bountiful'). In 'Higgins' low soluble solid content was compensated somewhat by low titrateable acidity.

Vigor ratings were made visually. Pruning to one or two buds and a high

rate of fertilizer application (1500 pounds per acre of 6-6-6) may have promoted excessive vegetative vigor in some varieties. A better balance between vegetative growth and fruit production might be obtained in such varieties by leaving longer spurs (4 buds), using a 2-wire instead of 1-wire vertical trellis, and decreasing the amount of fertilizer. 'Southland' and 'Chief' were vigorous even with heavy crops and severe pruning.

Ratings for Cercospora leaf spot defoliation indicated that 'Magoon' and 'Bountiful' were more susceptible than other varieties. In conclusion, 'Southland', 'Chief', 'Magoon', and 'Higgins' performed best in these trials and are recommended for planting in central Florida. Other newly released varieties and outstanding selections from the Crops Research Division of the U.S. Department of Agriculture and the Georgia and North Carolina Agricultural Experiment Stations are now being evaluated at this Station. Some of them appear promising.

#### Literature Cited

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