

# Cold Injury to Muscadine Grapes in Georgia and Mississippi

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Muscadine grapes are native to the southeastern United States, where there is normally a long growing season, a heavy summer rainfall, high humidity, and winter temperatures seldom lower than 10° F.

At Experiment, Georgia and Meridian, Mississippi, three exceptionally cold winters were experienced from December, 1961 to February, 1964. Each spring, notes were taken on injury to mature diploid and tetraploid muscadine grape vines, and on injury to diploids in spring, 1964 at Gay, Georgia. Data appear in Tables I and II. Brief weather data for December, January, and February for the three winters are given in Table III. The

number of vines of a variety varied from 2 to 30.

Winter injury was of three types: (1) The entire vine was killed; (2) normal spring growth was followed by sudden partial wilting and death; (3) or partial girdling resulted in late summer development of numerous aerial roots above the injury. The latter type was not apparent in the spring when our observations were noted. Where cold killed arms or trunks of the vines, the wood often split to a depth of 3/4 inch or more. Mature vines were injured more than young ones;

The extent of winter injury appeared to be influenced by the nutri-

**Table 1. Percentage of injury to mature muscadine grape varieties following 3 severe winters.**

|             | Experiment, Ga. <sup>1</sup> |      | Gay, Ga<br>1964 | 1962 | Meridian, Miss. <sup>2</sup> |      |
|-------------|------------------------------|------|-----------------|------|------------------------------|------|
|             | 1963                         | 1964 |                 |      | 1963                         | 1964 |
| Burgaw      |                              |      |                 | 0    | 0                            | 0    |
| Creek       | 0                            | 20   | 70              | 40   | 25                           | 55   |
| Creswell    |                              |      |                 | 0    | 0                            | 0    |
| Dearing     | 0                            | —    |                 | 0    | 0                            | 60   |
| Dulcet      | 15                           | 66   | 60              | 20   | 75                           | 75   |
| Higgins     | 0                            | 0    |                 | 10   | 20                           | 90   |
| Hunt        | 5                            | 25   | 7               | 20   | 80                           | 85   |
| Latham      |                              |      |                 | 0    | 0                            | 20   |
| Lucida      |                              |      |                 | 0    | 100                          | 100  |
| Magoon      | 15                           | —    |                 | 0    | 0                            | 25   |
| Memory      | 0                            | 0    |                 |      |                              |      |
| Nevermiss   | 0                            | 0    | 3               | 0    | 0                            | 0    |
| Pamlico     | 0                            | 0    |                 |      |                              |      |
| Seuppernong | 25                           | 82   |                 | 0    | 10                           | 50   |
| Tarheel     |                              |      |                 | 37   | 10                           | 40   |
| Thomas      | 0                            | 0    | 60              | 0    | 0                            | 55   |
| Topsail     |                              |      | 85              | 50   | 75                           | 90   |
| Wallace     |                              |      |                 | 10   | 25                           | 65   |
| Willard     |                              |      |                 | 0    | 15                           | 15   |
| Yuga        | 0                            | 50   | 66              | 75   | 65                           | 100  |

<sup>1</sup>No winter injury noted at Experiment, Georgia in the spring of 1912.

<sup>2</sup>The data taken at Meridian, Mississippi in 1962 and 1963 included the injury from the previous winter only, while the notes for 1964 are cumulative; missing vines and parts of vines from previous winters were included as winter injured.

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Table 2. Percentage of winter injury to diploid and tetraploid muscadine grape varieties and selections recorded in 1964, following 3 severe winters.

|               | Experiment, Georgia |            | Meridian, Mississippi |            |
|---------------|---------------------|------------|-----------------------|------------|
|               | Diploid             | Tetraploid | Diploid               | Tetraploid |
| Creek         | 20                  | 100        | 55                    | 100        |
| Higgins       | 0                   | 70         |                       |            |
| Topsail       |                     | 40         |                       |            |
| Yuga          | 50                  | 100        | 100                   | 100        |
| Georgia 29-59 |                     | 50         |                       |            |
| N.C. 11-173   |                     | 100        |                       |            |
| N.C. 11-178   |                     | 100        |                       |            |
| N.C. 20-30    |                     | 100        | 50                    | 75         |
| 6-4A          |                     | 100        | 25                    | 100        |
| 19            |                     |            | 85                    | 100        |
| 51-9B         |                     | 100        | 50                    | 100        |

Table 3. Temperature data for the winter months, December, 1961 through February, 1964.

|          | Normal average | Experiment, Georgia   |         |                | Normal average | Meridian, Mississippi   |         |                |
|----------|----------------|---|---------|----------------|----------------|-------------------------|---------|----------------|
|          |                | Departures from 1961-62   | 1962-63 | normal 1963-64 |                | Departures from 1961-62 | 1962-63 | normal 1963-64 |
|          |                | (in degrees F.)   |         |                |                | (in degrees F.)         |         |                |
| December | 45.8           | 0.7   | -3.2    | -7.8           | 48.3           | -0.1                    | -4.1    | -10.3          |
| January  | 46.0           | -2.9  | -7.7    | -7.3           | 48.1           | -5.0                    | -8.0    | -4.8           |
| February | 48.6           | 4.7   | -7.5    | -9.2           | 50.0           | 6.7                     | -7.5    | -2.0           |
|          |                | Number of times below 10° F. and minimum temperatures when below 10° F. |         |                |                |                         |         |                |
| December |                | 0   | 2 (-3)  | 1 (7°)         | 0              | 3 (2°)                  |         | 0              |
| January  |                | 2 (8°)  | 3 (-4)  | 1 (7°)         | 4 (-2°)        | 2 (1°)                  |         | 0              |
| February |                | 0   | 2 (6)   | 0              | 0              | 0                       |         | 0              |

tional condition of the vines which, in turn, was affected by many factors such as previous production, fertilization, cultivation, and soil moisture. Vines injured during the first or second severe winter were usually hurt still more during the second or third winter.

Injury to bearing tetraploid vines was more severe than to their diploid counterparts. The heavy leaf tissue of the tetraploids appeared to be functional except in the Topsail tetraploid, which is extremely susceptible to foliage diseases. The reason for greater winter injury to the tetraploids than to the diploids from which they originated is unknown, but it does not appear to be defective foliage.

The Earlidawn strawberry is pushing Premier out of the picture, and now makes up about 8-10% of the commercial acreage in Michigan, according to J. Moulton, of Mich. State University.

### Compatibility of Almond Varieties With Marianna Rootstocks

The clonal Marianna 2624 is sometimes used as a rootstock for almond in California, because of its relative tolerance to oak root fungus (*Armillaria mellea*), and to wet soils. D. E. Kester and C. J. Hansen have studied the compatibility of commercial almond varieties on this stock. They report in California Agriculture that the varieties Texas and Peerless combine well with Marianna 2624, but that Nonpareil, Davey and Kapareil are incompatible.

Interstocks of either Texas or Ne Plus Ultra almond fail to overcome to incompatibility between Nonpareil and the Marianna 2624 rootstock. However, interstocks of the plum variety Havens 2B appear to overcome this incompatibility.