WMR 29 Muskmelon Breeding Line

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Additional index words. disease resistance, watermelon mosaic, powdery mildew, sulfur, crown blight, vegetable breeding, Cucumis melo

WMR 29 is a productive, watermelon mosaic virus (WMV) 1 resistant muskmelon adapted for desert culture with excellent shipping characters: nearly spherical shape; heavily netted; dry stem scar; firm blossom end; very firm flesh at full slip; bright salmon-orange flesh; high soluble solids; small, dry seed cavity; and pleasant taste and aroma. Watermelon mosaic virus causes severe stunting and malformation of stems and leaves, and yield reduction of muskmelons in the American desert Southwest. WMV 1 and WMV 2 are contributing factors in declining muskmelon acreage in Imperial Valley during the last 40 years. It is common for Imperial Valley fields to be 100% infected by end of harvest. Dominant, single gene resistance to WMV 1 was found in PI 180280 (1). Resistance to WMV 2 has not yet been reported although cultivars appear to vary in field tolerance to WMV 2.

Origin

WMV-resistant breeding line WMR 29 was initiated in 1960 with pollen of a WMV 1-resistant selection from PI 180280, a large, smooth-skinned melon used for cooking in India. The pollen was received in a mature staminate flower which had been dried 24 hr at room temperature with corolla removed in Beltsville, Md., and air mailed in an ordinary paper envelope by R. E. Webb (1, 2) to La Jolla, Calif. The pollen was applied to pistillate flowers of an F₂

selection from the cross PI 124111 X 'Crenshaw' (Fig. 1). Five generations of backcrossing provided maximum opportunity for combining genes for quality with WmV 1 (1) (Fig. 1). Selection progress for quality was, however, limited by the comparatively small greenhouse populations. Mass selection for 5 generations yielded a population that produced dessert-type fruits, but it was variable in fruit characters and segregating for resistance to WMV 1 and powdery mildew race 2 (Sphaerotheca fuliginea (Schlecht. ex Fr.) Poll). After inbreeding for 2 generations and selecting plants homozygous for WMV 1 resistance, mass selection in the field for quality characters was done for 9 generations (Fig. 1). The 9th mass generation was released as WMR 29.

Disease and pest resistances

WMR 29 is resistant to WMV 1, tolerant to WMV 2, and is sulfur tolerant. It is segregating for resistance to powdery mildew race 2, and is susceptible to melon aphid (Aphis gossypii Glover).

Performance

Test plantings during 1976-1979 indicated that WMR 29 is well-adapted to culture in southern California and Arizona. It is tolerant to environmental factors in southern California and Arizona that cause crown blight in muskmelons, and retains green foliage well through harvest. WMR 29 yielded earlier than ‘Topmark’, but later than ‘PMR 45’ in a replicated trial at the University of California, Imperial Valley Field Station in 1979, (K. S. Mayberry, Cooperative Agricultural Extension, El Centro, CA, personal communication) (Table 1).

Table 1. Performance of WMR 29 at Imperial Valley Field Station, California, 1979.

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Sept. 24-28, 1979</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topmark</td>
<td>61</td>
<td>76</td>
</tr>
<tr>
<td>WMR 29</td>
<td>41</td>
<td>76</td>
</tr>
<tr>
<td>PMR 45</td>
<td>19</td>
<td>70</td>
</tr>
</tbody>
</table>

WMR 29 yielded 82% sizes 36 and 27 compared with 63% for ‘Topmark’ and 71% for ‘PMR 45’.

Fig. 1. Pedigree of muskmelon breeding line WMR 29.

Fig. 2. WMR 29 fruits at full slip.

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2Respectively: Research Geneticist (retired), 1094 Klish Way, Del Mar, CA 92014, Research Entomologist, Boyden Entomology Lab, University of California, Riverside, CA 92521, and Research Horticulturist, P.O. Box 5098, Salinas, CA 93915. Joseph A. Principe, Research Technician at Brawley, aided with WMV 1 tests in the backcross series and with all breeding work; Anthony Duran, Research Technician at Brawley, aided with all aspects of field tests; and Sharon Schuman, Research Technician at Riverside, aided with tests for reactions to WMV 1, WMV 2, powdery mildew, aphids, and high minor elements in mass-selected populations.
WMR 29 produces heavily netted, nearly spherical fruits that have prominent, net-free vein tracts (Fig. 2). Fruits are very firm at full slip and, thus, are suitable for shipping long distances. The blossom-end scar is also firm at full-slip; the flesh at the blossom-end is only slightly narrower than that in the rest of the fruit. The stem scar is larger than desired, but is variable and, hence, might be improved through continued mass selection.

The flesh is bright salmon-orange in color and is distinctly separated from the rind by a thin layer of bright green tissue. The seed cavity is small and dry. WMR 29 has a pleasing muskmelon (var. reticulatus) flavor even after refrigeration for 10 days at 7.2°C followed by storage at room temperature for 2-3 days at 24-30°C. Soluble solids in desert Southwest plantings ranges form 10 to 17%.

WMR 29, developed largely by mass selection, retains heterozygosity so it should respond favorably to continued selection. It can serve as a source of resistance to several pests and as a source of improved rind, flesh, and placenta characters for long distance shipping and handling.

## Availability
Limited quantities of seed are available to plant breeders and seed producers upon request.

## Literature Cited

### Fig. 1. Pedigree of 'Dover' strawberry.

### Fig. 2. Fruit of 'Dover' strawberry.

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**Table 1. Early and seasonal marketable yields and average fruit size of 'Dover', 'Tioga', and 'Tufts' strawberries in Central Florida.**

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>1975-76 Yield (MT/ha)</th>
<th>Early Seasonal Avg size (g/fruit)</th>
<th>1976-77 Yield (MT/ha)</th>
<th>Early Seasonal Avg size (g/fruit)</th>
<th>1977-78 Yield (MT/ha)</th>
<th>Early Seasonal Avg size (g/fruit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dover</td>
<td>4.9a 35.0a 12.9a</td>
<td>12.9a</td>
<td>4.9a 30.9a 13.2a</td>
<td>12.9a</td>
<td>3.7a 19.1a 12.8a</td>
<td>12.9a</td>
</tr>
<tr>
<td>Tioga</td>
<td>2.9b 29.6b 10.7b</td>
<td>3.6b 18.9b 10.9b 0.5c 16.4c 11.3b</td>
<td>2.7b 24.9c 13.1a</td>
<td>1.7b</td>
<td>16.3b 12.5a</td>
<td></td>
</tr>
<tr>
<td>Tufts</td>
<td></td>
<td></td>
<td></td>
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</table>

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‘Dover’ Strawberry

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‘Dover’ is a high yielding, firm fruited strawberry (Fragaria × ananassa Duch.) with excellent resistance to anthracnose. It has consistently shown good performance for the fresh market in trials in central Florida. ‘Dover’ is named for the village of Dover centered in the major strawberry production area in west-central Florida.

Origin

‘Dover’ was selected from a 1973 cross between ‘Florida Belle’ and Fla. selection 71-189 (Fig. 1) and was tested as selection 73-1965E. ‘Florida Belle’ was used as a parent because of its high degree of resistance to anthracnose (Colletotrichum fragaria Brooks), its large, excellent flavored fruit, and its upright growth habit. Selection 71-189 was chosen as a parent because of its resistance to anthracnose and its fruit firmness.

Description

‘Dover’ fruits are conic and slightly flattened (Fig. 2). They generally are smooth and of uniform shape with slightly recessed seeds. Ripe fruit is an attractive deep red with a glossy sheen but occasionally gets somewhat darker than is desirable. Fruit size, determined by weight, equals that of ‘Tufts’ (Table 1). The fruits have a strong epidermis and firm flesh which gives them excellent resistance to bruising during harvesting and shipping. In limited shipping tests, fruit of ‘Dover’ showed much less bruising than ‘Tioga’. Fruits are produced on long peduncles which usually extend beyond the plant canopy. Because of the small diameter of the peduncles and the firm attachment of the calyx to the fruit, the fruits are easy to pick with the calyx seldom accidentally removed.

In central Florida, harvest of ‘Dover’ usually begins in late December, about 2 weeks before the standard cultivars ‘Tioga’ and ‘Tufts’, and continues into early April. ‘Dover’ has consistently produced higher early and seasonal yields than ‘Tioga’ and ‘Tufts’ (Table 1). ‘Dover’ is highly resistant to anthracnose in Florida. It is an excellent plant producer. For nursery production in Florida, plants should be set about 76.2 cm (30 in) apart when 1.22 m (4 ft) wide beds are used or 45.72 cm (18 in) apart when 1.83 m (6 ft) wide beds are used. Closer spacing often results in overcrowding and production of small, spindly plants.

Availability

Limited supplies of plants for nursery settings are available from the University of Florida, Agricultural Research Center, Dover, FL 33527.