‘Guadajira’ and ‘Gevora’: Open-pollinated, Processing Tomato Cultivars Resistant to Root-knot Nematodes and Fusarium Wilt

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Origin and Methodology

The F1 hybrid ‘Centurion’ was backcrossed to the recurrent parent, ‘FM-6203’. ‘FM-6203’ is resistant to FOL race 0 (gene I), and ‘Centurion’ was the source of resistance genes Mi, I, and I-2. Both ‘FM-6203’ and ‘Centurion’ were once widely grown worldwide; ‘Centurion’ is still grown in Spain and both are well adapted to Spanish conditions (Rodríguez et al., 1995a). A ‘FM-6203’ x ‘Centurion’ F1 hybrid was generated and individuals at the seedling stage were propagated via in vitro culture of cuttings to obtain at least 10 propagules of each seedling. Three of these clones were used to evaluate root-knot nematode resistance, three for resistance to FOL, and four were cultivated in the field to observe their horticultural characteristics. Nematode resistance conditioned by the Mi gene was evaluated by inoculating plants at the four-leaf stage with 1500 eggs/root of a mixture of M. incognita and M. arenaria populations. An F1 individual was classified susceptible after 45 d when at least one of its three inoculated propagules had >5% of its roots infested or >10 galls. The three clones of all resistant individuals were reimplemented to eliminate escapes. Fusarium wilt resistance conditioned by the f-2 gene was tested by inoculating propagules with FOL race 1 as described by Rodríguez et al. (1995b).

The F1 plants selected for resistance and horticultural acceptability were crossed, using the female as the recurrent parent, to produce the BC1, BC2, and BC3 generations. We self-pollinated resistant BC3 progenies to produce BC3S1 lines. Resistant BC3S1 plants were self-pollinated to produce BC3S2 lines. Those BC3S2 lines that did not segregate for resistances were homozygous for the resistance genes and were grown under field conditions. Two of these lines, ‘Guadajira’ and ‘Gevora’, were promising horticulturally, and were compared with commercial cultivars in a randomized complete-block design with four replications (50 m² per cultivar and block) at one location in 1995. ‘Guadajira’ and ‘Gevora’ lines were then tested at five commercial farms (one plot of 500 m² per cultivar per farm) in 1996 and 1997.

Description

‘Guadajira’ and ‘Gevora’ are suitable for mechanical harvesting; the main stem is determinate and stops growing after the fourth or fifth truss. The foliage protects the fruits satisfactorily from sunscald. The fruits of both cultivars are round to elongated; the polar and equatorial diameters, respectively, are 56 ± 4 and 48 ± 4 mm for ‘Guadajira’ and 53 ± 4 and 47 ± 4 mm for ‘Gevora’. The fruits of both cultivars have three locules and the mean pericarp thickness is 8 ± 1 mm for ‘Guadajira’ and 7 ± 1 mm for ‘Gevora’. ‘Guadajira’ fruit (87 ± 7 g) is heavier than that of ‘Gevora’ (72 ± 7 g). Both ‘Guadajira’ and ‘Gevora’ are resistant to root-knot nematodes and to FOL race 0; ‘Gevora’ is resistant to FOL race 1.

Fruit yields of ‘Guadajira’ and ‘Gevora’ were similar to those of the hybrids (Table 1). ‘Soprano’ (52 t·ha⁻¹) and ‘Suan’ (48 t·ha⁻¹) produced the largest ranges in yield averaged over the 3 years; the range between the highest and lowest yield was 31 t·ha⁻¹ for ‘Guadajira’, 34 t·ha⁻¹ for ‘Gevora’, 43 t·ha⁻¹ for ‘FM-6203’, and 25 t·ha⁻¹ for ‘Centurion’. Consequently, ‘FM-6203’ and ‘Centurion’ showed more yield stability under field conditions in 1995, 1996, and 1997.

‘Guadajira’ and ‘Gevora’ had Brix >4.8 in all 3 years (Table 1); this is important in the European Union because the price of processing tomatoes is reduced when Brix are <4.8. Consequently, the prices of ‘Guadajira’ and ‘Gevora’ would not have been reduced in any


<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Yield (t·ha⁻¹)</th>
<th>Brix</th>
<th>Color (a/b)</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guadajira</td>
<td>85 ± 16 a</td>
<td>5.3 ± 0.2 ab</td>
<td>2.3 ± 0.1  b</td>
<td>4.2 ± 0.10 a</td>
</tr>
<tr>
<td>Gevora</td>
<td>71 ± 18 a</td>
<td>5.5 ± 0.4 a</td>
<td>2.4 ± 0.1  a</td>
<td>4.2 ± 0.11 a</td>
</tr>
<tr>
<td>FM-6203</td>
<td>83 ± 17 a</td>
<td>5.3 ± 0.3 ab</td>
<td>2.4 ± 0.1  a</td>
<td>4.2 ± 0.12 a</td>
</tr>
<tr>
<td>Centurion F1</td>
<td>87 ± 13 a</td>
<td>5.4 ± 0.6 ab</td>
<td>2.4 ± 0.1  ab</td>
<td>4.2 ± 0.07 a</td>
</tr>
<tr>
<td>Soprano F1</td>
<td>89 ± 27 a</td>
<td>5.1 ± 0.4 ab</td>
<td>2.3 ± 0.1  b</td>
<td>4.2 ± 0.14 a</td>
</tr>
<tr>
<td>Suan F1</td>
<td>89 ± 27 a</td>
<td>5.1 ± 0.5 b</td>
<td>2.3 ± 0.1  b</td>
<td>4.2 ± 0.21 a</td>
</tr>
</tbody>
</table>

Mean separation within columns by the Student–Newman–Keuls multiple range test at P ≤ 0.05.
‘Guadajira’ has higher yields than ‘Gevora’, but ‘Gevora’ has better color and °Brix than does ‘Guadajira’.

Availability

Requests for trial seeds and inquiries about stock seed should be sent to A.R.

Literature Cited


