Inheritance of Resistance to Fusarium Wilt in Local Germplasm of *Cucumis melo* subsp. *melon* conv. *adzhur*

**Longo, O., A. Ambrico, D. Schiavone and F. Ciccarese**

*Department of Biology and Plant Pathology - University of Bari, Italy, Via G. Amendola 165/A, 70126 Bari, Italy, E-mail: fciccare@agr.uniba.it*

**Introduction.** In Southern Italy and especially in Apulia, ‘Carosello’ [*Cucumis melo* L. subsp. *melon* conv. *adzhur* (Pang.) Grebensc] is extensively grown. This cucurbit is a relic of melon cultivars, and immature fruits are eaten raw or in salads as an alternative to cucumber (3). In numerous ‘Carosello’ plantings, especially in the greenhouse, a serious disease caused by *Fusarium oxysporum* f. sp. *melonis* was observed. Further studies on the physiological specialization of isolates derived from diseased plants showed that pathogen populations do not exhibit pathogenic variability and belong to race 0 of *F. oxysporum* f. sp. *melonis* (2).

‘Carosello’ has been cultivated for a long time in Apulia, and many local ecotypes have been selected by individual growers. Previous investigations on the reaction of local ‘Carosello’ germplasm collected directly from growers to race 0 of *F. oxysporum* f. sp. *melonis* supplied interesting and promising results. In particular, one ‘Carosello’ ecotype (BA1-7) showed resistance to Fusarium wilt (1). In this paper the inheritance of Fusarium wilt resistance in the BA1-7 ecotype of ‘Carosello’ is reported.

**Materials and Methods.** A single resistant plant of the original ‘Carosello’ ecotype (BA1-7) was self-fertilized and progeny were submitted to a new artificial inoculation cycle. In order to characterize the resistance in the BA1-7 ecotype, a plan of crosses and self-fertilizations were set-up. The cv. Bianco leccese of ‘Carosello’ was used as the susceptible parent. The progenies of *F*₁, *F*₂ and backcrosses to the resistant parent (BC-R) and with susceptible parent (BC-S) were submitted to artificial inoculation with the *F*₇ isolate belonging to race 0 of *F. oxysporum* f. sp. *melonis*. The artificial inoculations were made by dipping roots of seedlings in the pathogen fungal suspension (4 x 10⁶ Colony Forming Units) for 2-3 minutes.

Disease severity was assessed according to an empirical scale from 0 to 4 in which 0 = healthy plants and 4 = dead plants or plants with severe symptoms. About 100 plants were screened for each parental line and about 180 plants of *F*₁, *F*₂, BC-R and BC-S generations were screened. Gene segregation was evaluated by the chi-square test ($\chi^2$).

**Results and Discussion.** The high resistance to race 0 of *F. oxysporum* f. sp. *melonis* observed in the original BA1-7 ecotype of ‘Carosello’ was confirmed in the selfed progeny in this test (Figure 1). The segregation ratios strongly fit a single, dominant gene model conferring resistance in BA1-7 (Table 1). In preliminary observations (4), the BA1-7 ecotype of ‘Carosello’ showed valuable agronomic characteristics and therefore could be used where Fusarium wilt is a major problem. Further tests with other races of *F. oxysporum* f. sp. *melonis* and allelism tests with other resistance sources are needed to determine if this resistance gene is the same as previously reported (5) or a new gene.

**Literature Cited**


*Fusarium oxysporum* f. sp. *melonis* in germoplasma locale di *Cucumis melo*. Thesis of PhD in “Plant Pathology”, Department of Biology and Plant Pathology - University of Bari, Italy, pp. 73.
Table 1 - Observed segregation for Fusarium wilt resistance of the BA1-7 ecotype of ‘Carosello’ (*Cucumis melo* L. subsp. *melo* conv. *adzhur*) and Chi-square (χ²) goodness of fit test.

<table>
<thead>
<tr>
<th>Pedigree</th>
<th>Number of plants R:Sᵃ</th>
<th>Expectedᵇ ratio</th>
<th>χ²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA1-7</td>
<td>98 R: 0 S</td>
<td>98:0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bianco leccese</td>
<td>0 R: 96 S</td>
<td>0:96</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>F₁</td>
<td>185 R: 0</td>
<td>185:0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>F₂</td>
<td>125 R: 44</td>
<td>127:42</td>
<td>0.031</td>
<td>&gt; 0.90</td>
</tr>
<tr>
<td>BC-R</td>
<td>169 R: 0</td>
<td>169:0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>BC-S</td>
<td>98 R: 96</td>
<td>97:97</td>
<td>0.021</td>
<td>&gt; 0.90</td>
</tr>
</tbody>
</table>

ᵃR = resistant and S = susceptible
ᵇsingle, dominant gene model for inheritance of resistance

Figure 1 - Reactions to *Fusarium oxysporum* f. sp. *melonis* race 0 of cv Bianco leccese, and the original and selfed BA1-7 ecotype of ‘Carosello’. Disease rating scale: 0 = healthy, no symptoms to 4 = plant death, very severe symptoms.