

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

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**Introduction.** In Southern Italy and especially in Apulia, 'Carosello' [*Cucumis melo* L. subsp. *melo* conv. *adzhur* (Pang.) Grebensch] 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

**Literature Cited**

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2. Ciccarese F., Longo O. e Ambrico A.; 2000. Attacchi di tracheofusariosi su Carosello in Puglia e indagini sulla composizione razziale di

parent. The progenies of F<sub>1</sub>, F<sub>2</sub> and backcrosses to the resistant parent (BC-R) and with susceptible parent (BC-S) were submitted to artificial inoculation with the F<sub>7</sub> 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 10<sup>6</sup> 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<sub>1</sub>, F<sub>2</sub>, 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.

*Fusarium oxysporum* f. sp. *melonis*. *Inf. fitopat.* 7-8, 59-61.

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4. Longo O., 2001. Individuazione e caratterizzazione di fonti di resistenza verso

*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.

5. Risser G., Banihashemi Z., Davis D. W., 1976. A proposed nomenclature of *Fusarium oxysporum* f. sp. *melonis* races and resistance genes in *Cucumis melo*. *Phytopathology*, 66, 1105-1106.

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 ( $\chi^2$ ) goodness of fit test.

Pedigree	Number of plants R:S <sup>a</sup>		Expected <sup>b</sup> ratio	$\chi^2$	P
	R <sup>a</sup>	S			
BA1-7	98	0	98:0	-	-
Bianco leccese	0	96	0:96	-	-
F <sub>1</sub>	185	0	185:0	-	-
F <sub>2</sub>	125	44	127:42	0.031	> 0.90
BC-R	169	0	169:0	-	-
BC-S	98	96	97:97	0.021	> 0.90

<sup>a</sup>R =resistant and S = susceptible

<sup>b</sup>single, dominant gene model for inheritance of resistance

□ Bianco leccese    ■ Original BA1-7 ecotype    ■ Self-fertilization BA 1-7 ecotype

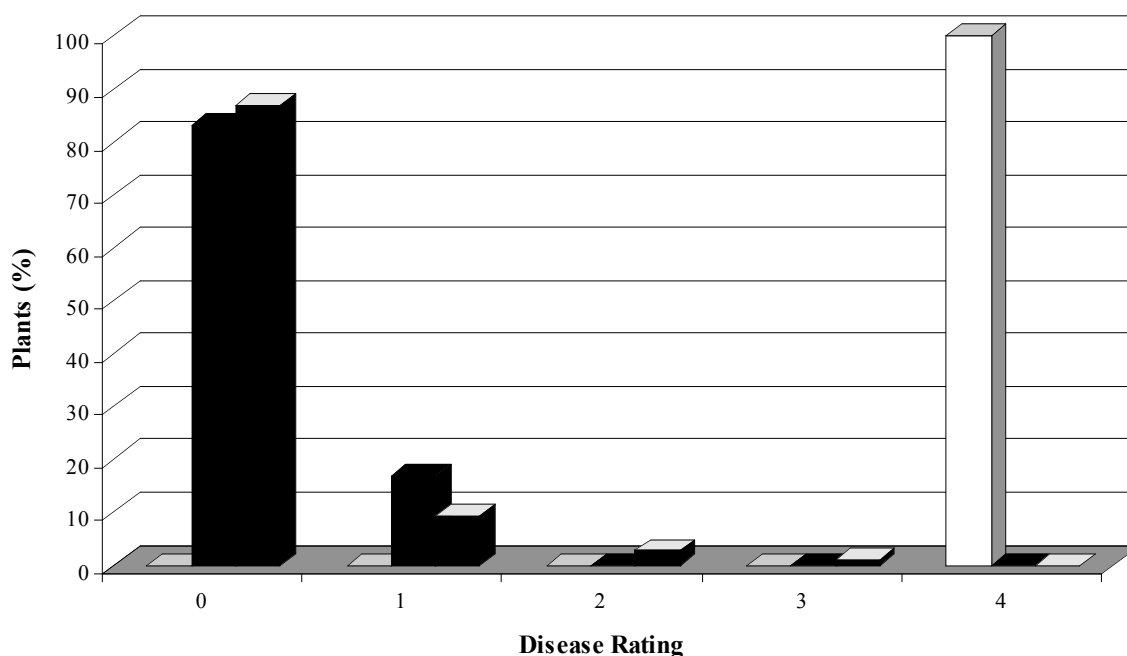


Figure 1 - Reactions to *Fusarium oxysporum* f. sp. *melonis* race 0 of cv Bianco leccese, and the original and selfed BA1-7 ecotype of ‘Carosello’. Disease rating scale: 0 = healthy, no symptoms to 4 = plant death, very severe symptoms.