U.C. PMR 45 and U.C. Top Mark Fusarium Wilt-resistant (Fom-3) Muskmelon Breeding Lines

F.W. Zink\textsuperscript{1} and W.D. Gubler\textsuperscript{2}
University of California, Davis, CA 95616

Additional index words. Cucumis melo, disease resistance, fusarium wilt, verticillium wilt, powdery mildew, crown blight, sulfur resistance, vegetable breeding

U.C. PMR 45 and U.C. Top Mark fusarium wilt-resistant (Fom-3) are andromoeccious, salmon orange fleshed, western shipping-type muskmelons (Cucumis melo L.) breeding lines. They have value as germplasm sources for selection as well as for the development of commercial hybrids.

Origin

‘Gusto 45’ or ‘Top Mark’ were crossed to a fusarium wilt-resistant selection made in the Texas cultivar Perliita (donor parent) in order to introduce via backcrossing the dominant gene \textit{Fom-3} (4) that confers resistance to \textit{Fusarium oxysporum f. sp. melonis} and \textit{Hans}. races 0 (1, 2) and 2 (4) into western shipping-types adapted to California’s melon production areas. The recurrent parent ‘Gusto 45’ carries resistance to powdery mildew, \textit{Sphaerotheca fuliginea} (Schlecht.) Poll] races 1 and 2, verticillium wilt, \textit{Verticillium dahliae} Kleb.), and crown blight. The recurrent parent ‘Top Mark’ carries resistance to verticillium wilt, crown blight, and sulfur. The fusarium wilt-resistant segregates from each cross were identified by a seedling test (3) and backcrossed to their respective recurrent parent. Selection for powdery mildew resistance (race 1) was initiated in the BC\textsubscript{2} generation (‘Gusto 45’ pedigree only).

Seeds from the 6th backcross to the recurrent parent (1:1 ratio of resistance to susceptibility for fusarium wilt) were planted into a fruit-to-row isolation plot at the San Joaquin Valley West Side Field Station. Selections were made in the ‘Gusto 45’ and ‘Top Mark’ populations (open-pollinated fruit) for horticultural characteristics, verticillium wilt, and crown blight. Progeny from the backcross to ‘Top Mark’ also were selected for sulfur resistance. Fusarium wilt-resistant segregates from the open-pollinated BC\textsubscript{6} generation (BC\textsubscript{6}F\textsubscript{2}) were identified by a seedling test and transplanted into a fruit-to-row isolation plot on the University Farm at Davis. Open-pollinated fruit selections were made for fruit quality, plant vigor, and freedom from verticillium wilt and crown blight symptoms. An additional generation (BC\textsubscript{6}F\textsubscript{3}) was grown on the University Farm following the same procedures for selection as was used in the BC\textsubscript{6}F\textsubscript{2}.

A seed sample from each selected fruit (BC\textsubscript{6}F\textsubscript{3}) was assayed for fusarium wilt resistance (seedling test). Resistant progenies, in the range of 55% to 100%, were recovered from all seed lots. The fusarium wilt-resistant U.C. PMR 45 (Fom-3) and U.C. Top Mark (Fom-3) breeding lines are mass increased from the 6th backcross to ‘Gusto 45’ or ‘Top Mark’ (Fig. 1).

Description U.C. PMR 45 (Fom-3)

The vines are vigorous with large leaves, giving good cover to the fruit. Plant diameter is about 3 m, with each plant producing 4 to 7 fruit. The fruit are oval, 11.5 to 14.5 cm in diameter and weight 1.2 to 1.6 kg. The fruit skin has a tight overall netting, with relatively indistinct vein tracts, and is beige at maturity. The flesh is thick, salmon orange, and firm with good flavor. Soluble solids range between 10% and 14% in the San Joaquin Valley. The seed cavity is small and relatively dry. The stem develops an abscission layer that allows the fruit to separate from the stem at market maturity. Fruit harvest is about the same as ‘Top Mark’.

The breeding line is resistant to verticillium wilt, crown blight, and sulfur. The breeder seed is heterogeneous for the fusarium wilt-resistant gene Fom-3; it consists of homozygous and heterozygous resistance plants, and susceptible plants.

Availability

A limited quantity of seed is available for distribution to seed producers and breeders upon written request.

Literature Cited