

Powdery Mildew Race 1 in Imperial Valley, California

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Melon production in Imperial Valley, California was hit by powdery mildew in 1925 (3). ‘PMR 50’, which was developed from a cross of California Accession #525 x ‘Hale’s Best’ was released in 1932. ‘PMR 45’ was released in 1936 after four more generations of selection for horticultural type (4). Resistance to powdery mildew in these cultivars was practically complete; inconspicuous spots of mildew were rarely found on them until mid-season 1938 when a few fields of ‘PMR 45’ developed powdery mildew, which spread until nearly all fields of it were infected (5). Resistance to this new race (race 2) began with a cross of PI 79376 x ‘Hale’s Best’ and was combined with race 1 resistance from ‘PMR 45’ to yield three race 2-resistant selections: ‘PMR 5’, ‘PMR 6’ and ‘PMR 7’ in 1942 and 1943, respectively (8). Race 2 has been generally considered to be present in Imperial Valley since that time.

Two species of fungi are known to incite powdery mildew on melon (7). The early reports of powdery mildew in Imperial Valley referred to the pathogen as *Erysiphe cichoracearum* DC ex Merat. Later, *Sphaerotheca fuliginea* (Schlecht. ex Fr.) Poll., was found to be widespread (see Pitrat et al., 1998 for a listing of reports).

Nine races of powdery mildew incited by *S. fuliginea* have been documented (2, 7) in melon. The objective of this research was to determine at one site the present race of powdery mildew in Imperial Valley, an important late spring-early summer melon production area of the U.S.A.

Materials and Methods

Ten powdery mildew race differentials (7) were direct-seeded on 20 March 2002 and watered via subsurface drip irrigation on 21 March at the University of California Desert Research and Education Center (DREC). Seeds were planted in hills spaced ca. 75 cm apart within rows (beds) on 2

m centers. There were two hills per plot, and entries were randomized in two replications. ‘Top Mark’, susceptible to all races except race 0, was planted in two adjacent border beds along one side and at each end of the test plot.

Powdery mildew infection was evaluated on 18 June (rep 1) and 19 June (rep 2). Infection of true leaves as evidenced by mycelial growth and sporulation was rated with the unaided eye on a 1 to 9 scale. Infection of cotyledons and true leaves as evidenced by mycelial growth and sporulation was rated on a 1 to 9 scale as follows: 1, no evidence of disease; 2, trace of hyphae; 3, hyphae restricted; 4, few colonies present, sporulation; 5, scattered colonies, sporulation; 6, numerous colonies, sporulation; 7, ≈50% of adaxial surface covered with hyphae and spores, few colonies on abaxial surface, abundant sporulation; 8, >50% of adaxial surface covered with hyphae and spores, scattered colonies on abaxial surface, abundant sporulation; and 9, >75% of adaxial surface covered with hyphae and spores, numerous or coalesced colonies on abaxial surface. Means were assigned to one of two categories: Resistant (R) ≤ 3.0; and Susceptible (S) > 3.0.

Results and Discussion

Powdery mildew species identification of a sample from Iran H was confirmed to be *Podosphaera xanthii* from examination of conidia for the presence of fibrosin bodies and production of forked germ tubes (1, 6).

Mildew was more severe on Iran H than on ‘Vedrantáis’ and ‘Top Mark’ (Table 1); no mildew was evident on the other differentials. The results clearly indicated presence of race 1 at this site in Imperial Valley: Iran H, ‘Vedrantáis’ and ‘Top Mark’ were susceptible, and ‘PMR 45’ and the other six powdery mildew race differentials were resistant (7).

DREC is not in an isolated area of Imperial Valley. Numerous commercial melon fields occurred within a kilometer of the test; one field was within 50 m. Although powdery mildew race 1 was present in the Imperial Valley in this study, race 2 or other powdery mildew races may also occur in this production area. Additional sampling sites and dates will be needed to make this determination.

Literature Cited

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Table 1. Reactions of 10 melon powdery mildew race differentials to natural infection in a field test at Holtville, California.

Differentials	Disease Rating	Disease Reaction
Iran H	9.0	S
Top Mark	5.0	S
Vedrantáis	4.5	S
PMR 45	1.0	R
PMR 5	1.0	R
WMR 29	1.0	R ^z
PI 414723	1.0	R
MR-1	1.0	R
PI 124111	1.0	R
PI 124112	1.0	R

^zone replication