

Evaluation of powdery mildew resistant muskmelon cultivars producing personal-sized fruit, 2009.

The objective of this study was to evaluate muskmelon cultivars that were released recently with resistance to powdery mildew. Only cultivars bred to produce small fruit were examined since these are in demand by organic growers because standard-sized fruit add too much weight to CSA boxes and can damage other produce when they roll. They were compared to Passport, a cultivar lacking genetic resistance. Fruit type for most of the cultivars tested is a cantaloupe; Arava is a galia and Sivan is a charentais. A field experiment was conducted at the Long Island Horticultural Research and Extension Center in Riverhead on Haven loam soil. The field was plowed on 30 Apr to 1 May and conventionally tilled on 14 May and 1 Jun. A blend of 19-10-12 controlled release fertilizer (containing 65% of N as ESN, a controlled release formulation) plus Muriate Potash (0-0-60) at 100 lb/A was spread on 10 Jun and then incorporated by disking. Black plastic mulch and drip tape were laid on 16 Jun. Ridges in the soil between the plastic strips were removed by roto-tilling. Seeds were sown on 4 Jun in the greenhouse. Seedlings were transplanted into the plastic-covered beds on 23 Jun. Water was provided as needed through drip irrigation lines located beneath the mulch. Weeds were controlled between the plastic mulch strips by applying Strategy (3 pt/A) plus Sandea (0.5 oz/A) on 17 Jun and during the season by hand weeding. Cucumber beetles were managed with Admire 2F (0.0007 fl oz/plant) applied after transplanting as a soil drench around transplants on 30 Jun and with Asana XL (9.6 oz/A) applied to foliage on 24 Jun and 1 Jul. No fungicides were applied specifically for powdery mildew control. Ridomil Gold EC 1 pt/A + SprayHandler 8 fl oz/A were applied to soil on 8 Jun and incorporated by disking for Phytophthora blight (*Phytophthora capsici*). The following foliar fungicides were applied preventively for downy mildew (*Pseudoperonospora cubensis*) and Phytophthora blight: ProPhyt (4 pts/A) on 24 Jun; Forum 4.16SC (6 oz/A) on 27 Jul, 8 Aug, 27 Aug, 13 Sep, and 24 Sep; and Ranman 400 SC (2.75 fl oz/A) on 17 Jul, 1 Aug, 16 Aug, 4 Sep, 18 Sep, and 1 Oct; and Forum 4.16SC (6 oz/A) on 27 Jul, 8 Aug, 27 Aug, 13 Sep, and 24 Sep. Plots were three adjacent rows each with three plants spaced 24-in. apart. Rows were spaced 68 in. apart. Within each of the three rows between each plot a plant of Gentry summer squash, a susceptible variety, was planted to separate plots and provide a source of inoculum. A randomized complete block design with four replications was used. Upper and lower leaf surfaces of 10 to 20 leaves per plot were assessed for powdery mildew on 15, 22, and 31 Jul; 4 Aug, and 25 Aug. Initially the examined leaves were selected from the oldest third of the foliage based on leaf appearance and position in the canopy. As disease progressed mid-aged to young leaves also were examined. Powdery mildew colonies (spots) were counted; severity was assessed by visual estimation of percentage leaf area affected when colonies could not be counted accurately because they had coalesced and/or were too numerous. Colony counts were converted to severity values using the conversion factor of 30 colonies/leaf = 1%. Average severity for the entire canopy was calculated from the individual leaf assessments. Melon fruit were harvested, weighed, and measured when they reached maturity. Harvesting was done on 18, 21, 24, 28, and 31 Aug, 4 Sep, and 8 Sep. Fruit characteristics were also evaluated and rated on a scale of 1 to 9 with 1 = poor and 9 = best. Average monthly high and low temperatures (°F) were 73/58 in Jun, 80/64 in Jul, and 83/68 in Aug. Rainfall (in.) was 6.43, 4.82, and 2.01 for these months, respectively.

Powdery mildew was first observed on 31 Jul. Severity remained very low through the last assessment on 25 Aug. All resistant cultivars were significantly less severely affected by powdery mildew on upper leaf surfaces on 25 Aug than Passport, the susceptible cultivar, and all except Sivan were less affected on lower leaf surfaces. Average fruit weight ranged from 1.9 lb for Lil' Loupe to 3.2 lb for Arava. Sugar Cube and Lil' Loupe produced the greatest number of marketable fruit. Sugar Cube received the highest taste rating (7.3) and had the highest Brix level (13.3% sucrose); Passport and Arava had the lowest values (both 4.3 and 9.5, respectively).

| Cultivar | Powdery mildew leaf severity on 8/25 (%) [*] | | Marketable fruit | | | Unmarketable fruit | |
|---|---|---------------|------------------|-----------------------|-----------------------|--------------------|-----------------------|
| | Upper surface | Lower surface | Number/ plant | Weight/ plant (lb) | Weight/ fruit (lb) | Number/ plant | Weight/ plant (lb) |
| Passport (Susceptible) HSR 4290 | 1.6560 a ^{**} | 2.4877 a | 1.53 d | 4.62 c | 3.03 | 0.39 b | 1.22 bc |
| | 0.0031 b | 0.0005 b | 2.92 bc | 8.24 a | 2.82 | 0.75 ab | 1.64 bc |
| Sugar Cube | 0.0001 b | 0.0043 b | 4.78 a | 9.58 a | 2.01 | 0.28 b | 0.44 c |
| Head Start | 0.0281 b | 0.0158 b | 3.47 b | 9.71 a | 2.80 | 0.75 ab | 2.05 ab |
| Pixie | 0.0355 b | 0.0630 b | 1.94 d | 5.06 bc | 2.60 | 1.19 a | 3.19 a |
| Lil' Loupe | 0.0680 b | 0.0533 b | 4.81 a | 9.31 a | 1.94 | 0.22 b | 0.33 c |
| Arava | 0.0167 b | 0 b | 2.33 cd | 7.34 ab | 3.15 | 0.72 ab | 1.73 bc |
| Sivan | 0.0335 b | 0.3044 ab | 3.06 bc | 8.56 a | 2.80 | 0.64 ab | 1.56 bc |
| <i>P</i> -value | 0.0094 | 0.0052 | 0.0001 | 0.0027 | | 0.0335 | 0.0115 |

^{*} Exact colony counts were made when possible and severity was estimated using the conversion factor of 30 colonies/leaf = 1%. Data were transformed from percentages by a square root transformation when needed to obtain normality of variance before analysis of variance was performed. The table has de-transformed means.

^{**} Numbers in each column followed by the same letter are not significantly different from each other according to Tukey's HSD (*P*=0.05).