

Powdery mildew resistant yellow summer squash cultivar evaluation, 2007.

The objective of this study was to evaluate four cultivars and one experimental cultivar of straightneck, yellow, summer squash with resistance to powdery mildew by comparing them to a susceptible cultivar that is an industry standard (Multipik). A field experiment was conducted at the Long Island Horticultural Research and Extension Center in Riverhead on Haven loam soil. Seeds were sown on 4 Jun in the greenhouse. Seedlings were transplanted into beds covered with black plastic mulch on 15 Jun. Fertilizer (N-P-K 10-10-10) at 400 lb/A was broadcast and incorporated on 16 May. Additional fertilizer (N-P-K 46-0-0) at 30 lb/A was injected through the drip irrigation system on 9 and 30 Jul. Water was provided as needed through drip irrigation lines placed beneath the mulch. During the season weeds were controlled with Strategy (2 pt/A) applied on 1 Jun and RoundUp WeatherMax (1% solution) applied on 12 and 27 Jun between the rows of black plastic mulch with a shielded sprayer, and by hand weeding. Cucumber beetles were managed with Admire 2F applied after transplanting as a soil drench around transplants (0.0007 fl oz/plant) on 21 Jun and with Asana XL (9.6 oz/A) applied to foliage on 16 Jul. No fungicides were applied specifically for powdery mildew. Kocide DF (2 lb/A) was applied preventively for bacterial leaf spot on 29 Jun. The following fungicides were applied preventively for downy mildew (*Pseudoperonospora cubensis*) and Phytophthora blight (*Phytophthora capsici*): Forum 4.16SC (6 oz/A) on 16 Jul, Ranman 400 SC (2.75 fl oz/A) on 12 Aug, Acrobat 50 WP (6.4 oz/A) on 19 Aug, and Previcur Flex 6 F (1.2 pt/A) on 29 Aug. Neither disease was detected before the end of this experiment. Plots were two adjacent rows each with six plants spaced 24-in. apart. Rows were spaced 68-in. apart. One zucchini plant of a susceptible cultivar (Zucchini Elite) was planted between each plot. A randomized complete block design with four replications was used. Upper and lower surfaces of 50 old leaves per plot were assessed for powdery mildew on 20 Jul; 8 days after fruit were harvested for the first time. Ten old, 10 mid-aged, and 10 young leaves were examined on 9 Aug in each plot based on leaf physiological appearance and position in the canopy. 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. Squash fruit were harvested and weighed a total of eight times on 12, 17, 20, 23, 26 and 31 Jul; and on 2 and 7 Aug. Fruit were separated into marketable and unmarketable grades based on length, then weighed. There were no unmarketable fruit with blemishes due to disease or insect feeding. Fruit characteristics were evaluated and overall appearance was rated on a scale of 1 to 9; 1 = poor, 5 = marginal, 7 = acceptable, and 9 = good. Average monthly high and low temperatures (°F) were 79/61 in Jun, 82/66 in Jul, and 82/65 in Aug. Rainfall (in.) was 3.37, 3.63, and 2.60 for these months, respectively.

Powdery mildew increased on the susceptible cultivar Multipik from a very low level on 20 Jul (less than 1% severity on old leaves) to about 30% on both leaf surfaces on 9 Aug. All cultivars tested showed less powdery mildew on upper and lower leaf surfaces relative to Multipik based on severity on 9 Aug. Degree of suppression generally was less than that achieved in 2006 when a similar experiment was conducted with these cultivars. No symptoms were found on HMX 5712 or Sunray on 9 Aug 2006 when Patriot II was exhibiting 71% and 63% less disease on upper and lower leaf surfaces compared to Multipik and Success PM had 76% and 75% less disease, respectively. Other powdery mildew-resistant squash types and pumpkins evaluated in additional experiments at LIHREC in 2007 also exhibited reduced suppression. The pathogen may have evolved to overcome the main resistance gene in these cultivars. Success PM was less severely affected by powdery mildew than the other cultivars likely because it is homozygous resistant and has at least one modifier gene. Sunray produced the greatest number and weight of marketable fruit, but did not differ significantly in yielding ability from Multipik. General Patton yielded best in 2006. Success PM had the lowest yield, as in 2006. This was partly due to delayed fruit production: this is the only cultivar with no fruit on the first harvest date and it had the fewest fruit at the second harvest in 2007. All cultivars produced fruit with acceptable characteristics, which were rated at least 7 out of 9.

Cultivar	Powdery mildew severity (%)*		Marketable fruit (12 Jul – 7 Aug)		
	Upper leaf surface	Lower leaf surface	Number/ plant	Yield (lb) / plant	Fruit weight (lb)
Success PM	3.9 c **	2.0 b	5.0 d	2.3 b	0.5
HMX 5712	14.7 b	4.8 b	7.0 c	2.7 b	0.4
Sunray	20.1 b	11.0 b	11.3 a	5.1 a	0.4
Patriot II	22.6 b	9.6 b	7.0 c	3.0 b	0.4
General Patton	22.0 b	11.6 b	9.6 b	4.4 a	0.5
Multipik (std)	34.0 a	28.7 a	10.6 ab	4.7 a	0.4
<i>P</i> -value	0.0001	0.001	< .0001	< .0001	0.6855

* Exact colony counts were made when possible and severity was estimated using the conversion factor of 30 colonies/leaf = 1%.
** Numbers in each column with a letter in common are not significantly different according to Fisher's Protected LSD (*P* = 0.05).