

Powdery mildew resistant pumpkin cultivar evaluation, 2007.

There are many pumpkin cultivars now commercially available that are advertised as having resistance to powdery mildew. Previous experiments have demonstrated that the level of resistance among these cultivars can be highly variable. In this study, nine Halloween-type pumpkin cultivars plus two specialty-type decorative squashes, One Too Many and Sweet Lightning, were evaluated for their ability to resist powdery mildew relative to two standard pumpkin cultivars without known genes for resistance, Fantasia and Sorcerer. A field experiment was conducted at the Long Island Horticultural Research and Extension Center in Riverhead on Haven loam soil. Seeds were sown on 1 Jun in the greenhouse. Seedlings were transplanted into black plastic mulch on 14 Jun. Water was provided as needed through drip irrigation lines placed beneath the mulch. 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. During the season, weeds were controlled between the rows of black plastic mulch by hand weeding, mowing, and applying Strategy (2.5 pt/A) on 1 Jun, Poast (1.5 pt/A) on 20 Jun, and RoundUp Weathermax (1.5 pt/A) on 27 Jun. Cucumber beetles were managed with Admire 2F applied after transplanting as a soil drench around transplants (0.0007 fl oz/plant) on 19 Jun and with Asana XL (9.6 oz/A) applied to foliage on 16 Jul. No fungicides were applied to control powdery mildew. 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, Curzate 60 DF (3.2 oz/A) on 22 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 four plants spaced 2 ft apart. Rows were spaced 8.5 ft apart. A plant of Multipik summer squash, a susceptible cultivar, was planted between each plot in each row to separate plots and provide a source of inoculum. A randomized complete block design with four replications was used. Upper and lower surfaces of 50 old leaves were assessed for powdery mildew on 27 Jul. Powdery mildew colonies (spots) were counted; severity was estimated when colonies had coalesced or were too numerous to count. Colony counts were converted to severity values using the conversion factor of 30 colonies/leaf = 1%. Powdery mildew control was calculated relative to the average severity value for Sorcerer. Pumpkin fruit were harvested and weighed in Sep. Unmarketable fruit were counted. Average monthly high and low temperatures (°F) were 79/61 in Jun, 82/66 in Jul, 82/65 in Aug, and 77/60 in Sep. Rainfall (in.) was 3.37, 3.63, 2.60, and 1.51 for these months, respectively.

Except 20 Karat Gold, all cultivars evaluated for powdery mildew resistance exhibited control of powdery mildew on upper leaf surfaces relative to the susceptible cultivar Fantasia on 27 Jul, which was early in powdery mildew development. All cultivars, except 20 Karat Gold and King Midas, exhibited control on lower surfaces. These two also did not exhibit control when compared to Sorcerer and Howden in 2006. However, powdery mildew was significantly more severe on the upper surface of old leaves of Fantasia (16.8%) than of Sorcerer (6.2%), and numerically more severe on lower surfaces (23% versus 9%). None of the evaluated cultivars were significantly less severely infected on both leaf surfaces than Sorcerer. Interestingly, Wee-B-Little had the lowest severity of powdery mildew on both leaf surfaces although this cultivar was not bred for resistance. It also has exhibited resistance in previous experiments conducted in NY and elsewhere. At the first assessment on 20 Jul, severity was numerically greatest on King Midas, Fantasia, 20 Karat Gold, and Sorcerer (2 – 6.5% on lower surface of old leaves) and least on Wee-B-Little, Sweet Lightning, Magician, and Rockafellow (<0.02%), but these differences were not statistically significant based on the two replications assessed. The cultivars evaluated exhibited a range in fruit size and quality.

Cultivar	Powdery mildew severity (%) *		Marketable Fruit	
	Upper Leaf Surface	Lower Leaf Surface	Number/plant	Weight (lb)/plant
	27-Jul	27-Jul		
Wee-B-Little	0.01 c**	0.03 b	3.9 ab	2.2 e
Rockafellow	0.19 bc	0.11 b	3.3 b	5.3 cd
Magician	0.37 bc	0.31 b	1.4 cd	13.6 a
Spartan	0.35 bc	0.70 b	0.9 de	8.2 bc
Iron Man	0.96 bc	0.71 b	2.1 c	7.2 bc
Prankster	3.42 bc	4.18 b	1.4 cd	3.8 de
Super Herc	6.28 bc	5.94 b	0.7 de	8.9 b
King Midas	5.54 bc	10.80 ab	1.0 d	12.1 a
20 Karat Gold	9.28 ab	22.36 a	0.8 de	8.0 bc
Sweet Lightning	0.28 bc	0.17 b	4.3 a	4.4 de
One Too Many	0.43 bc	0.18 b	0.2 e	2.1 e
Fantasia (Std)	16.82 a	22.87 a	0.8 de	8.3 b
Sorcerer (Std)	6.25 bc	9.17 ab	0.8 de	7.8 bc
<i>P</i> -value	0.0208	0.0261	<0.0001	<0.0001

* Exact colony counts were made when possible and severity was estimated using the conversion factor of 30 colonies/leaf = 1%. Severity data is for old and mid-aged leaves on 2 Aug and on mid-aged and young leaves on 25 Aug.

** Numbers in each column with a letter in common are not significantly different according to Fisher's Protected LSD (*P* = 0.05).