Powdery Mildew Resistant Pumpkin Cultivar Evaluation, New York 2007

Margaret T. McGrath, Cornell University, Riverhead, NY 11901
George M. Fox, Cornell University, Riverhead, NY 11901
Sandra Menasha, Cornell Cooperative Extension-Suffolk County, NY

There are many pumpkin cultivars now on the commercial market 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. Sweet Lightning is edible as well as ornamental.

Materials and Methods

A field experiment was conducted at the Long Island Horticultural Research and Extension Center in Riverhead on Haven loam soil. Seeds were sown on June 1 in the greenhouse. Seedlings were transplanted into black plastic mulch on June 14. Fertilizer (N-P-K 10-10-10) at 400 lbs./A was broadcast and incorporated on May 16. Additional fertilizer (N-P-K 46-0-0) at 30 lbs./A was injected through the drip irrigation system on July 9 and 30. 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 June 1 between the rows of black plastic mulch, hand weeding, and mowing. Cucumber beetles were managed with Admire 2F applied after transplanting as a soil drench around transplants (0.02 ml/plant) on June 21 and with Asana XL 9.6 oz./A applied to foliage on July 16. No fungicides were applied specifically for 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 July 16, Ranman 400 SC (2.75 fl. oz./A) on August 12, Acrobat 50 WP (6.4 oz./A) on August 19, and Previcur Flex 6 F (1.2 pt/A) on August 29. Neither disease developed before the end of this experiment.

Plots were two adjacent rows each with four plants spaced 2 feet apart. Rows were spaced 8.5 feet apart. A plant of Multipik summer squash, a susceptible variety, 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 July 27. Powdery mildew colonies (spots) were counted; severity was assessed 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%. Powdery mildew control was calculated relative to the average severity value for Sorcerer.

Pumpkin fruit were harvested and weighed in September. Unmarketable fruit were counted.

Results and Discussion

All cultivars evaluated for powdery mildew resistance exhibited control of powdery mildew on upper leaf surfaces relative to the susceptible variety Fantasia on July 27, which was early in powdery mildew development, except 20 Karat Gold. 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 was the only cultivar that was less severely affected on upper surfaces. This cultivar was not bred to have resistance, but it has exhibited resistance in previous experiments conducted in New York and elsewhere. The cultivars evaluated exhibited a range in fruit size and quality.

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Table 1. *Control of powdery mildew and yield for Halloween-type pumpkin and specialty squash cultivars compared on Long Island, New York, 2007. The last two entries are the standard pumpkin cultivars without resistance included for comparison. The two entries above these are specialty squashes.*

Pumpkin Cultivar	Seed Source	Powdery Mildew Control (%)[y]		Marketable Fruit	
		Upper Leaf Surface	Lower Leaf Surface	#/plant	Weight (lbs.)/ plant
Wee-B-Little	SI	99.9 c[z]	99.8 b	3.9 ab	2.2 e
Rockafellow	SI	98.4 bc	99.3 b	3.3 b	5.3 cd
Magician	HM	96.8 bc	98.1 b	1.4 cd	13.6 a
Spartan	SW	97.0 bc	95.6 b	0.9 de	8.2 bc
Iron Man	HM	91.6 bc	95.6 b	2.1 c	7.2 bc
Prankster	SI	70.4 bc	73.9 b	1.4 cd	3.8 de
Super Herc	HM	45.5 bc	62.9 b	0.7 de	8.9 b
King Midas	SI	52.0 bc	32.6 ab	1.0 d	12.1 a
20 Karat Gold	SI	19.5 ab	0 a	0.8 de	8.0 bc
Sweet Lightning	SI	97.6 bc	98.9 b	4.3 a	4.4 de
One Too Many	SI	96.2 bc	98.8 b	0.2 e	2.1 e
Fantasia (Std)	SI	-- a	-- a	0.8 de	8.3 b
Sorcerer (Std)	HM	-- bc	-- ab	0.8 de	7.8 bc
P-value		0.0208	0.0261	<0.0001	<0.0001

[y]Control based on severity of powdery mildew on old leaves on July 27 relative to the average value for Fantasia and Sorcerer, the two standard varieties without known genes for resistance to powdery mildew.
[z]Numbers in each column followed by the same letter are not significantly different from each other according to Fisher's protected LSD (*P*=0.05).