

Powdery mildew resistant acorn and delicata type winter squash cultivar evaluation, 2006.

The goal of this study was to evaluate four solid green acorn-type winter squash cultivars, two striped acorn-types, and a delicata-type squash with powdery mildew resistance for their ability to resist this disease as well as their yielding ability relative to Table Ace, a standard cultivar lacking powdery mildew resistance that is commonly grown. A field experiment was conducted at the Long Island Horticultural Research and Extension Center in Riverhead on Haven loam soil. All squash seed were planted on 18 May in the greenhouse and were transplanted into black plastic mulch on 13 Jun. During the season weeds were controlled with one application of Select 2 EC (8 fl oz) on 31 Jul, hand weeding, and mowing between the rows of black plastic mulch. Water was provided as needed through drip irrigation lines placed beneath the mulch. No fungicides were applied specifically for powdery mildew; however, copper fungicides applied for control of bacterial leaf spot (*Xanthomonas campestris* p.v. *cucurbitae*) would have also provided some suppression of powdery mildew on upper leaf surfaces. Champion WP (2 lb/A) was applied on 29 Jul; Cuprofix Disperss (2.5 lb/A) was applied on 12 Jul, and 5, 13, and 23 Aug; and Kocide 2000 (1.5 lb/A) was applied on 31 Aug. The following fungicides were applied preventively for downy mildew (*Pseudoperonospora cubensis*) and Phytophthora blight (*Phytophthora capsici*): Acrobat 50 WP (6.4 oz/A) on 12 Jul, Previcur Flex 6 F (1.2 pt/A) on 29 Jul, Ranman 200 SC (2.75 fl oz/A) on 23 Aug, and Tanos 50 W (8 oz/A) on 31 Aug. Neither disease developed before the end of this experiment. Plots were one 14-ft row each with a plant spacing of 24-in. One summer squash plant of a susceptible cultivar (Multipik) was planted as a border between each plot. A randomized complete block design with four replications was used. Upper and lower surfaces of leaves were assessed for powdery mildew beginning on 27 Jul when fruit were starting to enlarge. Ten old leaves were selected on 27 Jul and on 8 Aug in each plot based on leaf physiological appearance and position in the canopy. On 15 Aug, 10 mid-aged leaves were assessed. Powdery mildew colonies (spots) were counted; severity was assessed by visual estimation of percent 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. These canopy severity values were used to calculate area under disease progress curves (AUDPC) to obtain a measure of severity over the entire assessment period. Winter squash fruit were harvested, weighed, and measured on 11 Sep. Two representative fruit per plot were selected for measuring fruit width, fruit length, and cavity width and for assessing sugar content, which was done with a hand-held refractometer. A square root transformation was used when needed prior to analysis to achieve homogeneity of variance.

All squash cultivars tested with claims for resistance to powdery mildew exhibited at least 50% control relative to Table Ace based on AUDPC values. The most effective cultivar was Royal Ace PM followed closely by Autumn Delight and Table Star which provided excellent control of powdery mildew on the lower leaf surface. These three produce dark green to dark black/green acorn-type fruit. Bush Delicata, the only open-pollinated cultivar evaluated, provided good powdery mildew control statistically similar to that of Royal Ace PM, Autumn Delight, and Table Star. The two cultivars producing striped acorns (white fruit with green speckling), Harlequin and Celebration performed at a slightly lower level for powdery mildew control than the solid green conventional acorn-types. Fruit production was affected by poor weed control; therefore, yield data should not be considered an indication of yielding ability but rather should be considered relative yield values. The control cultivar Table Ace had the lowest marketable yield per plant, the least number of fruit per plant, and the lowest sugar content. This likely reflects impact of powdery mildew, which was severe on this susceptible cultivar from the first assessment on 27 Jul. Harlequin produced the statistically highest number of fruit per plant as well as the highest weight of fruit per plant. Harlequin, Celebration, Bush Delicata, and Table Star had the highest sugar content.

Cultivar	Powdery mildew severity (%)*						Yield		
	Upper leaf surface			Lower leaf surface			Marketable fruit/plant		Fruit length (in.)
	27-Jul	8-Aug	AUDPC	27-Jul	8-Aug	AUDPC	Total number	Yield (lb)	
Royal Ace PM.....	0.0 c**	1.3 c	8 c	0.0 c	3.2 c	19 d	1.1 bc	1.2 bcd	9.3 bc
Autumn Delight...	0.0 c	2.7 bc	16 c	0.0 c	4.8 c	29 cd	1.3 b	1.6 ab	10.0 b
Bush Delicata.....	0.0 c	5.0 bc	30 c	0.0 c	7.9 c	47 cd	1.2 bc	1.0 cd	12.9 a
Table Star.....	0.6 c	3.7 bc	26 c	0.7 c	4.1 c	29 cd	1.5 ab	1.4 abcd	7.5 c
Taybelle PM.....	1.0 c	6.2 bc	44 bc	1.4 c	9.6 bc	66 cd	1.2 bc	1.6 abc	8.8 bc
Harlequin.....	0.5 c	9.1 b	57 bc	0.3 c	17.5 b	107 bc	1.9 a	1.8 a	8.3 bc
Celebration.....	5.0 b	8.9 b	83 b	10.4 b	17.3 b	166 b	1.6 ab	1.5 abc	8.0 bc
Table Ace (std)....	17.8 a	19.6 a	225 a	28.6 a	28.4 a	342 a	0.8 c	0.9 d	8.2 bc
<i>P</i> -value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0059	0.0412	0.0035

* 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 leaves on 27 Jul and on mid-aged leaves on 8 Aug.

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