

Evaluation of Winter Squash Cultivars with Resistance to Powdery Mildew

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Introduction

The introduction of powdery mildew-resistant squash cultivars has offered the grower a more efficient approach to producing a high-quality crop for market and managing this disease. It is an annual problem in Iowa; indeed, in some years it has the potential to ruin the cucurbit crops if not controlled. This trial was established to provide an unbiased performance evaluation of cultivars with reported resistance/tolerance to powdery mildew and to generate information useful to growers for selecting the right cultivar for their marketing objectives.

Materials and Methods

Planting. One seed/cell and 72 cells/tray was the planting scheme for the greenhouse on June 7, 2005. Transplanting to the field was done on June 29.

Plot Design. A randomized complete block design with three replications was the plot design. A plot was a single row of eight plants, 32 in. apart, Rows were 8 ft apart.

Irrigation. Water was applied as needed with overhead sprinklers.

Fertility. A preplant application of 75 lb nitrogen (N) and 120 lb of potassium (K20) was done on June 3; on August 4, 50 lb of N was sidedressed.

Pest Control. Prefar, Sandea, Poast were the herbicides used; Capture was the insecticide; Bravo and Quadris were the fungicides.

Discussion and Results

Trial plots were established by transplanting into an area of the research farm with dark-colored, loamy sand-type soil and irrigating with a center pivot unit. The sunny, warm growing conditions during the season were favorable for squash growth, and at harvest, yields and quality were found to be unusually good. Fruit, with a few exceptions, were well formed, firm, heavy, and free of defects or rot. Powdery mildew was visible in the trial planting by early August, and visual ratings for severity of infection were taken on August 22 as reported in Table 1. Table Ace, the susceptible check, was observed to show the worst symptoms. In general, powdery mildew on resistant or tolerant cultivars never developed beyond moderate to slight, and it is doubtful the disease influenced yield to any degree. Because there was concern that other diseases, such as downy mildew, would affect the trial, Bravo and Pristine fungicides were applied to the plots on August 25 and again September 9 to keep vines healthy and to allow us to collect good yield data and fruit descriptions. Seeing other diseases in the trial was a good reminder that planting powdery mildew-resistant cultivars will not protect squash from all pests and does not eliminate the requirement for a good disease management program and timely fungicide sprays when needed.

Table 1 presents the number of marketable fruit and yield harvested from each cultivar as well as comments. Entries are grouped by squash type and ranked by yield, high to low. Table Star and Taybelle PM were the highest-yielding acorn cultivars in the trial. The multicolored and highly ornamental Harlequin and Celebration also

yielded well. The sole buttercup-type squash and the 2005 All America Selection, BonBon, had strong vigorous vines and produced the largest yield of all cultivars. Waltham, the standard butternut type, still showed merit producing a respectable yield and large fruit. Metro and JSW 6828 produced a good yield of nice butternut squash that were slightly smaller than Waltham. Bugle would have been the top-producing butternut except several fruit were

graded unmarketable because of cracking. Bush Delicata showed a very compact bush-growing habit and could have been planted much closer together than was done in this trial. A higher plant population would probably increase its yield potential. Cylindrical fruit were cream colored with green stripes and about 6 in. long. When fruit were cut open, the edible flesh was a bright yellow-orange and looked to be of good quality (not overly stringy).

Table 1. Winter squash cultivar average yield and fruit characteristics.

Cultivar	Seed source	Fruit per acre	Market yield (cwt/acre)	Average fruit wt. (lb)	Powdery mildew rating ¹	Comments
Acorn						
Table Star	RU	19,040	331.7	1.7	1.5	White "star" around stem
Taybelle PM	SM	15,300	313.3	2.1	1.7	Large acorn fruit
Harlequin	RU	18,587	285.6	1.5	1.0	Cream with green stripes
Celebration	RU	20,853	275.9	1.3	2.2	Orange and green stripes
Autumn Delight	SM	13,600	255.8	1.9	.7	Semi-bush plant
Table Ace	SM	12,920	239.9	1.9	2.8	PM-susceptible check
Royal Ace PM	HM	14,167	231.7	1.6	1.5	Semi-bush plant
TipTop PMR	JS	10,767	217.0	2.0	1.8	Good fruit color
Table Treat	RU	11,220	197.7	1.8	1.0	Bush plant
Butternut and specialty						
BonBon	ST	13,147	549.2	4.2	1.5	Buttercup type, AAS 2005
Metro PMR	JS	15,413	444.8	2.9	.7	Butternut, uniform fruit
JSW 6828	JS	12,580	385.1	3.1	.2	Butternut, cylindrical shape, a few "long" necks
Waltham	JS	9,973	367.2	3.7	1.8	Butternut, PM susceptible
Bugle	RU	14,053	365.4	2.6	.3	Some fruit splitting
Bush Delicata	ST	14,733	188.4	1.3	1.3	Small compact plant
Average		14,124	309.9	2.2	1.4	
LSD 5%		3,260	72.8	.3	.7	

¹Powdery mildew ratings: 0=no powdery mildew; 1=slight, a little visible on inner leaves; 2=moderate, easily visible on foliage; 3=severe, on foliage and stems, leaves turning yellow or brown.