Organic Seed Partnership

Acorn Squash
2006 Replicated Trial Report

OSP Acorn Squash Trial Collaborators:
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2006 Acorn Squash Replicated Variety Trials

As part of the Organic Seed Partnership (OSP) we evaluated acorn squash varieties and one advanced breeding line in replicated trials at Cornell University, University of California at Davis, and WVSU. The objective of the trials was to compare performance of Cornell varieties Harlequin and PMR Sweet REBA and Oregon State University's OSU 19 with standard varieties Royal Ace and Table Queen. The sites included Cornell's Organic Research Farm in Freeville, NY, the UC Davis Student Farm and Pepper King Farms in Gallipolis Ferry, WV. All sites were either certified organic, or at the least managed organically.

2006 Acorn Squash Replicated Trial Summary:

We got a good assessment of how the acorn squash varieties performed in NY, but there were no clear winners and no significant differences among them for any of the parameters measured. Heat and drought posed some problems at the WVSU location which resulted in overall lower yields, and here again there were no significant differences among any of the varieties tested.

At all 3 locations the multicolored acorns had higher soluble solids than the green acorns, however, it is generally expected that the multicolored acorns will be sweeter than the green acorns. In was particularly noteworthy that at the Freeville, NY location OSU19 had an extremely high BRIX of 16.2 and at UC Davis Harlequin had a BRIX of 17. In general, OSU 19 was comparable to Harlequin in terms of yield and sweetness.

Although statistical analysis was not possible at the UC Davis location due to poor survival, it was noted that at this location the multicolored varieties produced many more fruit (e.g. for OSU19 14.5 fruit/plant at UCD vs 4.2 fruit/plant at Freeville) and smaller fruit (e.g. 294 g's at UCD vs 487 g's at Freeville) than at the other two locations. Growing time was slightly shorter at UC Davis, which could partially explain this, but the extreme heat could have also been a factor affecting fruit size. Despite the smaller size of the fruit at UC Davis the total and marketable yields were relatively high, approximately 20-50% higher than what was obtained in Freeville, due to the greater number of fruit produced. It should be noted though that the number of plants that survived at UC Davis was low, on average 3.2 plants/variety, so there was less competition for water, nutrients and sunlight as compared to the other locations. Similar effects were noted in the results from the 2006 butternut trial at this location. Differences in fruit characteristics between locations were less notable for the green acorns, although they did tend to produce a larger fruit at UC Davis.

While there was no evidence that the newly released acorn squash varieties yielded any better than the standards at any of the 3 locations, in a year where powdery mildew was severe we would expect the PMR resistant Sweet REBA and PM tolerant Harlequin to hold up better than the others.

Sources for the new varieties:
Sweet REBA: High Mowing Seed, http://www.highmowingseeds.com/
Outstanding Seed Co, http://www.pumpkinvegetableorganicseeds.com/
Harlequin**:** Rupp Seeds, http://www.ruppseeds.com/

Cornell University- Freeville Organic Vegetable Research Farm

Materials and Methods:
Plants were started in the greenhouse on May 1st and transplanted to the field on June 2nd. Each plot consisted of 12 plants in a raised bed covered with black plastic mulch with 1 plant per hill. In row plant spacing was 2 ft and between row spacing was 9 ft. Soil type was Howard loam. Dairy compost was applied on May 8th at a rate of 5.4 tons/acre which is equivalent to 133 lbs of N per acre. All beds had drip irrigation, but because of a very wet season this was never used. Four applications of Pyganic were used to control cucumber beetle. Fruit was harvested on Sept 3rd from plants 2-11 leaving plants 1 and 12 as a buffer. Total number of fruit, marketable fruit, total yield, and marketable yield were recorded for each plot. A representative fruit from each plot was measured for size (length and width) and soluble solids using the BRIX test, which measure the sugars in the flesh.

Results:
There were no significant differences found between any of the acorn squash varieties tested except with respect to soluble solids, where OSU 19 separated itself from the rest with a very high average BRIX rating of 16.2 (Table 1a and 1b).

Table 1a. Acorn squash yield, Cornell Organic Farm, Freeville NY

Acorn Squash Varieties*	Total Fruit (#/plant)	Marketable Fruit (#/plant)	Total Yield (kg/plant)	Marketable Yield (kg/plant)
Harlequin	5.0 a	3.6 a	3.0 a	2.3 a
Royal Ace	3.7 a	3.1 a	2.2 a	1.9 a
OSU 19	4.2 a	4.0 a	1.9 a	1.9 a
Table Queen	3.8 a	2.9 a	2.2 a	1.7 a
Sweet REBA	3.0 a	1.9 a	1.8 a	1.1 a
LSD**	ns***	ns	ns	ns

*Varieties sorted by Marketable Yield
**LSD: Least significant difference between two means. Means with the same letter are not significantly different from each other.
***Not significant

Table 1b. Acorn squash fruit characteristics, Cornell Organic Farm, Freeville NY

Acorn Squash Varieties*	Average Fruit Weight (g)	Average Length (cm)	Average Width (cm)	Fruit Size - Average Length x Average Width	Soluble Solids (BRIX)
Table Queen	566.3 a	12.7 a	11.0 a	140.0 a	9.5 b
Royal Ace	605.7 a	11.8 a	11.3 a	135.3 a	8.0 b
Sweet REBA	589.0 a	11.7 a	11.3 a	132.3 a	9.8 b
OSU 19	487.0 a	11.3 a	11.2 a	128.6 a	16.2 a
Harlequin	626.3 a	10.2 a	12.0 a	122.3 a	11.0 b
LSD**	ns***	ns	ns	ns	4.3

*Varieties sorted by Fruit Size
**LSD: Least significant difference between two means. Means with the same letter are not significantly different from each other.
***Not significant

West Virginia State University Organic Farm

Materials and Methods:
This trial was planted at Pepper King Farms in Gallipolis Ferry, WV. The trial went well overall, but there was heat and drought in July and August. Fruit were harvested on Sept 22nd. Total number of fruit, marketable fruit, total yield, and marketable yield were recorded for each plot. A representative fruit from each plot was measured each week for size (length and width) and soluble solids using the BRIX test, which measure the sugars in the flesh.

Results:
There were no significant differences among any of the acorn squash varieties tested with respect to all parameters measured except for average length, where OSU 19 proved to be significantly longer than any of the other varieties, and soluble solids, where Sweet REBA came in with a very low BRIX rating relative to the other varieties (Tables 2a and 2b).

Table 2a. Acorn squash yield, WVSU

Acorn Squash Varieties*	Total Fruit (#/plant)	Marketable Fruit (#/plant)	Total Yield (kg)	Marketable Yield (kg)
Harlequin	3.7 a	3.6 a	1.8 a	1.8 a
Table Queen	2.4 a	2.3 a	1.4 a	1.3 a
Green Acorn	1.8 a	1.8 a	1.1 a	1.1 a
OSU 19	2.2 a	2.0 a	1.1 a	1.1 a
Royal Ace PM	1.7 a	1.7 a	1.0 a	0.9 a
Sweet REBA	1.3 a	1.2 a	0.6 a	0.6 a
LSD**	ns***	ns	ns	ns

*Varieties sorted by Marketable Yield
**LSD: Least significant difference between two means. Means with the same letter are not significantly different from each other.
***Not significant

Table 2b. Acorn squash fruit characteristics, WVSU

Acorn Squash Varieties*	Average Fruit Weight (g)	Average Length (cm)	Average Width (cm)	Fruit Size - Average Length x Average Width	Soluble Solids (BRIX)
OSU 19	574.0 a	17.2 a	8.3 a	143.5 a	11.0 a
Sweet REBA	534.5 a	11.4 b	10.0 a	114.0 a	6.8 b
Green Acorn	585.5 a	10.5 b	10.4 a	108.7 a	10.5 a
Royal Ace PM	533.0 a	10.5 b	10.2 a	107.1 a	9.8 ab
Table Queen	661.5 a	11.1 b	9.3 a	103.0 a	11.0 a
Harlequin	495.5 a	9.6 b	9.9 a	93.8 a	12.5 a
LSD**	ns***	4.6	ns	ns	3.3

*Varieties sorted Fruit Size
**LSD: Least significant difference between two means. Means with the same letter are not significantly different from each other.
***Not significant

University of California at Davis- UC Davis Student Farm

Materials and Methods:
Seed was planted directly in the field on June 30th. Within row spacing was 1 ft. and between row spacing was 5 ft. Feathermeal (12-0-0) was applied before sowing on June 28th at a rate of 10 lbs/200 ft. Underground irrigation was used twice a week. Soil type was Yolo Sandy loam and floating row cover was used for insect control. Fruit was harvested on Oct 10th. Total number of fruit, marketable fruit, total yield, and marketable yield were recorded for each plot. A representative fruit from each plot was measured each week for size (length and width). One fruit from each variety was tested for soluble solids using the BRIX test, which measures the sugars in the flesh. Note: Table Queen was substituted for Sweet REBA in this trial.

Results:
Germination was poor because of problems with the irrigation and extreme hot weather (over 100° F) right after sowing. Only a low number of plants/rep survived (1-3) out of the 12 planted for Harlequin, OSU 19 and Table Queen, although Royal Ace had 5-9 plants/rep. Because of the low number of plants that survived no statistics were performed on the data. The multicolored acorns, Harlequin and OSU19, both had good yields (Table 3a). Harlequin produced fewer larger fruit while OSU19 produced a large number of smaller fruit. Both had very high BRIX ratings (Table 3b). It was noted that neither of these varieties stored well. The performance of the green acorns Table Queen and Royal Ace were very comparable, with lower yields, larger fruit and lower BRIX than their multicolored counterparts.

Table 3a. Acorn squash yield, UC Davis Student Farm, California

Acorn Squash Varieties*	Total Fruit (#/plant)	Marketable Fruit (#/plant)	Total Yield (kg/plant)	Marketable Yield (kg/plant)
Harlequin	8.0	7.7	3.4	3.4
OSU19	14.5	9.5	3.4	2.6
Table Queen	4.0	4.0	2.6	2.6
Royal Ace	3.2	3.2	2.3	2.3

*Varieties sorted by Marketable Yield

Table 3b. Acorn squash fruit characteristics, UC Davis Student Farm

Acorn Squash Varieties	Average Fruit Weight (g)	Average Length (cm)	Average Width (cm)	Fruit Size - Average Length x Average Width	Soluble Solids (BRIX)
Table Queen	652.5	13.4	11.4	152.4	6.8
Royal Ace	736.3	12.7	11.0	139.8	6.0
Harlequin	443.3	9.3	10.6	99.0	17.0
OSU19	294.0	7.9	8.9	70.6	13.5

*Varieties sorted Fruit Size