

Variety Trial Report:

2016 Northern Organic Vegetable Improvement Collaborative

UW-Madison Organic Research and Extension Program

Dr. Erin Silva, Dylan Bruce

Organic Acorn and Delicata Winter Squash



"Delicata JS" © Johnny's Selected Seeds

Introduction

About NOVIC:

In its second iteration, the Northern Organic Vegetable Improvement Collaborative (NOVIC) joins researchers and farmers in Northern U.S. states to address organic farmers' seed and plant breeding needs. The collaborative includes researchers and educators from Oregon State University, University of Wisconsin-Madison, Cornell University, Washington State University, Organic Seed Alliance, and the USDA. The project partners with over 30 organic farmers to breed new varieties, identify the best performing existing varieties for organic agriculture, and educate farmers on organic seed production and plant variety improvement.

NOVIC conducts vegetable variety trials on certified organic ground, at research stations, and on cooperating organic farms, using the mother-daughter trialing method adopted from international agriculture. Trials include the five crops in the NOVIC breeding program (sweet corn, red bell and roasting peppers, tomatoes, cabbage, and winter squash) and one additional crop chosen by farmers regionally.

Results for NOVIC variety trials are published in the Organic Variety Trial Database, a national database of organic variety trial results maintained by collaborators at eOrganic. Reports can also be found on the UW-Organic site. See varietytrials.eorganic.info/ for national trial results, or uworganic.wisc.edu for local and regional trial results.

The overall goal of NOVIC is to develop open-pollinated varieties specifically adapted to meet the needs of organic growers. NOVIC breeding efforts focus on

key traits to improve market presence for the focal crops.

About this Trial:

All UW-Madison NOVIC trials take place at the West Madison Agricultural Research Station (WMARS) at 8502 Mineral Point Road, Verona, WI 53593. Trials can be viewed in person during the annual WMARS Organic Research Field Day during late summer (please feel free to contact westmadison@cals.wisc.edu for more info on field days, or Dylan Bruce to set up individual visits). Some varieties of the trial were planted on farm sites in 2016, including Luna Circle Farm, Troy Gardens, and Spooner Agricultural Station.

Winter squash is a common crop grown by organic farmers for wholesale, CSA, and market enterprises. Yet growing winter squash and other cucurbits without sprays and other conventional management tools can be extremely challenging. This trial is focused on yield, fruit quality, and pest and disease pressure under standard organic management. It should be noted that storage was badly effected by a pathogen identified by the UW-Madison Plant Pathogen Clinic as *Geotrichum*, a fungus that normally causes sour rot of vegetables like tomato and carrot; this was the clinic's first observation of the pathogen in cucurbits, but the quantity of pathogen in the sample and culture indicated it was the likely culprit. This sour rot may also have effected taste or other traits.

Methods

Field Methods:

The winter squash trial was planted in single-row plots, with two outer "border" rows at the perimeter of the field, and three replications in a complete randomized block

design. Rows within plots were 24' long, with twelve plants per row (2ft in-row spacing), followed by two plants of the 'Harlequin' variety, whose distinct fruits acted as a visual spacer during harvest.

All varieties were first seeded by West Star Organics in Cottage Grove, WI on May 11th, and after some delays because of weather, were transplanted on June 8th into freshly rototilled ground at WMARS that had drip irrigation under plastic mulch laid with a Mechanical Transplanter Company Model 85 Mulch Layer. The field had been amended in early spring with CPM (5-3-2) at a rate of 1.6ton/acre and Midwest BioAg's Microhume product at a rate of 100lb/acre. Drip irrigation was used as needed – every 1-2 days during particularly dry periods - but a surprising amount of the season relied only on rainfall. While 2016 was a particularly wet year – between June 8th and September 1st there was ~18.6in of rain accumulation – the plastic mulch had the effect of both holding in moisture longer, and preventing infiltration in that specific area during light rains. It also appeared to provide cover for pests during storms and spray applications.

Aisles were mulched at a rate of 10 tons of ground hay per acre. Before mulching stirrup hoes were used for weed control. After a bad thunderstorm in late July that washed away significant patches of mulch, intermittent hand weeding was used to control weeds setting seed. One thing to consider when selecting varieties is whether or not they vine out fully, providing more weed control with quicker canopy closure, but making field access more difficult without damaging the fragile vines.

Approximately two weeks after striped cucumber beetles and squash bugs were first noticed, pressure became intense

enough it was decided that regular pesticide applications were necessary. The decision to spray was also informed by an adjacent field of melons that had been quickly devastated. The first two sprays were done in increments of 3 days, and the next two in increments of 5 days, with a final application one week after the last. Three weeks after striped cucumber beetles were first noticed in the field, damage ratings were taken on a 1-9 scale (see appendix). Stand counts were taken at harvest to determine survival percent, which was mostly influenced by the few incidences of bacterial wilt vectored by the striped cucumber beetles.

Plants were monitored every other day to determine peak pollination (when 50% of plants in a plot had a female flower). Target harvest dates were set as 8 weeks after peak pollination. All plots of a variety were always harvested at once, and due to logistics target harvest dates were compromised into two harvests; September first and ninth. Immature fruit were qualitatively identified and excluded at harvest; only mature looking fruit near the start of the vines were included. This was also in an effort to keep varieties separate, as the aisles were mostly tangles of the two bordering plots.

At each harvest, total fruit picked, number of unmarketable fruit, and number and weight of marketable fruit (lb) were recorded. Representative marketable fruit were pulled aside for taste tests and brix analyses. Samples for brix were frozen and tested later. While Brix readings must be approached with caution, and do not necessarily equate to overall quality, it is commonly used as a proxy for quality because it represents dissolved sugars and salts. For instance, International Ag Labs, Inc., a consultancy, rates squash quality

poor at 6, average at 8, good at 12, and excellent at 14 °Brix.

Taste tests were also conducted on the center 1/3 of a fruit, by cooking the fruit for 35min in an over at 350°F in a dish with the bottom covered by ½” water (to prevent caramelization, thereby preserving the taste profile and making comparison between varieties easier). Texture (1=stringy, 9=smooth), sweetness (1=no sweetness, 9=very sweet), and flavor (1=off flavors/bad, 9=noticeably “squashy”) were all rated by four taste-testers for three squash per plot (when available).

Analysis:

Data was averaged to a plot level using Microsoft Excel, and was analyzed to a variety level using R Studio. Normality and variances for each outcome were assessed visually by plot (and often by Shapiro and Levene’s tests) and mostly determined to be acceptable for standard Analysis of Variance (ANOVA). Transformations were used as needed. Candystick variety was not included in yield assessments because of abnormality. The TukeyHSD function was used as an initial post-hoc test and the

HSD.test function was used to group means based on significant differences. Each variety was approached as a different treatment, and the three above tests were used for each outcome, except taste and percent survival, which were only ranked.

Results

Peak Pollination:

Days from seeding to peak pollination were significantly effected by variety (F=20.97, p=4.73 x 10⁻⁸). Acorn types generally reached peak pollination first (49.7-64.7 days versus 61.7-67 days for delicatas), while the intermediate Jester variety took the longest. The quickest variety, Sugar Dumpling, reached peak pollination by just 49.67 days (around July 28th), while the top yielding varieties – Delicata JS and Zeppelin – took nearly the longest at around 67 days.

Total Fruit Set:

Total fruit set removed from the plots, including marketable and unmarketable fruit, differed significantly by variety (F=2.79, p=0.032). Delicata types set the most fruit, followed by the intermediate

Variety	Days to Peak Pollination	Avg Percent Survival	Adj Marketable Yield	Adj Total Fruit	Adj Number Marketable Fruit	Marketable Yield	Total Fruit	Marketable Fruit	Marketable Fruit/Plant	Percent Unusable
	since seeding	%	lb			lb				%
Zeppelin	66.67 a	97.22	98.39 a	92 ab	74.73 ab	95.87	89.67	72.67	6.2	18.49
Bush Delicata	61.67 ab	88.88	76.04 ab	78.55 ab	58.91 ab	69.7	72.00	54.00	4.9	23.13
Delicata JS	67 a	94.44	90.35 ab	104 a	76.33 a	86.37	99.00	73.00	6.4	26.72
Candystick	66 a	97.22	86.17	75.68 ab	56.54	79.65	70.50	52.50	4.7	31.34
Sweet REBA	57 bc	69.44	72.07 ab	50.02 ab	46.73 abc	52.5	35.33	33.67	3.9	6.96
Tuffy	64.67 a	83.33	57.94 ab	57.07 ab	41.97 bc	46.87	46.00	34.00	3.5	28.32
Sugarbush F1	55 bc	94.44	51.72 b	36.47 b	31.80 c	48.83	34.67	30.00	2.7	12.38
Honey Bear F1	51 c	77.77	56.22 ab	52.53 ab	42.64 bc	44.3	40.67	34.00	3.6	18.64
Sugar Dumpling F1	49.67 c	86.11	68.1 ab	54.86 ab	51.38 abc	60.7	48.67	45.67	4.3	6.60
Jester F1	68 a	100.00	75.57 ab	71 ab	49.67 abc	75.57	71.00	49.67	4.1	29.14

Table 1: Acorn and Delicata Squash Trial Results

Results by variety for the 2016 NOVIC Winter Squash Trial are color coded with green being most desirable for the trait and red being least desired. Means for traits that showed significant differences in ANOVA (p<0.05) were grouped using multiple comparisons of treatment means using the Tukey method; varieties that share a letter to the right of that trait are not statistically significantly different from each other. Yield is presented both unadjusted and adjusted for stand count.

Jester F1. Acorn types set roughly half the fruit of delicata varieties. Adjusted for stand count, Delicata JS by far set the most fruit per plot on average (104), followed by Zeppelin (92). For acorn types, Tuffy set the most fruit, followed by Sugar Dumpling. Without adjustment for stand count, the same rankings held true, except for Sugar Dumpling producing slightly more than Tuffy.

Marketable Yield:

There was huge variability in Candystick yield between plots (15.8-156lb), representing extreme outliers to the rest of the data. Because of this, all Candystick plots were removed from the statistical analyses. Overall, average marketable yield weight adjusted for stand count was significantly different depending on variety ($F=2.89$, $p=0.034$; Fig 1). Variety also significantly influenced number of marketable fruit adjusted for stand count ($F=5.07$, $p=0.0029$). In both cases, delicata types yielded more, with Zeppelin and Delicata JS being top yielders. For acorn types, Sweet REBA was the best yielder by weight, followed closely by Sugar Dumpling, which was a better yielder in terms of

marketable fruit count. Interestingly, the intermediate type Jester F1 yielded fairly evenly between delicata and acorn types (see Table 1).

When not adjusted for stand count, variety did not have a significant effect on either yield outcome, although there was a trend for marketable fruit ($F=2.26$, $p=0.07$). Rankings remained largely unchanged, except Sugar Dumpling outperformed Sweet REBA.

Unmarketable Yield:

Total percentage of fruit deemed to be unmarketable was significantly influenced by variety ($F=4.72$, $p=0.0029$; Fig 2). Delicata types generally had higher percentages of unmarketable fruit, although Tuffy was an exception to the rule. Candystick had the highest average percent unmarketable fruit at 31.34% and Jester F1 had the second highest at 29.14% unmarketable fruit. The acorn varieties Sweet REBA (6.96%) and Sugar Dumpling (6.60%) fared best with the lowest percentages of unmarketable fruit. Unmarketability was primarily due to scarring from cucumber beetles and squash

Variety	Cucumber Beetle Damage	rank	Leaf Powdery Mildew	rank	Petiole Powdery Mildew	rank	Avg Fruit Weight		Avg Brix	rank	Avg Flavor	rank	Avg Texture	rank	Avg Sweetness	rank	Composite Taste Rank
	1=lethal, 9=not visible		1=lethal, 9=not visible		1=lethal, 9=not		lb		*Brix		see appendix		see appendix		see appendix		
Zeppelin	8.00	1	4.00	10	5.00	9	1.32	ab	9.76	7	5.27	10	5.75	7	3.94	10	10
Bush Delicata	7.67	4	6.33	1	7.67	1	1.29	ab	12.23	1	6.19	3	6.47	5	4.78	5	3
Delicata JS	7.00	7	4.67	7	4.67	10	1.19	b	10.93	2	5.3	9	5.21	#	4.89	4	9
Candystick	7.00	7	4.33	8	5.67	7	1.3	ab	10.11	6	5.42	8	5.52	8	5.25	2	6
Sweet REBA	6.33	10	5.67	3	6.67	3	1.53	ab	9.76	7	6.58	1	6.58	3	4.44	9	3
Tuffy	8.00	1	5.67	3	6.00	5	1.37	ab	10.42	4	6.33	2	8.72	1	5.33	1	1
Sugarbush F1	7.33	6	5.67	3	7.33	2	1.63	a	10.29	5	6.12	5	6.56	4	5.15	3	2
Honey Bear F1	6.67	9	6.33	1	6.00	5	1.33	ab	8.27	10	5.64	7	6.19	6	4.58	7	8
Sugar Dumpling F1	7.67	8	5.33	6	6.67	7	1.32	ab	8.92	9	6.13	4	5.38	9	4.76	6	7
Jester F1	8.00	1	4.33	8	5.67	7	1.55	ab	10.73	3	6.06	6	6.67	2	4.5	8	5

Table 2: Acorn and Delicata Squash Trial Results Continued

Results by variety for the 2016 NOVIC Winter Squash Trial are color coded with green being most desirable for the trait and red being least desired. Means for traits that showed significant differences in ANOVA ($p<0.05$) were grouped using multiple comparisons of treatment means using the Tukey method; varieties that share a letter for that trait are not statistically significantly different from each other. Some traits that were not statistically significantly different are presented with rankings to assist in interpretation.

bugs, as well as being misshapen or immature. There were some signs of sour rot in the field, but relatively few; these symptoms primarily appeared in storage (Fig 3).

Striped Cucumber Beetle Damage:

Variety did not have a significant effect on the amount of striped cucumber beetle damage ($F=1.61$, $p=0.18$). Rep did appear to be slightly significant (0.041). This was primarily because the third rep suffered worse damage than the others.

Powdery Mildew:

Normality for leaf powdery mildew was not improved with transformations. However, Shapiro-Wilkes Test Against Normality p -values were $>p=0.01$. When stats were run for leaf powdery mildew pressure, variety showed trends but no significance ($F=2.05$, $p=0.094$). Normality for petiole powdery mildew was slightly improved with cube transformation (from $p=0.002$ to $p=0.004$). When stats were run on petiole powdery mildew pressure, both variety and rep appeared significant ($F=2.80$, $p=0.03$ for variety, $F=3.59$, $p=0.049$ for rep). Significance lay in the difference between Bush Delicata, the least affected, and Delicata JS, the worst affected.

Fruit Size:

Variety had a significant effect on average marketable fruit weight ($F=2.98$, $p=0.025$). Delicata types generally had lower fruit weights, with the top yielding variety, Delicata JS, having the smallest average marketable fruit size at 1.19lb but the second best yielder, Zeppelin, having the largest delicatas at an average of 1.32 lb. For Acorn types, Sugarbush, a low yielder, had the largest average fruit size at 1.63lbs, followed closely by Sweet Reba. Sugar Dumping was the smallest acorn, followed closely by Honey Bear. The intermediate

Jester F1 had the second heaviest fruit in the trial after Sugarbush

Fruit Quality:

Difference in average Brix (soluble solids) between varieties was not significant ($F=0.75$, $p=0.66$). Bush Delicata had the highest average readings at 12.23 °Brix. Delicata JS was second with an average of 10.93 °Brix, followed closely by Jester F1, Tuffy, Sugar Bush F1, and Candystick, all above 10. Sweet REBA and Sugar Dumping, the top yielding acorn types, averaged 9.76 and 8.92 °Brix respectively. However, it is notable that these rankings did not match up to taste ratings; for instance, Delicata JS, which ranked second for brix, ranked 9th for taste. There were also some consistencies; Zeppelin, the top yielder, scored worst for both Brix and taste. Tuffy, true to its varietal description, scored best for taste, and also scored decently for Brix. That said, taste and varietal preference is highly subjective.

Interpretation and Additional Resources

The results of a variety trial must always be approached with caution. Annual weather fluctuations, soil type, and aspects of a farm's microclimate can have a huge impact on varietal performance. Moreover, certain varieties yielded well but did not score well for quality, and vice versa. In addition, rankings from the replicated trial site differed significantly from grower sites, although data collection at two of the grower sites was questionable (see table in appendix). However, this further illustrates the importance of site-specific factors in the performance of a variety. Finally, the incidence of sour rot, and the unusually wet fall that may have caused it, may limit

applicability of quality ratings, which are already subjective.

Peak pollination is an important data point for determining harvest time, if you allow your plants to vine out across aisles and want to avoid damaging them by walking over them when checking fruit maturity. Thus, it can also be a proxy for early maturation to help plan harvest.

Zeppelin and Delicata JS were certainly the best yielding delicata varieties, and Sweet REBA and Sugar Dumpling were the top yielders for acorn types. Sweet REBA and Sugar Dumpling also had the lowest rates of unmarketable fruit. In terms of counts, Sugar Dumpling yielded best for acorn types and Zeppelin and Delicata JS again yielded best for delicatas.

Zeppelin, Tuffy, and the intermediate-type Jester suffered by far the least striped cucumber beetle damage, with Sugar Dumpling close behind. However, overall damage was not extreme, especially compared to neighboring organic fields sprayed less frequently, illustrating the utility of well timed pesticide applications. Anecdotally, the rep that suffered significantly worse damage was closest to the aforementioned field of melons, planted earlier than our crop, which had been devastated by cucumber beetles. Next year, neem oil will be tank mixed with the pyrethrin, as the mix has shown some better efficacy for area farmers.

The only variety that stood out as performing well for low powdery mildew pressure was Bush Delicata. Interestingly, the top producing varieties of both types tended to show worse powdery mildew pressure. However, the onset of powdery mildew was late enough in the season that it

didn't seem to effect yield very badly overall.

True to its varietal description, the range of variability in Candystick was enormous, in terms of yield as well as fruit size. As an open-pollinated, OSSI-pledged variety that competes well even with a solid range of genetic variation, it represents a good starting point for any farmer looking to make annual selections for a delicata adapted to their specific microclimate.

Although the UW-Madison Plant Pathology Clinic had not previously seen sour rot in cucurbits, the concentration of pathogen isolated made it a likely culprit. Moreover, the fruit that rotted in storage all displayed the same symptoms as the fruit turned in to the Plant Pathogen Clinic. Because of this, storage data was likely not representative of a normal season – an entire set of fruit from multiple varieties that had been set aside for curing in standard conditions even rotted within 36 hours; after that (stinky) occurrence, all fruit was kept in storage at 50 °F, which seemed to mitigate the issue, although fruit subsequently removed from storage was usually deemed unmarketable because of soft rot.

As an opportunistic pathogen, which can live on decaying plant matter in the soil, it is fairly ubiquitous and can be found in many soils. Other sour rots have been identified to be splashborne on soil particles to surfaces of fruit. Surface injuries are frequent sites for the start of decay, and water congestion can weaken plant defenses; it is possible that the unusual amount of rain during late summer contributed to sour rot presence.

Varieties for this trial were chosen by Dr. Michael Mazourek's lab at Cornell University. If you would like to suggest a variety for inclusion in this trial, or have any

questions about the design, conditions, results, or management of the trial, please contact Dylan Bruce.

Resources for organic squash production can be found by contacting your local extension agent, and many are available online. For a useful, if somewhat dated guide on fresh market production from the University of Wisconsin Extension, see the link below. Couple regional information found there with organic production principles found in the sustainable agriculture guides published by the [National Center for Appropriate Technology](#) (NCAT). For a recent webinar series on management of cucurbit diseases and pests, visit the eOrganic.info YouTube channel.

1. Contact Dylan Bruce at dbruce3@wisc.edu.
2. UW-Madison Extension's guide, "Growing pumpkins and other vine crops in Wisconsin": <https://learningstore.uwex.edu/Assets/pdfs/A3688.pdf>
3. NCAT's Organic Production guides: <https://attra.ncat.org/organic.html>
4. eOrganic.info, webinars and videos: <https://www.youtube.com/user/eOrganic/>

This project was funded in 2014 by the [Organic Research and Extension Initiative](#) grant, part of the USDA National Institute of Food and Agriculture. Award # 2014-51300-22223.



United States
Department of
Agriculture

National Institute
of Food and
Agriculture

Appendix

Variety Descriptions and Seed Sources:

Delicata Types

Zeppelin – Certified Organic from Wild Garden Seeds (OP)

"...(B)est long-keeping Delicata you can find. While no pepo-type squash will ever keep like a Hubbard or other maxima-type, we believe that 'Zeppelin' is the only Delicata you will still be eating in mid-January. Buttery-cream colored with longitudinal green stripes, fruits weight 1 to 2 lbs, up to 6 good fruits per plant. Skin is tender enough to eat, the flesh is thick, a rich orange color, with a higher average brix than other available strains."

Bush Delicata - Certified Organic from High Mowing (OP)

"Compact, tidy plants with sweet, oblong fruits. Delicious smooth, nutty flesh with hints of butter and brown sugar. Skin starts creamy white with green stripes and flecks, curing to striped light yellow. Compact plants spread only 4-6 feet. AAS winner bred by Molly Jahn and George Moriarty at Cornell University. • Powdery Mildew-tolerant • Bush habit • 1.5-2lbs. *Days to maturity: 80 days*"

Delicata JS- Certified Organic from Johnny's Selected Seeds (OP)

"Distinct, widely-grown strain from Johnny's. Unique, 7-9" long, 3" wide, 1 1/2-2 lb., cream-colored fruits with dark green longitudinal stripes and flecks. Very sweet, excellent for stuffing and baking, even right at maturity. This beautiful strain has gained a nice following in the specialty produce trade. Avg. yield: 5-7 fruits/plant. • Vining habit • 1.5-2lbs. *Days to maturity: 100 days*"

Candystick – Untreated from Adaptive Seeds (OP)

"A large Honey Boat type with extremely thick flesh & delicious rich flavor... Candystick has a richer date-like flavor that is truly addictive. Fruits are tan skinned with green stripes."

Produces both short loaf shapes & long boat shapes. The fruit shape variability is desirable in this instance for genetic diversity & contributes to some added vigor. They keep very well & retain their sweetness better than other squash well into storage. Candystick was selected for a small seed cavity – more food per squash – so it is not as good for stuffing as Honey Boat. Bred by Carol Deppe of Corvallis, Oregon and her colleague, Nate France. The ultimate dessert squash. OSSI-pledged variety. *Days to maturity: 90 days.*

Acorn Types

Tuffy – Certified Organic from Johnny's Selected Seeds (OP)

"Tuffy has thicker, much sweeter, drier yellow flesh than others. Black-green skin, distinctive heavy ribbing. Avg. 2 lb. NOTES: (1) Rind is tough. Use care when cutting in half for baking. (2) For best sweetness wait two weeks or more after harvest. Avg. yield: 5-6 fruits/plant."

Sweet REBA – Certified Organic from High Mowing (OP)

"High yielding, uniform, disease resistant variety that allows for good sugar production. Resistant Early Bush Acorn (REBA) continues putting energy into developing sugars long after everything else has withered. Out-performed Table Ace in bush habit, mildew resistance, yield, flavor, uniformity and ripeness in High Mowing trials. From a partnership with Cornell University. 4-5 fruits/plant

• Powdery Mildew-resistant • Bush habit • 1.5-2lbs. *Days to maturity: 90 days*"

Sugarbush F1 – Certified Organic from High Mowing (F1)

"Heavy, attractive dark green fruits with sweet, deep orange flesh. Nicely rounded fruits are about 5" tall and wide with a small interior seed cavity. Compact bushy vines with strong powdery mildew resistance. Exceptional sweetness! Bred by Dr. Brent Loy at the University of New Hampshire and produced on

High Mowing's seed farm. • Powdery Mildew-resistant • Compact bush habit • 2.5lbs. *Days to maturity: 90 days*"

Honey Bear F1– Untreated from Johnny's Selected Seeds

"4 inch round, mini-acorn fruits are just the right size halved for single servings. Weighing just 1-1 1/4 lb. (500gm.), Honey Bear has a deliciously starchy and sweet flavor. Promising for direct marketing by name. Compact bush plant resists powdery mildew. This innovative acorn squash was bred by Dr. Brent Loy at the University of New Hampshire. Avg. 3-4 fruits/plant. AAS winner."

Sugar Dumpling F1 – Certified Organic from High Mowing (F1)

"Perfect two-serving dumpling squash with creamy striped skin and very sweet flesh. Deep orange, fine grained inner flesh. Bred specifically for semi-bush habit, powdery mildew resistance and exceptionally high sugar content. 4-6 fruits/plant. Stores up to 6 months. Developed by Dr. Brent Loy at UNH with High Mowing. • Powdery Mildew-resistant • Semi-bush habit • 1.5-2 lbs. *Days to maturity: 90 days*"

Acorn x delicata

Jester F1 – Untreated from Johnny's Selected Seeds

"Jester is oval, tapered at both ends, with small to average ribs. Fruits have an ivory background with green striping between the ribs, and avg. 1 1/2 lb. Widely adapted, short-vined plants average 5-7 fruits/plant. Like other acorn and Delicata type squash, best eating is within 2 months of harvest. "

Harlequin F1 – Untreated from Rupp

"A powdery mildew tolerant green striped acorn hybrid from Rupp with exceptional eating quality. Fruit Size: 4-5" Weight (lbs): 1.5-2 lbs. Color: Light Green/Dark Green Sutures Habit: Compact Bush *Days to maturity: 80 days*

Figures

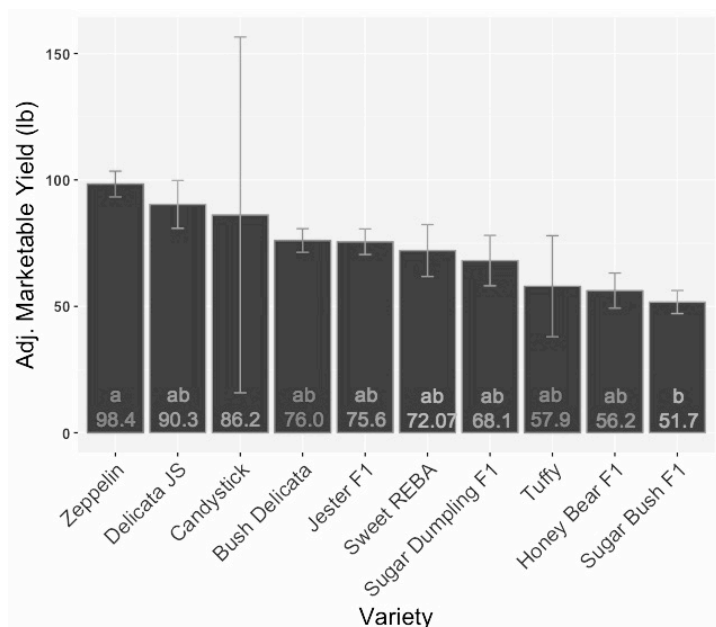


Figure 1: Adjusted Marketable Yield. Variety significantly influenced marketable yield. Candystick was extremely variable, and excluded from statistical analyses. In general there was high variability, with the only statistical difference being between the best and worst yielders; however, trends were visible, with delicata types generally yielding better. Varieties that share a letter are not statistically significantly different.

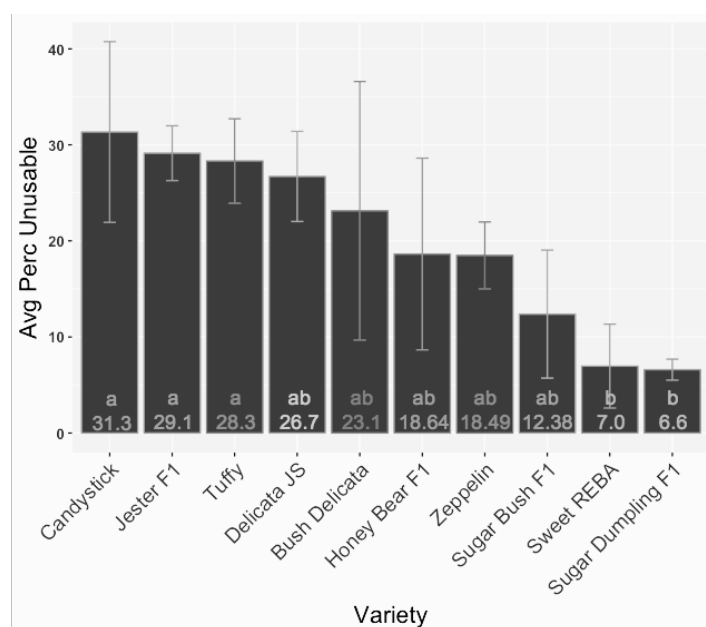


Figure 2: Percent of Total Fruit Deemed Unusable. Variety significantly influenced rates of unmarketability. Delicata types generally saw higher rates, with the exception of Zeppelin. However, wide variability was present throughout the varieties, with the only true statistical difference being between the best and worst performing varieties; varieties that share a letter are not statistically significantly different.



Figure 3: Delicata and Acorn Types Displaying Sour Rot Symptoms. The foamy substance visible on the left side of the acorn fruit would sometimes be ejected with an audible hissing. Other symptoms not visible included a syrupy, sticky liquid ejected, often from the base of the petiole. Symptoms frequently appeared from visible abrasions but also from seemingly healthy fruit, and symptoms often overtook some fruit completely, while other adjacent fruits showed no symptoms.

2016 NOVIC Winter Squash Trial Report
UW-Madison Organic Research and Extension

Grower Results:

UW-Madison NOVICII	Crop: Squash				
Sites Grown*: Luna Circle in Rio, WI; Spooner Ag Station, Spooner WI; Troy Gardens in Madison, WI					
Variety	Maturity	Avg Percent Survival	Yield Ranking	Striped Cucumber Beetle Damage	Notes
(in order of yield at UW-Madison Replicated Trial)	Date of harvest		1=worst, 6=best	1-9; see ratings table in appendix	
Zeppelin	9/8; 10/11	0.60	1; 4	7;	Not grown at Spooner Ag Station
Bush Delicata	9/8; 10/11	0.78	4; 3; 5	7; 5	
Candystick	9/8; 10/11	0.70	2; 5; 3	5; 7	
Tuffy	9/8; 10/11	0.90	3; 4; 1	9; 5	
Honey Bear	9/8; 10/11	0.78	6; 2; 2	7; 3	
Jester	9/8; 10/11	0.78	5; 6; 6	7; 7	
	Powdery Mildew Leaf	Powdery Mildew Petiole	Taste Ranking	Overall Score	Notes/Comments
Zeppelin	1-9; see ratings table in appendix		1=worst, 6=best		
Bush Delicata	5;	7;	4; 1	2;	nice large delicata type but poor storage
Candystick	5;	7;	5; 4; 6	6;	overall best - good production, taste, and storage
Tuffy	5;	7;	6; 6; 3	5;	good flavor but poor storage
Honey Bear	5;	7;	1; 2; 3	1;	"seems like a standard acorn"
Jester	5;	7;	2; 3; 4	4;	"a little small, but good flavor"
	5;	7;	3; 5; 5	3;	ok, but different shape makes it a little harder to sell
* all trait ratings presented in order of growing sites shown here					
- Troy Gardens did not provide beetle damage readings, although they indicated "average" pressure.					
- Neither Troy nor Spooner provided powdery mildew ratings					

1-9 Rating Scales:

Trait	Description	Score
Striped Cucumber Beetle Damage:	No visible damage on any of the plants	9
	25% defoliation on a plot basis, plants growing and fruiting normally	7
	50% defoliation on a plot basis, some compromise in fruiting or flowering, minimal fruit scarring	5
	75% defoliation on a plot basis, much compromise in fruiting or flowering, much fruit scarring	3
	All plants dead from defoliation from feeding	1
Powdery Mildew:	No visible mildew on petioles/tops of leaves	9
	25% of petioles/leaf canopy covered with mildew	7
	50% of petioles/leaf canopy covered with mildew	5
	75% of petioles/leaf canopy covered with mildew	2
	Petioles/tops of leaves completely covered with mildew, plant dead from this	1