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Pumpkin Cultivar Evaluation for Eastern Minnesota 2019

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The objective of this trial was to compare the performance of 32 pumpkin varieties, including new cultivars and cultivars commonly grown in Minnesota, under minimal-till conditions in east-central Minnesota.

This work began to address a need to identify pumpkin varieties well suited for Minnesota. It also allowed for the evaluation of pumpkin cultivars on minimally-tilled soil following a cover crop, two topics of interest to Minnesota vegetable farmers according to a 2019 needs assessment survey by University of Minnesota Extension (Klodd and Hoidal, 2019).

Materials and Methods

The trial took place at Rod's Berry Farm in Cambridge, MN (45.486592, -93.106416) on Anoka loamy fine sand. We evaluated thirty-two (32) pumpkin cultivars for yield, average fruit size, fruit size consistency, and fruit per plant. A complete block design was used, with three (3) replications and 5 plants per variety per plot. Rows were spaced 6 feet apart with 4 foot plant spacing (20 feet of row per plot).

Management: Pumpkins were direct-seeded on May 29. Plants were thinned to their final spacing (4 foot) on June 14 (16 DAP). Harvest occurred on September 26 (119 DAP). Fertility management was based on Midwest Vegetable Production Guide 2019 recommendations and soil testing. A spring 2019 soil test showed 1.1% organic matter, pH 6.4, 100+ ppm phosphorus (P), 145 ppm potassium (K), 357 ppm calcium (Ca), and 78 ppm magnesium (Mg). Nitrogen (N) and K were top-dressed on May 2. Additional N, K, S and Ca were broadcast on July 16.

The field was last tilled in fall 2018 following 3 years of strawberries with no tillage. Winter rye was seeded in fall, 2018 and terminated with glyphosate on May 4, 2019 at 6 inches tall. No spring tillage, cultivation, or pre-emergent herbicides were applied, though weed pressure remained very low throughout the trial. Clethodim was applied on June 25 for grass weed control, and lambsquarters were hand-removed on Aug. 22. Treated seed was used for all varieties; however no fungicides were applied, in order to observe cultivar disease susceptibility. Asana was applied for black cutworm control based on pheromone trap monitoring on June 10. No irrigation was applied, in an effort to be consistent with practices common among many pumpkin growers in Minnesota.

Data collection and analysis: Fruit were weighed individually, and average fruit weight (lbs per fruit), fruit weight variability, yield (tons per acre), and number of fruit per acre were calculated. Fruit weight variability was calculated using the Quartile coefficient of dispersion, a median-

adjusted measure of variability expressed as a percentage (%), with higher % values indicating higher levels of variability in fruit size within the cultivar. Handle length is considered observational data, as only two randomly selected fruit per cultivar were used for handle measurements due to limited labor availability. Handle lengths were measured with a fabric tape measure following the curvature of the handle along the outside edge.

Table 1: Average fruit weight, fruit weight variability, yield, and handle length for 32 pumpkin varieties evaluated at Rod’s Berry Farm in North Branch, MN in 2019. Data are sorted by average fruit weight.

Variety	¹ Seed	Fruit weight (lbs / fruit)		Per-acre yield		³ Handle	Comments
	Source	Average	Variability ²	Tons	No.	length	
Cronus	HM	24.9	14%	24.1	1936	+++	
Kratos	HM	18.1	16%	38.5	4235	++	
Spartacus (SPU 3269)	SK	16.9	20%	25.3	3025	++	
Bayhorse Gold	RU	16.5	19%	14.7	1815	++	
Apollo	HM	16.4	21%	14.3	1815	+++	
Mrs. Wrinkles	SK	16.0	28%	25.9	3267	++	
Earlipak	SK	16.0	32%	22.0	2783	++	
Rhea	HM	15.7	25%	24.5	3025	+++	
Warty Goblin	HM	15.0	19%	19.9	2783	++	<i>Specialty variety, warted</i>
Eagle City Gold	RU	14.9	29%	22.1	3025	++	
Honky Tonk	SK	14.4	31%	22.3	3146	+	
RPX 6889	RU	14.3	19%	21.3	3025	++	<i>Specialty variety, warted</i>
Diablo	SK	13.9	38%	14.0	2178	+++	
Spartan	SK	13.6	21%	20.3	3025	+	
RPX 6208	RU	13.6	18%	20.9	3025	+++	
Orange Sunrise	HM	13.5	30%	21.2	3146	+	
Magic Wand	HM	13.0	16%	24.4	3751	++	
Thor	SK	12.8	26%	22.3	3509	++	
Specter	HM	12.5	20%	21.7	3509	+++	<i>White variety with very minimal warting</i>
Gladiator	HM	12.3	12%	27.8	4477	++	
RPX 6209	RU	12.3	27%	23.8	3872	++	
Magic Lantern	HM	12.1	26%	26.4	4356	++	
Bus Stop	RU	11.9	28%	29.2	4840	+++	
RPX 6229	RU	11.8	17%	28.0	4840	+	<i>Unique tan-colored variety</i>
Carbonado Gold	RU	11.7	12%	21.4	3630	+++	
Zeus	HM	11.2	23%	25.4	4477	++	
Hermes	HM	10.6	33%	21.4	4114	+++	
Autumn Gold	RU	9.1	14%	10.7	2541	+	<i>High incidence of Xanthomonas bacterial spot</i>
Gold Standard	RU	9.1	21%	21.0	4598	++	
RPX 6880	RU	6.6	15%	19.6	6050	+++	<i>Pie pumpkin, small Jack-o-lantern shape</i>
Field Trip	HM	4.2	25%	16.2	7744	++	<i>Pie pumpkin, small Jack-o-lantern shape</i>
Warty Gnome	HM	3.0	14%	15.8	10527	++	<i>Specialty variety, warted, miniature</i>
F _{31,62}		13.3		1.8	6.6		
LSD _{0,05}		3.1		11.0	1900		

¹Harris Moran (HM), Rupp Seeds (RU), or Sakata Seeds (SK)

²Quartile Coefficient of Dispersion, a median-adjusted measure of how variable the fruit size is within a variety. 30% is twice as variable as 15%, for example.

³(+) 2 to 4 inches, (++) 4 to 6 inches, or (+++) 6 to 8 inches, on average

Results and Discussion

Overall yields in this trial were relatively high, with relatively low unmarketability levels. For many varieties, average fruit weight was below the breeder-reported averages for the cultivars. This is likely due to the loamy sand soil type, which has a low water holding capacity. It may have also been impacted by a dry period in July that had visible impacts on the leaves and may have slowed fruit growth. Average fruit weight ranged from 24.9 lbs (Cronus) to 3.0 lbs (Warty Gnome). (Table 1).

Yield: Average yields ranged from 38.5 tons per acre (Kratos) to 10.7 tons per acre (Autumn Gold). Of the 40-bin count carving pumpkins, the highest yielding varieties were Kratos (38.5 tons/acre), Gladiator (27.8 tons/acre), RPX 6229 (28.0 tons/acre), Bus Stop (29.2 tons/acre), and Magic Lantern (26.4 tons/acre).

Fruit weight variability: Fruit weight variability was a key consideration listed by the producers informing this trial, as some of their markets prefer consistent sizing, while other markets such as their roadside stands prefer a variety of sizes. Therefore, this study compared fruit weight variability among varieties. In Table 1, lower % variability represents more consistent sizing. Fruit size variability ranged from 38% (high variability; Diablo) to 12% (low variability; Gladiator and Carbonado Gold). Of the 40-bin count carving pumpkins, Gladiator (12%), Carbonado Gold (12%), Kratos (16%), Magic Wand (16%), RPX 6229 (17%), and Autumn Gold (14%) had the lowest weight variability. The varieties with the largest weight variability were Earlipak (32%), Honky Tonk (31%), Diablo (38%), Hermes (33%), and Orange Sunrise (30%).

While the focus of the trial was 40-bin count carving pumpkins, several specialty pumpkin varieties were also included. The highest yielding specialty pumpkin was Specter, with 21.7 tons/acre and 20% variability. Warty Gnome stood out as a highly productive variety, producing 10,527 fruit per acre, with a relatively consistent fruit size (14%) of 3.0 lbs per fruit.

In conclusion, several varieties stood out in this trial based on yield and size consistency. Kratos demonstrated the highest yield in the trial, and consistent sizing (16% weight variability). Gladiator demonstrated the most consistent sizing (12%) and a high yield at 27.8 tons/acre. Several of the new varieties also performed notably well; RPX 6229 yielded high at 28.0 tons/acre, with good consistency (17%). Another standout variety based on grower observations of fruit quality was Spartacus (SPU 3269), which had a relatively high average yield of 25.3 tons/acre, and moderate variability at 20%.

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References

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