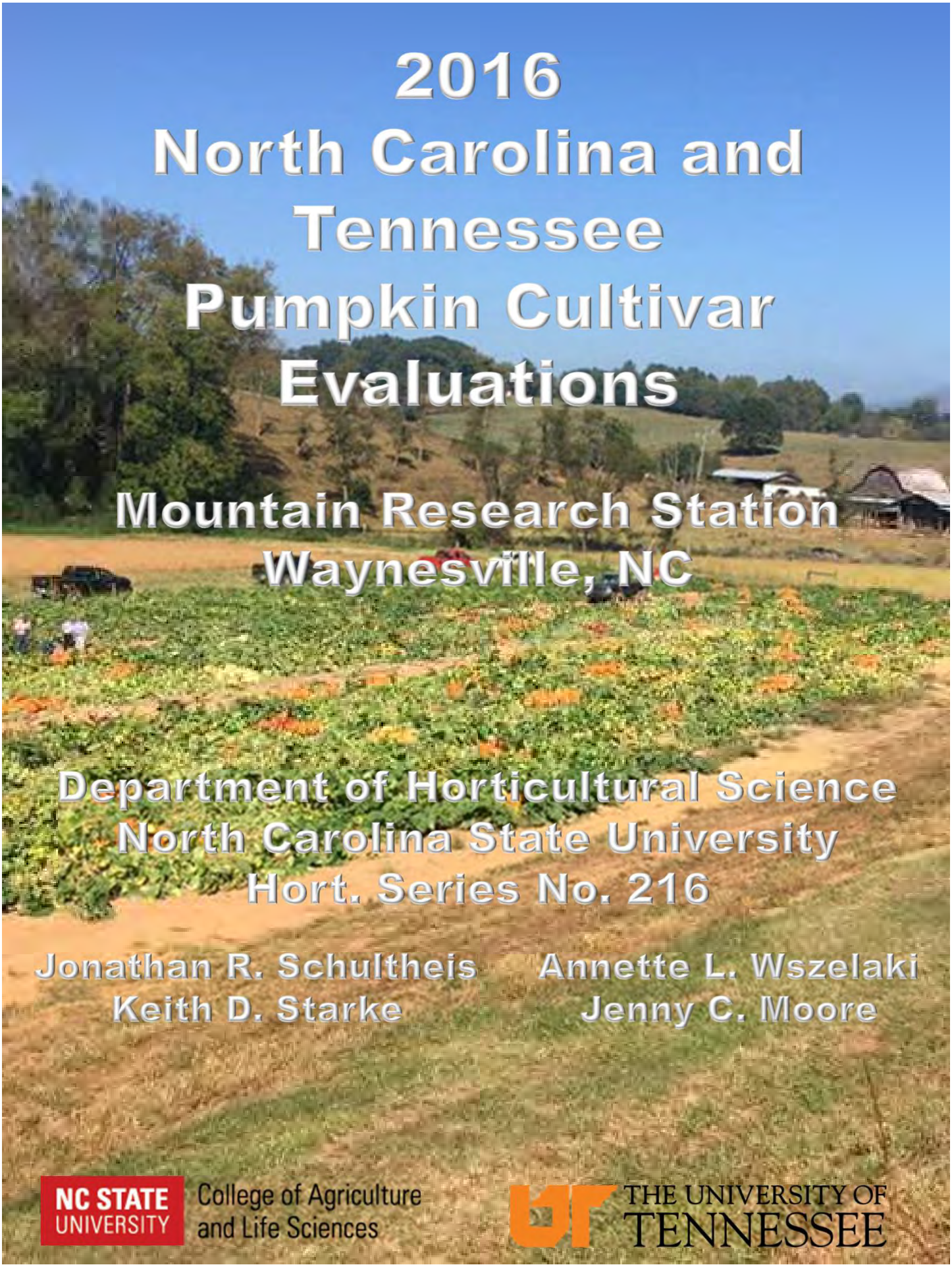

2016 North Carolina and Tennessee Pumpkin Cultivar Evaluations

Mountain Research Station
Waynesville, NC

Department of Horticultural Science
North Carolina State University

Hort. Series No. 216

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THE UNIVERSITY OF TENNESSEE

2016

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General Cultural Practices

The pumpkin cultivar evaluation trial was grown on black plastic mulch and fertigated using drip tape. Pesticides used on all plots were chemicals labeled for that crop, (2016 North Carolina Agricultural Chemicals Manual).

Acknowledgments

We gratefully acknowledge the assistance of Kaleb Rathbone (Superintendent), John Eric Freeman (Horticultural Crops Supervisor) and other supporting personnel at the Mountain Research Station, Waynesville, NC, for their help in establishing, maintaining, and harvesting the pumpkin cultivar evaluation trial. Additionally, we would like to thank the University of Tennessee and North Carolina State University student workers for assisting with various aspects of the trial and the Tuscola High School agriculture students for their help with harvest. We also want to acknowledge the following seed companies for their cooperation and support: Abbott & Cobb, Inc.; DP Seed; Enza Zaden USA; HM Clause Seed Company; Johnny's Selected Seeds; Rupp Seeds, Inc.; and Sakata Seed Company. Finally, we also want to acknowledge Joy Smith for conducting the statistical analysis on the data collected in this trial.

Disclaimer

This publication presents data from the cultivar evaluation trial conducted during 2016. Information contained in this report is believed to be reliable but should not be relied upon as a sole source of information. Limited accompanying detail is included but excludes some pertinent information, which may aid interpretation.

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Introduction

In 2016, the USDA- National Agricultural Statistics Service reported that planted acres of pumpkin for North Carolina and Tennessee was 3,800 and 1,900 acres, respectively. The economic value of the pumpkin crop in North Carolina was reported to be more than 15 million dollars in 2016. Although the crop carries a significant value to producers in both states the total planted acres is still modest when compared to other commodities grown within each state. In the western part of North Carolina and in pockets of Tennessee, pumpkin production is extensive due to the favorable climate and soils of the region. Collaborative pumpkin cultivar evaluation trials have been conducted by North Carolina State University and the University of Tennessee for about a decade. The advantage of growing pumpkin in areas of higher elevation is the cooler growing conditions where growers seem to experience less disease pressure, a point that Travis Birdsell, North Carolina Cooperative Extension Agent, highlighted in 2016 (**https://cals.ncsu.edu/news/extension-agent-cultivates-a-sweet-spot-for-pumpkins/**). According to the USDA Economic research service, consumer demand for specialty varieties has been increasing in recent years. The pumpkin cultivars included in this trial were mainly evaluated for yield. However, each cultivar was also rated for shape, color, suturing, vine habit, handle characteristics, and fruit size measurements. The fruit obtained from each replicated cultivar are also identified in a photograph. Several other cultivars were also included in the trial as observation plots (non-replicated) and most of these cultivars are identified in a photograph where available.

Materials and Methods

This trial was conducted at the Mountain Research Station in Waynesville, NC, and was a collaboration between North Carolina State University and the University of Tennessee. Seeds were planted on 21 June 2016. A total of 56 cultivars were evaluated, with 18 cultivars being un-replicated and for observational purposes only. The remaining 25 cultivars were evaluated in a randomized complete block (RCB) trial with 3 replications. Each plot measured 20 feet long with 6 plants spaced 3 feet apart (in-row) and row spacing was 10 ft (between-row).

Plant bed preparation included pre-plant fertilizer (250 lb/acre 12-21-21 and 21-0-0 at 380 lb/acre) broadcast applied and incorporated into the beds on 16 June before laying plastic mulch, providing 110 lb N, 53 lb P and 53 lb of K per acre. Fertigation with 50 lb KNO_3 (13-0-44) was applied through drip irrigation on 25 July 2016; 12 and 19 August; 2 and 9 September 2016. A total of 117 lb/acre N, 53 lb/acre P and 75 lb/acre K was applied to the trial site throughout the entire growing season.

Insecticides were only applied when needed and were applied at labeled rates for pumpkin production in North Carolina. The fungicide program implemented included the following products which were alternated to reduce potential for development of disease resistance: Actiguard, Cabrio, Previcur Flex, Presidio, Pristine, Procure, Radiant, Ranman, Quadris and Quintec. These products are registered for use in this crop and were applied according to labeled rates that can be referenced in the North Carolina Agriculture Chemical Manual. Fungicides

were applied every 7 to 14 days throughout the growing season beginning 8 July 2016 and repeated on the following dates: 15 and 29 July; 5, 12 and 26 September; 8 and 16 August 2016. Herbicides, Dual (1pt/ac) and Command (1pt/ac), were sprayed for weed control on 21 June 2016. Pumpkins were harvested on 6 October (107 days after planting). Yield per acre was calculated by extrapolating total yield from the 200 ft^2 area of each plot. Five representative fruit from each plot were measured to find the average length and width of each cultivar. Pumpkin color, shape, and suturing; and handle length, thickness and attachment were rated subjectively for each plot.

Results

Pumpkin entries are discussed by size class and are organized in tables in alphabetical order. Results mentioned in the paragraphs below only correspond to the replicated cultivars.

Mini

Four cultivars were evaluated in the mini size class (≤ 5.0 lbs). Jack Sprat, Orangita and Sirius Star were all orange, while Casperita was white. Average fruit size ranged from 0.9 lbs for Casperita to 2.7 lbs for Jack Sprat (Table 1). The smallest fruit were produced by Casperita, while fruit size of Orangita and Sirius Star were very similar. Jack Sprat produced the largest fruit in the mini size category. Orangita produced the least total yield at 11.7 tons/acre and Sirius Star was the highest yielding cultivar in the mini size category at 32.7 tons/acre. Fruit shapes were mostly round with the exception of Orangita which is slightly flat to round. (Table 2). Casperita maintained its pure white color for several weeks before turning pale yellow.

Small

Four cultivars were evaluated in the 'small' size class (5.1 – 10.0 lbs). Fruit of these entries are all orange. Fruit size averages between 5.1 to 6.7 lbs with Field Trip being the smallest, followed by Early Abundance. ACR 1428 and Darling produced fruit with an average weight of 6.7 lbs (Table 1). These entries ranged between 10,003 (Early Abundance) and 15,165 (Darling) fruit number per acre. Field Trip ranked second in fruit per acre at 11, 293 followed by ACR 1428 that produced 10,567 fruit per acre. Darling had the highest total fruit weight and yield of all of the entries in the 'small' size category (Table 1). Fruit shapes range from flat to round (Field Trip) to Darling that is slightly taller and less round.

Medium

Eleven cultivars were evaluated in the 'medium' size class (10.1-25.0 lbs). Average fruit size in this category ranged between 13.9 to 24.1 lbs per fruit (Table 1). Eagle City Gold produced the highest fruit yield and fruit number in this size category. Fruit yields ranged from 40.6 tons/acre (ACR 7599) to 80.8 tons/acre (Ares). Ares produced the least fruit number per acre (4,840) and Eagle City Gold produced the greatest number of fruit per acre at 9,196 (Table 1). All fruit in this size category are orange with the exception of Blue Doll and Indian Doll (Figure 1). Fruit shapes range from slightly flat to round (Blue Doll and Indian Doll) to Ares, a taller pumpkin (Table 2).

Large

Six varieties were evaluated in the 'large' size class (≥25.1 lbs). Average Fruit Size in this category ranged from 26.4 to 33.1 lbs (Table 1). Early King produced the highest fruit weight per acre (88 tons/ac), while Aladdin had the lowest total fruit weight per acre (62.0 tons per acre). Early King also produced that greatest number of fruit per acre, whereas, early Giant produced the least amount of fruit per acre (Table 1). Fruit shapes were mostly round in this size class, with the exception of Early King, which produced a slightly larger and taller pumpkin (Table 2).

Figure 1. Pumpkin photographs, replicated cultivars.
Waynesville, NC, 2016.

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Table 1. Pumpkin cultivar evaluation trial. Cumulative yield (tons) / acre, fruit number per acre and average fruit weight, **Waynesville, NC, 2016.**

			Cumulative		
Size Class	**Cultivar**	**Seed Company**	**Yield (tons) / Acre**	**Number of Fruit / Acre**	**Average Fruit Weight (lbs)**
Mini	Casperita	DP Seed	12.3	26,862	0.9
(≤ 5.0 lb)	Jack Sprat	Sakata	22.4	16,779	2.7
	Orangita	DP Seed	11.7	18,634	1.4
	Sirius Star	Rupp	32.7	27,185	2.4
	Average		19.8	22,365	1.9
	LSD (0.05)		**11.3**	**9,802**	**0.8**
Small	ACR 1428	Abbott & Cobb	35.3	10,567	6.7
(5.1 - 10.0 lb)	Darling	Abbott & Cobb	50.7	15,165	6.7
	Early Abundance	Abbott & Cobb	32.0	10,003	6.4
	Field Trip	Harris Moran	28.5	11,293	5.1
	Average		36.6	11,757	6.2
	LSD (0.05)		**8.2**	**2,724**	**0.4**
Medium	Ares	Harris Moran	80.8	6,776	24.1
(10.1 - 25.0 lb)	ACR 7599	Abbott & Cobb	40.6	5,566	14.6
	Bayhorse Gold	Rupp	51.2	5,485	18.8
	Bellatrix	Enza Zaden	68.7	6,131	22.3
	Blue Doll	DP Seed	51.4	5,001	20.6
	Cracker Jack	Sakata	49.9	6,453	15.7
	Eagle City Gold	Rupp	85.2	9,196	18.5
	Gladiator	Harris Moran	45.9	4,840	18.9
	Indian Doll	DP Seed	56.1	6,534	17.2
	Magic Lantern	Harris Moran	67.8	7,341	19.2
	RPX 5956	Rupp	57.1	8,228	13.9
	Average		59.5	6,505	18.5
	LSD (0.05)		**23.3**	**2,439**	**3.1**
Large	Aladdin	Harris Moran	62.0	4,679	26.4
(≥ 25.1 lb)	Cronus	Harris Moran	64.5	4,598	28.5
	Early Giant	Abbott & Cobb	67.4	3,953	34.2
	Early King	Abbott & Cobb	88.0	6,615	26.6
	Hulk	Sakata	80.4	5,485	29.1
	JPN 61560	Johnny's Seed	69.8	4,195	33.1
	Average		72.0	4,921	29.7
	LSD (0.05)		**29.4**	**1,848**	**3.3**

Table 2. Pumpkin cultivar evaluation trial. Fruit and quality measurements for replicated cultivars. **Waynesville, NC, 2016.**

Cultivar	Fruit Color[1]	Fruit Shape[2]	Fruit Suturing[3]	Fruit Texture[4]	Vine Habit[5]	*PM Rating[6]	Handle[7]			Fruit[8]		
							Thickness	Length	Attachment	Length	Width	LD
ACR 1428	7.0	5.7	3.8	3.3	4.0	5.0	7.0	5.0	6.7	7.4	8.0	0.9
ACR 7599	6.7	5.0	5.8	3.7	4.0	5.0	7.0	4.2	7.7	9.6	11.2	0.9
Aladdin	6.7	5.7	4.3	3.0	4.0	2.0	6.0	6.3	7.0	12.3	13.6	0.9
Ares	6.7	7.7	4.8	5.0	4.0	2.0	9.0	7.0	7.7	14.6	12.0	1.3
Bayhorse Gold	6.8	5.7	5.8	3.7	4.0	8.0	6.8	5.5	6.7	10.9	11.1	1.0
Bellatrix	6.3	4.8	6.3	2.3	4.0	8.0	7.7	6.5	6.0	10.6	12.9	0.8
Blue Doll	NA*	4.2	9.0	4.0	4.0	6.0	7.0	3.0	1.7	8.5	11.8	0.7
Casparita	1.0	4.2	7.7	3.3	2.0	9.0	5.7	7.7	6.7	2.8	4.2	0.7
Cracker Jack	8.0	4.8	7.7	4.7	5.0	5.0	6.7	5.0	7.7	10.3	11.9	0.9
Cronus	6.3	5.2	6.3	5.3	4.0	3.0	9.0	9.0	9.0	12.8	14.8	0.9
Darling	6.0	8.2	2.7	1.7	3.0	3.0	7.0	5.0	5.0	9.2	7.2	1.3
Eagle City Gold	6.0	5.2	3.3	4.3	3.0	3.0	6.7	5.7	7.7	11.0	11.8	0.9
Early Abundance	7.0	5.0	3.7	4.3	5.0	6.0	7.3	5.3	5.3	7.1	7.9	0.9
Early Giant	6.0	8.8	6.3	5.0	3.0	7.0	8.7	3.3	8.7	17.1	14.0	1.2
Early King	6.0	6.2	4.3	4.3	4.0	4.0	8.7	4.0	6.0	13.5	13.2	1.0
Field Trip	7.0	3.7	6.3	4.0	5.0	2.0	6.7	9.0	6.7	5.7	7.9	0.7
Gladiator	7.0	5.0	6.5	4.7	5.0	2.0	7.7	6.0	8.0	11.3	12.2	0.9
Hulk	6.7	8.2	8.3	4.3	3.0	5.0	8.0	4.0	8.7	15.5	12.9	1.2
Indian Doll	NA*	2.7	8.3	6.0	5.0	7.0	5.7	3.7	1.0	6.0	12.0	0.5
Jack Sprat	6.0	4.7	3.8	4.3	3.0	7.0	7.0	6.3	5.3	4.9	6.0	0.8
JPN 61560	6.0	6.5	7.8	3.3	2.0	2.0	6.3	6.8	7.0	13.6	13.8	1.0
Magic Lantern	7.3	5.3	6.5	2.7	4.0	3.0	6.0	6.3	7.0	11.4	12.1	0.9
Orangita	5.8	3.0	8.3	5.3	4.0	4.0	5.3	6.7	7.0	2.9	4.4	0.7
RPX 5956	7.0	4.8	4.5	5.3	4.0	4.0	7.7	4.8	5.8	8.8	10.4	0.8
Sirius Star	1.0	5.7	2.3	3.0	4.0	7.0	5.7	6.7	6.0	5.5	5.8	1.0
Average	6.1	5.4	5.8	4.0	3.8	4.8	7.0	5.7	6.5	9.7	10.5	0.9
LSD (0.05)	**0.6**	**0.8**	**1.4**	**2.3**	**NA**	**NA**	**0.9**	**1.4**	**0.9**	**1.0**	**0.8**	**0.1**

[1]Color Scale: 1 = yellow, 5 = orange, 9 = burnt orange.

[2]Fruit Shape Rating: 1 = flat, 5 = round, 9 = tall.

[3]Fruit Suturing: 1 = none, 5 = medium, 9 = deep.

[4]Texture Rating: 1 = smooth, 5 = semi-rough, 9= rough.

[5]Vine Habit: 1 = bush, 2 = semi-bush, 3 = semi-vine, 4 = vine, 5 = aggressive vine

[6]Powdery Mildew Rating: 1 = None, 9 = Severe
*Observed and rated on 6 September 2016.

[7]Handle Rating:
Thickness: 1 = thin, 5 = medium, 9 = thick.
Length: 1 = short, 5 = medium, 9 = long.
Attachment: 1 = poor, 5 = average, 9 = excellent.

[8]Fruit Measurements = Individual length and width values (inches) were taken from 5 fruit per replication, (20 total), The LD ratio was determined by dividing fruit length by fruit width.
*NA = Fruit not orange colored.

Figure 2. Pumpkin photographs, selected observation cultivars. **Waynesville, NC, 2016.**

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Table 3. Pumpkin, Gourd/Winter Squash cultivar evaluation trial. Selected observations (non-replicated cultivars). Cumulative yield (tons) per acre, number fruit per acre and average fruit weight, **Waynesville, NC, 2016.**

			Cumulative		
Size Class	Cultivar	Seed Company	Yield (tons) / Acre	Number of Fruit / Acre	Average Fruit Weight (lbs)
Mini (≥ 5.0 lb)	Autumn Crown	Johnny's Seed	3.2	37,026	3.2
	Flame	Johnny's Seed	1.0	24,684	1.0
	Koshare Yellow	Hollar Seed	1.8	23,232	1.8
	Spark	Johnny's Seed	0.6	65,824	0.6
	Average		1.7	37,692	1.7
Small (5.1 - 10.0 lb)	Blue Hubbard	Johnny's Seed	15.0	5,082	15.0
	Flatso	DP Seed	6.3	18,634	6.3
	Kakai	Johnny's Seed	6.8	11,374	6.8
	Moonshine	Johnny's Seed	7.7	7,986	7.7
	Sunshine	Johnny's Seed	5.5	10,164	5.5
	Triamble	Johnny's Seed	9.4	5,324	9.4
	Turks Turban	Johnny's Seed	6.4	8,470	6.4
	Average		8.2	9,576	8.2
Medium (10.1 - 25.0 lb)	Marina Di Chioggia	Johnny's Seed	17.3	2,178	17.3
	Kratos	Harris Moran	21.3	7,744	21.3
	One Too Many	Rupp	24.7	5,324	24.7
	New England Cheddar	Johnny's Seed	19.7	3,630	19.7
	Rhea	Johnny's Seed	73.9	7,018	21.1
	Warty Goblin	Harris Moran	19.5	6,292	19.5
	Average		29.4	5,497	20.6
Large (≥ 25.0 lb)	Full Moon	Hollar Seed	43.6	2,904	61.5
	Average		43.6	2,904	61.5

Table 4. Pumpkin, Gourd/Winter Squash cultivar evaluation trial. Fruit and quality measurements for selected observation replicated cultivars. **Waynesville, NC, 2016.**

Cultivar	Fruit Color[1]	Fruit Shape[2]	Fruit Suturing[3]	Vine Habit[5]	*PM Rating[6]	Handle[7]			Fruit[8]		
						Thickness	Length	Attachment	Length	Width	LD
Autumn Crown	Buff	2.0	8.0	2.0	2.0	3.0	8.0	7.0	3.5	6.8	0.5
Blue Hubbard	Blue	NA*	3.0	1.0	NA*	9.0	1.0	7.0	15.9	9.9	1.6
Flame	Ylw, Orng & Wht	3.0	9.0	9.0	5.0	5.0	6.0	5.0	3.0	4.2	0.7
Flatso	5.5	6.0	8.0	5.0	5.0	2.0	7.0	5.0	5.5	8.1	0.7
Full Moon	White	NA*	NA*	NA*	NA*	NA*	NA*	NA*	15.9	16.7	1.0
Kakai	5.0	5.5	2.0	6.0	2.0	1.0	5.5	5.0	7.2	8.3	0.9
Koshare Yellow	Green & Yellow	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*
Kratos	7.0	5.0	7.0	6.0	2.0	5.0	9.0	8.0	11.8	13.3	0.9
Marina Di Chioggia	Blue	2.0	8.0	2.0	1.0	9.0	1.0	8.0	6.4	11.4	0.6
Moonshine	1.0	5.0	5.0	8.0	3.0	2.0	6.0	7.0	7.6	9.5	0.8
New England Cheddar	Buff	4.0	7.0	2.0	5.0	1.0	6.0	4.0	8.6	12.2	0.7
One Too Many	1.0	6.0	4.5	2.0	2.0	7.0	1.0	6.5	12.2	14.5	0.8
Rhea	6.0	4.5	6.0	9.0	2.0	5.0	8.0	7.0	10.4	13.0	0.8
Spark	1.0	3.0	7.0	8.0	5.0	7.0	6.0	6.0	2.4	3.7	0.6
Sunshine	9.0	2.5	2.0	2.0	5.0	7.0	2.0	8.0	4.7	8.3	0.6
Triamble	Blue	3.0	9.0	3.0	5.0	5.0	3.0	4.0	5.8	10.2	0.6
Turks Turban	Grn, Red & White	NA*	NA*	NA*	NA*	NA*	NA*	NA*	5.6	8.7	0.6
Warty Goblin	7.5	5.5	2.0	9.0	2.0	9.0	8.0	8.0	10.7	11.6	0.9
Average	4.8	4.1	5.8	4.9	3.3	5.1	5.2	6.4	8.1	10.0	0.8

[1]Color Scale: 1 = yellow, 5 = orange, 9 = burnt orange.

[2]Fruit Shape Rating: 1 = flat, 5 = round, 9 = tall.

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