

PUMPKIN GERMPLASM AND VARIETY EVALUATION

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Introduction

Pumpkins are an unimportant crop in Georgia. There were only 458 acres of pumpkins produced in Georgia in 2008 (Boatright and McKissick, 2009). This was due to the high incidence of insect transmitted virus diseases that affect pumpkins. Most of the production is in north Georgia where an aggressive program of insect and disease control can result in a successful crop. In south Georgia even with such an aggressive program success is not always possible.

Insect transmitted virus diseases are very difficult to control. The aphids that transmit these diseases transmit them in a non-persistent manner, which means as soon as the insect probes the tissue the virus is transmitted. This means even with 90+% control of the insect vector, there can be enough insects remaining to infect the crop. Aphid populations continue to build throughout the spring and summer so for fall crops such as pumpkins, which are highly susceptible to these viruses production is acutely difficult.

Increased disease resistance in pumpkins would help a fall pumpkin industry grow in Georgia. To this end 'Orange Bulldog' pumpkin was released several years ago and has been offered for sale in Georgia. This work continues with goals of releasing a larger pumpkin with more uniformity and consistent coloring. To this end, the objective of this study was to evaluate advanced germplasm for yield and uniformity. In addition, several commercial pumpkin varieties were evaluated in this study.

Materials and Methods

Pumpkin seed of selected advanced lines as well as the commercial varieties were sown in a commercial potting mix in the greenhouses at the Horticulture Farm in Watkinsville, GA on 2 July 2009. Seedlings were transplanted by hand to a field prepared according to University of Georgia Cooperative Extension Service recommendation, which had 750 lbs/acre of 10-10-10 preplant incorporated.

Plants were set out with a 12-ft between-row and a 6-ft in-row spacing on 16-17 July 2009. There were 44 lines in the trial that consisted of 11 commercial varieties, including 'Orange Bulldog' and 33 advanced germplasm lines. The experiment was arranged in a randomized complete block design with three replications. There were 8 plants per experimental

unit. An additional 750 lbs/acre of 10-10-10 fertilizer was applied 4 weeks after transplanting. Plots were harvested on 29 September 2009 at which time the total number and weight was recorded for each plot. In addition, the degree of uniformity was determined between fruit from each plot. The variability index was 1-9 with 1 indicating a high degree of uniformity and 9 a high degree of variability. The variability index was transformed with a square root transformation prior to analysis and the results were back transformed to their original units. Finally photographs were taken of fruit from each harvested plot for future assessment and selection.

Results and Discussion

The highest yielding entry in the trial was '18-4-3' with 30,187 lbs/acre (Table 1, Figure 1). It had a relatively high variability index at 7.0 with an average fruit weight of 21 lbs. The highest yielding commercial variety was 'Dependable' from Abbott & Cobb with 11,344 lbs/acre. This points out the problem that this breeding program is trying to address and that is the relatively poor performance of commercial pumpkins in Georgia. It should be pointed out that no insecticides or fungicides were used in this trial so that the performance of the breeding material could be assessed. Commercial varieties can perform satisfactorily in north Georgia if a conscientious spray program is followed. In south Georgia even with such a spray program success is not guaranteed every year.

The lowest variability index among the UGA lines was with '18-4-2', which had a variability index of 4.2 (Figure 2). This was, however, not statistically different from most of the other entries.

This evaluation trial will be used to select material for selfing and making crosses in the greenhouse. The primary focus of the breeding program going forward is produce a variety with a larger size than 'Orange Bulldog' as well as having greater uniformity for size and color.

Literature Cited

Boatright, S.R. and J.C. McKissick. 2009. 2008 Georgia farm gate vegetable report. College of Agr. and Environ. Sci. Rpt. AR-09-02.

Table 1. Evaluation of advanced pumpkin germplasm & commercial pumpkins for yield, number of fruit, and variability.

Entry	Source	Yield		Variability Index ^z	Pre-Trial Color	Postharvest Comments
		(lbs/acre)	(No./acre)			
18-6-1	UGA	16,096	807	6.0	Orange	
11-4-2	UGA	15,957	1,109	7.3	Red	
11-4-3	UGA	11,369	706	4.9	Orange	
1-4-4	UGA	26,935	1,865	6.2	Red	Good color
17-3-1-2	UGA	18,011	1,311	4.9	Red	
5-3-A-2-1	UGA	21,830	756	5.5	Red	
19-1-4	UGA	16,272	756	5.6	Orange	
17-3-2	UGA	20,078	706	5.3	Orange	
18-4-3	UGA	30,187	1,437	7.0	Orange	
19-1-5	UGA	19,032	882	4.8	Red	
11-4-6	UGA	26,456	1,059	5.5	Orange	
5-3-3	UGA	17,003	756	4.6	Orange	
11-4-1	UGA	14,331	1,084	6.0	Red	Good
5-3-5	UGA	10,487	630	5.0	Ghost	
18-4-2	UGA	22,940	908	4.2	Orange	Colby Jack
8-1-5	UGA	20,368	857	5.9	Orange	
15-1-1	UGA	25,095	1,286	5.6	Orange	
19-1-2-4	UGA	21,440	1,386	5.9	Orange	
18-5-2	UGA	21,427	983	6.0	Orange	
Magic Wand	Harris Moran	7,247	580	2.6	Orange	
15-1-2	UGA	19,058	1,034	6.3	Red	
11-4-6	UGA	20,734	1,286	6.0	Red	Good color
11-2-3	UGA	16,713	807	6.0	Green	
5-3-A-1	UGA	16,776	857	4.9	Orange	
1-4-2	UGA	14,054	882	7.0	Orange	
5-3-1	UGA	19,259	933	5.9	Orange	
11-2-4	UGA	25,763	1,109	5.9	Orange	Some green
Dependable	Abbott & Cobb	11,344	857	3.3	Orange	
11-2-2	UGA	21,440	933	5.9	Red	Large
5-3-4	UGA	16,612	958	7.3	Orange	
5-3-2	UGA	12,982	681	5.3	Red	
OB Offtype	UGA	17,091	1,386	5.9	Orange	
11-2-1	UGA	14,835	832	5.9	Orange	
Magical	Abbott & Cobb	4,512	479	2.6	Orange	Very poor yield
Magician	Harris Moran	8,735	882	3.7	Orange	
11-2-5	UGA	27,528	1,185	8.3	Orange	
Warlock	Harris Moran	3,970	340	2.5	Orange	Severe sunscald
Charmed	Abbott & Cobb	7,953	832	2.9	Orange	

Gladiator	Harris Moran	3,945	303	4.5	Orange	
Magic Lantern	Harris Moran	7,285	655	2.6	Orange	
Field Trip	Harris Moran	4,538	1,260	1.3	Orange	
Aladdin	Harris Moran	10,083	681	1.6	Orange	
1-1-4-2	UGA	22,209	1,008	6.7	Red	
Orange Bulldog	UGA	10,020	1,185	4.4	Orange	Direct seeded late
Coefficient of Variation		32%	29%	31%		
LSD (p=0.05)		8,480	448	2.7		

^zVariability Index: 1-9, 1-uniform, 9-highly variable



Figure 1. '18-4-3', highest yielding entry in the trial.



Figure 2. '18-4-2', highest degree of uniformity among advanced germplasm entries.