smooth. The three numbered entries had a slightly rougher skin texture than the standards. Tuber shape of B0984-1 and B1145-2 was rated as mostly round. In comparison, tubers of 'Red LaSoda' and 'LaRouge' were round to oblong to mostly oblong. Eye depth of the numbered entries was shallower than 'Red LaSoda' and 'LaRouge'.

The order of varieties ranked from lowest to highest in overall appearance over all sites was 'LaRouge' (5.5), 'Red LaSoda' (5.7), B1758-3 (6.4), B0984-1 (6.9), and B1145-2 (7.1). A rating of 6.9 and 7.1 is considered good and is relatively uncommon in University of Florida potato trials. The higher overall appearance ratings for the numbered entries can be attributed to their generally darker red skin color, round tuber shape, and shallower eye depth compared to the standard varieties.

Overall appearance of the varieties varied over sites. The St. Johns 1 site had the highest overall appearance ratings of all sites with an average rating over all varieties of 7.1. The UF Farm site had the lowest rating over all varieties of 5.9.

Conclusions

Improving production efficiencies for Florida potato growers is a priority for the potato variety evaluation program. Methods for improving production efficiencies include increasing tuber production per area and/or improving tuber quality. 'Red LaSoda' and 'LaRouge' produced more total and marketable yield than the three numbered entries. B0984-1 was the highest yielding numbered entry producing 83% of the marketable yield of 'Red LaSoda'. However, B0984-1 external quality was higher than 'Red LaSoda' and 'LaRouge'. B0984-1 has a naturally dark red skin color, a rounder tuber shape, and shallower eyes than current standards and should be evaluated further. B1145-2 should also be considered for further evaluation. The large percentage of high quality, B-sized potatoes may make it an ideal variety for the processing market. The tuber qualities of B0984-1 and B1145-2 could improve the marketing potential of Florida red potatoes.

Based on these trials, the recommendation to growers to plant 'Red LaSoda' and 'LaRouge' will not be changed. However, large scale plantings of B0984-1 and B1145-2 should be made as seed becomes available. Increased planting in diverse commercial systems will provide further information on tuber quality and production characteristics.

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Performance of Chip Processing Potato Varieties in Northeastern Florida

C.M. Hutchinson,[1] J.M. White,[2] D.M. Gergela,[3] P.A. Solano,[4] K.G. Haynes,[5] R. Wenrich,[6] and C.S. Lippi[7]

ADDITIONAL INDEX WORDS. *Solanum tuberosum*, crisps, subsurface irrigation, seepage irrigation, internal heat necrosis, tuber defects

SUMMARY. **Potato (*Solanum tuberosum*) is a high value crop in Florida. It consistently ranks in the top five valued vegetable crops produced in the state. The identification of new potato varieties that improve production efficiency is an imperative because of constantly evolving market and production demands. A chip potato variety evaluation experiment was conducted in northeast Florida in 2002 to compare the production characteristics of industry standards to advanced selections. The potato varieties evaluated in this experiment were bred specifically for processing by the potato chip industry. The experimental design was a four (site) by five (variety) factorial with four replications at each site. The sites were the University of Florida's research farm in Hastings, FL and three commercial farms in the surrounding area. Potato varieties were two seed sources of 'Atlantic', as well as, 'Snowden', B0564-8, and B0766-**

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[1]Assistant professor, Horticultural Sciences Department, University of Florida, Gainesville, FL 32611-0690; corresponding author; cmhutch@ufl.edu.

[2]Associate professor, Mid-Florida Research and Education Center, University of Florida, Apopka, FL 32703-8504.

[3]Biologist, Horticultural Sciences Department, University of Florida, Gainesville, FL 32611-0690.

[4]Statistician, Horticultural Sciences Department, University of Florida, Gainesville, FL 32611-0690.

[5]Research plant geneticist, Vegetable Laboratory, USDA/ARS, Beltsville, MD 20705.

[6]Wise Foods, Inc., Berwick, PA 18603.

[7]Flagler County extension director and extension agent II, Bunnell, FL 32110.

3. Marketable yield for each variety was 39.4, 33.4, 38.4, 33.6, and 33.6 t·ha^{-1} (351, 298, 343, 300, and 300 cwt/acre), respectively. Total yield of B0564-8 was statistically equivalent to an 'Atlantic' standard at all four locations and similar to 'Snowden' at three of four locations. Specific gravity of B0564-8 and B0766-3 was significantly lower than that of 'Atlantic' from both sources but within acceptable range for chip potatoes. B0564-8 tubers had the highest overall appearance ratings and the most consistent size and shape. B0564-8 and B0766-3 tubers had a significantly lower percentage of hollow heart and internal heat necrosis than 'Atlantic' tubers. This resulted in overall better chip ratings for the numbered entries compared to 'Atlantic' tubers. A potential fit for B0564-8 and B0766-3 in northeastern Florida production may be as a late season chip variety when the potential for the development of internal heat necrosis increases.

Chip and fresh-market potatoes are grown in Florida as far south as Miami–Dade County and as far north as Suwannee County. Production areas span the entire length of the Florida peninsula. The highest concentration of chip potato production, however, is on about 7,284.3 ha (18,000 acres) in the Tri-County Agricultural Area (TCAA; St. Johns, Flagler, and Putnam counties) in northeastern Florida. The majority of the chip potatoes grown in the TCAA are produced on contract for national or regional processors. Chip potatoes produced in the TCAA are valued at about $40 million annually (Witzig and Pugh, 2001).

Typically, potatoes in the TCAA are planted from January through March and harvested from April to June. However, other sources of processing potatoes have reduced the market window for TCAA potatoes over the last several years. For instance, improved varieties and storage technologies have increased the availability of high quality storage potatoes. This has reduced the demand for TCAA chip potatoes early in the Florida season. In addition, demand for Florida chipping potatoes late in the production season is decreasing because of increased early production in the mid-Atlantic and southern, midwestern states. Selection of new potato varieties that produce earlier in these areas will only further weaken TCAA market dominance. To maintain or improve the traditional market share for TCAA production, potato varieties should be identified that have improved qualities compared to 'Atlantic' and 'Snowden', the two standard chip potato varieties (Hutchinson et al., 2002). The quality of TCAA chipping potatoes must entice chip processors to use Florida potatoes instead of storage potatoes. In addition, late-season tuber quality must remain high so that growers remain competitive with other regions of the country.

New varieties must improve production efficiency compared to the current standards before they will be adopted. To do this, new selections must grow well under Florida environmental conditions. Potatoes in the TCAA are planted during short day conditions with relatively cool days and nights. However, potatoes bulk as the days get longer and hotter. This production regime is not conducive for high yields and good quality with most widely accepted northern potato varieties. In addition, varieties must produce acceptable yields with consistent tuber size and shape. Tuber specific gravity should be at least 1.075. Tubers should be resistant to physiological disorders including growth cracks, hollow heart, and internal heat necrosis (IHN). Tubers should have a white to cream flesh that produces light colored chips with few defects soon after harvest. The potato plant should be tolerant to diseases such as late blight, early blight, and corky ringspot. Potato plants should also be able to recover from freezing temperatures and frequent, heavy rainfall without substantial yield loss. With these quality goals in mind, a research project was developed to compare the production and quality characteristics of USDA numbered entries with the two standard chipping potato varieties grown in the TCAA.

Materials and methods

The chip potato variety trial was arranged in a randomized complete block design with four replications at four locations in northeast Florida in 2002. All data were analyzed using analysis of variance (SAS, 2000). Mean separation was conducted using the Ryan-Einot-Gabriel-Welsch (REGWQ) multiple range test (Osborne and Simonne, 2002). Significant interaction means were separated using Fisher's least significant difference test.

The trial sites were a) University of Florida's Plant Science Research and Education Unit in St. Johns County (UF Farm); and three commercial fields, b) Flagler County (Flagler); c) St. Johns County near the St. Johns River (St. Johns 1); and d) in the eastern production area of St. Johns County (St. Johns 2). Sites represent a broad geographic area in the TCAA and the cooperators are noted for quality operations. Soil type at all locations was an Ellzey fine sand (sandy, siliceous, hyperthermic Arenic Ochraqualf; sand 90% to 95%, <2.5% clay, <5% silt).

Potato varieties in the trial were 'Atlantic' 1 (Agway, Presque Isle, Maine); 'Atlantic' 2 and 'Snowden' (Maine Farmer's Exchange, Presque Isle, Maine); B0564-8 and B0766-3 (USDA–ARS, Beltsville, Md.). Numbered entries should be referred to as clones and not varieties. However, for ease of reading, they will be called varieties.

Plot size at each location was a single, 4.9 m (16 ft) long row of a single entry. Between row and within row spacing were 101.6 and 20.3 cm (40 and 8 inches), respectively. Potatoes were cut to about 70.87 g (2.5 oz) seed pieces and dusted with fungicide [1.134 g (0.04 oz) a.i. fludioxonil and 21.829 g (0.77 oz) a.i. mancozeb per 45.4 kg (100 lb) seed pieces (Maxim MZ; Syngenta Crop Protection, Inc., Greensboro, N.C.)] before planting. Aldicarb [3.36 kg·ha^{-1} (3.0 lb/acre) a.i. (Temik, Bayer Corp., Kansas City, Mo.)] was applied in-row at planting. All other pest control practices followed extension recommendations (Hochmuth et. al., 2001). Each site was irrigated with subsurface seepage irrigation. Irrigation scheduling was determined by the farm manager at each site.

Fertilizer practices at each site were based on extension recommendations, individual grower experience, and soil testing (Hochmuth et al., 2001). Potatoes were planted at the UF Farm site on 30 Jan. and harvested 15 May. Fertilizer [14N–0.9P–10K at 638.4 kg·ha^{-1} (570 lb/acre)] was broadcasted and incorporated 2 d before planting. Potatoes were side-dressed twice with 14N–0.9P–10K [481.6 kg·ha^{-1} (430 lb/acre)] on 26 Feb. and 15 Mar. Total fertilizer applied was 224.0 kg·ha^{-1} (200 lb/acre) N, 13.4 kg·ha^{-1} (12 lb/acre) P, and 156.8 kg·ha^{-1} (140 lb/acre) K.

Potatoes were planted at the Flagler site on 25 Jan. and harvested

14 May. Fertilizer [32N–0P–0K at 70.12 L·ha^{-1} (7.5 gal/acre)] was injected about 1 month before planting. Two weeks before planting, fertilizer [12N–3.4P–12.5K at 1120.0 kg·ha^{-1} (1000 lb/acre)] was broadcasted and incorporated. Potatoes were side-dressed 3 weeks after emergence with 5.5N–0P–6.0K [1126.7 kg·ha^{-1} (1006 lb/acre)]. Total fertilizer applied was 224.0 kg·ha^{-1} (200 lb/acre) N, 39.2 kg·ha^{-1} (35 lb/acre) P, and 208.3 kg·ha^{-1} (186 lb/ acre) K.

Potatoes were planted at the St. Johns 1 site on 24 Jan. and harvested 7 May. Fertilizer [4N–3.4P–10K, 1904.0 kg·ha^{-1} (1700 lb/acre)] was broadcasted and incorporated 1 week before planting. Potatoes were side-dressed 3 weeks after emergence with 32N–0P–0K [374.0 L·ha^{-1} (40 gal/acre)]. Total fertilizer applied was 224.0 kg·ha^{-1} (200 lb/acre) N, 65.0 kg·ha^{-1} (58 lb/acre) P, and 190.4 kg·ha^{-1} (170 lb/acre) K.

Potatoes were planted at the St. Johns 2 site on 24 Jan. and harvested 8 May. Fertilizer [14N–4.3P–10K at 644.0 kg·ha^{-1} (575 lb/acre)] was broadcasted and incorporated 3 d before planting. Potatoes were side-dressed once with 14N–0P–10K [957.6 kg·ha^{-1} (855 lb/acre)] 3 weeks after emergence. Total fertilizer applied was 224.0 kg·ha^{-1} (200 lb/acre) N, 28.0 kg·ha^{-1} (25 lb/acre) P, and 156.8 kg·ha^{-1} (140 lb/acre^{-1}) K.

Emerged potato plants were covered with soil on 27 Feb. and uncovered 28 Feb. at all sites except St. Johns 1 because of below freezing night temperatures. The St. Johns 1 site was not covered because air temperatures were buffered by the warm microclimate created by the nearby St. Johns River. Early season freezing temperatures are common in the TCAA. It is important for varieties to be rated for the ability to recuperate after uncovering. Therefore, plants at all sites were rated for stand and early vigor 41 to 43 d after planting. Stand is the percent of emerged plants based on the number of seed pieces per plot and ranged from 95% to 100% for all entries. Plant vine type was rated at full flower about 8 to 9 weeks after planting. Plant maturity was rated at harvest. Early vigor, vine type, and plant maturity were rated following the rating system in Table 1 (Sisson and Porter, 2002).

Potatoes in each plot were harvested, washed, and graded into five size classes based on tuber diameter with commercial equipment. Size classes were 1= <4.83 cm (1.9 inches), 2 = 4.83 to 6.35 cm (2.5 inches), 3 = 6.35 to 8.38 cm (3.3 inches), 4 = 8.38 to 10.16 cm (4.0 inches), 5 = >10.16 cm. Marketable yield was defined as tuber weight in size classes 2 through 4 (4.83 to 10.16 cm). Culls (growth cracked, misshaped, sunburned, and rotten tubers) were removed and weighed before sizing marketable tubers. Total cull weight was the sum of tuber weight from all cull categories. Distribution by size class and size class range were calculated on marketable tubers. Specific gravity was calculated on a subsample of 15 mixed-grade tubers from each plot using the weight-in-air/weight-in-water method. Specific gravity tuber samples for each variety were combined and rated for external tuber appearance (Table 2; Sisson and Porter, 2002). Percent marketable yield was the marketable yield for 'Atlantic' 2, 'Snowden', B0564-8, and B0766-3 divided by marketable yield of 'Atlantic' 1.

External tuber appearance scores were the mean of ratings by two or

Table 1. Plant growth characteristic rating codes used for potato evaluation in the University of Florida potato evaluation program.[z]

Rating	Early vigor (plant ht)[y]	Vine type	Vine maturity at harvest
1	No emergence	Decumbent–poor	Dead
2	Leaves in rosette	Decumbent–fair	---
3	Plants < 5 cm	Decumbent–good	Yellow and dying
4	Plants 5 to 10 cm	Spreading–poor	---
5	Plants 10 to 15 cm	Spreading–fair	Moderately mature
6	Plants 15 to 20 cm	Spreading–good	---
7	Plants 20 to 25 cm	Upright–poor	Starting to mature
8	Plants 25 to 30 cm	Upright–fair	---
9	Plants > 30 cm	Upright–good	Green and vigorous

[z]Adapted from Sisson and Porter, 2002.
[y]1.0 inch = 2.54 cm.

Table 2. Internal and external tuber characteristic rating codes used for potato evaluation in the University of Florida potato evaluation program.[z]

Rating	Internal flesh color	Skin color	Skin texture	Tuber shape	Eye depth	Overall appearance
1	White	Purple	Partial russet	Round	Very deep	Very poor
2	Cream	Red	Heavy russet	Mostly round	---	---
3	Light yellow	Pink	Moderately russet	Round to oblong	Deep	Poor
4	Medium yellow	Dark brown	Light russet	Mostly oblong	---	---
5	Dark yellow	Brown	Netted	Oblong	Intermediate	Fair
6	Pink	Tan	Slightly netted	Oblong to long	---	---
7	Red	Buff	Moderately smooth	Mostly long	Shallow	Good
8	Blue	White	Smooth	Long	---	---
9	Purple	Cream	Very smooth	Cylindrical	Very shallow	Excellent

[z]Adapted from Sisson and Porter, 2002.

three trained personnel. A 20-tuber subsample from each plot was cut into quarters and rated for internal quality. Brown rot (BR), corky ringspot (CRS), and internal heat necrosis (IHN) were scored as tuber number of out of 20 exhibiting the disorder on any one of the quarter sections.

A 2.27 kg (5.0 lb) tuber subsample from each plot or location was shipped to Wise Foods, Inc., Berwick, Pa. for chip quality evaluation. Samples were chipped within 48 h of harvest. Chips were prepared and rated by trained personnel following standardized industry procedures (Gould et al., 1995). The chip quality rating system was 1 = outstanding, no blemish or color; 2 = very good, minimal blemish; 3 = good, minor blemish/color variation; 4 = marginal acceptance, borderline defects and/or color; 5 = not acceptable, high defect level and/or color variation.

Results and discussion

Growing conditions. Overall growing conditions were rated as good in the TCAA. Weather conditions were rated as acceptable, fertilization practices were good, irrigation practices were good, and pest incidence was light for the trial. Overall growing conditions for the trial were good (Osborne and Simonne, 2002). Growing conditions were acceptable at all locations so a valid comparison of entries over sites could be made.

Production statistics. Differences in total yield, marketable yield, size distribution by class, size class range, and specific gravity within the variety main plot were significant. Total and marketable tuber yields were significantly higher for 'Atlantic' 1 and 'Snowden' than for 'Atlantic' 2, B0564-8, and B0766-3 (Table 3). 'Atlantic' 1 was used as the 'Atlantic' marketable yield standard because it represents the yield potential of the variety. Marketable yield of B0564-8 and B0766-3 was about 85% of that of 'Atlantic' 1. Marketable yields of the two numbered entries were not significantly different than 'Atlantic' 2. However, both numbered entries produced significantly lower marketable yield than 'Snowden'. Yield of all varieties are in the acceptable range for the area. 'Atlantic' 1 produced significantly more size 3 potatoes than the numbered entries. 'Atlantic' 1 produced the largest potatoes with about 45% of tubers in size class range 3 to 4. Size class distributions of 'Atlantic' 2, 'Snowden', B0564-8, and B0766-3 were not significantly different. 'Atlantic' 1 and 'Atlantic' 2 had a significantly higher tuber specific gravity than both B0564-8 and B0766-3.

UF Farm and St Johns 2 marketable tuber yields were significantly higher than at the Flagler and St. Johns 1 sites (Table 3). Eighty-two percent of tubers produced at the St. Johns 1 site size classes 1 and 2 which contributed to lower yields at this location. Tuber specific gravity was significantly higher at the St. Johns 1 site (1.084) than at all other sites.

The variety by site interaction was significant for total yield, size distribution by class, and size class range (Table 3). 'Snowden' at the UF Farm site produced significantly higher total yields [51.6 t·ha^{-1} (460 cwt/acre)] than all other variety by site combinations except for 'Atlantic' 1 at the UF Farm and St. Johns 2 sites. 'Atlantic' 1 and 'Atlantic' 2 produced significantly equivalent total tuber yields within each site. B0564-8 produced total tuber yields statistically equivalent to the standard varieties at the Flagler, St. Johns 1, and St. Johns 2 sites. B0766-3 produced total tuber yields equivalent to at least one of the standard varieties at all four locations.

External and internal tuber quality. Differences within variety main effects for misshaped, sunburned, total culls, hollow heart, and IHN were significant (Table 4). 'Atlantic' 1 had significantly more misshaped tubers than all other varieties. B0564-8 had significantly fewer sunburned tubers than 'Atlantic' and 'Snowden' and the lowest percentage of total culls. 'Atlantic' tubers averaged 2.9% hollow heart compared to 0.2% and 0.6% for B0564-8 and B0766-3, respectively.

Percent IHN in 'Atlantic' varieties was 7.7% compared to 0.0 and 0.3% for B0564-8 and B0766-3, respectively. 'Atlantic' is the standard chip variety

Table 3. Analysis of variance for total yield, marketable yield, percentage of yield by grade, size class range, and specific gravity of chipping potatoes grown in northeastern Florida.

Factor	Total yield (t·ha^{-1})[y]	Marketable yield (t·ha^{-1})	Marketable yield % of standard	Size distribution by class (%)[z] 1	2	3	4	5	Size class range (%) 2–4	3–4	Specific gravity
Variety	***	***	---	*	**	**	NS	NS	*	**	***
Site	***	**	---	NS	***	***	***	NS	NS	***	***
Variety × site	*	NS	---	NS	**	*	NS	NS	NS	**	NS
Variety											
'Atlantic' 1	42.7 a[x]	39.4 a	---	4.4 b	50.9 b	33.4 a	11.2	0.0	95.6 a	44.6 a	1.081 a
'Atlantic' 2	37.9 b	33.4 b	84.8	9.2 a	53.3 ab	28.0 ab	9.6	0.0	90.8 b	37.5 b	1.080 a
'Snowden'	41.7 a	38.4 a	97.5	6.2 ab	57.2 ab	27.9 ab	8.7	0.0	93.8 ab	36.6 b	1.079 ab
B0564-8	37.0 b	33.6 b	85.3	7.7 ab	58.6 a	23.9 b	9.8	0.0	92.3 ab	33.7 b	1.075 c
B0766-3	36.8 b	33.6 b	85.3	6.5 ab	58.1 a	25.7 b	9.7	0.0	93.5 ab	35.5 b	1.076 bc
Site											
UF Farm	44.4 a	41.6 a	---	3.4	42.1 c	38.3 a	16.3 a	0.0	96.6	54.5 a	1.075 b
Flagler	34.5 b	31.2 b	---	7.5	63.4 b	24.2 c	4.9 b	0.0	92.5	29.1 b	1.077 b
St. Johns 1	35.5 b	31.7 b	---	9.8	72.2 a	16.9 d	1.1 b	0.0	90.2	18.0 c	1.084 a
St. Johns 2	42.4 a	38.3 a	---	6.6	44.7 c	31.8 b	16.9 a	0.0	93.4	48.7 a	1.077 b

[z]Size classes: 1= <4.83 cm (1.9 inches), 2 = 4.83 to 6.35 cm (2.5 inches), 3 = 6.35 to 8.38 cm (3.3 inches), 4 = 8.38 to 10.16 cm (4.0 inches), 5 = >10.16 cm.
[y]1.0 t·ha^{-1} = 8.92 cwt/acre.
[x]Means separated within columns using the Ryan-Einot-Gabriel-Welsch multiple range mean separation test at $P \leq 0.05$.
[ns,*,**,***]Nonsignificant or significant at $P \leq 0.05$, 0.01, or 0.001, respectively.

Table 4. Analysis of variance for external and internal tuber defects of chipping potatoes grown in northeastern Florida.

	External tuber defects (t·ha^{-1})[z]					Internal tuber defects[y] (%)				Chip
Factor	Growth cracks	Mis-shaped	Sun-burned	Rotten	Total culls[x]	HH	BR	CRS	IHN	rating
Variety	NS	***	**	NS	**	***	NS	NS	***	---
Site	NS	*	**	NS	*	NS	NS	NS	*	---
Variety × site	NS	*	**	NS	***	NS	NS	NS	NS	---
Variety										
Atlantic' 1	0.0	0.8 a[w]	0.5 a	0.2	1.6 a	2.7 a	0.0	0.0	8.2 a	3.3
'Atlantic' 2	0.1	0.4 b	0.6 a	0.3	1.3 ab	3.0 a	0.0	0.0	7.2 ab	3.3
'Snowden'	0.0	0.1 b	0.5 a	0.2	0.9 bc	0.4 b	0.0	0.0	1.6 bc	2.3
B0564-8	0.0	0.1 b	0.1 b	0.5	0.7 c	0.2 b	0.0	0.0	0.0 c	2.0
B0766-3	0.2	0.2 b	0.3 ab	0.3	1.0 a–c	0.6 b	0.0	0.0	0.3 c	2.3
Site										
UF Farm	0.1	0.1 b	1.0 a	0.2	1.4 a	0.8	0.0	0.0	2.0 b	---
Flagler	0.0	0.2 b	0.0 b	0.5	0.8 ab	1.7	0.0	0.0	2.0 b	---
St. Johns 1	0.0	0.3 b	0.1 b	0.1	0.5 b	1.1	0.0	0.0	3.0 ab	---
St. Johns 2	0.1	0.8 a	0.4 ab	0.3	1.7 a	2.0	0.0	0.0	6.8 a	---

[z]1.0 t·ha^{-1} = 8.92 cwt/acre.
[y]HH = hollow heart, BR = brown rot, CRS = corky ringspot, IHN= internal heat necrosis.
[x]Total culls is the sum of growth cracks, misshaped, sunburned, and rotten categories.
[w]Means separated within columns using the Ryan-Einot-Gabriel-Welsch multiple range mean separation test at $P \leq 0.05$.
[ns,*,**,***]Nonsignificant or significant at $P \leq 0.05$, 0.01, or 0.001, respectively.

in Florida. However, the susceptibility of 'Atlantic' to IHN, a physiological disorder causing browning of parenchyma tissue greatly increases grower risk of economic loss from unmarketable tubers (Henninger et al., 1979). Although the prevalence of IHN is not very high in Florida, growing conditions can occasionally promote a high incidence of the disorder. Development of IHN is dependent on environmental factors such as timing of extreme air and soil temperature and insufficient irrigation during the season (Lee et al., 1992). Breeding high yielding, high specific gravity varieties with resistance to IHN is reported as possible (Henninger et al., 2000). B0564-8 and B0766-3 may be less susceptible to IHN and may improve consistency of tuber quality.

Differences within site main effects for misshaped, sunburned, total culls, and IHN were significant (Table 4). St. Johns 2 site had significantly more misshaped tubers than all other sites. The highest total culls were at the UF Farm, Flagler, and St. Johns 2 sites. The incidence of IHN was highest at the St. Johns 2 site at 6.8% compared to 2.0% at the UF Farm and Flagler sites. Except for IHN, external and internal defects were consistently low at all four sites.

The variety by site interaction was significant for misshaped, sunburned, and total culls (Table 4). The highest incidence for total culls for the variety by site interaction was recorded for 'Atlantic' 1 [3.0 t·ha^{-1} (27 cwt/acre)] and 'Atlantic' 2 [2.5 t·ha^{-1} (22 cwt/acre)] at the St. Johns 2 site. Total culls for B0766-3 ranged from 0.28 to 1.5 t·ha^{-1} (2.5 to 13 cwt/acre) at the St. Johns 1 and Flagler sites, respectively. The highest rate of sunburned tubers was at the UF Farm site with 'Atlantic' 2 [1.3 t·ha^{-1} (12 cwt/acre)] and 'Snowden' [1.8 t·ha^{-1} (16 cwt/acre)]. Sunburning was primarily a result of covering and uncovering plants early in the season for freeze protection.

PLANT GROWTH AND TUBER CHARACTERISTICS. The mean site early vigor ratings for B0564-8 and B0766-3 were 5.9 and 6.2, respectively. The two 'Atlantic' treatments had a mean early vigor rating of 5.3 over all sites. Vine type for all varieties at all sites was rated consistently as upright with a good canopy. Season length at the UF Farm, Flagler, St. Johns 1, and St. Johns 2 site was 105, 109, 103, and 104 d, respectively. Even though, season length at all sites was similar, vine maturity at harvest varied. Plants at the UF Farm and St. Johns 2 sites were less mature at harvest than varieties at the Flagler and St. Johns 1 sites which were consistently rated as dead. Crop management practices at each site were responsible for the differences in plant maturity. Plants at the UF Farm, Flagler, and St. Johns 2 sites were covered with soil early in the season for freeze protection which delayed maturity. Conversely, irrigation at the Flagler and St. Johns 1 sites was reduced late in the season to prepare vines for harvest. Late season warm air temperatures and reduced irrigation combined to enhance vine decline at the Flagler and St. Johns 1 sites.

Tuber characteristics for B0564-8 and B0766-3 were similar to the standard varieties. For all varieties, internal flesh color ranged from white to cream. Skin color was rated from tan to buff. Skin texture ranged from netted to slightly netted. Tuber shape was rated as mostly round. Eye depth ranged from intermediate to shallow with no difference between varieties. Overall appearance of the varieties ranged from fair to good.

Chip rating is a combination of chip color and percent defects. The numbered entries had relatively better chip ratings than 'Atlantic' (Table 4). Chip ratings for 'Atlantic' 1 and 2 at the UF Farm and St. Johns 2 site were fours (data not shown). These high scores were a result of high levels of IHN. 'Snowden', B0564-8, and B0766-3 scored a chip rating of 2.0 at three of four sites. A rating of two is considered very good. Potato shipments can be rejected by the processor for unacceptable internal quality. The low chip scores in the numbered entries reflect the low rate of internal tuber defects in these selections.

Conclusions

B0564-8 and B0766-3 tuber production and quality were comparable or better than both the 'Atlantic'

and 'Snowden' selections. Although 'Snowden' had good yields and chip ratings, it is not widely accepted by processors because of its potential for high glycoalkaloid levels which can negatively affect chip quality. Total yield of B0564-8 was statistically equivalent to an 'Atlantic' standard at all four locations and similar to 'Snowden' at three of four locations. Marketable yield of both numbered entries was about 92% of 'Atlantic'. B0564-8 had the most consistent conformation and highest overall appearance ratings of all varieties. Both numbered entries had significantly lower levels of hollow heart and IHN than 'Atlantic'. This translated into better chip ratings for the numbered entries compared to 'Atlantic'. A potential role for the new selections, especially B0564-8, may be as a late season chipper. B0564-8 could be recommended for late season plantings in the TCAA with the intent of filling June contracts when IHN becomes a potential problem with 'Atlantic'. Planting the numbered entries may improve the consistency of tuber quality and, in turn, production efficiency.

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Sweet Corn Variety Trials in Ohio: Recent Top Performers and Suggestions for Future Evaluations

Matthew D. Kleinhenz

Additional index words. crop quality, °Brix, plant height, ear height, ear length, ear diameter, shank length, row number, yield, *Zea mays*

Summary. A total of 21 and 28 standard and experimental varieties of yellow and white *se*- and *sh2*-type sweet corn (*Zea mays*) were planted in 1999 and 2000 in Fremont and Wooster, Ohio, which are separated by 193.1 km (120 miles) and contain different soil types. Data are reported here for a subset of these varieties (eight yellow, two white) showing a consistently high level of use in Ohio and planted in both years. Endosperm types were planted in distinct, parallel experiments separated by a minimum of 79.9 m (262 ft) at each site. A randomized complete block design with four replications per variety (V) per location (L) was used, with measures of 13 production- and market-based variables taken from emergence to 48 hours after harvest. Soluble solids 48 hours after harvest were greater at Wooster than Fremont in the *sh2* study. Variety had a significant, independent effect on mean plant and ear height in the *se* and *sh2* study, respectively, although further analysis of year × variety (Y × V) and location × variety (L × V) interactions suggested that V affected additional traits. On average, 'Tuxedo' (*se*) and 'HMX6383S' (*sh2*) had superior com-

Dept. of Horticulture and Crop Science, The Ohio State University, Ohio Agricultural Research and Development Center, 1680 Madison Avenue, Wooster, Ohio 44691-4096.

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