Variety Trials

Red-skinned, Fresh-market Potato Varieties for Northeastern Florida Production

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Additional index words. *Solanum tuberosum*., **fresh market, subsurface irrigation, seepage irrigation, quality, specific gravity, tuber defects**

Summary. **Potato (*Solanum tuberosum*) is an important agricultural crop for Florida. From 1996 to 2000, the winter and spring potato crop was grown on an average of 15,782.7 ha (39,000 acres) and valued at $117 million. Variety evaluation and selection is an important tool to improve production efficiency and increase the competitiveness of Florida growers. A red-skinned potato variety evaluation was conducted in northeastern Florida in 2002. The experimental design was a 4 (site) × 5 (variety) factorial with four replications at each site. The four sites were the University of Florida's Plant Science Research and Extension Unit and three local commercial farms. Potato varieties in the trial were 'Red LaSoda', 'LaRouge', B0984-1, B1145-2, and B1758-3. Marketable tuber yields were 36.3, 35.6, 30.2, 20.3, and 21.4 t·ha^{-1} (324, 318, 269, 181, and 191 cwt/acre) respectively, with tuber yields of the two named varieties significantly higher than the numbered entries. Specific gravity ranged from 1.060 ('Red LaSoda') to 1.070 (B0984-1). There were no significant differences among entries for total cull weight or the incidence of hollow heart, brown rot, or corky ringspot. However, a higher percentage of B0984-1 tubers showed symptoms of internal heat necrosis than all other varieties. Potato varieties ranked from lowest to highest in overall appearance were 'LaRouge', 'Red LaSoda', B1758-3, B0984-1, and B1145-2. Higher appearance ratings in the numbered entries were attributed to darker-red skin color, rounder tuber shape, and shallower eyes compared to 'Red LaSoda' and 'LaRouge'. 'Red LaSoda' and 'LaRouge' will continue to be recommended as the standard red-skinned potato varieties for Florida. However, B0984-1 and B1145-2 had desirable characteristics and should be planted in larger plantings to further evaluate quality and production characteristics.**

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Potato consistently ranks among the top five valued vegetable crops in Florida. From 1996 to 2000, potatoes were grown on an average of 39,000 acres and valued at $117 million annually (Witzig and Pugh, 2001). Florida is one of the few states in the U.S. that produces spring and winter potato crops (Hochmuth et al., 2001). The demand for Florida potatoes is generally very strong due to this unique production and marketing window. However, potato production efficiency must be improved in order for Florida growers to remain competitive in an ever expanding global marketplace.

Variety evaluation and selection is an important tool to improve production efficiency. Potato varieties that have better production and quality characteristics than the current standard varieties need to be identified. In Florida, potato varieties must perform well under short-day/long night conditions and be able to withstand floods and freezes. Fresh-market, red-skinned varieties must produce a high yield of attractive, round, bright red tubers with shallow eyes and few external or internal tuber defects. New varieties must also mature early. The average season length for Florida fresh-market potatoes is about 100 d, which eliminates late maturing northern varieties from consideration.

The standard fresh-market, red-skinned varieties currently recommended in Florida are 'Red LaSoda' and 'LaRouge' (Hutchinson et al., 2002). Advanced numbered selections that have demonstrated improved production or quality characteristics compared to standard varieties in university farm trials were selected as entries for this trial. In this context, the objective of this study was to evaluate potential new red-skinned potato varieties for Florida production at university and commercial farms.

Materials and methods

The experimental design was a four (site) × five (variety) factorial with four replications at each site. Data were subjected to analysis of variance (SAS, 2000). Variety and site means were separated 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 selected represent a broad range of conditions found in the Tri-County Agricultural Area (TCAA; St. Johns, Flagler, and Putnam counties). Commercial cooperators were selected based on their 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 entries were 'Red LaSoda', 'LaRouge' (both supplied by Agway, Presque Isle, Maine), B0984-1, B1145-2, and B1758-3 (USDA–ARS, Beltsville, Md.). Numbered entries should be referred to as clones and not varieties as they are not yet named. However, for ease of reading, clones will be called varieties and/or numbered entries.

Plot size was a single, 4.9-m-long row (16 ft). Between and within row spacing were 101.6 and 20.3 cm (40 and 8 inches), respectively, which resulted in an approximate plant population of 48,165 plants/ha (19,500 plant/acre). 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 as needed.

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 sidedressed 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, 13.8 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 sidedressed 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 at 1904.0 kg·ha^{-1} (1700 lb/acre)] was broadcasted and incorporated 1 week before planting. Potatoes were sidedressed three 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

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.

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) K.

Emerged potato plants were mechanically covered with soil on 27 Feb. and uncovered 28 Feb. at all sites except St. Johns 1 because of freezing night temperatures. St. Johns 1 site was not covered because air temperatures were buffered by the nearby St. Johns River. Plants at all sites were rated for plant vigor and stand between 41 and 43 d after planting (Sisson and Porter, 2002). Plant vine type was rated on all plots at full flower about 8 to 9 weeks after planting. Plant maturity was rated at harvest.

Potatoes in each plot were harvested, washed, and graded based on tuber diameter into five size classes 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. Culls (growth cracked, misshaped, sunburned, and rotten tubers) were removed and weighed before sizing. The total culls category was a sum of the tuber weight from all cull categories. Distribution by size class and size class range were calculated on tuber weight after culls were removed. Marketable yield was defined as tuber weight in size classes 2 through 4 (4.83 to 10.16 cm). Specific gravity was calculated on a subsample of 15 tubers from each plot using the weight-in-air/weight-in-water method. Tubers used to measure specific gravity of the same variety were grouped and rated for external tuber appearance (Tables 1 and 2; Sisson and Porter, 2002).

External tuber appearance scores are presented as the mean of two or three independent ratings made by trained personnel. A 20-tuber sample from each plot was cut into quarters and rated for internal quality. Hollow heart (HH), brown rot (BR), corky ringspot (CRS), and internal heat necrosis (IHN) were scored as the number of tubers exhibiting a physiological disorder on any one of the quarter sections.

Results and discussion

GROWING CONDITIONS. Growing conditions were generally good at all four sites for the season. Plants at the UF Farm, Flagler, and St. Johns 2 sites were covered with soil for freeze protection on 28 Feb. Covering plants with soil reduced freeze injury but increased mechanical damage and delayed maturity. Overall, however, weather conditions were 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).

TUBER PRODUCTION STATISTICS. The differences within total yield, marketable yield, size distribution by class, size class range, and specific gravity among varieties were significant (Table 3). 'Red LaSoda' and 'LaRouge' total and marketable yields were significantly higher than the three numbered entries. Marketable tuber yields of 'Red LaSoda' and 'LaRouge' were 36.3 and 35.6 t·ha^{-1} (324 and 318 cwt/acre), respectively. Marketable yield of B0984-1 was 30.2 t·ha^{-1} (269 cwt/acre) or 84% of Red LaSoda. B0984-1 produced the largest tubers with 47% of tubers in size classes 3 and 4. The yield and size of B0984-1 are similar enough to the current standards to make it a competitive variety.

B1145-2 and B1758-3 produced about 57% of 'Red LaSoda' marketable yield. B1145-2 and B1758-3 produced the smallest tubers with 92% and 85% of tubers in the first two size classes, respectively (Table 3). This was expected because the varieties were originally selected for their large production of small potatoes. These potatoes could potentially be marketed to processors and the B-sized, fresh-market.

Mean specific gravity ranged from 1.060 ('Red LaSoda') to 1.070 (B0984-1) (Table 3). The specific gravity of B1145-2 and B1758-3 tubers was similar to that of 'LaRouge', a current standard for the area. All varieties had a relatively low specific gravity that is desired for fresh-market potatoes.

The UF Farm and St Johns 2 sites

Table 3. Analysis of variance for total yield, marketable yield, percentage of yield by grade, size class range, and specific gravity of red-skinned 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	***[y]	***	---	***	***	***	***	NS	***	***	***
Site	**	***	---	***	***	***	***	NS	***	***	***
Variety × site	NS	NS	---	**	***	**	**	NS	**	***	*
Variety											
'Red LaSoda'	39.3 a[x]	36.3 a	---	5.8 b	54.9 b	30.9 a	8.4 b	0.0	94.2 a	39.3 b	1.060 d
'LaRouge'	39.3 a	35.6 a	98	6.3 b	60.3 b	26.5 a	6.9 bc	0.0	93.7 a	33.4 c	1.064 bc
B0984-1	33.0 b	30.2 b	83	4.8 b	48.4 c	28.0 a	18.7 a	0.0	95.2 a	46.7 a	1.070 a
B1145-2	25.1 c	20.3 c	56	16.8 a	74.9 a	7.8 c	0.5 d	0.0	83.2 b	8.3 e	1.062 cd
B1758-3	26.5 c	21.4 c	59	15.3 a	70.1 a	12.2 b	2.4 cd	0.0	84.7 b	14.6 d	1.065 b
Site											
UF Farm	36.4 a	33.3 a	---	6.6 c	55.4 b	28.4 a	9.6 a	0.0	93.4 a	38.0 a	1.062 c
Flagler	30.3 b	26.1 c	---	11.6 b	61.7 b	20.5 b	6.1 b	0.0	88.4 b	26.7 b	1.065 b
St. Johns 1	29.5 b	25.5 c	---	13.3 a	73.6 a	11.8 c	1.3 c	0.0	86.7 c	13.0 c	1.069 a
St. Johns 2	34.3 a	29.7 b	---	7.8 c	56.2 b	23.2 ab	12.8 a	0.0	92.2 a	36.0 a	1.062 c

[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 on external and internal tuber defects of red-skinned potatoes grown in northeastern Florida.

	External tuber defects (t·ha^{-1})[z]					Internal tuber defects[y] (%)			
Factor	Growth cracks	Misshaped	Sunburned	Rotten	Total culls[x]	HH	BR	CRS	IHN
Variety	NS	*	***	NS	NS	NS	NS	NS	***
Site	***	**	**	NS	**	NS	NS	NS	NS
Variety × site	NS	NS	***	NS	NS	*	NS	NS	NS
Variety									
'Red LaSoda'	0.3	0.3 ab[w]	0.2 a–c	0.2	1.0	1.1	0.0	0.0	0.0 b
'LaRouge'	0.1	0.7 a	0.3 a	0.3	1.5	1.3	0.0	0.0	0.6 b
B0984-1	0.1	0.1 b	0.0 c	1.0	1.2	1.3	0.3	0.0	8.1 a
B1145-2	0.1	0.2 ab	0.1 bc	0.6	0.9	0.1	0.3	0.3	0.3 b
B1758-3	0.1	0.4 ab	0.2 ab	0.7	1.6	1.1	0.0	0.0	6.6 a
Site									
UF Farm	0.0 b	0.2 b	0.2 ab	0.6	1.0 b	0.6	0.3	0.3	2.5
Flagler	0.2 a	0.2 b	0.0 b	0.7	1.1 b	1.0	0.3	0.0	2.5
St. Johns 1	0.0 b	0.1 b	0.0 b	0.1	0.3 b	1.4	0.0	0.0	4.0
St. Johns 2	0.2 a	0.8 a	0.3 a	1.0	2.5 a	0.7	0.0	0.0	3.7

[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.

produced the highest total yields of all sites at 36.4 and 34.3 t·ha^{-1} (325 and 306 cwt/acre), respectively (Table 3). The UF Farm site produced the highest marketable tuber yield, 33.3 t·ha^{-1} (297 cwt/acre). Tubers at the St. Johns 1 site were smallest with 87% of tubers sized in size classes 1 and 2. Specific gravity was highest in tubers grown at the St. Johns 1 site (1.069) and lowest at the UF Farm (1.062) and St. Johns 2 sites (1.062).

The site by variety interaction was significant for size distribution by class, size class range, and specific gravity variables (Table 3). 'Red LaSoda' and B0984-1 had significantly higher percentages of tubers in size classes three and four than B1145-2 and B1758-3 at all locations. In general, the varieties had an acceptable specific gravity for the fresh-market at all sites. The lack of significant differences for total and marketable yields for the site by variety interaction emphasizes the similar production over the TCAA.

External and internal tuber quality. There were significant differences among the varieties for the tuber external and internal defects (Table 4). 'Red LaSoda' and 'LaRouge' had significantly more misshaped and sunburned tuber weight than B0984-1. However, B0984-1 had a higher incidence of internal heat necrosis than 'Red LaSoda', 'LaRouge', and B1145-2. In 4 years of testing on university farms, internal heat necrosis has been noted only during one season in B0984-1 when it appeared in 1% of the tubers (data not shown). Unseasonably warm late season temperatures in northeast Florida in 2002 may have contributed to the increased incidence of the disorder. There were no significant differences in the incidence of growth cracks, rotten tubers, total culls, hollow heart, brown rot, or corky ringspot among varieties. The levels of internal and external tuber disorders would not preclude recommending any of the numbered entries for larger scale plantings.

The UF Farm site had among the lowest incidence of tubers with growth cracks, misshapes, sunburn, and total culls of all the sites (Table 4). Incidence of external tuber defects including total culls was highest at the St. Johns 2 site. However, the values for total culls at all sites were acceptable for the area. There were no significant differences among sites for the incidence of internal tuber defects.

Plant growth and tuber characteristics. Early vigor ratings for 'Red LaSoda' and 'LaRouge' averaged 5.9 over all sites. B0984-1, B1145-2, and B1758-3 averaged early vigor ratings over all sites of 5.3, 5.9, and 5.6, respectively. The similar early vigor values indicated that early season growth and canopy size were comparable among varieties. Vine type was consistent over all sites for all varieties and was rated as upright with a good canopy.

Vine maturity at harvest varied among locations. Vine desiccants were not applied at any site. Plots were harvested after 105, 109, 103, and 104 d at the UF Farm, Flagler, St. Johns 1, and St. Johns 2 sites, respectively. At harvest, plants at the Flagler and St. Johns 1 sites were rated consistently as "dead". In comparison, plants at the UF Farm and St. Johns 2 sites were less mature at harvest. Differences in maturity at harvest among sites can be attributed to differences in crop management. 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. Additionally, irrigation at the Flagler and St. Johns 1 sites was reduced late in the season compared to other sites to control tuber size and to aid in tuber skin set. Warm weather conditions and reduced irrigation late in the season resulted in enhanced vine decline at the Flagler and St. Johns 1 sites. At all sites, the numbered entries matured at about 100 d after planting. Early maturity is required to meet market demands and reduce the negative effects of inclement summer weather late in the season.

Internal and external tuber quality characteristics were consistent within varieties for all sites. For all varieties, internal flesh color ranged from white to cream. Skin color was rated from red to pink. B0984-1 was consistently rated with a naturally darker red skin color than 'Red LaSoda' and 'LaRouge'. Skin texture of 'Red LaSoda' and 'LaRouge' was rated as moderately smooth to

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

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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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