

# Fall 2007 Commercial Fruit & Vegetable Variety Trials

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# Introduction: Tips for Interpreting Vegetable Varieties Performance Results

Edgar Vinson and Joe Kemble

The fall 2007 variety trial bulletin includes results from Auburn University and North Carolina State University. The information provided by this report must be studied carefully in order to make the best selections possible. Although yield is an essential part of varietal performance, other information must be studied. The following provides a few tips to help adequately interpret results in this report.

**Open pollinated or hybrid varieties.** In general, hybrids (also referred to as  $F_1$ ) produce a more uniform crop and have improved disease, pest, and/or virus tolerance/resistance. As a result of these enhanced characteristics,  $F_1$  varieties are often more expensive than open pollinated varieties (OP), and seeds cannot be collected from one crop in order to plant the next crop. Selecting a hybrid variety is the first step toward earliness and quality.

**Yield potential.** Yields reported in variety trial results are extrapolated from small plots. Depending on the vegetable crop, plot sizes range between 100 to 500 square feet. Yields per acre are estimated by multiplying plot yields by corrective factors ranging from 100 to 1,000. Small errors are thus amplified, and estimated yields per acre may not be realistic. Your expected yield cannot be estimated directly from the values reported in these trials; however, the relative differences in performance among varieties are realistic, and can be used to identify best-performing varieties.

**Statistical interpretation.** The coefficient of determination ( $R^2$ ), coefficient of variation (CV) and least significant difference (LSD) are reported for each trial. These numbers are helpful in separating the differences due to small plots (sampling error) and true (but unknown) differences among entries.

$R^2$  values range between 0 and 1. Values close to 1 suggest that the test was conducted under good conditions and most of the variability observed was mainly due to the effect of variety and replication. Random, uncontrolled errors were of lesser importance. CV is an expression of yield variability relative to yield mean. Low CVs (less than 0.20) are desirable but are not always achieved.

There must be a minimum yield difference between two varieties before one can statistically conclude that one variety actually performs better than another. This is known as the Least Significant Difference (LSD). When the difference in yield is less than the LSD value, one cannot conclude that there is any real difference between two varieties. For example, in the lettuce trial presented in this issue conducted at the Brewton Agricultural Research Unit, 'Rubicon' yielded 7,024 pounds per acre, while 'Paramount' and 'Red Eye Cos' yielded 5,716 and 3,971 pounds per acre, respectively. Since there was less than a 2,173 difference between 'Rubicon' and 'Paramount', there is no statistical difference between these two varieties. However, the yield difference between 'Rubicon' and 'Red Eye Cos' was 3,053, indicating that there is a real difference between these two varieties. From a practical point of view, LSD values are the most useful for interpreting results.

**Trial conditions.** AU vegetable variety trials are conducted under standard, recommended commercial production practices for Alabama. If the cropping system to be used is different from that used in the trials, the results of the trials may not apply. Information on soil type (Table 1), planting dates, and production methods is provided to help compare specific practices to the standard in order to make relevant adjustments.

**Ratings of trials.** At each location, variety trials were rated on a 1 to 5 scale, based on weather conditions, fertilization, irrigation, pest pressure, and overall performance (Table 2). Results from trials with ratings of 2 and under are not reported. These numbers may be used to interpret differences in performance from location to location. The overall rating may be used to give more importance to the results of variety performance under good growing conditions.

**Where to get seeds.** Because seeds are living, their performance and germination rate depends on how old they are, where and how they were collected, and how they have been handled and stored. It is always preferable to

get certified seeds from a reputable source, such as the ones listed in Selected Sources for Vegetable Seeds.

Several factors other than yield have to be considered when choosing a vegetable variety from a variety trial report. The main factors are type, resistance and tolerance to diseases, earliness, and of course, availability and cost

of seeds. Although seed cost might seem high, purchasing the best quality seed of recommended varieties is a critical step in the production of quality produce. It is always better to try two to three varieties on a small scale before making a large planting of a single variety.

**Table 1. Soil Types at the Location of the Trial**

Location	Water holding capacity (in/in)	Soil type
Gulf Coast Research and Extension Center (Fairhope)	0.09-0.19	Malbis fine sandy loam
Brewton Agricultural Research Unit (Brewton)	0.12-0.14	Benndale fine sandy loam
Wiregrass Research and Extension Center (Headland)	0.14-0.15	Dothan sandy loam
Lower Coastal Plain Research and Extension (Camden)	0.13-0.15	Forkland fine sandy loam
EV Smith Research Center, Horticultural Unit (Shorter)	0.15-0.17	Norfolk-orangeburg loamy sand
Chilton Area Horticultural Substation (Clanton)	0.13-0.15	Luvernue sandy loam
Upper Coastal Plain Research and Extension Center (Winfield)	0.13-0.20	Savannah loam
North Alabama Horticultural Research Center (Cullman)	0.16-0.20	Hartsells-Albertville fine sandy loam
Sand Mountain Research and Extension Center (Crossville)	0.16-0.18	Wynnvilleville fine sandy loam

**Table 2. Description of Ratings**

Rating	Weather	Fertilizer	Irrigation	Pests	Overall
5	Very Good	Very Good	Very Good	None	Excellent
4	Favorable	Good	Good	Light	Good
3	Acceptable	Acceptable	Acceptable	Tolerable	Acceptable
2	Adverse	Low	Low	Adverse	Questionable
1	Destructive	Very Low	Insufficient	Destructive	Useless



# Several Bell Pepper Varieties Resistant to Tomato Spotted Wilt Virus



Joe Kemble, Edgar Vinson, and Jason Burkett

A bell pepper variety trial was conducted at E.V. Smith Research Center (EVSRC) in Shorter, Alabama, (Tables 1 and 2). On May 31, 10 five-week-old pepper varieties were transplanted into plots that were 20 feet long on 5-foot centers. Plants within a row were spaced at 1.5 feet. Plastic mulch and drip irrigation were used. Experimental plots were arranged in a randomized complete block design.

Soils were fertilized according to the recommendations of the Auburn University Soil Testing Laboratory. Current recommendations for commercial vegetable crops can be found in the “Southeastern U.S. Vegetable Crop Handbook.” Copies are available from your local Extension agent and online at [www.aces.edu/com\\_veg](http://www.aces.edu/com_veg).

Bell peppers were harvested on August 7, August 16, and August 22. Fruits were harvested at the mature green color stage, weighed, and graded (Table 3) using the USDA grade standards (Circular AHR-784 of the Alabama Cooperative Extension System). The mature green stage is the point when developing fruit can be removed from plants and continue to ripen.

**Table 1. Ratings of the 2007 Bell Pepper Variety Trial<sup>1</sup>**

Location	EVSRC
Weather	3
Fertility	5
Irrigation	5
Pests	5
<b>Overall</b>	<b>4.6</b>

<sup>1</sup> See introduction for description of ratings scales

‘X3R Camelot’ is the market standard in this study. Tomato spotted wilt tolerant/resistant varieties ‘Stiletto’ and ‘Heritage’ were similar to the market standard ‘X3R Camelot’ in total marketable yield. In total marketable number, all varieties were similar to ‘X3R Camelot’ with the exception of ‘Valencia’ which was statistically lower. Due to weather conditions, sunscald developed on most of the fruit. Fruit with sunscald are culled. Canopy cover is essential to preventing the development of sunscald. ‘Queen’, known for its excellent leaf cover, had one of the lowest percentages of sunscald. ‘Mavras’ had the lowest percentage of sunscald.

**Table 2. Seed Source, Fruit Characteristics, and Relative Earliness of Selected Bell Pepper Varieties**

Variety	Type	Seed source	Fruit color	Days to harvest	Disease tolerance/resistance
X3R Camelot	F <sub>1</sub>	Seminis	Green-Red	74	BLS(1,2,3),TbMV
Heritage	F <sub>1</sub>	Harris Moran	Green-Red	—	BLS(1,2,3,5), TSW
Ironsides	F <sub>1</sub>	Seminis	Green-Red	70	BLS(1,2,3)
Lafayette	F <sub>1</sub>	Rogers	Green-Yellow	75	BLS(1,2,3), PeMV, PVY
Lilac	F <sub>1</sub>	Rogers	White-Lilac-Red	68	Stip, TMV
Mavras	F <sub>1</sub>	Siegers	Green-Purple	68	TMV
Queen	F <sub>1</sub>	Siegers	Green-Orange	—	TMV
Stiletto	F <sub>1</sub>	Rogers	Green-Red	75	BLS(1,2,3) TSW
Valencia	F <sub>1</sub>	Rogers	Green-Gold	75	Stip, TbMV
X3R Wizard	F <sub>1</sub>	Siegers	Green-Red	73	BLS(1,2,3) TbMV

Type: F<sub>1</sub> = Hybrid. Disease claims: BLS=Bacterial Leaf Spot; TbMV=Tobacco Mosaic Virus; TSW=Tomato Spotted Wilt; PeMV=Pepper Mottle Virus; PVY=Potato Virus Y; TMV=Tobacco Mosaic Virus.

— = not available from seed catalogues

**Table 3. Performance of Selected Bell Pepper Varieties**

Variety	Total marketable yield <i>lbs/A</i>	Total number of marketable fruit <i>no/A</i>	Total number of culls (nonmarketable number) <i>no/A</i>	Total cull weight (nonmarketable weight) <i>lbs/A</i>	Sunscald fruit <sup>1</sup> <i>pct</i>	Individual fruit weight <i>lbs</i>
X3R Camelot	7,469	27,514	13,920	2,543	36	0.12
Heritage	6,390	28,275	22,946	2,715	23	0.10
Stiletto	6,319	29,689	31,320	4,106	20	0.10
X3R Wizard	6,041	23,816	15,008	2,381	16	0.11
Lafayette	5,563	20,554	19,140	3,232	24	0.12
Queen	5,340	25,556	28,928	3,577	14	0.09
Mavras	4,945	22,403	19,140	2,043	12	0.10
Ironside	4,307	22,403	12,724	1,907	22	0.09
Valencia	4,156	17,509	39,259	5,252	17	0.10
Lilac	3,431	19,901	55,136	5,321	21	0.08
<b>R<sup>2</sup></b>	<b>0.60</b>	<b>0.50</b>	<b>0.80</b>	<b>0.70</b>	•	<b>0.53</b>
<b>CV</b>	<b>44</b>	<b>41</b>	<b>33</b>	<b>38</b>	•	<b>17</b>
<b>LSD</b>	<b>1,305</b>	<b>11,683</b>	<b>10,159</b>	<b>685</b>	•	<b>0.025</b>

<sup>1</sup> Sunscald fruit=Percent of total fruit harvested that were culled due to sunscald.





# New Looseleaf Lettuce Varieties Top Standards



Joe Kemble, Edgar Vinson, and Randy Akridge

In 2007, a lettuce variety trial was conducted at the Brewton Agriculture Research Unit in Brewton, Alabama (Tables 1 and 2).

On October 10, five-week-old butterhead, looseleaf, and Romaine lettuce transplants were set in staggered double rows with a 12-inch spacing between plants within a row. Plots were covered in white plastic mulch and drip irrigation was installed. Plots were 20 feet long on 6-foot centers. This created a stand of approximately 7,200 plants per acre. Experimental plots were arranged in a randomized complete block.

Soils were fertilized according to the recommendations of the Auburn University Soil Testing Laboratory. Current recommendations for commercial vegetable crops can be found in the “Southeastern U.S. Vegetable Crop Handbook.” Copies are available from your local Extension agent and online at [www.aces.edu/com\\_veg](http://www.aces.edu/com_veg).

Lettuce was harvested and graded according to the Standards for Grade of Lettuce (U.S. Dept. of Agriculture Publication 60-6130) (Table 3).

Location	BARU
Weather	5
Fertility	5
Irrigation	5
Pests	5
<b>Overall</b>	<b>5</b>

<sup>1</sup> See introduction for description of ratings scales

In this year’s trial there were only two varieties each for butterhead and looseleaf lettuce types. Overall, yields for butterhead and looseleaf were lower this year than last year with butterhead types yielding half as much as last year. There were no significant differences found in varieties of either type. Among the Romaine types the yield of ‘Rubicon’ was significantly higher than that of ‘Red Hot Cos’ and ‘Athena’. ‘Rubicon’ was similar to all other varieties. Numerically, ‘Rubicon’ produced more marketable heads than the other Romaine lettuces, but statistically ‘Rubicon’ outproduced only ‘Athena’ in terms of total marketable heads.

Variety	Head type	Seed source	Days to harvest	Leaf color	Disease claims	Years evaluated
Athena	Romaine	Enza Zaden/Siegers	63	Green	CRR,DM,LMV,TB	02-04, 06,07
Bergam’s Green	Looseleaf	Siegers	57	Green	CRR, TB	06,07
Green Towers	Romaine	Harris	74	Green	—	02-04,06,07
Optima	Butterhead	Vilmorin\Siegers	55	Green	DM,LMV	95-97,02-04, 06,07
Paramount	Romaine	Siegers	60	Green	CRR	
Red Butter	Butterhead	Siegers	61	Green-Red	—	06,07
Red Eye Cos	Romaine	Stokes	—	Red	—	02-04,06,07
Red Hot Cos	Romaine	Stokes	70	Red	—	06,07
Rubicon	Romaine	Siegers	67	Green	CRR, LMV	06,07
Tehema	Looseleaf	Siegers	53	Green	B, CRR, TB	06,07

Disease claims: B=Bolt tolerant/resistant; CRR=Cork Root Rot; DM=Downy Mildew; LMV=Lettuce Mosaic Virus; TB = Tip Burn. — = not available from seed catalogues

**Table 3. Performance of Selected Romaine, Butterhead, and Looseleaf Lettuce Types**

Variety	Type	Marketable weight <i>lbs/A</i>	Marketable heads <i>no/A</i>	Average weight <i>lbs/head</i>	Marketable heads compared to total heads <sup>1</sup> %	Cull heads <i>no/A</i>
Optima	Butterhead	4,642	6,615	0.71	67	323
Red Butter	Butterhead	3,570	6,534	0.54	46	1,210
Bergams Green	Looseleaf	6,184	7,381	0.83	80	363
Tehema	Looseleaf	5,594	7,623	0.73	72	121
Rubicon	Romaine	7,024	7,583	0.92	91	161
Paramount	Romaine	5,726	7,018	0.82	74	726
Red Hot Cos	Romaine	5,178	7,381	0.70	67	363
Green Towers	Romaine	4,893	6,897	0.71	62	968
Red Eye Cos	Romaine	3,971	6,897	0.57	52	726
Athena	Romaine	3,360	5,929	0.56	43	1,815
<b>R<sup>2</sup></b>		<b>0.60</b>	<b>0.44</b>	<b>0.60</b>	<b>0.60</b>	•
<b>CV</b>		<b>24</b>	<b>11</b>	<b>18</b>	<b>23</b>	•
<b>LSD</b>		<b>2,173</b>	<b>1,087</b>	<b>0.20</b>	<b>0.22</b>	•

<sup>1</sup> Percent of heads that are marketable compared to total number of heads harvested.



# Performance of Muscadine Grape Varieties in Central Alabama



Elina Coneva, Bryan Wilkins, and Jason Burkett

Nine muscadine grape cultivars are being evaluated at the E.V. Smith Research Center in Central Alabama. ‘Early Fry’, ‘Janet’, ‘African Queen’, ‘Darlene’, ‘Black Beauty’, ‘Black Fry’, and ‘Pam’ are muscadine grapes commonly recommended for fresh market. ‘Ison’ and ‘Noble’ are commonly recommended for processing into juice or wine. The experimental block was planted in 1996 and muscadine vines spaced at 20 by 12 feet. Vines were trained to a Geneva Double Curtain (GDC) trellis system.

‘Pam’, ‘Black Beauty’, ‘Early Fry’, and ‘Darlene’ were the best performing fresh market muscadine cultivars in 2007 based on yield, berry size, and fruit quality data. ‘Pam’ had the highest yield—an average of 179 pounds of fruit per vine (see table), which translates to 32,578 pounds per acre at a 20-foot by 12-foot vine spacing with 182 plants per acre. Other cultivars with good cropping potential in this study were ‘Black Beauty’, ‘Early Fry’, and ‘Janet’. ‘African Queen’ grape produced the lowest yield in 2007, when compared to the rest of the fresh market cultivars tested. From the group of processing type muscadine cultivars, ‘Ison’ produced 110 pounds per vine on average, and data for ‘Noble’ yield were not complete.

A muscadine grape cultivar grown for fresh market consumption should be large, sweet, and attractive with a relatively thin skin. ‘Darlene’ grape produced the largest berries—an impressive 0.6 ounce on average (see table). ‘Pam’, ‘Black Fry’, and ‘Janet’ also had large size berries

(0.5 ounce on average). Average berry size was medium (0.4 ounce) for ‘Ison’ and small (0.1 ounce) for ‘Noble’ processing muscadines grapes. ‘Early Fry’ had the highest soluble solids content—16.7 percent—followed by ‘Darlene’ and ‘Black Beauty’ with 16.1 percent and 15.5 percent soluble solids, respectively.

Generally, ‘Ison’ and ‘Noble’, the processing type cultivars, had high berry density, expressed as number of berries per unit shoot length. Among the fresh market muscadine cultivars, ‘Early Fry’ and ‘Black Fry’ had the highest berry density of 18 berries per unit shoot length, followed by ‘Pam’ with 14 berries per unit shoot length.

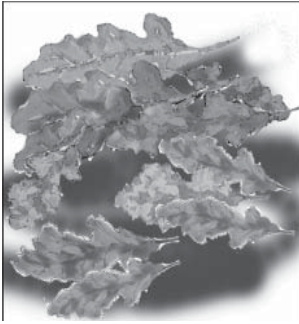
‘Noble’ was the processing type of muscadine grape with a crop level of 2.7 fruit clusters per unit shoot length. ‘Early Fry’ and ‘Black Fry’ fresh market grapes also produced more than two fruiting clusters per unit shoot length.

Although continued evaluation of muscadine grape cultivars in Central Alabama is ongoing, it appears that ‘Pam’, ‘Black Beauty’, ‘Early Fry’, and ‘Darlene’ have a very good cropping potential in Central Alabama, while ‘African Queen’ may not be suitable for production in the central part of the state.

Further research is needed to evaluate the muscadine cultivar performance under different environmental conditions in upcoming years.

**Performance of Selected Fresh Market and Processing Muscadine Cultivars, E.V. Smith Research Center, 2007**

Cultivar	Yield lbs/plant	Mean fruit size oz.	Soluble solids pct	Berry density no berries/unit shoot length	Crop level no clusters/unit shoot length
<b>Fresh Market</b>					
Early Fry	101	0.4	16.7	18	2.4
Black Fry	90	0.5	8.6	18	2.1
Black Beauty	132	0.4	15.5	2	1.6
Pam	179	0.5	6.0	14	1.4
Darlene	71	0.6	16.1	5	0.9
Janet	104	0.5	14.2	8	1.2
African Queen	51	0.4	7.5	10	1.2
<b>Processing</b>					
Ison	110	0.4	13.2	17	1.4
Noble	—	0.1	5.6	37	2.7



# Several Types of Chinese Greens Grown in Central Alabama



Joe Kemble, Edgar Vinson, and Jason Burkett

A Chinese cabbage and greens variety trial was conducted at E.V. Smith Research Center (EVSRC) in Shorter, Alabama, (Tables 1 and 2). Six-week-old Napa, Mizuna, and Bok Choi types were transplanted onto plots that were 20 feet long on 6-foot centers on May 31. Plants within a row were spaced on 1.5 foot centers. White plastic mulch and drip irrigation were used.

Soils were fertilized according to the recommendations of the Auburn University Soil Testing Laboratory. Current recommendations for commercial vegetable crops can be found in the "Southeastern U.S. Vegetable Crop Handbook." Copies are available from your local Extension agent and online at [www.aces.edu/com\\_veg](http://www.aces.edu/com_veg).

Bok Choi and Mizuna types were harvested on November 29 and Napa types were harvested on December 19. At both harvests, greens were weighed in the field (Table 3). Heads of all types and varieties were marketable once they

**Table 1. Ratings of the 2007 Chinese Cabbage Variety Trial<sup>1</sup>**

Location	EVSRC
Weather	4
Fertility	5
Irrigation	5
Pests	3
<b>Overall</b>	<b>4</b>

<sup>1</sup> See introduction for description of ratings scales

reached an appreciable size and had little or no insect damage or other physiological disorder.

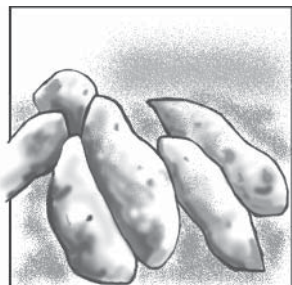
Since Chinese cabbage and greens are new to the trials, there are not enough data to determine market standards. There were two varieties among the Bok Choi types and they were both statistically similar. Among the Napa types, 'Greenwich' was statistically higher than 'Minuet' but similar to 'Lettucy' and 'Rubicon'. In the marketable

**Table 2. Seed Source, Fruit Characteristics, and Relative Earliness of Selected Chinese Cabbage Varieties**

Variety	Type	Seed source	Plant habit	Leaf color	Days to harvest
Joi Choi	Bok Choi	Johnny's	Upright	Green	50
Mei Qing Choi	Bok Choi	Johnny's	Upright	Green	45
Early Mizuno	Mizuna	Johnny's	Looseleaf	Green	40
Greenwich	Napa	Johnny's	Upright	Green	50
Lettucy	Napa	Johnny's	Upright	Green, Yellow	45
Rubicon	Napa	Johnny's	Upright	Green, Yellow	52
Minuet	Napa	Johnny's	Upright	Green, Yellow	48

**Table 3. Performance of Selected Chinese Cabbage Varieties**

Variety	Type	Total marketable yield lbs/A	Total marketable number no/A	Nonmarketable head number no/A	Individual head weight lbs
Joi Choi	Bok Choi	7,346	7,260	0	1.0
Mei Qing Choi	Bok Choi	5,852	7,260	0	0.8
Early Mizuno	Mizuna	5,436	7,260	0	0.8
Greenwich	Napa	14,552	6,806	363	2.1
Lettucy	Napa	10,482	6,080	817	1.7
Rubicon	Napa	10,427	5,082	1,906	2.0
Minuet	Napa	9,992	6,534	908	1.5
<b>R<sup>2</sup></b>		<b>0.72</b>	<b>0.61</b>	.	<b>0.90</b>
<b>CV</b>		<b>25</b>	<b>12</b>	.	<b>18</b>
<b>LSD</b>		<b>3,467</b>	<b>1,209</b>	.	<b>0.40</b>



# Results of the 2007 National Sweetpotato Collaborators' Trial



Joe Kemble, Edgar Vinson, and Arnold Caylor

National Sweetpotato Collaborators' trials were conducted at the North Alabama Horticulture Research Center (NAHRC) in Cullman, Alabama (Table 1). The sweetpotato collaborators' trial was replicated at other universities in the Southeast. The purpose of the trials is to improve sweetpotato yield and quality through the development and testing of new breeding lines.

Sweetpotato roots from selected commercial varieties and breeding lines were planted in a heated bed at NAHRC on March 4 for slip production. Slips of two sweetpotato lines were planted on June 12. Varieties were replicated four times. Plots contained two rows that were 40 feet long and 3.5 feet wide. Within-row spacing was 1 foot.

Soils were fertilized according to the recommendations of the Auburn University Soil Testing Laboratory and consisted of (per acre) 80 pounds N, 184 pounds P<sub>2</sub>O<sub>5</sub> and 156 pounds K<sub>2</sub>O total. Current recommendations for commercial vegetable crops can be found in the "Southeastern U.S. Vegetable Crop Handbook." Copies are available from your local Extension agent and online at [www.aces.edu/com\\_veg](http://www.aces.edu/com_veg).

Sweetpotatoes were harvested on September 11. Roots were graded as US No. 1 (roots 2 to 3.5 inches in di-

Location	NAHRC
Weather	5
Fertility	5
Irrigation	5
Pests	5
<b>Overall</b>	<b>5</b>

<sup>1</sup> See introduction for description of ratings scales

ameter, 3 to 9 inches in length, well shaped, and free of defects), Canner (roots 1 to 2 inches in diameter, 2 to 7 inches in length), Jumbo (roots that exceed the diameter, length, and weight requirements of the US No. 1 grade, but that are of marketable quality), or cull (roots at least 1 inch in diameter but so misshapen or unattractive that they could not be classified as marketable roots). Marketable yield was calculated by adding the yields of the US No. 1, Canner, and Jumbo grades. Percent US No. 1 was calculated by dividing the yield of the US No. 1 grade by the marketable yield (Table 2).

Variety	Total marketable 50-lb bu/A	US No.1 50-lb bu/A	Canner 50-lb bu/A	Jumbo 50-lb bu/A	Percent US No.1 50-lb bu/A	Cull 50-lb bu/A
NC99-573*	374	264	79	31	71	26
Beauregard (B94-14 G2)	370	209	99	62	56	39
B63** (B63 G1 LSU)	332	238	54	40	71	17
Evangeline	331	203	41	87	61	36
NC Japanese	200	88	112	0	43	31
Covington	162	84	55	22	49	49
L0129*	152	44	108	0	25	23
<b>R<sup>2</sup></b>	<b>0.70</b>	<b>0.74</b>	<b>0.68</b>	<b>0.61</b>	<b>0.65</b>	<b>0.41</b>
<b>CV</b>	<b>28</b>	<b>37</b>	<b>33</b>	<b>86</b>	<b>26</b>	<b>49</b>
<b>LSD</b>	<b>123</b>	<b>95</b>	<b>45</b>	<b>44</b>	<b>23</b>	<b>26</b>

Average yields are given on a per acre basis. \* = Breeding lines. \*\* = Modified versions of Beauregard.

US No. 1: Roots 2 to 3.5 inches in diameter, 3 to 9 in length; must be well shaped and free of defects.

Canner: Roots 1 to 2 inches in diameter, 2 to 7 inches in length.

Jumbo: Roots that exceed the diameter, length, and weight requirements of the above two grades, but are of marketable quality.

Percent US No.1: Calculated by dividing the weight of US No.1s by the total marketable weight (Culls not included).

Cull: Roots must be 1 inch or larger in diameter and so misshapen or unattractive that they could not fit as marketable roots in any of the above three grades.





# Asparagus Cultivar Evaluation, 2007-2008

Carl Cantaluppi



People moving into North Carolina from northern states, where asparagus is commonly grown, often want to buy asparagus from local growers. Asparagus is a high-value horticultural crop that is easy to grow and can bring in extra income for growers.

Proper variety selection is important for success, so a 3-acre replicated asparagus cultivar trial was planted at the Garnett Carr farm in Roxboro, North Carolina with 13 cultivars (Table 1). Seeds were sown in the greenhouses of Aarons Creek Greenhouses in Buffalo Junction, Virginia, in late January 2005 and transplants were planted into the field on May 4, 2005 in an Appling Sandy Loam soil.

A randomized complete block design with 12 plants per plot and four replications was used. The purpose of this trial was to evaluate new cultivars to see which are the most suitable for commercial production.

Since the trial was planted using seedling transplants, no harvest was taken in 2006. This was done to build food reserves in the crown of the plant to strengthen the plant for a two-week harvest in 2007.

For more than 20 years, new asparagus varieties that have been released are male hybrids. Asparagus is normally dioecious, meaning that it has male and female reproductive structures (flowers) on separate plants. Female plants expend energy to produce seed while in the fern growth stage. Because of this, female plants produce half as many

spears as male plants, which produce no seed. Seeds from female plants fall to the ground and germinate, causing a seedling asparagus weed problem. For this reason, asparagus breeders in the U.S. and other countries have gone with male hybrids obtained from super male parent plants. When these super males are crossed with a female, the majority of the F1 generation is male, with no seeds produced. These super male hybrids yield about three times the amount of the older dioecious open-pollinated varieties, such as Mary Washington.

Harvest started on March 15, 2007, with just a few spears each of 'Grande', 'UC 157', and UC 115'. A frost occurred on March 19, which delayed future spear emergence until March 26. The other cultivars then started to emerge with the exception of 'Purple Passion', 'Dulce Verde', and 'Guelph Millennium', which did not emerge until April 2.

The last harvest was taken on April 5. On April 6, April 7, and April 8, we had severe frosts that stopped harvest again. A decision was made to end the 2007 harvest at this time, as the harvest period lasted three weeks, with an actual harvest of two weeks for most cultivars, with one week being lost to frost. Ten harvests were made during the three-week period.

'UC 157' yielded the highest and along with 'Atlas', 'Grande', and 'Jersey Knight' had the greatest

**Table 1. Breeding Location and Parentage of and Comments on Selected Asparagus Cultivars**

Variety	Breeding location	Parentage	Comments
Jersey Giant	New Jersey	NJ 56 female, NJ 22-8 super male	—
Jersey Supreme	New Jersey	NJ 44P female, NJ 22-8 super male	—
Jersey Gem	New Jersey	NJ G27 female, NJ 22-8 super male	—
Jersey Knight	New Jersey	NJ 277C female, NJ 22-8 super male	—
UC 157	California	F 109 female, M120 male	Dioecious hybrid
DePaoli	California	F600 female clone, M256 male clone	Dioecious hybrid
Atlas	California	F 109 female, unspecified Rutgers male	Dioecious hybrid
Apollo	California	F 109 female, unspecified Rutgers male	Dioecious hybrid
Grand	California	F 109 female, unspecified Rutgers male	Dioecious hybrid
Purple Passion	California	Progeny of Vileta d' Albinga	Burgundy, sweeter than green types, Open-pollinated
Dulce Verde	California	—	High sugar, Discontinued
Guelph Millennium	U. Of Guelph	—	—

percentage of large diameter spears, which were 93, 95, 97, and 91 percent respectively.

'Jersey Giant', 'Jersey King', and 'Jersey Supreme' were the second, third, and fourth highest yielders, with 80, 81, and 84 percent large diameter spears, respectively.

'Jersey Knight' was the lowest yielding cultivar of the New Jersey male hybrids.

'Purple Passion' was a low yielder and a prolific seed producer (from the female plants). However, growers should be able to charge a higher price for it since the spears are purple and it has higher sugar content than green asparagus.

'Guelph Millennium' was one of the latest varieties to emerge before the second frost occurrence in 2007, and did not get a chance to fully perform before the harvest was terminated; hence, the yields were low.

The drought of 2007 seemed to have no impact on asparagus yields in 2008. At last year's twilight meeting on August 17 at 6 P.M., 40 people braved the 104 degree heat to see asparagus ferns that received no water all year standing like a green oasis in an Appling Sandy Loam soil. This is a great testament for the extreme drought tolerance of asparagus.

In 2008, harvest started on March 22 for most cultivars with the exception of 'Guelph Millennium'. Cool temperatures occurred below 70 degrees until April 11, when yields accelerated, and 'Guelph Millennium' started to emerge. One frost in mid-April set yields back for one week. Then yields increased until it was decided to end the harvest on April 26. The harvest period lasted five weeks, with a good harvest of four weeks for most cultivars, with a one-week slump in yield, due to frost. Twenty-one harvests were made during the six-week period.

With the California hybrids, 'UC 157' moved from 1st place last year down to sixth place this year and 'UC 115' moved from fifth place to eighth place. 'Apollo' moved from ninth place to eleventh place. However, 'Grande' moved up from eighth place to first place in 2008 and 'Atlas' moved from seventh to third place.

With the New Jersey hybrids, 'Jersey Giant' remained at second place, 'Jersey Supreme' remained in

fourth place, 'Jersey King' fell from third to fifth place, 'Jersey Gem' fell from sixth to ninth place, and 'Jersey Knight' fell from tenth to last place. 'Purple Passion' fell from tenth to eleventh place. 'Guelph Millennium' moved up from twelfth to seventh place, mainly because it started to emerge on April 11, which was 20 days after the other cultivars. Since harvest lasted five weeks, it was able to show more of its full yield potential.

The percentage of large diameter spears was greatest with 'Grande' (93 percent), 'Atlas' (91 percent), and 'Purple Passion' (90 percent), followed by 'UC 157' and 'Jersey Knight' (87 percent), 'Apollo' (84 percent), 'Jersey Supreme' (83 percent), 'Jersey Giant' (82 percent), 'UC 115' (81 percent), 'Jersey King' (78 percent), 'Jersey Gem' (76 percent), and 'Guelph Millennium' (71 percent).

Spear toughness or tenderness is determined by the tightness of the spear tip, not by spear diameter. A tight spear tip will cause the spear to be tender while a loose tip will cause the spear to be tough and fibrous. As the spear tip opens up or "ferns out," fiber development starts in the base of the spear to enable the elongated spear to change into a woody stalk to support the weight of the fern, after the harvest season is over. As temperatures increase over 70 degrees F, spears will fern out at shorter heights, causing the grower to pick shorter spears (sacrificing spear height) in order to harvest tender spears. Under cool temperatures below 70 degrees, spears will elongate more before ferning out, enabling the grower to harvest taller spears with tight tips that remain tender.

Cultivars that fern out at taller heights enable the grower to harvest spears that weigh more than ones that fern out at shorter heights, with spears that remain tender.

'Atlas' had tight spear tips at 9 inches tall, 'Apollo' at 11 inches tall, 'Grande' at 12 inches tall, 'UC 157' at 11 inches tall, 'UC 115' at 10 inches tall, and 'Guelph Millennium' at 7.5 inches tall. The other cultivars ferned out at shorter spear heights under warm temperatures.

**Table 2. Performance of Selected Asparagus Varieties**

Cultivar	Total yield lbs/A	Weight > 3/8 in.diam lbs (pct)	Weight < 3/8 in.diam lb	Spears/ plant no
<b>2007</b>				
UC 157 F <sub>1</sub>	1,155 a <sup>1</sup>	1,071 a (93 %)	84 bcd	3.1 a
Jersey Giant	944 ab	752 b (80%)	192 a	3.2 a
Jersey King	883 abc	712 b (81%)	171 a	2.9 a
Jersey Supreme	860 abc	722 b (84%)	138 abc	2.9 a
UC 115	821 abc	697 b (85%)	124 abc	2.2 abc
Jersey Gem	734 bcd	581 b (79%)	153 ab	2.6 ab
Atlas	717 bcd	684 b (95%)	33 de	1.4 cde
Grande	703 bcd	684 b (97%)	19 de	1.7 cde
Apollo	555 cd	481 b (87%)	74 cde	1.5 cde
Jersey Knight	456 de	414 b (91%)	42 de	1.2 def
Purple Passion	151 ef	104 c (69%)	47 de	0.6 ef
Guelph Millenium	86 f	42 c (49%)	44 de	0.4 f
Dulce Verde	71 f	69 c (97%)	2 e	0.2 f
<b>2008</b>				
Grande	3,030 a	2,821 a (93%)	209 e	7.6 bc
Jersey Giant	2,737 ab	2,263 ab (82%)	474 bc	10.2 a
Atlas	2,523 abc	2,298 ab (91%)	225 e	6.8 cd
Jersey Supreme	2,485 abc	2,064 ab (83%)	421 bcd	8.7 abc
Jersey King	2,458 abc	1,915 b (78%)	543 ab	9.3 ab
UC 157 F <sub>1</sub>	2,385 abc	2,078 ab (87%)	307 cde	7.2 bcd
Guelph Millenium	2,332 abc	1,653 b (71%)	679 a	8.7 abc
UC 115	2,314 abc	1,875 b (81%)	439 bcd	7.8 bc
Jersey Gem	2,071 bc	1,579 b (76%)	492 b	7.7 bc
Purple Passion	1,915 bc	1,723 b (90%)	192 e	4.4 e
Apollo	1,781 c	1,501 b (84%)	280 de	5.4 de
Jersey Knight	1,604 c	1,401 b (87%)	203 e	5.3 de

<sup>1</sup>Means with the same letter within columns are not statistically significant, Duncan's Multiple Range Test, .05 level.



# Selected Sources for Vegetable Seeds

**Abbott and Cobb**

800-345-SEED  
www.acseed.com

**American Takii, Inc.**

408-443-4901  
www.takii.com

**Baker Creek Heirloom Seeds**

407-924-8917  
www.rareseeds.com

**California Asparagus Seed and Transplants, Inc.**

530-753-2437  
www.calif-asparagus-seed.com

**D. Palmer See Co., Inc.**

Distributed by Clifton Seed Co.,  
Johnny's Select Seeds, Rupp Seed  
Co., Seedway, and Siegers Seed  
Co.  
www.dpalmerseed.com

**Harris Moran Seeds Co.**

239-543-7300  
www.harrismoran.com

**Holmes Seed Co.**

800-435-6077  
www.homesseed.com

**Jersery Asparagus Farms, Inc.**

856-358-2548  
www.jerseryasparagus.com

**Johnny's Select Seeds**

877-564-6697  
www.johnnyseeds.com

**Kelly Seed Company**

334-588-3821  
800-654-0726

**Nunhems Seed Company**

800-733-9505  
www.nunhemsusa.com

**Rispens Seeds Inc.**

888-874-0241  
www.rispensseeds.com

**Rogers Brand/Syngenta Seeds, Inc.**

Distributed by Clifton Seed Co.,  
Seedway, and Siegers Seed Co.  
www.reogersadvantage.com

**Ronniger's Potato Farm LLC**

877-204-8704  
www.ronnigers.com

**Rupp Seeds Inc.**

800-700-1199  
www.ruppseeds.com

**Sakata Seed America, Inc.**

Distributed through Siegers Seed  
Co., Seedway, Inc., and Twilley  
Seed Company, Inc.  
www.sakata.com

**Seeds of Change**

888-762-7333  
www.seedsofchange.com

**Seedway, LLC**

800-952-7333  
www.seedway.com

**Segrest Feed and Seed Co.**

Slocomb, AL  
334-886-2371

**Siegers Seed Company**

800-962-4999  
www.siegers.com

**Seminis Vegetable Seeds, Inc**

Distributed by Kelly Seed Co.,  
Rupp Seed Co., Seedway, Inc.,  
Seminis Vegetable Seeds, and Siegers  
Seed Co.  
229-382-1815  
www.seminis.com

**Stokes Seeds, Inc.**

800-396-9238  
www.stokesseeds.com

**Tomato Growers Supply Company**

888-478-7333  
www.tomatogrowers.com

**Twilley Seed Co., Inc.**

800-622-7333  
www.twilleyseed.com

**Vermont Bean Seed Co.**

800-349-1071  
www.vermontbean.com

**Willhite Seed Inc.**

800-828-1840  
www.willhiteseed.com



## **Guidelines for Contributions to the Vegetable Variety Regional Bulletin**

Vegetable variety evaluation and selection is an essential part of production horticulture. The vegetable variety regional bulletin is intended to report results of variety trials conducted by research institutions in the Southeast in a timely manner. Its intended audience includes growers, research/extension personnel, and members of the seed industry.

Timeliness and rapid turnaround are essential to better serve our audience. Hence, two bulletins are printed each year: one in November with results from spring crops, and another one in April or May with results from summer and fall crops. It is essential that trial results are available before variety decisions for the next growing season are made.

Results pertaining to variety evaluation in a broad sense. This includes field performance, quality evaluation, and disease resistance. Here are a few tips:

- Follow the format used in the other regional bulletins.
- Include each author's complete mailing address, e-mail address, and phone number.
- Follow your own unit's internal review process. Contributions will be edited, but not formally reviewed.

Send a disk and hard copy to  
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AUBURN UNIVERSITY

1. E.V. Smith Research Center, Shorter, AL
2. North Alabama Horticulture Research Center, Cullman, AL
3. Brewton Agricultural Research Unit, Brewton, AL

NORTH CAROLINA STATE UNIVERSITY

4. Garnett Carr Farm, Roxboro, NC