Fall 2011 Commercial Fruit and Vegetable Variety Trials

October 2012

Regional Bulletin 25
Auburn University
The University of Georgia
North Carolina State University

Alabama Agricultural Experiment Station
William Batchelor, Director
Auburn University, Alabama

Special thanks is extended to the following companies who generously donated seed for the research reported in this regional bulletin:

Harris Moran,
Kelly Seed Company,
Sakata Seed America, and
Seminis Vegetable Seeds, Inc.

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Names of chemicals are mentioned only for describing the production practices used. This represents neither a recommendation nor an endorsement of these products.

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Introduction: Interpreting Vegetable Varieties Performance Results

Edgar Vinson and Joe Kemble

The fall 2011 fruit and vegetable regional bulletin includes research 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 a good indicator of varietal performance, other information must be studied. The following provides a few tips to help producers adequately interpret results in this report.

Open pollinated or hybrid varieties. In general, hybrids (also referred to as F_1) are earlier and produce a more uniform crop. They have improved disease, pest, or virus tolerance/resistance. F_1 varieties are often more expensive than open pollinated varieties (OP), and seeds cannot be collected from one crop to plant the next. Despite the advantages hybrids offer, OP are still often planted in Alabama. 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. Therefore, locations cannot be compared by just looking at the range of yields actually reported. 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, 5 percent) are reported for each test. 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 (under 20 percent) 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 E.V. Smith Research Center, 'Star Fighter' yielded 2,611 pounds per acre, while 'Bergam's Green' and 'Nevada' yielded 2,534 and 1,859 pounds per acre, respectively. Since there was less than a 683 difference between 'Star Fighter' and 'Bergam's Green', there is no statistical difference between these two varieties. However, the yield difference between 'Star Fighter' and 'Nevada' was 752, indicating that there is a real difference between these two varieties. From a practical point of view, producers should place the most importance on LSD values when interpreting results.

Testing conditions. AU vegetable variety trials are conducted under standard, recommended commercial production practices. All of Auburn University's commercial vegetable production recommendations can be found in the current edition of the Southeastern U.S. Vegetable Crop Handbook. Copies are available from your county Extension office or online at www.thegrower.com/south-east-vegetable-guide. Additional information on any aspect of vegetable production can be obtained from your county Extension office or online at www.aces.edu. Information on soil type (Table 1), planting dates, fertilizer rates, and detailed spray schedule are provided to help producers compare their own practices to the standard one used in the trials and 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 alive, 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 Seed Sources, page 40.

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. It is always better to try two to three varieties on a small scale before making a large planting of a single variety.

Fruit and vegetable trials on the Web. For more vegetable variety information be sure to visit our Web page at www.aces.edu/depart/com_veg/veg_trial/vegetabl.htm.This website provides descriptions of variety types, a ratings system, and information about participating seed companies.

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

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 Broccoli Varieties Produce Higher Than Market Standard

Joe Kemble, Edgar Vinson, and Arnold Caylor

A broccoli variety trial was conducted at the North Alabama Horticulture Research Center (NAHRC) in Cullman, Alabama (Tables 1 and 2).

Five-week-old broccoli transplants were set in staggered double rows with a 12-inch spacing on August 5, 2011. Plots were 20 feet long and placed on 6-foot centers. Plots were covered in white plastic mulch and drip irrigation was installed.

Soils were fertilized according to the recommendations of the Auburn University Soil Testing Laboratory. Current commercial lettuce production information for Alabama—including insect, disease, and weed management as well as recommended fertigation and spray schedules—is available in the Southeastern U.S. Vegetable Crop Handbook. Copies are available from your county Extension office or online at www.thegrower.com/south-east-vegetable-guide.

Broccoli heads were harvested on October 31 and November 14. Marketable weight (in number of 23-pound cartons) and corresponding number of heads were recorded (Table 3).

There were several differences found in marketable weight. 'Gypsy' produced the highest yields overall, but this yield was statistically similar to 'Major', 'Emerald Crown', and 'Premium Crop'. The varieties 'Gypsy', 'Major', 'Emerald Crown', and 'Premium Crop' all produced yields that were significantly higher than the market standard 'Packman'. All other varieties were statistically similar to 'Packman'.

Broccoli varieties followed the same trend in number of marketable heads per acre. 'Gypsy', 'Major', 'Emerald Crown', and 'Premium Crop' had statistically higher number of marketable heads per acre than the market standard 'Packman'.

TABLE 1. RATINGS OF THE 2011 BROCCOLI VARIETY TRIAL[1]

Location	NAHRC
Weather	5
Fertility	5
Irrigation	5
Pests	5
Overall	5

[1] See introduction for description of ratings scales.

TABLE 2. SEED SOURCE, EARLINESS, AND DISEASE CLAIMS OF SELECTED BROCCOLI VARIETIES

Variety	Type[1]	Seed source	Days to harvest	Disease claims[2]
Arcadia	F_1	Johnny's Selected Seeds	63	DM
Emerald Crown	F_1	Sakata	78	—
Green Magic	F_1	Sakata	75	CR
Gypsy	F_1	Sakata	68	CR
Major	F_1	Seedway	55	DM
Packman	F_1	Seedway	48	—
Patron	F_1	Sakata	60	DM
Premium Crop	F_1	Harris	65	DM
Sultan	F_1	Sakata	80	DM
Windsor	F_1	Seedway	58	CR

[1] Type: F_1 = Hybrid variety. [2] Disease claims: CR = Clubroot. — = information not available

TABLE 3. YIELD OF SELECTED BROCCOLI VARIETIES

Variety	Marketable 23-lb cart *no/A*	Marketable weight *lb/A*	Marketable heads *no/A*	Head diameter *in*	Stem diameter *in*
Gypsy	242	5,565	7,069	9.79	2.53
Major	236	5,427	6,960	11.88	2.58
Emerald Crown	198	4,560	5,220	9.97	2.53
Premium Crop	198	4,552	6,416	11.68	2.74
Patron	173	3,979	4,785	5.60	1.46
Green Magic	147	3,381	5,075	6.65	1.90
Sultan	144	3,313	5,655	8.52	2.50
Packman	97	2,238	3,698	12.01	2.35
Windsor	60	1,395	3,045	6.56	1.51
Arcadia	29	661	725	5.46	1.67
R^2		***0.70***	***0.66***	***0.67***	***0.51***
CV		***39***	***34***	***24***	***26***
LSD		***2,058***	***2,479***	***3.11***	***0.83***

Brussels Sprout Varieties Evaluated in Central Alabama

Joe Kemble, Edgar Vinson, and Jason Burkett

A Brussels sprout variety trial was conducted at the E.V. Smith Research Center (EVSRC) in Shorter, Alabama (Tables 1 and 2).

Five-week-old Brussels sprout transplants were set in staggered double rows with a 12-inch spacing on August 5, 2011. Plots were 20 feet long and placed on 6-foot centers. Plots were covered in white plastic mulch and drip irrigation was installed.

Soils were fertilized according to the recommendations of the Auburn University Soil Testing Laboratory. Current commercial lettuce production information for Alabama—including insect, disease, and weed management as well as recommended fertigation and spray schedules—is available in the Southeastern U.S. Vegetable Crop Handbook. Copies are available from your county Extension office or online at www.thegrower.com/south-east-vegetable-guide.

Brussels sprouts were harvested on December 5 and 14, 2011 and January 4 and 18, 2012 (Table 3). Brussels sprouts were graded as large (diameter 2.5 to 3.2 cm), medium (diameter 2.2 to 2.5 cm), and small (diameter 1.8 to 2.2 cm). Total yield was the sum of large, medium, and small yields. Brussels sprouts were culled if they were loose or opened, less than 1.8 cm in diameter, or had some other defect.

In total marketable yield, 'Diablo' had significantly higher yield than 'Franklin' (Table 3). This yield was similar to all other varieties. 'Diablo' also had the highest yield in the small weight category producing yields significantly higher than 'Franklin'. In the large weight category, 'Churchill' had the highest numerical yield. This yield was higher than 'Royal Marvel' and 'Catskill' but similar to 'Diablo', 'Dimitri', and 'Franklin'. 'Diablo' and 'Dimitri' had the largest sprouts overall (See individual sprout weight, Table 3). Both varieties produced sprouts that were larger than the sprouts of 'Royal Marvel', 'Catskill', and 'Franklin'. 'Diablo' produced sprouts that were larger than the sprouts of 'Churchill' as well.

TABLE 1. RATINGS OF THE 2011 BRUSSELS SPROUT VARIETY TRIAL[1]

Location	EVSRC
Weather	5
Fertility	5
Irrigation	5
Pests	4
Overall	5

[1] See introduction for description of ratings scales.

TABLE 2. SEED SOURCE, EARLINESS, AND DISEASE CLAIMS OF SELECTED BRUSSELS SRPOUT VARIETIES

Variety	Seed source	Days to harvest	Sprout size *(in)*	Disease claims[1]	Years evaluated
Catskill	Burpee	90	1.5-2	—	2011
Churchill	Johnny's Seeds	90	1-1.25	—	2011
Diablo	Johnny's Seeds	110	1-1.25	CT	2011
Dimitri	Seedway	105	1-1.5	—	2011
Franklin	Seedway	100	1-1.5	—	2011
Royal Marvel	Seminis	85	1-1.25	—	2011

[1] Disease claims: CT = Cold tolerant. — = none; from seed catalogues.

TABLE 3. EARLY YIELD OF SELECTED BRUSSELS SPROUT VARIETIES

Variety	Total marketable yield *lb/A*	Total marketable number *no/A*	Large weight *lb/A*	Large number *no/A*	Medium weight *lb/A*	Medium number *no/A*	Small weight *lb/A*	Small number *no/A*	Individual fruit weight *grams*	Cull weight *lb/A*
Diablo	819	88,391	137	2,541	260	15,155	422	70,694	3.65	70
Churchill	790	91,385	228	14,157	309	31,853	253	45,375	3.09	403
Dimitri	772	80,949	138	8,349	309	24,321	325	48,279	3.50	88
Royal Marvel	631	75,050	58	3,358	228	19,511	345	52,181	3.00	170
Catskill	572	74,052	39	3,025	156	14,792	263	41,836	2.86	136
Franklin	549	68,153	131	7,623	191	15,337	228	45,194	2.84	74
R^2	***0.65***	***0.36***	***0.61***	***0.64***	***0.47***	***0.60***	***0.51***	***0.41***	***0.45***	***0.66***
CV	***25***	***29***	***83***	***78***	***47***	***47***	***40***	***41***	***22***	***79***
LSD	***249***	***33,033***	***147***	***7,370***	***171***	***14,335***	***184***	***31,341***	***0.003***	***187***

Lettuce Trials Conducted in South and Central Alabama

Joe Kemble, Edgar Vinson, Randy Akridge, and Jason Burkett

A lettuce variety trial was conducted at the Brewton Agriculture Research Unit (BARU) in Brewton, Alabama, and the E.V. Smith Research Center in Shorter, Alabama (Tables 1 and 2).

Five-week-old leaf and romaine lettuce transplants were set in staggered double rows with a 12-inch spacing at BARU and in single rows with 12-inch spacing at EVSRC on October 3 and September 30, respectively. At both locations, plots were covered in white plastic mulch and drip irrigation was installed. Plots were 20 feet long on 6-foot centers. Varieties were replicated four times and arranged in a randomized complete block experimental design.

Soils were fertilized according to the recommendations of the Auburn University Soil Testing Laboratory. Current commercial lettuce production information for Alabama—including insect, disease, and wed management as well as recommended fertigation and spray schedules—is available in the Southeastern U.S. Vegetable Crop Handbook. Copies are available from your county Extension office or online at www.thegrower.com/south-east-vegetable-guide.

Lettuce was harvested and graded according to the standards for Grade of Lettuce (U.S. Dept. Of Agriculture Publication 60-6130) (Table 3) on November 28, 2011 at BARU and on November 16 and 21 at EVSRC.

At BARU, five leaf lettuce varieties were planted. Marketable yield of 'North Star' was similar to 'Bergam's Green' but significantly higher than 'Nevada' and 'New Red Fire'. Individual head weight followed a similar trend with both 'North Star' and 'Star Fighter' producing individual head weights statistically similar to 'Bergam's Green' but higher than 'Nevada'. There were few differences among the romaine lettuce varieties. 'Ideal Cos' and 'Green Forest' produced the two highest yields. These were similar to all other varieties except for 'Rhazes' and 'Outredgeous'.

TABLE 1. RATINGS OF THE 2011 LETTUCE VARIETY TRIAL[1]

Location	BARU
Weather	5
Fertility	5
Irrigation	5
Pests	5
Overall	5

[1] See introduction for description of ratings scales.

TABLE 2. SEED SOURCE, EARLINESS, AND DISEASE CLAIMS OF SELECTED LEAF AND ROMAINE LETTUCE VARIETIES

Variety	Type	Seed source	Days to harvest	Leaf color	Disease claims[1]	Years evaluated
Bergam's Green	Leaf	Enza Zaden/Siegers	57	Green	B,TB,DM	06-08,2011
Cherokee	Romaine	Rijk Zwaan/Siegers	54	Red	TB	08,2011
Coastal Star	Romaine	Enza Zaden/Siegers	65	Green	CR	2011
Green Forest	Romaine	Johnny's Seeds	56	Green	---—	2011
Green Towers	Romaine	Harris/Siegers	62	Green	—	08,2011
Ideal Cos	Romaine	Seminis	63	Green	TB	2011
Musena	Romaine	Rogers	68	Green	DM1-24,LMV2	08,2011
Nevada	Leaf	Vilmorin/Siegers	45	Green	DM,LMV,TB	08,2011
New Red Fire	Leaf	Takii	55	Red	B, HT	95,96,02-04,08,11
Outredgeous	Romaine	Johnny's Seeds	57	Red	—	2011
Rhazes	Romaine/ Bibb	Johnny's Seeds	42	Red	DM 1,4-6,13,15,17	2011
Star Fighter	Leaf	Rijk Zwaan/Siegers	58	Green	B,DM 1-21,Tp	

[1] Disease Claims: B= Bolt Tolerant, CR=Cork Root, DM=Downey Mildew, HT= Heat Tolerant, LMV=Lettuce Mosaic Virus, Tp= Tip Burn. — = none; from seed catalogues.

At EVSRC, only four leaf varieties were planted in the trial. 'Star Fighter' produced the highest yields along with 'Bergam's Green'. 'North Star' was not included at this location. Marketable yield of 'Star Fighter' was statistically higher than 'Nevada' and 'New Red Fire'. Marketable yield of 'Bergam's Green' was statistically higher than 'New Red Fire' but statistically similar to both 'Star Fighter' and 'Nevada'. Among romaine varieties 'Green Forest' topped the list in marketable yield. 'Green Forest' along with 'Green Towers', 'Coastal Star', and 'Musena' produced marketable yields higher than the three remaining varieties 'Ideal Cos, 'Cherokee', and 'Outredgeous.'

Over all there were not many differences among romaine or leaf lettuce varieties. 'Star Fighter' performed similarly at both locations but 'North Star' was included only at BARU where it produced a higher yield than 'Star Fighter' though this yield was not significant. At BARU 'Ideal Cos' produced the highest yield though it was only statistically higher than 'Rhazes' and 'Outredgeous'. Yield of 'Ideal Cos' at EVSRC was significantly lower than all other romaine type lettuce except 'Cherokee' and 'Outredgeous'. This might indicate that 'Ideal Cos' is better suited for more northerly climates.

TABLE 3. YIELD OF SELECTED LEAF AND ROMAINE LETTUCE VARIETIES

Variety	Type	Marketable weight *lb/A*	Individual head weight *lb*
E.V. Smith Research Center			
Star Fighter	Leaf	2,611	0.50
Bergam's Green	Leaf	2,534	0.49
Nevada	Leaf	1,859	0.36
New Red Fire	Leaf	1,425	0.27
Green Forest	Romaine	4,084	0.78
Green Towers	Romaine	3,848	0.74
Coastal Star	Romaine	3,589	0.69
Musena	Romaine	3,562	0.68
Ideal Cos	Romaine	2,816	0.54
Cherokee	Romaine	2,218	0.42
Outredgeous	Romaine	1,860	0.36
R^2		***0.81***	***0.81***
CV		***17***	***17***
LSD		***683***	***0.13***
Brewton Agricultural Research Unit			
North Star	Leaf	4,933	0.71
Star Fighter	Leaf	4,640	0.68
Bergam's Green	Leaf	4,486	0.64
New Red Fire	Leaf	3,559	0.51
Nevada	Leaf	2,826	0.41
Ideal Cos	Romaine	4,935	0.71
Green Forest	Romaine	4,529	0.65
Musena	Romaine	4,103	0.59
Green Towers	Romaine	4,084	0.59
Coastal Star	Romaine	3,769	0.54
Cherokee	Romaine	3,435	0.49
Rhazes	Romaine	2,342	0.34
Outredgeous	Romaine	2,183	0.31
R^2		***0.41***	***0.41***
CV		***31***	***32***
LSD		***1,735***	***0.25***

Hybrid Bunch Grape Cultivar Trial in North Alabama

Elina Coneva, Yilanna Hu, Edgar Vinson, and Joyce Ducar

Pierce's Disease (PD) is a serious threat to the cultivation of grapes in the United States, especially in the warmer southern regions. Presently, there is no known cure for PD, which is caused by the bacterium *Xylella fastidiousa*. This bacteria causes a variety of plant diseases. In grapes it causes Pierce's Disease. Grape infection leads to a blockage of the xylem vessels of the vine, delays vine growth, and eventually leads to vine decline, and yield loss. Usually vine death occurs within two to three years of infection. Current PD management efforts are focused on the development of grape selections resistant to this devastating disease and an effective insect vector control. Even though PD is endemic in the southeastern U.S. and is the main factor limiting the grape industry in the area, fruit growing acreage data for the state of Alabama shows that grape production is the third largest fruit industry in the state with a total acreage of 467, according to a 2009 USDA National Agricultural Statistics Service report. When compared to the grape acreage a decade ago, there is a 41 percent increase, which is a considerable growth.

French-American and American hybrid bunch grapes that are tolerant to PD also can produce a substantial crop for the fresh market and for processing, which can add value to the grape production. Currently, the commercial bunch grape production in the Southeast is very limited, and sustainable production systems have not been determined.

An experimental vineyard was established at the Sand Mountain Research and Extension Center (SMREC), Crossville, Alabama, in 2008 to compare the performance and determine the best suited Pierce's Disease (PD) tolerant American and French-American hybrid bunch grape cultivars. The ten cultivars studied included 'Black Spanish', 'Blanc du Bois', 'Champanel', 'Conquistador', 'Cynthiana', 'Favorite', 'Lake Emerald', 'Seyval Blanc', 'Seyval Blanc' grafted on C3309, 'Stover', and 'Villard Blanc'. The trial experimental design was a randomized complete block design with four replications and four vines per plot. To assess cultivar vigor and development, measurements were collected on vine pruning weight, trunk cross sectional area, leaf area, and chlorophyll rates. Cultivar phenology was studied by recording early shoot development, percent open flowers, and veraison (onset of ripening) progression throughout the growing season. Cultivar productivity and fruit quality were determined based on total yield per vine, mean cluster and berry weight, and soluble solids content.

The results of our study suggest 'Champanel' was the most vigorously growing cultivar in 2011 (see table). Dor-

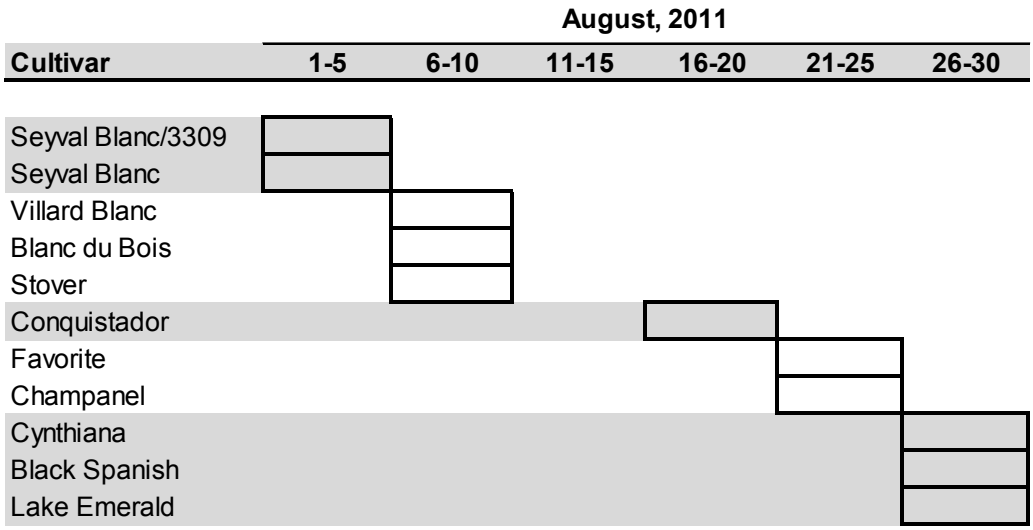
VEGETATIVE GROWTH AND YIELD CHARACTERISTICS OF SELECTED PD TOLERANT HYBRID BUNCH GRAPE CULTIVARS GROWN AT THE SMREC, CROSSVILLE, AL, 2011

Variety	Pruning weight	Yield	Mean cluster weight	Mean berry weight
	g	*kg/vine*	*g*	*g*
Villard Blanc	1.2 c	16.5 a	238 a	2.6 c
Seyval Blanc	0.2 e	11.0 b	136 bc	1.9 ef
Black Spanish	0.6 d	9.4 bc	152 b	1.7 gf
Favorite	0.6 d	8.8 bc	149 b	1.6 g
Seyval Blanc/3309	0.2 e	8.5 bcd	123 cd	2.0 de
Cynthiana	0.7 d	7.1 bcde	110 cd	1.3 i
Stover	0.5 de	5.8 cdef	85 ef	2.2 d
Champanel	2.2 a	4.5 def	101 de	4.2 a
Blanc du Bois	1.1 c	4.3 ef	112 cd	3.4 b
Lake Emerald	1.6 b	3.6 ef	71 fg	1.5 gh
Conquistador	0.6 d	2.1 f	56 g	1.3 i

mant pruning resulted in an average of 2.2 kg/vine pruning weight removed from 'Champanel', while only 0.2 kg/vine was removed from 'Seyval Blanc' and 'Seyval Blanc'/3309. 'Villard Blanc' provided the greatest yield of 16.5 kg per vine and largest mean cluster weight of 238 g. Cultivars 'Champanel', 'Blanc du Bois', 'Lake Emerald', and 'Conquistador' had a relatively low yield, less than 5.0 kg/vine. 'Champanel' produced the largest berries (4.2 g on average), and 'Conquistador' and 'Cynthiana' had the smallest berry size of 1.3 g. 'Seyval Blanc' and 'Seyval Blanc'/3309 matured early in the season, while 'Cynthiana', 'Black Spanish', and 'Emerald' ripened in late August (see figure).

Research will continue, and multiple season data are going to provide a more complete evaluation on suitability of growing hybrid bunch grape cultivars in Alabama and the Southeast.

Season of ripening of selected PD tolerant hybrid bunch grape cultivars grown at the SMREC, Crossville, AL, 2011.



Peach Rootstock Cultivar Evaluation, 2011

Elina Coneva, Edgar Vinson, and Jim Pitts

In order to evaluate the influence of various rootstocks on peach tree disease resistance, fruit quality, and vegetative growth, a peach rootstock trial consisting of 14 newly developed or imported rootstocks was planted at the Chilton Research and Experimental Center (CREC) near Clanton in 2009.

The experimental block was comprised of the following peach rootstocks: 'Guardian' and 'Lovell' (standards), 'Viking', 'Atlas', BH-5 (bacterial canker resistant), Krymsk 86 (wet feet tolerant), KV010123, KV010127 (USDA breeding program), 'Empyrean 2', HBOK 10, HBOK 32, Krymsk 1, and 'Controller 5' (size controlling rootstocks). 'Redhaven' was used as a scion cultivar. Experimental design was a completely randomized block with eight single-tree replications. Data on peach tree vegetative growth including trunk circumference, tree height and width, number of suckers per trunk, and tree survivability were collected in 2009, 2010, and 2011.

Our results indicate significant differences of the Julian date of 90 percent open flowers among the 14 rootstocks in the trial in 2011 (Table 1). Trees on 'Controller 5' had the latest flowering date (73.8), while trees on HBOK 10 flowered early, on the 70.4 Julian date.

Trees on 'Guardian', 'Mirobac', and BH-5 were once again the most vigorously growing in 2011, based on their trunk cross sectional area (TCSA) (see table). For the third consecutive season, HBOK 10 and HBOK 32 demonstrated the least tree vigor of 23.7 and 36.2 cm^2 TCSA, respectively.

Trees on 'Guardian' were found to have the highest number of suckers in their third growing season (1.9 suckers per tree on average). BH-5 and 'Lovell' were also found to produce a few root suckers.

In addition to one tree grafted on HBOK 32 that died in 2009, two additional trees grafted on 'Krymsk 1' and 'Emparyan 2' (Penta) died in 2011 (see table).

Based on tree height and width, trees grafted on 'Guardian', 'Mirobac', BH-5, and 'Atlas' were found to be vigorously growing, while HBOK 10 had the least canopy growth in 2011 (see table).

FIELD PERFORMANCE OF 'REDHAVEN' PEACH ON 14 NC-140 ROOTSTOCKS, 2011

Rootstock cultivar	Julian date of 90% bloom	Trunk cross sectional area *cm^2*	Root suckers *no*	Survival *%*	Height, cm	Width 1 cm	Width 2 cm
Controller 5 (K146-46)	73.8 a	42.8 fgh	0.3 b	1.0	246.1 bc	323.9 g	305.9 ef
Mirobac	73.0 abc	96.2 ab	0.3 b	1.0	276.2 a	460.3 abc	453.0 ab
HBOK 10	70.4 d	23.7 h	0.0 b	1.0	215.7 d	302.5 g	278.9 f
BH-5	72.3 bc	80.1 bcd	1.0 ab	1.0	278.9 a	483.9 a	462.6 ab
Guardian	71.8 c	107.6 a	1.9 a	1.0	277.4 a	468.3 ab	452.2 ab
Lovell	72.3 bc	66.7 cde	1.0 ab	1.0	261.4 ab	432.1 bcde	422.5 bc
HBOK 32	72.4 bc	36.2 gh	0.0 b	0.9	230.8 cd	334.4 g	303.9 ef
Krymsk ®1 (VVA-1)	73.3 ab	48.9 efg	0.0 b	0.9	212.5 d	347.9 fg	335.7 de
Empyrean®2 (Penta)	72.4 bc	66.5 cde	0.0 b	0.9	245.2 bc	411.5 cde	418.0 bc
Viking	72.6 abc	82.3 bc	0.1 b	1.0	252.6 bc	452.3 abcd	419.9 bc
Atlas	72.3 bc	75.0 bcd	0.6 b	1.0	265.6 ab	493.4 a	493.0 a
Krymsk®86 (Kuban 86)	71.8 c	61.3 cdef	0.6 b	1.0	247.3 bc	402.7 de	371.8 cd
KV010123	72.4 bc	57.0 defg	0.4 b	1.0	260.2 ab	393.2 ef	398.5 c
KV010127	72.0 bc	58.7 defg	0.5 b	1.0	252.6 bc	393.6 ef	387.5 c
Significance	***	***	*	n.s.	***	***	***
P-value	***0.0007***	***<0.0001***	***0.0400***	***0.5780***	***<0.0001***	***<0.0001***	***<0.0001***

Comparison of Pumpkin Varieties

George Boyhan, Suzzanne Tate, and Ryan McNeil

A pumpkin variety trial was conducted in late summer/early fall of 2011 with 18 entries. All were commercial varieties with the exception of 18-4-2, which is an advanced line developed at the University of Georgia. The trial included standard pumpkin types as well as small (less than 1 pound) ornamental types. Also included was 'Orange Bulldog' a *Cucurbita maxima* pumpkin developed at the University of Georgia with better disease resistance. Overall yields were low because of a severe powdery mildew infection. The highest yielding entry in the trial was 18-4-2 with 23,583 pounds per acre. This was almost double the next highest yielding entry.

MATERIALS AND METHODS

Pumpkins were sown in the greenhouse from June 28 to July 8, 2011 in a peat-based media. Pumpkin plants were transplanted on July 25 into plastic covered beds with an in-row spacing of 6 feet and a between-row spacing of 12 feet. White plastic mulch was laid with drip irrigation lines prior to transplantation. There were 10 plants per experimental unit (plot) with an experimental arrangement of a randomized complete block design with four replications. Pumpkins were grown following University of Georgia Cooperative Extension Service recommendations.

Pumpkins were harvested on September 29 and weights and counts for each experimental unit were recorded. Data were analyzed with StataSE 12.1.

RESULTS AND DISCUSSION

18-4-2, an advanced breeding line, had the greatest yield with 23,583 pounds per acre, which was almost double the next highest yielding entry. Another breeding line, 18-4-3 failed to germinate so no data could be collected. The highest yielding entry among the commercial entries was 'Magic Wand', which yielded better than the other commercial entries.

There were two small ornamental types (less than 1 pound): 'Munchkin' and 'Lil Pump-ke-Mon'. Both these entries had less than 6,000 pounds per acre yields.

We were unable to control a severe outbreak of powdery mildew in the trial because we did not want to drive over the vines. If diseases occur in the future, we will use a cannon air-blast sprayer to apply disease control measures.

TABLE 1. RATINGS OF THE 2011 PUMPKIN VARIETY TRIAL[1]

Location	Durham Horticulure Farm
Weather	5
Fertility	5
Irrigation	5
Pests	2
Overall	3

[1] See introduction for description of ratings scales.
Soil type at the Georgia location: water holdin capaticty (in/in) = 0.33-0.35; Soil type = Cecil sandy loam.

TABLE 2. PUMPKIN VARIETY TRIAL, 2011

Variety	Yield *lb/A*	Yield *no/A*	Fruit weight *lb*
Alladin	9,910	1,007	9.8
Magic Wand	12,776	1,227	10.4
18-4-2	23,583	1,255	18.8
Lil Pump-ke-Mon	5,362	8,256	0.6
Munchkin	5,151	14,320	0.4
Cannon Ball	6,173	1,754	3.5
Orange Bulldog	8,249	1,417	5.8
Appalachian	10,173	1,133	9.0
Field Trip	7,299	2,149	3.4
Jack-o-Lantern	6,080	1,149	5.3
Trickster	3,822	2,133	1.8
Phantom	6,164	1,006	6.1
Spirit	10,253	1,678	6.1
Spooktacular	5,234	2,435	2.1
18-4-3	—	—	—
Lumina	3,179	855	11.9
Gold Strike	7,460	627	11.7
Longface	3,470	297	13.7
Howden	3,370	246	1.1
CV	***26%***	***24%***	
LSD	***978***	***203***	

Comparion of Heirloom and Commercial Hybrid Tomato Varieties

George Boyhan, Jeff McConnaughey, Suzzanne Tate, and Ryan McNeil

Tomatoes are an important crop in Georgia with almost $25 million in farm gate value in 2011, and interest in organic production has grown dramatically in Georgia during the last 10 years. While organic production still represents a very small fraction of Georgia agriculture overall, this increasing interest has resulted in more effort being put forward by the University of Georgia to address organic growers' problems.

A tomato variety trial was conducted at the Durham Horticulture Farm in Watkinsville, Georgia, to evaluate commercial F_1 and open-pollinated varieties for performance under organic production practices. Production followed National Organic Program guidelines for certified organic production; however, the experiment was not conducted on certified organic land.

MATERIALS AND METHODS

Twenty tomato varieties were evaluated in this trial: 10 heirloom varieties—'Ozark Pink', 'Druzba', 'Neptune', 'Red Mortgage Lifter VFN', 'Cherokee Purple', 'Abraham Lincoln', 'Crnkovic Yugoslavian', 'Jeff Davis', 'Costoluto Fiorentino', and 'Florida Pink'; five commercial varieties—'Mountain Fresh Plus', BHN 602, 'Fletcher 0377', 'Celebrity', and 'Scarlet Red'; and five experimental varieties—RFT 80771, RFT 80772, HMX 8847, HSX 8115H, and "market seed", a tomato obtained from a local market.

Tomato seeds were acquired from a variety of different sources and were sown on February 25 and March 10, 17, 18, and 21, 2011. The seeds were planted in Fafard organic potting mix covered with vermiculite and grown using liquid fish + kelp and bone meal. Plants were transplanted at the UGA Horticulture Farm in Watkinsville, Georgia, on April 27, 2011. Prior to planting, agricultural lime and Nature Safe 8-5-5 fertilizer were added at rates of 1,341 pounds per acre and 2,682 pounds per acre, respectively. White plastic mulch was laid with drip irrigation lines prior to transplantation. Six weeks after transplanting, hydrolyzed fish was delivered at the rate of 52 fluid ounces per acre employing a Dosatron via drip irrigation each week through the peak harvest period.

The experiment consisted of three replications of 20 varieties laid out in a randomized complete block design. Each plot consisted of 10 plants in a single row with in-row spacing of 3 feet, half of which would be harvested for sampling. The between row spacing was 6 feet, and individual replications were separated by a 5-foot buffer. Plants were not pruned and wooden stakes set between each plant were used along with natural twine for plant support. Plants were scouted bi-weekly for insect and disease damage, but no sprays were required. Fruit were harvested on July 12, 22, and 26 and August 4 and 11, 2011. Early yields were calculated as those fruit harvested on July 12 and 22.

A Kerian speed sizer was used to divide the ripe tomatoes into size classes. We divided the fruit into small/medium and large/extra large size classes delineated by the maximum diameter opening a medium-sized fruit will pass through in any position (2 17/32 inches or 6.4 cm) as set by the USDA. These size classes will henceforth be referred to as small and large, respectively.

All data were transformed with a square root transformation and the final results were back transformed to their original units and are reported as pounds per acre. StataSE 12.1 was used to calculate transformations, Fisher's protected LSD, and coefficients of variation.

TABLE 1. RATINGS OF THE 2011 TOMATO VARIETY TRIAL[1]

Location	Durham Horticulure Farm
Weather	5
Fertility	5
Irrigation	5
Pests	2
Overall	3

[1] See introduction for description of ratings scales.
Soil type at the Georgia location: water holdin capaticty (in/in) = 0.33-0.35; Soil type = Cecil sandy loam.

RESULTS AND DISCUSSION

'Mountain Fresh' had the highest total yield at 21,251 pounds per acre with 31 percent in the large category (Table 1). This variety did not differ from 'Costaluto Florentino' or BHN 602. 'Castaluto Florentino' did not have any fruit in the large category, and BHN 602 had 45 percent in the large category. BHN 602 also had the highest yield of large fruit at 7,947 pounds per acre, which was significantly greater than all the other varieties.

Early total yield was greatest with 'Costaluto Florentino' at 10,311 pounds per acre, which was greater than all the oth-

er entries except for 'Mountain Fresh'. 'Mountain Fresh' also had the greatest yield of early large fruit with 2,815 pounds per acre, which was greater than all other varieties except BHN 602.

The hybrid entries, which included the five named cultivars and the five experimental entries, had higher early and total yields compared to the open-pollinated or heirloom varieties (Table 2). In addition, the determinant varieties performed better than the indeterminant or semi-determinant types. There was no difference between the heirloom and experimental varieties for either total early or total yields. Finally the commercial varieties performed better than the heirloom or the experimental varieties.

Overall the commercial entries had higher yields. Heirloom varieties, although not yielding as well as hybrids are still popular for their unique characteristics for flavor, shape, or color. This may indicate an opportunity for breeding programs to improve heirloom varieties with greater yield and disease resistance.

TABLE 2. TOMATO VARIETY TRIAL EARLY AND TOTAL YIELDS, 2011

Variety	Seed source	Plant type	Early large [1,2] *lb/A*	Early total [1,2] *lb/A*	Total large [2] *lb/A*	Total [2] *lb/A*
Mountain Fresh	SeedWay	Determinant	2,815	8,726	6,534	21,251
Costaluto Florentino	Tomato Growers	Semi-determinant	0	10,311	0	18,569
BHN 602	SeedWay	Determinant	2,771	7,152	7,947	17,497
Fletcher 0377	SeedWay	Determinant	978	3,316	3,222	16,821
Celebrity	Harris Seed	Determinant	676	7,098	1,613	15,539
HSX 8115H	Hortag Seeds	Semi-determinant	1,101	6,188	1,663	14,226
Neptune	Southern Exposure Seed Exchange	Semi-determinant	395	4,640	668	13,937
Market Seed	Local Market	Semi-determinant	670	2,635	2,668	11,022
Scarlet Red	Harris Seed	Determinant	2,204	4,561	2,623	8,823
Abraham Lincoln	Southern Exposure Seed Exchange	Indeterminant	115	1,580	175	5,719
RFT 80772	Rogers/Syngenta	Semi-determinant	943	2,395	1,137	5,479
HMX 8847 F1	Harris Moran	Semi-determinant	82	1,834	260	4,992
Ozark Pink	Southern Exposure Seed Exchange	Indeterminant	82	1,834	680	4,992
Druzba	Southern Exposure Seed Exchange	Semi-determinant	0	18	0	4,453
Cherokee Purple	Southern Exposure Seed Exchange	Indeterminant	128	1,879	184	4,270
RFT 80771	Rogers/Syngenta	Semi-determinant	317	1,024	710	3,633
Crnkovic Yugosla	Seed Savers Exchange	Semi-determinant	582	2,985	582	3,083
Red Mortgage Lifter	Southern Exposure Seed Exchange	Indeterminant	91	364	185	1,631
Florida Pink	Tomato Growers	Semi-determinant	0	241	0	1,099
Jeff Davis	Tomato Fest	Indeterminant	21	315	162	383
CV			***62%***	***50%***	***56%***	***40%***
LSD			***678***	***2,846***	***1,209***	***4,963***

[1] Fruit graded into ≥ 2.5 inches (Large) and < 2.5 inches.

[2] Early yield harvested July 12 and 21 2011. Total yield includes fruit harvest on July 12, 21, and 26 and on August 4 and 11.

TABLE 3. PLANNED COMPARISONS OF TOMATO VARIETIES				
	Early large *lb/A*	**Early total *lb/A***	**Total large *lb/A***	**Total *lb/A***
Comparisons				
Hybrids (commercial & experimental)	1,674	6,442	3,511	16,733
Heirloom	164	2,602	405	7,665
Probability				
Determinant	2,644	9,003	6,072	23,538
Indeterminant/semi-determinant	283	2,909	593	8,222
Probability				
Commercial	1,763	6,002	4,048	15,692
Heirloom	80	1,655	167	4,642
Experimental	544	2,576	1,142	7,369
Probabilities				
Commercial vs heirloom	0.000	0.001	0.000	0.000
Commercial vs experimental	0.001	0.025	0.000	0.011
Heirloom vs experimental	0.002	0.329	0.001	0.179

Colored Bell Pepper Variety Trial

Susan Colucci, Chris Gunter, and Michael Hannah

A colored bell pepper variety trial was conducted on a commercial grower's farm located in Haywood County, North Carolina, to determine the marketable yield and quality of commercially available varieties. Fourteen varieties were tested including nine mature red, three yellow, one white, and one chocolate (Table 1).

Six week old pepper transplants were set by hand in double rows on May 20. Each plot had 40 plants, rows were spaced on 5-foot centers, and spacing within row was 14 inches. Black plastic mulch was used and beds were irrigated using drip irrigation. Plants were trellised using the Florida weave technique. A randomized complete block design was used with two repetitions.

Soils were fertilized according to recommendations of the North Carolina State Extension Service and the 2011 Production Handbook for Commercial Vegetable Growers in the Southeast. For current recommendations for pest and weed control in vegetable production in North Carolina, consult your county Extension agent (see http://www.ces.ncsu.edu/).

Peppers were hand harvested, counted and graded according to industry standards on July 25; August 5, 15, and 29; September 8 and 23; and October 8. Grades for peppers included jumbo (diameter greater than 4 inches), extra-large (diameter 3.5 to 3.9 inches), large (diameter 3 to 3.4 inches), medium (less than 3 inches diameter), and "chopper" (misshapen fruit). Culls were those pods with visible damage or disease. Pod counts were converted to boxes per acre (boxes per acre). Marketable yield was the sum of jumbo, extra-large, large and medium mean grades across all four harvests (Table 2). Table 2 is sorted by number of jumbo boxes per acre.

Colored bell peppers are not a widely produced commercial crop in western North Carolina but have potential for profitability. There are no standards for yield per acre for colored bell peppers in North Carolina to compare these results.

'Flamingo' (1751.9 boxes per acre), 'Red Lion' (1551.8 boxes per acre), and 'Bell King' (1482.1 boxes per acre) were the top yielding red varieties. 'Flavorburst' (1698 boxes per acre) was the top yielding yellow variety in regards to total marketable boxes per acre; however, 'Mecate' produced significantly more jumbo grade fruit (326.4 boxes per acre). 'Flamingo' and 'Mecate' were the top yielding red and yellow varieties, respectively, in the 2010 test. There was no significant difference in extra-large fruit (boxes per acre) or culls among the varieties.

TABLE 1. SEED SOURCE AND FRUIT CHARACTERISTICS OF SELECTED COLORED BELL PEPPER VARIETIES

Variety	Seed source	Leaf color	Shape	Glossiness
Alliance	Harris Moran	Green to Red	Blocky	Medium
Bell King	Harris Moran	Green to Red	Blocky	Glossy
Bianca	Enza Zaden	White	Blocky	Glossy
Brownie	Enza Zaden	Chocolate	Blocky	Glossy
Constitution	Harris Moran	Green to Medium Dark Red	Blocky	Glossy
Flamingo	Harris Moran	White to Cherry Red	Short, 3-lobe	Glossy
Flavorburst	Bejo	Lime green to Yellow	Blocky	Glossy
Karisma	Harris Moran	Green to Medium Dark Red	Blocky	Medium
Mecate	Harris Moran	Green to Yellow	Blocky	Medium
Moonset	Enza Zaden	Green to Yellow	Blocky	Glossy
Red Lion	Harris Moran	Green to Dark Red	Rectangular, ½ long	Glossy
Red Madonna	Harris Moran	Green to Dark Red	Rectangular, ½ long	Glossy
Sandpiper	Harris Moran	White to Bright Red	Blocky	Glossy
Tequila	Enza Zaden	Lilac to Bright Red	Blocky	Glossy

TABLE 2. YIELD [1] OF SECLECTED COLORED BELL PEPPER VARIETIES

Variety	Total marketable yield *boxes/A* [2]	Jumbo *boxes/A*	Extra large *boxes/A*	Large *boxes/A*	Medium *boxes/A*	Chopper *boxes/A*	Culls *boxes/A*
Alliance	780.4 e[3]	176.6 b	493.4	53.8 i	58 f	103.4 def	679.6
Bell King	1482.1 abc	4 d	789.4	438.8 cd	250.5 bcd	210.5 bc	464.4
Brownie	1198.5 bcde	0 d	292.6	600 b	305.7 abc	156.6 cd	403
Constitution	1014.3 cde	38.6 cd	500.2	273.2 efg	201.5 bcde	350.5 a	503
Flamingo	1751.9 a	0 d	454	959 a	338.8 ab	147 cde	287
Flavorburst	1698 a	98 bc	1195	300.8 ef	104.2 ef	145 cdef	438
Karisma	750 e	160 b	443	98 hi	49.7 f	40.7 f	601.7
Mecate	1043.3 cde	326.4 a	579	91 hi	46.2 f	44.9 ef	274.6
Moonset	1093 bcde	111 bc	726.6	152.5 ghi	102.1 ef	147 cde	681.7
Red Lion	1551.8 ab	0 d	477.5	679 b	396 a	107 cdef	379.5
Red Madonna	990.2 de	103.5 bc	555.5	200.8 fgh	130.4 def	280.8 ab	514.7
Sandpiper	1542.8 ab	0 d	1027.4	338.8 de	176 cdef	109 cdef	366.4
Tequila[4]	1374.5 abcd	37.3 cd	612.7	560.3 bc	165.6 def	340.9 a	512
p-value	***<0.0001***	***<0.001***	***ns[5]***	***<0.0001***	***0.0015***	***0.0007***	***ns***
LSD	***489.3***	***84***		***125.4***	***139.8***	***104.8***	

[1] Mean of all harvests. Bianca was removed from the data due to inadequate number of plants.
[2] 1 1/9 bushel boxes per acre. Boxes per acre calculated using the following equation based on 14,934 plants per acre: boxes/A = (pods/plant x 14,934)/box count. Box count: Jumbo 45 pods, Extra-large (Fancy) 55 pods, Large 65 pods, Medium 70 pods, Culls 55 pods.
[3] Letters followed by the same letter are not significantly different.
[4] These varieties were not replicated. All others were replicated twice.
[5] Not statistically significantly different.

Seed Sources for Alabama Trials, 2011

Harris Moran
Contact: Terry Kelly
P.O. Box 4938
Modesto, CA 95352
Phone: (229) 947-3253
Email: t.kelly@hmclause.com

Harris Seeds
To order: (800) 544-7938
P.O. Box 22966
Rochester, NY 14624-2966

Johnny's Select Seeds
To order: (207) 437-4395
Contact: Steve Woodward
955 Benton Ave
Winslow, ME 04901
Phone: (207) 861-3900
Email: info@johnnyseeds.com

Kelly Seed Company
Contact: Jack Stuckey
420 North Shiloh Road
Hartford, AL 36344
Phone: (334) 588-3821

Sakata
Contact: Jay Jones
P.O. Box 880
Morgan Hills, CA 95038-0880
Phone: (239) 289-2130

Seedway
To order: (800) 952-7333
Contact: James J. Pullins
1225 Zeager Road
Elizabethtown, PA 17022
Ph: (717) 367-1075
Fax: (717) 367-0387
Email: info@seedway.com

Seminis Vegetable Seed, Inc.
Contact: Rusty Aubty
2221 North Park Ave.
Tifton, GA 31796
Phone: (229) 386-0750

Siegers Seed Company
13031 Reflections Drive
Holland, MI 49424
Phone: (800) 962-4999
Fax: (616) 994-0333

Takii
301 Natividad Road
Salinas, CA 93906
Phone: (831) 443-4901

Guidelines for Contributions to the Commercial Fruit and Vegetable Variety Trials Regional Bulletin

Fruit and vegetable variety evaluation and selection is an essential part of production horticulture. The fruit and 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.

Here are a few useful guidelines to speed up the publications process for the next regional bulletin:

What: 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.

How: Send a disk and hard copy to

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Department of Horticulture
101 Funchess Hall
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Or send e-mail to
vinsoed@auburn.edu
kembljm@auburn.edu

Alabama's Agricultural Experiment Station
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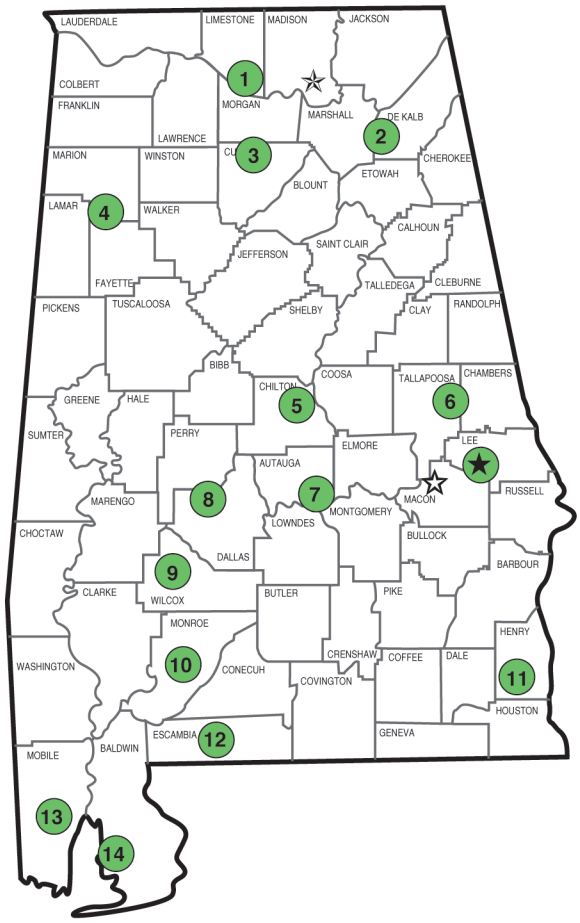
With an agricultural research unit in every major soil area, Auburn University serves the needs of field crop, livestock, forestry, and horticultural producers in each region in Alabama. Every citizen of the state has a stake in this research program, since any advantage from new and more economical ways of producing and handling farm products directly benefits the consuming public.



Research Unit Identification

★ Main Agricultural Experiment Station, Auburn.
☆ Alabama A&M University.
☆ E. V. Smith Research Center, Shorter.

1. Tennessee Valley Research and Extension Center, Belle Mina.
2. Sand Mountain Research and Extension Center, Crossville.
3. North Alabama Horticulture Research Center, Cullman.
4. Upper Coastal Plain Agricultural Research Center, Winfield.
5. Chilton Research and Extension Center, Clanton.
6. Piedmont Substation, Camp Hill.
7. Prattville Agricultural Research Unit, Prattville.
8. Black Belt Research and Extension Center, Marion Junction.
9. Lower Coastal Plain Substation, Camden.
10. Monroeville Agricultural Research Unit, Monroeville.
11. Wiregrass Research and Extension Center, Headland.
12. Brewton Agricultural Research Unit, Brewton.
13. Ornamental Horticulture Research Center, Spring Hill.
14. Gulf Coast Research and Extension Center, Fairhope.