Vegetable and Fruit

Variety Trials
Spring 2013

Regional Bulletin 29
Alabama Agricultural Experiment Station
Department of Horticulture
William Batchelor, Director
Auburn University

In cooperation with the Alabama Cooperative Extension System
(Alabama A&M University and Auburn University)

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

Harris Moran Seed Co.
Nunhems Seeds
Sakata Seed America

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Tips to Interpret Results on Vegetable Varity Performance

Edgar Vinson and Joe Kemble

Introduction: 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 information provides a few tips to adequately interpret results in this report.

Open-Pollinated or Hybrid Varieties

In general, hybrid varieties (also referred to as F1 varieties) are earlier and produce a more uniform crop. They have improved disease and pest or virus tolerance/resistance. F1 varieties are often more expensive than open-pollinated varieties (also referred to as OP varieties), and seeds cannot be collected from one crop in order to plant the next. Despite the advantages F1 varieties offer, OP varieties 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 simply by 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 ranges between 0 and 1. Values close to 1 suggest that the test was conducted under good conditions and that 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 are desirable (under 20 percent) but are not always achieved.

TIPS

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 watermelon trial presented in this issue conducted at the E.V. Smith Research Center; 'Summer Flavor 880' yielded 88,585 pounds per acre, while 'Valentino' and 'Estrella' yielded 74,030 and 66,823 pounds per acre, respectively. Since there was less than a 20,603 difference between 'Summer Flavor 880' and 'Valentino ,' there is no statistical difference between these two varieties. However, the yield difference between 'Summer Flavor 880' and 'Estrella' was 21,762 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 Condition
Auburn University variety trials are conducted under standard, recommended commercial production practices. 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, fertilizer rates and 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 rates depend 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 the Appendix.

Several factors other than yield have to be considered when choosing a variety from a variety trial report. The main factors to consider 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.
Vegetable and Fruit Variety Trials on the Web – to view this and other publications online go to:
www.aaes.auburn.edu/comm/pubs/pubs-by-type/rebulllist.php

Table 1

Soil Types at the Location of the Trial

Location	Water holding capacity (In.)	Soil type
Gulf Coast Research and Extension Center (Fairhope)	0.09-0.19	Malhis fine sandy loam
Brewton Experiment Field (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 Substation (Cullman)	0.16-0.20	Hartsells-Albertville fine sandy loam
Sand Mountain Research and Extension Center (Crossville)	0.16-0.18	Wynnville 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

Three Yellow Summer Squash Varieties Top List in Early and Total Yield

Joe Kemble, Edgar Vinson and Randy Akridge

A summer squash variety trial was conducted at the Brewton Area Research Unit (BARU) in Brewton, Alabama (Tables 3.1 and 3.2). Beds were formed and plastic mulch and drip irrigation were used. Squash varieties were direct seeded on white plastic mulch on May 13. Beds were 20 feet long on 6-foot centers. Spacing within a row was 1.5 feet.

Soils were fertilized according to the recommendations of the Auburn University Soil Testing Laboratory. For current recommendations for pest and weed control in vegetable production in Alabama, consult the latest edition of the Southeastern U.S. Vegetable Crop Handbook (www.thegrower.com/south-east-vegetable-guide). For a copy of the handbook and for further information, consult your local county extension agent. Your agent can be found by going to www.aces.edu/counties .

Squash were harvested eight times between June 12 and June 26. Squash were graded according to the United Stated Standards for Grades of Summer Squash (U.S. Department of Agriculture, G.P.O 1987-180-916:40730 AMS) (Table 3). Early yield consisted of the first three harvests. In early marketable yield 'Superpik' was significantly higher than 'Lioness' (Table 3). There were no other differences found in this category. The varieties 'Cougar,' 'Supersette' and 'Ocelot' produced the three highest yields in the early US No.1 category. These yields were significantly higher that 'Cheetah' and 'Lioness'. 'Cheetah' produced the highest US No.2 yield overall. The yield was significantly higher than 'Supersette,' 'Cougar,' 'Lazor,' and 'Lioness.' Early US No.2 yield value for 'Superpik' was significantly higher than 'Cougar' and 'Lioness.' There were no other differences in this category.

'Ocelot ,' 'Supersette ,' and 'Superpik' produced the three highest values in total marketable yield (Table 3.4). These three varieties were statistically similar in the category, produced values that were statistically higher than the remaining cultivars with the exception of 'Multipik. 'Ocelot' and 'Supersette' also produced the highest values in US No.2 yield category. There were few differences in this category. 'Ocelot' and 'Supersette' produced values that were significantly different from 'Cheetah' and 'Lioness' only. Similarly, there was little difference found among US No.2 fruit. 'Ocelot ,' 'Superpik ,' and 'Multipik' produced values that were statistically higher than 'Cougar' and 'Lioness'.

Table 3.1

Ratings of 2013 Summer Squash Variety Trial

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

[1]See introduction for description of ratings scales.

Table 3.2

Seed Source, Fruit Type and Relative Earliness of Selected Yellow Summer Squash Varieties

Variety	Type	Seed source	Days to harvest	Disease claims	Years Evaluated
Cheetah	F1	Harris Moran	--	PM, PRSV, WMV, ZYMV	13
Cougar	F1	Harris Moran	--	PRSV, ZYMV	13
Lazor	F1	Seedway	42	ZYMV	11-13
Lioness	F1	Harris Seeds	50	CMV, PRSV, WMV 2[1], ZYMV	04-08, 11-13
Multipik*	F1	Harris Seeds	50	CMV, WMV	11-13
Ocelot	F1	Harris Moran	--	--	11-13
Superpik*	F1	Harris	50	CMV, WMV	12, 13
Supersette*	F1	Harris Moran	--	CMV, WMV	94, 96, 03, 12, 13

[1]Indicates variety is resistant/tolerant to Watermelon Mosaic Virus race 2. * Precocious Variety – Has ability to mask blemishes caused by some viruses; -- = none; from seed catalogues; Disease Claims: CMV = Cucumber Mosaic Virus; PM = Powdery Mildew; PRSV = Papaya Ring Spot; ZYMV = Zucchini Yellow Mosaic Virus ; WMV = Watermelon Mosaic Virus

Table 3.3

Early Yield of Selected Yellow Summer Squash Varieties

Variety	Early Marketable Yield (lbs/ac)	Early U.S. No. 1 Weight (lbs/ac)	Early U.S. No. 2 Weight (lbs/ac)	Early U.S. No. 1 Number (#/ac)	Early U.S. No. 2 (#/ac)
Superpik	8,033	3,422	4,611	12,180	6,235
Superset	7,778	4,082	3,695	15,660	6,634
Ocelot	7,569	3,624	3,945	13,703	5,220
Multipik	7,486	3,376	4,111	11,310	6,416
Cheetah	7,186	2,114	5,072	6,634	3,154
Cougar	7,117	4,233	2,884	14,355	4,459
Lazor	6,853	3,330	3,524	10,005	3,045
Lioness	4,537	1,599	2,938	4,785	3,371
R^2	0.65	0.64	0.60	0.80	0.64
CV	13.6	26	24	23	30
LSD	1,407	1,235	1,339	3,690	2,129

Table 3.4

Total Yield of Selected Yellow Summer Squash Varieties

Variety	Marketable Yield (lbs/ac)	U.S. No. 1 Weight (lbs/ac)	U.S. No. 2 Weight (lbs/ac)	U.S. No. 1 Number (#/ac)	U.S. No. 2 (#/ac)
Ocelot	14,536	8,374	6,162	31,755	9,679
Superset	14,011	8,182	5,829	31,320	11,310
Superpik	13,845	7,543	6,302	25,810	9,715
Multipik	13,076	6,555	6,521	22,511	10,984
Cougar	12,254	7,924	4,330	27,296	7,069
Lazor	11,769	6,740	5,029	21,641	5,546
Cheetah	9,516	4,154	5,361	12,071	3,589
Lioness	7,474	3,613	3,861	11,854	5,111
R^2	0.90	0.74	0.53	0.83	0.77
CV	8	20	20	19	25
LSD	1,495	1,986	1,583	6,410	2,970

Zucchini Yields Differ in Early and Total Yield

Joe Kemble, Edgar Vinson and Jason Burkett

A zucchini squash variety trial was conducted at the E.V. Smith Research Center (EVSRC) in Shorter, AL (Tables 4.1 and 4.2). Zucchini varieties were direct seeded on white plastic mulch on May 3. Beds were 20 feet long on 6-foot centers. Spacing within a row was 1.5 feet. Soils were fertilized according to the recommendations of the Auburn University Soil Testing Laboratory. For current recommendations for pest and weed control in vegetable production in Alabama, consult the latest edition of the Southeastern U.S. Vegetable Crop Handbook (www.thegrower.com/south-east-vegetable-guide). For a copy of the handbook and for further information, consult your local county extension agent. Your agent can be found by going to www.aces.edu/counties .

Zucchini were harvested 13 times between June 5 and July 3. Squash were graded according to the United States Standards for Grades of Summer Squash (U.S. Department of Agriculture. G.P.O 1987-180-916:40730 AMS) (Table 4.3 and 4.4). Grades were combined and categorized as marketable or non-marketable.

Early yield consisted of the first three harvests. In this category, 'Zucchini' produced a significantly higher than all other varieties (Table 4.3). 'Spineless Beauty ,' which was considered the market standard in this trial, produced the second highest early yield which was significantly higher than the remaining varieties. 'Spineless Perfection' is an improved version of 'Spineless Beauty.' Unlike 'Spineless Beauty ,' 'Spineless Perfection' has a disease resistance package against Powdery Mildew, Watermelon Mosaic Virus, Zucchini Yellow Mosaic Virus. In early marketable yield, 'Spineless Beauty' produced significantly higher yield than 'Spineless Perfection'. In total marketable yield, 'Cashflow' which was a moderately performing variety early in harvest season produced the highest yield. This yield was significantly higher than all varieties with the exception of 'Zucchini Elite' and 'Spineless Beauty.'

Significant differences existed among several varieties in both early and total marketable yield. 'Spineless Beauty' produced yields significantly higher than most varieties early in the harvest season. Some differences disappeared by the end of the season. For example, differences in early marketable yield between 'Spineless Beauty' and 'Spineless Perfection' were not found in total marketable yield.

Table 4.1

Ratings of 2013 Zucchini Squash Variety Trial[1]

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

[1]See introduction for description of ratings scales.

Table 4.2

Seed Source, Fruit Type and Relative Earliness of Selected Zucchini Squash Varieties

Variety	Type	Seed source	Days to harvest	Disease claims	Years evaluated
Cashflow	F1	Syngenta	47	ZYMV	10, 11, 13
Reward	F1	Harris	49	PM, CMV, WMV, ZYMV	12, 13
Leopard	F1	Harris Moran	--	PRSV, ZYMV	11-13
Spineless Perfection (RSQ 5184)	F1	Harris	44	PM, WMV, ZYMV	10, 11, 13
Spineless Beauty	F1	Harris	43	--	95-97, 99, 10-13
Zucchini Elite	F1	Harris Moran	--	--	95-97, 99, 10-13
Elegance	F1	Harris Moran	--	PM, WMV, ZYMV	10-13

-- = none; from seed catalogues; Disease Claims: CMV = Cucumber Mosaic Virus; PM = Powdery Mildew; PRSV = Papaya Ring Spot; ZYMV = Zucchini Yellow Mosaic Virus ; WMV = Watermelon Mosaic Virus

Table 4.3

Early Yield of Selected Zucchini Squash Varieties

Variety	Early Marketable Yield (lbs/ac)	Early Marketable Number (lbs/ac)	Cull (lbs/ac)	Individual Fruit Weight (lbs)
Zucchini Elite	8,033	3,422	4,611	12,180
Spineless Beauty	7,778	4,082	3,695	15,660
Leopard	7,569	3,624	3,945	13,703
Cashflow	7,486	3,376	4,111	11,310
Spineless Perfection	7,186	2,114	5,072	6,634
Elegance	7,117	4,233	2,884	14,355
Reward	6,853	3,330	3,524	10,005
R^2	0.65	0.64	0.60	0.80
CV	13.6	26	24	23
LSD	4,537	6,599	2,938	4,785

Table 4.4

Total Yield and Quality of Selected Summer Squash Varieties

Variety	Total Marketable Yield (lbs/ac)	Total Marketable Number (#/ac)	Cull (lbs/ac)	Individual Fruit Weight (lbs)
Cashflow	21,063	44,468	7,685	0.47
Zucchini Elite	18,905	35,120	7,801	0.54
Spineless Beauty	18,141	29,766	8,021	0.61
Elegance	17,685	36,572	8,018	0.48
Leopard	16,936	34,394	7,497	0.49
Spineless Perfection	16,258	28,949	9,537	0.57
Reward	15,135	38,387	4,323	0.40
R2	0.60	0.64	0.40	0.83
CV	12	13	32	7
LSD	3,114	15,180	3,591	0.02

Bell Pepper Trials in North and South Alabama

Joe Kemble, Edgar Vinson, and Randy Akridge, and Arnold Caylor

Spring bell pepper variety trials were conducted at the Brewton Agricultural Research Unit (BARU) in Brewton, Alabama and at the North Alabama Horticulture Research Center (NAHRC) in Cullman, Alabama. Five-week-old, bell-pepper transplants were set onto 20-foot long plots at a within-row spacing of 1.5 feet on April 30 at BARU and May 20 at NAHRC. White plastic mulch and drip irrigation were used.

Soils were fertilized according to the recommendations of the Auburn University Soil Testing Laboratory. For current recommendations for pest and weed control in vegetable production in Alabama, consult the latest edition of the Southeastern U.S. Vegetable Crop Handbook (www.thegrower.com/south-east-vegetable-guide). For a copy of the handbook and for further information, consult your local county extension agent. Your agent can be found by going to www.aces.edu/counties.

At BARU, bell peppers were harvested four times between July 8 and July 30. Prior to weighing, bell peppers were graded according to USDA's Grader's Guide as US Fancy, Number 1, Number 2, and cull (Table 5.3). Marketable yield was the sum of Fancy, Number 1 and Number 2 grades (Table 5.3). At NAHRC, bell peppers were harvested three times between August 1 and September 23. Bell peppers were graded according to fruit diameter (D) (Table 5.4). Diameters of fresh market bell pepper were adapted from the USDA's Grader's Guide (Table 5.4).

At BARU, 'Camelot X3R' was included in the trial as market standard. Varieties that produced the three highest values in total marketable yield were 'Declaration ,' 'Aristotle' and 'Gridiron' (FPP9048). All varieties except FPP-1814 and 'Allegiance' produced higher values than the market standard in the US Fancy category. Overall, the majority of total marketable yield came from US No.1 fruit at 68 percent, while US Fancy and US Number 2 where 23 percent and 10 percent of the total yield respectively. A similar trend was exhibited among the top three performing varieties. Thirty four percent of total marketable yield of 'Declaration' was the result of US Fancy yield, while 30percent and 23 percent of total marketable yield was the result of US Fancy yield in 'Aristotle' and Gridiron respectively. The majority of total marketable yield was 58 percent, 64 percent, and 66 percent was the result of US Number 1 Fruit in 'Declaration ,' 'Aristotle ,' and Gridiron respectively.

At NAHRC, ‘Camelot X3R’ was again the market standard. The three top performing varieties were ‘Vanguard ,’ FPP1814, and ‘Double Up.’ Of the top three ‘Vanguard’ and FPP1814 produced yields that were significantly higher than the market standard. All other varieties were similar to the market standard. Overall, medium size fruit was responsible for 50 percent of total marketable yield. Extra-large and large were responsible for 18 percent and 31 percent of total marketable yield respectively.

Table 5.1

Ratings of 2013 Bell Pepper Variety Trial[1]

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

[1]*See introduction for description of ratings scales.*

Table 5.2

Seed Source, Fruit Characteristics and Relative Earliness of Selected Bell Pepper Varieties

Variety	Type	Seed Source	Fruit Color	Days to Harvest	Disease Claims[1]	Years Evaluated
Allegiance	F1	Harris Moran	G-R	61	BSp1-5, PVY 0, TbMV	11-13
Aristotle	F1	Harris	G-R	73	BSp1-3, PVY, TMV	01, 10, 11
Camelot X3R	F1	Seminis	G-R	74	TbMV	94-97, 99, 01, 10-13
Declaration	F1	Harris Moran	G-R	75	CMV, PRR, TSWV	10-12
Double Up	F1	Sakata	G-R	--	BSp 0-3, 5, 7, 8, TMV 0	12, 13
FPP1814	F1	Sakata	G	--	--	12, 13
Gridiron (FPP9048)	F1	Sakata	G-R	--	BSp 0-5, 7-9, TEV, TMV	12, 13
Revolution	F1	Harris Moran	G-R	--	Bsp 1-3, 5, CMV, PRR	12, 13
Vanguard	F1	Harris Moran	G-R	--	BSp 1-5, CMV, PRR	10-13
Wizard X3R	F1	Seminis	G-R	74	Bsp 1-3, TMV	01, 11-13
Blitz (XPP7039)	F1	Sakata	G-R	--	Bsp 0-5, 7-9, TEV, TMV	12, 13

[1]Numbers that follow abbreviations indicate race of disease. For Example BSp 1-5 indicates that a cultivar is resistant/tolerant to bacterial spot races 1 through 5. ; “- -“ = not available from seed catalogues; Type: F1 = Hybrid; BSp = Bacterial Spot; CMV = Cucumber Mosaic Virus; PRR = Phytophthora Root Rot; PVY = Potato Virus Y; TbMV = Tobamo Virus; TEV= Tabacco Etch Virus; TMV=Tobacco Mosaic Virus; TSWV = Tomato Spotted Wilt Virus; G=Green; G-R = Green to Red; G-Y = Green to Yellow

Table 5.3

Yield and Grade Distribution of Selected Bell Pepper Varieties, BARU

Variety	Total Marketable Yield (lbs/ac)	Total Marketable Number (#/ac)	Fancy Number (#/ac)	Fancy Weight (lbs/ac)	U.S.#1 Number (#/ac)	U.S.#1 Weight (lbs/ac)	U.S.#2 Number (#/ac)	U.S.#2 Weight (lbs/ac)	Individual Fruit Weight (lbs)	Cull (lbs/ac)
Declaration	16,112	38,569	10,073	5,538	23,595	9,333	4,901	1,241	0.42	1,788
Aristotle	15,368	36,482	8,984	4,743	24,412	9,770	3,086	855	0.42	1,243
Gridiron	14,054	35,393	6,080	3,209	23,777	9,286	5,536	1,559	0.40	1,287
Double Up	13,284	35,030	1,906	1,000	26,227	10,424	6,897	1,860	0.38	1,325
Revolution	13,222	31,400	7,532	4,309	20,419	8,131	3,449	782	0.42	1,788
Blitz	13,110	30,674	7,169	4,124	20,600	8,271	2,904	715	0.43	1,530
Vanguard	12,950	30,855	7,169	3,926	20,419	8,231	3,267	793	0.42	1,441
Camelot X3R	11,798	33,033	1,573	801	26,318	9,759	5,536	1,437	0.36	1,525
FPP1814	11,770	32,216	1,361	675	23,686	9,117	7,169	1,978	0.37	1,755
Allegiance	8,001	22,234	1,573	886	16,244	6,225	4,810	1,111	0.36	1,686
R^2	0.61	0.60	0.81	0.80	0.57	0.54	0.50	0.51	0.76	0.40
CV	17	16	35	37	16	17	50	53	4.7	27
LSD	3,188	7,337	2,847	1,630	5,292	2,148	3,449	952	0.03	600

Table 5.4

Yield and Grade Distribution of Selected Bell Pepper Varieties, NAHRC

Variety	Total Marketable Yield (lbs/ac)	Total Marketable Number (#/ac)	Extra Large Number (#/ac)	Extra Large Weight (lbs/ac)	Large Number (#/ac)	Large Weight (lbs/ac)	Medium Number (#/ac)	Medium Weight (lbs/ac)	Individual Fruit Weight (lbs)	Cull (lbs/ac)
Vanguard	49,958	52,363	12,342	17,529	14,248	15,163	22,200	17,266	1.0	2,494
FPP1814	46,197	57,354	1,997	2,649	11,798	13,007	38,404	30,540	0.8	2,797
Double Up	40,637	51,092	3,358	4,540	9,983	10,434	32,891	25,663	0.8	1,250
Gridiron (FPP9048)	40,094	43,742	5,899	8,831	12,796	13,622	22,585	17,641	0.9	1,242
Aristotle	36,778	44,195	5,627	7,856	10,799	11,602	23,074	17,320	0.9	1,965
Revolution	36,013	43,742	4,538	6,379	11,888	12,620	22,088	17,014	0.9	2,192
Camelot X3R	32,535	41,564	3,449	4,404	11,435	11,935	22,367	16,196	0.8	2,731
R^2	0.41	0.33	0.80	0.82	0.20	0.22	0.44	0.51	0.50	0.28
CV	23	26	36	36	33	33	35	34	10	59
LSD	13,576	18,694	2,849	3,953	6,501	6,138	13,583	10,118	0.06	1,837

No Differences Found Among Tomato Varieties in South Alabama

Joe Kemble, Edgar Vinson and Randy Akridge, Arnold Caylor

Spring tomato variety trials were conducted at the Brewton Agricultural Research Unit (BARU) in Brewton, Alabama and the North Alabama Horticulture Research Center (NAHRC) in Cullman, Alabama (Tables 6.1 and 6.2, Figure 1). Five-week-old tomato transplants were set on May 4 and April 26 at NAHRC onto 20-foot long plots and a within-row spacing of 1.5 feet. White plastic mulch and drip irrigation were used at both locations.

Soils were fertilized according to the recommendations of the Auburn University Soil Testing Laboratory and pesticides were applied. For current recommendations for pest and weed control in vegetable production in Alabama, consult the latest edition of the Southeastern U.S. Vegetable Crop Handbook (www.thegrower.com/south-east-vegetable-guide). For a copy of the handbook and for further information, consult your local county extension agent. Your agent can be found by going to www.aces.edu/counties.

Tomatoes were harvested, weighed, and graded four times between July 9 and July 30 at BARU and four times between July 15 and August 5 at NAHRC. Grades and corresponding fruit diameters (D) of fresh market tomato were adapted from USDA standards and were extra-large (D>2.9 inch), large (D>2.5 inch) and medium (D>2.3 inch). Marketable yield was the sum of extra-large, large and medium grades (Table 6.3).

At BARU, market standard included in the trial was ‘Florida 47.’ All varieties were similar to the market standard in total marketable yield. In the extra-large category, ‘Charger’ produced statistically higher values than all other varieties. Both ‘Bella Rosa’ and ‘Tribute’ produced values that were significantly higher than the market standard in this category.

At NAHRC, ‘Florida 47’ was again used as the market standard. Among the varieties in this trial, half of the entries were statistically similar to the market standard in total marketable yield. In extra-large yield, values of ‘Bella Rosa’ were significantly larger than other varieties with the exception of ‘Charger’ and ‘Volante.’ All other varieties produced extra-large yields similar to the market standard.

Table 6.1

Ratings of 2013 Tomato Variety Trial[1]

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

[1]See introduction for description of ratings scales.

Table 6.2

Seed Source, Fruit Characteristics and Relative Earliness of Selected Tomato Varieties

Variety	Type	Seed Source	Plant	Fruit Color	Days to Harvest	Disease Claims[1]	Years Evaluated
Amelia	F1/FM	Harris Moran	Det	Red	80	FW 1-3, TSWV, VW	03-08, 10-13
Bella Rosa	F1/FM	Sakata	Det	Red	74	FW 1-2, TSWV, VW	07-08, 10-13
Florida 47	F1/FM	Seminis	Det	Red	75	ASC, FW1-2, St, VW	97-99, 02, 08, 10, 11, 13
Reba	F1/FM	Sakata	Det	Red	--	ASC, FW1-2, St, VW1	13
Charger	F1/FM	Sakata	Det	Red	--	ASC, FW1-3, St, VW1, TY	12, 13
Crista	F1/FM	Harris Moran	Det	Red	74	FW1-3, NE, TSWV, VW	06-13
Mt. Fresh	F1/FM	Reimer	Det	Red	77	FW, Nt, VW, St	13
Red Defender	F1/FM	Harris	Det	Red	75	ASC, FW1-2, St, TSWV, VW	07, 11, 13
Mt. Merit	F1/FM	Johnny's	Det	Red	75	FW0-2, LB, Nt, TSWV	13
Red Bounty	F1/FM	Harris Moran	Det	Red	76	FW1-2, Nt, St, TSWV, VW1	13
Tribute	F1/FM	Sakata	Det	Red	--	--	10-13
Trinity	F1/FM	Harris Moran	Det	Red	--	FW 1-2, Nt, TSWV, VW 1	10-13
XTM-8105	F1/FM	Sakata	Det	Red	--	--	13
XTM-8135	F1/FM	Sakata	Det	Red	--	--	13
Volante	F1/FM	Sakata	Det	Red	--	ASC, FW 1-2, VW 1, St, TSWV	13

[1]Numbers that follow abbreviations indicate race of disease. For Example FW 1-3 indicates that a cultivar is resistant/tolerant to Fusarium Wilt races 1 through 3.Type: F1 = Hybrid; EB=Early Blight; FM = Fresh-Market; Plant Habit: Det = Determinate; Disease Claims (Resistance/Tolerance): FC = Fusarium Crown Rot, FR = Fusarium Root Rot,FW = Fusarium Wilt;LB = Late Blight; VW = Verticillium Wilt; ASC = Alternaria Stem Canker; St = Stemphylium (grey leaf spot); TSWV = Tomato Spotted Wilt Virus, TY=Tomato Yellow Leaf Curl, ToMV=Tomato Mosaic Virus, Nt = Root not nematode; "- -" = not available from seed catalogues

Table 6.3

Yield and Size Distribution of Selected Tomato Varieties, BARU, 2013

Variety	Total Marketable Yield (lbs/ac)	Total Marketable Number (#/ac)	Extra Large Number (#/ac)	Extra Large Weight (lbs/ac)	Large Number (#/ac)	Large Weight (lbs/ac)	Medium Number (#/ac)	Medium Weight (lbs/ac)	Small Weight lbs/acre	Individ-ual Fruit Weight (lbs)	Cull (lbs/ac)
Amelia	44,237	58,988	4,969	7,532	13,032	28,768	26,236	22,688	2,347	0.70	2,502
Tribute	38,556	92,928	10,182	17,606	18,842	44,740	9,532	30,583	1,920	0.41	2,719
Charger	34,383	65,068	17,704	26,045	13,582	28,949	3,098	10,073	675	0.53	3,762
Volante	29,795	64,705	9,088	14,520	14,919	32,035	5,788	18,150	1,194	0.46	1,790
XTM8105	28,825	67,881	8,555	13,794	12,998	29,887	7,272	24,200	2,773	0.43	3,170
Florida 47	28,621	68,698	4,964	7,986	15,389	33,941	8,267	26,771	2,294	0.42	1,643
Bella Rosa	27,040	54,813	10,309	15,065	12,747	27,407	3,984	12,342	490	0.50	2,880
Reba	26,978	62,164	5,091	7,986	14,498	31,490	7,389	22,688	2,225	0.43	2,773
Crista	24,288	56,084	5,650	8,984	12,264	26,953	6,374	20,147	2,621	0.43	2,606
Red Defender	24,080	58,443	5,407	8,712	11,402	25,592	7,271	24,140	5,069	0.41	1,771
R^2	0.20	0.60	0.64	0.61	0.44	0.52	0.30	0.70	0.81	0.23	0.60
CV	47	17	41	41	19	19	143	24	33	38	25
LSD	20,729	15,618	4,821	7,581	3,815	8,506	17,781	479	1,017	0.26	916

Table 6.4

Yield and Size Distribution of Selected Tomato Varieties, NAHRC, 2013

Variety	Total Marketable Yield (lbs/ac)	Total Marketable Number (#/ac)	Extra Large Number (#/ac)	Extra Large Weight (lbs/ac)	Large Number (#/ac)	Large Weight (lbs/ac)	Medium Number (#/ac)	Medium Weight (lbs/ac)	Small Weight lbs/acre	Individ-ual Fruit Weight (lbs)	Cull (lbs/ac)
Bella Rosa	57,175	109,082	9,154	17,424	26,637	40,747	18,165	40,838	3,219	0.53	8,560
Florida 47	57,036	121,242	2,205	2,541	16,590	26,590	22,644	51,455	8,619	0.47	11,954
Reba	55,528	103,277	2,421	3,267	16,255	27,497	21,927	48,098	7,835	0.54	10,956
Mt. Fresh	55,246	113,710	2,645	3,086	21,611	34,939	24,030	54,541	6,960	0.49	9,178
Red Defender	51,179	106,359	3,445	3,993	19,940	31,763	20,935	49,459	6,860	0.48	14,828
Amelia	51,124	103,183	3,516	3,267	19,987	32,307	22,442	51,728	5,180	0.49	9,935
Tribute	46,694	85,789	4,483	5,203	22,096	33,487	14,770	34,848	3,129	0.54	8,313
Mt. Merit	44,778	97,526	1,377	1,573	12,812	20,419	22,973	52,817	7,077	0.46	8,952
Charger	44,156	79,134	9,086	9,620	19,344	29,675	12,750	29,585	2,976	0.56	6,741
Red Bounty	41,928	80,132	4,747	5,264	17,279	26,590	14,697	33,396	5,205	0.52	8,950
Crista	39,932	76,049	3,521	4,084	18,194	28,586	15,065	33,668	3,152	0.53	5,661
Volante	39,395	72,842	6,049	6,534	17,966	27,588	11,661	27,134	2,966	0.54	6,049
XTM-8135	32,697	62,073	3,443	3,630	13,801	21,236	12,252	27,407	3,201	0.53	7,106
XTM-8105	20,134	38,841	2,017	2,178	8,288	12,161	7,351	16,880	2,477	0.50	6,840
R2	0.72	0.80	0.58	0.59	0.50	0.51	0.76	0.77	0.75	0.35	0.64
CV	17	15	55	75	25	27	19	18	27	9	23
LSD	12,588	18,940	3,443	5,864	7,227	10,853	4,655	10,423	1,938	0.065	2,972

Table 6.5

Yield and Quality of Selected Tomato Varieties

Variety	Total marketable yield (lbs/ac)	Total marketable cull (boxes/ac)	Total marketable number (#/ac)	Extra large weight (lbs/ac)	Extra large number (#/ac)	Large weight (lbs/ac)	Number (#/ac)	Large weight (lbs/ac)	Medium number (#/ac)	Medium weight (lbs)	Individual fruit weight (lbs/ac)
Red Defender	26,722	432	61,952	10,802	17,303	9,052	21,296	6,868	23,353	0.43	6,695
BHN 640	24,964	377	55,902	9,431	15,065	9,728	22,506	5,804	18,332	0.45	11,429
Trinity	24,613	527	50,336	13,164	20,328	7,229	16,214	4,220	13,794	0.49	8,495
BHN 602	24,275	508	52,393	12,697	20,933	7,622	18,150	3,957	13,310	0.46	11,191
Bella Rosa	23,411	492	72,721	12,291	19,602	7,072	39,809	4,047	13,310	0.39	9,767
Tribeca	22,787	370	50,215	9,249	14,641	8,682	19,602	4,856	15,972	0.45	9,138
Charger	22,112	500	42,955	12,504	18,513	6,685	15,004	2,922	9,438	0.51	14,814
Amelia	21,958	363	49,126	9,079	15,004	7,789	17,545	5,090	16,577	0.45	8,977
HM 8849	21,658	360	47,674	9,002	14,641	8,021	17,908	4,634	15,125	0.45	10,192
Primo Red	20,989	436	40,898	10,906	16,093	7,197	15,730	2,886	9,075	0.51	11,167
XTM 7262	20,093	435	43,318	10,869	118,392	5,279	11,979	3,945	12,947	0.47	6,967
Crista	19,482	303	43,076	7,585	11,979	7,421	16,456	4,476	14,641	0.45	10,053
Sunguard	17,177	203	40,172	5,071	8,107	7,448	16,819	4,659	15,246	0.43	8,871
Tribute	16,896	250	39,446	6,262	10,285	6,694	15,609	3,941	13,552	0.43	15,188
R^2	0.50	0.68	0.40	0.70	0.60	0.50	0.40	0.60	0.62	0.40	0.80
CV	17	21	30	21	25	22	66	25	25	10	16
LSD (α = 0.05)	5,499	122	22,011	3,077	5,748	2,400	18,191	1,622	5,275	0.06	2,390

Figure 1. Tomato Varieties Included in Tomato Trials at BARU and NAHRC

TOMATO


RED DEFENDER
RED DEFENDER


106
Charger


Crista


Reba


105
Tribute


Volante


110
XTM 8105

Several Varieties Show No Instances of Hollow Heart in Central Alabama Watermelon Trial

Joe Kemble, Edgar Vinson, and Jason Burkett

A seeded watermelon trial was conducted at the E.V. Smith Research Center in Shorter. Tennessee seeded watermelon varieties were direct seeded on April 30, 2013. Transplants were spaced ten feet between rows and five feet within a row. Drip irrigation and black plastic mulch were used.

Soils were fertilized according to the recommendations of the Auburn University Soil Testing Laboratory. For current recommendations for pest and weed control in vegetable production in Alabama, consult your county extension agent (see http://www.aces.edu/counties/).

Watermelons were harvested once on July 15 and were graded according to the Watermelon Grader's Guide (Circular ANR-681 from the Alabama Cooperative Extension System) and marketable yield was determined (Table 7.3). Representative watermelon samples were collected for each variety and were used to measure soluble solids (sweetness). These samples were not replicated. A handheld digital refractometer was used to measure soluble solids. Watermelons with reading below 10 are not considered sweet.

'Stargazer' was included in the trial as a market standard. All varieties with the exception of 'Allsweet' performed as well as the market standard in total marketable yield. There were no differences found among varieties in total marketable number. Most varieties produced cull yield statistically similar to the market standard. The only differences found in this category were between 'Summer Flavor 860' and 'Maistro.' 'Summer Flavor 860' produced the highest cull yield and 'Maistro' produced the lowest cull yield. 'Summer Flavor 860' produced the largest individual fruit size. 'Montreal' and 'Sweet Amigo' produced fruit of a significantly lower weight than the market standard 'Stargazer' while individual fruit of 'Summer Flavor 880,' 'Summer Flavor 860' and 'Valentino ,' and 'Verde Grande' were significantly higher than the market standard. Soluble solids of all varieties were above the threshold of sweet (>10 percent). 'Allsweet ,' 'Sweet Amigo ,' 'Estrella' and 'Montreal' were the only melons in the trial that did not show hollow heart.

WATERMELON

Table 7.1

Ratings of 2013 Seeded and Seedless Watermelon Variety Trial

Location	EVSRC
Fertility	5
Irrigation	5
Pests	5
Overall	5

Note: See introduction for description of ratings scales

Table 7.2

Seed Source, Fruit Characteristics and Relative Earliness of Selected Seeded and Seedless Watermelon Varieties

Variety	Type	Seed source	Fruit shape	Flesh color	Days to harvest	Disease claims[a]	Years evaluated
Allsweet	OP, AS	Seiger	Elongated	Red	90	[bd]Ant, FW	12, 13
Estrella	F1, AS	Seedway	Oblong	Red	84	Ant, FW	12
Fantasy	F1, AS	Sakata	Elongated	Red	87	[b]Ant, [b]FW	13
Maistro	F1, AS	Harris Moran	Oblong	Red	--	[b]Ant, [ab]FW	13
Montreal	F1, AS	Nunhems	Blocky	Red	--	[b]FW	01, 02, 13
Stargazer	F1, AS	Sieger	Elongated	Red	85	Ant, FW	98-01, 03, 12, 13
Summer Flavor 860	F1, AS	Abbott & Cobb	Oblong	Red	--	--	12, 13
Summer Flavor 880	F1, AS	Abbott & Cobb	Elongated	Red	--	--	12, 12
Sweet Amigo	F1, AS	Sakata	Elongated	Red	85	[b]FW	13
Valentino	F1, AS	Sakata	Oblong	Red	87	[b]Ant, [b]FW	13
Verde Grande	F1 P	Sakata	Oblong	Red	85	--	13

[a]Race 0; [b]Race 1 ; [c]Race 2; '- -' = not available from seed catalogues; Type: F1 = Hybrid; OP = Open Pollinated AS= Allsweet; CS = Crimson Sweet P=Peacock; Ant = Anthracnose; FW = Fusarium Wilt; R=Red

Table 7.3

Yield and Quality of Selected Seeded Watermelon Varieties

Variety	Total Marketable Yield (lbs/ac)	Total Marketable Number (#/ac)	Cull (lbs/ac)	Individual Fruit Weight (lbs)	Soluble Solids (%)	Hollow Heart (in)
Summer Flavor 880	88,585	4,719	6,828	18.9	12.2	6.1
Montreal	82,875	5,808	4,765	14.3	10.8	.
Stargazer	81,577	5,082	7,108	16.1	12.4	5.6
Summer Flavor 860	80,858	4,265	13,576	19.0	10.9	4.0
Maistros	77,544	5,082	2,955	15.4	12.1	5.0
Valentino	74,030	4,175	10,721	17.7	12.4	2.5
Estrella	66,823	4,175	6,575	16.0	12.1	.
Verde Grande	63,569	3,358	5,670	18.9	11.9	6.0
Sweet Amigo	62,211	4,356	5,590	14.3	11.6	.
Fantasy	60,095	3,630	7,906	16.6	12.4	5.9
Allsweet	53,147	3,449	6,549	15.6	11.4	.
R^2	0.43	0.51	0.40	0.50	0.40	0.30
CV	20	19	62	12	7	60
LSD	20,603	2,579	6,787	1.3	1.2	1.8

Growing 87.5% *V. vinifera* Grapes Within the High Disease Pressure Southeastern Region

Elina Coneva, Edgar Vinson and Jim Pitts

Although Pierce's Disease (PD) is a serious threat to the cultivation of grapes in the United States, especially in warmer southern regions, the U.C. Davis grape breeding program has recently developed new generations with over 87 percent *V. vinifera* that are resistant to the devastating PD. These new accessions are expected to produce high quality yield even in regions with high PD pressure, such as the southeastern U.S., where the *V. vinifera* production was previously not a viable option. The objective of our study is to assess the feasibility of growing PD resistant *V. vinifera* selections in Alabama and the southeast.

An experimental vineyard was established at the Chilton Research and Extension Center (CREC), Alabama, in 2010 consisting of three recently developed PD resistant 87.5 percent *V. vinifera* selections, namely 502-10, 502-01, and 501-12. The grapevines were trained to a vertical shoot positioning (VSP) system and supplemental drip irrigation was provided to facilitate plant establishment. The grape selections grew well in 2011. Fruiting clusters were removed from the plants in an attempt to provide optimal conditions for the growth and development of the vine root system and enhance the vine vigor and longevity. In 2012 all three *V. vinifera* selections produced their first commercial crop and a number of measurements were collected to evaluate the vegetative growth, productivity, and fruit quality of these newly introduced grapevines. Data collection continued in 2013.

To assess the pruning weight and aid in determining the optimal crop load, all of the dormant-pruned one-year-old wood was collected and weighed. Our results shown in Table 1 suggest that in both seasons selection 502-10 had the lowest pruning weight, while 501-12 produced the largest pruning weight. The greater pruning weight indicates the more vigorously growing vine.

Our results indicated statistical differences in total yield per vine with the late maturing 501-12 producing the greatest crop of 5.8 and 8.1 kilogram per vine in 2012 and 2013 respectively (Figure 1). Bird feeding was accountable for about 70 percent crop loss for the early ripening selection 502-10 in 2012.

Table 8.1.
Trunk Cross Sectional area and pruning weight of PD Resistant 87.5% V.vinifera Selections, CREC, 2012-2013

Selection	TCSA (cm^2)	Pruning Weight (kg)
	2012	
502-10	4.7	0.64 b
502-01	4.3	0.95 a
501-12	4	0.96 a
Significance	n.s.	***
	2013	
502-10	9.7	2.1
502-01	9.9	2.3
501-12	8.2	2.4
Significance	*	n.s.

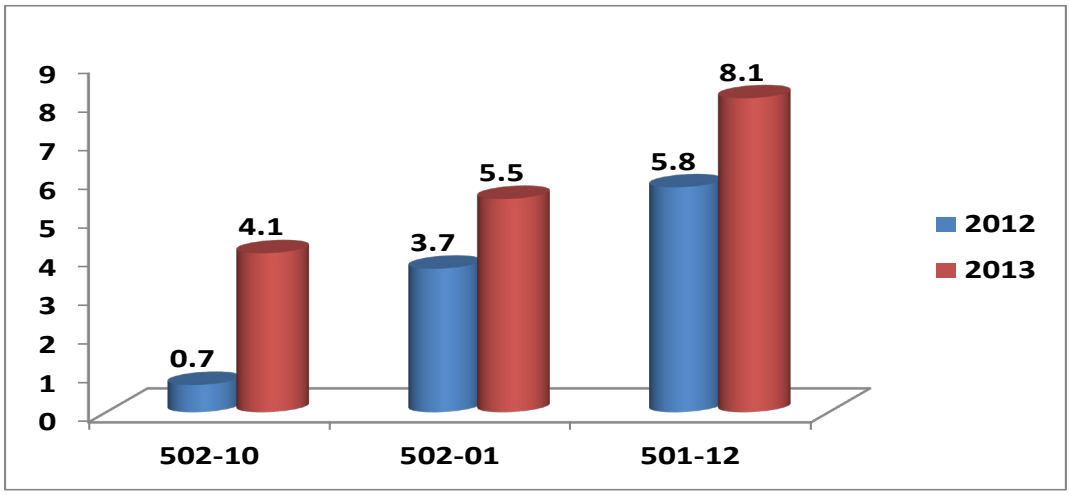

Figure 1. Total yield per vine of PD resistant 87.5% V. vinifera selections grown at the CREC, Clanton, AL, 2012-2013.

During both years of our study, late season selection 501-12 produced the highest number of clusters per vine, while the early ripening selection 502-10 had fewer clusters per vine (Table 2). Mid-season selection 502-01 had the largest clusters in 2012, while the early ripening 502-10 produced the largest clusters in 2013.

Figure 2. Fruit clusters of PD resistant late season 87.5% V. vinifera selection 501-12, grown at the Chilton REC, Clanton, October 8, 2013.

The preliminary results on the performance of the newly developed PD resistant *V. vinifera* selections in Alabama are very encouraging. Knowledge gained through this project will aid in development of best management practices and production system recommendations, vital for the establishment of a sustainable grape industry in Alabama and the Southeast.

Seed Sources

Supporting Seed Companies

Nunhems
1200 Anderson Corner Rd.
Parma, ID 83660
(800) 733-9505
rbeckham@rose.net

Harris Moran Seed Co.
Michael Hannah
P.O Box 4938
Modesto, CA 95352
(828) 421-6618
Fax: (828) 246-0925
m.hannah@hmclause.com

Sakata Seed America
Jim Stewart
18095 Serene Drive
Morgan Hills, CA 95037
(408) 778-7758
jayjones@sakata.com

Other Seed Sources

Harris Seeds
355 Paul Rd.
Rochester, NY 14624
(800) 544-7938
growers@harrisseeds.com

Johnny's Select Seeds
955 Benton Ave
Winslow, ME 04901
(207) 861-3900
info@johnnyseeds.com

Reimer Seeds
P.O. Box 206
Saint Leonard, MD 20685
Fax: (866) 716-4748
mail@reimerseeds.com

Seedway
1225 Zeager Rd
Elizabethtown, PA 17022
(717) 367-1075
info@seedway.com

Seminis Vegetable Seeds
2700 Camino Del Sol
Oxnard, CA 93030
(855) 733-3834
seminis.deruiter
@monsanto.com

Siegers Seed Company
13031 Reflections Drive
Holland, MI 49424
(616) 786-4999

Syngenta
Woody Speir
P.O. Box 18300
Greensboro, NC 27419
(229) 894-5398
woody.speir@syngenta.com