# Vegetable and Fruit
## Variety Trials
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# Tips to Interpret Results on Vegetable Variety 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 interpret results in this report.

*Open-Pollinated or Hybrid Varieties*

In general, hybrid varieties (also referred to as $F_1$ varieties) are earlier and produce a more uniform crop. They have improved disease and pest or virus tolerance/resistance. $F_1$ 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 hybrids 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.

For $R^2$ ranges are 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 seeded watermelon trial presented in this issue conducted at the Chilton Area Research and Extension Center, 'Summer Flavor 860' yielded 75,288 pounds per acre, while 'Allsweet' and 'Fantasy' yielded 50,992 and 46,376 pounds per acre, respectively. Since there was less than a 28,471 difference between 'Summer Flavor 860' and 'Allsweet,' there is no statistical difference between these two varieties. However, the yield difference between 'Summer Flavor 860' and 'Fantasy' was 28,912 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*

AU vegetable 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**

Our website will provide such useful information as description 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.) | Soil type |
|---|---|---|
| Gulf Coast Research and Extension Center (Fairhope) | 0.09-0.19 | Malbis 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 |

# Cantaloupe Varieties Produce Commercially-Sized Production

**Joe Kemble, Edgar Vinson and Arnold Caylor**

A cantaloupe trial was conducted at the North Alabama Horticulture Research Center (NAHRC) in Cullman, Ala. (Tables 3, 4 and 5).

Cantaloupe varieties were direct-seeded May 1 onto 20 foot rows with 8 feet between rows and a within row spacing of 2 feet. Drip irrigation and black plastic mulch were used. Cantaloupes were harvested twice at the half-slip stage of maturity on from July 23 and 27 (Table 5).

Soils were fertilized according to the recommendations of the Auburn University Soil Testing Laboratory. For current recommendations for pest and weed management in vegetable production in Alabama, consult the latest edition of the Southeastern U.S. Vegetable Crops Handbook (www.thepacker.com/thegrower). For a copy of the handbook and further information, consult your local county Extension agent (www.aces.edu/counties).

In marketable yield, 'Rock Star' and 'Maverick' produced the highest values. The yield of 'Rock Star' was significantly higher than the market standard 'Athena' and all other varieties with the exception of 'Maverick.' The yield of 'Maverick' was significantly higher than the market standard 'Athena,' 'Goodess,' and 'Cleopatra.' In marketable fruit number, 'Maverick,' 'Wrangler,' and 'Ambrosia' produced significantly higher values than the market standard 'Athena.' 'Athena' was similar to all varieties.

In commercial production, it is desirable to have melons that have individual weights of 4-6lbs. All cantaloupes, with the exception of 'Diva' (large) and 'Wrangler' (small) produced cantaloupes that were most suitable for commercial sale. 'Diva,' which typically produces fruit that weigh 6-8 pounds, produced melons that exceeded the range for commercial melons and weighed significantly more than all other varieties while 'Wrangler' produced fruit that were slightly below the range for commercial melons and weighed significantly less than most other melons in the trial.

**Table 3**

*Ratings of 2013 Cantaloupe Variety Trial[1]*

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

*1:* See introduction for description of ratings scales

**Table 4**

*Seed Source, Fruit Characteristics and Relative Earliness of Selected Varieties of Cantaloupe*

| Variety | Type | Seed Source | Days to Harvest | Flesh Color | Rind Aspect | Disease Claims |
|---|---|---|---|---|---|---|
| Ambrosia | F1 | Harris | 86 | Orange | E | DM, PM |
| Athena | F1 | Seedway/Novartis | 80 | Orange | E | [abc]FW, [bc]PM |
| Atlantis | F1 | Sakata/Siegers | 74 | Orange | E | [abc]FW, [bc]PM |
| Cleopatra | F1 | Harris | 76 | Orange | E | [abc]FW, [bc]PM |
| Diva | F1 | Harris | 83 | Orange | E | [abc]FW |
| Goddess | F1 | Seedway | 70 | Orange | E | [abc]FW, [bc]PM |
| Gold Star | F1 | Harris | 83 | Orange | E | [b]FW |
| Maverick | F1 | Harris | 83 | Orange | E | [ac]FW |
| Rock Star | F1 | Harris | 73 | Orange | E | [abc]FW, [bc]PM |
| Wrangler | F1 | Harris | 85 | Orange | E | [abc]FW, PM |

*[a]Race 0; [b]Race 1; [c]Race 2; [d]Race 3; Type: F1 = Hybrid CS = Crimson Sweet; FW = Fusarium Wilt*

**Table 5**

*Yield and Fruit Characteristics of Selected Eastern Cantaloupe Varieties*[1]

| Marketable Variety | Marketable Yield (lbs/acre) | Individual Number (#/acre) | Fruit Weight (lbs) | Fruit Length (inches) | Soluble Width (inches) | Solids (Brix) |
|---|---|---|---|---|---|---|
| Rock Star | 80,083 | 13,737 | 5.90 | 8.81 | 6.25 | 11.15 |
| Maverick | 64,981 | 15,483 | 4.68 | 7.06 | 6.31 | 10.90 |
| Diva | 60,757 | 7,412 | 8.19 | 8.94 | 7.19 | 10.60 |
| Ambrosia | 60,370 | 14,212 | 4.24 | 6.44 | 5.94 | 10.80 |
| Atlantis | 56,985 | 9,316 | 6.13 | 6.56 | 6.38 | 12.00 |
| Wrangler | 52,224 | 14,481 | 3.66 | 6.94 | 5.69 | 11.65 |
| Gold Star | 50,769 | 11,152 | 4.62 | 7.63 | 6.19 | 10.70 |
| Athena | 47,875 | 9,385 | 5.12 | 8.06 | 6.31 | 11.85 |
| Goddess | 40,875 | 8,161 | 5.02 | 8.08 | 6.75 | 11.13 |
| Cleopatra | 36,170 | 7,549 | 4.86 | 7.13 | 5.88 | 10.00 |
| $r^2$ | 0.65 | 0.62 | 0.84 | 0.44 | 0.65 | 0.30 |
| CV | 21 | 27 | 12 | 19 | 6 | 10 |
| LSD | 16,837 | 4,427 | 0.93 | 2.10 | 0.58 | 1.74 |

*[1]One melon per replication was used to measure length, width and soluble solids content.*

# Several Bicolor Sweetcorn Varieties Trialed In North East Alabama

**Joe Kemble, Edgar Vinson and Joyce Ducar**

Bicolor supersweet ($sh_2$) sweet corn varieties were evaluated at the Sand Mountain Research and Extension Center (SMREC) in Crossville (Tables 1 and 2).

Experimental plots established on April 25, 2014, consisted of four rows and were 20-feet long. Rows were set on 2.5-foot centers. Plots were seeded heavily and thinned to one plant every 8-10 inches.

Soils were fertilized according to the recommendations of the Auburn University Soil Testing Laboratory. For current recommendations for pest and weed management in vegetable production in Alabama, consult the latest edition of the Southeastern U.S. Vegetable Crops Handbook (www.thepacker.com/thegrower). For a copy of the handbook and further information, consult your local county Extension agent (www.aces.edu/counties).

Sweet corn varieties were harvested on July 23 and were graded following the Sweet Corn Grader's Guide (Circular ANR-680 of the Alabama Cooperative Extension System). Yield and ear characteristics (Tables 6 and 7) were also determined.

Very few differences were exhibited among the white $sh_2$ varieties. 'Flagship' had the highest numerical yield but this yields was similar to all other white $sh_2$ varieties with the exception of 'Treasure' which produced significantly lower yields than all other varieties. In the ear number category no differences were found. Among yellow $sh_2$ varieties no differences in yield or ear number were found.

In both yellow and white supersweet varieties the percent stand did not appear to impact yield significantly. Varieties with comparatively low stands were still capable of producing yields comparable to varieties with high stands.

**Table 6**

*Seed Source, Fruit Characteristics and Relative Earliness of Selected Sweet Corn Varieties*

| Variety | Type | Seed Source | Color | Days to Harvest | Disease Claims | Years Evaluated |
|---|---|---|---|---|---|---|
| EX08745857 | $sh_2$ | Seminis | BC | 76 | CR | 2014 |
| Fantastic XR | $sh_2$ | Siegers | BC | 75 | CR, SBW | 2014 |
| Marai 336BC | $sh_2$ | Siegers | BC | 73 | -- | 2014 |
| Triumph | $sh_2$ | Siegers | BC | 75 | -- | 2014 |
| Rainier | $sh_2$ | Harris | BC | 73 | -- | 2014 |
| Summer Sweet Higlowms 7002R | $sh_2$ | A&C | BC | 72 | CR, NCLB, SBW,SCLB | 2014 |
| Summer Sweet Multiglow 7112R | $sh_2$ | A&C | BC | 75 | CR, NCLB, SBW,SCLB | 2014 |
| Xtra Tender 270A | $sh_2$ | Siegers | BC | 70 | -- | 2014 |

*Disease resistance/tolerance: CR = Corn Rest; NCLB=Northern Corn Leaf Blight; SBW=Stewart's wilt; SCLB=Southern Corn Leaf Blight*

**Table 7**

*Yield, Ear Number, Ear Set Height and Quality of Selected Sweet Corn Varieties*

| Variety | Yield (lbs/acre) | Ear Number (#/acre) | Ear Set Height (inches) | US#1 Wt. (lbs/acre) | US#2 Wt. (lbs/acre) | Individual Fruit Wt. (lbs) | Cull Wt. (lbs) |
|---|---|---|---|---|---|---|---|
| Fantastic XR | 15,279 | 30,800 | 15.75 | 3,138 | 1,398 | 0.27 | 780 |
| Triumph | 14,884 | 36,323 | 15.00 | 2,243 | 1,902 | 0.27 | 899 |
| Marai 336BC | 14,605 | 37,954 | 14.75 | 1,474 | 1,684 | 0.25 | 935 |
| Xtra Tender 270A | 12,920 | 37,084 | 11.00 | 1,849 | 1,182 | 0.27 | 868 |
| EX08745857 | 12,539 | 36,214 | 13.50 | 1,741 | 1,069 | 0.25 | 265 |
| Summer Sweet Higlowms 7002R | 10,984 | 27,731 | 12.75 | 1,830 | 1,350 | 0.25 | 922 |
| Rainier | 15,279 | 25,121 | 13.75 | 1,646 | 1,024 | 0.27 | 751 |
| Summer Sweet Multiglow 7112R | 15,279 | 27,296 | 12.25 | 813 | 967 | 0.24 | 285 |
| $r^2$ | 0.42 | 0.40 | -- | 0.24 | 0.24 | 20 | 0.32 |
| CV | 39 | 37 | -- | 48 | 48 | 11 | 34 |
| LSD | 1,770 | 6,352 | -- | 930 | 930 | 0.04 | 635 |

# Greenhouse Tomatoes Trialed

**Joe Kemble, Edgar Vinson and Jane Hoehaver**

A greenhouse tomato variety trial was conducted at the Plant Science Research Center (PSRC) on the campus of Auburn University (Tables 8 and 9). (Also, see the pictures in Figure 1.)

Six-week-old tomato transplants were planted on March 10, 2014, into 2 cubic feet polyethylene bags filled with pine bark. There were 2 plants per bag and 2 bags per plot. Each variety was replicated 4 times. Plants were arranged in a completely randomized design.

Tomato plants were irrigated using drip emitters. Two emitters were placed in each bag. Irrigation was controlled by an electronic timer. During each watering fertilizer stock solution was injected into the irrigation system using Dosatron fertilizer injector. Fertilizer stock preparation made and fertilizer method performed according to the Greenhouse Tomato Guide published through Mississippi State Extension Service (publication 1828). For more information concerning the greenhouse tomato guide and other useful information concerning greenhouse tomato production, go to www.ext.msstate.edu.

Tomatoes were harvested, weighed, and graded 6 times between April 17 and June 18. Grades and corresponding fruit diameters (D) of fresh market tomato were adapted from the Tomato Grader's Guide (Circular ANR 643 from the Alabama Cooperative Extension System) 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 (Tables 8 and 9).

There were no significant differences found among varieties in total yield or total marketable number (Table 8 and 9). In the large yield category, 'Big Dena' and 'Terero' produced significantly higher yields than 'DRW7749' but were similar to 'Geronimo' and 'Trust.' 'Trust' produced the highest yield of medium-size fruit but this was only significantly higher than 'Geronimo.' In the small fruit category, 'DRW7749' produced the highest yield of marketable fruit. This was significantly higher than 'Geronimo' and 'Big Dena.' The individual size of 'Big Dena' was significantly higher than 'DWR7749' and the market standard 'Trust.'

**Table 8**

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

| Variety | Type | Seed Source | Fruit Color | Days to Harvest | Disease Claims | Years Evaluated |
|---|---|---|---|---|---|---|
| Big Dena | F1/Beef | Paramount/Syngenta | Red | 74 | FCR;FW(0-1);LM;ToM-V(0-2);VW | 2014 |
| Geronimo | F1/Beef | Paramount | Red | 78 | FW(1-2); LM(A-E);TMV | 2005, 2014 |
| DRW7749 (Rebelski) | F1/FM | Paramount/BHN | Red | 75 | FW(1-2);LM(A-E); ToMV(0-2);VW | 2005, 2014 |
| Terero | F1/Beef | Paramount/Vilmorin | Red | -- | FCR;FW(1-2); LM(A-E);ToMV(0-2);VW | 2014 |
| Trust | F1/FM | Paramount/Sakata | Red | 78 | FW(1-2);FCR;LM(A-E); TMV;VW | 2014 |

*[1]Numbers or letters in parentheses that follow disease claim abbreviations indicate race of disease. For example, ToMV(0-2) indictaes that a cultivar is resistant/tolerant to bacterial spot races 0 through 2. Likewise, LM (A-E) indicates resistance to races A through E of leaf mold.*
*FW = Fusarium Wilt; LM = Leaf mold; FCR = Fusarium Crown Rot; ToMV= Tomato Mosaic Virus; TMV = Tobacco Mosaic Virus; VW=Verticillium Wilt*

**Table 9**

*Yield and Size Distribution of Selected Greenhouse Tomato Varieties*

| Variety | Marketable Yield (lbs/plot) | Marketable Number (#/plot) | Large Yield (lbs/plot) | Medium Yield (lbs/plot) | Small Yield (lbs/plot) | Individual Fruit Wt. (lbs) |
|---|---|---|---|---|---|---|
| Trust | 8.38 | 25.00 | 3.04 | 5.34 | 1.36 | 0.33 |
| Terero | 7.42 | 19.67 | 4.13 | 3.30 | 0.91 | 0.37 |
| Big Dena | 7.43 | 19.00 | 4.38 | 3.05 | 0.67 | 0.40 |
| Geronimo | 5.55 | 14.75 | 3.15 | 2.40 | 0.86 | 0.37 |
| DRW7749 (Rebelski) | 4.39 | 13.00 | 1.30 | 3.09 | 1.73 | 0.34 |
| $r^2$ | 0.30 | 0.30 | 0.32 | 0.40 | 0.50 | 0.36 |
| CV | 42 | 43 | 49 | 44 | 43 | 8 |
| LSD | 4.65 | 13 | 2.6 | 2.5 | 0.83 | 0.05 |

*Yields are based on 4-plant plots.*


**Figure 1.** Stem end, blossom end and crossection of selected greenhouse tomatoes. Green labels in photos are six inches in length.

# Seeded Watermelon Varieties Show Few Differences In Marketable Yield In Central Alabama

**Joe Kemble, Edgar Vinson and Jim Pitts**

A seeded watermelon trial was conducted at the Chilton Area Research and Extension Center in Clanton, Ala. (Tables 10, 11 and 12) Eight seeded watermelon varieties were direct seeded on May 23, 2014. Drip irrigation and black plastic mulch were installed. Hills were spaced five feet apart within a row and rows were spaced 10 feet apart. Seeds were sown at a rate of 5 seeds per hill and thinned to 2 plants per hill.

Soils were fertilized according to the recommendations of the Auburn University Soil Testing Laboratory. For current recommendations for pest and weed management in vegetable production in Alabama, consult the latest edition of the Southeastern U.S. Vegetable Crops Handbook (www.thepacker.com/thegrower). For a copy of the handbook and further information, consult your local county Extension agent (www.aces.edu/counties).

Watermelons were harvested on August 4 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 12). Two watermelon fruit were collected from each replication of each variety and were used to measure soluble solids or percent brix (sweetness) with a hand-held digital refractometer. Watermelons with brix readings below 10 are not considered sweet.

Few differences were exhibited in total marketable yield. Total marketable yield of 'Summer Flavor' was significantly higher than 'Fantasy' and 'Tropical' watermelon varieties. There were no other differences in this category. In total marketable fruit number 'Estrella' produced the highest fruit number numerically, but this yield was only significantly higher than 'Fantasy.' Individual fruit weight of 'Summer Flavor 860,' 'Stargazer,' and 'Verde Grande' were significantly higher than 'Tropical,' 'Summer Flavor 800,' and 'Estrella.' Brix readings of all varieties were at least 10% indicating that all varieties were considered to taste sweet.

**Table 10**

*Ratings of 2014 Watermelon Variety Trial*

| Location | CAREC |
|---|---|
| Weather | 5 |
| Fertility | 5 |
| Irrigation | 5 |
| Pests | 5 |
| Overall | 5 |

*Note: See introduction for description of ratings scales*

**Table 11**

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

| Variety | Type | Seed Source | Fruit Shape | Flesh Color | Days to Harvest | Disease Claims | Years Evaluated |
|---|---|---|---|---|---|---|---|
| Allsweet | OP,AS | Sieger | Elongated | Red | 90 | [bd]Ant, FW | 2012,2014 |
| Estrella | F1,AS | Seedway | Oblong | Red | 84 | Ant, FW | 2012,2014 |
| Fantasy | F1,AS | Sakata | Elongated | Red | 87 | [b]Ant, [b]FW | 2014 |
| Stargazer | F1,AS | Sieger | Elongated | Red | 85 | Ant, FW | 98-01, 03,12,14 |
| Summer Flavor 800 | F1,AS | Nunhems | Oblong | Red | -- | -- | 2014 |
| Summer Flavor 860 | F1,AS | Nunhems | Oblong | Red | -- | -- | 2012,2014 |
| Tropical | F1,AS | Harris Moran | Elongated | Red | -- | [b]Ant, [ab]FW | 11,12,14 |
| Verde Grande | F1,P | Sakata | Oblong | Red | 85 | -- | 2014 |

*[a]Race 0; [b]Race 1 ; '--' = not available from seed catalogues; Type: F1 = Hybrid ; OP= Open pollinated; AS= Allsweet; P=Peacock; Ant = Anthracnose; FW = Fusarium Wilt; O= Orange; R=Red; Y = Yellow*

**Table 12**

*Yield and Quality of Selected Seeded Watermelon Varieties*

| Variety | Total Marketable Yield | Total Marketable Number | Individual Fruit Wt. (lbs) | Soluble Solids (% Brix) |
|---|---|---|---|---|
| Summer Flavor 860 | 75,288 | 3,045 | 24.72 | 10.00 |
| Stargazer | 66,986 | 2,827 | 23.68 | 10.94 |
| Estrella | 59,733 | 3,262 | 18.31 | 11.56 |
| Verde Grande | 57,302 | 2,501 | 22.91 | 10.00 |
| Summer Flavor 800 | 55,454 | 2,972 | 18.65 | 10.75 |
| Allsweet | 50,992 | 2,392 | 21.31 | 10.88 |
| Fantasy | 46,376 | 2,138 | 21.68 | 11.13 |
| Tropical | 45,329 | 2,356 | 19.23 | 10.56 |
| $r^2$ | 0.40 | 0.32 | 0.56 | 0.32 |
| CV | 30 | 28 | 11 | 13 |
| LSD | 28,71 | 2,797 | 3.61 | 2.00 |

# New Seedless Watermelon Varieties Are Compared To Market Standard In North Alabama

**Joseph Kemble, Edgar Vinson, and Arnold Caylor**

A seedless watermelon trial was conducted at the North Alabama Horticulture Substation (NAHRC) in Cullman. (Tables 13, 14 and 15)

Four-week-old seedless watermelon transplants were set on May 10 onto plots that were 30 feet long on 10-foot centers. Drip irrigation and black plastic mulch were installed.

Soils were fertilized according to the recommendations of the Auburn University Soil Testing Laboratory. For current recommendations for pest and weed management in vegetable production in Alabama, consult the latest edition of the Southeastern U.S. Vegetable Crops Handbook (www.thepacker.com/thegrower). For a copy of the handbook and further information, consult your local county Extension agent (www.aces.edu/counties).

Watermelons were harvested on July 28 and graded according to the Watermelon Grader's Guide (Circular ANR-681 from the Alabama Cooperative Extension System) and marketable yield was determined (Table 15). Two melons from each plot were used to measure soluble solids (sweetness), hollow heart, and rind thickness. A hand-held digital refractometer was used to measure soluble solids. Watermelons with reading below 10 are not considered sweet.

In total marketable yield, all varieties were similar to the market standard Tri-X-313. As in the previous trial, 'Distinction' topped the list in this category followed by 'Bold Ruler' and 'Tri-X-Palomar,' but there were no significant differences found. 'Distinction' topped the list in the marketable fruit number category as well followed by 'Indiana' and 'Tri-X-Palomar'; however, there were no significant differences found.

Watermelon varieties in this trial were all in the 45-count category with some having a range of 36-45 or 45-60. 'Tri-X-313' produced the largest individual fruit followed by 'Sweet Gem' and 'Bold Ruler.' The former varieties along with 'Distinction' and 'Indiana' produced fruit that were larger than their weight class. Average individual fruit weight of 'Tri-X-Palomar,' '4502 Seedless,' and 'Summer Sweet 5244' remained within the ranges of their respective size classes.

Rind thickness revealed no statistical differences among varieties. Rind of most varieties was numerically higher than the market standard Tri-X-313. On average, the rind of 'Tri-X-Palomar' was 14% thicker than the control followed by 'Indian' and 'Sweet Gem' which were both 10% thicker than the control.

The soluble solids content of all varieties was above 10% so they were all considered to be sweet. There were several differences found among varieties. 'Distinction,' 'Sweet Gem,' and 'Tri-X-Palomar' were statistically similar to the market standard 'Tri-X-313' in soluble solids content.

Hollow heart ranged from 0.25 – 4.5 inches. Of the incidences of hollow heart, 'Sweet Gem' exhibited the smallest. No incidence of hollow heart was found in 'Distinction.'

**Table 13**

*Ratings of 2014 Watermelon Variety Trial*

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

*Note: See introduction for description of ratings scales*

**Table 14**

*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 | Years Evaluated |
|---|---|---|---|---|---|---|---|
| Bold Ruler | F1,P | Harris Moran | Oval | R | 78 | [b]Ant | 11,14 |
| Distinction | F1,CS | Rogers/ Syngenta | Round | R | 88 | [b]Ant | 11,14 |
| Tri-X-313 | F1,CS | Syngenta | Oval | R | 85 | [b]Ant | 96-98,02-05, 07,10,14 |
| Indiana | F1,CS | Syngenta/ Rogers | Round | R | 75 | Ant, [c]FW | 10,14 |
| Tri-X-Palomar | F1,CS | Syngenta | Round | R | 87 | [b]Ant | 2014 |
| Summer Sweet 5244 | F1,AS | Nunhems | Oval | R | -- | [b]Ant | 2014 |
| 4502 Seedless | F1,CS | Seedway | Round | R | 84 | [ab]FW | 2014 |
| Sweet Gem | F1, P | Syngenta | Ropund | R | 78 | -- | 2014 |

*[a]Race 0; [b]Race 1 ; '--' = not available from seed catalogues; Type: F1 = Hybrid ; OP= Open pollinated; AS= Allsweet; P=Peacock; Ant = Anthracnose; FW = Fusarium Wilt; O= Orange; R=Red; Y = Yellow*

**Table 15**

*Yield and Quality of Selected Seeded Watermelon Varieties*

| Variety | Total Marketable Yield (lbs/acre) | Total Marketable Number (#/acre) | Individual Fruit Wt. (lbs) | Rind Thickness (inches) | Soluble Solids (% Brix) | Hollow Heart (inches) |
|---|---|---|---|---|---|---|
| Distinction | 58,924 | 3,131 | 19.03 | 0.66 | 12.65 | 0 |
| Bold Ruler | 57,378 | 2,965 | 19.17 | 0.65 | 11.7 | 2.83 |
| Tri-X-Palomar | 56,828 | 3,040 | 18.63 | 0.72 | 12.38 | 2.125 |
| Summer Sweet 5244 | 56,015 | 2,995 | 18.57 | 0.56 | 10.38 | 2.125 |
| Indiana | 53,493 | 3,131 | 16.80 | 0.69 | 12.55 | 2.75 |
| 4502 Seedless | 52,540 | 2,768 | 18.76 | 0.67 | 11.58 | 4.5 |
| Sweet Gem | 47,349 | 2,314 | 20.40 | 0.69 | 12.65 | 0.25 |
| Tri-X-313 | 47,018 | 2,087 | 22.73 | 0.63 | 12.53 | 1.25 |
| $r^2$ | 0.20 | 0.40 | 0.20 | 0.40 | 0.51 | 0.52 |
| CV | 36 | 28 | 21 | 21 | 10 | 87 |
| LSD | 28,261 | 1,159 | 0.20 | 0.20 | 0.82 | 1.21 |

# Evaluation Of Cantaloupes For Georgia Production

**George Boyhan, Tim Coolong and Cecilia McGregor**

Cantaloupes are one of the many vegetable crops produced in Georgia. There was almost $22 million worth of cantaloupes produced in Georgia in 2012, which represents over 3,500 acres (Wolfe & Stubbs, 2013). Cantaloupe production has been dominated by the variety 'Athena' and varieties similar to it. This type is considered an 'Eastern' shipping type, which has orange flesh, a netted rind, and may have a faint suture line. There is, however, interest in new types such as long shelf life (LSL) melons, and specialty melons such as crenshaws and casabas.

This study (Tables 16, 17 and 18 and Figure 2) was undertaken to evaluate cantaloupe varieties under South Georgia conditions. Yield and fruit characteristics were evaluated. Fifteen varieties were sown on March 24, 2014, in Fafard mix 3B (Conrad Fafard, Inc., Agawam, MA) into 6-pak inserts. Seedlings were grown in the greenhouse at the Durham Horticulture Farm in Watkinsville, Ga. 20-20-20 fertilizer (J.R. Peters, Inc., Allentown, PA) was applied once at 781 ppm.

Land was prepared at the Tifton Vegetable Research Park in Tifton, Ga., according to University of Georgia Cooperative Extension Service recommendations. The land was fumigated with Pic-Chlor 60 in February and covered with black plastic TIF mulch. Prior to laying the plastic, the land was fertilized with 1,000 lbs/acre 5-10-15. Plants were transplanted on April 22, 2014, with an in-row spacing of 2 feet and a between-row spacing of 6 feet. Plots were fertilized with 7-0-7 weekly at 12 lbs N/acre per week starting 1 week after planting. The total amount of fertilizer used had 170 lbs/acre of nitrogen. Weeds were controlled between rows with Dual II Magnum + Curbit (Sonalan) applied according to label directions. Weekly fungicide sprays were applied according to UGA recommendations, which included copper based materials. Imidacloprid insecticide was applied at planting; Venom and Agrimek insecticides were applied during production when needed. Finally, Quintec and Torino fungicides were applied for powdery mildew control.

There were three harvests, which occurred on June 17 and 23 and July 3. The total marketable weight and count were recorded for each plot. In addition, two fruit from each plot were measured for length, width, flesh depth, soluble solids (% sugar) and firmness (lbs/ft with an 8 mm probe).

# CANTALOUPE

Data were analyzed with an analysis of covariance using the stand count as a covariate. Both a coefficient of variation (CV) and Fisher's Protected Least Significant Difference (LSD) were calculated.

Yields ranged from 9,819 to 80,164 lbs/acre. Caution should be exercised in interpreting these yields per acre results. Typical production of cantaloupes ranges in the 20,000-40,000 lbs/acre. These results are, however, valid to assess performance between varieties in this trial.

'Avatar' had the highest yield of 80,164 lbs/acre, which was significantly greater than the next highest yielding entry; 'Earlidew,' which is a honeydew type. 'Avatar' also had better yields than 'Athena,' which had the third highest yield at 62,844 lbs/acre.

Among the specialty melons, casaba, yellow canary, crenshaw, and charentais, 'Amy,' a casaba melon type, had the greatest yield with 57,005 lbs/acre. These specialty melons tended to have the lowest yields among the melons trialed. 'Versallies' and 'Savor,' both Charentais types, had low yields with 20,051 and 9,819 lbs/acre, respectively. 'Savor' is the more typical Charentais type with 'Versallies' having both netting and sutures, which are not typical for this melon type. The specialty melons had some of the sweetest fruit measured. 'Versallies' had the highest average soluble solids at 14.4%, which differed significantly from all entries with less than 11.6% soluble solids.

Overall, the trial went very well. CV values were 18% or less, which is extremely good for a trial of this type. Typically trials such as these will have CV values of 30-40%. The best performing varieties based on yield remain, for the most part, standard 'Eastern' melons. We did not conduct any postharvest evaluations to assess the value of Long Shelf Life (LSL) melon types. The specialty melons tended to have lower yields, but often had higher sugar content.

**Table 16**

*Vidalia Onion and Vegetable Research Center Trial Conditions at Tifton, Ga.*

| Location | VOVRC |
|---|---|
| Weather | 5 |
| Fertilizer | 5 |
| Irrigation | 5 |
| Pests | 2 |
| Overall | 5 |

*Note 1: See introduction for description of ratings scales.*
*Note 2: The soil type at the VOVRC was Tifton Loamy Sand with a water holding capacity of 0.09-0.10 in./in.*

**Table 17**

*Cantaloupe Variety Trial Conducted at the Vidalia Onion & Vegetable Research Center, 2014*

| | | | Yield | |
|---|---|---|---|---|
| **Entry** | **Company** | **Type** | **(lbs/acre)** | **(No./acre)** |
| Avatar | Sakata | Eastern | 80,164 | 11,798 |
| Earlidew | Harris Seed | Honeydew | 63,425 | 16,789 |
| Athena | Syngenta | Eastern | 62,844 | 14,157 |
| Samoa | Harris Moran | LSL Harper | 61,088 | 14,520 |
| Infinite Gold | Sakata LSL | LSL Western | 60,780 | 13,976 |
| Tirreno | Enza Zaden | Eastern | 60,621 | 15,246 |
| Majus | Enza Zaden | Eastern | 60,249 | 14,066 |
| Amy | Harris Seed | Casaba | 57,005 | 20,510 |
| Aphrodite | Syngenta | Eastern | 53,062 | 10,436 |
| Atlantis | Sakata | Eastern | 52,916 | 10,890 |
| RML 0609 | Syngenta | Eastern | 50,448 | 11,616 |
| Sunbeam | Harris Moran | Yellow Canary | 49,913 | 16,154 |
| Early Crenshaw | Burpee | Crenshaw | 39,063 | 4,810 |
| Versallies | Harris Moran | Charentais | 20,051 | 8,440 |
| Savor | Johnny's | Charentais | 9,819 | 6,171 |
| | | **CV** | 18% | 16% |
| | | **LSD (p≤0.05)** | 13,214 | 2,941 |

# CANTALOUPE

**Table 18**

*Cantaloupe Variety Trial conducted at the Vidalia Onion & Vegetable Research Center, 2014*

| Entry | Weight/fruit (lbs) | Width (inches) | Length (inches) | Flesh Depth (inches) | Soluble Solids (%) | Firmness (8mm probe lb/ft) |
|---|---|---|---|---|---|---|
| Avatar | 6.9 | 7.5 | 7.4 | 2.0 | 11.2 | 3.9 |
| Earlidew | 3.8 | 5.8 | 6.1 | 1.6 | 11.3 | 8.5 |
| Athena | 4.5 | 6.5 | 6.7 | 1.8 | 10.8 | 4.5 |
| Samoa | 4.2 | 6.0 | 6.2 | 1.8 | 8.0 | 8.0 |
| Infinite Gold | 4.4 | 6.2 | 7.2 | 1.8 | 8.8 | 8.3 |
| Tirreno | 4.0 | 6.3 | 6.6 | 1.9 | 9.5 | 9.2 |
| Majus | 4.3 | 6.3 | 6.3 | 1.8 | 11.8 | 5.9 |
| Amy | 2.8 | 5.3 | 5.2 | 1.5 | 13.1 | 7.6 |
| Aphrodite | 5.1 | 6.7 | 6.8 | 1.7 | 12.2 | 4.7 |
| Atlantis | 4.9 | 6.7 | 7.0 | 1.6 | 9.2 | 4.9 |
| RML 0609 | 4.4 | 5.9 | 6.0 | 1.9 | 11.5 | 5.3 |
| Sunbeam | 3.2 | 4.9 | 6.3 | 1.5 | 10.1 | 11.8 |
| Early Crenshaw | 8.2 | 7.7 | 9.4 | 2.0 | 10.8 | 5.5 |
| Versallies | 2.4 | 5.0 | 4.8 | 1.5 | 14.4 | 6.7 |
| Savor | 1.6 | 4.7 | 4,7 | 1.3 | 12.3 | 6.0 |
| | | | | **CV** | 18% | |
| | | | | **LSD (p≤0.05)** | 2.8 | |

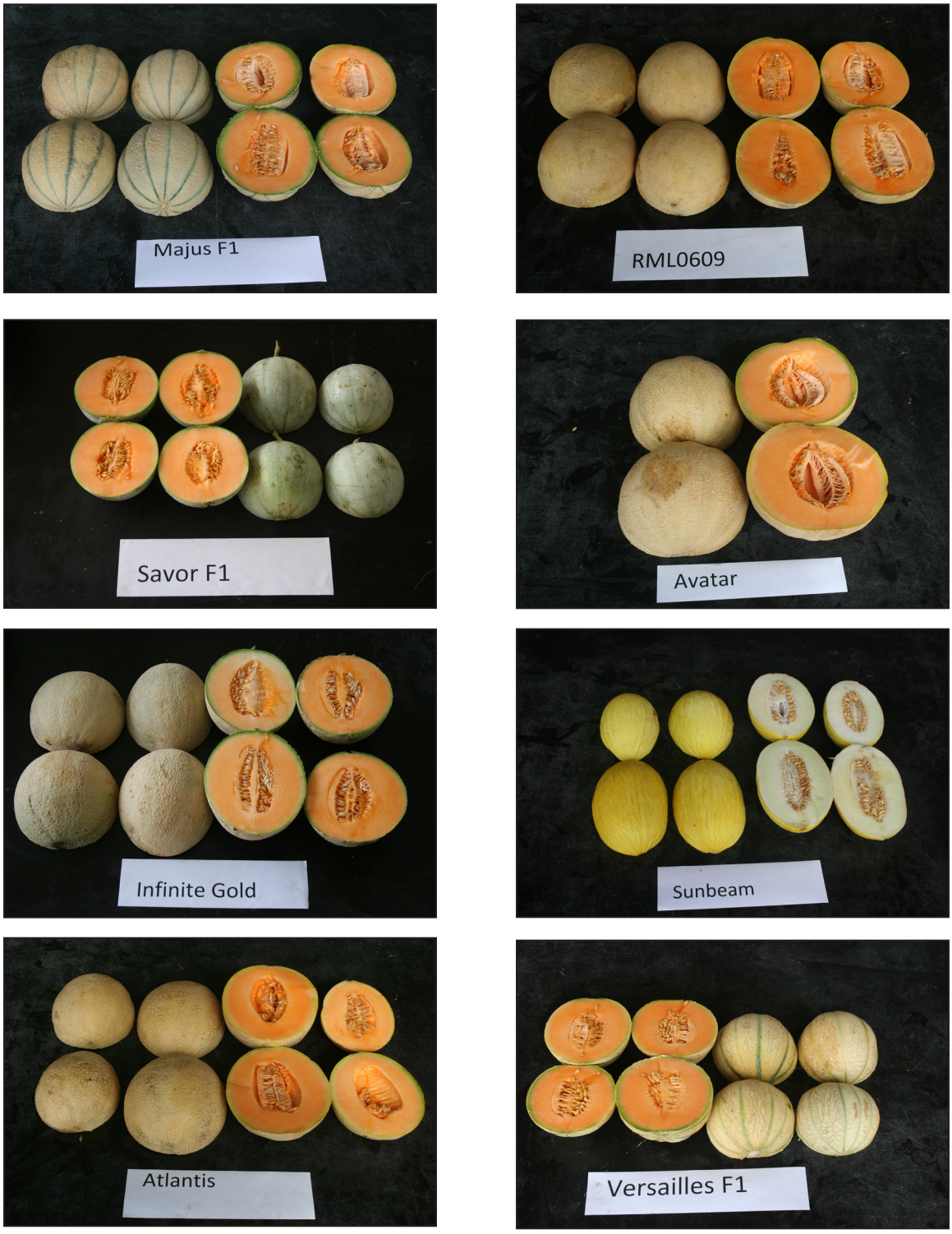
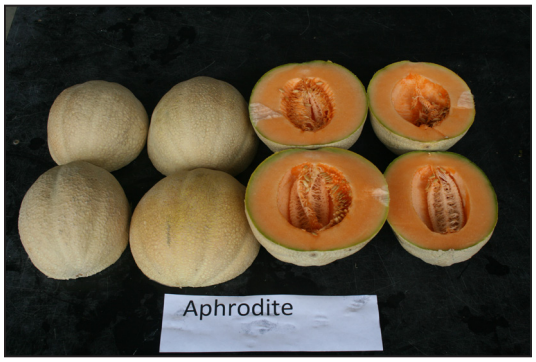
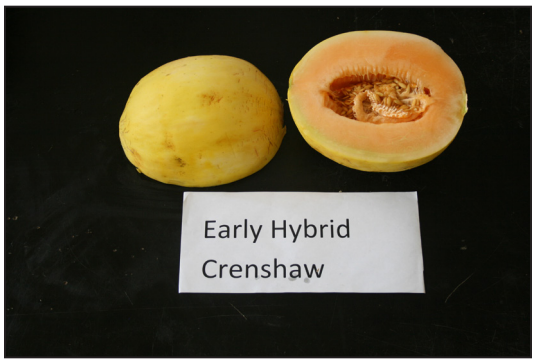


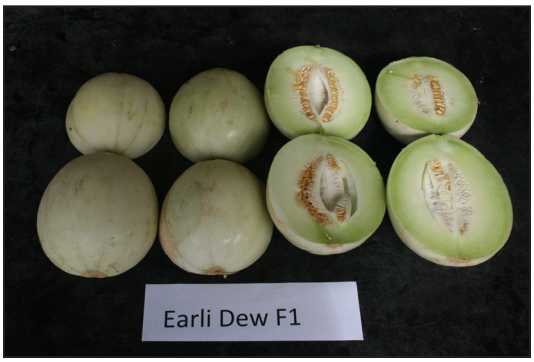

**Figure 2.** Fruit of cantaloupe entries evaluated.

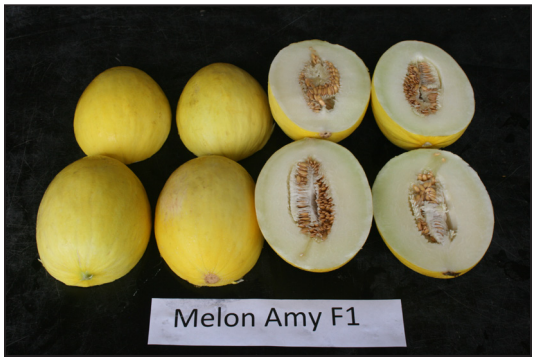
# CANTALOUPE


Aphrodite

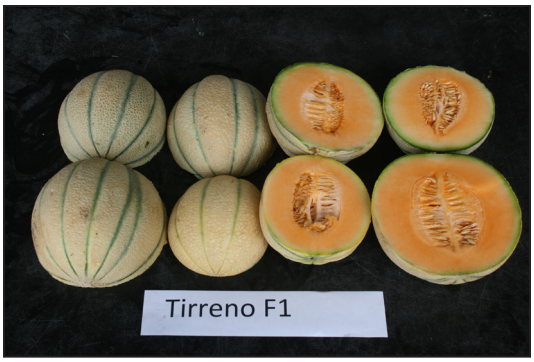

Samoa


Early Hybrid
Crenshaw


Earli Dew F1


Melon Amy F1


Athena


Tirreno F1

# North Carolina Replicated Asparagus Cultivar Evaluation - 2007-2014

**C.J. Cantaluppi**

As more people are moving into North Carolina from northern states, where asparagus is commonly grown, they look to buy it from local growers here. It is a high-value horticultural crop that is easy to grow and can bring in extra income for growers.

For over 25 years, new asparagus cultivars are being released as male hybrids. Asparagus is normally dioecious, having 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 yield 50-75% less spears than 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. The late Dr. Howard Ellison, former asparagus breeder at Rutgers University, observed that although asparagus produces both male and female plants, about one in 500 male plants would produce male flowers and a few flowers with functional male and female parts. By selfing flowers on one of these plants, called 'hermaphrodites,' Ellison produced his first super male hybrid. When these super males are crossed with a female, the F1 generation is all male, with no seeds produced. These super male hybrids yield about two to three times the amount of the older dioecious open-pollinated varieties, such as Mary Washington.

Other hybrids are obtained by selecting a male and female parent having good characteristics including spear size, spear quality, yield, and disease resistance. These plants are crossed and the resulting hybrids are evaluated for yield, spear quality, and other essential traits. When two parents that produce good hybrid offspring have been identified, a large number of the male and female parent plants are produced by cloning, in which small pieces of male and female spear tissue are grown separately in tissue culture, which completely regenerates into complete male and female plants that are planted in fields. The root systems or crowns of these plants are dug out of the fields after one year and sold to growers who produce the spears that consumers will buy.

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 of high quality. Under these conditions, a grower will need to pick at least once a day. 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, with the grower picking once every 2-3 days.

The attributes of the California Hybrids should enable the grower to harvest a taller spear (8-9 inches) at temperatures above 70 degrees F. without the tip of the spear opening up or 'ferning out', which causes spears to be tough. Taller spears are heavier, having more weight per spear. The New Jersey male hybrids, University of Guelph male hybrid, and open-pollinated cultivars fern out at a shorter spear height (5-6 inches) under warm temperatures above 70 degrees F.

The cultivars that were studied in this trial (Table 19) were chosen based on ones that are currently grown for commercial production that are standards in the industry, and ones that may show promise in the future.

**Table 19**

*Breeding Location and Parentage of and Comments on Selected Asparagus Cultivars*

| Variety | Breeding Location | Parentage | Comments |
|---|---|---|---|
| Jersey Giant | NJ | NJ 56 female, NJ 22-8 super male | -- |
| Jersey Supreme | NJ | NJ 44P female, NJ 22-8 super male | -- |
| Jersey Gem | NJ | NJ G27 female, NJ 22-8 super male | -- |
| Jersey Knight | NJ | NJ 277C female, NJ 22-8 super male | -- |
| UC 157 | CA | F 109 female, M120 male | dioecious hybrid |
| UC 115 | CA | F600 female clone, M256 male clone | dioecious hybrid |
| Atlas | CA | F 109 female, unspecified Rutgers male | dioecious hybrid |
| Apollo | CA | F 109 female, unspecified Rutgers male | dioecious hybrid |
| Grande | CA | F 109 female, unspecified Rutgers male | dioecious hybrid |
| Purple Passion | CA | Progeny of Violeta d' Albinga | Burgundy, high sugar |
| Guelph Millennium | Univ. of Guelph | -- | |

# ASPARAGUS

Proper variety selection is important for grower success so a ¼ acre replicated asparagus cultivar trial was planted at the Garnett Carr farm in Roxboro, NC with 13 cultivars. Seeds were sown in the greenhouses of Aarons Creek Greenhouses in Buffalo Junction, VA on January 20, 2005, and 15-week-old seedling 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 4 replications was used. Transplants were spaced one foot between plants in the row and five feet between rows and planted in the bottom of a 6-inch deep furrow as recommended by Cantaluppi and Motes. As new spears emerged, and as new ferns were formed, the furrows were filled in below the lowest fern branchlets until the furrows were completely filled in at ground level. 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 2-week harvest in 2007.

The transplants were irrigated as needed, during the first growing season only. Irrigation is normally not needed during field establishment and beyond, if establishing a field from crowns (roots) from one-year-old plants in states where the rainfall is 30 inches or more per year. However, irrigation is imperative during the establishment year with seedling transplants, since they do not have a one-year-old established root system that can tolerate periods of drought. Irrigation is needed in areas where less than 30 inches of rainfall occur per year. Seeds were used to establish this trial because most of the cultivars were not available as crowns.

The trial was harvested for two weeks, in 2007, four weeks in 2008, six weeks in 2009, eight weeks in 2010, and six weeks from 2011-2014, due to yield decreases after six weeks. This harvesting frequency was chosen following research recommendations made by Benson and Motes, Motes, and Cantaluppi which showed that harvesting asparagus that was established by planting one year old crowns, one year after planting (the second year), caused no reduction in subsequent yield, but provided the grower with an income one year earlier than did harvesting two years after planting. Also, in the second year after planting (the third year), the average spear weight was found to be significantly greater in plants that were harvested the previous year than in plants not harvested the previous year. The increase in spear production may be due to the release of buds from suppression by older shoots.

Asparagus spears can be cut or snapped to produce spears of marketable length, which is usually between 7 and 9 inches, depending on tip tightness. Asparagus spears may be cut below the soil surface with a knife, or they may be hand-snapped above the soil surface. Cutting asparagus requires more labor,

but increases yield 20 to 25% because spears are longer. However, cutting spears below the soil greatly increases the chance of the knife injuring a bud or emerging spear on the same crown.

When hand snapping, the spear usually breaks above the area containing fiber. In other words, the portion of the spear left in the field will be fibrous, while the harvested spear is tender and is completely edible. The small stub left above the soil after snapping dries up and disintegrates. A new spear does not come up at that spot, but comes up from another bud that enlarges on another part of the crown. Snapped asparagus has no trim-off waste and should command a higher price than cut asparagus with white butts. In this trial, it was decided to snap spears instead of cutting because of the above reasons and is the preferred and accepted method by most growers.

Yield data was recorded in lbs./acre. This was obtained by dividing the total square feet of one plot row (60), into 43,560 (the number of square feet in one acre) to get 726-60 square foot rows in one acre. Data that was recorded included total yield per cultivar, the yield (and percentage) of spears per cultivar that were greater than 3/8-inch in diameter, the yield of spears that were less than 3/8-inch in diameter, and the number of spears per plant that each cultivar produced. Recording yield data in terms of spear diameter (an industry standard), also allows the grower to select a cultivar that would be suitable to him and his customers' preferences. Recording the number of spears produced per plant per cultivar lets the grower compare spear output per cultivar over time. The harvesting frequency was based on how fast the spears grew, based on air temperatures as previously described, resulting in harvested spears that had tight tips, before they started to fern out.

**Observations of the Trial – 2007-2014**

Yields increased for most cultivars from 2007 to 2012 but in 2012 and 2013, yields started to decrease dramatically for all cultivars (Table 20). It was assumed that severe disease pressure from Cercospora needle blight in 2012 and 2013, as well as aging of the field, contributed to the yield decline. After the 2014 harvest, a fungicide program was started in early July, with fungicides being sprayed every week until late September, alternating Chlorothalonil and Mancozeb every other week. This was a change in spraying every two weeks with Mancozeb only in previous years. This tightening up of the spray interval and alternating fungicides were done in the hopes of protecting the ferns from Cercospora and to try to stop further yield decreases in 2015. At the end of September, the majority of the ferns were green and six to seven feet tall, with

very little Cercospora present. It is hoped that the 2015 harvest year will show yield increases again, by the judicious use of fungicides to prevent Cercospora needle blight.

During the 2014 season, Purple Passion and Guelph Millennium remained in first and second place, as in 2013 (Table 21). Jersey Giant declined from 5th to 10th place. Most other cultivars moved up in yield ranking with the exception of Jersey Supreme, Jersey Knight, UC 157, and Jersey Gem, which moved down in yield ranking. Purple Passion and Guelph Millennium remained in first and second place, as in 2013.

Purple Passion and Guelph Millennium retained the same percentage of spears greater than 3/8-inch in diameter, while Jersey King and Jersey Giant had the percentage of spears greater than 3/8ths of an inch in diameter decrease from 67 to 69% to 50-55%. The percentage of spears greater than 3/8-inch in diameter decreased among all cultivars except for UC 157, which increased from 70 to 71%

For grower recommendations, Table 3 shows that Jersey Giant and Jersey Supreme would be good choices, along with Guelph Millennium. It is not clear why Purple Passion moved to first place in 2013 and 2014, after lagging behind other cultivars in yields in previous years. It was not observed that Purple Passion was any more tolerant than other cultivars to Cercospora needle blight.

Data collection in this trial will be on-going for a total of 13 years to evaluate the longevity of these cultivars by getting a more realistic picture of how they perform over time.

**Table 20**

*Asparagus Yield Totals and Rankings in Lbs./Acre*

| Cultivar | '07 | '08 | '09 | '10 | '11 | '12 | '13 | '14 | 7 yr total | Rank |
|---|---|---|---|---|---|---|---|---|---|---|
| UC 157 | 1,155a | 2,385abc | 3,848abc | 4,397a | 4,897ab | 5,278ab | 3,507a | 2,025b | 2,7492 | 8 |
| Jersey Giant | 944ab | 2,737ab | 4,494abc | 5,304a | 6,021ab | 5,390ab | 4,601a | 1,448b | 3,0939 | 4 |
| Jersey King | 883abc | 2,458abc | 3,937abc | 3,992a | 4,902ab | 5701ab | 4,233a | 1,754b | 2,7860 | 7 |
| Jersey Supreme | 860abc | 2,485abc | 4,211abc | 4,759a | 5,696ab | 6,273ab | 4,794a | 2,625ab | 3,1703 | 3 |
| UC 115 | 821abc | 2,314abc | 3,175c | 4,204a | 5,102ab | 4,154b | 3,138a | 1,276b | 2,4184 | 11 |
| Jersey Gem | 734bcd | 2,071bc | 3,442abc | 3,712a | 3,770b | 4,575ab | 4,178a | 2,042b | 2,4524 | 10 |
| Atlas | 717bcd | 2,523abc | 3,987abc | 4,716a | 5,630ab | 5,846ab | 4,336a | 2,362b | 3,0117 | 5 |
| Grande | 703bcd | 3,030a | 4,935a | 5,195a | 6,654a | 6,621a | 4,926a | 2,290b | 3,4354 | 1 |
| Apollo | 555cd | 1,781c | 3,550abc | 4,204a | 4,220ab | 4,160b | 3,594a | 1,358b | 2,3422 | 12 |
| Jersey Knight | 456de | 1,604c | 3,233bc | 3,821a | 4,233ab | 5,189ab | 4,514a | 2,546b | 2,5596 | 9 |
| Purple Passion | 151ef | 1,915bc | 3,287bc | 3,884a | 4,436ab | 5,280ab | 5,251a | 3,930a | 2,8134 | 6 |
| Guelph Millennium | 86f | 2,332abc | 4,868ab | 6,029a | 6,560ab | 5,293ab | 5,212a | 2,779ab | 3,3159 | 2 |

*[1]Cultivars with the same letter within columns are not statistically significant, Duncan's Multiple Range Test, .05 level.*

**Table 21**

*Yearly Asparagus Cultivar Ranking in Numerical Order*

| Cultivar | '07 | '08 | '09 | '10 | '11 | '12 | '13 | '14 |
|---|---|---|---|---|---|---|---|---|
| UC 157 | 1 | 6 | 7 | 6 | 8 | 8 | 11 | 8 |
| Jersey Giant | 2 | 2 | 3 | 2 | 3 | 5 | 5 | 10 |
| Jersey King | 3 | 5 | 6 | 9 | 7 | 4 | 8 | 9 |
| Jersey Supreme | 4 | 4 | 4 | 4 | 4 | 2 | 4 | 3 |
| UC 115 | 5 | 8 | 12 | 7 | 6 | 12 | 12 | 12 |
| Jersey Gem | 6 | 9 | 9 | 12 | 12 | 10 | 9 | 7 |
| Atlas | 7 | 3 | 5 | 5 | 5 | 3 | 7 | 5 |
| Grande | 8 | 1 | 1 | 3 | 1 | 1 | 3 | 6 |
| Apollo | 9 | 11 | 8 | 8 | 11 | 11 | 10 | 11 |
| Jersey Knight | 10 | 12 | 11 | 11 | 10 | 9 | 6 | 4 |
| Purple Passion | 11 | 10 | 10 | 10 | 9 | 7 | 1 | 1 |
| Guelph Millennium | 12 | 7 | 2 | 1 | 2 | 6 | 2 | 2 |

# High Tunnel Asian Greens Cultivar Trial (2013)

**Bill Evans, Sarah Reynolds, Peter Hudson and Anna McCain**

Asian greens can be a good crop for farmers markets and other local sales outlets, but the fine soils of central Mississippi, our heavy storms and weed and insect pressure can make field production of these crops a challenge. One option available for small growers is to raise these crops in high tunnels, unheated greenhouse-like structures with roll up sides used for temperature control and ventilation. No rain falls in a high tunnel which means potentially fewer soil and leaf borne diseases in the crops. The objective of this trial was to evaluate Asian greens cultivars for commercial spring-time production in high tunnels in central Mississippi for local markets.

A trial of commercial Asian greens cultivars was conducted in Spring 2013 at the Mississippi Agriculture and Forestry Experiment Station's Truck Crops Branch Experiment Station (TCBES). (Tables 22 and 23) The experiment was laid out as a Randomized Complete Block Design with 3 replications and 9 cultivars in a single high tunnel 30 ft. x 96 ft. To prepare for the trial, the soil in raised bed boxes 4 ft. wide and 8 ft. long was moistened using sprinkler irrigation, amended with sphagnum peat moss (4 compressed cu. ft./box), and thoroughly tilled. Fertilizer (256 g 13-13-13/box) was incorporated into each box and the soil raked smooth. This was equivalent to 100 lbs. N/acre. On March 22, 4-week old transplants were transplanted 6 inches apart in twin rows 12 inches apart and 4 ft. long, making each plot 4 sq. ft. with 14 plants/plot. Plants were watered in at transplanting and irrigated as needed through four lines of drip tubing evenly spaced on the soil surface after setting out the transplants. No additional fertilizer was added to the boxes after the pre-plant application. Tunnel temperature was regulated by opening all four sides when the outside air temperature exceeded 60 F or if the inside temperature exceeded 80 F, and closing them any time that night time temperatures were forecast to fall below 40 F.

On April 12, 20 days after transplanting, every other plant was harvested as a 'baby' plant by cutting it at the soil surface. Harvested plants were trimmed to remove damaged, unsightly outer leaves if necessary; graded into marketable and cull plant; counted; and weighed. The plants remaining in the plots were allowed to continue growing until they reached full size or had deteriorated to a point of unmarketability. Plots were checked twice a week and individual plants that had reached full size or had begun to show signs of bolting were harvested, trimmed, graded, counted, and weighed. The final harvest date was June 5, 74 days after transplanting, for some nappa cabbage plants.

Weather and pest incidence was rated as good, and irrigation and fertility as

excellent resulting in an overall site rating of good (Table 22). The weather was quite warm at the end of the trial period and a minor outbreak of leaf chewing worms needed control with two sprays, seven days apart, with an organic pyrethrum-based product.

There were no statistically significant differences in marketable early ('baby') or mature yield among the nine Asian greens grown in this trial. (Table 23) Each entry produced a full complement of seven marketable 'baby' plants for harvest at 20 days after transplanting. The crops then matured some, but not all of the remaining plants into marketable, full-sized plants. Harvest of these 'mature plants' extended through June 5, a period of more than a month after the first 'baby' harvest. It is promising that all of the crops were able to produce a full complement of baby plants for early harvest. The baby-sized plants averaged from between 1.28 oz. for Dark Purple mizuna, to 2.65 oz. for Rubicon nappa cabbage. The same spread tended to occur for mature plants. Marketable full-sized plants averaged from just over 1.0 lbs./plant for Dark Purple mizuna to just over 1.5 lbs./plant for Rubicon nappa cabbage.

Despite the lack of significant yield differences found in this trial, growers can use this information to estimate expected yields and potential revenue from a late spring Asian greens crop in high tunnels in our area. Each plot was four square feet, so the range in marketable yield per square foot was from under 0.15 to almost 0.30 lbs./sq.ft. for the early yield in this two-cut system, and an additional 0.18 to 1.5 lbs./sq.ft. from the remaining mature plants. These were generated in a period from 20 to 74 days from transplanting. These yield ranges can be used to estimate yields and returns based on space and time. Growers who get a premium for baby greens and small crops may find that a single cut system works best for them and that quickly turning the space over to another crop may be a good choice for them. Other growers may value the marketing diversity provided by the two cut system used here. In that case, the system allows growers to provide small, baby vegetables early in the season, and to achieve higher yields per square foot by selling much larger plants a few weeks later.

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**Table 22**

*Ratings of the Asian greens trial (Spring 2013)*

| Location | TCBES |
|---|---|
| Weather | 4 |
| Fertility | 5 |
| Irrigation | 5 |
| Pests | 4 |
| Overall | 4 |

*Note: See introduction for description of ratings scales*

**Table 23**

*Yield of Asian Greens Grown In a High Tunnel at Crystal Springs, Miss. (Spring 2013)*

| Crop | Cultivar/Source | Number of Marketable Baby Plants (#/plot) | Weight of Marketable Baby Plants (lbs/plot) | Number of Mature Marketable Plants (#/plot) | Number of Mature Marketable Plants (#/plot) |
|---|---|---|---|---|---|
| Mizuna | Not stated (JSS) | 7.0 | 1.03 | 3.33 | 3.07 |
| Mizuna | Dark Purple | 7.0 | 0.56 | 0.67 | 0.70 |
| Nappa | Rubicon | 7.0 | 1.16 | 4.0 | 6.30 |
| Nappa | Minuet | 7.0 | 1.10 | 2.33 | 3.28 |
| Pac Choi | Vivid | 7.0 | 0.98 | 3.00 | 2.55 |
| Pac Choi | Black Summer | 7.0 | 1.03 | 2.00 | 2.15 |
| Pac Choi | Shiro | 7.0 | 1.03 | 0.67 | 1.07 |
| Pac Choi | Win-Win | 7.0 | 1.14 | 2.67 | 3.10 |
| Tat Soi | Not stated | 7.0 | 0.98 | 0.67 | 0.77 |
| | *Significance*[Y] | *n.s.* | *n.s.* | *n.s.* | *n.s.* |

[Z] *Starting number of plants = 14, spaced 6 inches apart and thinned at 'baby' harvest to 12 inches apart. Each plot area was 4 sq.ft.*

[Y] *n.s. = not significant at the statistical significance level of $p < 0.05$.*

# Seed Sources

**Supporting Seed Companies**

**Harris Moran Seed Company**
260 Cousteau Place, Suite 100
Davis, CA 95619
PH: 828-246-0925

Tech Rep: William Terry Kelly
Cell: 229-947-3253
Office: 828-246-0925
t.kelley@hmclause.com

Tech Rep: Michael Hannah
Cell: 828-421-6618
Office: 828-246-0925
m.hannah@hmclause.com

**Other Seed Companies:**

**Abbott and Cobb, Inc.**
PH: 800-345-7333

**Harris Seed Company**
PH: 800-544-7938

**Nunhems USA, Inc**
PH:208-674-4000

**Paramount Seed Company**
772-221-0653

**Sakata Seed America**
408-778-7758

**Seedway, LLC**
800-952-7333

**Seminis Vegetable Seeds**
866-334-1056

**Siegers Seed Company**
800-962-4999

**Syngenta Seeds**
800-549-0158

**Vilmorin**
520-884-0011