Appendix A.01

# ROUND TOMATO VARIETY TRIAL RESULTS - 2003

Stephen A. Garrison[1] Wesley Kline[2] and June F. Sudal[3]
Rutgers - The State University of New Jersey
121 Northville Road, Bridgeton, NJ 08302

## Introduction

Commercial varieties and advanced breeding lines of tomatoes for the round tomato market were evaluated for adaptation to New Jersey growing conditions. A total of thirty four promising lines were included in the trial conducted at Rutgers Agricultural Research and Extension Center, Bridgeton, NJ.

## Methods

### *Culture*

Seeds were sown on April 11, in 72-cell (1½" X 1½") trays containing peat-vermiculite media formulated for tomato transplant production. Seedlings were thinned to 1 plant per cell. Sixty-five pounds of N per acre plus $P_2O_5$ and $K_2O$ based on soil tests were disked into the sandy loam soil. Devrinol 50DF (3 lb/A), and Sencor 4F (0.33 lb/A), were applied and incorporated during bedding. Black plastic mulch and drip irrigation tube were laid. Transplants were set 24" apart on raised beds with 5-ft centers on June 10. Plants were grown on four foot stakes. The plants were pruned to allow three axillaries to develop below the main fork. Three applications of 40 pounds/A of N, $P_2O_5$ and $K_2O$ were applied through the drip system during the growing season. Insects were controlled as required using commercial recommendations for tomatoes. Fungicides were applied for suppression of foliar diseases and fruit rots. Rainfall was 3.25, 6.19, 4.72, 4.69 and 4.73 inches in May, June, July, August, and September respectively.

### *Experimental, Harvesting and Evaluation*

Field plots were replicated two times in a randomized block design. Data were obtained on foliage and fruit characteristics for all of the varieties in the trial. Yields, external and internal fruit characteristics were also obtained for all lines. A hand harvest of each plot was made on August 27 when early fruits were ripening and on 9/4, 9/10, 9/18 9/25 and 10/7. All fruits with pink to red maturity were harvested. Fruits were separated into usable, and culls. Major defects were identified and recorded. On September 10, a sample of representative fruit from each plot was used to evaluate external and internal fruit characteristics using the rating system shown in the table below.

| Color | Fruit Firmness | Blossom Scar | White Tissue |
|---|---|---|---|
| 5 = Excellent | 5 = Firm | 5 = Large | 5 = None |
| 4 = Very Good | 4 = Medium Firm | 4 = Medium - Large | 4 = Slight-some |
| 3 = Good | 3 = Medium | 3 =Medium | 3 = Moderate |
| 2 = Fair | 2 = Medium Soft | 2 = Small - Medium | 2 = Mod-heavy |
| 1 = Poor | 1 = Soft | 1 = small | 1 = Severe |

[1]Extension Specialist Emeritus in Vegetable Crops, [2]Cumberland County Agricultural & Resource Management Agent and [3]Research Technician in Horticulture

## Results

Data from the trial are summarized in Tables 1 and 2. There were statistical differences among varieties for most of the characteristics. Frequent heavy rains during May and early June delayed planting from a scheduled date of May 17 to June 10. The delay in planting exposed the transplants to cold and wet outside conditions during the holding period. Exposure of the transplants to prolonged periods of low temperatures caused high levels of cat facing in most varieties. After planting the hardened plants grew slowly but developed good vegetation vigor by mid season. Frequent rains before and during the harvest period caused high levels of weather checking and cracking in most varieties. Early varieties with light foliage were at a disadvantage in 2003. Internal white tissue was present in many varieties.

Vine vigor ratings are summarized in Table 1. Those varieties with excellent or very good vine vigor were ACR 42, Amelia, FLA 91, NC 0227, ACR 252, ASX 334, BHN 641, RFT 6153, ACX 12A, BHN 591, HMX 2807, and NC 02226. Those with fair or poor vigor were S 336, Sunshine, Sunchief, and Sunsation.

Varieties with high early marketable yields in the 2003 trial were S 3242, BHN 591, S 336, NC 96365, RFT 2374, ASX 334, ACR 242, Amelia and Sunbrite. FLA 91, NC 0227, ACX 12A and ACR 252 produced lower early marketable yields than the varieties listed above (Table 1). High season marketable yields were produced by NC 02226, BHN 591, FLA 47, NC 96365, NC 0258, FLA 91, HMX 2807, ASX 334 and NC 0015 (Table 1). Sunchief, Sunshine, ACR 2012, and S 336 produced low marketable yields for the season.

The varieties that produced the highest percentage of marketable fruits were FLA 47, HMX 2807, Amelia, NC 96365, and BHN 591 (Table 1). Sunshine, Sunchief, ACR 42, S336, ACR 2012, Sunsation, and ACR 252 all had a low percentage of marketable yields in 2003 (Table 1).

Varieties that had a high percentage of marketable fruits in the large and extra large size classes (2 ¾ inches and above) were: Sunchief (66%), Sunbrite (61%), Amelia (60%), S 1797 (60%), S 336 (58%), NC 0258 (54%), FLA 47 (54%), FLA 91 (53%), NC 0256 (51%), Sunsation (50%) and NC 0343 (50%) (data not in tables).

Ratings of selected fruit characteristics are shown in Table 2. There were no statistical differences among varieties for external fruit color. Varieties with excellent or very good internal color included ACR 2012, BHN 641, BHN 591, NC 0258, RFT 2374, RFT 6153. The following varieties were rated fair or fair to good in internal color: ACR 42, ACR 242, ACR 252, ACX 12A, BHN X649, FLA 47, NC 02226, NC 0343, NC 0344, and NC 0346. The other varieties in the trial were rated good or good to very good for internal color (Table2).

A number of varieties in this trial including extended shelf life types were rated firm. The firm varieties were: ACR 42, ACR 242, ACR 252, NC 02226, NC 0343, NC 0344, and NC 0346 (Table 2). ACX 12A, NC 0236, and RFT 6153 were rated medium firm to firm. The varieties rated medium soft or medium soft to medium include RFT 2374, S 1797, S 336, Sunbrite, and Sunchief. Sunshine was rated soft to medium soft (Table2).

Blossom Scars were generally larger than usual in 2003, due to cool spring temperatures. There was also a relatively high variability in blossom scar ratings. Those varieties with small to medium blossom scars include: NC 0258, S 1797, S 3242, Sunsation, ACR 242, S 336, and Sunchief (Table 2). Varieties with large or medium

large blossom scars include ACR 42, ACX 12A, ACR 252, Amelia, Sunshine, ACR 2012, ASX 334, BHN 591, BHN 641, FLA 91, NC 0236, NC 0256, NC 0344, Sunbrite, and Sunguard (Table 2).

**Table 1. Vine Vigor, Early and Total Marketable Yield, Round Tomato Trial - 2003**

| Variety | Seed Source | Vine[1] Vigor Rating | Early[2] Market Yield Boxes/A | Total Market Yield Boxes/A | % Total Market Yield |
|---|---|---|---|---|---|
| ACR 42 | Abbott & Cobb Inc. | 5.00 | 433 | 1168 | 39 |
| ACR 242 | Abbott & Cobb Inc. | 3.50 | 836 | 1607 | 57 |
| ACR 252 | Abbott & Cobb Inc. | 4.50 | 425 | 889 | 44 |
| ACR 2012 | Abbott & Cobb Inc. | 3.00 | 466 | 1240 | 42 |
| ACX 12A | Abbott & Cobb Inc. | 4.00 | 414 | 1070 | 43 |
| ASX 334 | Agriset Seed | 4.50 | 845 | 1726 | 54 |
| Amelia | Harris Moran Seed | 5.00 | 818 | 1635 | 62 |
| BHN 591 | BHN Seed | 4.00 | 924 | 1934 | 60 |
| BHN 641 | BHN Seed | 4.50 | 595 | 1479 | 53 |
| BHN X649 | BHN Seed | 2.50 | 536 | 1412 | 47 |
| FLA 47 | Seminis | 3.00 | 720 | 1915 | 63 |
| FLA 91 | Seminis | 5.00 | 379 | 1774 | 56 |
| Floralina | Seminis | 3.00 | 503 | 1374 | 49 |
| HMX 2807 | Harris Moran Seed | 4.00 | 607 | 1735 | 63 |
| NC 0015 | NC State | 2.50 | 621 | 1707 | 58 |
| NC 0227 | NC State | 5.00 | 393 | 1465 | 54 |
| NC 0236 | NC State | 3.50 | 698 | 1344 | 47 |
| NC 0256 | NC State | 3.50 | 660 | 1475 | 55 |
| NC 0258 | NC State | 3.50 | 784 | 1775 | 58 |
| NC 02226 | NC State | 4.00 | 688 | 1998 | 57 |
| NC 0343 | NC State | 3.50 | 663 | 1621 | 56 |
| NC 0344 | NC State | 3.50 | 404 | 1368 | 45 |
| NC 0346 | NC State | 3.50 | 590 | 1451 | 54 |
| RFT 2374 | Rogers Seed | 3.00 | 848 | 1432 | 54 |
| RFT 6153 | Agriset Seed | 4.50 | 529 | 1474 | 54 |
| S 336 | Seminis | 1.00 | 883 | 969 | 41 |
| S 1797 | Seminis | 3.50 | 640 | 1409 | 57 |
| S 3242 | Seminis | 3.00 | 962 | 1276 | 53 |
| Sunbrite | Stokes | 3.00 | 812 | 1295 | 49 |
| Sunchief | Seminis | 1.50 | 533 | 591 | 27 |
| Sunguard | Seminis | 2.50 | 622 | 1494 | 53 |
| Sunsation | Seminis | 2.00 | 653 | 1177 | 43 |
| Sunshine | Seminis | 1.00 | 514 | 662 | 26 |
| NC 96365 | NC State | 3.00 | 874 | 1884 | 62 |
| HSD 5% | | 2.30 | 534 | 1104 | 20 |

[1]5=Excellent, 3=Good, 1=Poor. [2]Early Yields from harvest 1 and 2.

Internal white tissue rating indicated BHN 641 had no white tissue. Varieties with slight or slight to no white tissue include: NC 96365, NC 0015, ACR 2012, ACX 12A, NC 0346, RFT 2374, S 3242, Sunchief, and Sunguard (Table 2). Varieties with severe or moderate to severe white tissue include ACR 242, ACR 252, S 336, and Sunshine (Table 2).

**Table 2. Fruit Characteristics, Fresh Market Round Tomato Trial – 2003**

| Variety | External[1] Color | Internal[1] Color | Firmness[1] | Blossom[1] Scar | White[1] Tissue |
|---|---|---|---|---|---|
| ACR 42 | 2.00 | 2.00 | 5.00 | 5.00 | 3.00 |
| ACR 242 | 2.50 | 2.00 | 5.00 | 2.50 | 1.00 |
| ACR 252 | 2.00 | 2.50 | 5.00 | 4.50 | 2.00 |
| ACR 2012 | 2.50 | 5.00 | 3.00 | 4.30 | 4.00 |
| ACX 12A | 2.50 | 2.50 | 4.50 | 5.00 | 4.00 |
| ASX 334 | 3.50 | 3.50 | 3.00 | 4.00 | 2.50 |
| Amelia | 2.50 | 3.50 | 3.50 | 4.50 | 2.50 |
| BHN 591 | 3.50 | 4.00 | 3.00 | 4.00 | 3.00 |
| BHN 641 | 2.00 | 5.00 | 3.00 | 4.00 | 5.00 |
| BHN X649 | 2.00 | 2.50 | 3.00 | 3.50 | 2.50 |
| FLA 47 | 2.50 | 2.50 | 3.50 | 3.50 | 2.80 |
| FLA 91 | 2.00 | 3.00 | 3.00 | 4.00 | 2.50 |
| Floralina | 2.50 | 3.50 | 3.00 | 3.50 | 3.50 |
| HMX 2807 | 3.50 | 3.50 | 3.00 | 3.00 | 3.50 |
| NC 0015 | 3.00 | 3.50 | 3.00 | 3.00 | 4.50 |
| NC 0227 | 2.50 | 3.00 | 3.50 | 3.50 | 3.50 |
| NC 0236 | 3.00 | 3.50 | 4.00 | 4.00 | 3.50 |
| NC 0256 | 3.00 | 3.00 | 3.50 | 4.00 | 2.50 |
| NC 0258 | 2.75 | 4.00 | 3.50 | 2.00 | 3.00 |
| NC 02226 | 2.00 | 2.50 | 5.00 | 3.00 | 3.50 |
| NC 0343 | 2.50 | 2.50 | 5.00 | 3.50 | 3.50 |
| NC 0344 | 2.00 | 2.50 | 5.00 | 4.00 | 3.50 |
| NC 0346 | 2.50 | 2.50 | 5.00 | 3.50 | 4.00 |
| RFT 2374 | 3.50 | 4.00 | 2.50 | 3.00 | 4.00 |
| RFT 6153 | 3.50 | 4.00 | 4.00 | 3.50 | 3.50 |
| S 336 | 3.00 | 3.50 | 2.00 | 2.50 | 2.00 |
| S 1797 | 3.00 | 3.00 | 2.50 | 2.00 | 3.50 |
| S 3242 | 3.00 | 3.00 | 4.00 | 2.00 | 4.00 |
| Sunbrite | 3.00 | 3.80 | 2.00 | 4.00 | 2.50 |
| Sunchief | 3.00 | 3.00 | 2.00 | 2.50 | 4.00 |
| Sunguard | 3.00 | 3.00 | 3.00 | 4.00 | 4.00 |
| Sunsation | 2.50 | 3.00 | 3.50 | 2.00 | 3.00 |
| Sunshine | 2.50 | 3.50 | 1.50 | 4.50 | 2.00 |
| NC 96365 | 3.00 | 3.00 | 3.00 | 3.00 | 4.50 |
| HSD 5% | NS | 2.45 | 1.98 | 3.25 | 3.59 |

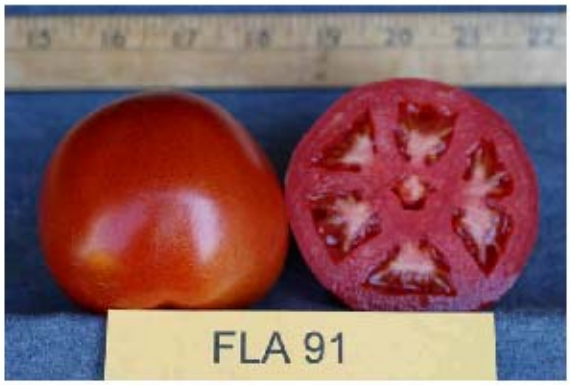
[1]See Table in methods section for a description of ratings.

## Summary

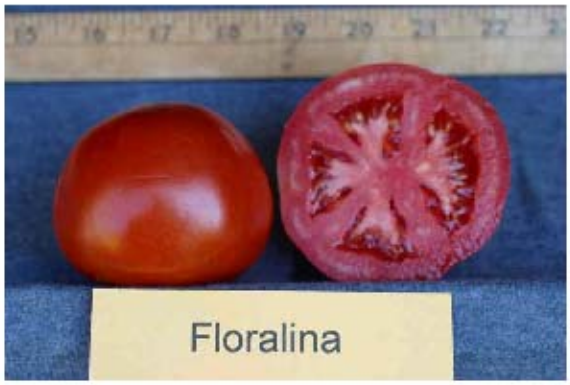
The season was dominated by unfavorable weather conditions early in the growing season and during harvest. A decrease in the percentage of marketable fruits contributed to lower marketable yield, even though total yields were relatively high in 2003. The standard, FLA 47 performed well in the difficult conditions of 2003. The following varieties also had a good combination of yield, size, and fruit characteristics: Amelia, BHN 591, NC 0258, NC 96365, NC 02226, FLA 91, HMX 2807, and NC 0015.

# 2003 Round Tomato Variety Trial Pictures

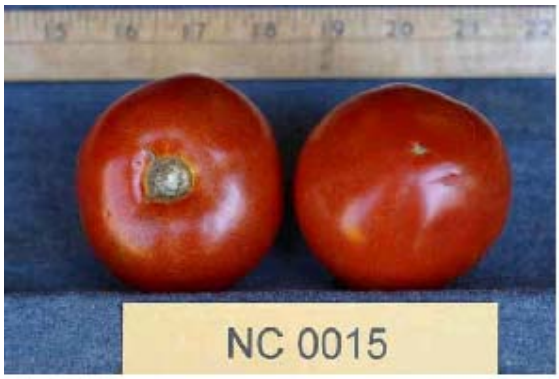









NC 0015


NC 0015


NC 02226


NC 02226


NC 0227


NC 0227


NC 0236


NC 0236


NC 0258


NC 0258


NC 0343


NC 0343


NC 0344


NC 0344


NC 0346


NC 0346


NC 96365


NC 96365


RFT 6153


RFT 6153


RFT 2374


RFT 2374


S 1797


S 1797


S 3242


S 3242


Sunbrite


Sunbrite


Sunguard


Sunguard


Sunsation


Sunsation


Sunshine


Sunshine