ROUND TOMATO CULTIVAR TRIAL RESULTS - 2004

Stephen A. Garrison[1] Wesley L. 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 twenty-one promising lines were included in the trial conducted at Rutgers Agricultural Research and Extension Center, Bridgeton, NJ.

Methods

Culture

Seeds were sown on April 6 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 May 19. 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 3.87, 3.42, 6.55, 4.23 and 2.6 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 2nd when early fruits were ripening and on 8/9, 8/17, 8/24, 9/1, 9/7 and 9/22. All fruits with breaker to red maturity were harvested. Fruits were separated into usable and culls. Major defects were identified and recorded. On August 27th, a sample of 16 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-Severe
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

The 2004 growing season was generally favorable. Temperatures were above average during the early part of the growing season. This promoted rapid establishment and good early vegetative growth. Temperatures were very favorable during the fruit set period, but lower than average temperatures during mid-season tended to moderate total vegetative growth.

Table 1. Vine Vigor, Early and Total Marketable Yield, Round Tomato Trial - 2004

Variety	Seed Source	Vine[1] Vigor Rating	Early[2] Market Yield Boxes/A	Season Marketable Yield Large & Ex. Large[3] Total Box/A	%	%
Amelia	Harris Moran Seed	2	992	3253	45	55
BHN 586	BHN Seed	2.5	600	3282	44	66
BHN 591	BHN Seed	3	1004	3647	41	57
BHN 640	BHN Seed	2	1217	3539	37	52
BHN 665	BHN Seed	4	1083	4593	46	62
Debut	Seminis	1.5	2058	3782	39	52
FLA 47	Seminis	3	767	3423	47	58
HMX 3823	Harris Moran Seed	2.5	901	3746	45	60
Mt. Fresh plus	Harris Moran Seed	3.5	870	3753	43	57
RFT 2374	Rogers Seed	2.5	1334	3665	35	54
Sebring	Rogers Seed	3.5	777	3529	35	41
Solar Fire	Harris Moran Seed	3.5	797	3862	36	51
Sorayo	Rogers Seed	2.5	716	4108	51	58
Sun Brite	Seminis	4	1326	4103	54	60
S 8233	Seminis	4	842	3984	47	62
S 8383	Seminis	4	713	4030	42	56
NC 0227	NC State	3.5	1042	3503	49	67
NC 0236	NC State	3.5	1185	4032	52	72
NC 0256	NC State	4.5	992	3615	50	69
NC 0377	NC State	4.5	1132	3733	45	69
NC 0392	NC State	4	681	3645	57	75
LSD 5%		1.3	346	NS	8	9
HSD 5%		2.6	676	NS	15	17

[1]5=Excellent, 3=Good, 1=Poor. [2]Early Yields from harvest 1 and 2. [3]Large = 2.75 – 3.5, Extra Large = > 3.5 size fruit.

Table 1 shows the results of vine-vigor ratings and marketable yields. There were significant differences among varieties for vine-vigor ratings. NC 0256, NC 0377, NC 0392, BHN 665, Sun Brite, S 8233, and S 8383 had the most vigorous vines (4.5 or 4.0 rating). The early variety Debut, BHN 640 and Amelia had significantly less vine-vigor than those varieties listed above. The lower vigor rating of Amelia was due to one poor plot in the two-replication trial. The other varieties were intermediate in vine-vigor (2.5 – 3.5 rating).

The early marketable yield of Debut was significantly higher than all other varieties in the trial (Table 1). RFT 2374, Sun Brite and BHN 640 also had high early yields. Early yields of BHN 586, NC 0392, S 8383, Sorayo, FLA 47, Sebring and Solar Fire were lower than many of the other varieties in the trial.

There were no statistical differences among varieties for total marketable yield in 2004. However there were several trends. BHN 665, Sorayo, Sun Brite and NC 0236 tended to have high marketable yields. Amelia and BHN 586 had lower yields, but this was probably due to plot location, since the vigor of both of these varieties was low in rep I.

The percentage of the marketable yield represented by large (2.75 – 3.5 in diameter) plus extra large (greater than 3.5 inches in diameter) fruits is shown in Table 1. NC 0392, Sun Brite, NC 0236, Sorayo, and NC 0256 all had 50% or more of the marketable fruits in the large plus extra large categories. RFT 2374, Sebring, Solar Fire, BHN 640 and Debut all had less than 40% or marketable fruits in the large plus extra large categories. There are two reasons for a low percentage of marketable fruits in the large plus extra large category; 1) small average fruit size. 2) a high percentage of defects (culls) in large fruit sizes.

The percentage of marketable fruits for the season is summarized in Table 1. There were significant differences among varieties. NC 0392, NC 0377, NC 0256, NC 0227 and BHN 586 all had 66% marketable yield or greater. Sebring had a significantly lower percent marketable fruit (41%) than all other varieties in the trial.

Table 2. Fruit Characteristics, Fresh Market Round Tomato Trial – 2004

Variety	External[1] Color	Internal[1] Color	Firmness[1]	Blossom[1] Scar	White[1] Tissue
Amelia	4	2.5	2.5	2.5	2.5
BHN 586	3	2	3	2	1
BHN 591	3	3	2.5	3	4
BHN 640	3.5	3	3	3.5	2.5
BHN 665	3	2.5	2	2	3.5
Debut	3	1.5	2	2.5	1.5
FLA 47	2.5	2.5	4	3	2.5
HMX 3823	3.5	4.5	3.5	2.5	4
Mt. Fresh plus	3.5	2	3	2	2
RFT 2374	4	3	1.5	2.5	3
Sebring	1	2.5	3	4	2.5
Solar Fire	3	2.5	2.5	3	2.5
Sorayo	1	1.5	3.5	3.5	3
Sun Brite	2.5	3	1.5	3	3
S 8233	2.5	1.5	3	4	3
S 8383	2.5	2	1.5	3.5	2
NC 0227	3.5	2.5	3	2.5	3
NC 0236	3	2.5	4	2	2.5
NC 0256	4	2.5	4	2.5	2.5
NC 0377	4	2.5	3	2.5	3
NC 0392	3.5	2.5	3	2	3
LSD 5%	0.9	1.0	0.9	1.0	1.1
HSD 5 %	1.7	2.2	1.8	2.0	2.2

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

Fruit characteristics of varieties in the 2004 trial are summarized in Table 2. Varieties with the highest external fruit color (rating 4.0) were Amelia, RFT 2374, NC 0256, and NC 0377. BHN 640, HMX 3823, Mt. Fresh plus, NC 0227 and NC 0392

all had above average fruit color (3.5). Sebring and Sorayo both had poor external fruit color.

Internal fruit color of HMX 3823 (4.5) was significantly higher than all other varieties in the trial. Debut, Sorayo and S 9233 internal fruit color was rated fair to poor (1.5). Whereas BHN 586, Mt. Fresh plus and S 8383 were rated fair-good or good for internal fruit color.

Firmness of FLA 47, NC 0236 and NC 0256 were all rated medium firm (4.0) and HMX 3823 and Sorayo were rated medium to medium firm (3.5). Sun Brite, RFT 2374 and S 8383 were rated medium soft to soft (1.5). BHN 665 and Debut were rated medium soft. Other varieties were medium (3.0) or medium to medium soft (2.5) for firmness.

Blossom scars of BHN 586, BHN 665, Mt. Fresh plus, NC 0236 and NC 0392 were rated small to medium (2.0). Sebring and S 8233 blossom scars were rated medium large (4.0). All other varieties were in the medium range (2.5 – 3.5) (Table 2).

Internal white tissue ratings indicated that BHN 591 and HMX 3823 were the best, with slight to some (4.0) white tissue. BHN 665 had a 3.5 rating. BHN 586 had severe white tissue (1.0) and Debut had severe to moderately severe (1.5) white tissue. Mt. Fresh plus and S 8383 had moderately to sever (2.0) rating. All other varieties had moderate (2.5 or 3.00) ratings for white tissue (Table 2).

Summary

Promising varieties from the 2004 trial include HMX 3823 (best overall fruit quality), BHN 665, NC 0227, NC 0236, NC 0377, NC 0392. Varieties that had one or more serious defect in the 2004 trial include S 8383, Sorayo, Sebring, S 8233, BHN 586, Debut, Sun Brite and Mt. Fresh plus. Debut produced very high early yields, but fruit quality was below average.

2004 ROUND TOMATO CULTIVARS


BHN 665


BHN 665


Debut


Debut


FLA 47


FLA 47


HMX 3823


HMX 3823


Mt. Fresh plus


Mt. Fresh plus


RFT 2374


RFT 2374


Sebring


Sebring


Solar Fire


Solar Fire


Sorayo


Sorayo


Sun Brite


Sun Brite


S 8233


S 8233


S 8383


S 8383