

FRESH MARKET TOMATO VARIETY TRIAL – YEAR 2

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Introduction - Fresh market tomatoes are a very important crop in Pennsylvania. According to the USDA, in 2015 total harvested acreage was 2,200 with a crop value of over \$33.2 million. Since there had been no evaluation of newly released varieties in the state in a replicated trial in recent years, this study was initiated in 2016 and repeated again in 2017.

Materials and Methods – Thirty-two round red tomato varieties (named and advanced selections) were evaluated using plasticulture and drip irrigation. In addition, ten advanced selections from the Penn State tomato breeding program were also included. Seeds were started on April 6 and transplants were set in the field on May 17. There were four 6-plant replications per variety with an in-row spacing of 1.5 ft. Fertilizer was applied preplant according to soil test results and standard fertility and pest management practices were used during the growing season as found in the Commercial Vegetable Production Guide. Harvest started on July 21 and ended on September 11. Fruit were graded into #1, #2 and cull and each group was counted and weighed.

Results and Discussion – Mountain Fresh Plus was used as the standard variety in this trial. Yields of #1 fruit and total marketable fruit (#1 + #2) were 1.6 and 4.7 lbs. per plant. In 2017 there was a severe bacterial infection in the entire planting that started early in the season which resulted in decreased yields compared to the 2016 trial where Mountain Fresh Plus had 6.5 and 12.0 lbs per plant of #1 fruit and total marketable fruit (data not presented). Varieties with weights of #1 fruit 0.5 lbs. or more than Mountain Fresh Plus were Grand Marshall, Primo Red, Red Bounty, Red Morning, Red Mountain, Rutgers 250, Tribute and Volante (Table 1). Numbered varieties with better yields of #1 fruit 0.5 lbs. or more were 17X03, 17X07, XTM2255, XTM 2261, 16-11 and 16-13 (Tables 1 & 2). 17X03 had a much higher yield of #1 fruit per plant but the fruit size was too small (0.21 lbs.) for this class of tomato.

Varieties with a total marketable yield 1.5 lbs per plant (or more) greater than Mountain Fresh Plus were Grand Marshall, Primo Red, Red Morning, Red Mountain, Rutgers 250, Tribute and Volante (Table 3). Rutgers 250 had an average marketable fruit size of 0.50 lbs. which is probably smaller than acceptable for this class of tomato. Numbered varieties with a total marketable yield 1.5 lbs per plant (or more) greater than Mountain Fresh Plus were 17X03, 17X07, XTM2255 and XTM 2261. Most of the Penn State selections had total marketable yields comparable to Mountain Fresh Plus (Table 4).

Mountain Fresh Plus had a value of 42% for total marketable percent of harvested fruit (compared to 80% in 2016). Varieties with greater than 50% total marketable percent of

all fruit were Grand Marshall, Primo Red, Red Mountain, Rutgers 250 and Tribute (Table 6). Numbered varieties with at least 50% total marketable percent of all fruit were 17X03, 17X07, XTM1134, XTM2255 and almost all of the Penn State selections (Tables 5 & 6).

Average marketable fruit size for Mountain Fresh Plus was 0.66 lbs.; only Mountain Merit, Rutgers 250 and Tribute had fruit size below 0.6 lbs. All of the Rutgers advanced selections averaged below 0.6 lbs. while most of the Sakata selections were above 0.7 lbs. No consistent differences in flavor were noted with informal tastings on selected harvests.

I would like to thank the PA Vegetable Marketing & Research Board for funding this trial.

Table 2. Yields of #1 and #2 fruit for 10 advanced selections of round red tomato from the Penn State tomato breeding program. All numbers are averages from four replications and are reported on a per-plant basis.

Variety	Number #1	Weight #1(lbs)	Number #2	Weight #2(lbs)
PSFH 16-2	3.1	1.9	3.9	2.3
PSFH 16-7	3.3	1.6	5.1	2.7
PSFH 16-8	3.6	1.9	5.7	2.9
PSFH 16-10	2.6	1.7	4.3	2.7
PSFH 16-11	4.1	2.4	4.5	2.7
PSFH 16-13	3.3	2.1	4.0	2.4
PSFH 16-14	2.4	1.5	3.7	2.3
PSFH 16-18	2.0	1.2	4.6	2.8
PSFH 16-118	0.9	0.5	3.3	2.2
PSFH 16-124	3.4	1.9	5.1	3.1

Table 1. Yields of #1 and #2 fruit for 22 named varieties and 10 advanced selections of round red tomato. All numbers are averages from four replications and are reported on a per-plant basis.

Variety	Number #1	Weight #1(lbs)	Number #2	Weight #2(lbs)
Bella Rosa	1.2	0.8	6.7	4.5
BHN 589	1.8	1.3	5.2	3.1
Camaro	1.8	1.3	4.9	3.7
Grand Marshall	5.1	3.3	8.5	5.5
Mountain Fresh Plus	2.3	1.6	4.8	3.1
Mountain Majesty	2.3	1.5	4.7	3.7
Mountain Merit	2.9	1.5	5.4	2.9
Primo Red	5.5	3.9	5.5	4.3
Red Bounty	3.4	2.1	6.0	3.9
Red Delight	1.6	1.2	4.4	3.0
Red Deuce	2.0	1.6	4.3	3.4
Red Morning	3.8	3.1	4.9	4.0
Red Mountain	8.4	5.0	7.1	4.5
Red Rave	2.5	1.3	3.7	2.3
Redline	1.8	1.1	3.8	2.5
Resolute	3.2	1.8	6.2	4.1
Rocky Top	3.0	2.0	4.7	3.1
Rutgers 250	5.3	2.5	8.0	4.1
Scarlet Red	1.5	1.0	3.7	2.1
Summerpick	2.0	1.3	4.5	3.1
Tribute	3.9	2.2	8.5	6.1
Volante	3.3	2.4	6.0	4.5
STM 8005	2.4	1.7	5.7	4.1
TFW6017X03	43.2	8.6	14.2	3.7
TFW6017X05	1.2	0.5	2.8	1.5
TFW6017X07	5.2	2.5	9.3	4.7
TFW6017X09	2.0	1.0	3.5	1.8
XTM0004	1.3	1.0	4.2	3.0
XTM1134	1.8	1.4	4.6	3.8
XTM1135	2.8	1.7	5.6	3.7
XTM2255	3.0	2.4	6.0	5.0
XTM2261	3.7	2.7	5.3	3.9

Table 3. Total # and weight of marketable fruit, average weight and # culls for 22 named varieties and 10 advanced selections of round red tomato. All numbers are averages from four replications and are reported on a per-plant basis.

<u>Variety</u>	<u>Total Number Marketable</u>	<u>Total Marketable Wt.(lbs)</u>	<u>Average Marketable Wt.(lbs)</u>	<u>Number Culls</u>
Bella Rosa	7.9	5.3	0.67	11.2
BHN 589	7.0	5.1	0.73	12.0
Camaro	6.7	5.0	0.74	14.5
Grand Marshall	13.6	8.8	0.65	9.4
Mountain Fresh Plus	7.1	4.7	0.66	10.0
Mountain Majesty	6.9	5.2	0.76	10.7
Mountain Merit	8.3	4.4	0.54	13.5
Primo Red	11.0	8.2	0.74	10.0
Red Bounty	9.4	5.9	0.63	11.2
Red Delight	6.0	4.2	0.70	10.1
Red Deuce	6.3	4.5	0.79	12.4
Red Morning	8.9	7.1	0.82	10.6
Red Mountain	15.5	9.5	0.61	11.2
Red Rave	6.2	3.6	0.58	9.3
Redline	5.5	3.6	0.65	10.6
Resolute	9.4	5.9	0.62	11.3
Rocky Top	7.7	5.1	0.66	8.4
Rutgers 250	13.2	6.6	0.50	11.4
Scarlet Red	5.2	3.7	0.70	9.6
Summerpick	6.4	4.4	0.68	11.4
Tribute	12.5	7.1	0.57	13.0
Volante	9.3	6.9	0.74	10.5
STM 8005	8.1	5.8	0.72	8.6
TFW6017X03	57.5	12.3	0.21	16.8
TFW6017X05	3.9	2.0	0.52	17.3
TFW6017X07	14.5	7.2	0.50	13.2
TFW6017X09	5.4	2.8	0.51	14.0
XTM0004	5.5	3.9	0.71	11.8
XTM1134	6.4	5.3	0.82	7.7
XTM1135	8.4	5.4	0.64	11.0
XTM2255	9.0	7.5	0.82	8.0
XTM2261	9.0	6.5	0.72	10.4

Table 4. Total # and weight of marketable fruit, average weight and # culls for 10 advanced selections of round red tomato from the Penn State tomato breeding program. All numbers are averages from four and are reported on a per-plant basis.

Variety	Total Number Marketable	Total Marketable Wt.(lbs)	Average Marketable Wt.(lbs)	Number Culls
PSFH 16-2	6.8	4.2	0.62	7.6
PSFH 16-7	8.4	4.2	0.50	6.9
PSFH 16-8	9.3	4.8	0.52	7.0
PSFH 16-10	6.6	4.4	0.67	6.6
PSFH 16-11	8.6	5.1	0.59	5.6
PSFH 16-13	7.3	4.5	0.62	6.1
PSFH 16-14	6.1	3.7	0.61	6.7
PSFH 16-18	6.6	3.9	0.59	5.2
PSFH 16-118	4.3	2.8	0.65	7.9
PSFH 16-124	8.5	4.9	0.58	6.1

Table 5. Total # and weight of harvested fruit, percent marketable fruit for 10 advanced selections of round red tomato from the Penn State tomato breeding program. All numbers are averages from four replications and are reported on a per-plant basis.

Variety	Total Number Harvested	Total Weight Harv.(lbs)	Percent Marketable	Seed Source
PSFH 16-2	14.3	8.6	49	PSU
PSFH 16-7	15.4	7.6	56	PSU
PSFH 16-8	16.3	8.2	59	PSU
PSFH 16-10	13.2	8.6	51	PSU
PSFH 16-11	14.3	7.8	65	PSU
PSFH 16-13	13.5	8.3	55	PSU
PSFH 16-14	12.4	6.9	54	PSU
PSFH 16-18	11.8	6.7	59	PSU
PSFH 16-118	12.2	7.8	35	PSU
PSFH 16-124	14.7	8.1	61	PSU

PSU = Dr. Majid Foolad, Penn State

Table 6. Total # and weight of harvested fruit, percent marketable and seed source for 22 named varieties and 10 advanced selections of round red tomato. All numbers are averages from four replications and are reported on a per-plant basis.

<u>Variety</u>	<u>Total Number Harvested</u>	<u>Total Weight Harv.(lbs)</u>	<u>Percent Marketable</u>	<u>Seed Source</u>
Bella Rosa	19.0	12.4	43	CS
BHN 589	18.9	13.5	38	SW
Camaro	21.2	15.4	32	SK
Grand Marshall	23.0	16.9	52	SK
Mountain Fresh Plus	17.1	11.2	42	HM
Mountain Majesty	16.9	12.2	43	HM
Mountain Merit	21.8	12.2	36	SW
Primo Red	20.9	15.3	53	HM
Red Bounty	20.5	12.9	46	HM
Red Delight	16.1	11.4	37	CS
Red Deuce	18.7	15.1	33	HM
Red Morning	19.3	15.7	45	HM
Red Mountain	26.7	15.7	60	HM
Red Rave	15.5	9.3	39	SW
Redline	16.1	10.3	35	CS
Resolute	20.7	12.9	45	SW
Rocky Top	16.1	10.8	47	SW
Rutgers 250	24.6	11.9	55	RU
Scarlet Red	14.8	10.5	35	SW
Summerpick	17.8	11.6	38	CS
Tribute	25.5	14.0	51	CS
Volante	19.8	14.4	48	CS
STM 8005	16.7	11.9	49	CS
TFW6017X03	78.1	17.0	72	RU
TFW6017X05	21.3	11.0	19	RU
TFW6017X07	27.7	14.6	50	RU
TFW6017X09	19.4	10.1	28	RU
XTM0004	17.3	12.2	32	SK
XTM1134	14.1	10.5	50	SK
XTM1135	19.4	12.3	43	SK
XTM2255	17.1	13.1	57	SK
XTM2261	19.4	13.4	49	SK

CS = Clifton Seed, HM = Harris Moran, RU= Rutgers, SK = Sakata, SW = SeedWay