PROCESSING TOMATO VARIETY TRIAL SUMMARY - 2005[1]

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INTRODUCTION

Commercial varieties and advanced breeding lines were evaluated for adaptation to New Jersey growing conditions. Twenty one promising lines recommended by local processors, seedsmen, growers and those that had performed well in previous trials were included in the 2005 trial. All twenty one varieties in the trial were replicated four times.

METHODS

Culture

Seeds were sown on April 8, in 338-cell trays containing peat-vermiculite media formulated for tomato transplant production. Seedlings were thinned to 1 plant per cell. Fertilizer at the rate of 65 lbs N, 30 lbs P_2O_5 and 200 lbs K_2O per acre was broadcast and worked in before planting. On May 14 transplants were set 8" apart on beds with 5-ft centers. Irrigation (0.75 inches) was applied after transplanting. Sencor DF (0.33 lb/A), was applied June 4th after the plants were established. A herbicide application of Sencor DF (7 oz/A) plus Matrix (1 oz/A) was made on July 17th. Insects and fungicides were controlled as required using commercial recommendations for tomatoes. On July 4th Bravo (2 pt/A), Previcur Flex (1.2 pt/A) and SpinTor 2SC (6 oz/A) was applied; followed by Amistar (2 oz/A) on July 12th. On July 15th Bravo (2 pt/A), Previcur Flex (1.2 Pt/A) and SpinTor 2SC (5 pt/A) were applied with 4-0-0 Ele-Max foliar (2 pt/A). On July 21st Dithane DF (1.5 lb/A), Tanos (0.5 lb/A) and Ele-Max 4-0-0 were applied. Bravo, Previcur Flex and Ele-Max were applied on July 27th at the same rates as on July 15th. On August 4th, Bravo (2.75 pt/A) plus Dimate 4EC (1pt/A) were applied. On August 13th, Bravo 2.5 pt/A) and Warrior (3.2 oz/A) were applied. No Ethrel was applied to the plots. Rainfall was 2.22, 2.46, 4.43, 1.52 and 1.07 inches in May, June, July, August, and September respectively.

Experimental, Harvesting and Evaluation

Field plots were arranged in a randomized block design with four replications. Data were obtained on foliage and fruit characteristics of the most promising varieties in the trial. A 5 – 7 pound sample of representative fruit was harvested from each plot at the estimated maturity date for the plot. Raw juice color (Agtron), soluble solids and pH determined by the Violet Packing Company. Quantitative and many subjective evaluations in the replicated trial were subjected to analysis of variance. Means were compared using the LSD and the HSD test at the 5% level.

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RESULTS

The 2005 season was favorable for tomato growth , yield and fruit quality. Rainfall was adequate in May and June but high in July, with significant disease pressure in June and July. Temperatures were favorable for fruit set. During late July, August and early September rainfall was much below normal. Fruit cracking in the field was low to moderate on most varieties but there was some Alternaria and Anthracnose on the fruit at harvest. Data from selected varieties in the 2005 trial are summarized in Table 1, 2 and 3. Comments on the important characteristics of most varieties are included after the data.

Table 1. Maturity, yield potential and size of tomatoes, 2005 replicated trial

Variety	Seed Source	Relative Maturity[1]	Vine Size[2]	Vine type[3]	Yield Potential Rating[4]
FG 00 115	Ohio State	M	5	3.75	3.63
FG 00 117	Ohio State	M	5	3.88	3.63
FG 00 140	Ohio State	M	3.5	3.5	2.63
FG 00 160	Ohio State	M-L	4.25	4	3.88
FG 99 19	Ohio State	M	5	4	3.63
OX 325	Ohio State	E-M	4.5	3.89	3.75
U2008	Ohio State	E-M	4.25	4	3.88
TSH 4	Tomato Solutions	VE	2.75	3.75	2.63
H 2501	Heinz Seeds	M-L	4.5	3.75	3.63
H 3402	Heinz Seeds	M	5	4.25	4.13
H 5203	Heinz Seeds	M-L	4.13	4.13	3.63
BOS 47721	B. Orsetti Seed	M	5	4	3.25
BOS 52295	B. Orsetti Seed	M	4.5	3.63	3.38
BOS 66509	B. Orsetti Seed	E-M	4.75	3.25	4.13
BOS 67374	B. Orsetti Seed	M	5	4.38	3.38
H 9704	Heinz Seeds	M	3	2.63	3.25
LSD 5%	-	-	0.6	0.6	0.9
HSD 5%	-	-	1.0	1.0	1.5

[1]E=early season , M=middle season, L=late season,
[2]1=very small, 2=small, 3=medium, 4=large, 5=very large
[3]1=compact, 2=semi-compact, 3=semi spreading, 4=spreading, 5=semi upright,
[4]1-Poor, 2=Fair, 3=Good, 4=Very Good, 5=Excellent. Recorded at the end of the season

TSH 4 was the earliest maturing variety followed by OX 325, U2008, and BOS 66509. FG00160, H 2501 and H 5203 were mid to late maturity and all other varieties were midseason in maturity. (Table 1)

The vine size was generally large in 2005. However TSH 4 had small to medium vine size, and FG 00140 and H 9704 were rated medium. All other varieties were large to very large. (Table 1)

Yield potential was rated on a 1 – 5 scale and the data are shown in Table 1. The varieties with the lowest yield potential were the early variety TSH 4 and FG 00140. The highest rated varieties were H 3402 and BOS 66509. All other varieties were rated good to very good.

Table 2. Plant and fruit characteristics, 2005 replicated trial

Variety	% Fruit Cover	% defol.	Foliage[1] Disease	Alternaria[1]	Anthracnose[1]	Sun[1] Burn
FG 00 115	63	41	4.85	5.63	5.38	6.75
FG 00 117	46	44	6.75	5.25	5.25	5.25
FG 00 140	49	46	4.75	6.75	6.75	5.13
FG 00 160	44	53	4.5	7	6.5	4.5
FG 99 19	61	33	5.75	6	5.5	6
OX 325	58	29	5.5	5.5	4.88	6.5
U2008	51	43	6	5.25	5.75	6.25
TSH 4	33	46	5	3.25	3.88	5.75
H 2501	60	34	6	6.5	7.25	4.5
H 3402	67	24	7	8	7.5	7.25
H 5203	66	33	6	6.75	7	7.25
BOS 47721	68	23	7.25	6.25	6.25	7
BOS 52295	60	36	6	5.5	5.5	6
BOS 66509	60	30	6.25	5.75	5.25	5.75
BOS 67374	70	28	6.5	6.75	6.5	6.75
H 9704	58	33	6	8	8	7
LSD 5%	18	NS	NS	1.6	1.4	1.8
HSD 5%	33			2.9	2.6	3.2

[1]Higher number indicates better resistance 9=Excellent, 7=Very Good, 5=good, 3=Fair, 1=poor.

Fruit cover ratings at harvest are shown in Table 2. The early variety TSH 4 had the poorest (33%) fruit cover. FG 00160, FG 00117 and FG 00140 had less than 50% cover and all other varieties has 58-70% cover.

The ratings for percent defoliation and foliage disease were not statistically different for the varieties in the trial. This was due in part to large variations in ratings between replications. Replication 1 and 4 were on sandy soils with lower moisture holding capacity and showed greater stress. There was a trend (not significant) toward greater defoliation and foliar diseases in FG 00160, TSH 4, FG 00140, U2008 and FG 00117. (Table 2)

The ratings for Alternaria on the fruit (Table 2) showed that H 9704 and H 3402 had the least Alternaria, followed by FG 00160, GH 00140, H 5203 and BOS 67374. TSH 4 had the most Alternaria. H 9704, H 3402 and H 2501 had the highest Anthracnose ratings (least anthracnose). TSH 4 and OX 325 had the lowest anthracnose ratings (most anthracnose). The first fungicide spray (July 4th) may not have been applied early enough to adequately protect the fruit and foliage of these early maturing varieties from fungal pathogens.

Sunburn ratings were closely associated with fruit cover. H 3402, H 5203, BOS 47721 and H 9704 had the best sunburn ratings. FG 00160 and H 2501 had the lowest sunburn ratings. (Table 2)

Table 3. Fruit characteristics and raw juice quality, 2005 replicated trial

Variety	Firmness[1]	Field Cracking		Raw Juice Quality		
		Type[2]	Severity[3]	Agtron	Soluble Solid	pH
FG 00 115	2.13	5,3	7.25	25.1	4.6	4.4
FG 00 117	2.5	5	8.75	25.3	4.7	4.4
FG 00 140	3	3,5	8	24.2	4.7	4.4
FG 00 160	3.88	3,5	8.5	23.1	4.3	4.3
FG 99 19	2.5	3,5,4	8	24.2	4.5	4.3
OX 325	2.63	3,5	8	24.5	4.2	4.4
U2008	3.5	3,5	8.5	26.4	4.7	4.3
TSH 4	3.13	-	9	-	-	-
H 2501	4	3,5	6.75	23.0	4.8	4.2
H 3402	4.5	3,5,4	8	24.3	4.8	4.4
H 5203	4.5	3,5	7	24.4	5.1	4.2
BOS 47721	4.13	3,5,4	7.5	26.9	5.0	4.3
BOS 52295	4.13	3,5	6.5	27.6	5.4	4.2
BOS 66509	4	3,5,4	7.25	27.1	4.7	4.3
BOS 67374	4.25	3	8.75	26.4	5.0	4.3
H 9704	4.88	3,5	8.5	25.4	4.4	4.2
LSD 5%	0.4	-	1.0	2.4	0.5	0.1
HSD 5%	0. 8	-	1.8	4.2	0.9	NS

[1] 5=excellent, 4=very good, 3=good, 4=fair, 5=poor
[2] 3=radial, 4=transverse, 5=checking/russeting
[3] 9=none, 8=very slightly, 7=slightly, 6=slight-moderate, 5=moderate

Fruit firmness ratings are shown in Table 3. H 9704 had the highest firmness rating followed by H 3402, H 5203, BOS 67374, BOS 47721, BOS 52295, BOS 66509 and H 2501. All of these varieties were rated very good to excellent in firmness. FG 00115, FG 00117, FG 9919, OX 325 and FG 00140 were rated in the fair to good range and FG 00160, U 2008 and TSH 4 were in the good range. (Table 3) Severity of fruit cracking in the field was generally low in 2005. No cracking was observed in TSH 4 (harvest maturity before later rain in August). BOS 52295 and H 2501 had more fruit cracking than the other varieties in the trial. (Table 3)

Raw juice quality of varieties in the trial (except TSH 4, which matured before sampling began) is shown in Table 3. The varieties with the highest color (lowest Agtron number) were H 2501 and FG 00160, (23-23.1) followed closely by FG 9919, FG 00140, H 3402, H 5203 and OX 325, all with Agtron color of 24-24.5. FG 00115, FG 00117 and the standard H 9704 had Agtron color of 25.1-25.4. All other varieties had Agtron color of 26-27. (Table 3)

BOS 52295 had the highest soluble solids (5.4%), followed by H 5203, BOS 47721 and BOS 67374 all with solids of 5.0 – 5.1%. OX 325, FG 00160 and the standard H 9704 had relatively low (4.2 - 4.4%) solids, and all other varieties were intermediate (4.5 – 4.8%) in solids.

The pH of the juice was 4.2 for H 9704, H 2501, H 5203 and BOS 52295. FG 00115, FG 00117, FG 00140, OX 325 and H 3402 had juice pH of 4.4. Other varieties were intermediate (4.3) in juice pH.

Summary

The most promising variety in the 2005 trial was H 3402. It had a stronger vine and higher yield potential than H 9704. Firmness, crack resistance and fruit qualities of H 3402 were similar to H 9704.

H 2501 and H 5302 has a stronger vines than H 9704 but slightly more fruit diseases and cracking than H 9704. FG 00160 had slightly more fruit diseases and less firmness than H 9704, but higher yield potential and equal or better juice color.

BOS 66509 had a strong vine and higher yield potential than H 9704, but fruit diseases were higher and color was not as good as H 9704. BOS 47721 and BOS 67374 has strong vines, good yield potential, fruit firmness and crack resistance, but Agtron color was generally lower than the standards.