UNIVERSITY OF FLORIDA

Institute of Food and Agricultural Sciences
North Florida Research and Education Center – Suwannee Valley

Evaluation of Greenhouse Beefsteak and Cluster Tomato Varieties for North Florida for 1999-2000 Season 2000-02

Robert C. Hochmuth[1], Lei Lani Davis[2], Norma Tillman[3]

Materials and Methods

This trial was conducted at the University of Florida, North Florida Research and Education Center - Suwannee Valley, near Live Oak, Florida in a single 22 x 60-ft stand-alone greenhouse with 8-ft sidewalls. The structure was covered with two layers of 6mil polyethylene and the area between the two layers was inflated with air. The greenhouse was equipped with an evaporative cooling pad on one end-wall and ventilation fans on the opposite end-wall. Propane gas was used to heat the greenhouse and provide a minimum temperature of 62°F. Warm air was conveyed by 12-inch ventilation tubes along the floor between the double rows of tomatoes. The same ventilation tubes were used to recirculate greenhouse air in the crop canopy to minimize free water formation on the tomato plants. In addition, horizontal airflow fans were located above the crop and also used to reduce moisture and disease on the plants.

Seeds of seventeen varieties (Tables 1) were planted into rockwool seeding cubes (1.5 x 1.5 x 1.5 inches) on 27 August 1999. The transplants were grown in these cubes using water and nutrient solution as needed until transplanting. The transplants were planted into lay-flat bags of perlite on 29 September 1999. The crop was grown in accordance with the standard lay-flat perlite bag production practices. The nitrogen level was maintained at 70 ppm N at the beginning of the season and raised to 150 ppm by first harvest and was maintained at 150 ppm N for the remainder of the crop season.

The tomato crop was maintained with standard practices for training, suckering, pruning lower leaves, and cluster pruning. The seed company made the determination of fruit class, cluster or beefsteak. Clusters of fruit from cluster varieties were harvested at a range of fruit maturity from "breaker" to "ripe". Cluster varieties were harvested by clipping entire clusters, weighing each cluster and

[1] Multi-County Extension Agent, University of Florida, North Florida Research and Education Center – Suwannee Valley, 7580 County Road 136, Live Oak, FL 32060-7434.
[2] Sr. Lab Technician, University of Florida, North Florida Research and Education Center – Suwannee Valley, 7580 County Road 136, Live Oak, FL 32060-7434.
[3] Greenhouse Assistant, University of Florida, North Florida Research and Education Center – Suwannee Valley, 7580 County Road 136, Live Oak, FL 32060-7434.

counting fruit on each cluster (Table.2). Beefsteak fruits were harvested individually at the breaker stage and graded marketable (4 ounces and over) or cull. Cull fruit in the beefsteak varieties were those fruit less than four ounces or with other defects (Table 3).

Postharvest evaluations were made on March 30, 2000 on harvested fruit from all varieties. Evaluations were made on ripe fruit that had been at room temperature for 5 days after harvest. Ratings were taken on several fruit quality parameters including external and internal fruit quality and taste (Table 4).

Discussion

This study was conducted as an observational trial due to the limited greenhouse space at the Research Center. The trial is intended to provide some basic information about overall yield and quality on tomato varieties. Fruit quality has been the most important set of factors in choosing a greenhouse tomato variety for North Florida. Fruit russeting and other fruit cracking disorders have been especially important in variety selection. Ratings in Table 4 give a opportunity to make relative comparisons to standard varieties used in North Florida such as “Trust”, and “Tradiro”.

Changes in tomato varieties should always be made with caution. In addition to yield potential, fruit quality characteristics must be considered in making any change.

Table 1. Seed source, presence of greenback fruit trait, and plant habit for cluster and beefsteak greenhouse tomato varieties, 1999 – 2000 season at North Florida REC – Suwannee Valley, Live Oak, Florida.

Variety	Seed Source	Greenback Trait[z]	Plant Height[y]
Cluster			
Apetito	Rijk Zwaan	N	T
Brillante	Hazera	G	M
DRW4628	DeRuiter	N	S
E20.30772	Enza Zaden	N	T
Emanuelle	Hazera	G	M
HA-3103	Hazera	G	M
HA-3104	Hazera	G	M
Petual	Rijk Zwaan	N	T
Rougella	Rijk Zwaan	N	T
Thomas	Novartis	N	T
Tradiro	DeRuiter	N	S
Beefsteak			
Alcudia	Novartis	N	T
Barione	Rijk Zwaan	N	M
Blitz	DeRuiter	N	S
Mississippi	Rijk Zwaan	N	S
Quest	DeRuiter	N	S
Trust	DeRuiter	N	S

[z] Greenback trait is either non-greenback (N) or greenback (G).

[y] Plant height was measured for each variety when the tallest plants reached the trellis cable height of 7.5 feet. Varieties were placed in these categories: over 6-ft (T), 4-6-ft (M), or less than 4-ft (S).

Table 2. Yield, cluster characteristics, and average fruit weight of several greenhouse cluster tomato varieties, 1999 – 2000.

Variety	Total yield (lbs/plt)	Early yield (lbs/plt)[z]	No clusters per plant	Avg No fruit per cluster	Avg fruit wt (lbs)
Apetito	15	1	20	4	0.20
Brillante	19	2	23	3	0.26
DRW4628	19	2	21	3	0.29
E20.20772	16	2	21	3	0.22
Emanuelle	13	2	15	3	0.28
HA-3103	14	1	22	4	0.16
HA-3104	14	1	22	4	0.16
Petula	20	1	23	4	0.23
Rougella	15	1	23	4	0.17
Thomas	16	2	21	3	0.23
Tradiro	12	1	15	3	0.25

[z] Early fruit yield was a total of the harvest period of December 21, 1999 to January 10, 2000 (first four harvests).

Table 3. Yield and average fruit weight for greenhouse beefsteak tomato varieties, 1999-2000**.**

Variety	Seed Source	Total Mkt Wt (lbs/plt)	Early Yield (lbs/plt)[Z]	Avg Fruit Wt (lbs)
Alcudia	Novartis	18	2	0.39
Barione	Rijk Zwaan	25	5	0.43
Blitz	Deruiter	20	3	0.38
Mississippi	Rijk Zwaan	27	3	0.45
Quest	Deruiter	18	3	0.44
Trust	Deruiter	25	3	0.44

[Z] Early fruit yield was a total of the harvest period of December 21, 1999 to January 10, 2000 (first four harvests).

Table 4. Observational quality ratings for several greenhouse tomato cluster and beefsteak varieties on March 30, 2000.

	Exterior fruit ratings					Internal fruit ratings				
Variety	Color [Z]	Luster [Y]	Russet [X]	Calyx Quality [W]	Calyx Scar [V]	Color [Z]	Core Size [U]	White Tissue [T]	Fruit Size Uniformity Rating [S]	Taste Rating [R]
Beefsteak										
Alcudia	4	3	3	NA	5	3	5	3	NA	2
Blitz	4	4	4	NA	1	3	3	4	NA	3
Quest	5	5	4	NA	3	5	2	2	NA	4
Barione	5	4	2	NA	3	5	2	2	NA	5
Trust	5	4	4	NA	2	3	3	4	NA	4
Mississippi	5	4	3	NA	3	4	1	3	NA	3
Cluster										
Emanuelle	4	4	3	3	NA	3	1	4	5	2
Petula	5	5	5	3	NA	3	2	3	4	3
Brillante	3	5	4	3	NA	4	1	2	3	3
HA-3102	5	3	3	5	NA	5	1	1	3	5
E20-20772	3	4	5	3	NA	4	2	3	4	3
DRW4628	2	3	1	5	NA	1	3	4	4	1
Tradiro	5	5	5	3	NA	3	2	3	4	3
Thomas	5	5	4	5	NA	4	2	2	5	3
HA-3104	5	4	3	2	NA	5	4	1	3	3
Rougella	5	5	5	2	NA	4	2	1	5	5
Apetitio	5	4	3	3	NA	4	2	2	3	4

[Z] Color rating: 1=poor, 5=deep red
[Y] Luster rating: 1=poor, 5=excellent
[X] Russet rating: 1=excessive russeting, 5=no russeting
[W] Calyx quality rating: 1=poor calyx, 5=excellent appearance
[V] Calyx scar rating: 1=large scar, 5=no scar
[U] Core size rating: 1=small core, 5=large core
[T] Internal white tissue rating: 1=very little, 5=high level
[S] Fruit size uniformity rating: 1=poor uniformity, 5=excellent uniformity
[R] Taste rating: 1=poor, 5=excellent