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HEIRLOOM TOMATO CULTIVARS

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Abstract. **Ten heirloom tomato cultivars were tested for suitability in the FL fresh market tomato industry. While yield and storage time were comparable with commercial cultivars, heirloom cultivars exhibiting extra-large fruit size had so many physical defects almost all fruit was unmarketable. 'Cherokee Purple' and 'Eva Purple Ball' showed good resistance to late blight (*Phytophthora infestans*) infection. 'Lemon Boy' and 'Eva Purple Ball' performed superior to all other cultivars in this spring trial.**

Cultivars for the gassed-green tomato market are by necessity, designed to withstand the considerable physical stresses imposed by the industry's picking, packing and shipping techniques. However, in a recent issue of *The Packer*, the voice of the fresh fruit and vegetable industry, it was noted that "specialty tomatoes" are gaining favor with the American public, especially plum (roma), yellow, and cluster-style tomatoes.

Today's cuisine demands variety, and the addition of specialty tomatoes pleases not only the eye, but the palate as well. For the grower willing to go the extra mile to properly pack and ship these specialties, rewards abound. Heirloom varieties, those long-forgotten predecessors of our modem day gassed-green, may also offer specialty market opportunities. With these varieties, the grower must be aware of the fruit quality, harvesting, and shipping constraints that may outweigh the rewards!

Methods

A subsurface seepage irrigation trial was established at the Southwest Florida Research and Education Center of the University of Florida in Immokalee, FL to test heirloom cultivars supplied by Linda Sapp of Tomato Growers Supply (Ft. Myers, FL). Ten cultivars were assayed for appropriateness under Florida environmental, cultural, and commercial conditions:

Aunt Ruby's German Green - 80 days, beefsteak type, green

Black Prince - 70 days, Siberian heirloom, deep garnet

Cherokee Purple - 80 days, Tennessee heirloom, dusky rose to purple fruit

Eva Purple Ball - 70 days, German heirloom, dark pink

Flamme - 70 days, French heirloom, small bright orange fruit

Garden Peach - 80 days, fuzzy fruit, yellow-pink

Green Zebra - 75 days, amber green with dark green stripes

Lemon Boy - 72 days, a hybrid, lemon yellow fruit

Mary Ann - 78 days, classic beefsteak, deep pink to orange red

Nebraska Wedding - 90 days (or longer), Nebraska heirloom, meaty, pale orange fruit

A standard methyl bromide fumigated (320 lb/acre, broadcast), granular fertilized (220N-78P-300K), plastic mulched (black, 3 ml), 32 inch wide bed was prepared for the heirloom trial. Holes were punched in a single row (18 inch in-row pattern on 6 ft centers), and transplants were set on 26 Feb. 1997. Four replications were set out (twelve plants per replication) in a randomized complete block fashion. Soil and air temperatures during that time ranged from the high 70s to low 80s (°F). A rotation of weekly fungicide applications was employed to prevent the advancement of late blight, *Phytophthora infestans.* Various *Bacillus thuringiensis* (*Bt*) insecticides were also applied to reduce worm infestation.

Seven harvests occurred beginning on 7 May and ending on 6 June to accommodate the varying cultivar maturity dates. Fruits were picked at breaker stage (to satisfy a vine-ripe market), and sized according to Florida Tomato Exchange standards. Fruit physical characteristics (average fruit weight, diameter, number and weight per plant) and defects (blossom-end scar, gray wall, odd shape, zipper scar, catface, blossom-end rot, concentric cracks, radial cracking) were determined for each cultivar. Additionally, breaker fruit from each cultivar were held at 50°F until soft to determine storage shelf life. Incidence of late blight prompted rating the plots to determine cultivar susceptibility. Three ratings were taken during the week prior to initial harvesting.

Results

All heirloom cultivars were indeterminate and required hedging three wk prior to harvest. Fruit characteristics of most heirloom cultivars were generally inappropriate for the gassed-green market (Table 1). 'Aunt Ruby's German Green', 'Mary Ann', and 'Cherokee Purple' were generally extra-large in size (>3.0 inches), had rough shoulders, and often leaked from the blossom-end scar when ripe (Table 2). 'Nebraska Wedding' attained extra-large size having smoother shoulders. 'Lemon Boy', 'Garden Peach', 'Green Zebra', 'Black Prince', and 'Eva Purple Ball' were of medium to large size. 'Flamme' was small fruited (<2.0 inches), slightly larger than a cherry tomato. Most cultivars produced 8 to 12 lb of fruit per plant and breaker fruit could be stored for 7 to 10 days at 50°F (Table 1).

All heirloom cultivars showed physical defects that would render them unmarketable by Florida gassed-green standards

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Table 1. Heirloom variety trial at SWFREC, Immokalee, FL spring 1997: Fruit characteristics.

Variety	Average Fruit Wt (oz)	Diameter (in)	Average Fruit Size	Fruit No.	Fruit Wt (lb/plt)	Mean Days to Soft Stage
Aunt Ruby's German Green	8.4 b[z]	3.6 a	XL	22 e	11.6 cd	10.6 b-d
Garden Peach	2.1 g	2.3 c	M	92 ab	12.0 cd	6.4 f
Mary Ann	9.2 b	3.5 a	XL	22 e	12.8 c	11.6 a-c
Green Zebra	3.6 f	2.5 c	M-L	46 d	10.4 cd	12.8 ab
Nebraska Wedding	6.9 c	3.3 ab	XL	18 e	8.0 d	13.6 a
Flamme	1.9 g	1.9 d	S	99 a	11.9 cd	7.6 ef
Black Prince	3.7 f	2.5 c	M-L	59 cd	13.7 bc	9.7 c-e
Cherokee Purple	10.3 a	3.5 a	XL	19 e	12.5 c	11.0 a-d
Lemon Boy	5.9 d	2.9 b	M-L	50 d	18.3 a	8.8 d-f
Eva Purple Ball	4.7 e	2.5 c	M-L	43 d	12.7 c	13.5 a

[z]Values followed by the same letter(s) are not significantly different from one another via mean separation by Duncan's multiple range test ($p < 0.5$).

Table 2. Descriptive categories: Percent by fruit number for all harvests.

Variety	Blossom-end Scars	Grey Wall	Odd Shape	Zipper Scars	Cat-facing	Blossom-end Rot	Concentric Cracks	Radial Cracks
Aunt Ruby's German Green	36.4 a[z]	0.0 b	6.1 a	0.7 a-c	1.5 b	2.0 ab	3.0 bc	60.0 b
Garden Peach	1.6 b	0.2 b	0.7 cd	0.1 c	1.8 b	0.2 b	0.1 c	1.1 e
Mary Ann	36.8 a	0.0 b	4.0 a	3.3 a	1.8 b	0.0 b	3.1 bc	50.4 b
Green Zebra	0.5 b	0.0 b	0.6 cd	2.1 a-c	0.5 b	2.7 a	7.0 b	6.5 de
Nebraska Wedding	4.3 b	0.0 b	0.6 cd	1.2 a-c	0.9 b	0.0 b	1.9 bc	26.0 c
Flamme	0.2 b	0.0 b	0.1 d	0.3 c	0.1 b	3.2 a	1.6 bc	0.8 e
Black Prince	0.5 b	0.0 b	0.3 d	3.1 ab	1.4 b	0.1 b	17.8 a	9.2 de
Cherokee Purple	30.5 a	0.0 b	3.3 bc	3.4 a	7.4 a	0.0 b	4.1 bc	73.3 a
Lemon Boy	0.9 b	0.0 b	1.1 cd	0.4 bc	0.9 b	0.3 b	3.6 bc	15.1 cd
Eva Purple Ball	0.4 b	2.8 a	0.2 b	0.4 bc	0.4 b	0.3 b	1.0 bc	6.3 de

[z]Values followed by the same letter(s) are not significantly different from one another via mean separation by Duncan's multiple range test ($p < 0.5$).

(Table 2). 'Aunt Ruby's German Green', 'Mary Ann', and 'Cherokee Purple' were completely unmarketable, exhibiting 100% cull fruit mostly from blossom-end scar and radial cracking. 'Black Prince' and 'Nebraska Wedding' had 30% culls while 'Green Zebra' and 'Lemon Boy' had about 20% culls. Both of these groups showed defects from concentric and radial cracking. 'Garden Peach', 'Flamme', and 'Eva Purple Ball' showed 6%, 6%, and 12% culls, respectively.

Late blight infested the heirloom test block more or less uniformly late in the season (Table 3). Although disease development was not rapid, tolerance to late blight was apparent in 'Cherokee Purple' and 'Eva Purple Ball'. Disease seemed to advance more rapidly with 'Lemon Boy' and 'Green Zebra'. Most other cultivars fell in an intermediate range in tolerance to late blight under a twice-weekly spray regime.

Table 3. Heirloom late blight rating. 0 = none, 10 = heavy.

Variety	2 May 1997	5 May 1997	8 May 1997
Aunt Ruby's German Green	3.2 a-c[z]	3.5 a-c	3.8 a-e
Garden Peach	2.2 b-d	2.5 b-d	3.0 c-f
MaryAnn	4.5 a	5.0a	5.2 a
Green Zebra	3.5 a-c	4.5 a	4.8 a-c
Nebraska Wedding	2.2 b-d	2.2 b-d	3.0 d-f
Flamme	2.8 a-d	3.2 a-c	3.2 b-e
Black Prince	2.5 b-d	2.5 b-d	3.2 b-e
Cherokee Purple	1.2 d	1.2 d	1.2 f
Lemon Boy	4.0 ab	4.8 a	5.0 ab
Eva Purple Ball	1.8 cd	1.8 cd	2.2 ef

[z]Values followed by the same letter(s) are not significantly different from one another via mean separation by Duncan's multiple range test ($p < 0.5$).

Discussion

The heirloom cultivars tested in this trial would not stand up to the picking, packing, and shipping rigors of the FL gassed-green market. However, for the "vine ripe" specialty market, a few cultivars were notable. 'Eva Purple Ball' stored extremely well (14 days), was thick walled, presented good color, and produced few culls under spring conditions in Florida. The other low-cull cultivars, 'Garden Peach' and 'Flamme', were very thin walled and had low shelf life. 'Green Zebra' and 'Lemon Boy', while having a fairly high cull rate (1 in 5), offered excellent color, thick walls, and suitable storing capacity.

All cultivars grew and produced well in spring 1997. Further testing of heirloom cultivars is necessary before recommendations can be made concerning the appropriateness of these tomatoes for a commercial market in Florida.