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FLORIDA

IFAS EXTENSION

Growing Heirloom Tomato Varieties in Southwest Florida¹

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Introduction

Tomato varieties produced by the commercial tomato industry are designed to withstand the considerable physical stresses imposed by the industry's picking, packing, and shipping techniques. Yet, *The Packer*, the voice of the fresh fruit and vegetable industry, notes 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 also the palate.

Heirloom tomato varieties are one such group of specialty tomatoes. According to *Taylor's Guide to Heirloom Vegetables*, a tomato must meet three criteria to be considered an heirloom variety: the variety must grow "true to type" from seed saved from each fruit; seed must have been available for more than 50 years; and the tomato variety must have a history or folklore of its own.

For the homeowner, heirloom varieties provide a flavorful alternative to the standard garden tomato. This bulletin includes information on 15 varieties of

heirloom tomatoes that may work in your garden. For general information on home garden tomato production, refer to "Florida Vegetable Gardening Guide" (<http://edis.ifas.ufl.edu/VH021>) and "Tomatoes in the Florida Garden" (<http://edis.ifas.ufl.edu/VH028>). Both of these publications are available from the University of Florida (UF) Cooperative Extension Service.

Commercial heirloom growers must be aware of the considerable fruit quality, harvesting, and shipping constraints associated with heirloom tomatoes. For the commercial grower willing to go the extra mile to properly pack and ship these specialties, however, heirlooms offer special market opportunities.

Methods

General

The University of Florida's Southwest Florida Research and Education Center in Immokalee established two standard commercial production heirloom trials to test 15 different kinds of heirloom tomatoes. Linda Sapp of Tomato Growers Supply in

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1. This document is Fact Sheet HS921, one of a series of the Horticultural Sciences Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date: April 2003. Please visit the EDIS Web site at <http://edis.ifas.ufl.edu>.
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Ft. Myers, FL, provided seed of the 15 tomato varieties.

Standard commercial 32-inch-wide beds were used for this trial, using black, 3 mil plastic mulch. Beds were fumigated with methyl bromide (320 lbs./A, broadcast) and used a granular fertilizer (220N-78P-300K). Holes were punched in a single row (18-inch in-row pattern on 6-foot centers), and the plants were staked and tied in the basket weave fashion typical of commercial production. Four replications were set out in a randomized complete block (statistical design) fashion to determine statistically verifiable differences between varieties. Soil and air temperatures during that time ranged from the high 70s to low 80s F. Fungicides were applied weekly to prevent the advancement of disease, and various insecticides were used to reduce worm infestation.

Varieties - Spring 1997

Ten tomato varieties selected for appropriateness to Florida environmental, cultural, and commercial conditions were planted in 1997:

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 (not a true heirloom)

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

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

Four replications were set out of 12 plants on February 26, 1997. To accommodate the varying variety maturity dates, the plants were harvested seven times, beginning on May 7 and ending on June 6. To satisfy a vine-ripe market, the fruit were picked at breaker stage (showing a slight bit of color at the blossom end) and sized according to Florida Tomato Exchange standards. For each variety, fruit physical characteristics (average fruit weight, diameter, number, and weight per plant) and defects (blossom-end scar, gray wall, odd shape, zipper scar, cat facing, blossom-end rot, concentric cracks, calyx cracking) were determined. Breaker fruit were held from each variety at 50° F until soft to determine storage shelf life. Incidence of late blight (*Phytophthora infestans*) prompted a rating of the varieties to determine varietal susceptibility. Three ratings were taken during the week before first harvest.

Varieties - Spring 1998

Five tomato varieties were seeded from Tomato Growers Supply Company into 242 cell transplant trays on January 26, 1998, and transplanted the seedlings on March 2, 1998, in field plots of 10 plants. Plots were replicated four times. Plants were harvested five times between May 15, 1998, and June 5, 1998, taking fruit from three replications of six plants for each variety.

Pink Ping Pong - 75 days, sweet pink fruit about the size of a ping pong ball

Arkansas Traveler - 85 days, southern heirloom, pink 6-8 oz., heat tolerant

Clear Pink Early - 58 days, determinate, 3 inches diameter, Russian heirloom

Mr. Stripey (Tigrella) - 56 days, 1 1/2 - 2 in., red and orange striped, tangy

Black - 83 days, 4 oz., Russian heirloom, mahogany-brown

In this trial, intent was to assess tomatoes of small to medium size to reduce the incidence of

concentric and radial cracking at the stem end and thereby increase commercial pack out. Fruit physical characteristics (average fruit weight, number, and weight per plant) and defects (blossom-end scar, gray wall, odd shape, zipper scar, cat facing, blossom-end rot, concentric cracks, calyx cracking) were determined for each variety. No assessments were made on storage capacity or *Fusarium* crown rot (*Fusarium oxysporum* f. sp. *radicis-lycopersici*) incidence during the 1998 trial.

Results from 1997

All the heirloom varieties we studied in 1997 were indeterminate, that is, they grow continually, unlike commercial varieties that will stop vertical growth after about 7 weeks. Though staked with longer stakes than commercial growers typically use, the indeterminate growth habit required that the plants be clipped off above the stakes three weeks before harvest, as they otherwise quickly outgrew the stakes and fell back on themselves.

Fruit characteristics of most heirloom varieties were generally not appropriate 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 with 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 varieties produced 8 to 12 pounds of fruit per plant, and breaker fruit could be stored for 7 to 10 days at 50° F (Table 1).

All heirloom varieties showed physical defects that would render them unmarketable by Florida gassed-green standards (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 calyx cracking. Garden Peach, Flamme, and Eva Purple Ball showed 6%, 6%, and 12% culls, respectively.

Late blight infested the varieties 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 varieties fell in an intermediate range in tolerance to late blight under a twice-weekly spray regime.

Results from 1998

Clear Pink Early was the only variety that was determinate (stopped growing vertically after about seven weeks). Crown rot was discovered in the trial in late April. Crown rot in 1998 reduced the harvest period significantly, and in several replications the number of harvestable plants was also reduced. *Fusarium* crown rot generally attacks the plant at first pick and results in rapid wilting and desiccation.

The 1998 heirloom varieties were of small to medium size, with Arkansas Traveler being the largest. Fruit number per plant ranged from 41 to 107 and closely approximated similar sized fruit from the 1997 trial (e.g. Arkansas Traveler, 3.43 oz, 41 fruit vs. Green Zebra, 3.6 oz, 46 fruit or Mr. Stripey, 1.51 oz, 107 fruit vs. Flamme, 1.9 oz, 99 fruit.) In general, however, fruit weight per plant was below that noted in 1997 for comparable varieties (9.72 lbs in 1998 vs. 12.8 lbs in 1997). This may have been the result of the *Fusarium* crown rot epidemic, however.

There were notably fewer fruit defects recorded in 1998. The only prominent defects were once again cracking, both concentric and radial. In 1997, calyx cracking was the dominant defect, while in 1998 concentric cracking was the dominant defect. The largest concentration of concentric cracking occurred in Mr. Stripey and Black (similar to Black Prince in 1997). The loss of production for Mr. Stripey (22%) and Black (40%) would greatly reduce their application in the commercial market. Black Prince in 1997 also showed the greatest percentage of concentric cracks. Clear Early Pink, Arkansas Traveler, and Pink Ping Pong did not show a high percentage of cracking in either category.

Discussion

The heirloom varieties tested in these trials would not stand up to the picking, packing, and shipping rigors of the Florida gassed-green market. However, for the "vine ripe" specialty market, a few varieties were notable.

In 1997, 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 varieties, 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.

In 1998, Clear Early Pink appeared to produce the greatest volume of unblemished fruit. Arkansas Traveler, the largest fruit in the trial, also produced a large percentage of unblemished fruit, as did Pink Ping Pong.

The future of heirloom tomatoes in Florida is not yet clear. Many varieties may be suitable for Florida home gardens and a few may be appropriate for our commercial market. However, further testing is necessary before recommendations can be made to help growers choose the best varieties for their various needs. Assessments of the many different varieties should be made over several seasons to determine overall productivity, defects, and unforeseen problems that may be dependent on season. UF's Cooperative Extension Service is performing research to discover the best ways for Floridians to grow and use these delicious and fascinatingly varied fruits.

Literature Cited

Watson, Benjamin. 1996. Taylor's Guide to Heirloom Vegetables. Houghton Mifflin Co., New York, New York. Pp. 343.

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Stephens, J. 1994. Tomatoes in the Florida Garden (<http://edis.ifas.ufl.edu/VH028>). Florida Cooperative Extension Service, Fact Sheet HS-508.

Table 1. Heirloom variety trial at SWFREC, Immokalee, FL. Spring 1997: Fruit Characteristics

Variety	Average Fruit Wt. (oz.)	Diameter(in.)	Average Fruit Size	Fruit Number	Fruit Wt (lbs./plt)	Mean Days to Soft Stage
Aunt Ruby's German Green	8.4 b*	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	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

*Values followed by the same letter(s) are not significantly different from one another via mean separation by Duncan's Multiple range Test ($p \leq 0.5$).

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 Cracking
Aunt Ruby's German Green	36.4 a*	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 d	0.4 bc	0.4 b	0.3 b	1.0 bc	6.3 de

* Values followed by the same letter(s) are not significantly different from one another via mean separation by Duncan's Multiple Range Test ($p \leq 0.5$).

Table 3. Heirloom Late Blight Rating. 0=None, 10=Heavy

Variety	May 2, 1997	May 5, 1997	May 8, 1997
Aunt Ruby's German Green	3.2 a-c*	3.5 a-c	3.8 a-e
Garden Peach	2.2 b-d	2.5 b-d	3.0 c-f
Mary Ann	4.5 a	5.0 a	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

*Values followed by the same letter(s) are not significantly different from one another via mean separation by Duncan's Multiple Range Test ($p \leq 0.5$).

Table 4. Heirloom variety trial at SWFREC, Immokalee, FL, Spring 1998: Fruit Characteristics

Variety	Average Fruit Wt. (oz.)	Fruit Number	Fruit Wt. (lbs/plt)
Pink Ping Pong	1.41 d*	92 a	8.0 b
Arkansas Traveler	3.43 a	41 c	8.9 b
Clear Pink Early	2.93 b	69 b	12.7 a
Mr. Stripey	1.51 d	107 a	10.2 b
Black	2.71 c	52 bc	8.8 b

*Values followed by the same letter(s) are not significantly different from one another via mean separation by Duncan's Multiple Range Test ($p \leq 0.5$).

Table 5. Descriptive categories in percent at total of all harvests, Spring 1998 (percent by number of fruit)

Variety	Blossom-end Scars	Odd Shape	Zipper Scars	Cat Facing	Blossom-end Rot	Concentric Cracks	Radial Cracking
Pink Ping Pong	0.1 a*	0.4 a	0.5 a	0.0 a	0.2 a	2.7 c	0.1 b
Arkansas Traveler	0.4 a	0.0 a	0.1 a	0.0 a	0.4 a	0.2 c	0.0 b
Clear Pink Early	0.2 a	0.2 a	1.2 a	0.2 a	0.1 a	3.9 c	2.6 a
Mr. Stripey	0.0 a	0.0 a	0.1 a	0.0 a	0.2 a	21.9 b	0.1 b
Black	0.0 a	0.1 a	0.8 a	0.1 a	0.4 a	40.3 a	0.0 b

* Values followed by the same letter(s) are not significantly different from one another via mean separation by Duncan's Multiple Range Test ($p \leq 0.5$).