

# Yield and Income of Fall Staked Tomato Cultivars in Eastern Kentucky

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## Introduction

Kentucky growers produce approximately 1,200 acres of staked, vine-ripe tomatoes for local and national sales. Kentucky tomatoes have an excellent reputation for quality among produce buyers. This trial evaluated new and existing cultivars to identify those that might produce well as late-season (fall) tomatoes with heat tolerance and resistance to various disease problems. Cultivars were evaluated for yield, appearance, and potential return to growers. We wanted to see which tomato cultivars would produce good yields of attractive fruit acceptable to the industry.

## Materials and Methods

Thirteen market, red-fruited tomato cultivars were evaluated at Quicksand, Kentucky (Table 1). According to soil test results, the plot received 20 lbs.  $P_2O_5$ , and 50 lbs. N/A preplant (Table 2). An additional 75 lbs. of N/A was applied through the drip irrigation lines during the growing season. Pest control was based on recommendations from ID-36, *Vegetable Production Guide for Commercial Growers*. Fungicides were applied weekly and insecticides, as needed.

Trays were seeded in the greenhouse at Quicksand on May 2. Black plastic mulch and drip tape were laid on June 26 and tomatoes were transplanted the next day. Cultivars were replicated four times with six plants per replication. Plants were spaced 18 inches within rows. Rows (bed centers) were 7 feet apart to allow the sprayer to be driven between beds.

Eight harvests were made during this trial. The tomato cultivars were harvested when the fruit was at the breaker stage. Data collected included: grade, weight, and count for jumbo and extra large (>3.5 in.), large (>2.5, <3.5 in.), No. 2, mediums (<2.5, >2.0 in), and cull tomatoes. Reasons for culling included catfacing, concentric or radial cracks, disease, scars, and blotchy ripening. Incomes were calculated based on the prices received by growers for staked tomatoes at the Lincoln County Produce Auction in 2007 (Table 3).

## Results and Discussion

The 2007 growing season was drier and much warmer than normal. Rainfall totals for June through September were: 1.95, 4.00, 2.41, and 2.49 inches for a total of 10.85 inches. Through September 21, 2007, Quicksand had a 12.5-inch deficit. Extreme heat and other weather-related problems may have increased the incidence of blotchy ripening in the last three harvests. Despite hot, dry weather, bacterial speck was present in the planting

Mt. Fresh Plus had the highest fall total marketable yield and income, but it was not significantly different from Scarlet Red or Nico in total marketable fruit or income (Table 4). Mt. Fresh Plus and Crista were not significantly different in marketable yield but Mt. Fresh Plus did have a significantly higher income. Six of the 12 large-fruited red tomatoes, Nico, Mt Fresh Plus, Scarlet Red, Crista, Solar Fire, and Talladega produced the greatest number of boxes of jumbo

and extra large tomatoes. While Amelia had the highest percentage (15.7%) of cull tomatoes, it was not significantly higher than the other cultivars (Table 4). Talladega, Redline, and Solar Fire produced the most No. 2 tomato fruit. Looking at the prices received for fall tomatoes in Table 3 it can be seen that cultivars that produced a lot of fruit later in the season (Sept 19, 26, and October 4), when prices were higher, would have been favored in the income produced. Redline, Scarlet Red, Solar Fire, and Talladega had the largest fruit size (Table 5). There was a significant difference in the percentage of jumbo/extra large tomatoes. Redline and Scarlet Red produced significantly more jumbo and extra large fruit than seven of the other large fruited cultivars.

Tomato plants were rated visually for severity of bacterial speck and blotchy ripening disorder. Based on visual ratings of the 13 cultivars (Table 6), Plum Crimson, Mt. Glory and Red Defender had the highest disease ratings. Mt. Fresh Plus and Nico had the lowest ratings. For some reason the stem end scars on Amelia and Talladega were large and rough looking. Most of the cultivars showed some blotchy ripening on the next to the last two harvests.

Growers should use caution when selecting any vegetable cultivar based on one year's results at a single location.

**Table 1.** *Tomato cultivars, descriptions, and reported disease resistance, grown at Quicksand and Lexington, Ky., 2007.*

Variety Name (Company)	Comments/Description <sup>1</sup>
1. Plum Crimson (HM)	Determinate, 80-day high yield saladette. Resistance to FW 1, 2, 3; VW.
2. Nico (HM)	Determinate, mid-maturity, dark red fruit. Resistance to VD, FW 1,2; ASC, Nt, TSWV.
3. Red Defender [HMX 5825] (HM)	Determinate, mid-maturity, dark red fruit. Resistance to VD, FW 1,2; ASC, TSWV.
4. Mt. Fresh Plus (HM)	Determinate, red, 78 days, Resistance to FW 1,2; Nt, Vd.
5. Scarlet Red (HM)	Determinate, 73 days, extra lg., red fruit, Resistance to VW 1, FW 1, 2; GLS, ASC.
6. Crista [NC 0256] (HM)	Determinate, red, 75 days, Resistance to FW 1 1,2,3; VD, TSWV, Nt.
7. Amelia VR (HM)	Determinate, red, 80 days, Resistance to FW 1,2; TSWV, Nt, Vd, ST.
8. Solar Fire (SW, HM)	Heat set, 73 days, determinate compact plant, red fruit. Resistance to FW 1, 2, 3; VW 1, ST.
9. Mt Glory [NC 0392] (ST)	Determinate, large, red-fruited Mt. Spring type. Resistance to FW1,2; VW 1,2,3 ST, TSWV (tol.).

<sup>1</sup>VW 1=Verticillium wilt 1, 2, 3; FW 1=Fusarium wilt R1; FW2=Fusarium wilt R2; GLS=gray leaf spot; Nt=nematode tolerant; ASC=Alternaria stem canker tolerant; ST=Stemphylium tolerant; 9=Fusarium wilt R3; TSWV=Tomato Spotted Wilt Virus ED=early blight tolerant; VD=Verticillium dahliae; BW=bacterial wilt, BSR=bacterial speck resistant.

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**Table 1** (continued)

Variety Name (Company)	Comments/Description <sup>1</sup>
10. Finishline [RFT 4974] (ST)	Determinate for extra lg. green harvest. Resistance to FW 1, 2, 3; VW; ST; TSWV.
11. Redline (ST)	Determinate, L-XL red fruit. Resistance to TSWV, FW 1, 2, 3.
12. Talladega (ST)	Heat set, 76 days, determinate, vigorous plts, XL red fruit. Resistance to: FW 1, 2, ST, TSWV, VW.
13. Florida 7514 (RU)	Determinate, 75 days, lg. red fruit. Resistance to BW, FW 1, 2; . ST, BSR, VW, BSR.

<sup>1</sup>VW 1-Verticillium Wilt 1, 2, 3; FW FW 1 -Fusarium Wilt R1, FW2 -Fusarium Wilt R2, GLS- Gray Leaf Spot, Nt-Nematode tolerant, ASC-Alternaria Stem Canker Tolerant, ST-Stemphylium Tolerant, 9-Fusarium Wilt R3, TSWV- Tomato Spotted Wilt Virus- TSWV, ED-Early Blight Tolerant. VD- Verticillium dahliae, BW - Bacterial Wilt, BSR- Bacterial speck resistant.

**Table 2.** Results from soil test at Quicksand, Ky., 2007.

pH	Buffer pH	P	K	Ca	Mg	Zn
6.25	6.8	70	473	3,311	415	6.5

**Table 3.** Prices used to calculate incomes — average farm gate prices paid at the Lincoln County Produce Auction in 2007<sup>1</sup>.

Week	Price per 25-Pound Box
Aug 21 <sup>st</sup>	\$6.31
Aug 27 <sup>th</sup>	\$5.39
Aug 30 <sup>th</sup>	\$5.39
Sept 5 <sup>th</sup>	\$5.39
Sept 12 <sup>th</sup>	\$5.36
Sept 19 <sup>th</sup>	\$7.33
Sept 26 <sup>th</sup>	\$11.17
Oct 4 <sup>th</sup>	\$11.59

<sup>1</sup>Yields for extra large and jumbo grades were multiplied by these prices for the appropriate harvest dates to calculate “income per acre” for each cultivar.

**Table 4.** 2007 fall fresh market tomato yields at Quicksand, Ky., 2007. Data are means of four replications.

Cultivar	Jumbo & Extra Large (boxes/acre) <sup>3</sup>		Pounds Extra Large <sup>3</sup>		Total Marketable Yield (lbs.) <sup>1,3</sup>		Income (\$)		Pounds No. 2 Tomatoes <sup>3</sup>		Percent Culls <sup>2,3</sup>	
Mt. Fresh Plus	2,270	AB	40,236	AB	62,232	A	20,202	A	3,978	DE	10.1	A
Scarlet Red	2,242	AB	33,815	BC	57,557	AB	17,723	AB	6,444	BCD	8.9	A
Nico	2,290	A	41,733	A	61,466	A	17,025	ABC	6,705	BCD	9.6	A
Crista	1,913	ABC	35,254	ABC	51,335	ABC	15,741	BC	4,258	D	6.3	A
Solar Fire	1,881	ABCD	36,817	ABC	48,881	BC	14,325	BCD	9,345	AB	11.4	A
Mt. Glory [NC 0392]	1,811	CD	36,576	ABC	49,021	BC	14,257	BCD	4,686	D	9.6	A
Redline	1,860	BCD	31,287	C	47,640	BC	14,194	BCD	8,517	ABC	12.5	A
Amelia	1,530	CD	30,385	C	41,243	C	14,125	BCD	6,868	BCD	15.7	A
Talladega	1,906	ABC	35,526	ABC	49,390	BC	13,929	BCD	11,200	A	13.9	A
Finishline [RFT 4974]	1,766	CD	31,497	C	46,194	C	13,755	BCD	6,747	BCD	11.3	A
Red Defender [HMX 5825]	1,495	D	31,264	C	41,943	C	13,370	DC	5,172	CD	7.3	A
Florida 7514	1,579	CD	35,137	ABC	44,140	C	11,076	DE	5,095	CD	12.0	A
Plum Crimson	12.4	E	311	D	28,934	D	8,707	E	350	E	15.2	A
Minimum Significant Difference (MSD 5%)	410.3		6,703.2		10,994		4,088.6		3,654		10.4	

<sup>1</sup>Includes all grades except culls.

<sup>2</sup>A small amount of blotchy ripening was seen in some cultivars during the last three harvests in September and October.

<sup>3</sup>Means within a column followed by the same letter are not significantly different as determined by MSD (5%).

**Table 5.** 2007 Fall tomato cultivar trial, average fruit weight and percentage of jumbo and extra large fruit, Quicksand, KY.

Cultivar	Avg. Fruit Wt. (oz)		% Fruit Jumbo and Extra Large	
Redline	10.29	A	97.64	A
Scarlet Red	9.92	AB	97.54	A
Solar Fire	9.72	ABC	96.31	ABC
Talladega	9.38	ABCD	96.48	AB
Finishline [RFT 4974]	9.23	BCDE	95.41	ABCD
Crista	9.08	BCDE	93.07	BCDE
Nico)	8.92	BCDEF	93.11	BCDE
Mt. Fresh Plus	8.86	CDEF	90.35	E
Amelia	8.46	DEF	92.32	CDE
Mt. Glory [NC 0392]	8.28	EF	92.15	DE
Red Defender [HMX 5825]	7.99	F	89.13	E
Florida 7514	7.96	F	89.81	E
Plum Crimson	3.96	G	1.05	F
Minimum Significant Difference (MSD 5%)	1.0155		4.1216	

**Table 6.** Bacterial speck severity ratings on tomato plant appearance from Quicksand, Ky., 2007.

Cultivar	Visual Rating <sup>1</sup>				Average	Comments (Quicksand <sup>2</sup> )
	Quicksand					
	R1	R2	R3	R4		
Redline	2	2.5	1.5	3	2.25	Some blotchy ripening late in season.
Scarlet Red	3	3.5	3	3	3.13	Pretty tomato.
Solar Fire	3	2	2	2	2.25	Slight blotchy ripening late, some ugly fruit following a rain shower.
Talladega	3	2.5	3	4	3.13	Big stem scars.
Finishline [RFT 4974]	3	1.5	3	3	2.63	Some blotchy ripening late in season.
Crista	2	3.5	4	4	3.38	Pretty tomato.

<sup>1</sup>1=no infection, 5=severe infection (100 %). Rated on October 4, 2007.

<sup>2</sup>BR/YSD=blotchy ripening or yellow shoulder disorder present in several late harvests.

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**Table 6** (continued)

Cultivar	Visual Rating <sup>1</sup>				Average	Comments (Quicksand <sup>2</sup> )
	Quicksand					
	R1	R2	R3	R4		
Nico	2.5	1.5	2	2	2.0	Some blotchy ripening late in season.
Mt. Fresh Plus	1.5	1	1.5	1.5	1.4	Slight blotchy ripening late.
Amelia	3	4	2.5	3	3.13	Ugly stem scars.
Mt. Glory [NC 0392]	2.5	3.5	4	3.5	3.38	Pretty tomato.
Red Defender [HMX 5825]	2	4	3	4	3.25	Pretty tomato.
Florida 7514	1	3	3	2.5	2.38	Blotchy ripening late in season.
Plum Crimson	3.5	3.5	4	4.5	3.88	Fruit slightly smaller than spring crop.

<sup>1</sup>1=no infection, 5=severe infection (100 %). Rated on October 4, 2007.

<sup>2</sup>BR/YSD=blotchy ripening or yellow shoulder disorder present in several late harvests.