

Determination of consumer preferences among tomato cultivars grown in hoop houses

Heather Bryant, Christina Howard, Mary Ellen Camire, and Mark Hutton
University of Maine

Abstract/Introduction

Some tomato growers in Maine and the Northeast use un-heated greenhouses or hoop houses to extend the short growing season and provide the tomatoes with more heat. However, most tomato cultivars have been bred for either greenhouse or open field production. Which cultivars then should growers choose?

The objective of this trial was to test 15 cultivars of greenhouse and open field tomatoes to identify the best performers in hoop houses in terms of yield, quality, and disease. Results showed that both open field and greenhouse cultivars produced similar and acceptable yields of high quality marketable fruit with minimal disease problems.

There were some differences between individual cultivars. ‘Arbason’ and ‘First Lady II’ were the best yielding cultivars, but they scored in the middle of the group in fruit quality and plant health. ‘Jet Star’ scored well in fruit quality, but poorly in yields. Overall, the top performers were ‘Mr. Ugly’, ‘Big Beef’, ‘Brilliante’, ‘First Lady II’, and ‘Arbason’.

Methods and Materials

Fifteen tomato cultivars (Table 1) were grown in a 26’ X 95’ hoop house at the University of Maine’s Highmoor Farm in Monmouth. Four, 75’ long rows of raised beds covered with plastic mulch were established in the house, and each row served as a replication. Plants were spaced 1’ apart along the rows. The rows were divided into 15 plots, and each variety was randomly assigned one of the 15 plots. In total 300 seedlings were planted and each one had 6.5 square feet of space in which to grow.

The plants were started in the greenhouse on April 17, 2007 and transplanted to the hoop house on May 29th. All plants were trellised and pruned to one main stem. Plants that exceeded 7’ in height were topped. The fruit were harvested at the red ripe stage beginning on August 6th and continuing until October 11th. Fruit were sorted into two marketable categories, A (premium), and B (small or slightly blemished) and one unmarketable category, C (cull). Fruit in each category were counted and weighed, and observations on disease and other problems were made. Samples of each cultivar were sent to the University of Maine Food Science Center for sensory analysis. The data was used to rank each cultivar’s performance in yields, quality, and plant health. A ranking of 1 signifies the variety that performed the best in the category, 15 signifies the worst performance.

Prior to planting soil tests were taken and 25 pounds of 10-10-10 granular fertilizer applied according to recommendations. Plants were watered as needed with 17-5-17 3CA-1Mg neutral water soluble fertilizer calibrated to provide 125 ppm N.

Results and Discussion

The tomatoes grew well throughout the season with 1,347 kg or 2,964 lbs of marketable fruit harvested. In fact overall this seasons yields were 50% higher than they were in 2005 when a similar trial was undertaken. There are two possible explanations for this. First several poor performers from 2005 were replaced with different cultivars in 2007, some of which performed well. Additionally, in 2007 the seedlings were planted into the hoop house 2 weeks earlier than they were in 2005.

Some significant differences were found in yields between the 15 cultivars. ‘Arbason’ and ‘First Lady II’ produced the highest yields of marketable fruit, although ‘Arbason’ produced the highest yields of grade A fruit, and much fewer grade B’s, while ‘First Lady II’ produced a high yield of grade B fruit but fewer grade A’s. ‘Buffalo’, ‘Dundee’ and ‘Trust’ were the poorest performers in terms of marketable yields. See Table 1.

Table 1. Marketable Yields Of Hoop House Grown Tomatoes In 2007, Highmoor Farm, Monmouth, ME.

Variety	Supplier ^z	Type ^x	Mean Wt of A's (kg) ^w	Ave size A's (kg)	Mean Wt of B's (kg) ^w	Ave size B's (kg)	Mean Wt of Mkt fruit (kg) ^w
Arbason	Johnny's	GH	20.9	0.272	10.0	0.237	30.8
First Lady II	Johnny's	OF	11.2	0.239	15.4	0.203	26.6
Mr. Ugly	Seedway	OF & GH	19.4	0.347	6.5	0.226	25.9
Geronimo	Stokes	GH	9.3	0.252	16.2	0.200	25.5
Cobra	Stokes	GH	16.2	0.295	8.3	0.250	24.5
Big Beef	Johnny's	OF	17.4	0.353	6.3	0.304	23.7
Brilliante	Stokes	OF	16.3	0.245	7.1	0.177	23.4
Zapata	Seedway	GH	13.8	0.277	8.5	0.259	22.3
Ultra Boy	Stokes	OF	9.0	0.284	13.2	0.238	22.2
Betterboy	Harris	OF	9.5	0.325	12.0	0.291	21.5
Ultra Sweet	Stokes	OF	13.7	0.315	7.6	0.207	21.3
Jet Star	Harris	OF	14.8	0.344	6.0	0.265	20.7
Trust	Johnny's	GH	10.1	0.307	9.0	0.263	19.2
Dundee	Stokes	GH	9.6	0.309	5.1	0.253	14.7
Buffalo	Johnny's	GH	9.0	0.297	5.6	0.230	14.6

LSD =
4.249

LSD =
2.766

LSD =
4.449

^z Harris Seeds (355 Paul Road; P.O. Box 24966; Rochester, NY 14624-0966),
Johnny's Seeds (955 Benton Avenue; Winslow, ME

04901-2601), Seedway (99 Industrial Road; Elizabethtown, PA 17022), Stokes
(Box 548; Buffalo, NY 14240-0548)

^x GH – greenhouse, OF – open field

^w LSD = data in this column must differ by this much to be considered statistically different

Table 2 below shows the results of the rankings for quality, yield and plant health. Rankings for quality were determined based on the percentages of the harvest that fell into each of the three grades. Plant health rankings were determined by counting the number of incidences of fruit or plant disease per plot. The top five overall performers in the study were ‘Mr. Ugly’, ‘Big Beef’, ‘Brilliante’, ‘First Lady II’, and ‘Arbason’. Table 3 shown below provides a brief description of each variety grown in the trial

Table 2. Yield, Quality and Plant Health Rankings for 15 Tomato Cultivars Grown in a Hoop House at Highmoor Farm, Monmouth, ME, 2007

Variety	Type	Quality A	Yield B	Plant Health C	Raw Total A+2B+C	Final Ranking
Mr. Ugly	GH and OF	1	3	1	8	1
Big Beef	OF	4	6	2	18	2
Brilliante	GH	2	7	2	18	2
First Lady II	OF	9	2	5	18	2
Arbason	GH	5	1	12	19	5
Cobra	GH	6	5	8	24	6
Geronimo	GH	15	4	7	30	7
Jet Star	OF	3	12	6	33	8
Zapata	GH	8	8	13	37	9
Ultra Sweet	OF	7	11	8	37	9
Betterboy	OF	12	10	8	40	11
Buffalo	GH	9	15	4	43	12
Ultra Boy	OF	14	9	14	46	13
Trust	GH	13	13	11	50	14
Dundee	GH	11	14	15	54	15

Table 3. Brief Descriptions of Tomato Cultivars Evaluated at Highmoor Farm in 2007.

Variety	Shape	Color	Firmness	Uniformity	Comments
Arbasson	flat round	glossy dark	firm	uniform	large vigorous plant
Betterboy	tall round	not good, not bad	soft	fairly uniform	cracking
Big Beef	flat round to round	glossy dark red	medium firm	variable	some with high shoulders, some cracking
Brilliante	round to tall round	dark red, not too glossy	firm	very uniform	shows more stink bug damage than other cultivars
Buffalo	variable	deep red	soft	variable	
Cobra	round	med red, slight orange	soft	variable	some yellow shoulder, some cracking, picks easily
Dundee	tall round	pale	hard	uniform	poor yields
First Lady II	rough	glossy medium red, sparkly	firm	fairly uniform	some green shoulder
Geronimo	flat round	orange red	firm	uniform	a lot of cracking, high shoulders, large vigorous plant
Jet Star	mostly deep round	orange/red glossy	soft	variable	some grey wall, slight cracking, slightly rough
Mr. Ugly	flat, ribbed with high shoulders	deep red	medium firm	variable	crew favorite, lg blossom scar, late season fruit developed some hollow centers
Trust	tall round	light	fair	uniform	few splitting fruit, green shoulder
Ultra Boy	round to flat round	good color red/orange	soft	variable	some cracking at stem end, most have green/yellow shoulder, weak plants with yellowed leaves
Ultra Sweet	slightly rough, raised shoulders	uniform red with slight orange tint	soft	variable	very little yellow shoulder, weak plants with yellowed leaves
Zapata	round	slightly orange	firm	uniform	some cracking, no shouldering

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