

## APPENDIX A.5

# 2002 NEW JERSEY LARGE ROUND HEIRLOOM TOMATO OBSERVATION TRIAL RESULTS<sup>1</sup>

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## INTRODUCTION

Heirloom tomatoes are an expanding niche in the produce industry. Growers are trying to determine which heirlooms consumers prefer, but there are several hundred possibilities. Yields, plant and fruit characteristics vary widely among the different varieties and heirlooms need special post harvest handling. The tomato program enhancement grant is evaluating heirloom tomatoes to help growers make determinations as to which varieties have acceptable horticultural characteristics for New Jersey conditions. This report is one of five from 2002.

## MATERIALS AND METHODS

### Culture

Seeds were sown on April 15 in 200 cell trays and transplanted into 48 cell trays. The media contained peat-vermiculite media formulated for tomato transplant production at Snyder Research and Extension Farm on May 10. Plants were transferred to the Rutgers Agricultural Research and Extension Center (RAREC) and maintained in the greenhouse until one week before transplanting when they were placed in an outside protected area to harden off. Beds on 5-ft centers were formed and black plastic mulch with drip irrigation tube was laid. Plants were set in the field on May 26 by hand in single rows with 24 inches between plants. Plants were staked with 8 ft. tomato stakes with one stake between every two plants. Tomato string was used to hold the plants on the stakes. The first string was placed at 6 inches off the ground and the rest of the strings (5 – 7) were placed at 8 – 12 inch intervals.

Before bed making, a pre-plant fertilizer was applied at 60-lbs/A nitrogen as calcium nitrate. All additional fertilizer was applied through the drip system four times during the growing season with Peters 20-20-20 at a rate of 62 lbs/A of nitrogen (N), phosphorus (P<sub>2</sub>O<sub>5</sub>), and potassium (K<sub>2</sub>O) for three applications and 1 application at the rate of 30 lbs/A for total nutrients of 216 lbs/A of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O per mulched acre. A total of three-pounds boron was applied with the other nutrients through the drip system.

The herbicide *Napropamide* (Devrinol 50DF - 3 lbs/A) was applied broadcast prior to bedding. This was followed with *metolachlor* (Dual Magnum II - 1.9 oz/A) and *paraquat* (Gramoxone Extra - 0.25 pts/A) between the beds after the plastic was laid. Insects and diseases were controlled using Rutgers commercial recommendations for tomatoes. *Imidacloprid* (Admire - 3ml/flat) was applied as a drench to the seedling flats before transplanting in enough water to saturate the growing media without draining off. The following materials were applied to the

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foliage with an air blast sprayer: *Avermectin-B* (Agri-mek 0,15EC – 8 oz/A), *azoxystrobin* (Quadris - 6 oz/A) and *lambda-cyhalothrin* (Warrior – 4 oz/A) – August 23 and *cyfluthrin* (Baythroid 2 – 2.8 oz/A) and *chlorothalonil* (Bravo Weather Stik – 3.0 pt/A) – August 27.

Overall, the temperature throughout the growing season was warm and dry. With the monthly high average temperatures of 67, 76, 82, 87, 96, 80 and 64 degrees fahrenheit for months April, May, June, July, August, September and October, respectively. With the monthly low average temperatures of 45, 51, 62, 66, 66, 58 and 48 degrees fahrenheit for months April, May, June, July, August, September and October, respectively. The monthly rainfall (in inches) for April, May, June, July, August, September and October was; 3.32, 3.86, 6.10, 2.08, 2.96, 2.53 and 5.78, respectively for a season total of 26.63 inches. Tensiometers were placed in each replication at the 12-inch depth to schedule supplemental irrigation.

### Experimental Design, Harvesting and Evaluation

The cultivars were arranged in a randomized complete block design with four plants per plot and two replications. Tomatoes were hand harvested on July 26, August 1, 9, 15, 24, 30, September 6, 12, 19, 25 and October 7. Fruits were graded into marketable and culls; both were counted and weighed. Culls were further divided by the type of defect (blossom end rot, insect damage, green shoulder, cat facing, zipper, rot, small, misshapen; radial, concentric, and transversal cracks; sunburn, rain checking and miscellaneous) and counted.

At the seventh harvest, five fruit was randomly selected from marketable fruit for each replication to evaluate internal and external fruit characteristics. Data was collected on vine vigor, fruit cover and plant height on October 25. Data were statistically analyzed using ANOVA and compared with Least Significant Difference (LSD) Test at the 5% level. All yield data is recorded in 25 lb boxes.

The cultivars and seed sources are listed in table 1 followed by the key for fruit characteristics in table 2 and plant characteristics in table 3.

**Table 1- Seed Source** (Table continues on next page)

Cultivar	Source
Aunt Ginny's	Tomato Grower's Seed Co.
Bisigano	Chuck Wyatt's Heirloom Tomatoes
Black Krim	Cook's Garden
Black Russian	Scheepers Kitchen Garden Seeds
Box Car Willie	Tomato Grower's Seed Co.
Brandy Boy	Burpee's Seed
Brandywine	Totally Tomatoes
Brandywine OTV	Tomato Grower's Seed Co.
Brandywine (Power's Strain)	Marianna's Heirloom
Brandywine Yellow (Platfoot Strain)	Tomato Grower's Seed Co.
Brandywine Red (Landis Valley Strain)	Tomato Grower's Seed Co.
Brandywine (Suddath Strain)	Chuck Wyatt's Heirloom Tomatoes
Briana	Chuck Wyatt's Heirloom Tomatoes
Carbon	Tomato Grower's Seed Co.

Cultivar	Source
Caspian Pink	Totally Tomatoes
Chianti Rose	Renne's Garden
Druzba	Totally Tomatoes
Goldie	Tomato Grower's Seed Co.
Great White	Tomato Grower's Seed Co.
Italian Sweet	Tomato Grower's Seed Co.
Mariglobe	Totally Tomatoes
Mexico	Tomato Grower's Seed Co.
Mortgage Lifter	Burpee's Seeds
Mule Team	Tomato Grower's Seed Co.
Olena Ukrainian	Tomato Grower's Seed Co.
Oxacan Jewel	Marianna's Heirloom
Polish C-Regular Leaf	Chuck Wyatt's Heirloom Tomatoes
Pruden's Purple	Tomato Grower's Seed Co.
Ramapo	Dr. Steve Garrison
Red Penna	Chuck Wyatt's Heirloom Tomatoes
Sainte Lucie	Tomato Grower's Seed Co.
Santa Clara Canner	Tomato Grower's Seed Co.
Yellow Stuffer	Tomato Grower's Seed Co.
Zapotec Pink Ribbed	Tomato Grower's Seed Co.

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**Table 2 Fruit Characteristics Key** (Table continues on next page)

**Shape:**

- 1- Beef Steak
- 2- Flattened Globe
- 3- Round
- 4- Blocky
- 5- Long Blocky
- 6- Very Deep-Round Oval
- 7- Pear
- 8- Plum
- 9- Oxheart
- 10- Bell
- 11- Flat
- 12- Elongated Oxheart

**Stem Scar:**

- 1- Small
- 2- Small/Medium
- 3- Medium
- 4- Medium/Large
- 5- Large

**External Color:**

- 1- White
- 2- Green
- 3- Light Yellow
- 4- Yellow
- 5- Dark Yellow
- 6- Orange Yellow
- 7- Orange
- 8- Red Orange
- 9- Red
- 10- Light Pink
- 11- Pink
- 12- Dark Pink
- 13- Purple
- 14- Black
- 15- Mahogany
- 16- Red Mahogany
- 17- Orange Mahogany

**Firmness:**

- 1- Firm
- 2- Medium / Firm
- 3- Medium
- 4- Medium / Soft
- 5- Soft

**Blossom Scar:**

- 1- Small
- 2- Small / Medium
- 3- Medium
- 4- Medium / Large
- 5- Large

**Internal Flesh Color:**

- 1- Red
- 2- Yellow / Red
- 3- Yellow
- 4- Yellow / Green
- 5- Green

(Table continues from previous page)

**Jelly Color:**

- 1- Red
- 2- Yellow / Red
- 3- Yellow
- 4- Yellow / Green
- 5- Green

**Core Size:**

- 1- Small
- 2- Small / Medium
- 3- Medium
- 4- Medium / Large
- 5- Large

**Overall External:**

- 1- Excellent
- 2- Very Good
- 3- Good / Average
- 4- Fair
- 5- Poor

**Overall Internal:**

- 1- Excellent
- 2- Very Good
- 3- Good / Average
- 4- Fair
- 5- Poor

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**Table 3. Field Observations Key**

**Plant Color:**

- 1- Dark Green
- 2- Green
- 3- Light Green

**Plant Vigor:**

- 1- Excellent
- 2- Very Good
- 3- Good / Average
- 4- Fair
- 5- Poor

**Fruit Cover:**

- 1- Excellent
- 2- Very Good
- 3- Good / Average
- 4- Fair
- 5- Poor

**Stem Attachment:**

- 1- Jointed
- 2- Jointless

**Leaf Type:**

- 1- Regular
- 2- Regular / Narrow
- 3- Regular / Curled
- 4- Regular / Fuzzy
- 5- Potato

**Vine Size:**

- 1- Small
- 2- Small / Medium
- 3- Medium
- 4- Medium / Large
- 5- Large

## RESULTS AND DISCUSSION

Table 4 summarizes the yield components and market fruit size for the early (1, 2 and 3) harvest period. All cultivars were ready to harvest 61 days after transplanting except 'Brandywine' (67 days), 'Black Krim' (67 days), 'Box Car Willie' (67 days), 'Brandywine – Power's Strain' (67 days), 'Brandywine – Suddath Strain' (67 days), 'Briana' (75 days), 'Great White' (67 days), 'Mule train' (67 days), 'Olena Ukrainian' (67 days), 'Oxacan Jewel' (75 days), 'Polish C-Regular Leaf' (67 days), 'Pruden's purple' (75 days), 'Ramapo' (67 days), 'Red Penna' (67 days), 'Sainte Lucie' (67 days) and 'Yellow Stuffer' (67 days). Early total yields ranged from 48 to 676 boxes per acre. The cultivar 'Brandywine – Power's Strain' had the highest yield, but was not statistically different from seven other cultivars. 'Yellow Stuffer' had the lowest yield, but was not significantly different from nineteen other cultivars. This demonstrates variability among the cultivars. 'Mortgage Lifter', had the most marketable fruit per acre, but did not statistically differ from 'Goldie', 'Carbon' or 'Brandywine'. Five cultivars had no marketable yield. Percentage marketable fruit ranged from 0 to 100%. The cultivar 'Ramapo' had 100% marketable fruit, but did not differ statistically from 'Santa Clara Canner', 'Sainte Lucie' or 'Goldie'. There was no significant difference among the cultivars for marketable fruit size.

The cultivar 'Brandywine – Power's Strain' had statistically more culls than any other cultivar. Only 'Ramapo' had no cull fruit. When the culls were separated by type (data not shown) 'Bisigano' had the most blossom end rot (BER), but statistically did not differ from eight other cultivars. Five cultivars: 'Briana', 'Brandywine – Power's Strain', 'Ramapo', 'Olena Ukrainian' and 'Oxacan Jewel' had no BER. The cultivar 'Bisigano' statistically had more zippered fruit than any other cultivar. Over half of the cultivars had no zippered fruit and remainder had few. Fruit cracking can be a serious problem in heirloom tomatoes especially under wet conditions. Four cultivars ('Brandywine – Power's Strain', 'Brandywine – Suddath Strain', 'Oxacan Jewel' and 'Chianti Rose') had the most radial cracked fruit. Most cultivars had few cracked fruit and twelve had none. All the other cull parameters were not statistically different among the cultivars.

**Table 4. Large round heirloom tomato yield and fruit size for first, second, and third harvest (early) – RAREC Bridgeton, New Jersey - 2002** (table continues on next page)

Cultivar	Days to Harvest	Total Boxes/A	Marketable Boxes/A	Cull Boxes/A	% Marketable	Marketable Fruit Wt. Oz.
Aunt Ginny's	61	191	42	149	26	10.1
Bisigano	61	254	13	241	4	4.8
Black Krim	67	479	159	321	34	6.8
Black Russian	61	368	73	295	21	10.8
Box Car Willie	67	259	88	172	33	6.9
Brandy Boy	61	506	131	375	26	6.9
Brandywine	67	297	183	414	29	15.2
Brandywine OTV	61	101	26	76	27	6.7
Brandywine (Power's Strain)	67	677	24	653	4	8.7
Brandywine Yellow (Platfoot Strain)	61	97	0	97	0	----
Brandywine Red (Landis Valley Strain)	61	55	30	25	50	3.6
Brandywine (Suddath Strain)	67	437	28	409	6	5.1
Briana	75	150	0	150	0	----
Carbon	61	108	189	311	39	10.0
Caspian Pink	61	103	0	103	0	----
Chianti Rose	61	339	108	231	32	8.9
Druzba	61	304	67	237	22	10.4
Goldie	61	514	266	248	56	14.3
Great White	67	374	121	253	35	14.8
Italian Sweet	61	376	20	356	5	3.7
Mariglobe	61	147	36	111	23	6.4
Mexico	61	289	29	260	7	10.6
Mortgage Lifter	61	551	314	237	55	10.5
Mule Team	67	223	126	97	55	12.1
Olena Ukrainian	67	217	43	174	19	12.8
Oxacan Jewel	75	230	11	220	3	3.9
Polish C-Regular Leaf	67	413	92	321	12	11.3

Cultivar	Days to Harvest	Total Boxes/A	Marketable Boxes/A	Cull Boxes/A	% Marketable	Marketable Fruit Wt. Oz.
Pruden's Purple	75	269	108	161	40	11.2
Ramapo	67	108	108	0	100	8.9
Red Penna	67	123	76	46	31	7.0
Sainte Lucie	67	170	117	53	71	10.7
Santa Clara Canner	61	67	51	16	76	9.0
Yellow Stuffer	67	48	0	48	0	----
Zapotec Pink Ribbed	61	116	0	116	0	----
<b>LSD 0.05</b>	-----	<b>251</b>	<b>138</b>	<b>222</b>	<b>44</b>	<b>11.9</b>

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Table 5 summarizes the combined yield and fruit size data for the mid season harvests (4, 5, 6 and 7). The total yield per acre varied between 626 to 2298 boxes/A. 'Brandy Boy' had the highest yield and 'Brandywine Yellow – Platfoot Strain' had the lowest. There were no statistical differences among the cultivars for total or marketable yields. 'Brandywine Yellow – Platfoot Strain' had the lowest yield and 'Mariglobe' the highest. As with the early harvest 'Ramapo' had the highest percentage marketable fruit with 80%, but it was not statistically different from nine other cultivars. 'Mexico' had the largest average fruit size (16.5 oz), but did not differ significantly from fourteen other cultivars. The cultivar with the smallest average fruit sizes was 'Yellow Stuffer'. Fruit size is based on weight which is a disadvantage for 'Yellow Stuffer' since it is a stuffing type tomato which means it is hollow.

Cull fruit yields ranged from 250 to 1505 boxes/A. 'Black Krim' had the most cull fruit of all cultivars, but it was not statistically different from six other cultivars. The cultivar 'Yellow Stuffer' had significantly more blossom end rot (data not shown) than all other cultivars. Three cultivars ('Briana', 'Caspian Pink' and 'Olena Ukrainian') had no blossom end rot. The cultivar 'Brandy Boy' and 'Italian Sweet' had statistically more cat-faced fruit the other cultivars. Unlike with the early harvest, 'Black Krim' had the most radial cracked fruit, but six other cultivars had statistically the same number. 'Zapotec Pink Ribbed' and 'Bisigano' had more concentrically cracked fruit.

**Table 5. Large Round Heirloom yield and fruit size for mid season harvests – RAREC, Bridgeton, New Jersey – 2002** (table continues on next page)

Cultivar	Total Boxes/A	Marketable Boxes/A	Cull Boxes/A	% Marketable	Marketable Fruit Wt. Oz.
Aunt Ginny's	1514	892	621	59	8.2
Bisigano	1243	511	732	39	8.0
Black Krim	1916	411	1505	21	8.6
Black Russian	1422	456	967	32	10.0
Box Car Willie	1258	853	405	61	7.7
Brandy Boy	2299	796	1503	34	11.3
Brandywine	1983	669	1314	32	9.3
Brandywine OTV	921	380	42	42	11.3
Brandywine (Power's Strain)	1564	497	1068	32	12.1
Brandywine Yellow (Platfoot Strain)	626	66	561	11	16.1

Cultivar	Total Boxes/A	Marketable Boxes/A	Cull Boxes/A	% Marketable	Marketable Fruit Wt. Oz.
Brandywine Red (Landis Valley Strain)	1230	796	358	71	5.6
Brandywine (Suddath Strain)	1106	111	995	11	8.8
Briana	1602	645	957	40	13.2
Carbon	1532	382	1151	24	6.3
Caspian Pink	1681	288	1393	17	9.7
Chianti Rose	1206	362	845	32	9.1
Druzba	1045	212	834	17	16.0
Goldie	1716	863	802	48	11.1
Great White	714	168	547	21	9.9
Italian Sweet	2157	1049	1109	49	12.1
Mariglobe	1742	1239	503	71	5.0
Mexico	1036	524	512	50	16.5
Mortgage Lifter	1888	1239	649	63	10.7
Mule Team	1420	965	454	65	8.5
Olena Ukrainian	1842	910	932	50	14.9
Oxacan Jewel	1469	592	878	39	14.8
Polish C-Regular Leaf	1698	806	892	47	15.9
Pruden's Purple	1665	716	949	43	12.0
Ramapo	1457	1207	250	81	7.7
Red Penna	1536	734	802	49	14.2
Sainte Lucie	1727	952	776	56	14.2
Santa Clara Canner	1072	665	408	62	10.1
Yellow Stuffer	1468	1124	344	77	3.8
Zapotec Pink Ribbed	1624	627	997	38	5.9
<b>LSD 0.05</b>	<b>887</b>	<b>715</b>	<b>439</b>	<b>26</b>	<b>5.2</b>

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Table 6 summarizes the combined yield and fruit size data for the late season harvests (8, 9, 10 and 11). There were no statistical differences among the cultivars for total yield. 'Mortgage Lifter' had the highest marketable yield per acre, but it did not differ statistically from five other cultivars. Most other cultivars did not vary statistically from one another. The percentage marketable fruit ranged from 8 to 78%. 'Mortgage Lifter' had the highest percentage marketable fruit, but was not statistically different from fourteen other cultivars. 'Caspian Pink' had the least, but it was not statistically different from twelve others. Fruit size has decreased from the last two harvests. 'Mortgage Lifter' had the largest average fruit size at 12.8 oz/fruit, but four other cultivars were statistically equal ('Polish C-Regular Leaf', 'Mule Team', 'Druzba' and 'Olena Ukrainian'). The cultivar with the smallest average fruit was 'Bisigano'.

'Zapotec Pink Ribbed' and 'Oxacan Jewel' had statistically more cull fruit than the other cultivars. The cultivar 'Brandywine Red – Landis Valley Strain' had the least cull fruit, but it was not statistically different from fourteen other cultivars. When the culls were separated by type (data not shown), 'Yellow Stuffer' had statistically more blossom end rot than any other cultivar. The cultivar 'Mexico' had the second highest number and was different from all others.

'Bisigano' had more zippered fruit than other cultivar. Four cultivars ('Olena Ukrainian', 'Brandywine Red – Landis Valley Strain', 'Mariglobe' and 'Black Krim') had no zippered fruit. The number of fruit with cracks increased in the late harvest period. 'Zapotec Pink Ribbed' statistically had more radial cracked fruit than all other cultivars. The cultivar 'Bisigano' had the least radial cracked fruit, but was not statistically different from most other cultivars. In contrast to radial cracks, 'Bisigano' had statistically more concentric cracks than all other cultivars. Most other cultivars were not significantly different from one another. Rain checking did not become a problem until the end of the harvest season since there was little rain. 'Yellow Stuffer' had statistically more rain checking than all other cultivars. A third of the cultivars had no rain-checked fruit.

**Table 6. Large round heirloom yield and fruit size for late season harvests – RAREC, Bridgeton, New Jersey – 2002** *(Table continues on next page)*

Cultivar	Total Boxes/A	Marketable Boxes/A	Cull Boxes/A	% Marketable	Marketable Fruit Wt. Oz.
Aunt Ginny's	1482	841	641	55	4.8
Bisigano	1347	624	1082	20	2.8
Black Krim	1064	487	577	51	5.5
Black Russian	1072	234	839	21	6.2
Box Car Willie	1691	990	701	55	5.5
Brandy Boy	1162	553	608	49	7.3
Brandywine	1034	387	649	37	6.2
Brandywine OTV	1139	484	654	43	7.1
Brandywine (Power's Strain)	1396	354	1042	23	8.1
Brandywine Yellow (Platfoot Strain)	711	378	334	53	6.1
Brandywine Red (Landis Valley Strain)	940	696	244	74	4.6
Brandywine (Suddath Strain)	976	287	689	30	4.6
Briana	2082	1048	1035	47	8.4
Carbon	498	99	398	20	6.3
Caspian Pink	1088	87	1002	8	7.9
Chianti Rose	875	298	577	32	5.0
Druzba	1531	278	1253	18	5.0
Goldie	1194	547	647	46	9.0
Great White	1142	174	967	16	5.8
Italian Sweet	1224	751	474	59	7.7
Mariglobe	1754	1327	427	76	3.2
Mexico	1252	547	659	44	5.2
Mortgage Lifter	2140	1660	480	78	12.8
Mule Team	1143	602	542	50	10.1
Olena Ukrainian	1214	394	820	33	8.9
Oxacan Jewel	1651	312	1339	19	7.3
Polish C-Regular Leaf	1582	758	825	47	11.6
Pruden's Purple	1449	950	499	64	6.4



Cultivar	Total Boxes/A	Marketable Boxes/A	Cull Boxes/A	% Marketable	Marketable Fruit Wt. Oz.
Ramapo	1324	1025	298	66	5.5
Red Penna	1062	487	575	45	8.4
Sainte Lucie	1030	602	427	59	8.3
Santa Clara Canner	1304	726	578	55	7.2
Yellow Stuffer	1194	750	670	53	2.9
Zapotec Pink Ribbed	1858	174	1685	10	4.5
<b>LSD 0.05</b>	<b>823</b>	<b>730</b>	<b>374</b>	<b>30</b>	<b>4.3</b>

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Table 7 summarizes the combined yield and fruit size data for the total seasonal harvests. The differences in total harvest days were a reflection of starting to harvest later than other cultivars. Total yield varied between 1433 and 4578 boxes/A. 'Mortgage Lifter' had the highest yield, but it was not statistically different from thirteen other cultivars, which ranged from 3272 to 4578 boxes/A. The cultivar 'Brandywine Yellow – Platfoot Strain' had the lowest yield (1433 boxes/A), but nine other cultivars did not differ significantly from it. Three cultivars ('Mortgage Lifter', 'Mariglobe' and 'Ramapo') had statistically the highest yields among the cultivars, but 'Mariglobe' and 'Ramapo' did not differ from thirteen other cultivars. 'Caspian Pink' had the lowest yield, but with the availability in the trial did not differ from twenty other cultivars. The percentage marketable fruit ranged from 13 to 76%. 'Ramapo' had 76% marketable fruit, which would be low for standard commercial cultivars. Eight other cultivars did not statistically differ from 'Ramapo'. Average marketable fruit size ranged from 3.4 to 13.7 ounces. Most of the larger sized fruit also had low percentage of marketable fruit. The exceptions were 'Mortgage Lifter' and 'Sainte Lucie'. Mariglobe had the second lowest average fruit size. 'Polish C-Regular Leaf' had the largest fruit size, but it did not differ from ten other cultivars.

Cull numbers for the total season ranged from 548 boxes/A ('Ramapo') to 2798 boxes/A ('Zapotec Pink Ribbed'). There were eight cultivars which did not differ statistically from 'Ramapo' for least culls ('Brandywine Red - Landis Valley Strain', 'Brandywine Yellow – Platfoot Strain', 'Santa Clara Canner', 'Mariglobe' and 'Yellow Stuffer'). When the culls were separated by type (data not show), 'Yellow Stuffer' statistically had more blossom end rot and rain checking than all other cultivars. Most other cultivars did not differ statistically from one another. The cultivar 'Black Krim' had more cat-faced fruit than all others, but it did not significantly differ from 'Brandy Boy', 'Italian Sweet' or 'Brandywine – Power's Strain'. Only 'Yellow Stuffer' had no cat-faced fruit. The cultivar 'Bisigano' had statistically more zippered, rotted and concentric cracked fruit than all other cultivars. 'Zapotec Pink Ribbed' had the second highest number of concentric cracked fruit and significantly more radial cracked than all other cultivars.

**Table 7. Large round heirloom tomato yield and fruit size for total season harvests – RAREC, Bridgeton, New Jersey – 2002** (Table continues on next page)

Cultivar	Total Harvest Days	Total Boxes/A	Marketable Boxes/A	Cull Boxes/A	% Marketable	Marketable Fruit Wt. Oz.
Aunt Ginny's	74	3187	1776	1411	54	6.2
Bisigano	74	2843	789	2055	28	4.9
Black Krim	68	3459	1056	2403	31	6.7

Cultivar	Total Harvest Days	Total Boxes/A	Marketable Boxes/A	Cull Boxes/A	% Marketable	Marketable Fruit Wt. Oz.
Black Russian	74	2861	1875	2099	26	8.5
Box Car Willie	68	3208	1930	1278	56	6.0
Brandy Boy	68	3966	1480	2486	37	9.5
Brandywine	68	3614	1238	2376	33	8.3
Brandywine OTV	74	2161	889	1272	42	7.2
Brandywine (Power's Strain)	68	3635	874	2762	24	10.3
Brandywine Yellow (Platfoot Strain)	74	1433	443	991	31	6.7
Brandywine Red (Landis Valley Strain)	74	2224	1597	267	72	5.1
Brandywine (Suddath Strain)	68	2519	427	2093	17	5.3
Briana	60	3833	1692	2141	44	10.0
Carbon	74	2530	670	1860	27	6.9
Caspian Pink	74	2871	374	2497	13	8.6
Chianti Rose	74	2420	768	1652	32	5.9
Druzba	74	2878	555	2323	18	10.7
Goldie	74	3422	1675	1748	17	8.3
Great White	74	2229	462	1767	21	11.5
Italian Sweet	74	3757	1820	1938	48	9.8
Mariglobe	74	3643	2602	1042	72	4.9
Mexico	74	2576	1145	1431	44	10.0
Mortgage Lifter	74	4578	3211	1367	70	5.6
Mule Team	68	2785	1693	1093	60	6.7
Olena Ukrainian	68	3272	1347	1926	42	12.3
Oxacan Jewel	60	3350	914	2436	26	10.9
Polish C-Regular Leaf	68	3693	1656	2038	45	13.7
Pruden's Purple	60	3382	1775	1609	52	8.3
Ramapo	68	2888	2340	548	76	6.2
Red Penna	68	3720	1297	1423	48	11.3
Sainte Lucie	68	2926	1671	1256	58	10.7
Santa Clara Canner	74	2442	1441	1001	58	8.3
Yellow Stuffer	68	2936	1875	1062	64	3.4
Zapotec Pink Ribbed	74	3598	800	2798	23	5.4
<b>LSD 0.05</b>	-----	<b>1341</b>	<b>1254</b>	<b>538</b>	<b>21</b>	<b>4.1</b>

(Table continued from previous page)

Table 8 summarizes the fruit characteristics for the seventh harvest from a sample of 5 marketable fruit per replication. Most cultivars were either beefsteak, flattened globe or round shaped. The exceptions were 'Druzba' (oxheart), 'Mariglobe' (blocky) and 'Zapotec Pink Ribbed (Bell)'. Most cultivars had dark pink to red exterior fruit color. Four cultivars ('Brandywine Yellow – Platfoot Strain', 'Goldie', 'Great White' and 'Oxacan Jewel') had some shade of yellow. Fruit firmness is important if growers are to ship these cultivars to the wholesale market. The cultivars which would be too soft are 'Brandywine Red – Landis Valley Strain', 'Druzba', 'Mexico'

and Sainte Lucie'. The firm cultivars and more acceptable to shipping were 'Black Krim', 'Brandywine', 'Mortgage Lifter' and 'Zapotec Pink Ribbed'. Medium/large to large stem or blossom scars may be a detriment to the cultivar depending on the consumer preference. Ten cultivars had both medium/large to large for the stem and blossom end. These cultivars should have other good attributes if they are to be planted by commercial growers. Poor exterior and/or interior fruit appearance may reduce consumer purchase of heirloom tomatoes. Three cultivars ('Carbon', 'Oxacan Jewel' and 'Zapotec Pink Ribbed') had fair to poor appearance for both ratings. Twelve others had fair to poor exterior appearance and three had fair to poor interior appearance. The cultivars with the best ratings for both parameters were 'Mariglobe', 'Mexico', 'Ramapo' and 'Yellow Stuffer'. Most cultivars had red to yellow jelly color. Two cultivars ('Black Krim' and 'Carbon') had green jelly. Black colored fruit seems to have yellow green-to-green jelly color. Flesh color varied from red to yellow/green with most cultivars being red to yellow/red. Large core size is the normal for this group of cultivars. Three cultivars had small/medium cores ('Chianti Rose', 'Goldie' and 'Ramapo').

**Table 8. Large round heirloom tomato fruit characteristics for the seventh harvest – RAREC, Bridgeton, New Jersey – 2002** (Table continues on next page)

Cultivar	Length (in) <sup>1</sup>	Width (in) <sup>1</sup>	L/W <sup>1</sup>	Shape <sup>2</sup>	Ext. Color <sup>2</sup>	Firmness <sup>3</sup>	Stem Scar <sup>4</sup>	Blossom Scar <sup>4</sup>	Overall Ext. <sup>5</sup>	Overall Int. <sup>5</sup>	Jelly Color <sup>6</sup>	Intern. Flesh <sup>6</sup>	Core Size <sup>4</sup>
Aunt Ginny's	2.3	3.2	0.7	2	12	2	5	5	4	3	3	1	3
Bisigano	2.0	2.2	0.9	3	8	3	2	1	5	2	4	2	5
Black Krim	2.1	3.0	0.9	1	12	1	4	5	5	3	5	4	5
Black Russian	2.1	3.0	0.7	2	12	2	3	3	4	3	4	4	4
Box Car Willie	2.1	3.0	0.8	2	9	3	3	2	3	1	3	2	4
Brandy Boy	2.1	3.4	0.7	2	11	3	4	4	3	2	4	2	3
Brandywine	2.3	3.1	0.7	1	10	1	5	5	5	*	*	*	*
Brandywine OTV	2.4	3.3	0.7	2	9	3	4	3	5	1	2	2	5
Brandywine (Power's Strain)	2.2	3.4	0.7	2	10	3	4	*	*	*	*	*	*
Brandywine Yellow (Platfoot Strain)	2.3	3.4	0.7	2	5	2	5	3	3	*	*	*	*
Brandywine Red (Landis Valley Strain)	2.2	2.7	0.8	2	8	4	2	2	1	4	2	3	5
Brandywine (Suddath Strain)	2.0	2.8	0.7	2	11	3	3	3	4	2	4	2	3
Briana	2.4	3.4	0.7	1	11	2	3	5	4	3	3	3	5
Carbon	2.0	2.6	0.8	2	12	3	2	5	5	4	5	4	4
Caspian Pink	2.3	3.1	0.7	1	11	3	5	3	5	3	2	4	5
Chianti Rose	2.3	3.3	0.7	2	11	3	3	3	2	4	4	4	2
Druzba	3.1	2.6	1.2	9	8	4	3	3	5	*	*	*	*
Goldie	2.0	3.0	0.7	1	6	3	5	5	4	1	3	1	2
Great White	2.4	2.9	0.8	3	3	3	4	4	3	*	*	*	*
Italian Sweet	2.5	3.6	0.7	1	11	2	5	3	2	4	2	3	5
Mariglobe	2.0	1.8	1.2	4	8	2	3	1	2	2	2	1	3
Mexico	2.6	3.6	0.7	1	12	4	5	4	2	2	2	2	4
Mortgage Lifter	2.4	3.2	0.7	1	11	1	3	3	2	2	3	2	3

Cultivar	Length (in) <sup>1</sup>	Width (in) <sup>1</sup>	L/W <sup>1</sup>	Shape <sup>2</sup>	Ext. Color <sup>2</sup>	Firmness <sup>3</sup>	Stem Scar <sup>4</sup>	Blossom Scar <sup>4</sup>	Overall Ext. <sup>5</sup>	Overall Int. <sup>5</sup>	Jelly Color <sup>6</sup>	Intern. Flesh <sup>6</sup>	Core Size <sup>4</sup>
Mule Team	2.5	3.3	0.8	1	8	3	5	5	3	3	2	2	5
Olena Ukrainian	2.5	3.2	0.8	1	11	3	5	3	3	2	2	1	4
Oxacan Jewel	2.3	3.0	0.8	1	5	3	4	3	4	4	3	3	5
Polish C-Regular Leaf	2.4	3.5	0.7	1	11	2	5	5	3	2	2	1	5
Pruden's Purple	2.2	3.1	0.7	1	11	3	4	3	3	2	2	2	4
Ramapo	2.4	3.1	0.8	3	8	3	4	2	2	2	2	2	2
Red Penna	2.5	3.3	0.8	2	8	2	4	3	4	2	2	2	4
Sainte Lucie	2.5	3.4	0.7	2	8	4	4	2	3	3	2	1	4
Santa Clara Canner	2.2	3.1	0.7	2	9	3	4	3	3	2	1	1	5
Yellow Stuffer	2.4	2.4	1.0	3	9	3	1	1	2	2	1	1	3
Zapotec Pink Ribbed	2.2	2.9	0.8	10	12	1	4	5	5	4	3	4	4
<b>LSD 0.05</b>	<b>0.3</b>	<b>0.5</b>	<b>0.1</b>	---	---	---	---	---	---	---	---	---	---

<sup>1</sup>Mean 5 of fruit; <sup>2</sup> see table 2; <sup>3</sup> 1=firm, 5=soft; <sup>4</sup> 1=small, 5=large; <sup>5</sup> 1=excellent, 5=poor; <sup>6</sup> 1=red, 5=green

(Table continued from previous page)

Table 9 summarizes the plant characteristics that were done after the last harvest. Two cultivars had light green foliage ('Brandywine – Power's Strain' and Brandywine – Suddath Strain'). The remaining cultivars had green to dark green foliage. All cultivars had good to excellent plant vigor even at the end of the growing season. Most would have continued to produce fruit if there had not been a frost. The plant height ranged from 4.8 to 8.4 feet. All the cultivars would need at least seven-foot stakes except 'Ramapo', which could be planted on a standard tomato stake. Four cultivars had jointless stem attachments ('Olena Ukrainian', 'Oxacan Jewel', 'Polish C-Regular Leaf' and 'Zapotec Pink Ribbed').

**Table 9. Large round heirloom tomato plant characteristics after the last harvest – RAREC, Bridgeton, New Jersey – 2002** (Table continues on next page)

Cultivar	Plant Color <sup>1</sup>	Plant Vigor <sup>2</sup>	Avg. Plant Height (ft) <sup>3</sup>	Fruit Cover <sup>2</sup>	Leaf Type <sup>4</sup>	Vine Size <sup>5</sup>	Stem Attachment <sup>6</sup>
Aunt Ginny's	1	3	6.2	3	1	4	1
Bisigano	1	3	6.9	3	2	5	1
Black Krim	1	3	6.0	3	1	4	1
Black Russian	1	3	5.8	3	1	4	1
Box Car Willie	2	2	6.4	4	1	5	1
Brandy Boy	1	3	6.1	3	3	4	1
Brandywine	2	1	7.0	3	3	5	1
Brandywine OTV	2	1	7.6	2	5	5	1
Brandywine (Power's Strain)	3	2	7.1	3	5	5	1
Brandywine Yellow (Platfoot Strain)	1	1	7.1	2	5	5	1
Brandywine Red (Landis Valley Strain)	2	3	6.1	3	3	4	1
Brandywine (Suddath Strain)	3	1	7.1	3	5	5	1
Briana	2	3	6.3	2	5	5	1
Carbon	2	2	5.8	3	2	3	1

Cultivar	Plant Color <sup>1</sup>	Plant Vigor <sup>2</sup>	Avg. Plant Height (ft) <sup>3</sup>	Fruit Cover <sup>2</sup>	Leaf Type <sup>4</sup>	Vine Size <sup>5</sup>	Stem Attachment <sup>6</sup>
Caspian Pink	1	2	6.5	3	1	4	1
Chianti Rose	2	3	6.5	3	3	4	1
Druzba	2	3	5.9	3	1	4	1
Goldie	2	2	7.2	2	2	5	1
Great White	2	2	7.4	4	1	5	1
Italian Sweet	2	3	7.1	3	5	5	1
Mariglobe	1	2	6.9	3	2	4	1
Mexico	1	1	8.4	2	1	5	1
Mortgage Lifter	2	2	7.3	3	1	5	1
Mule Team	2	3	6.3	2	1	4	1
Olena Ukrainian	1	2	6.7	2	5	5	2
Oxacan Jewel	1	3	5.9	3	2	4	2
Polish C-Regular Leaf	2	2	6.9	3	4	5	2
Pruden's Purple	2	3	6.9	3	5	5	1
Ramapo	2	3	4.8	3	1	4	1
Red Penna	2	2	7.4	2	2	4	1
Sainte Lucie	2	2	6.3	3	1	5	1
Santa Clara Canner	1	2	6.6	2	1	5	1
Yellow Stuffer	1	1	7.0	3	1	4	1
Zapotec Pink Ribbed	2	1	7.8	4	2	4	2
<b>LSD 0.05</b>	---	---	<b>1.1</b>	---	---	---	---

<sup>1</sup> – 1=dark green, 3=light green; <sup>2</sup> – 1=excellent, 5=poor; <sup>3</sup> – mean two plants; <sup>4</sup> – 1=regular, 5=potato; 5 – 1=small, 5=large; <sup>6</sup> – 1=jointed, 2=jointless (Table continued from previous page)

## SUMMARY

Based on yield and fruit characteristics 'Box Car Willie', 'Brandywine Red – Landis Valley Strain', 'Mariglobe', 'Mortgage Lifter' and 'Ramapo' were the best cultivars in the trial. If the grower is looking for unique fruit types 'Yellow Stuffer' and 'Black Krim' should be evaluated.

## NOTES