

## Research Note

### FRESH MARKET TOMATO CULTIVAR TRIALS AT TWO LOCATIONS<sup>1,2</sup>

Octavio Colberg-Rivera<sup>3</sup>, Rubén Vélez-Colón<sup>4</sup>, Carmen Alamo-González<sup>5</sup>  
and Carmela Chao de Báez<sup>6</sup>

J. Agric. Univ. P.R. 80(3):207-210 (1996)

Tomato (*Lycopersicon esculentum*) is one of the most economically important vegetable crops in Puerto Rico. In fiscal year 1991-92 fresh market tomato gross income at farm level was \$11.279 million, representing 40% of the total vegetable gross income (USDA, 1992). Local production (99%) is concentrated on the south coast and is usually harvested from January to April. The average yield from 1988 to 1991 was approximately 56,700 kg per hectare (USDA, 1990; 1992); this yield was 59% higher than Florida's in 1988 (USDA, 1989). The economic potential of tomato for the local and export markets justifies research to improve yield and quality. New fresh market tomato cultivars were evaluated off season to explore the possibility of extending the production until May and June.

Eighteen tomato varieties were transplanted to the field 11 March 1991 (Agricultural Experiment Station at Lajas) and 12 March 1991 (Agricultural Experiment Station at Juana Díaz) in a randomized complete block design with four replications. Each plot consisted of one 6.75-m row. Row spacing was 0.9 m. Fifteen plants were transplanted per plot at a distance of 0.45 m between plants.

A low pressure drip irrigation system and plastic mulch were used. The Lajas trial was planted on a Fraternidad soil, very fine, montmorillonitic, isohyperthermic Udic Chromusterts. The Juana Díaz trial was planted on a San Antón soil, fine-loamy, mixed, isohyperthermic, Cumulic Haplustolls (Gierbolini, 1979). Both trials were fertigated weekly with approximately 6.8 kg of urea, 1.9 L of H<sub>2</sub>PO<sub>4</sub>, 6.8 kg of KNO<sub>3</sub> and 6.8 kg of KCL. Weeds and other pests were controlled according to the recommendations of the 'Conjunto Tecnológico para la Producción de Solanáceas' (Servicio de Extensión Agrícola y Estación Experimental Agrícola, 1992; Irizarry, 1992).

The Lajas trial was harvested four times [55, 72, 79 and 86 days after transplant (DAT)]. The Juana Díaz trial was harvested five times (66, 71, 78, 85 and 92 DAT). Weight and size were measured by using a sample of 25 fruits per plot and a 12.7 × 15.24 cm sizer (samples that size or larger are considered extra large). The results were statistically analyzed, and means were separated by using Duncan's multiple range test.

The cultivars under test behaved significantly differently at the two locations; this finding may be due to differences in edaphic and meteorological conditions during the

<sup>1</sup>Submitted to Editorial Board 21 October 1993.

<sup>2</sup>We thank Ariel Aponte, Technical Aid at Juana Díaz and Pedro Rivera, Former Technical Aid at Lajas.

<sup>3</sup>Former Research Assistant, Department of Horticulture.

<sup>4</sup>Assistant Horticulturist, Department of Horticulture, Agricultural Experiment Station.

<sup>5</sup>Research Assistant, Department of Agricultural Economics.

<sup>6</sup>Researcher, Department of Statistics.

TABLE 1.—Yield and average fruit weight for total and "extra large" marketable fruits of fresh market tomato varieties in trials at Lajas and Juana Díaz.

Cultivar	Seed Company	Lajas			Juana Díaz		
		Yield		Average fruit weight	Yield		Average fruit weight
		Total <sup>2</sup>	Extra large marketable <sup>1,2</sup>		Total <sup>2</sup>	Extra large marketable <sup>1,2</sup>	
		----- t/ha -----		g/fruit	----- t/ha -----		g/fruit
Capitan	Petoseed	987 a	54 f	60 f	668 a	44 d	52 e
Heat Wave	Petoseed	903 ab	120 bcdef	72 bcdef	601 a	92 cd	63 bcd
Sun 984	Sunseeds	874 abc	136 abcde	74 abcde	564 a	151 abc	73 abc
Carnival	Petoseed	873 abc	183 a	85 a	679 a	161 ab	74 abc
Vegas	Northrup King	869 abc	96 ef	70 bcdef	562 a	139 bc	67 abcd
Baja	Northrup King	792 abc	177 ab	80 abc	542 a	192 a	83 a
Pik Rite	Harris Moran	764 abc	167 abcd	80 abc	528 a	178 ab	70 abcd
Castleking	Sunseeds	743 abc	116 def	85 a	482 a	106 cd	61 cd
Royal Flush	Ferry Morse	738 abc	163 abcd	77 abcd	526 a	159 abc	71 abcd
NVH-4459	Northrup King	721 abc	145 abcde	76 abcd	509 a	145 abc	72 abcd
Olimpic	Petoseed	717 abc	177 ab	77 abcd	548 a	147 abc	76 ab
BHN-66	South Coast	701 abc	134 abcde	72 bcdef	575 a	184 ab	73 abc
Whirlaway	Ferry Morse	699 abc	118 cdef	70 bcdef	584 a	120 bc	72 abcd
NVH-4465	Northrup King	675 abc	159 abcd	78 abcd	520 a	174 ab	72 abcd
Viva	Harris Moran	616 abc	107 def	67 cdef	524 a	139 bc	74 abc
Bonita	Northrup King	598 abc	92 ef	62 ef	419 a	147 abc	66 abcd
Castlecrown	Sunseeds	566 bc	140 abcde	71 bcdef	440 a	143 abc	72 abcd
Summit	Sunseeds	501 c	109 def	65 def	478 a	138 bc	72 abcd

<sup>1</sup>Extra large fruits are the ones measuring 12.7 cm × 15.24 cm or more.

<sup>2</sup>Means followed by the same letter are not significantly different at the 0.05 level, using Duncan's Multiple Range Test.

growing season. At Lajas, an average of 741 t/ha of total marketable fruits was produced, with an average fruit weight of 73.4 g. At Juana Díaz, 542 t/ha was produced, with an average fruit weight of 70.2 g.

There were few statistical differences among cultivars for total yield (Table 1). On average, cultivars Carnival, Heat Wave and Capitan excelled at both locations in relation to total yield. Cultivars Castlecrown, Bonita and Summit yielded least. The behavior of cultivars Sun 984 and Whirlaway, among others, was erratic. As for average fruit weight, Capitan produced the lightest fruits.

Some cultivars produced large attractive fruits, even though their total yield might have been comparatively low. To assess this characteristic, we measured the extra large marketable yield (fruits measuring 12.7 × 15.24 cm or more). Baja, Carnival, Pik Rite, Royal Flush and NVH-4465 stood out at both locations (Table 1). Olimpíe also stood out at Lajas, whereas BHN-66 excelled at Juana Díaz.

We evaluated each harvesting date separately to discriminate between early and late producers (Table 2). At Lajas, Carnival and Pik Rite showed the highest percentage of total marketable yield for the first harvesting date, 55 DAT, May 5. For the second harvesting, 72 DAT, May 23, NVH-4465 and Pik Rite led in production. Heat Wave and Viva showed their highest production values at 79 DAT, May 30; Bonita and Sun-984, at the fourth and final harvesting date, 86 DAT, June 6. At Juana Díaz, Capitan, Pik Rite and Castleking showed the highest percentage of total marketable yield for the first harvesting date, 66 DAT, May 17. At 71 DAT, May 23, Carnival and Royal Flush led. Olimpíe

TABLE 2.—Percentage of total marketable yield by harvest at Lajas and Juana Díaz.

Cultivar	Days after planting Lajas				Days after planting Juana Díaz				
	55	72	79	86	66	71	78	85	92
	%	%	%	%	%	%	%	%	%
Sun-984	19	37	22	22	8	19	26	32	15
Summit	9	44	28	19	6	21	37	19	17
Castleking	21	41	30	3	16	33	29	9	13
Viva	10	36	36	18	7	26	32	23	12
Pik Rite	23	48	19	10	16	33	22	19	10
Whirlaway	15	47	30	8	13	33	34	11	9
Royal Flush	18	46	26	10	10	37	27	19	7
NVH 4459	20	38	34	8	15	31	34	12	8
NVH 4465	22	49	18	11	15	34	25	11	15
Baja	17	47	26	10	15	25	30	16	14
Vegas	10	47	31	12	8	27	24	26	15
Bonita	6	42	28	24	9	21	30	20	20
Carnival	27	40	22	11	11	39	33	7	10
Heat Wave	14	28	39	19	15	27	37	12	9
Capitan	16	43	25	16	23	20	31	18	8
Olimpíe	18	40	32	10	5	16	47	24	8
Castlecrown	12	57	22	9	11	26	26	20	17
BHN-66	18	45	25	12	15	20	28	23	14

showed the highest value at 78 DAT, May 30; Sun-984 and Vegas at 85 DAT, June 6; Bonita, Summit and Castlecrown at the fifth and final harvesting date, 92 DAT, June 13.

The results indicate that even when planted out of season some cultivars have a tendency to be early producers, whereas others are mid-season or late. It is possible to have an acceptable harvest in May or June. The results also indicate that some cultivars tend to cluster while some tend to spread throughout the harvesting period.

#### LITERATURE CITED

- Departamento de Agricultura, 1992. Ingreso Bruto Agrícola de Puerto Rico, 1990-91 a 1991-92. Oficina de Estadísticas Agrícolas, Departamento de Agricultura del Estado Libre Asociado de Puerto Rico, Santurce, Puerto Rico.
- Departamento de Agricultura, 1990. Ingreso Bruto Agrícola de Puerto Rico, 1988-89 a 1989-90. Oficina de Estadísticas Agrícolas, Departamento de Agricultura del Estado Libre Asociado de Puerto Rico, Santurce, Puerto Rico.
- Gierbolini, R. E., 1979. Soil Survey of the Ponce Area of Southern Puerto Rico. USDA Soil Conservation Service, in cooperation with the University of Puerto Rico College of Agricultural Sciences.
- Irizarry-Jusino, M., 1992. Recomendaciones para la Siembra Comercial de Hortalizas. Publicación del Servicio de Extensión Agrícola de la Universidad de Puerto Rico, en cooperación con el Departamento de Agricultura de los Estados Unidos.
- Servicio de Extensión Agrícola y Estación Experimental Agrícola, 1992. Conjunto Tecnológico para la Producción de Solanáceas. Recinto Universitario de Mayagüez, Universidad de Puerto Rico.
- USDA, 1989. Preliminary Acreage, Yield and Production of Fresh Market Vegetables. USDA Agricultural Statistics Board, Washington, DC.