

## Research Note

### PRELIMINARY EVALUATION OF COMMERCIAL HYBRIDS AND OPEN POLLINATED EGGPLANT CULTIVARS<sup>1</sup>

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Eggplant (*Solanum melongena*) is a shrubby short-life perennial plant that can be classified on the basis of skin color and fruit shape (Williams et al., 1991). Color groups are pale to light green, red to purple, and black. Fruit shape varies from almost round or egg-shaped to long and thin. Many cultivars are well adapted to lowland tropics and are a summer crop in temperate zones. New hybrids and selected cultivars are usually higher yielding although with less resistance to pests and diseases (Howe and Waters, 1987).

During 1997-98, the gross income of vegetable production in Puerto Rico was \$223.7 million with eggplant contributing \$1.12 million (Departamento de Agricultura, 2000). For 1998-99, the production dropped to 863 t, but the price was kept almost the same (\$660/ t).

The most popular eggplant in Puerto Rico is a local cultivar known as "Rosita," which was developed by the Agricultural Experiment Station for resistance to bacterial wilt (Rico-Ballester and López-García, 1968). Rosita produces a purple egg-shaped fruit. Farmers producing eggplant have their own strains of the Rosita cultivar. Most Rosita strains have a smooth epidermis, pubescent leaves, and an indeterminate growth pattern. According to the Munsell Color Chart (1977), immature fruit color varies from 5 RP/3-4/4-6 to 5 RP/3-7/10. Flower color varies, around 5 RP/8/2. Performance of these strains is not well characterized; thus, yield and quality is highly variable. Great variability exists for growth, yield, and resistance to pests and diseases among other characteristics. For farmers, it is difficult to maintain a steady market because of Rosita's variability in yield, days to maturity, and other horticultural traits. It is important to identify and document the differences among cultivars. The goal of this preliminary research was to establish the basis for a selection program for eggplant well adapted to conditions in Puerto Rico. Eggplant production can be an alternative to diversify agriculture in Puerto Rico. The specific objective of the study was to evaluate and characterize different Rosita strains and compare them with commercial hybrids in terms of yield.

A preliminary cultivar trial was conducted in 1993 at the Lajas and Juana Díaz Substations of the UPR Agricultural Experiment Station. The Lajas trial was conducted on a Fraternidad clay (Typic Haplusterts); the Juana Díaz trial, on a San Antón clay soil (Cumulic Haplustolls). The average minimum monthly temperatures were 16.2 and 20.0°C for Lajas and Juana Díaz, respectively (Figure 1). Maximum mean temperatures were near 30°C for both locations. During the eggplant growing season evaporation exceeded rainfall except in May 1993. The water deficit was more severe at Juana Díaz than at Lajas (Figure 1). To compensate for the soil moisture deficit, microirrigation was applied twice weekly.

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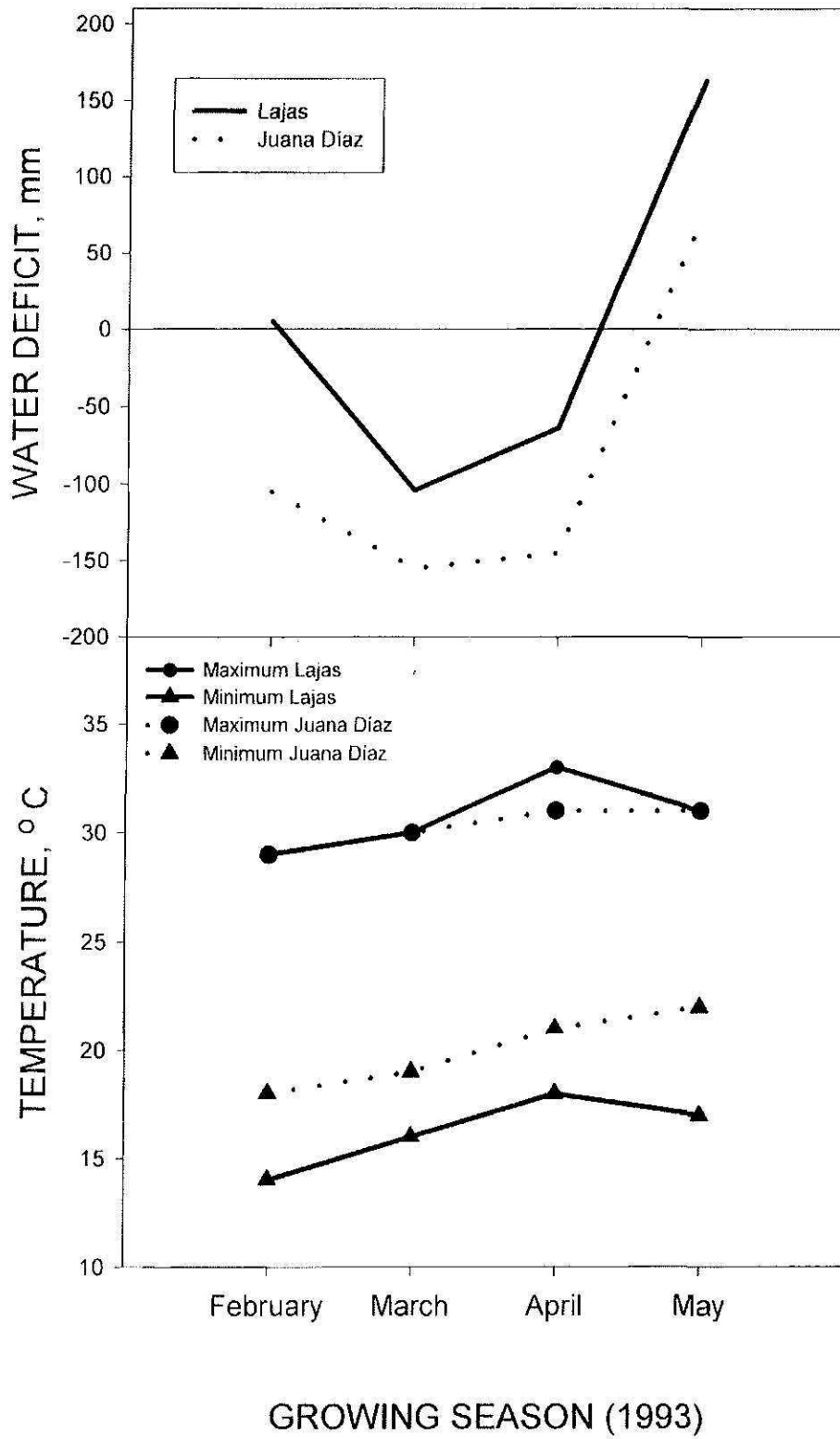


Figure 1. Mean water deficit and temperature during 1993 eggplant growing season at two locations.

Seven Rosita strains and six commercial hybrids were evaluated. Rosita strains 4, 5, and 6 were hybrids developed by a farmer on the south coast of Puerto Rico. Commercial hybrid, which had black epidermis (all except Italian Pink Bicolor) were developed and distributed by companies in the United States. Table 1 describes Rosita cultivar and hybrid sources. Eggplant seeds were planted on trays in the greenhouse 23 December 1992 with a commercial mixture as growing media. Overhead irrigation and foliar fertilization were used to supply water and nutrient requirements in the greenhouse. Plants were transplanted in February 1993 at both locations. Plants were spaced 0.60 m apart within beds and 1.8 m apart between beds (9,074 plants per hectare). Treatments were arranged in a randomized complete block design with two replications. Each experimental unit consisted of 12 plants. Overall crop management including use of aluminum plastic mulch and fertigation were applied according to the location and following standard recommendations (Estación Experimental Agrícola, 1992). Insects were controlled with azinphos-methyl, endosulfan, and permethrin. To complete harvest, a total of four and five pickings were needed at Lajas and Juana Díaz, respectively, at weekly intervals. Yield and fruit number were recorded. Data were submitted to an analysis of variance and means were separated by using a Duncan's Multiple Range test.

Yield at Juana Díaz was higher than at Lajas. At Juana Díaz, all commercial hybrids, with the exception of Italian Pink Bicolor, were among the highest yielders. Rosita strains 4, 5, and 6 (hybrids) were also high yielders. However, the remaining Rosita strains were the poorest yielding cultivars, generally producing half the yield of the best cultivars. Few yield differences were observed in the Lajas trial, no differences among the local Rosita strains. Yield at both locations during 1993 was higher than the 11,227 kg/ha reported by Rico Ballester and López García (1968) at Juana Díaz. Yields recorded for Rosita 3, 4, 5, and 6 were similar to yield reported by Williams et al. (1991).

Rosita 4 had the highest fruit number with 302.0 (33 fruits per plant) and 89.6 (9.8 fruits per plant) thousand fruits per ha for Juana Díaz and Lajas, respectively, but fruit size was small (Table 1). At Lajas, Rosita 2 produced the lowest fruit number (5.9 fruits per plant) whereas at Juana Díaz the lowest producer was Rosita 3 (6.01 fruits per plant). Fruit size tends to be smaller for Rosita strains than for commercial hybrids. Generally, Rosita hybrids 4, 5, and 6 compared favorably with commercial black epidermis hybrids. Epic produced the most fruits per plant (19.4) and Agora the fewest (3.7 fruits per plant). Rico Ballester and López García (1968) reported Rosita producing 5.9 fruits per plant at Juana Díaz.

Large differences in yield were observed between locations. Yield was higher at Juana Díaz, regardless of the cultivar. Differences between locations cannot be attributed to differences in rainfall pattern because the experiments were supplemented with irrigation. An important climatic difference is that average minimum temperature was higher at Juana Díaz. This difference might have increased early stage growth at Juana Díaz in comparison with that of plants growing at Lajas. Another possibility for lower yields at Lajas might have been that the two-degree higher average maximum temperature registered there in April reduced fruit set (Figure 1). Finally, it might be that eggplant grows better in Mollisols than in Vertisols. It is well documented that physical and chemical characteristics of Mollisols are better than those of Vertisols for vegetable production. Further research is needed to support any of these statements.

Even though black hybrids are not actually grown by local farmers, the information reported here provides an idea of the potential for exportation to the United States. Hybrids have disadvantages such as black epidermis, which is not well accepted by Puerto Rican consumers, higher seed cost, and some degree of bitterness. One of the Rosita strains (4, 5, or 6) is actually known and marketed as Neon and is used by some eggplant producers on the south coast of Puerto Rico.

TABLE 1.—Eggplant origin, yield, and fruit number of 13 performing cultivars and hybrids grown at two locations (Lajas and Juana Díaz).

Cultivar	Source <sup>1</sup>	Yield <sup>2</sup>		Fruit Number	
		Juana Díaz	Lajas	Juana Díaz	Lajas
		kg/ha		fruits/ ha × 1000	
Rosita 1	Peñuelas (PR)	20,747 c	14,235 ab	59.1 c	62.7 abc
Rosita 2	Potala (Santa Isabel, PR)	17,098 c	15,459 ab	53.8 c	61.7 abc
Rosita 3	AES (Isabela)	22,825 c	14,651 ab	75.9 c	54.6 abc
Rosita 4	Potala (Santa Isabel, PR)	59,309 a	15,055 ab	302.0 a	89.6 a
Rosita 5	Potala (Santa Isabel, PR)	57,392 ab	16,603 ab	182.0 b	70.6 abc
Rosita 6	Potala (Santa Isabel, PR)	49,241 ab	17,087 ab	157.7 b	75.9 ab
Rosita 7	Potala (Santa Isabel, PR)	24,822 c	14,651 ab	85.0 c	59.9 abc
Agora	Northrup King	55,348 ab	10,171 b	168.4 b	34.0 c
Black Magic	Harris Moran	61,456 a	23,598 a	169.9 b	75.1 abc
Epic	Peto Seed	54,286 ab	12,930 ab	176.2 b	53.5 abc
Sonata	Harris Moran	50,869 ab	22,790 a	137.9 b	75.9 ab
Regal	Northrup King	62,333 a	17,491 ab	159.2 b	56.3 abc
Italian Pink Bicolor	Stokes	41,113 b	10,171 b	135.1 b	37.5 bc

<sup>1</sup>Refers to where the original seeds were obtained.

<sup>2</sup>Four and five pickings were needed to complete harvest at Lajas and Juana Díaz, respectively.

A particular Rosita selection must be chosen, and its seed increased and maintained in order for it to be available to farmers and for future trials. Further research is needed to better characterize these cultivars and determine the reason(s) for the poor performance of eggplant at Lajas. A detailed study is recommended to define growth, yield, and nutrient requirements of the best open pollinated cultivars or Rosita hybrids. The horticultural variability demonstrated in this study justifies the establishment of a research project for selecting the best Rosita strain for local production.

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