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EVALUATION OF TOMATO VARIETIES FOR OFF-SEASON PRODUCTION IN JAMAICA

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INTRODUCTION

Tomato (**Lycopersicon esculentum**) is the most popular vegetable worldwide. An estimated 45 million tons are produced on 4.5 million acres annually, but of this only 15% is derived from the tropics (Anais and Daley, 1985). One of the chief causes is that fruit setting is hindered when atmospheric temperatures are high (above 25ºC) (Sajjapongse, A. and George, G., 1985). This also affects plant growth, flowering, fruit development and quality (Abdalla and Verkerk, K., 1968; Bashir et al., 1979; Stevens, 1981). Several attempts have been made to slect or breed tomato varieties with the potential to produce marketable fruits during the hotter periods of the year (Anais and Daley, 1985; Hernández et al., 1983; Levitt, 1972; Villareal et al., 1984; Abdalla and Verkerk, 1968; Anais, 1984). Based on some encouraging results, many others have been looking for varieties to satisfy peculiar needs.

In Jamaica, research on this crop has included a quest for varieties for canning (Donaldson, 1971), disease control during hot wet weather (Henry, 1975), and heat tolerance (Henry, 1976, Gunning and Davidson, 1979). In most of the tests, the varieties Tropic, Roma and Homestead 24 gave good, but far from acceptable, production.

Recently the Caribbean Agricultural Research and Development Institute (CARDI), in collaboration with the Asian Vegetable Research and Development Centre (AVRDC), conducted trials in St. Lucia to evaluate some heat-tolerant, high-yielding varieties (Sajjapongse and George, 1985). Tests were conducted to find varieties that would give acceptable yields during the hot wet season, as well as during cool dry periods. Similar tests were done in Jamaica using five of the best selections from St. Lucia in comparison with the three mentioned above, namely Tropic, Roma and Homestead 24. This paper describes the research methodology and the results of the first trials.

METHODS

The experiment was done at Mona on Naverly clay loam which is representative of much of the hot humid plains of Jamaica. Eight varieties were included in the trial as shown in the following tabulation:

Varieties	Number of plants
Roma (Castle seeds)	50
CL 5915 39D4-1-4-0	50
CL 5915 136D-1-0	50
CL 5915 229D4-1-1-0	38
CL 5915 222D4-1-4-0	50
CL 5915 229D4-1-5-0	50
Tropic (Ferry Morse seeds)	33
Homestead 24 (Ferry Morse seeds)	50

The experiment was laid out as a three-replicate randomized block design. Due to poor germination, all the varieties did not appear the same number of times in the experiment. Varieties CL 5915 229D4-1-1-0 and Tropic appeared in two plots while Homestead 24 was in five. As a result, the standard error was approximated in these cases.

The seeds were germinated in seed boxes and the seedlings later transplanted into plastic potting bags. Because the planting site appeared uniform, and only a few plants were available for guard rows the trial was laid out in a three-replicate randomized block design. An experimental plot consisted of 15 plants set in three rows of five plants each. The rows were spaced 1 m apart ant the plants set at 0.5 along the row. Fifteen grams of 7-14-14 fertilizer were incorporated in the top soil around the plants and overhead irrigation was applied. Irrigation was done twice weekly to field capacity, and during the growing period only one shower of raim fell (12 mm of rainfall). The daytime temperature averaged 32ºC and nights 24ºC.

Four weeks after setting out, plants were staked and large weeds (**Parthenium hysterophorus** and **Amaranthus dubius**) removed by hand. At six weeks, there was a mild attack of late blight disease (**Phytophthora infestans**) but this was quickly controlled by hand picking and by two weekly sprays of Trimiltox Forte. The lower leaves and branches were pruned to allow for greater air circulation near the plant base. The plants grew vigorously to cover the soil, quickly smothering the weeds.

Reaping began 12 weeks after planting and continued for six weekly intervals. The fruits were counted, graded and weighed. Some seeds were extracted and kept for later trials.

Analyses of variance were done, with data from seven varieties. Fruits were rejected if they were too small, discoloured or damaged. For each variate, the new tomato cultivars were compared with the controls, Tropic and Roma.

RESULTS AND DISCUSSION

Data on total fruit production are shown in the following tabulation:

Variety	Yields (kg ha^{-1})
CL 5915 222D4-1-4-0	30,700
CL 5915 39D4-1-4-0	30,400
Roma (Control)	29,100
CL 5915 136D4-1-0	25,700
Tropic (Control)	23,500
CL 5915 229D4-1-1-0	23,000
CL 5915 229D4-1-5-0	19,700
Homestead (Control)	16,300
S.E.D.	5,382

There were no significant differences between the control varieties and the test varieties.

Yields of marketable fruits are shown in the following tabulation:

Variety	Yields (kg ha^{-1})
CL 5915 39D4-1-4-0	28,500
Roma (Control)	28,100
CL 5915 222D4-1-4-0	28,000
CL 5915 136D4-1-0	24,400
Tropic (Control)	22,200
CL 5915 229D4-1-1-0	21,500
CL 5915 229D4-1-5-0	14,300
S.E.D.	5,175

Table 1 presents data on unmarketable fruits.

Table 1. Mean yields of unmarketable fruit

Variety	Yield (kg ha^{-1})	Per cent unmarketable
Roma (Control)	960	3.4
Tropic (Control)	1,280	5.8
CL 5915 136D4-1-0	1,290	5.3
CL 5915 229D4-1-1-0	1,530	7.1
CL 5915 39D4-1-4-0	1,860	6.5
Homestead (Control)	1,970	13.8
CL 5915 229D4-1-5-0	2,300	13.2
CL 5915 222D4-1-4-0	2,710	9.7
S.E.D.	508	9.7

There were no significant differences between the control varieties and the test varieties. The production of Homestead was about average for that of the year. Roma gave the lowest percentage of unmarketable fruits.

This may be due to plant morphology as it bares clusters of fruits high on the vine. All others bore fruits close to the ground. Homestead had cases of cracking.

The tomato varieties were grown using normal production practices. The prevailing temperature during the growing season was about 20ºC below average. The trial was planted later than the regular planting time of the plains, and the temperature recorded was normal for the upland growing areas during the hottest part especially where overhead irrigation is used.

Production of fruits was considered good for the time of the year, but none of the introduced varieties outyielded the controls. Homestead is characteristically a low yielder in hot weather. Because of the prevailing dry condition, spoilage from fruit rot was low, and the percentage was related to the height on the vine the fruits were borne, Roma being the highest.

Except for Homestead all the other varieties bore small fruits, but these were firm with thick skin, thick locule walls, and high solid contents. Roma is grown mainly for processing but is used occasionally as fresh fruit. All the Asian varieties were highly acceptable to the fresh fruit consumers. There was no marked time difference in ripeness.

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