

EVALUATION OF THREE PEPPER (*Capsicum annuum* L.) VARIETIES

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ABSTRACT

Three pepper varieties were evaluated at the Gladstone Road Agricultural Centre in a replicated small plot trial during 2016. Two of the peppers are classified as bell or sweet peppers, while the third is a mild pimiento variety. Total fruit weights averaged just over 100 g of marketable fruit per plant for the three sweet pepper varieties. Of the three sweet pepper varieties, 'Revolution' had the highest marketable fruit weights per plant. This was followed closely by 'Mavras', while the pimiento heirloom, a distinct type from the two hybrids, yielded less than one third of the top performer.



'Revolution' sweet pepper variety

Introduction:

Worldwide, the sweet pepper (*Capsicum annuum* L.) is one of the most popular vegetable crops utilised by consumers. Also referred to as bell peppers, the sweet pepper is cultivated over a wide range of climate and soil conditions, in both temperate and tropical regions of the world. The most recent FAO statistics (FAOSTAT, 2014), indicate that more than 32.3 million tonnes of fresh fruit is produced on 1.94 million hectares, worldwide. Total production for the Caribbean region is in excess of 120 thousand tonnes, grown on 14 thousand hectares.

The sweet pepper has always been an important component in the preparation of local Bahamian dishes. It is consumed fresh in salads or cooked in a variety of dishes including soups and stews. The sweet pepper is an attractive addition to any dish, providing colour, texture and flavour. In The Bahamas, it is perhaps one of the most commonly used fresh vegetable seasoning. It is an important ingredient in the favourite native dish, conch salad. The sweet pepper is an excellent source of vitamins A and C and is rich in health promoting antioxidant compounds (Nadeem, *et al.*, 2011).

Objectives:

The purpose of this trial was to evaluate the performance of three pepper varieties, two sweet peppers and one mild pimiento pepper, for production on the local market.



‘Mavras’ sweet pepper variety

Materials and Methods:

This experiment was conducted at the Gladstone Road Agricultural Centre, New Providence, during the 2015-2016 winter vegetable growing season. The 3 x 3 factorial experiment was established in a completely randomised design, with three replications, using three pepper varieties harvested at three different dates. The varieties included ‘Revolution’, a bell pepper hybrid that ripens with a bright red colour, ‘Mavras’, a bell pepper hybrid with a deep purple colour at maturity, and an unnamed mild pimiento heirloom variety, a very different type from the two hybrids. The pimiento seeds used in this trial were obtained from seeds saved from a previous harvest.

The three varieties were established in a seedbed on the 10th February, 2016. Healthy, vigorous seedlings were selected from the seedbed and transplanted to the field plots, after 30 days of growth. Each plot consisted of fifteen plants, with inter-row spacing of 1.5 m (5.0 ft) between plots and within row spacing of 45 cm (1.5 ft) between plants. The usual cultural practices were observed to ensure an even stand of plants. Control measures were applied to protect the tomato plots against pest and disease problems. A weekly regime of Bravo[®] fungicide, alternated with the insecticides Pounce[®] and Endosulfan[®], added to Nutrileaf[®] liquid fertiliser in a 20-20-20 formulation, was applied on a regular schedule throughout the growing season.

Peppers were harvested a total of three times at weekly intervals from the end of April to early May, after the first mature fruit were green ripened and of a marketable size. For this study, all observations and measurements were made on a total of fifteen plants per variety, for each harvest. Fruit yield was determined from the actual area of each plot, which, according to Romani *et al.*, (1993), provides a good estimate of true yield. This is also supported by Neppel *et al.*, (2003) whose study indicated that interactions of centre row with border row were insignificant.

The mean monthly maximum temperature for the trial period was recorded at 28.6°C (83.6°F), while the mean monthly minimum temperature was 20.2°C (68.3°F). The total rainfall for the period was 293.7 mm (11.54 in). Mean monthly sunshine duration for the period was 8.6 h. Weather data (Table 1) on maximum and minimum temperatures, rainfall and sunshine duration were obtained from the Meteorological Department of the Commonwealth of The Bahamas.

Table 1. Weather data on rainfall, hours of sunshine and mean maximum and minimum temperatures for New Providence for the period of February 2016 to April 2016, courtesy of the Meteorological Department of The Bahamas.

Month	Total rainfall (mm/inches)	Mean monthly radiation (h)	Mean maximum temperature (°C/°F)	Mean minimum temperature (°C/°F)
February	36.6/1.44 in	7.4	26.1/79.0	17.6/63.6 F
March	16.5/0.65	8.3	28.4/83.1	20.3/68.5
April	23.6/0.93	10.2	29.1/84.4	20.8/69.5
May	216.4/8.52	9.5	30.9/87.7	22.0/71.6

Note: Monthly mean values have been rounded up to the nearest tenth

Statistical Analyses:

All experimental results were analysed using Instat+™ v3.37. Instat is an interactive statistical package, copyright © 2006, Statistical Services Centre, University of Reading, UK. All rights reserved.

Results and Discussion:

Harvestable mature green peppers were produced by the three pepper varieties between seventy and eighty days after transplanting. Analysis of variance (Table 2) for total number of fruit per plant, total weight of fruit per plant, weight of a single fruit, number of marketable fruit per plant and weight of marketable fruit per plant was conducted on the three pepper varieties. The results revealed a significant effect of variety on total and marketable fruit weights per plant, and weight of a single fruit. Harvest date had a significant effect only on total fruit weight per plant. Also, there was a significant effect of the interaction among variety and harvest date on the all of the yield responses, with the exception of weight of marketable fruit per plant.

Table 2. Analysis of variance (ANOVA) for total number of fruit per plant, total weight of fruit per plant, weight of a single fruit, number of marketable fruit per plant and weight of marketable fruit per plant for three sweet pepper varieties. Standard error is for each treatment mean. Error mean square has 134 df. *, ** and *** denote statistical significance at 5, 1 and 0.1% level of confidence, respectively. NS indicates differences between means not significant.

Source	df	Total number of fruit per plant	Total weight of fruit per plant (g)	Weight of a single fruit (g)	Number of marketable fruit per plant	Weight of marketable fruit per plant (g)
Variety	2	NS	***	***	NS	***
Harvest Date	2	NS	***	NS	NS	NS
Harvest Date x Variety	4	***	***	***	***	NS
Error	126					
Std. Err.		0.04	5.6	4.4	0.02	4.3

Mean values for the total number of fruit per plant, total weight of fruit per plant, weight of a single tomato, number of marketable fruit per plant and weight of marketable fruit per plant for the three varieties are shown in Table 3. Total fruit weights averaged just over 100 g of marketable fruit per plant for the three sweet pepper varieties.

Table 3. Mean values of yield responses for three sweet pepper varieties, 2016

Variety	Total number of fruit per plant	Total weight of fruit per plant (g)	Weight of a single fruit (g)	Number of marketable fruit per plant	Weight of marketable fruit per plant (g)
Marvas	1.2a	95.6b	79.5b	1.0a	84.6b
Revolution	1.1a	168.2a	154.4a	1.0a	153.1a
Pimiento	1.3a	51.4c	39.3c	1.1a	44.3c
Mean	1.2	105.1	91.1	1.03	94.0

The t-test at a level of 5% probability was applied. For each variety, means within columns bearing different lowercase letters differ significantly at 5% level of confidence.

Of the three sweet pepper varieties, ‘Revolution’ had the highest marketable fruit weights per plant. This was followed closely by ‘Mavras’, while the pimiento heirloom, a distinct type from the two hybrids, yielded less than one third of the top performer.

Table 4. Quality characteristics of three pepper varieties evaluated at the Gladstone Road Agricultural Centre during 2016.

Variety	Stated number of days to maturity from transplanted seedlings	Actual number of days to maturity from transplanted seedlings	Fruit size	Fruit shape	Skin colour	Visible signs of disease or disorder
Mavras	69-80	82	medium	Blocky, with four lobes	Deep purple to deep red at maturity	None
Revolution	75	77	medium	Blocky, with four lobes	Deep green to bright red at maturity	None
Pimiento	75-80	80	medium	Long, flat, slightly tapered	Glossy, deep green turning red	None

The pepper varieties exhibited acceptable post-harvest quality characteristics (Table 4, Plate 1), consistent with the basic requirements for the USDA standards for grades of fresh sweet peppers (USDA-AMS, 2005).



Plate 1. Pepper varieties, left to right, ‘Revolution’, ‘Mavras’ and ‘Pimiento’

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