

Evaluation of banana cultivars for fresh fruit market in Puerto Rico.

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RESUME - Cinq cultivars de bananiers nains (Grande Naine, Johnson, Valéry, Ziv, Petite Naine) ont été plantés sur la côte sud de Puerto Rico à Jacaguas (mollisol) dans les argiles avec une irrigation au goutte à goutte. L'expérimentation a débuté le 23 décembre 81 et les récoltes ont été terminées le 23 novembre 1982. La plantation était faite en double rang (3,6 x 1,8 x 1,8 m) soit 1990 plants/ha environ. L'irrigation a apporté 35 à 50 mm d'eau par semaine pour maintenir le sol à sa capacité aux champs.

L'apport d'engrais, N et K₂O, a été effectué à raison de 250 et 617 kg/ha. Les contrôles des nématodes et du charançon, *Cosmopolites sordidus*, étaient faits avec des traitements au Temik 10 G : 28 g/plant à la plantation puis tous les quatre mois. Les mauvaises herbes ont été contrôlées à la herse et au Round Up.

A la jetée tous les fruits ont été épistillés et les régimes dégagés. Ceux-ci étaient récoltés quand les fruits atteignaient les grades plein ou 3/4 plein, soit environ 100 jours après la jetée.

Le plus haut rendement était obtenu par Ziv et Grande Naine avec une production moyenne de 49,5 t/ha de fruits frais commercialisables, soit environ 2730 cartons/ha. L'examen des goût, texture et qualité générale des fruits mûrs ont permis de classer, après panels de dégustation, ces variétés dans la rubrique « acceptable » ou « hautement acceptable ».

INTRODUCTION

Local banana production is estimated at about 90,000 MT of fruits with a farm value of \$8.5 million. This production is obtained from the tall Montecristo cultivar widely planted as coffee shade and small pure stand plots in the interior highlands of Puerto Rico. Fruits produced under these conditions are of poor quality and are consumed locally as green as well as ripe bananas.

This paper describes the preliminary results of a study

that is being conducted on my farm in cooperation with the USDA-Agricultural Research Service, Rio Piedras, Puerto Rico to determine the potential of growing bananas for fresh fruit market utilizing drip irrigation techniques.

MATERIALS AND METHODS

Five dwarf banana (*Musa acuminata*, AAA) cultivars namely : Ziv, Dwarf Cavendish, Johnson, Grand Nain and Valery were planted on a Jacaguas silty clay loam (Mollisol) of the dry south coast under drip irrigation.

The Ziv and Dwarf Cavendish cultivars were introductions from Israel, and the propagating material originated

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from tissue culture. Johnson is a local cultivar that produces bunches with similar characteristics to the Montecristo banana, whereas Grand Nain and Valery are well known commercial varieties. These cultivars were established from propagating corms weighing about 2 kg each.

The soil pH is 7.8, containing 21 p/m of available P and 0.9, 21.2 and 10.5 meg/100 g of soil of exchangeable K, Ca and Mg, respectively. Besides the alkaline soils, the southern region of Puerto Rico is characterized by a low rainfall, (900 to 1,000 mm yearly) with a well defined dry season from January to April. Average minimum and maximum air temperatures are 21 and 31°C, respectively.

The experiment was planted December 23, 1981. Plants were spaced at 3.6 x 1.8 x 1.8 m (about 1,990 plants/ha) in a double row system using a completely randomized block design with 6 replications. Each replication contained 9 plants per cultivar.

To maintain the moisture around the plants near field capacity, irrigation was applied at the weekly rate of 35-50 mm.

The plants were fertilized with 250 kg of N and 617 kg/ha of K₂O. These amounts were injected into the drip system and distributed in 40 weekly applications.

Nematodes and the banana borer, *Cosmopolites sordidus*, were controlled with applications of 28 g of Temik 10 G at planting time and every 4 months thereafter.

Since yellow sigatoka is not a problem in the southern region of Puerto Rico, leaf spot diseases were not controlled.

Weed growth was suppressed with the use of a harrow and «spot» post-emergence applications of Roundup at the rate of 2.2 kg/ha.

The plants were continuously desuckered and 4 months after planting the «follower» for the first ratoon crop was selected.

At bunch shooting the dates, number of functional leaves, plant height and pseudostem diameter were recorded, the individual fruits were deflowered, and the bunches sleeved. The bunches were harvested when the fruits reached the light full or full 3/4 stages, about 100 days from bunch shooting.

Dehanding was done in the field and the fruits transported to a ripening chamber in cardboard boxes. The ripe fruits were evaluated for flavor, texture and general quality.

RESULTS AND DISCUSSION

The bunch-shooting peak for all cultivars averaged about 7.5 months after planting. Mean number of functional leaves at shooting was between 13 and 14 for all varieties (Table 1).

TABLE 1 - Mean number of functional leaves, plant height and pseudostem diameter recorded at the time of bunch shooting from five dwarf banana cultivars grown under drip irrigation on the south coast of Puerto Rico.

Parameter	Cultivars				
	Johnson	Valery	D. Cavendish	Ziv	Grand Nain
No. of functional leaves at bunch shooting	13.0	13.1	14.0	13.8	12.9
Plant height (m)	2.5	2.5	1.9	2.4	2.2
Pseudostem diameter (cms) *	16.8	16.9	17.3	17.7	16.5

* - measurement taken about 1 m above soil level.

TABLE 2 - Marketable yields obtained from the plant crop of five banana cultivars grown under drip irrigation on the south coast of Puerto Rico.

Cultivar	Bunch weight (kg)	Production/ha (MT)	No. of Boxes (2)	Non-marketable fruit %
Ziv	25.5	50.6 a (1)	2,789	7.4
Grand Nain	24.4	48.4 ab	2,670	7.8
Johnson	23.2	46.1 bc	2,541	7.4
Valery	22.5	44.8 c	2,467	6.9
Dwarf Cavendish	21.4	42.6 c	2,349	8.8

1 - means followed by the same letters do not differ significantly at the P = 0.05 probability level (Duncan's multiple range test).

2 - one box = 18.14 kg.

Although these bananas are classified as dwarf cultivars there were also differences of plant height and diameter at bunch-shooting (Table 1). The tallest cultivars were Johnson and Valery with 2.5 m, and the smallest Dwarf Cavendish with 1.9 m. The thicker pseudostems were observed in the two Israeli cultivars, Dwarf Cavendish and Ziv with a mean diameter of 17.5 cm.

All bunches from the plant crop were harvested during a planting-to-harvest cycle of about 11 months. The highest yielding cultivars were Ziv and Grand Nain with an average production of 49.5 MT/ha of fresh marketable fruits. This

yield is equivalent to about 2,730 boxes of fresh banana fruits (Table 2).

The yields obtained from the cultivar Ziv were significantly higher than those recorded from Johnson, Valery and Dwarf Cavendish but not different than Grand Nain.

Non-marketable fruits obtained from all cultivars ranged from 6.9% for Valery to 8.8% for the Dwarf Cavendish variety.

A testing panel consistently classified all ripe fruits as acceptable or highly acceptable.