

# SWEET POTATO PRODUCTION IN THE LOCAL ENVIRONMENT

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June 2019

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## Introduction

The sweet potato is one of the more important staple food crops in the Bahamas and is grown primarily for the fresh market. Production has not been exploited to its fullest extent, however. In the northern Bahamas there has been a significant increase in the acreage planted, using improved sweet potato varieties. Varieties planted in the south eastern Bahamas are generally rain fed, with little or no supplemental irrigation. Generally, a crop may reach maturity within six to eight months, while many of the varieties grown in the southern islands take up to ten months to develop mature tubers. Early maturing varieties combined with improved agronomic practices provide the opportunity for increased productivity of the sweet potato crop.



Collection of sweet potato varieties at the Gladstone Road Agricultural Centre

## Root Crops Programme

The Root and Tubers Programme at the Gladstone Road Agricultural Centre (GRAC) has as its goal to implement a viable root and tuber crops programme, relevant to the needs of local farmers. Among the programme's objectives are the identification of high yielding root and

tuber crops with resistance to pests and diseases, and tolerance to environmental stresses.

Ongoing activities at GRAC include the collection and evaluation of sweet potato varieties, and the multiplication and distribution of selected plant material. The selection programme takes into consideration the needs of the local farmers who will benefit from the newly introduced varieties and aims to release to them varieties that require the minimum of inputs for a successful production.



Sweet potato variety trial at the Gladstone Road Agricultural Centre, 2012

Several trials on sweet potato tuber quality and yield have been conducted at GRAC. Four sweet potato varieties were evaluated in 2007. The variety 'Six Weeks' outperformed the other three varieties. 'Solomon' succumbed to the root-knot nematode and fared poorly. During 2008, eight sweet potato varieties were evaluated. The varieties 'Antigua' (also known as 'King's Crown') and 'Six Weeks' proved to be superior to the other sweet potato varieties in quality and yield of marketable tubers. A further study, conducted during 2012, determined that the sweet potato varieties 'Six Weeks' and 'Antigua' should continue to be utilised within the cropping systems of Bahamian farmers, based on their yield potential, tuber quality, disease tolerance, resistance to weevil attack and early maturity.



Extension workshop and training on sweet potato production

Workshops and extension visits are important for improving farming conditions of local farmers, and have been conducted on several of the Family Islands in the Bahamas. Based on the trials conducted during 2007, 2008 and 2012, the two varieties 'Antigua' and 'Six Weeks' have been recommended for multiplication and distribution. This material has already been distributed to farmers in Abaco, Acklins, Andros, Cat Island, Crooked Island, Eleuthera, Exuma, Long Island and Mayaguana.



Distribution of sweet potato planting material

### **Establishment of a Sweet Potato Crop**

The sweet potato is a sun loving crop. It requires a considerable amount of rain during the growth period and a dry period during root formation. Warm sunny days and cool nights are very much favourable for storage

root formation in sweet potato. Tuber yields are reduced considerably if drought occurs within the first six weeks after planting.

**Preparation of planting material** - The quality of the plant material used by the farmer has a great impact on the yields obtained. It is important to use only healthy young vines with vigorous growth and healthy leaves. If the material used is to be rooted before being planted to the field, the leaves are trimmed and the vines cut into two-node segments.



Two-node cuttings after 10 days of growth



Newly planted sweet potato in the field

Two node cuttings of sweet potato are rooted in polystyrene trays containing a potting mixture (Pro-Mix). The plantlets are propagated under shade and are kept well-watered until they produce a well-developed root system and at least two fully expanded leaves. After two weeks of growth, the plants are ready to be transplanted directly to the field. A one acre plot using a 2' x 5' spacing, approximately 4,500 plants are required.



The two-node cuttings are placed in a shaded area and kept well-watered. After 10-14 days of growth, the sweet potato plants are ready for transplanting to the field.



Field being prepared for planting on ridges, using drip irrigation system

**Land preparation** – Land that has been previously cultivated will need to be disced, followed by ridging (hilling). The proper preparation of the soil and the use of good quality planting material are two important factors in achieving a successful production. Sweet potato is a quick growing crop and it covers the ground quickly and suppresses most of the weeds. However, weeding may become necessary, particularly in the early stages of growth. To protect the crop from weeds the field must be weeded at least twice and hilled up within 45 days after planting, if ridges or mounds were not formed in the field prior to planting.



Sweet potato grown on ridges at the Gladstone Road Agricultural Centre

**Weeding** - Sweet potato is a quick growing crop and it covers the soil quickly and suppresses most of the weeds. However, weeding may become necessary, particularly in the early stages of growth. To protect the crop from weeds, the field should be cleaned at least twice. Hilling up must be done about 6 weeks after planting, along with fertiliser application. Dacthal, a pre-emergent herbicide, can be used up to 6 weeks after transplanting.

**Irrigation** - Water should be applied uniformly and applications reduced as the tubers begin to mature. Too much rain, irrigation or poorly drained soil prevents proper root formation. Sweet potatoes prefer hot, dry weather once the vines cover the ground.

**Fertiliser** - Application of fertiliser should be done before six weeks to get a maximum vegetative growth of the crop. Fertiliser should be applied after two weeks and top dressing at six weeks after planting. Locally available fertilisers, such as 4-9-6 should be adequate. Fertilisers to be used, according to the percentages of nitrogen, phosphorus and potassium (N-P-K) are: 4-9-6, 8-18-8, or 10-20-20.

**Sweet Potato Pests** - Weevils are the main pest of sweet potato. Larvae are reared primarily in storage roots and can be transported from one location to another, unnoticed. Their damage to storage roots makes them unmarketable. Pheromones are used to trap the male sweet potato weevils which are attracted to the scent which simulates the scent of the female sweet potato weevil.



Use of pheromone trap for controlling sweet potato weevil

Sweet potatoes are frequently damaged by root-knot nematodes (*Meloidogyne incognita*), resulting in stunting and yield loss. Root-knot nematodes in the tubers may cause cracking or internal dark lesions, which severely reduce the value of the sweet potato crop.



Sweet potato variety 'Solomon' infested with root-knot nematode



Sweet potato variety 'Antigua' resistant to root-knot nematode

Several steps should be taken together to minimise nematode injury to sweet potatoes. Do not plant the same crop in the same field year after year. Rotate crops to prevent buildup of pests and diseases. Remove all plants immediately after harvesting. Destroy plants and plant roots by pulling up immediately after harvest.

Sweet potato varieties vary in their susceptibility to the root-knot nematode. The variety 'Solomon' is very susceptible, while the variety 'Antigua' appears to be resistant. Farmers should not ignore these steps in nematode management because of the resistance reported for most sweet potato varieties.

There are several fungal, bacterial and viral diseases that infect the sweet potato crop. As sweet potato is grown primarily as a subsistence crop, chemical control of these diseases is not widely practised. In general, diseases are not serious in sweet potato. However root rot caused by *Fusarium* has been identified in locally grown sweet potato. The symptoms are yellowing of leaves and later drying of vines and rotting of roots. Control measures include improving drainage of soil, ensuring field sanitation and using resistant varieties.

**Harvesting** - Unlike most vegetable crops, sweet potatoes do not have a definite stage where they are classified as mature, since plants will continue to grow as long as there are green leaves. The crop should be harvested when it has produced the highest percentage of tubers of the desired size. Select tubers with tight, unwrinkled skins with no blemishes or bruises. The harvested roots can be transported to the market or can be stored. The tubers are normally cured by keeping in an open place for 4 to 7 days. After curing sweet potato tubers can be stored for 3 months.



Freshly harvested sweet potato tubers

### Sweet potato cost of production

Cost of production for one acre of sweet potato to ensure yield of 6,000 lbs/acre and above (\*Note: does not include labour costs for planting operations, all costs are subject to change)

INPUT	QUANTITY	*COST/UNIT (\$)	TOTAL
Land preparation			
discing	2 hours of discing	\$40.00/hr	<b>\$80.00</b>
ridging	2 hours ridging	\$40.00/hr	<b>\$80.00</b>
Preparation of Planting Material			
cuttings	4,500 plantlets/acre	-	-
trays	2 boxes (100 trays)	\$70.00/box	<b>\$140.00</b>
Pro-Mix	1 bale (3.8 cu. ft./bale)	\$30.00/bale	<b>\$30.00</b>
Planting Operations			
pre-emergent herbicide	3 3-lb packages of Dacthal	\$42.00/3lb bag	<b>\$126.00</b>
weed control (manual)		-	-
transplanting		-	-
fertiliser	200lb/acre (8-18-8 or 10-20-20)	\$14.00/50lb bag	<b>\$56.00</b>
pest control	pheromone traps	estimate: \$150.00	<b>\$150.00</b>
harvesting		-	-
		<b>SUBTOTAL</b>	<b>\$662.00</b>
		<b>TOTAL</b>	<b>-</b>