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TUBER QUALITY AND YIELD OF SIX SWEET POTATO VARIETIES EVALUATED DURING 2012

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ABSTRACT

This study was conducted as part of the ongoing programme at the Gladstone Road Agricultural Centre to select improved varieties of sweet potato for introduction into the cropping systems of local farmers. Six sweet potato varieties were evaluated from October 2011 to March 2012 for tuber quality and yield. They were also evaluated for their morphological characteristics. The results showed a large variation in the leaf and tuber characteristics for the sweet potato varieties under study. The variety 'Six Weeks', which is an early maturing sweet potato with white flesh and high dry matter content, produced the highest marketable yield at 25.5 t/ha, followed by 'Antigua' which yielded 25.2 t/ha of marketable tubers. Proximate analyses of the raw pulp taken from the tubers of the six sweet potato varieties revealed differences in the mineral contents. The mean values of sodium, on a dry weight basis, ranged from a low 131 mg/100g for 'Three Month' to a high of 389 mg/100g for 'Solomon'. The values for potassium ranged from 381 mg/100g for 'Solomon' to 1106 mg/100g for 'CI001'. The ash content varied from a low 0.82% for 'Six Weeks' to a high 1.45% content for 'Solomon'. From the present study, it is 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.

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

Introduction:

The sweet potato (*Ipomoea batatas* [L.] Lam) is an important staple crop in many parts of the tropics. It is known for its drought resistance, vigorous growth and its productivity, with even the minimum of inputs. Cultivation of this crop has increased over the years, and according to the most recent FAO statistics (FAOSTAT, 2011), world production of sweet potato is within the range of 107 million tonnes per annum. Most of this production comes from China (more than 80 million tonnes) and other Asian countries, including Indonesia, Japan and Korea. Total production for the Caribbean region is in excess of 700 thousand tonnes, with The Bahamas contributing 900 tonnes to this figure.

The sweet potato is rich in carbohydrates and vitamins (Villareal, 1982) and is a potential ally in the fight against vitamin A deficiency. Indeed, recent research results indicate increased availability of beta-carotene (Provitamin A) and crude protein for good nutrition and health (Ukom *et al*., 2009). Orange-fleshed varieties are rich in beta-carotene, while purple-fleshed varieties are high in anthocyanins, two important antioxidants thought to prevent chronic heart diseases and cancer (Teow *et al*., 2007). Significant amounts of essential minerals are found in the sweet potato, including manganese, copper, iron and potassium, which is the most prevalent mineral present (Huang, 1982).

A large amount of variation exists within the sweet potato (Mukhtar *et al*., 2010; Vimala and Hariprakash, 2011). Differences that are easy to determine include vine characteristics, leaf morphology and storage root shape and colour (Martin and Rhodes, 1983). Other characteristics not as easily detected include variations in the resistance of different sweet potato varieties to insect pests and diseases. A proper understanding of these variations would assist the selection of the appropriate sweet potato types, improve the agronomic practices and contribute to improved crop establishment and increased yields.

In The Bahamas, where it is grown mostly by small-scale farmers, the sweet potato is, perhaps, the most important of the starchy food crops cultivated. Several varieties of sweet potato are cultivated locally, including older varieties such as ‘Solomon’ from Cat Island and ‘Pumpkin’ from Long Island, in addition to newer, improved varieties like ‘Six Weeks’ and ‘Antigua’. The newer, improved varieties have been replacing some of the older, traditional varieties for their tuber quality, yield and earlier maturity range. The older, late-maturing varieties may take up to ten months to mature, when grown under rain-fed conditions on marginal soils of the southeastern Bahamas. On the other hand, early-maturing sweet potato can reach maturity after three to six months, depending upon variety.

The present study is the third in a series of evaluations of sweet potato varieties since the initiation of the Department of Agriculture’s Root and Tuber Crops Programme and complements two previous studies conducted at the Gladstone Road Agricultural Centre. Two important objectives of these trials are to gain familiarity with the range of sweet potato types and varieties and to assess the stability of their quality characteristics. This work further demonstrates the tremendous potential for sweet potato production in The Bahamas, based on the agronomic performance of the varieties and their nutritive qualities.

Objectives:

The purpose of this experiment was to identify high yielding varieties producing good quality medium-sized tubers, with uniform and attractive root shapes. Another objective was to document the morphological characteristics of the sweet potato varieties collected locally.

Materials and Methods:

The study was carried out at the Gladstone Road Agricultural Centre, New Providence, from October 2011 to March 2012. Two node cuttings of sweet potato were rooted in polystyrene trays containing a potting mixture. The plantlets were propagated under green house conditions until they produced a well-developed root system and at least two fully expanded leaves. After two weeks of growth, the plants were transplanted directly to field plots. The sweet potato selections used in this study and some of their characteristics are listed in Table 1. All of these varieties, with the exception of 'Ruby', have been or are still being utilised by local farmers. Sweet potato classified as early maturing generally take between three and six months to develop marketable tubers, while late maturing sweet potato take between eight and ten months to reach maturity. Intermediate types (early/medium or medium/late) fall between the early and late maturing types.

Table 1. Characteristics and origin of plant material used in the experiments.

VARIETY	ORIGIN	DESCRIPTION
Antigua	Antigua and Barbuda	Early maturing, bushy erect plant
CI001	Cat Island	Late maturing, spreading plant
Ruby	Antigua and Barbuda	Early maturing, bushy erect plant,
Six Weeks	New Providence	Early maturing, bushy semi-erect plant, tending to spread.
Solomon	Cat Island	Late maturing, up to 10 months, vigorous, spreading plant,
Three Months	New Providence	Early/medium maturing, bushy semi-erect plant, tending to spread

The six sweet potato varieties were established in an open field in a completely randomised design with three replications, on ridges 1.5 m apart, with a spacing of 0.6 m between plants within the rows. Each plot consisted of 30 plants in a 3 x 10 plot formation. For this experiment, tuber 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 Neppl *et al*. (2003) whose study indicated that interactions of centre row with border row were insignificant.

The usual cultural practices were observed to ensure an even stand of plants in the experimental plots. Before planting, the field was sprayed with the pre-emergent herbicide Dacthal® to prevent germination of broadleaf weed species. Fertiliser was applied at a rate of 250 kg per hectare (223 lb per acre) three months after planting, in a single application. Before the application of fertiliser, the plots were weeded and cultivated. The plots were irrigated with a drip irrigation system which supplied water throughout the growing period. Plant characteristics along with pest and disease problems were observed and recorded.

After five months of growth, the plots were harvested and data for the number of marketable tubers per plant and weight of marketable tubers per plant were recorded. Root and vine characteristics were described according to the classification system (Table 3a, 3b), used in an early study of Martin and Rhodes (1983), which defined and categorised sweet potato roots based upon harvest, kitchen and table quality. Some modifications were made to this table, according to the Descriptors for Sweet Potato (Huamán, ed., 1991).

Table 3a. Sweet potato vine characteristics observed and system of rating

Characteristic	**Method of determination**	**Scale and key**	**Desired state**
GROSS MORPHOLOGY			
1.Twining	Observing and estimating	Non-twining, slightly twining, moderately twining, twining, very twining	Non-twining
2. Plant type	Observing and estimating	Erect, semi-erect, spreading, extremely spreading	Erect, semi-erect
3. Ground cover	Observing and estimating	Low, medium, high, total	Total
Vine internode length	Measuring	Very short, short, intermediate, long, very long	Intermediate
Vine internode diameter	Measuring	Very thin, thin, intermediate, thick, very thick	-
Predominant vine colour	Observing and estimating	Green, green with few purple spots, green with many purple spots, green with many dark purple spots, mostly purple, mostly dark purple, totally dark purple	-
Secondary vine colour	Observing and estimating	Absent, green base, green tip, green nodes, purple base, purple tip, purple nodes	-
Vine tip pubescence	Observing and estimating	Absent, sparse, moderate, heavy	Moderate to heavy
General outline of the leaf	Observing and estimating	Rounded, reniform, chordate, triangular, hastate, almost divided	-
Leaf lobes type	Observing and estimating	No lateral lobes (entire), very slight (teeth), slight, moderate, deep, very deep	-
Leaf lobe number	Counting	1, 3, 5, 7 or 9	-
Shape of central leaf lobe	Observing and estimating	Absent, toothed, triangular, semi-circular, semi-elliptic, elliptic, lanceolate, oblanceolate, linear (broad), linear (narrow)	-
Mature leaf size	Measuring	Small (< 8cm), medium (8-15cm), large (16-25cm), very large (> 25cm)	Large
Abaxial leaf vein pigment	Observing and estimating	Yellow, green, purple spot in the base of main rib, purple spot in several veins, main rib partially purple, main rib mostly or totally purple, all veins partially purple, all veins mostly or totally purple, lower surface and veins totally purple	-
Mature leaf colour	Observing and estimating	Yellow-green, green, green with purple edge, greyish-green (due to heavy pubescence), green with purple veins on upper surface, slightly purple, mostly purple, green upper-purple lower, purple both surfaces	-
Immature leaf colour	Observing and estimating	Yellow-green, green, green with purple edge, greyish-green (due to heavy pubescence), green with purple veins on upper surface, slightly purple, mostly purple, green upper-purple lower, purple both surfaces	-
Petiole length	Measuring	Very short (< 10cm), short (10-20cm), intermediate (21-30cm), long (31-40cm), very long (> 40cm)	Long
Petiole pigmentation	Observing and estimating	Green, green with purple near stem, green with purple near leaf, green with purple at both ends, green with purple spots throughout petiole, green with purple stripes, purple with green near leaf, some petioles purple-others green, totally or mostly purple	-

Table 3b. Characteristics observed of sweet potato roots and system of rating

Characteristic	Method of determination	Scale and key	Desired state
Storage roots per plant	Counting	-	Intermediate
Shape of root	Observing and estimating	Round, round elliptic, elliptic, ovate, obovate, oblong, long oblong, long elliptic, long irregular or curved	-
Uniformity of shape	Observing and estimating	Very irregular, 50% or more irregular, 25-50% irregular, mostly uniform, very uniform	Very uniform
Absence of lobes	Observing and estimating	Very lobed, slightly lobed, without lobes	Absence
Absence of cracks	Observing and estimating	Many cracks, few cracks, no cracks	Absence
Smoothness of surface	Observing and estimating	Very irregular, somewhat irregular, very smooth	Smooth
External colour	Observing and estimating	White, cream, yellow, orange, brownish orange, pink, red, purple-red, dark purple	-
Internal colour	Observing and estimating	White, cream, dark cream, pale yellow, dark yellow, pale orange, intermediate orange , dark orange, strongly pigmented with anthocyanins	-
Uniformity of colour	Observing and estimating	Very irregular, slightly irregular, very uniform	Very uniform

The mean monthly maximum and minimum temperatures for the trial period were 27.8°C (82.0°F) and 20.4°C (68.7°F), respectively. The total rainfall for the period was 338.7 mm (15.3 in). Mean monthly sunshine duration for the period was 7.7 h. Weather data (Table 2) on sunshine duration, maximum and minimum temperatures and rainfall for the period under study were obtained from the Meteorological Department of the Commonwealth of The Bahamas.

Table 2. Weather data on rainfall, hours of sunshine and mean maximum and minimum temperatures for New Providence for the period of October 2011 to March 2012, courtesy of the Meteorological Department of The Bahamas.

Month	Total rainfall (**mm**/inches)	Mean monthly radiation (h)	Mean maximum temperature (**ºC**/ºF)	Mean minimum temperature (**ºC**/ºF)
October 2011	**232.7**/9.16	**5.5**	**30.4**/86.7	**23.9**/75.0
November 2011	**20.1**/0.79	**8.1**	**28.2**/82.7	**21.6**/70.8
December 2011	**22.9**/0.9	**7.0**	**26.9**/80.4	**19.8**/67.6
January 2012	**6.6**/0.26	**8.0**	**26.1**/78.9	**17.8**/64.0
February 2012	**44.2**/1.74	**8.1**	**27.2**/81.0	**19.2**/66.6
March 2012	**62.2**/2.45	**9.3**	**27.8**/82.1	**20.1**/68.2

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

Statistical Analyses:

All experimental results were analysed using Instat+™ and ASSISTAT. Instat is an interactive statistical package, copyright © 1999-2005, Statistical Services Centre, University of Reading, UK. All rights reserved. ASSISTAT, Version 7.5 beta (2008), website – http://www.assistat.com, by Francisco de Assis Santos e Silva, Federal University of Campina-Grande City, Campina Grande, Brazil.

Results:

Plant characteristics (Tables 4 and 5) were described based on Martin and Rhodes (1983), with modifications according to the descriptor list for sweet potato genetic resources (Huamán, ed., 1991). The varieties presented a wide range of vine, leaf and tuber characteristics, an indication of the adaptability of the sweet potato over a wide range of agricultural and ecological environments.

Table 4. Vine and leaf characteristics of six sweet potato varieties at five months after planting.

PLANT DATA	VARIETY					
	ANTIGUA	**CI001**	**RUBY**	**SIX WEEKS**	**SOLOMON**	**THREE MONTHS**
GROSS MORPHOLOGY						
1.Twining	non-twining	slightly twining	non-twining	non-twining	non-twining	non-twining
2. Plant type	erect	spreading	erect	semi-erect	spreading	spreading
3. Ground cover	high	high	high	total	total	high
4. Vine internode						
a) length	very short	very long	very short	short	intermediate	intermediate
b) diameter	thin	very thin	thin	thin	thin	thin
5. Vine pigmentation						
a) predominant vine colour	green with many dark purple spots	green	purple	green	green	green
b) secondary vine colour	purple nodes	purple nodes	absent	absent	purple base	absent
6. Vine tip pubescence	absent	moderate		absent	moderate	absent
7. Mature leaf shape						
a) general outline of the leaf	lobed	triangular	lobed	almost divided	triangular	almost divided
b) leaf lobes type	deep	very slight (teeth)	deep	very deep	very slight (teeth)	very deep
c) leaf lobe number	5	5	5	5	3	3
d) shape of central leaf lobe	lanceolate	triangular		elliptic	triangular	elliptic
8. Mature leaf size	medium	medium	medium	medium	small	small
9. Abaxial leaf vein pigment	purple spot in the base of main rib	all veins mostly or totally purple	all veins mostly or totally purple	green	all veins mostly or totally purple	green
10. Foliage colour						
a) mature leaf colour	green	green	purple	green	green	green
b) immature leaf colour	green	green with purple edge	purple	mostly purple	green with purple edge	green
11. Petiole length	short	intermediate	short	long	very short	intermediate
12. Petiole pigmentation	green with purple at both ends	totally or mostly purple	totally or mostly purple	green	green	green

The morphological characterisation of the six sweet potato varieties (Table 5) indicated a wide range of differences among the tubers in storage root shape. Most of the varieties were uniform in shape, except for ‘Solomon’ which had long, irregular roots. External colours ranged from red to deep purple, the colours preferred by the local market. There was one exception, ‘Solomon’ which displayed a creamy skin colour. The flesh colours varied from white to creamy yellow.

Table 5. Tuber characteristics of six sweet potato varieties at five months after planting.

	VARIETY					
CHARACTERISTIC	**ANTIGUA**	**CI001**	**RUBY**	**SIX WEEKS**	**SOLOMON**	**THREE MONTHS**
Storage roots per plant	4	2	4	4	1	3
Shape of root	ovate	round	round elliptic	round elliptic	long elliptic	round elliptic
Uniformity of shape	very uniform	mostly uniform	mostly uniform	mostly uniform	50% or more irregular	mostly uniform
Absence of lobes	longitudinal grooves	absent	absent	absent	absent	absent
Absence of cracks	absent	absent	absent	absent	absent	absent
Smoothness of surface	smooth	smooth	smooth	smooth	smooth	smooth
External colour	purple-red	red	deep purple	red	cream	red
Internal colour	cream	creamy yellow	creamy yellow with purple streaks	white	pale yellow	white
Uniformity of colour	very uniform	very uniform	very uniform	very uniform	very uniform	very uniform

The six sweet potato selections in this study presented a variety of leaf shapes, sizes and colours (Plate 1). According to Somda and Kays (1990), dry matter production of the sweet potato plant is affected by leaf size, shape, and number and petiole length. The largest leaves were found in the late-maturing and spreading variety ‘CI001’. The longest petiole lengths (Table 4) were found in ‘Six Weeks’, a semi-erect, bush type and early-maturing variety.

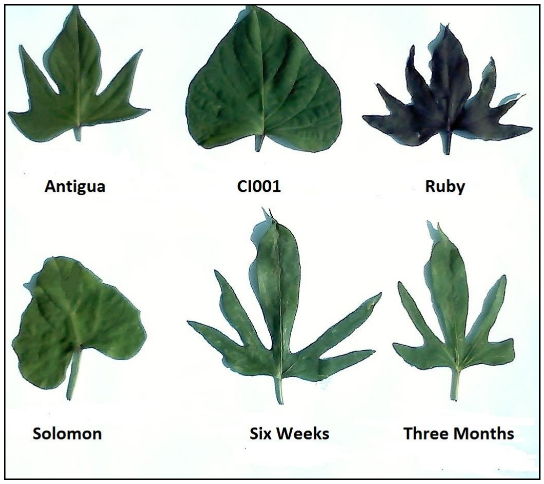

Plate1. Leaf morphology displayed by the six sweet potato varieties.

The analysis of variance (ANOVA) of the yield responses (Table 6) for the six sweet potato varieties showed a statistical significance for number of marketable tubers per plant and weight of marketable tubers per plant at a 1.0 % level of confidence.

Table 6. Analysis of variance (ANOVA) for total number of tubers and total tuber weights among six sweet potato varieties. Standard error is for each treatment mean. Error mean square has 71 df. *, ** and *** denote statistical significance at 5, 1 and 0.1% level of confidence, respectively. NS indicates differences between means not significant.

		--------------------Significance levels---------------------	
Source	df	No. of tubers/plant	Total weight of tubers
Varieties	5	**	**
Error	66		
Std. Err		0.21	0.19

Table 7 displays the mean root yield responses for the six sweet potato varieties. Tuber weights ranged from 0.12 kg per plant for ‘Solomon’ to 3.82 kg per plant for ‘Six Weeks’. Of the six sweet potato varieties, ‘Six Weeks’ also had the highest number of marketable tubers per plant.

Table 7. Mean values of root yield responses of six sweet potato varieties, assessed 5 months after planting.

Variety	**Number of marketable tubers/plant**	**Weight of marketable tubers/plant (kg)**
Antigua	4.17a	3.78a
CI001	2.00bc	0.42c
Ruby	4.08a	1.94b
Six Weeks	4.67a	3.82a
Solomon	1.25c	0.12c
Three Months	2.92b	1.51b

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.

Two sweet potato varieties, ‘Antigua’ and ‘Six Weeks’, out yielded the other varieties by a significant margin, consistent with trials conducted at the Gladstone Road Agricultural Centre during 2007 and 2008. The newly introduced variety ‘Ruby’ was the next best performer, producing nearly 2 kg of marketable tubers per plant. The variety ‘Solomon’ gave very low yields, due to nematode damage (Plate 2). Most of the roots were distorted, with very little tuberisation. The present experiment was conducted in the same field that was used during the sweet potato variety trials of 2007, with the same results for the ‘Solomon’ variety.

‘Antigua’

‘CI001’

‘Ruby’

‘Six Weeks’

‘Solomon’

‘Three Months’

Plate 2. Sweet potato varieties. Note ‘Solomon’ variety at bottom left, showing damage resulting from root knot nematode.

The proximate analyses of the nutrient compositions of the six sweet potato varieties are presented in Table 8. The results of this study indicate differences among the six sweet potato varieties in their nutrient contents. The varieties showed significant difference in values of moisture contents. Moisture content ranged from 65.9% in ‘Three Months’ to 69.9% in ‘CI001’. The mean values of sodium (Na^+), on a dry weight basis, ranged from a low 131 mg/100g for ‘Three Month’ to a high of 389 mg/100g for ‘Solomon’. The values for potassium (K^+) ranged from 381 mg/100g for ‘Solomon’ to 1106 mg/100g for ‘CI001’. The ash content varied from a low 0.82% for ‘Six Weeks’ to a high 1.45% content for ‘Solomon’.

Table 8. Proximate analyses of the raw pulp taken from the tubers of six sweet potato varieties.

	ANTIGUA	CI001	RUBY	SIX WEEKS	SOLOMON	THREE MONTHS
Moisture (%)	69.6	69.9	69.5	67.3	68.2	65.9
Ash (%)	0.97	0.97	1.01	0.82	1.45	0.96
Salt (%)	0.11	0.10	0.12	0.12	0.13	0.12
Na^+ (mg/100g) (dry weight)	262	163	185	116	389	131
K^+ (mg/100g) (dry weight)	613	1106	1093	1053	381	934

Discussion:

Results indicate that 'Six Weeks' has a greater yield potential, with better quality attributes, than any of the other varieties in the trial, followed closely by 'Antigua'. Overall, a total of three varieties, 'Six Weeks', 'Antigua' and 'Ruby' produced the best marketable yields. The tubers were well shaped and smooth with a vibrant skin colour. These three top performers produced good quality medium-sized tubers, with uniform and attractive root shapes. Four of the varieties in this present study produced larger weights of marketable tubers than any of the sweet potato varieties evaluated during any of the previous studies. Several varieties with red skin and white flesh have been studied in past research trials, but all resulted in poor yields.

The sweet potato variety 'Six Weeks' presented the highest mean yields of marketable tubers per hectare (Fig. 1) at 25.5 t/ha compared to 'Antigua' at 25.2 t/ha and 'Ruby' at 14.9 t/ha. According to FAOSTAT estimates, the average yield in 2010 for sweet potato growing regions of the world was 13.2 t/ha, which is well below the results obtained by these three varieties in this study, under experimental conditions. These results demonstrate that under improved agronomic practices, increases in tuber yields can be obtained from sweet potato.

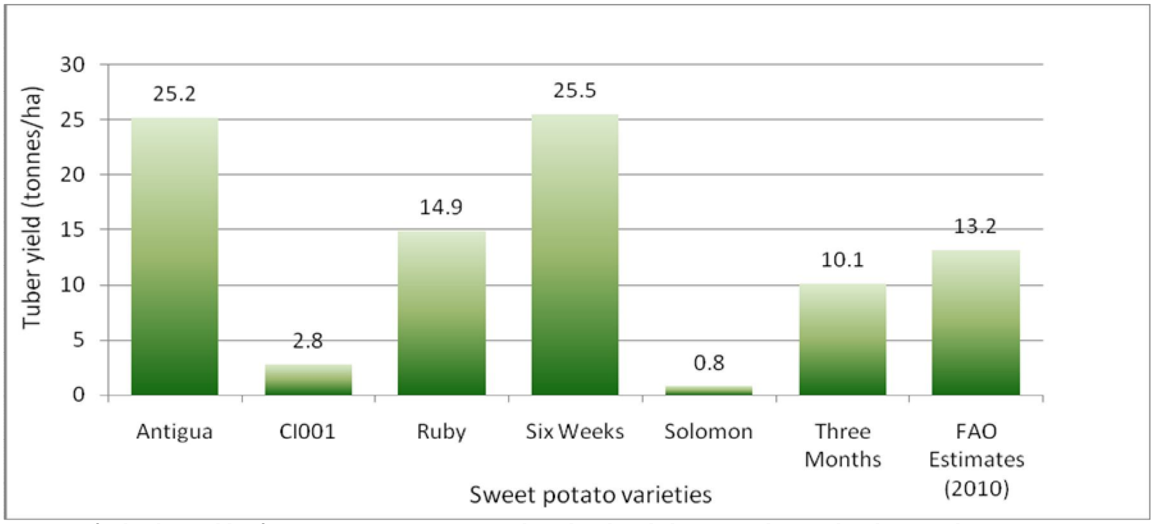

Fig. 1. Average fresh tuber yields of six sweet potato varieties evaluated at the Gladstone Road Agricultural Centre during 2012. FAO estimates for the sweet potato growing regions of the world are found in the column at far right. In 2010, the world average annual yield for the sweet potato was 13.2 tonnes per hectare.

The variety 'CI001' had small tubers (Plate 2) which exuded large amounts of latex when cut. The presence of latex in sweet potato is an indication of the maturity of the tuber. When the latex dries up and does not turn black when cut, the sweet potato is deemed mature and harvestable. This confirms 'CI001' as a late-maturing sweet potato. Also, a very small number of the larger tubers showed evidence of weevil damage, while none of smaller tubers were damaged by weevils. Documented evidence exists confirming that the presence of latex in plants deters feeding insects (Data, *et al.*, 1996; Sethi *et al*., 2008; Stevenson, *et al*., 2009). According to Kays and Data (1993), latex acts as a natural defense mechanism against the sweet potato weevil. They noted that young vines produced more latex and less feeding damage than older vines. Stevenson *et al*. (2009), recorded high levels of mortality and developmental inhibition for weevils fed on latex treated sweet potato. This information could be used to determine harvest time in sweet potato. If plants could be brought to marketable yield, without compromising quality, early harvesting could be used as a means to combat against weevil damage.

The moisture contents of the six sweet potato varieties in this study were quite high, ranging from about 66% to 70%. This difference can be attributed to variety. As with other root and tuber crops, the sweet potato has a high moisture content, resulting in a relatively low dry matter content (Vimala and Hariprakash, 2011). Dry matter content of sweet potato is approximately 30%, but varies according to variety, climate and soil conditions and agronomic practices (Ingabire and Vasanthakaalam, 2011).

The percentage ash content, which gives an indication of the total mineral content of the sweet potato varieties, was low, but it is comparable to that of Ukom *et al*. (2009) who reported ash contents within a range of between 1.3 and 2.0% of dry matter, for sweet potato grown at different levels of nitrogen fertilisation. This low ash content suggests that the sweet potato varieties in this study were low in some mineral elements.

Upon analysis of the mineral composition of the sweet potato varieties, large amounts of potassium were found within the tubers of 'CI001', 'Ruby', 'Six Weeks' and 'Three Months'. These values were generally high, when compared to those reported in the literature (Ukom *et al*., 2009; Laurie, 2010; Antonio *et al*., 2011). However, the results of this study are within the range of results reported by Liu *et al*. (2009), who recorded potassium contents of more than 1000 mg/100g, among several sweet potato varieties. These elevated levels of potassium were accompanied by low levels of sodium. While it is not possible to draw more definitive conclusions on the rates of potassium and sodium found within the sweet potato tubers, the varieties that accumulated large amounts of potassium in comparison to their sodium contents, could very well be responding to elevated sodium concentrations within the soil environment by maintaining a low concentration of sodium and a high potassium to sodium ratio within their cell walls (Blumwald, 2000).

Large amounts of sodium were also found within the tubers, with a very high content in 'Solomon' and a moderately high amount in 'Antigua'. The potassium contents of these two varieties were much lower than the other four varieties that maintained low sodium and high potassium contents within their tubers. According to Leonard *et al*. (1947), similar ions, such as sodium and potassium, compete with each other, with sodium depressing the percentage of potassium in the mineral composition of plants. This concurs with what appears to have happened in this study; as the sodium content of the sweet potato tubers increased, the potassium content tended to decrease.

General Comments:

As seen in this study, great variability exists among the morphological characteristics of the six sweet potato varieties. Most of these sweet potato varieties can be grown successfully under the soil and environmental conditions of The Bahamas, as some are already being cultivated by local farmers. A wide range of sweet potato types will allow the farmer to choose those varieties best suited to his growing conditions.

Under local environmental conditions, the two varieties 'Antigua' and 'Six Weeks' have been consistent in their performance over the period of evaluation between 2007 and 2012. This suggests that these two varieties may be stable in their yield characteristics. The variety 'Ruby' has good quality characteristics and shows some potential for improved production. 'Three Months' also has the potential of improving its performance with improved agronomic practices, as its yields fell just below the world annual average yield for sweet potato (Fig. 1). The varieties 'CI001' and 'Solomon' were below standard in their performance, with the variety 'Solomon' giving the poorest overall performance. This is largely due to the low yields associated with the susceptibility of 'Solomon' to the rootknot nematode. This variety is also a late-maturing sweet potato.

From the present study, it is 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. The other outstanding performer 'Ruby' will be added to these recommended varieties.

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