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## Germplasm Collection Evaluation and Selection of Promising Suwandel Banana (*Musa acuminata*) Accessions

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AJ Warusavitharana and MARL Perera

<sup>1,2</sup>Fruit Crop Research and Development Centre, Department of Agriculture, Kananwila, Horana, Sri Lanka.

### Abstract

A field experiment of germplasm collection, evaluation and selection of promising Suwandel banana accessions was conducted at the Fruit Crop Research and Development Centre, Horana, Sri Lanka from 2003 to 2010 with the objective of identifying, high yielding, good quality banana varieties which are adaptable to the Low Country Wet Zone. Varietal diversity was observed among the tested accessions. Based on the investigation of Suwandel germplasm, two Suwandel accessions namely HoSu 3 and Hosu 9 were identified as high yielding and good quality accessions which are adaptable to prevailing climatic conditions of Low Country Wet Zone in Sri Lanka. They produced reasonably high yield of acceptable fruits which having higher brix value (28). According to performances of mother crop HoSu 3 and Hosu 9 recorded 14.6 kg and 18.2 bunch weight respectively and consumer preference was higher over the other tested accessions.

**Key words:** Accessions, Growth, Preference, Suwandel, Yield,

### Introduction

Banana is a popular fruit crop in the world which belongs to family Musaceae. It is a tropical crop that originated in southern and Southeast Asia. The average banana yield in Sri Lanka is about 8.20 Mt/ha (Anonymous 2011) and it is poor when compared with the world average of 21.40 Mt/ha (FAO 2012). This low yield could be attributed to low yielding varieties, high incidence of pest and diseases and poor crop management practices. Hence crop improvement programme of germplasm collection, evaluation and selection of promising Suwandel banana accessions was conducted at the Fruit Crop Research and Development Centre, Horana from 2003 to 2010 to identify, high yielding, good quality banana varieties which are adaptable to the Low Country Wet Zone. Among available banana varieties in Sri Lanka, Suwandel is one of most popular, marketable and acceptable dessert variety. Although domestic demand for Suwandel is high, good quality high yielding variety is not available among farmers at present. Suwandel banana can also be used to produce baby product and other value added product. However numbers of local accessions of Suwandel are grown in different part of the country, many of them produce low yield with poor quality fruits. Hence Identification of high yielding with good quality

accessions is timely needed for commercial and domestic banana cultivation in Sri Lanka.

### Materials and Methods

Suwandel germplasm were collected from Kalutara, Colombo and Gampaha district in Sri Lanka. Collected germplasm were initially established in the Research field of Fruit Crop Research Development Centre (FCRDC), Horana, Sri Lanka in 2003. Considering the growth, yield and quality parameters initial collection of ten Suwandel accessions was narrowed down to five (data was not presented). These identified accessions were established as multiplication plots to obtain basic planting materials. In addition; multiplication plots were maintained to get basic information. Five different accessions of Suwandel were planted in a Randomized Completed Block Design with 4 replicates. Three sword suckers were accommodated in a plot at the spacing of 3m x 3 m. Fertilizer and other crop management practices were done as per the Departmental recommendation. Growth, yield and quality parameters of tested accessions were recorded. Growth observations recorded were plant height (from soil level to the point where the two highest petioles meet each other.) and plant girth at flower emergence. Girth of plant was measured at 30

**Table 1: Yield and Growth performances of the mother crop of Suwandel accessions at FCRDC, Horana**

Acc No	Days taken from flowering to harvesting	Maturity age (days)	Plant height (cm)	Plant girth (cm)	Bunch weight (kg)	No. of hands	Fruit weight (g)	Fruit length (cm)	Fruit girth (cm)	Brix
Hosu3	116	408 <sup>a</sup>	268 <sup>c</sup>	54 <sup>b</sup>	14.6 <sup>bc</sup>	10 <sup>c</sup>	108.7 <sup>b</sup>	13.5 <sup>ab</sup>	13.0 <sup>ab</sup>	28 <sup>a</sup>
Hosu9	118	414 <sup>a</sup>	300 <sup>a</sup>	63 <sup>a</sup>	18.2 <sup>a</sup>	15 <sup>a</sup>	104.8 <sup>b</sup>	13.0 <sup>b</sup>	12.9 <sup>ab</sup>	28 <sup>a</sup>
Hosu6	114	400 <sup>b</sup>	197 <sup>d</sup>	55 <sup>b</sup>	13.2 <sup>c</sup>	9 <sup>d</sup>	114.2 <sup>a</sup>	14.0 <sup>a</sup>	13.7 <sup>a</sup>	26 <sup>b</sup>
Hosu7	117	410 <sup>a</sup>	277 <sup>bc</sup>	58 <sup>ab</sup>	16.1 <sup>b</sup>	13 <sup>b</sup>	95.1 <sup>c</sup>	12.1 <sup>c</sup>	12.2 <sup>b</sup>	25 <sup>c</sup>
Hosu1	116	412 <sup>a</sup>	280 <sup>b</sup>	51 <sup>b</sup>	7.2 <sup>d</sup>	7 <sup>e</sup>	71.8 <sup>d</sup>	10.1 <sup>d</sup>	10.2 <sup>c</sup>	24.5 <sup>c</sup>
LSD (0.05)	NS	7.93	10.85	7.38	1.69	0.932	4.02	0.70	1.41	0.90
CV%	7.77	12.59	26.75	8.52	7.89	5.88	7.19	3.63	7.38	5.89

Values in a column with different superscripts are significantly different at the 5% level. \*NS-not significant

cm above from the ground level. Yield attributes observed were weight of bunch, number of hands, weight of fruit, length of fruit and girth of fruit. The maximum length and girth of 3 fruits from the middle part of second hand was measured separately and average was calculated. Days from planting to harvest and days to flower emergence were also recorded. All the data was analyzed statistically according to SAS programme (SAS,1989). Means were separated using Least Significant Difference (LSD) at 5% level of significant value.

### Result and Discussion

The data pertaining to the growth, yield and quality as influenced by different accessions are presented in Table 1. In general the Suwandel germplasm that is described in this paper had not been evaluated before.

There are no significant differences between treatments with regard to days taken from flowering to harvesting. Other growth and yield parameters observed were statistically significant. The result revealed that accession Hosu 6 reached to maturity stage earlier than rest of accessions due to its plant height is very low compared to other tested accessions. Being the shortest plant is an advantageous characteristic for wind damage. The control accession (Hosu1) reached the flowering stage with fewer diameters. Accession HoSu 9 gave highest bunch weight and numbers of hands compare to others and it is the tallest accession. Plant girth was also highest in Hosu 9 over the rest of accessions which was at par with Hosu7. Effect of early accumulation of assimilates in the rhizome in a big plant can compensate for latter period of growth cycle during period of fruit development. The

maximum bunch weight was more than two times over the control accession (Hosu1). The result revealed that the weight of fruit was found to be significantly highest in the accession Hosu6 over the rest of the accessions due to size of the fruit is bigger which was followed by Hosu 3 and Hosu 9. Although highest fruit weight was recorded in HoSu6, its consumer preference is less. (Table 2). Hence HoSu6 was not reflected for good accessions. HoSu3 and HoSu9 have very good taste with significantly highest TSS percentage (Total Soluble Solids- Brix-28). Their fruit weight, fruit length and fruit girth were at par with each other. Furthermore there was no significant difference for days taken from flowering to harvesting among all the Accessions. Hosu1 accession was significantly inferior for size of the fruit to all other accessions. Numbers of suckers at bearing in the multiplication plot were varied from 8 to 10 for the tested accessions. More suckers per mat were observed in accession HOSu 1. Accession no HoSu3 and Hosu9 gave 8 and 9 suckers respectively. (Data was not presented). Normally Suwandel banana variety has higher suckering ability compared to Kolikuttu banana. Leaf spot diseases- yellow sigatoka occurs in mild condition during wet climate period in irrespective of accessions. However it could be easily controlled by removing of affected leaves (Weerasinghe 2000). Severe occurrence of

**Table 2: Consumer preference for tested Suwandel accessions**

Accession no	Rank
HoSu1	4
Hosu3	1
Hosu6	3
Hosu7	3
Hosu9	2

Weevil damage was not recorded due to pre treatment was adopted before planting and field management condition were well. Ranking was performed by using an in house consumer panel of 20 and the overall acceptability is ranked as shown in table 2. Fruit size, taste, flesh color and external appearance were considered as main characteristics for consumer preference. It is seen from the Table 2 a first rank was received to HoSu 3 Suwandel accession and it was followed by the accession HoSu9.

Daniells (2000) has argued that there is no perfect variety, that each has its own set of advantages and disadvantages. Growers must find out what is best from them. Among the evaluated accessions, two Suwandel accessions namely HoSu3 and Hosu 9 were identified as high yielding and good quality accessions with which are adaptable to prevailing climatic conditions of Low Country Wet Zone in Sri Lanka. They produced reasonably high yield of acceptable fruits. According to

the performances of HoSu 3 and HoSu 9 were selected to evaluate in the farmer field.

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