

Short Communication

SEEDLING GROWTH OF THREE COCONUT (*COCOS NUCIFERA* L.) VARIETIES IN KARACHI, PAKISTAN

Abdul Hameed Solangi^{1*}, Parwaiz Ahmed Baloch¹, Aqeel Ahmed Siddiqui¹, R. Uddin¹, Fateh Khan Nizamani¹ and M. Zafar Iqbal²

¹Institute of plant Introduction, Pakistan Agricultural Research Council, Karachi,

²Department of Botany, University of Karachi, Pakistan

*Corresponding author E-mail: solangi_2001@yahoo.co.in

ABSTRACT

Three coconut varieties i.e Sri Lanka Tall (SLT), Malaysia Golden Tall (MGT) and Malaysia Yellow Tall (MYT) seedlings were studied at the nursery stage at Institute of Plant Introduction, Karachi, Pakistan. The seedling length was significantly ($p < 0.05$) highest in Malaysia Golden Tall as compared to Sri Lanka Tall and Malaysia Yellow Tall. Total number of leaves were significantly ($p < 0.05$) higher in Malaysia Golden Tall as compared to Sri Lanka Tall and Malaysia Yellow Tall. The number of roots was significantly ($p < 0.05$) higher in Malaysia Golden Tall.

KEYWORDS: Coconut, Seedling, Nursery, Morphological characters.

Coconut is grown commercially in 90 around countries covering 11.9 million hectares (Carpio, *et al.*, 2005). Coconut has two forms, the Tall and Dwarf (Santos, 1987). These are basically differentiated from one another by height or stature, mode of pollination, rate of growth and maturation, composition of principal fruit component, yield and other morphological characters. Tall are highly cross pollinated and hence, the variations in nuts are spectacular. Dwarfs are mostly self pollinated. Inter and Intra-varietals crosses were made to develop progenies with combined desirable characteristics of parents and over-dominant traits particularly on yield performance (Rethinam, *et al.*, 2005). Proper selection of seedlings in the nursery alone ensures 10 percent improvement in yield (Liyanage, 1953).

Coconut gardens in Pakistan tend to decrease due to climatic changes in the area i.e. low rain fall, prevailing drought conditions etc, besides urbanization is another reason of the adoptability in coconut growing area in coastal area of Pakistan (Laghari & Solangi, 2005). The present study focuses on the seedling growth performance/morphological diversity of different varieties of coconut.

A study was conducted at the Institute of Plant Introduction (IPI), Southern Agricultural Research Center (SARC), Pakistan Agricultural Research Council (PARC), Karachi. The coconut varieties were selected i.e., Sri Lanka Tall (SLT), Malaysia Golden Tall (MGT) and Malaysia Yellow Tall (MYT). Fifty mature coconut seed nuts were collected from the experimental plots for seedling study from each variety. The coconut seeds were sown horizontally on raised plots (size 3.5 m × 3.5 m) at a spacing of 45 cm between seeds and 90 cm between rows. A pathway of 60 cm separated each plot to facilitate irrigation and drainage. The beds were irrigated twice a week. For each variety, 05 seedling plants were selected randomly from the each variety. All measurements were done on 12 month old seedlings. The morphological observation; seedling length (cm), seedling girth (cm) was measured with the plastic tape., total no. of leaves, number of roots and color of petiole were recorded at 12 months after laying, using the method developed by IPGRI (1995) and Newman (1963).

The data were statistically analyzed by the analysis of variance (ANOVA) and Duncan Multiple Range Test (DMRT) (Duncan, 1955) at $p < 0.05$ on personal computer software package, Costat Version 3.

The seedling length was significantly ($p < 0.05$) highest in MGT as compared to SLT and MYT. The seedling height 124.0 was higher in MGT as compared to SLT and MYT (Table 1). Morpho-metric characterization revealed that substantial variations were existing in stem base, crown shape, pigmentation of young fruits, young inflorescence and, nut weight, nut shape have contributed to the observed variation (Foale, 1968). The girth or collar of the coconut is that part of the stem which is just below the oldest functional leaf. The girth of a young palm is below the whorl of leaves closet to the leveled ground. The seedling girth was significantly ($p < 0.05$) highest in MGT as compared to SLT and MYT. The seedling girth 12.3 cm was higher in MGT as compared to SLT and MYT. Liyanage (1953) also investigated that collar girth of 10 cm at one year age of coconut seedling. Total number of leaves were significantly ($p < 0.05$) higher in MGT as compared to SLT and MYT.

Table 1. Coconut (*Cocos nucifera* L.) seedling height, seedling girth, total number of leaves, number of roots and color of petiole in nursery experiment.

Name of variety	Seedling height (cm)	Seedling girth (cm)	Total No. of leaves	Number of roots	Color of petiole
SLT	116.6 ± 08.33 a	09.6 ± 0.57 b	5.1 ± 0.37 b	5.7 ± 0.36 a	Green
MGT	124.0 ± 07.73 a	12.3 ± 0.74 a	7.1 ± 0.27 a	6.1 ± 0.95 a	Golden yellow
MYT	113.0 ± 05.76 a	09.0 ± 0.44 b	5.6 ± 0.33 b	5.6 ± 0.33 a	Yellow green
LSD p<0.05	21.35	1.75	1.00	1.81	-nil-

Numbers followed by the same letters in the same column are not significantly ($p < 0.05$) different, according to Duncan's Multiple Range Test. *Mean ± Standard Error. LSD (Least Significant Difference)

The number of leaves were significantly ($p < 0.05$) high in MGT as compared to other rest varieties. While, non significant differences were recorded in SLT and MYT. Solangi & Iqbal, (2012) reported that the seedling length (238.40 cm) and number of leaves (7.2) were significantly ($p < 0.05$) highest in Treatment one (NPK+ neem seed powder + *gliricedia sepium* leaves) as compared untreated treatments. The seedlings about thirty weeks have three seed leaves developed, at the stage on the average only about seven roots have developed, of which only four or five have emerged in to the soil through the husk (Child, 1974). The number of roots was significantly ($p < 0.05$) higher in MGT as compared to SLT and MYT. The results indicated that, the number of roots was maximum in MGT as compared to SLT and MYT. The petiole color of the Sri Lanka tall (SLT), Malaysian golden tall (MGT) and Malaysia yellow Tall (MYT), were green, golden yellow and yellow green respectively. Liyanage (1953) investigated that the essential points to be noted during selection of seedlings are early germination, early splitting of leaves into leaflets, short and thick leaf stalks, healthy and robust appearance, having minimum of six leaves at one year age. Proper selection of seedlings in the nursery alone ensures 10 per cent improvement in yield. According to the results of the present study showed that among the morphological characters only seedling girth and total no. of leaves were some what distinct for SLT, MGT and MYT coconut variety. According to Santos *et al* (1984) the most distinguishing feature of tall and dwarf coconut and the various forms in the coconut germplasm collection in the Philippines has been identified with in each type. Height, mode of pollination, rate of growth and maturation, composition of principal fruit component, yield and other morphological characters basically differentiate them from one another.

References

- Carpio, C.B., G.A. Santos, E.E. Emmanaul and H. Novarianto. (2005). Resaerch on coconut genetic resources in South East and East Asia. Coconut Genetic Resources International Plant Genetic Resources Institute-Regional office for Asia, the Pacific and Oceania (IPGRI-APO), Serdange, Selangor DE, Malaysia. pp. 533-545.
- Child, R. (1974). Coconuts. Second edition Longman group limited, London.
- Duncan, D.B. (1955). Multiple ranges and multiple F-tests. *Biometrics*, 11: 1-42.
- Foale, M.A. (1968). Growth of the young coconut palm 2. The influence of nut size on seedling growth in three cultivars. *Australian Journal of Agricultural Research*, 19: 927-937.
- IPGRI (International Plant Genetic Resources Institute). (1995). Descriptor for coconut (*Cocos nucifera* L.). International Plant Genetic Resources Institute, Rome, Italy. 61p.
- Laghari, M.H. and A.H. Solangi. (2005). Status of coconut genetic resources research in Pakistan. Coconut genetic resources IPGRI-regional office for Asia the Pacific and Oceana (IPGRI - APO), Serdang, selangor DE, Malaysia. pp. 604-607.
- Liyanage, D.V. (1953). Selection of coconut seed nuts and seedlings. *Ceylon coconut Quart.* 4:127-129.
- Liyanage, D.V. and Abeywardena, (1957). Correlations between seed nut, seedlings and adult palm characters in coconut. *Tropical Agriculturist*, 133: 325-340.
- Newman, E.J. (1963). A method of estimating the total length of root in a sample. *Journal of Applied Economic*, 3: 139-149.
- Rethinam, P., P. Batugal and F. Rognon. (2005). Performance evaluation of coconut varieties and farmers vareital performances. Coconut genetic resources. IPGRI-Regional office for Asia the pacific and oceania, serdang, serlangor DE, Malaysia. 309p.
- Solangi, A.H. and M.Z. Iqbal. (2012). Preliminary studies on morphological diversity of coconut seedlings by organic and inorganic fertilizers amendments at Karachi, Pakistan. *Pakistan Journal of Botany*, 44(1): 161-164.

(Received August 2014; Accepted November 2014)