



E-ISSN: 2278-4136

P-ISSN: 2349-8234

www.phytojournal.com

JPP 2021; 9(6): 1774-1776

Received: 03-09-2020

Accepted: 05-10-2020

KS Vijai Selvaraj

Agricultural College and
Research Institute, TNAU,
Echankottai, Thanjavur, Tamil
Nadu, India

A Bharathi

Agricultural College and
Research Institute, TNAU,
Echankottai, Thanjavur, Tamil
Nadu, India

K Ashokumar

Cardamom Research Station,
Kerala Agricultural University,
Pampadumpara, Kerala, India

P Sivakumar

Agricultural College and
Research Institute, TNAU,
Echankottai, Thanjavur, Tamil
Nadu, India

HP Maheswarappa

ICAR-Central Plantation Crops
Research Institute, Kasaragod,
Kerala, India

Corresponding Author:**KS Vijai Selvaraj**

Agricultural College and
Research Institute, TNAU,
Echankottai, Thanjavur, Tamil
Nadu, India

Evaluation of selected indigenous coconut accessions for high nut yield and nut quality with special traits in Tamil Nadu

KS Vijai Selvaraj, A Bharathi, K Ashokumar, P Sivakumar and HP Maheswarappa

DOI: <https://doi.org/10.22271/phyto.2020.v9.i6z.13203>

Abstract

The conservation and utilization of indigenous coconut accessions or germplasm has been undertaken worldwide due to its economic magnitude. The aim of present study was designed to evaluate the five Tamil Nadu (a southern India state) elite indigenous coconut accessions for high nut yield and nut quality. Experiments were conducted in Coconut Research Station, Tamil Nadu Agricultural University, Veppankulam, Thanjavur district, Tamil Nadu, India, during the years 2006 – 2020 for five accessions along with two checks (Kerakeralam and Aliyarnagar Tall) under ICAR-AICRP on Palms programme. Among the five local genotypes conserved and evaluated, IC 599265 (Selection from Kasangadu local ECT) recorded higher annual nut yield (82 nuts/palm/year) with desirable nut quality characters like higher dehusked nut weight (620g/nut), higher kernel (286 g/nut) and copra content (160g/nut) followed by IC59924 (Selection from Adirampattinam local ECT) which was collected from coastal eco system. IC 599263 (Selection from Thambikkottai local ECT) beared dwarf stature (650 cm/palm) as special trait.

Keywords: elite local genotypes, morphological and yield, nut quality parameters

Introduction

Coconut (*Cocos nucifera*.L) is a only tropical palm in which all the parts are offering multiple uses and hence it's called as "Kalpavriksha" meant tree of heaven. It is believed to have originated in South East Asia (Indonesia, Malaysia and Philippines) or Miconesia [1]. Evaluation and characterization of conserved accessions or germplasm lines in coconut repository is a prerequisite to identify the particular indigenous or exotic accessions possess imperative features, which will become useful in coconut breeding [2].

Coconut exhibits a huge variability in nut production ranging from 30 to 400 nuts / palm / year depending on environmental conditions and cultivars [3]. The copra obtained by drying the kernel of the coconut is the richest source of vegetable oil containing 65 to 70 per cent oil. Coconut is currently grown in nearly eighty countries spread along the tropical belt about 10 million families rely on coconut as either main source of income and stable food. Breeders dealing with coconut palms are aware of the significant difference in performance of coconut varieties from location to location and from year to year [4].

According to Fisher [5], the continuous variation exhibited by quantitative traits with which the plant breeder includes heritable and non-heritable component. The choice of potential palms as one of the donor parent depends upon variability and proper selection for the desirable traits. The larger the variability in the material more will be the scope for improvement. Studies on the yield and nut traits in coconut germplasm are meager. This effort was made to document the diversity of morphology, yield and nut quality characters.

Materials and methods

A field study was conducted at Coconut Research Station, Veppankulam since 2006 to till date to evaluate elite local genotypes for yield and nut quality characters. Five genotypes (selection from East Coast Tall) along with two check variety (Kera Keralam and ALRCN1) were used for the study. The passport data of the elite coconut genotypes conserved and evaluated at CRS, Veppankulam were summarized in Table 1. The genotypes were 14 years old. The experiment was laid out in a Randomized Block Design with four replications with each genotype representing four palms per replication. The palms are planted at a distance of 7.5 m x 7.5 m. Recommended package of practices were followed for all the genotypes [6]. Observations were recorded from all five palms representing each genotype in each replication

on vegetative, reproductive and nut characters with mean values were calculated. The yield of nuts per palm was recorded periodically at each harvest for five years from 2015 to 2020 and pooled to get nut yield per palm per year. Data was subjected to statistical analysis as per the standard procedures [7].

Results and discussion

In the present investigation, significant differences were observed on palm height, palm girth, annual nut yield, dehusked nut weight, kernel weight and copra content (Table 2 and 3). Since harvesting is a big menace and difficult task among the tree climbers, dwarf stature is the critical trait which makes more attraction among the coconut growers which paves to extend the area. Accordingly, IC 599263 an elite genotype collected from the coastal area of Thambikkottai exhibited lesser palm height (649.33 cm) and palm girth (136.33 cm) at 14 years of planting. In contrast the maximum palm height was observed in IC 599266 of 726.67 cm, which was collected from Kallikadu. The maximum number of leaves was recorded (34.92) in IC 599265, followed by IC 599264 (33.10). The number of leaves is an important character since it decides the ability of the leaf to support the bunches in the axis and also increases the photosynthetic efficiency. Similar results were also reported by [8-11].

The maximum number of inflorescence per palm per year was recorded by IC 599265 (13.16) followed by IC 599264 (13.02) compared to minimum values recorded in IC 599267 (11.17). Significantly highest pooled nut yield per palm was recorded by IC599265 (82 nuts) followed by IC 599264 (80

nuts). The genotype IC 599265 recorded higher dehusked nut weight (620 g / nut) followed by IC 599265 (538 g / nut). Kernel weight was more in IC 599265 (286 g/nut) with higher copra content (160 g/nut). Similar trends of increase in dehusked nut weight, kernel and shell weight were reported by Jeyabose *et al.* [12] and Rachel *et al.* [13]. The higher annual nut yield may be due to the increased production of inflorescence per palm per year and number of functional leaves produced per year, which might have contributed higher photosynthetic accumulation towards the reproductive phase. Variation in nut characters might be due to both genetic factors and environmental factors, including available soil moisture and nutrient status [14]. Elite genotype collected from Kasangadu (IC 599265) is considered to be more suitable for further crop improvement programme as one of the donor parent at Coconut Research Station, Veppankulam in future.

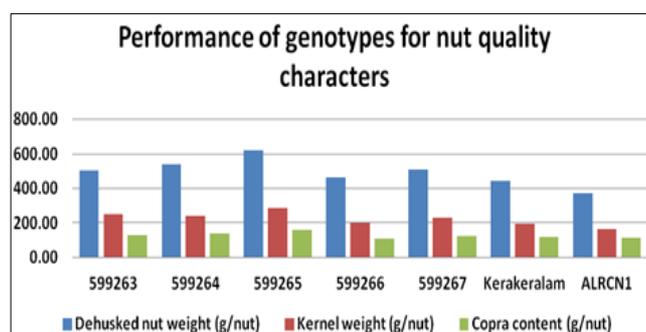


Fig 1: Performance of coconut genotypes for nut quality characters

Table 1: Passport data of the elite coconut genotypes conserved and evaluated at CRS, Veppankulam

S. No.	IC number	Sample Type	Sampling Method	Habitat	Site of Collection			Latitude	Longitude	Altitude	Remarks for eliteness	
					Village	Mandal	District					
1.	599263	Seed nut	Random	Inland	Thambikkottai	Muthupet	Thiruvarur	T.N	10.40 N	79.48E	1.82 m	Slightly salt tolerant, dwarf with average yielding and high kernel thickness (1.3cm).
2.	599264	Seed nut	Random	Coastal	Adhirampattinam	Pattukkottai	Thanjavur	T.N	10.35 N	79.40E	0.91 m	Highly tolerant to salt and comes up well in saline sodic soil, higher whole nut weight (1325gm).
3.	599265	Seed nut	Random	Inland	Kasangadu	Pattukkottai	Thanjavur	T.N	10.38 N	79.27 E	99.39 m	High yielding and medium statured plant.
4.	599266	Seed nut	Random	Irrigated	Kallikadu	Pattukkottai	Thanjavur	T.N	10.40 N	79.29 E	4.85 m	Moderately tolerant to drought with intermediate nature of growth habit, higher kernel weight of 326.5gm and high copra content (168.0g).
5.	599267	Seed nut	Random	Irrigated	Thamarrakkottai	Pattukkottai	Thanjavur	T.N	10.23 N	79.24 E	4.85 m	High yielding (135 nuts/palm/year) with round shaped nuts.

Table 2: Performance of elite coconut genotypes for vegetative characters

Sl. No.	Genotypes (IC numbers)	Palm height (cm)	Palm girth (cm)	Number of leaves
1.	599263	649.33	136.33	32.72
2.	599264	684.33	162.67	33.10
3.	599265	726.67	152.67	34.92
4.	599266	676.00	174.00	32.69
5.	599267	731.33	158.67	31.19
6.	Kerakeralam	706.67	142.33	30.22
7.	ALRCN1	712.67	170.67	31.37
	S.E.M =	3.07	2.14	0.21
	S.E.d =	4.34	3.03	0.30
	CV =	1.09	3.38	1.64
	CD(5%) =	9.11	6.37	0.65
	Significance	S	S	S

Table 3: Performance of elite coconut genotypes for reproductive and nut characters

S. No.	Genotypes (IC numbers)	Palm height (cm)	Palm girth (cm)	Annual nut yield (nuts/palm)	Dehusked nut weight (g/nut)	Kernel weight (g/nut)	Copra content (g/nut)
1	599263	649.33	136.33	72.33	505.00	248.67	128.67
2	599264	684.33	162.67	79.67	538.33	241.67	139.33
3	599265	726.67	152.67	81.67	620.00	286.00	159.67
4	599266	676.00	174.00	74.00	462.00	202.00	108.33
5	599267	731.33	158.67	68.67	511.33	232.67	125.33
6	Kerakeralam	706.67	142.33	70.33	445.00	196.33	116.33
7	ALRCN1	712.67	170.67	75.00	370.67	162.00	113.33
	S.E.M =	3.07	2.14	1.17	2.66	0.70	1.21
	S.E.d =	4.34	3.03	1.66	3.76	0.99	1.70
	CV =	1.09	3.38	5.33	1.33	0.77	2.34
	CD(5%) =	9.11	6.37	3.49	7.89	2.09	3.58
	Significance	S	S	S	S	S	S

References

- Harries HC. The Cape Verde region, 1499-1549: The key to coconut culture in the western Hemisphere. *Turriable quarry* 1977;31:227-231.
- Perera SACN, Dissanayaka HDMAC, Herath HMNB, Meegahakumbura MGMK, Perera L. Quantitative characterization of nut yield and fruit components in indigenous coconut germplasm in Sri Lanka. *International Journal of Biodiversity* 2014, 2014. Article ID 740592. <https://doi.org/10.1155/2014/740592>.
- Iyer RD, Rao EVVB, Sukumaran CK, Jacob PM. Towards an ideal plant type concept in coconut. In: *Proc of Annual Symp. Plantn. Crops. PLACROSYM-IV. (Ed.) S. Vishveshra* 1981, 29-37.
- Natarajan C, Ganesamurthy V, Kavitha M. Genetic variability in coconut. *Elec. Journal of Plant Breeding* 2010;1(5):1367-1370.
- Fisher RA. The correlation between relatives on the supposition of Mendelian inheritance. *Trans R. Soc. Edinb* 1918;52:399-433.
- Nampothiri KUK, Singh HP, Arulraj S, Thamban C. Coconut cultivation technology, Coconut Development Board, Kochi 2000.
- Panase VG, Sukhatme PV. *Statistical Methods for Agricultural workers*, ICAR, New Delhi 1985, 97-128.
- Jerard AB. Studies on the mean performance, variability, association analysis, stability and diversity in coconut (*Cocos nucifera* L) genotypes. Ph.D. Thesis submitted to Tamil Nadu Agricultural University, Coimbatore, India 2002.
- Jayalakshmy VG, Sree Rengasamy SR. Morphological variations in coconut cultivars. *Madras Agric J* 2002;89:154.
- Basavaraju TB, Palanna KB, Lavanya TN, Prashanth M, Arulraj S. Growth and yield performance of coconut hybrids in Maiden tract of Karnataka. *Journal of plantation crops* 2011;39(1):71-73.
- Suchitra M. Studies on performance of certain indigenous and exotic coconut genotypes (*Cocos nucifera* L) MSc. Thesis submitted to Tamil Nadu Agricultural University, Coimbatore, India 2014.
- Jeyabose C, Ganesh S, Mohanan KV, Arulraj S. Estimation of Heterosis of economic importance of coconut. *Journal of Plantation crops* 2008;36(3):151-154.
- Rachel AR, Louis V, Alexia V, Jean X, Ernest. Physiochemical characteristics of kernel during fruit maturation of four coconut cultivars (*Cocos nucifera* L) *African Journal of Biotech* 2010;9(14):2136-2144.
- Selvaraj Vijai KS, Maheswarappa V. Variability and correlation in coconut germplasm for morphological and fruit characters. *Adv. Crop. Sci. Tech* 2016;4(3):221-222.