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Performance of coconut genotypes for yield and nut quality under Coimbatore conditions

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Abstract
Investigations was carried out at Coconut nursery, Department of Spices and Plantation crops, Horticultural College and Research Institute, TNAU, Coimbatore during the year 2014-2018 to evaluate coconut genotypes and hybrids for yield and nut quality. Fourteen genotypes were used for the study. Among the fourteen genotypes the maximum vegetative characters *viz.,* tree height (12.10m) in Andaman ordinary, trunk girth in Chandra Laksha (103.10cm). Maximum number of functional leaves was recorded (35.92) in Andaman Ordinary. Maximum number of inflorescence per palm per year was recorded by Andaman Ordinary (13.26) followed by Laccadive Ordinary (13.06) compared to minimum values recorded by Kulasekaran Dwarf Green (10.51). Maximum number of bunches per palm per year (12.58) was recorded by Andaman ordinary followed by Chandra Sankara (12.11) compared to minimum values recorded in Kulasekaran Green Dwarf (9.01) and Malayan Green Dwarf (9.60). The genotype Laccadive Ordinary recorded whole nut weight (871.00g) and dehusked nut weight (387.61g). Kernal weight was more in Andaman Ordinary (219.62 g) whereas it was low in Kulasekaran Green Dwarf (134.914g). Andaman Ordinary is considered to be more suitable for further crop improvement programme under Coimbatore conditions.

Keywords: Coconut, genotypes, nut yield

Introduction
Coconut (*Cocos nucifera* L.) is one of the most beautiful and useful palm in the world. It is believed to have originated in South East Asia (Indonesia, Malaysia and Philippines) or Micronesia (Harries 1977) [2]. Every part of the tree is useful to human life for some purpose or the other. Hence the coconut palm is endearingly called 'Kalpavrisha' meaning tree of heaven. 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 their main source of food and income. Coconut palm breeders and agronomist are aware of the difference in performance of coconut varieties from location to location and from year to year (Natarajan *et al* 2010) [7]. According to Fisher the continuous variation exhibited by quantitative traits with which the plant breeder includes heritable and non-heritable component. Variability always provides more possibility of selecting desired genotypes. The choice of parents, depends upon variability and proper selection for the desirable characters. The larger the variability in the material more will be the scope for improvement. Studies on the diversity of nut traits in coconut germplasm are meager. This effort was made to document the diversity of morphology, nut and yield characters.

Materials and methods
A field study was conducted at Coconut nursery, Department of Spices and Plantation crops, Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore during the year 2014-2018 to evaluate coconut genotypes and hybrids for yield and nut quality. Fourteen genotypes were used for the study. The genotypes were of 25 years old. The experiment was laid out in a Randomized Block Design with two replications with each genotype representing three palms per replication. The palms are placed at a distance of 7.5 x7.5m. Recommended package of practices were followed for all the genotypes. (Nampoorthiri *et al*., 2000) [6]. Observations were recorded from all the three palms representing each genotype in each replication on vegetative, reproductive and nut characters and the mean values were calculated. The yield of nuts per palm was recorded periodically at each harvest for three years from December 2014 to November 2018 and pooled to get nut yield per palm per year. Data was subjected to statistical analysis as per the standard procedures (Panse and Sukhatme, 1985) [8].

Table 1: List of coconut genotypes and their origin and characters

S. No.	Genotype	Origin	Characters
1.	Andaman Ordinary	India	Tender nut and Copra
2.	Laccadive Ordinary	India	Excellent for toddy and high oil
3.	West Coast Tall	India	Tender nut and Copra
4.	East Coast Tall	India	Tender nut and Copra
5.	Cochin China Tall	Vietnam	Good toddy yielder
6.	Philippines ordinary	Philippines	Tender nut and copra
7.	Chowghat Orange Dwarf	India	Good quality tender nut
8.	Kulasekaran Dwarf Green	India	Good quality tender nut
9.	Malayan yellow Dwarf	Malaysia	Good quality tender nut
10.	Malayan Green Dwarf	Malaysia	Good quality tender nut, Root wilt resistance
11.	Chandra Sankara	India	Tender nut and copra
12.	Chandra Laksha	India	Tender nut and copra
13.	Laksha Ganga	India	Tender nut and copra
14.	Kera Sankara	India	Tender nut and copra

Results and Discussion

In the present investigation significant differences were observed on tree height, trunk girth, Number of leaves and number of inflorescence per palm (Table 2 to 6). The maximum tree height was observed in Andaman Ordinary (12.10m). Highest trunk girth was recorded in Chandra Laksha (103.10cm) and the lowest was recorded in Kulasekaran Green Dwarf (64.42cm). Maximum number of leaves was recorded (35.92) in Andaman Ordinary and the minimum values were recorded in Chowghat Orange Dwarf (27.97) and Kera Sankara (28.33). The number of leaves and length of leaves are important character, since it decides the ability of leaf to support the bunches in the axis and also increases the photosynthetic efficiency. Similar results were also reported by Jerard (2002) [5], Jeyalakshmi and Rengasamy (2002) [4], Basavaraju *et al.* (2011) [1], Suchitra (2014) [12] and Ramanandam *et al.* (2017) [9].

Table 2: of coconut genotypes for vegetative characters

S. No.	Genotypes	Palm height (m)	Trunk girth (cm)
1	Andaman Ordinary	12.10	86.82
2	Laccadive Ordinary	11.35	93.43
3	Philippines ordinary	10.71	90.63
4	West Coast Tall	11.61	90.69
5	East Coast Tall	11.50	85.60
6	Cochin China Tall	10.68	84.80
7	Chowghat Orange Dwarf	4.23	78.39
8	Malayan Yellow Dwarf	11.70	87.57
9	Malayan Green Dwarf	6.49	66.30
10	Kulasekaran Green Dwarf	6.83	64.42
11	Chandra Sankara	8.70	91.08
12	Chandra Laksha	8.50	103.10
13	Laksha Ganga	9.90	93.35
14	Kera Sankara	9.00	91.25
	Mean	9.52	86.25
	SE (d)	0.001	5.59
	CD (0.05 %)	0.002	11.56

Maximum number of inflorescence per palm per year was recorded by Andaman Ordinary (13.26) followed by Laccadive Ordinary (13.06) compared to minimum values recorded by Kulasekaran Dwarf Green (10.51). Maximum number of bunches per palm per year (12.58) was recorded by Andaman ordinary followed by Chandra Sankara (12.11) compared to minimum values recorded in Kulasekaran Green Dwarf (9.01) and Malayan Green Dwarf (9.60). Significantly highest pooled nut yield per palm was recorded by Andaman Ordinary (118.55nuts) compared to lowest by Chandra Sankara (72.79). The genotype Laccadive Ordinary recorded whole nut weight (871.00g) and dehusked nut weight (387.61g). Kernal weight was more in Andaman Ordinary (219.62g) whereas it was low in Kulasekaran Green Dwarf (134.914g),

Table 3: Performance of coconut genotypes for leaf characters

S. No.	Genotypes	Number of leaves	Number of leaflets	Leaf length (m)	Petiole length (m)
1	Andaman Ordinary	35.92	225.56	4.63	1.13
2	Laccadive Ordinary	34.10	224.18	4.40	1.07
3	Philippines ordinary	32.83	218.47	4.37	1.16
4	West Coast Tall	31.29	218.73	4.52	1.10
5	East Coast Tall	30.57	218.06	4.44	1.06
6	Cochin China Tall	30.57	218.18	4.34	1.02
7	Chowghat Orange Dwarf	27.97	219.48	4.32	1.17
8	Malayan Yellow Dwarf	34.68	223.96	4.24	1.15

9	Malayan Green Dwarf	32.26	215.66	4.03	0.94
10	Kulasekaran Green Dwarf	30.99	209.79	3.97	0.92
11	Chandra Sankara	32.92	235.20	4.47	1.18
12	Chandra Laksha	32.47	234.03	4.36	1.15
13	Laksha Ganga	31.33	225.21	4.31	1.04
14	Kera Sankara	28.33	225.03	4.07	1.10
	Mean	31.87	222.25	4.32	1.08
	SE (d)	0.42	1.73	0.05	0.09
	CD (0.05 %)	0.87	3.58	0.10	NS

Similar trends of increase in dehusked nut weight, kernel and shell weight was reported by Jeyabose *et al.* (2008) [3] and Rachel *et al.* (2010) [10]. They also reported that kernel weight is positively associated with dehusked nut weight.

Table 4: Performance of coconut genotypes for floral characters

S. No.	Genotypes	Number of inflorescence	Number of female flowers	Spadix length(cm)	Stalk length (cm)
1	Andaman Ordinary	13.26	17.31	110.02	40.65
2	Laccadive Ordinary	13.06	13.30	95.79	37.73
3	Philippines ordinary	12.24	18.53	102.47	37.36
4	West Coast Tall	12.03	19.73	105.70	31.85
5	East Coast Tall	12.44	19.48	103.28	31.48
6	Cochin China Tall	11.96	18.28	102.47	32.25
7	Chowghat Orange Dwarf	11.37	16.17	95.72	34.93
8	Malayan Yellow Dwarf	11.27	19.17	114.41	35.32
9	Malayan Green Dwarf	11.36	15.32	88.93	33.62
10	Kulasekaran Green Dwarf	10.51	10.65	84.21	33.90
11	Chandra Sankara	11.33	16.55	121.20	35.77
12	Chandra Laksha	11.65	14.17	93.97	35.82
13	Laksha Ganga	11.86	20.03	94.41	37.62
14	Kera Sankara	11.40	18.22	94.51	37.12
	Mean	11.84	16.92	100.51	35.39
	SE (d)	0.25	0.12	4.62	2.39
	CD (0.05 %)	0.53	0.24	9.56	4.95

The maximum number of nut yield may be due to the increased production of inflorescence per palm per year and number of functional leaves per year which might have contributed higher photosynthetic accumulation towards the reproductive phase. Variation of nut characters might be due to both genetic factors and environment factors including soil moisture and nutrient status (Selavaraj and Maheswarappa, 2016) [11]. Andaman Ordinary showed significantly higher quantitative characters compared to other genotypes. Hence the study concluded that the genotype Andaman Ordinary is considered to be more suitable for further crop improvement programme under Coimbatore conditions.

Table 5: Performance of coconut genotypes for nut characters

S. No	Genotypes	Number of bunches/ year/palm	Number of nuts perbunch	Total number of nuts	Whole nut weight (g)
1	Andaman Ordinary	12.58	12.45	118.55	709.02
2	Laccadive Ordinary	11.69	10.50	100.30	871.00
3	Philippines ordinary	11.76	10.19	82.94	729.83
4	West Coast Tall	12.36	11.02	101.85	843.62
5	East Coast Tall	11.39	10.36	97.56	840.78
6	Cochin China Tall	11.49	10.11	74.33	840.54
7	Chowghat Orange Dwarf	11.07	10.44	74.22	593.17
8	Malayan Yellow Dwarf	9.60	9.17	81.00	748.75
9	Malayan Green Dwarf	9.52	8.91	63.47	614.53
10	Kulasekaran Green Dwarf	9.01	8.66	62.61	501.62
11	Chandra Sankara	12.11	10.13	72.79	808.83
12	Chandra Laksha	11.20	10.13	75.58	862.50
13	Laksha Ganga	11.11	10.13	85.13	793.71
14	Kera Sankara	11.05	10.03	80.19	735.04
	Mean	11.14	10.16	83.61	749.50
	SE (d)	0.16	0.30	0.89	28.05
	CD (0.05 %)	0.32	0.63	1.86	57.98

Table 6. Performance of coconut genotypes for nut characters

S. No	Genotypes	Dehusked nut weight (g)	Kernal weight (g)	Oil content (%)
1	Andaman Ordinary	344.38	219.62	69.36
2	Laccadive Ordinary	387.61	216.72	70.55
3	Philippines ordinary	362.26	202.79	68.80
4	West Coast Tall	380.52	187.02	66.64
5	East Coast Tall	369.52	206.07	68.07
6	Cochin China Tall	379.43	200.53	68.50
7	Chowghat Orange Dwarf	346.85	185.96	66.28
8	Malayan Yellow Dwarf	322.69	165.82	66.39
9	Malayan Green Dwarf	320.92	150.44	66.31
10	Kulasekaran Green Dwarf	319.46	134.91	64.07
11	Chandra Sankara	340.64	187.88	69.13
12	Chandra Laksha	310.57	184.57	65.61
13	Laksha Ganga	304.92	172.96	68.77
14	Kera Sankara	297.49	171.62	66.23
	Mean	341.95	184.78	67.48
	SE (d)	8.15	10.84	0.06
	CD (0.05 %)	16.85	22.41	0.13

References

1. 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):71-173.
2. Harries HC. The Cape Verde region, 1499-1549; the key to coconut culturein the western Hemisphere. Turriable quary. 1977; 31:227-231.
3. Jayabose C, Ganesh S, Mohanan KV, Arulraj S. Estimation of Heterosis of economic importance of coconut. Journal of Plantation Crops. 2008; 36(3):151-154.
4. Jayalakshmy VG, Sree Rengasamy SR. Morphological variations in coconut cultivars. Madras Agric J. 2002; 89:154.
5. 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.
6. Nampoothiri KUK, Singh HP, Arulraj S, Thamban C. Coconut cultivation technology, Coconut development Board, Kochi, 2000.
7. Natarajan C, Ganesamurthy V, Kavitha M. Genetic variability in coconut. Elec. J Plant breeding. 2010; 1(5):1367-1370.
8. Panse VG, Sukhatme PV. Statistical Methods for Agricultural Workers, ICAR, New Delhi, 1985, 97-128.
9. Ramanandam G, Ravikumar V, Padma X, kalpana M, Maheswarappa V. Potential coconut (*Cocos nucifera*) hybrids for yield and quality for coastal region of Andhra Pradesh (India). Indian Journal of Agric. Sci. 2017; 87(8):1073-1076.
10. Rachel AR, Louis V, Alexia V, Jean X, Ernest. Physicochemical characteristics of kernel during fruit maturation of four coconut cultivars (*Cocos nucifera L*) African J biotech. 2010; 9(14):2136-2144.
11. 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.
12. 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