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Variability and Correlation in Coconut Germplasm for Morphological and Fruit Characters

Vijai Selvaraj KS[1]* and Maheswarappa HP[2]

[1]*Coconut Research Station, Veppankulam-614 906, Tamil Nadu, India*
[2]*Project Coordinator, AICRP on Palms, CPCRI, Kasaragod, Kerala-671 124, India*

Abstract

A set of twelve genotypes received from Central Plantation Crop Research Institute, Kasaragod, maintained and evaluated at Coconut Research Station, Veppankulam were studied for variability and character correlation among the fruit/nut characters. A wide range of variability was observed among the genotypes studied. Correlation studies revealed that significant positive correlation among the fruit/nut characters were observed. So selection of each character helps simultaneously on the improvement of other characters which were coinciding each other.

Keywords: Oilseed crop; Germplasm; Non heritable; Dehusked

Introduction

Coconut, an important perennial oilseed crop which provides food, oil, health drink (Tender nut water), medicine, fuel, etc., to the man kind and improve the lively hood of the farming people. According to Fisher [1] the continuous variation exhibited by quantitative traits with which the plant breeder includes heritable and nonheritable components. Variability always provides more possibility of selecting desired types [2]. Selection is effective only for variations which are heritable in nature. 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. Nut characters are of prime importance in classifying coconut varieties. Studies on diversity of nut traits in coconut germplasm are meagre. This effort was made to document the diversity of morphology, nut and yield characters in coconut.

Materials and Methods

Twelve coconut genotypes *viz.,* Kalpa Raksha, Aliyarnagar Tall, Kalpathatu, IND 057, IND 050, IND034, VPM3, Chandra Kalpa, IND 040, Kalpadhenu, CRP509 and CRP509 were received from CPCRI, Kasaragod and planted at Coconut Research Station, Veppankulam. The morphological characters *viz.,* plant height, plant girth, number of functional leaves, petiole length, length of leaves, length of leaflet, breath of leaves and number of leaf lets (left and right) were taken periodically. The fruit/ nut characters *viz.,* whole nut weight, dehusked nut weight, kernel thickness, kernel weight, shell weight, copra weight, nut length and nut breath and cumulative yield of each palm over period of nine years were recorded. Mean performance of these germplasm was analyzed. Variability and correlation studies were done for morphological and nut characters were studied using SAS, software version, 4.0.

Results and Discussion

The mean, range and variability for various morphological and nut characters were given in Tables 1 and 2. The mean performance among the germplasm were higher in VPM3 for length of petiole (1.36 m), no of leaflets (125 left, 123 right). IND 034 registered highest whole nut weight (1345.0 g), dehusked nut weight (850.5 g), kernel weight (400.0

S No	Germplasm	Plant ht (m)	Girth (m)	No. of leaves	Length of petiole (m)	Length of leaf (cm)	Length of leaflet (cm)	Breadth of leaflet (cm)	No. of leaflets (cm)	
									L	R
1.	Kalpa Raksha	7.68	0.92	30.50	1.13	4.35	121.5	4.50	105.0	98.50
2.	Aliyarnagar Tall	9.25	0.80	30.50	1.18	4.34	129.0	5.00	106.0	105.0
3.	Kalpatharu	7.71	0.80	29.00	1.17	3.36	94.0	4.50	114.5	113.0
4.	IND 057	9.54	0.87	28.50	1.30	3.99	126.5	5.80	107.5	105.0
5.	IND 050	6.70	0.98	30.50	1.07	3.95	105.0	5.25	113.5	109.0
6.	IND 034	7.26	0.73	34.00	1.10	3.70	110.0	5.90	108.0	108.5
7.	VPM 3	7.45	0.84	31.50	1.36	4.18	128.0	5.25	125.0	123.0
8.	Chandra kalpa	8.25	0.89	25.50	1.20	3.58	140.0	5.90	117.0	113.5
9.	IND 040	8.32	0.79	28.00	1.24	3.78	102.5	5.80	102.5	99.5
10.	Kalpadhenu	9.22	0.93	34.00	1.18	3.48	98.0	6.00	98.0	95.0
11.	CRP 509 (MPM)	8.18	0.91	33.00	1.31	4.00	113.5	6.40	113.5	111.0
12.	CRP 509 (VPM)	9.24	0.6	33.50	1.18	3.75	106.5	6.20	111.0	108.0
	CV	39.52	16.45	12.85	14.78	11.14	36.78	15.38	13.8	18.3

Table 1: Mean and variability for morphological characters in coconut.

***Corresponding author:** Vijai Selvaraj KS, Coconut Research Station, Veppankulam-614 906, Tamil Nadu, India, Tel: +919489320948; E-mail: ksvijayselvaraj@gmail.com

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S No	Germplasm	Whole nut wt. (g)	Dehusked nut wt. (g)	Thickness of kernel (cm)	Weight of kernel (g)	Weight of shell (g)	Weight of copra (g)	Nut length (cm)	Nut breadth (cm)
1	Kalpa Raksha	763	435.3	1.3	275.63	121.5	135.3	17.6	13.3
2	Arasampatti tall	742.5	420.5	1.2	215.0	115.7	115.3	19.9	14.3
3	Kalpatharu	800.0	455.0	1.4	250.7	130.5	118.3	21.2	18.1
4	IND 057	940.0	590.0	1.3	320.5	140.0	155.2	21.0	15.6
5	IND 050	1025.0	695.5	1.2	330.2	145.3	185.5	27.7	16.3
6	IND 034	1345.0	850.5	1.2	400.0	185.0	203.0	23.6	15.4
7	VPM 3	920.5	569.5	1.3	300.5	145.0	130.5	20.4	15.5
8	Chandra kalpa	703.0	425.0	1.0	205.7	92.5	85.7	16.0	13.5
9	IND 040	485.5	305.4	1.2	145.0	115.3	85.0	18.5	14.3
10	Kalpa Dhenu	1025.5	585.5	1.3	295.0	163.5	137.5	21.5	17.8
11	CRP 509 (MBM)	785.5	485.3	1.3	278.5	126.5	147.5	20.4	15.4
12	CRP 509 (VPM)	725.0	430.5	1.4	230.3	125.5	135.8	18.9	14.3
	Range	485.5- 1345	305.4- 850.5	1- 1.4	145- 400	92.5- 185	85- 203	16-27.7	13.3-18.1
	CV	12.3	16.4	23.1	15.6	26.7	21.5	18.6	11.5
S No	**Germplasm**	**Whole nut wt. (g)**	**Dehusked nut wt. (g)**	**Thickness of kernel (cm)**	**Weight of kernel (g)**	**Weight of shell (g)**	**Weight of copra (g)**	**Nut length (cm)**	**Nut breadth (cm)**
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	CV	12.3	16.4	23.1	15.6	26.7	21.5	18.6	11.5

Table 2: Mean and variability for nut characters and yield in coconut.

Traits	Whole nut wt. (g)	Dehusked nut wt.(g)	Thickness of kernel (cm)	Weight of kernel (g)	Weight of shell (g)	Weight of copra (g)	Nut length (cm)	Nut breadth (cm)
Whole nut wt. (g)	1							
Dehusked nut wt.(g)	0.352*	1						
Thickness of kernel (cm)	0.536*	0.536*	1					
Weight of kernel (g)	0.653*	0.365*	0.453*	1				
Weight of shell (g)	0.564*	0.432*	0.531*	0.421*	1			
Weight of copra (g)	0.321*	0.452*	0.532*	0.452*	0.257*	1		
Nut length (cm)	0.753*	0.654*	0.873*	0.456*	0.356*	0.456*	1	
Nut breadth (cm)	0.234*	0.523*	0.425*	0.783*	0.236v	0.423*	0.465*	1

Table 3: Correlation of nut characters in coconut.

g), shell weight (185.0 g), copra weight (203.0 g). Variability parameters indicated that high variability exists in kernel weight, copra weight, nut length and whole nut weight. Hence all the characters except nut breath were good for further improvement through selection (Table 3).

Correlations analysis revealed significant and positive association between all the nut characters studied. Ganesamurthy et al. [3] reported the similar results in tall coconut varities. Satyabalan and Mathew [4] also reported the same results in West Coast Tall coconut varities. So, selection based on one character will lead simultaneous improvement on other correlated characters also. The genotypes with desirable characters can be profitably exploited in coconut breeding programme. It can be concluded that a wide range of variability and significant differences between genotypes for various traits existed in the material studied. The results presented in this paper indicate that the germplasm of coconut were important genetic reservoir of variability.

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