

GENETIC VARIABILITY IN NINE CULTIVARS OF COCONUT (*COCOS NUCIFERA* L.)

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Abstract: An experiment conducted at the Instructional Farm, College of Horticulture, Vellanikkara, Thrissur on nine coconut cultivars during 1995-96 in RBD with three replications and three palms per plot revealed the absence of significant variation among most of the characters. Economic characters showed higher genotypic coefficients of variation (16 to 22 %) compared to vegetative and reproductive characters. Among all the characters, heritability was maximum for petiole length (52 %) followed by the economic characters, per cent oil content and nut yield (45% each).

Key words: Coconut, coefficient of variation, genetic variability, heritability

INTRODUCTION

In coconut (*Cocos nucifera* L.), identification of elite genotypes has a major role in the crop improvement programmes. Intervarietal and intravarietal variability have been reported in this crop for several characters (Louis, 1981). Total phenotypic variation is conditioned by the joint action of genes and environment and the response to selection is governed by the proportion of genetic variation.

Hence, the present study was undertaken to estimate genetic variability for yield and component characters in coconut from a set of nine genotypes including three hybrids.

MATERIALS AND METHODS

The experiment was conducted at the Instructional Farm, College of Horticulture, Vellanikkara during 1995-96 on nine coconut varieties planted in 1976 in RBD with three replications and three palms per plot. The palms were observed for 15 characters, which included vegetative, reproductive and economic characters. Oil content (%) of the nuts was estimated using the cold percolation method (Kantha and Sethi, 1957). The data on all characters were subjected to ANOVA and their genotypic and phenotypic coefficients of variation and heritability (broad sense) were estimated.

RESULTS AND DISCUSSION

Absence of varietal variance for most of the characters studied (Table 1) differs from the general trend of previous observations.

Balakrishnan and Namboodiri (1987) reported variation for trunk girth and leaf number among 24 cultivars. However, Ramanathan *et al* (1992) reported absence of variability for functional leaves. Significant differences were observed for petiole length and leaf length, which are in agreement with the findings of Pillai *et al.* (1991).

Reproductive characters showed lack of variability among cultivars. Similar results were reported by Vanaja (1993) for female flowers and fruit set. But the above results are contradictory to the previous reports in general (Rajamony *et al.*, 1983). However, Laccadive Ordinary produced the highest values for spadix production, spadix length and branches per spadix, besides being endowed with high female flower production and fruit set (%), whereas Jawa was characterised by the lowest values for all the reproductive characters.

Varieties showed differences with respect to nut yield and oil content (%). But it was not realized in terms of the total yield in copra or oil. This was due to the inverse relationship of these characters with respect to nut yield and oil content (%). The hybrid West Coast Tall x Choughat Yellow Dwarf had the highest nut yield but only moderate oil content (%), whereas Laccadive Ordinary x Gangabondam was characterized by high nut yield but its oil content (%) was the lowest. Significant variation was found in several works for nut yield (Potty *et al.*, 1980 and Balakrishnan and Kannan, 1991) and oil content (Balakrishnan and Namboodiri, 1987). Hybrids of Laccadive Ordinary and West Coast Tall with Gangabondam had low nut yield

Table 1. Mean, variability and heritability (broad sense) of various characters

Characters	Overall mean	Level of significance	GCV (%)	PCV (%)	H ² (%)
Trunk height (m)	8.42	0.06	6.79	11.84	32.9
Trunk girth (m)	0.89	0.11	4.06	8.21	24.5
Total leaves	40.43	0.85	0.00	3.37	0.0
Leaves per year	11.42	0.92	0.00	7.98	0.0
Petiole length (m)	1.32	0.01**	5.51	7.68	51.5
Leaf length (m)	6.55	0.05*	3.48	5.91	34.7
Spadices per year	11.30	0.07	5.00	9.09	30.2
Spadix length (cm)	70.83	0.49	0.00	10.35	0.0
Branches per spadix	33.50	0.47	0.14	9.50	0.0
Female flowers per spadix	26.79	0.09	15.76	30.27	27.1
Fruit set (%)	54.91	0.17	7.77	17.77	19.1
Copra yield (kg palm ⁻¹)	12.66	0.19	15.95	37.73	17.9
Oil content (%)	60.81	0.02*	16.09	24.00	45.0
Oil yield (kg palm ⁻¹)	7.60	0.19	16.76	39.90	17.6
Nut yield (no. palm ⁻¹)	63.60	0.02*	22.32	33.35	44.8

Note: Level of significance refers to the significance of mean squares due to cultivars

Table 2. Mean performance of nine cultivars for certain characters

Cultivars	Characters			
	Petiole length (m)	Leaf length (m)	Oil content (%)	Nut yield (no./palm)
West Coast Tall x Choughat Yellow Dwarf	1.31	6.71	53.72	84.36
West Cost Tall x Gangabondam	1.33	6.37	60.40	58.36
Laccadive Ordinary x Gangabondam	1.37	7.01	35.07	74.45
West Coast Tall	1.19	6.47	64.20	75.44
Philippines	1.28	6.26	64.00	55.47
Jawa	1.24	6.80	74.13	45.47
Cochin China	1.34	6.54	59.27	58.33
New Guinea	1.49	6.70	63.07	36.67
Laccadive ordinary	1.32	6.07	73.40	83.86
CD(5%)	0.12	0.54	18.74	27.27

Note: Characters for which significant variation was absent are not included in the table

and oil content (%) than their respective female parents (Table 2). All characters except female flowers per spadix and economic characters showed low coefficients of genotypic and phenotypic variation (Table 1). Coefficient of variation, high for female flowers and low for spadix production and fruit set (%) highlight the importance of the former for nut yield, which showed high coefficient of variation in the present study as well as in previous works (Reddy *et al.*, 1980 and Vanaja, 1993).

Heritability was nil in the case of total leaves, leaves per year, spadix length and branches per spadix owing to the absence of genetic variance (Table 1). For other characters, it ranged from 17.6 to 51.5 per cent. High heritability shown by nut yield (44.8%), second only to petiole length (51.5%), is in agreement with the findings of Lakshmanachar (1959). Similarly, high heritability (45%) for oil content (%) observed in the present study is supported by the previous report of Meunier *et al.* (1984).

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