Variability and Correlation in Coconut Germplasm for Morphological and Fruit Characters

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Abstract

A set of twelve genotypes received from Central Plantation Crop Research Institute, Kasaragod, maintained and evaluated at Coconut Research Station, Vepankulam 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. According to Fisher [1] the continuous variation exhibited by quantitative traits with which the plant breeder includes heritable and nonheritable components. 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, Vepankulam. The morphological characters viz., plant height, plant girth, number of functional leaves, petiole length, length of leaves, length of leaflet, breadth of leaflet, number of leaflets (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 g) and breadth of leaflet (1.21 cm). IND 034 also recorded highest in number of leaflets (209 left, 208 right). IND 040 was the highest in petiole length (1.18 m). Table 1: Mean and variability for morphological characters in coconut.

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     | Kalpadhenu     | 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


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

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Received February 16, 2016; Accepted April 04, 2016; Published April 11, 2016


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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 breadth were good for further improvement through selection (Table 3).

Correlations analysis revealed significant and positive association between all the nut characters studied. Ganeshmurthy et al. [3] reported the similar results in tall coconut varieties. Satyabalan and Mathew [4] also reported the same results in West Coast Tall coconut varieties. So, selection based on one character will lead simultaneous improvement also reported the same results in West Coast Tall coconut varieties. So, selection based on one character will lead simultaneous improvement 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.

**References**


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

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

**Table 3:** Correlation of nut characters in coconut.


**Citation:** Vijai Selvaraj KS, Maheswarappa HP (2016) Variability and Correlation in Coconut Germplasm for Morphological and Fruit Characters. Adv Crop Sci Tech 4: 221. doi:10.4172/2329-8863.1000221