

IMPACT OF SEEDNUT SELECTION ON HERITABILITY,
GENOTYPIC AND PHENOTYPIC CORRELATIONS
IN ARECANUT

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ABSTRACT

The heritability studies on the six morphological characters and two yield characters in arecanut were carried out for the data derived from unselected nuts from selected mother palms and selected nuts from selected mother palms in order to see the impact of seednut selection. The yield characters recorded a very low heritability. However, the selection of seednuts increased the heritability from 0.05 to 0.25 in the case of number of nuts and 0.08 to 0.29 in the case of weight of nuts. The other morphological characters excepting height and number of leaves showed increased heritability due to seednut selection.

The impact of seed nut selection on yield was further established by the high genotypic and phenotypic correlations for the yield characters with seed weight, seedling girth and age at 1st flowering thereby highlighting the importance of seednut selection.

INTRODUCTION

The importance of seed and seedling selection in crop husbandry has been well recognised for a long time. The role of selected planting material in arecanut has been widely discussed by Bavappa and Ramachander (1967 a, b) Ramachander and Bavappa (1972). But so far, no attempt has been made to study the effect of seednut selection on heritability genotypic and phenotypic correlations. Keeping this in view the present study was conducted.

MATERIALS AND METHODS

The experimental material consisted of two treatments viz., unselected (Tu) and selected (Ts) seednuts from selected mother



palms. About 50 seednuts in each case from each of six selected mother palms were planted. The data on seed weight, days taken for germination, seedling girth, seedling height and number of leaves (at the time of transplanting), age at first flowering and the yield characters viz., number of nuts and fresh weight of nuts (averaged over 4 years 1972-1976) were subjected to half-sib analysis (Singh and Chaudhary, 1979) for determining genotypic and phenotypic correlations and heritabilities.

RESULTS AND DISCUSSION

Effect of seednut selection on yield and morphological characters

On testing the efficacy of selection of seednuts through a significance test the seed weight alone showed a significant difference between the treatments Tu and Ts and none of the remaining morphological characters and yield characters showed any direct impact of selection, though a positive trend in most of the characters excepting age at first flowering was observable. Perusal of Table 1 reveals that there is a high degree of variability in almost all the characters excepting girth and number of leaves and this might be one of the causes for insignificant effect of seednut selection. Another cause for the insignificant difference observed between the progenies of unselected nuts and selected nuts might be due to the fact that these 'unselected nuts' were obtained from the selected

Table 1. Mean values and range of various characters in progenies of selected and unselected nuts from selected mother palms.

Character	Tu (unselected nuts)		Ts (selected nuts)	
	Mean	Range	Mean	Range
Seed wt. (g)	30.92	15.0-39.0	35.40	24.0-56.0
Germination (days)	62.56	30.0-95.0	60.69	32.0-93.0
Girth (cm)	0.95	0.6-1.4	0.99	0.8-1.4
Height (cm)	39.56	12.0-63.0	41.40	20.0-65.0
No. of leaves	2.26	2-3	2.31	2-3
Flowering period (yrs.)	4.42	3.1-6.3	4.47	3.3-6.2
Number of nuts	140.67	4.3-422.0	141.85	4.4-437.0
Fresh weight of nuts (kg)	5.11	0.2-16.0	5.14	0.1-18.0

mother palms of the progeny garden of the station, which in turn were the progenies of selected mother palms of reputed gardens (well maintained) of farmers. This series of selection in the earlier generations might have contributed for the present results.

Effect of seednut selection on genotypic and phenotypic correlations

The study on genotypic and phenotypic correlations of yield with the morphological characters showed that seed weight, seedling girth and age at first flowering had high significant correlations with the yield characters (Tables 2 & 3). While comparing the

Table 2. Genotypic correlations of characters with number and fresh weight of nuts.

Character	No. of nuts			Fresh wt. of nuts		
	Tu	Ts	Diff.	Tu	Ts	Diff.
Seed wt.	.. 0.12	0.38*	S	0.12	0.38*	S
Germination	.. -0.10	-0.17	NS	-0.10	-0.21	NS
Girth	.. -0.22	-0.69*	S	-0.35	-0.66*	S
Height	.. -0.15	-0.24	NS	-0.14	-0.20	NS
No. of leaves	.. 0.01	0.02	NS	0.01	0.03	NS
Flowering period	.. -0.40*	-0.98*	S	-0.22	-0.95*	S

* indicates significant correlation at 5% level.

S indicates significant, NS indicates non-significant difference.

Table 3. Phenotypic correlations of characters with number and fresh weight of nuts.

Character	No. of nuts			Fresh wt. of nuts		
	Tu	Ts	Diff.	Tu	Ts	Diff.
Seed wt.	.. 0.09	0.33*	S	0.10	0.35*	S
Germination	.. -0.08	-0.17	NS	-0.10	-0.19	NS
Girth	.. -0.10	-0.60*	S	-0.18	-0.58*	S
Height	.. -0.13	-0.24	NS	-0.10	-0.20	NS
No. of leaves	.. -0.05	-0.02	NS	-0.01	0.02	NS
Flowering period	.. -0.32*	-0.89*	S	-0.20	-0.87*	S

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performance of selected nuts and unselected nuts, a significant improvement in correlation was noted for the yield characters with seed weight, seedling girth and age at first flowering, thus highlighting the favourable impact of seednut selection on the genotypic and phenotypic correlations.

Effect of seednut selection on heritability estimates

Heritability values (Table 4) indicated that the selection of seednuts resulted in an improvement in heritability for all the characters except for height and number of leaves. The heritabilities for the yield characters (Number and fresh weight of nuts) were found to be very low, thereby suggesting that selection based on yield alone will not be effective.

A study of the co-heritabilities (a measure of combined transmissibility of gene frequencies) of yield components with that of yield characters (Table 5) showed that, here too selection had a

Table 4. Heritability estimates of various characters.

Character	Tu (unselected nuts)	Ts (selected nuts)
Seed wt.	.. 0.14	0.33
Germination	.. 0.53	0.65
Girth	.. 0.08	0.25
Height	.. 0.59	0.58
No. of leaves	.. 0.23	0.23
Flowering period	.. 0.15	0.26
No. of nuts	.. 0.06	0.25
Fresh wt. of nuts	.. 0.08	0.29

Table 5. Co-heritabilities of characters with yield characters.

Character	No. of nuts		Wt. of nuts	
	Tu	Ts	Tu	Ts
Germination	.. 0.51	0.58	0.50	0.63
Height	.. *	0.81	*	0.81
No. of leaves	.. *	0.27	*	0.22
Flowering period	.. 0.23	0.54	0.16	0.55

* indicates that they are unestimatable.

favourable effect. High co-heritabilities were observed for germination, height and age at first flowering, thereby highlighting the importance of these characters in the selection of mother palms.

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