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SELECTION INDICES IN ROSELLE (*HIBISCUS SABDARIFFA* L.)

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ABSTRACT

Selection indices were constructed using 45 genotypes of roselle (*Hibiscus subdariffa* L.). Four characters, viz., plant height, basal diameter, fibre weight/plant and fibre–wood ratio were considered for the formation of selection indices for fibre yield in roselle. The results indicated that all the four characters exhibited high genetic advance and are useful for simultaneous improvement of these characters. Efficiency of fibre–wood ratio was more as compared to the efficiency of fibre weight, suggesting that fibre–wood ratio is an important trait to be considered while making selection for fibre yield in roselle.

Key words: *Hibiscus sabdariffa*, roselle, selection indices.

Yield is a complex quantitative character, influenced by environmental fluctuations. Therefore, direct selection for yield as such will not be reliable. Hence selection criteria based on yield components would be helpful in selecting suitable plant types. The knowledge of interrelationship between yield components and the relative weightage that should be given to different yield components to obtain maximum gain is, therefore, most important.

Discriminant function analysis developed by Fisher [1] and first applied by Smith [2] gives information on proportionate weightage that should be given to a particular yield component. Construction of selection indices using discriminant function technique will be highly helpful to discriminate desirable genotypes on the basis of their phenotypic performance, especially in *Hibiscus sabdariffa* L.).

MATERIALS AND METHODS

Forty five genotypes of roselle were sown in replicated randomized block design with three replications. Recommended agronomic practices were followed. Ten plants selected at random per plot were used for recording observations. Data on plant height, basal diameter, fibre weight per plant and fibre–wood ratio were used to construct selection indices, and genetic advance was calculated by the method of Brim et al. [3] with the help of phenotypic and genotypic variances and covariances.

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Selection indices were constructed for all possible combinations of the four yield contributing characters. Relative efficiencies over selection for fibre yield/plant alone and fibre–wood ratio alone were computed for all the characters.

RESULTS AND DISCUSSION

All the indices were found to be superior to direct selection for fibre yield/plant (Table 1). In the present study, inclusion of characters one by one in the function resulted in increased efficiency of selection. Similar results were reported by Maiti et al. [4] in jute and Tikka et al. [5] in linseed.

Table 1. Selection index, discriminant function, expected genetic advance and relative efficiency in roselle genotypes

Selection index	Discriminant function	Genetic advance	Relative efficiency for	
			fibre yield per plant	F:W ratio
Plant height	0.0400	1.26	115.6	140.4
Basal diameter	0.3288	0.76	69.7	84.5
Fibre yield/plant	0.0226	1.09	100.0	121.4
Fibre–wood ratio	1.3475	0.90	82.4	100.0
Pl. ht.–bas. dia.	0.0400 + 0.3288	1.47	134.9	163.7
Pl. ht.–fib. yld.	0.0400 + 0.0226	1.67	152.6	185.3
Pl. ht.–F:W ratio	0.0400 + 1.3475	1.54	141.3	171.5
Bas. dia.–fib. yld.	0.3288 + 0.0226	1.33	121.7	147.8
Bas. dia–F:W ratio	0.3288 + 1.3475	1.17	107.4	130.4
Fib. yld.–F:W ratio	0.0226 + 1.3475	1.40	128.0	155.4
Pl. ht.–bas. dia.–fib. yld.	0.0400 + 0.3288 + 0.0226	1.83	167.8	203.7
Pl. ht.–bas. dia.–F:W ratio	0.0400 + 0.3288 + 1.3475	1.72	157.7	191.2
Pl. ht.–bas. dia.–F:W ratio	0.0400 + 0.0226 + 1.3475	1.89	172.4	209.3
Bas. Dia.–fib. yld.–F:W ratio	0.3288 + 0.0226 + 1.3475	1.59	145.7	176.9
Pl. ht.–bas. dia.–Fib. yld.–F:W ratio	0.0400 + 0.3288 + 0.0226 + 1.3475	2.03	186.0	225.8

Pl. ht.—plant height, bas. dia.—basal diameter, fib. yld.—fibre yield, and F:W—fibre–wood.

Fibre yield/plant showed a genetic advance of 1.09 while plant height and fibre weight/plant recorded still higher genetic advance (1.67). When three characters, i.e., plant height, basal diameter and fibre yield/plant, were taken together, the genetic advance increased to 1.83. The function which included all the four characters gave the highest genetic advance (2.03) and the highest relative efficiencies of 186.0 and 225.8% over fibre yield and fibre–wood ratio alone, respectively [6].

The study further revealed that the index which includes more than one character gave high genetic advance, suggesting the utility of construction of selection indices for affecting simultaneous improvement of several characters. The present study indicates that plant height, basal diameter, fibre yield/plant and fibre–wood ratio are the traits needed for index construction in roselle. The index based on all the four characters gave the most efficient genetic advance and may be used for simultaneous improvement of these characters.

The relative efficiencies indicated that the efficiency over fibre–wood was more when compared to that over fibre yield, suggesting the fibre–wood ratio as an important trait for consideration while making selection in roselle.

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