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HERITABILITY AND CORRELATION STUDIES IN KENAF (*HIBISCUS CANNABINUS* L.)

D. SUBRAMANYAM, P. V. RAMA KUMAR, B. KRISHNAMURTHY AND S. ISMAIL

Department of Genetics and Plant Breeding, Agricultural College Bapatla

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ABSTRACT

Eight hybrids involving four lines (HC 583, AMC 6, AMC 8 and AMC 53) and two testers (AMC 15 and AMC 7) were tested to find out the extent of variability, heritability, genetic advance, and correlations for ten quantitative characters. Fibre weight per plant, green plant weight and bark thickness showed high heritability, indicating that selection in early generations would be effective. Correlation studies revealed that the characters studied are positively associated among themselves except internodal length and days to flowering which showed negative correlation. Selection for plant height, number of nodes, basal stem diameter, green plant weight, fibre length, fibre-wood ratio, and bark thickness would simultaneously improve fibre weight (yield).

Key words: Genetic parameters, fibre yield, kenaf.

Before launching any breeding programme, a thorough knowledge of the nature and magnitude of genetic variability and the extent of association between yield and yield components is essential. Similarly, heritability estimates may be helpful in selecting superior individuals. The present investigation has been undertaken to determine genetic variability and character correlations in kenaf.

MATERIALS AND METHODS

Eight cross combinations were obtained using HC 583, AMC 6, AMC 8 and AMC 53 as female parents and AMC 15 and AMC 7 as male parents. Variability, heritability (broad sense) genetic advance and correlations were worked out for plant height, number of nodes, internodal length, days to 50% flowering, basal stem diameter, green plant weight, fibre weight per plant, fibre length, fibre–wood ratio and bark thickness [1, 2].

RESULTS AND DISCUSSION

A comparison of the range and mean values of the parents and the crosses of kenaf (Table 1) showed that the mean values of the F_1s were higher than the parents for plant height, number of nodes, internodal length, basal stem diameter, green plant weight, fibre

Table 1. Mean, range, genotypic (GCV) and phenotypic coefficients of variation (PCV), heritability and genetic advance in eight F_1s and six parents in kenaf

Character	Parents		Crosses		GCV	PCV	Heritability (%)	Genetic advance
	mean	range	mean	range	(%)	(%)		
Plant height	2.91	2.90–3.01	3.05	2.96–3.11	2.36	4.47	27.95	7.71
Number of nodes	69.72	67.46–73.73	76.03	68.53–83.06	5.48	9.64	32.35	470.97
Days to 50% flowering	83.78	81.33–82.33	83.04	81.66–84.66	1.83	2.09	88.15	276.83
Internodal length	3.95	3.95–4.16	4.06	3.79–4.31	2.11	7.39	8.16	5.01
Basal stem diameter	2.22	2.28–2.32	2.62	2.42–2.87	8.60	12.05	50.93	30.94
Green plant weight	629.94	611.70–619.33	988.33	783.30–1211.20	23.31	31.40	55.09	29747.56
Fibre weight/plant	17.41	16.96–17.28	27.88	21.73–33.90	23.86	31.37	57.89	875.33
Fibre length	2.66	2.67–2.76	2.85	2.77–2.89	3.25	5.08	41.01	11.89
Fibre–wood ratio	0.30	0.29–0.30	0.36	0.33–0.38	8.38	11.28	55.65	4.36
Bark thickness	0.19	0.17–0.22	0.24	0.22–0.26	11.84	14.43	64.48	4.29

weight per plant, fibre length, fibre-wood ratio and bark thickness. Days to flowering showed reduction in F_1 as compared to the parents, indicating greater earliness in F_1 than in the parents. This is a desirable situation for reducing the crop duration [3, 4].

Genotypic and phenotypic coefficients of variation, broad sense heritability and genetic advance were estimated for all the characters (Table 2). The phenotypic coefficients of variation for the characters were higher than the genotypic coefficients of variation which may be due to higher degree of interaction of the genotypes with environment [3].

High heritability values were observed for fibre weight per plant, green plant weight and bark thickness. This indicates that selection for these characters in early generations would be effective [3, 5].

Correlation coefficients between yield and its components for parents and crosses showed that majority of characters had significant positive correlations except internodal length and days to flowering, which showed negative correlation (Table 3). The correlation

Table 2. Corelation coefficients for different characters in parents of kenaf crosses

Character	Number of nodes	Internodal length	Days to 50% flowering	Basal stem diameter	Green weight per plant	Fibre weight per plant	Fibre length	Fibre–wood ratio	Bark thickness
Plant height	0.79**	0.12	−0.33	0.49**	0.54*	0.57*	0.99**	0.66**	0.15
Number of nodes		−0.42	−0.18	0.62**	0.66**	0.69**	0.80**	0.80**	0.09
Internodal length			−0.31	−0.31	−0.43	−0.43	0.13	−0.47*	0.02
Days to 50% flowering				−0.20	0.04	−0.005	−0.32	−0.05	0.22
Basal stem diameter					0.91**	0.91**	0.50*	0.86**	0.51*
Green weight per plant						0.99**	0.54*	0.89**	0.56*
Fibre weight per plant							0.57*	0.91**	0.53*
Fibre length								0.65**	0.17
Fibre–wood ratio									0.32

*,**Significant at 5% and 1% levels, respectively.

coefficients were higher in the F1s than their respective parents. Correlation studies indicate that basal stem diameter, green plant weight, fibre length, plant height and bark thickness are the major components contributing to fibre weight in kenaf [3–6]. Therefore, selection for tall and sturdy stems with thicker bark will improve the fibre yield in kenaf.

Table 3. Correlation coefficients for different characters in F_1 generation of crosses in kenaf

Character	Number of nodes	Internodal length	Days to 50% flowering	Basal stem diameter	Green weight per plant	Fibre weight per plant	Fibre length	Fibre–wood ratio	Bark thickness
Plant height	0.73**	−0.23	−0.40	0.36	0.55**	0.56**	0.99**	0.46*	0.44*
Number of nodes		−0.34	−0.22	0.34	0.60**	0.59**	0.73**	0.53**	0.42*
Internodal length			0.08	−0.74**	−0.65**	−0.66**	−0.24	−0.63**	−0.72**
Days to 50% flowering				−0.18	−0.28	−0.36	−0.41*	−0.25	−0.20
Basal stem diameter					0.83**	0.85**	0.38	0.83**	0.98**
Green weight per plant						0.99**	0.57**	0.87**	0.84**
Fibre weight per plant							0.57**	0.93**	0.85**
Fibre length								0.48*	0.46*
Fibre–wood ratio									0.84**

*,**Significant at 5% and 1% levels, respectively.

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