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Character Association and Path Analysis for Fibre Yield and Component Characters in Roselle (*Hibiscus sabdariffa* L.)

Key words : Character association, Correlation, Path analysis, Roselle.

Roselle is an important fibre yielding crop in India next to jute and the fibre is extracted from the bast region of stem. Fibre yield by itself may not be the best criterion for selection as it is quantitatively inherited and influenced by genetic factors as well as environments. The correlation and path analysis provides information about the association between two characters and partitioning of the relationship into direct and indirect effects showing the relative contribution of each of the causal factors towards the yield. In these regards, a good number of research works in jute has been reported by many workers (Ahmed *et al.*, 1994; Chaudhury *et al.,* 1981). The objective of the work was to investigate correlations of fibre yield components and to find out the extent of direct and indirect effects of the components towards fibre yield. Knowledge of these correlations may help in planning efficient breeding programme (Johnson *et al.,* 1955).

The experimental material comprised of sixty genotypes of roselle which was raised in a Randomized Block Design with three replications during Kharif (rainy), 2011. Each genotype was sown in three rows of three meters length with a spacing of 30x10 cm. Five plants in each plot replication were selected at random and mean of the plant observations were recorded for yield attributing characters. The characters studied were days to 50% flowering, plant height(cm), basal stem diameter(cm), number of nodes per plant, internodal length per plant(cm), green plant weight(g), fibre length per plant(cm), fibre-wood ratio and fibre yield per plant(g). Genotypic and phenotypic correlation and path analysis were worked out as per the standard procedures (Falconer, 1964; Dewey and Lu, 1959).

Phenotypic and genotypic correlation coefficients in all possible combinations of the characters were presented in Table 1. Individually, the genotypic correlation was high in magnitude than phenotypic correlation, indicating the influence of environment in reducing the actual inherent association between various characters. Fibre yield per plant exhibited a significant positive correlation with plant height, basal stem diameter, number of nodes per plant, green plant weight (at both genotypic and phenotypic levels) and internodal length per plant (at genotypic level). A non significant positive correlation was observed with fibre wood ratio (at both genotypic and phenotypic levels). Hence, simultaneous selections based on these characters for improvement in fibre yield are possible. Similar results were reported by Pulli Bai *et al*. (2005), Rani *et al*. (2006) and Bhajantri *et al*. (2007) in roselle.

It is observed that plant height had significant positive association with basal stem diameter, number of nodes per plant, internodal length per plant, green plant weight and fibre length indicating that increase in plant height may help in increase of the number of nodes, internodal length, basal stem diameter, green plant weight and fibre length, ultimately the fibre yield.

Path analysis studies (Table 2) revealed that plant height (at both genotypic and phenotypic levels) and basal stem diameter (at genotypic level) had exerted the highest positive direct effect on fibre yield followed by fibre wood ratio (both at phenotypic and genotypic levels). Days to 50% flowering, number of nodes per plant and internodal length per plant (at both genotypic and phenotypic levels), basal stem diameter (at phenotypic level) and fibre length (at genotypic level) showed negative direct effect on fibre yield. Similar results were reported by Pulli Bai *et al*. (2005) and Rani *et al.* (2006) in roselle.

As plant height, basal stem diameter, green plant weight and fibre wood ratio had positive direct effect with fibre yield and also positive association hence selection of stable genotypes for these traits can be practiced effectively for stabilizing the fibre yield per plant in the present breeding material.

Table 1. Phenotypic and genotypic correlation coefficient between fibre yield per plant and its components in sixty genotypes of roselle

S.No	Characters		Plant height (cm)	Basal stem diameter (cm)	Number of nodes plant^{-1}	Internodal length plant^{-1} (cm)	Green plant weight (g)	Fibre length plant^{-1} (cm)	Fibre wood ratio	Fibre yield plant^{-1} (g)
1	Days to 50%	r_p	-0.176	-0.154	0.118	-0.105	-0.302	-0.177	-0.108	-0.235
	flowering	r_g	-0.179	-0.181	0.180	-0.140	-0.357*	-0.177	-0.122	-0.243
2	Plant height(cm)	r_p		0.865**	0.704**	0.427**	0.841**	0.927**	0.048	0.888**
		r_g		0.961**	0.700**	0.578**	0.879**	1.005**	0.121	0.930**
3	Basal stem	r_p			0.732**	0.282	0.852**	0.798**	-0.039	0.803**
	diameter(cm)	r_g			0.745**	0.579**	0.945**	0.944**	0.058	0.927**
4	Number of nodes	r_p				0.045	0.627**	0.654**	-0.108	0.618**
	plant^{-1}	r_g				0.184	0.634**	0.717**	-0.041	0.661**
5	Internodal length	r_p					0.246	0.399**	0.197	0.320
	plant^{-1}(cm)	r_g					0.377*	0.558**	0.237	0.423*
6	Green plant	r_p						0.746**	-0.087	0.846**
	weight(g)	r_g						0.866**	0.012	0.912**
7	Fibre length	r_p							0.126	0.861**
	plant^{-1}(cm)	r_g							0.213	0.943**
8	Fibre wood ratio	r_p								0.226
		r_g								0.264

r_p = Phenotypic correlation coefficient. *Significant at 5% level
r_g = Genotypic correlation coefficient. **Significant at 1% level

Table 2. Phenotypic (P) and genotypic (G) path coefficient estimates of fibre yield per plant and its components in roselle.

S.No	Characters		Days to 50% flowering	Plant height (cm)	Basal stem diameter (cm)	Number of nodes plant^{-1}	Internodal length plant^{-1} (cm)	Green plant weight (g)	Fibre length plant^{-1} (cm)	Fibre wood ratio	Correlation with fibre yield plant^{-1} (g)
1	Days to 50%	P	**0.023**	-0.057	0.004	-0.002	0.007	-0.142	-0.044	-0.025	-0.235
	flowering	G	**-1.468**	-0.738	-3.445	-0.540	0.665	4.246	1.161	-0.124	-0.243
2	Plant height(cm)	P	-0.004	**0.320**	-0.022	-0.014	-0.028	0.395	0.230	0.011	0.888**
		G	0.263	**4.118**	18.333	-2.104	-2.743	-10.467	-6.593	0.123	0.930**
3	Basal stem	P	-0.004	0.277	**-0.026**	-0.015	-0.018	0.400	0.198	-0.009	0.803**
	diameter(cm)	G	0.265	3.957	**19.079**	-2.240	-2.748	-11.255	-6.189	0.059	0.927**
4	Number of nodes	P	0.003	0.225	-0.019	**-0.020**	-0.003	0.294	0.162	-0.025	0.618**
	plant^{-1}	G	-0.264	2.882	14.219	**-3.006**	-0.875	-7.549	-4.706	-0.042	0.661**
5	Internodal length	P	-0.002	0.137	-0.007	-0.001	**-0.066**	0.115	0.098	0.046	0.320
	plant^{-1}(cm)	G	0.205	2.379	11.043	-0.554	**-4.748**	-4.484	-3.660	0.241	0.423*
6	Green plant	P	-0.007	0.270	-0.022	-0.013	-0.016	**0.469**	0.185	-0.020	0.846**
	weight(g)	G	0.524	3.620	18.037	-1.906	-1.788	**-11.905**	-5.681	0.012	0.912**
7	Fibre length	P	-0.004	0.297	-0.021	-0.013	-0.026	0.350	**0.248**	0.029	0.861**
	plant^{-1}(cm)	G	0.260	4.139	18.003	-2.156	-2.650	-10.311	**-6.559**	0.217	0.943**
8	Fibre wood ratio	P	-0.003	0.016	0.001	0.002	-0.013	-0.041	0.031	**0.232**	0.226
		G	0.179	0.498	1.105	0.123	-1.123	-0.139	-1.396	**1.019**	0.264

Bold are direct effects *Significant at 5% level
Residual effects (P): 0.334 **Significant at 1% level
(G): 0.336

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LITERATURE CITED

Ahmed S S, Muttalib M A and Ahmed A 1994 Correlation between fibre yield and its components in tossa jute (*Corchorus olitorius* L.). *Bangladesh Journal of Plant Breeding and Genetics,* 7: 13-16.

Bhajantri C M, Mummigatti U V and Doddamani M B 2007 Correlation studies in Mesta genotypes. *Karnataka Journal of Agricultural Science,* 20 (2): 368-369.

Chaudhury S K, Singh M K and Singh D P 1981 Path analysis in tossa jute. *Indian Journal of Agricultural Science,* 51(1): 772-775.

Dewey D R and Lu K H 1959 A Correlation and path coefficient analysis of components of crested wheat grass. *Agronomy Journal,* 51: 515-518.

Falconer D S 1964 *An Introduction to Quantitative Genetics*. Oliver and Boyd, Edinburgh, London 312-324.

Johnson H W, Robinson H F and Comstock R E 1995 Estimates of genetic and environmental variabilities in soyabean. *Agronomy Journal* 47: 314-318.

Pulli Bai P, Razia Sultana, Panduranga Rao C and Srinivasa Rao V 2005 Character association and path analysis in roselle hemp (*Hibiscus sabdariffa* L.). *The Andhra Agricultural Journal,* 52 (3&4): 403-406.

Rani C h, Rama Kumar P V, Panduranga Rao C and Srinivasa Rao V 2006 Character association, path analysis and selection indices in roselle (*Hibiscus sabdariffa* L.). *The Andhra Agricultural Journal,* 53 (3&4): 157-159.

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