CROSS B

Characters	Mean	Phenotypic variance	Genotypic variance	Heritability (H^2)	Genetic advance (GA)	Genetic advance as percentage of mean	Coefficient of variability (CV)
Seed yield	7.24	14.77	10.10	68.42	4.63	156.44	48.75
Plant height	76.92	172.05	41.81	24.29	5.61	7.30	23.05
Primary branches	4.29	2.04	1.45	71.17	1.79	41.70	35.20
Secondary branches	2.04	4.18	1.29	30.81	1.11	54.35	61.60
Capsule number	51.34	1635.86	915.88	55.99	39.86	77.69	49.19
Capsule length	2.12	0 51	0.32	63.30	0.80	37 53	21.23
Days to maturity	82.31	109.41	86.05	78.64	14.48	17.59	2.99

CROSS C

Characters	Mean	Phenotypic variance	Genotypic variance	Heritability (h^2)	Genetic advance (CA)	Genetic advance as percentage of mean	Coefficient of variability (CV)
Seed yield	8.81	22.21	10.08	45.39	3.76	42.73	47.67
Plant height	76.21	1201.37	600.56	49.99	30.50	40.01	21.10
Primary branches	4.20	5.26	0.26	14.99	0.61	14.41	38.09
Secondary branches	1.19	5.04	0.44	8.79	0.38	29.19	46.22
Capsule number	53.98	1186.14	209.79	17.69	10.72	19.80	47.74
Capsule length	2.01	0.81	0.25	30.90	0.49	19.58	19.92
Days to maturity	86 50	109.13	86.16	78 95	14.52	16.78	17.34

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Association Analysis for Yield Components in Upland Cotton

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Correlations and path coefficients between yield and its components were studied in 5 genetic populations (P_1, P_2, F_1, F_2, and F_3) in upland cotton. From the component characters, only boll number and sympodes had positive and highly significant correlation with yield. The path coefficient analysis revealed that boll number had high positive direct effects on yield in cotton. All the characters studied also contributed indirectly *via* sympodes and boll number for yield of seed cotton.

For yield improvement in cotton, according to the findings of present investigation the emphasises should be paid on higher number of bolls together with larger number of primary and secondary sympodes.

The magnitude and direction of character association in cotton are varied. It could be due to differences the choice of material (Rana. 1952). A large majority of inter-relationship studies have been conducted on varieties, (Singh and Gupta. 1968;) and only a few on segregating progenies from hybrids; the latter gives an indication of the extent to which genetic linkage is responsible for the correlation observed (Sikka and Afzal 1947 and Harland. 1939). It is also more important to test the Universality of inter relationship through studies on segregating progenies. The nature and magnitude for character association was. therefore, investigated using varieties and early generations segregating materials viz. F_1, F_2 and F_3. In the present investigating correlation coefficient and path analysis have been used to find out direct and indirect causes of character association in upland cotton.

MATERIAL AND METHODS

The experimental material consisted of 5 genetic populations, i. e. P_1. P_2, F_1, F_2, and F_3 of 5 crosses between six varieties (Jai, 101-102 B, IAN-1327, S. B. 1, Reba-B-50 and Bikaneri narma) of *Gossypium hirsutum*. Experimental details have earlier been described (Singh *et al.* 1979.) The path coefficient analysis was carried out.

RESULTS AND DISCUSSION

The relationship between yield and other traits and among themselves are presented in Table 1.

The findings. in general, were in comfirmity with those obtained by earlier workers in *hirsutum* cotton Butany *et al.*, 1966;Singh and Gupta 1968; Singh *et al.*,

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1968). Yield of seed cotton showed high significant positive association with sympodes and boll number. Other very strong positive correlation was recorded for boll number with monopodes. It may, thus, be suggested that selection for sympodes, monopodes and boll number, giving appropriate weightage to each character, is expected to bring about rational improvement in cotton yield. The poor association of yield with first fruiting node and boll weight suggested that these characters should also be given due consideration as any improvement in them would not permit much advancement in yield, unless the linkage is broken.

Cotton yield is a very complex character which is influenced by number of various characters directly, as well as indirectly *via* other component traits. Hence, path coefficient analysis was used to determine the direct and indirect effects of various characters on yield. These relationships are shown in Table 2.

A perusal of the results obtained in path coefficient analysis revealed that the yield of cotton was the resultant of single major variable viz., boll number. The character boll number gave the highest positive direct effect (0.8425) on yield. Its indirect effect *via* sympodes and boll weight was also positive. The character sympodes (0.1972) and boll weight (0.1649) had low positive direct effects on seed cotton yield. Number of branches (primary sympodes and secondary sympodes both), moreover, had sufficiently high positive indirect effects on yield *via* number of bolls. None of the character had positively influenced yield indirectly *via* monopodes and first fruiting node whereas, all the characters studied appeared to have indirect effect, more or less through sympodes and boll number. Earlier reports (Miller, *et al.* 1958 and Butany, *et al.* 1968) have also emphasized the importance of high boll number and sympodes for contribution in yield of cotton. The number of bolls and sympodes also showed positive highly significant association with yield.

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TABLE 1 : Estimates of correlation coefficients for six characters in upland cotton.

Characters	Monopodes	First fruiting node	Boll weight	Boll number	Yield of seed cotton
Sympodes	+0.03	+0.13	+0.11	+0.32	+0.48**
Monopodes		+0.01	−0.09	+0.46**	+0.31
First fruiting node			−0.08	+0.30	+0.22
Boll weight				+0.07	+0.25
Boll number					+0.87**

** P=0.1

TABLE 2 : Path coefficient analysis showing the direct and indirect effects of five characters on seed cotton yield in upland cotton

Character	Sympodes	Monopodes	First fruiting node	Boll weight	Boll number	Correlation
Sympodes	**0.1972**	−0.0026	−0.0053	0.0185	0.2779	+0.4857
Monopodes	0.0075	**−0.0685**	−0.0003	−0.0152	0.3343	0.3178
First fruiting node	0.0271	−0.006	**−0.0384**	−0.0143	0.2539	0.2277
Boll weight	0.0221	−0.0063	−0.0033	**0.1649**	0.0592	0.2558
Boll number	0.0651	−0.0321	−0.0116	0.0116	**0.8425**	0.8755

Note : Bold figures denote the direct effects