

## Path Coefficient Analysis in Cotton Grown under Intercropping System\*

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Correlation coefficients and path coefficients analysis were computed in cotton (*Gossypium hirsutum* L.) grown under intercropping system. The results indicated that the number of picked bolls per plant was the main yield contributing trait in cotton followed by boll weight and lint index. The results are thus, indicative that an improvement in yield potential may be brought about by making selection on the number of picked bolls per plant.

A knowledge of the association of various component characters and their direct and indirect effect on seed cotton yield would be of immense help in selecting suitable plant type when grown under intercropping system. Butany *et al.* (1968) reported that sympodia and boll weight made the greatest contribution towards yield in upland cotton while Bala Kotaish (1973) reported sympodia and seed index as important yield determinants. Miller *et al.* (1958) and Khorgade and Ekbote (1980) also showed that the number of bolls per plant and boll weight to be the important yield determiners possessing maximum direct influence on yield. The present study was undertaken to study the phenotypic association of various yield components and their direct and indirect effects on seed cotton yield in cotton under intercropping system.

### MATERIAL AND METHODS

A field experiment on cotton (*Gossypium hirsutum* L.) variety G. Cot.

10 was carried out during *kharif* 1979-80 at Agricultural College Farm, Parbhani. Twenty seven treatment combinations of three plant arrangements (60 cm x 30 cm, 75 cm x 24 cm and 90 cm x 20 cm), three intercrops (Green gram, Black gram and Groundnut) and three fertilizer levels (100% recommended dose of cotton to cotton, 75% recommended dose of cotton to cotton + 25% recommended dose of intercrop to intercrop and 100% recommended dose of cotton to cotton + 25% recommended dose of intercrop to intercrop) were tested in 3<sup>3</sup> partially confounded design with two replications. One row each of green gram, black gram and groundnut were intercropped between the rows of cotton.

Data on five randomly selected plants in each treatments were recorded for 8 characters : number of sympodia per plant, total dry matter (g) per plant, number of picked bolls per plant, boll weight, lint

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index, seed index, ginning percentage and seed cotton yield per plant.

Path-coefficient analysis was done to study cause effect relationships among various characters affecting yield, according to the methods suggested by Dewey and Lu (1959).

## RESULTS AND DISCUSSION

The data (Table 1) revealed that seed cotton yield (g/plant) showed significantly positive correlations with number of sympodia, total dry matter, number of picked bolls and boll weight. The correlations between yield per plant vs lint index, seed index and ginning percentage were not significant. Further it is also observed that among these yield components number of picked bolls per plant had the highest ( $P_{s_{10}} = 0.8834$ ) direct positive effect on seed cotton yield. In addition, boll weight and lint index also had positive direct effects on seed cotton yield. These results indicated that the number of picked bolls is an important trait to be taken into consideration while selecting cotton variety for high yield under intercropping system. Similar results were reported by Miller *et al.* (1958) and Khorgade and Ekbote (1980). The correlation between yield and number of picked bolls per plant was positive and highly significant mainly because of the direct positive effect of picked bolls. The smaller indirect effects of the boll weight and seed index were more or less nullified by similar negative indirect effects due to the remaining traits. The number of picked bolls per plant had a considerable indirect influence on the correlations of the yield with number of sympodia

per plant, total dry matter per plant and boll weight.

The number of sympodia per plant and total dry matter per plant which possessed significant positive association with yield, exhibited negative direct effect of low magnitude. On the other hand indirect positive effects of both the characters via number of picked bolls per plant and boll weight were also considerable. It is assumed that significant positive association of sympodia and total dry matter per plant with yield was mainly due to indirect positive influence via number of picked bolls and boll weight.

Notwithstanding the direct positive effect of lint index with yield, their correlation was negative which might be due to the cancelling effects of the indirect negative influence of lint index via ginning percentage, seed index and picked bolls per plant. Direct positive effect of boll weight on yield and indirect positive effects of bolls weight via picked bolls and lint index were mainly responsible in influencing the correlation between boll weight and yield. The remaining traits did not much influence the yield of seed cotton directly or indirectly.

Musande (1980) reported that the plant arrangements 75 cm X 24 cm and 90 cm X 20 cm showed its superiority in improving number of picked bolls, boll weight, sympodias per plant and total dry matter per plant over 60 cm X 30 cm plant arrangement while cotton intercropped with groundnut significantly reduced the yield



contributing characters as compared to cotton + green gram and cotton + black gram. Application of higher fertilizer dose (100% recommended dose of cotton to cotton + 25% recommended dose of intercrop to intercrop) also resulted additional advantage in these respect.

It may finally be concluded from above findings that for increasing seed cotton yield in intercropping system maximum stress is needed on increasing the number of picked bolls per plant.

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TABLE-1 Path-coefficient analysis in cotton showing direct and indirect effects of component characters on yield.

Characters	Sympodia/ plant	Total dry matter/ plant	Picked bolls/ plant	Boll weight (g)	Lint index	Seed index	Ginning %	Correla- tion with seed cotton yield/plant (r)
Sympodia/plant	-0.0107	-0.0105	0.6908	0.1647	-0.0103	0.0059	0.0060	0.835**
Total dry matter/plant	-0.0086	-0.0130	0.8463	0.1237	-0.0498	0.0210	0.0285	0.948**
Picked bolls/plant	-0.0084	-0.0125	0.8634	0.1233	-0.0159	0.0187	-0.0046	0.984**
Boll Weight (g)	-0.0082	-0.0075	0.5070	0.2148	0.0352	0.0244	-0.0109	0.706**
Lint index	0.0003	0.0019	-0.0424	0.0227	0.3324	-0.1190	-0.2200	-0.024
Seed index	0.0002	0.0012	-0.0724	0.0229	0.1731	-0.2284	0.0432	-0.060
Ginning %	0.0002	0.0012	0.0141	0.0081	0.2539	0.0342	-0.2880	0.024

Residual effect = 0.0397

Underlined figures denote direct effects

\*\*Significant at 1% level.



contributing characters as compared to cotton + green gram and cotton + black gram. Application of higher fertilizer dose (100% recommended dose of cotton to cotton + 25% recommended dose of intercrop to intercrop) also resulted additional advantage in these respect.

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Boll Weight (g)	-0.0082	-0.0075	0.5070	0.2148	0.0352	0.0244	-0.0109	0.706**
Lint index	0.0003	0.0019	-0.0424	0.0227	0.3324	-0.1190	-0.2200	-0.024
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