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Research Note

Correlation studies in elite lines of upland cotton (*Gossypium hirsutum* L.)

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Abstract
Yield is a complex character which is contributed by a large number of components. Therefore, to determine the relative importance of the component characters and to initiate an effective selection programme, correlation studies were done. In cotton, seed cotton yield is an important and of economically valued character. Hence, the seed cotton yield per plant was taken as dependent character for correlation studies in this investigation. Seed cotton yield expressed a significant positive association with the plant height (0.2458 and 0.4348), the number of monopods per plant (0.2821 and 5.9365), the number of bolls per plant (0.8606 and 0.8558), boll weight per boll (0.5077 and 0.5137), lint index (0.3382 and 0.4409), ginning out-turn (0.2794 and 0.4566), seed index (0.1826 and 0.2117),the number of seeds per locule (0.1826) and 0.2117), at both genotypic and phenotypic levels. Number of locules per boll (1.5872) showed a significant correlation at the genotypic level with seed cotton yield. A significant negative correlation was observed with days to 50% flowering (-0.2222 and -0.2931) at both levels.

Keywords
Correlation, seed cotton yield

Cotton is the most important commercial fibre-crop of India. It plays a key role in the national economy in terms of contribution to trade, textile industry, employment and foreign exchange. Increasing productivity per unit area is the requirement for the sustenance of domestic and export needs. Expression of various traits often varies with the changing breeding material and environment. Therefore, the information on character associations between the traits them selves and with the yield is important for breeding high yielding genotypes. In cotton, seed cotton yield is an important character which is of economic value. Hence, the seed cotton yield per plant was taken as dependent character for correlation studies in this investigation.

The present investigation was carried in the Research Area of Cotton Section, Department of Genetics & Plant Breeding, CCS Haryana Agricultural University, Hisar. The experimental material for this study comprised of fifty germplasm lines of upland cotton. The experimental design used was Randomized Block Design with three replications with one row of each genotype. Each row length was 3.0 m with row to row distance 1.35 m and plant to plant distance 30 cm and all the recommended package of practices were followed to raise a good crop. Five competitive plants were selected randomly from each genotype in each replication. These plants were used for the recording of data for different characters *viz*., plant height (cm), the number of monopods per plant, the number of bolls per plant, boll weight boll (g), lint index(g), seed index(g), the number of seeds per locule, seed cotton yield per plant (g), the number of locules per boll. Days to 50% flower and ginning out-turn (%) were recorded on the plot basis. The data obtained was statistically analyzed to estimate correlation coefficients at phenotypic and genotypic level were calculated using the variances and co-variances according to Al-Jibouri*et al.,* (1958).

Seed cotton yield(g) was significantly and positively associated with plant height (cm), the number of monopods per plant,the number of bolls per plant, boll weight (g), lint index (g), ginning out turn (%), seed index (g) and the number of seeds per locule at both the levels while, a significant negative correlation with days to 50% flowering. These results are in agreement with Tuteja*et al.* (2006), LeelaPratap*et al.* (2007) and Vijaylaxmi*et al.* (2008).

The phenotypic and genotypic correlation coefficients between the seed cotton yield (g) and other related component characters and among themselves were estimated and presented in **Table 1** and the results were discussed character wise. Genotypic correlations in general were higher than phenotypic correlations. This may be due to the relative stability of genotypes as the majority of them were subjected to certain amount of selection (Johnson *et al.,* 1955).

Days to 50% flowering exhibited a significant negative correlation at both phenotypic and genotypic levels with number of boll weight per plant (g) and seed cotton yield per plant (g) whereas a significant genotypic positive association was observed with the number of monopods per plant (Padmavathi*et al.,* 2008). While, a significant negative correlation was observed with plant height (cm), the number of bolls per plant, the number of seeds per locule and the number of locules per boll.

Plant height (cm) showed a significant positive association at both genotypic and phenotypic levels with the seed cotton yield per plant (g), seed index (g), boll weight per bol (g)l (Venkateswaralu*et al.* 2010) and the number of bolls per plant (Kaushik and Kapoor 2006). This trait showed a significant positive correlation with the number of locules per bolls and lint index (g) at genotypic level and a significant negative genotypic correlation with days to 50% flowering (Vijayalaxmi*et al.,* 2008).

Table 1. Phenotypic (above diagonal) and Genotypic (below diagonal) correlation coefficients of various

Phenotypic / Genotypic	Days to 50% flower	Plant height	No. of mono pods	No. of bolls/ plant	Boll wt/boll	Lint index	GOT	Seed index	No. of seeds/ locule	No. of locules/ boll	Seed cotton yield
Days to 50% flower		-0.1443	-0.0201	-0.1436	-0.2212**	-0.0011	-0.0292	-0.0145	-0.0367	-0.0082	-0.2222*
Plant height	-0.3340**		0.0502	0.1965*	0.1746*	0.1163	-0.0776	0.1971*	-0.0173	-0.0318	0.2458*
No. of monopods	0.2498**	-0.1452		0.2349**	0.1609	0.0881	0.0988	0.0482	-0.0795	0.2572**	0.2821*
No. of bolls/plant	-0.1897*	0.2704**	1.3905**		0.0107	0.2104**	0.2450**	0.0422	-0.0573	0.1257	0.8606*
Boll wt/boll	-0.2723**	0.4543**	0.0721	0.0028		0.3206**	0.1435	0.2980**	0.2708**	-0.0655	0.5077*
Lint index	-0.0209	0.4235**	0.1326	0.2768**	0.4007**		0.6566**	0.7175**	0.0183	0.0098	0.3382*
GOT	-0.0975	-0.611**	0.5150**	0.3567**	0.2943**	0.668**		0.0021	0.1381	0.0786	0.2794*
Seed index	0.0071	0.5760**	0.0575	0.0545	0.3303**	0.7516**	0.0140		-0.0481	-0.0116	0.1826*
No. of seeds/locule	-0.2246**	0.1566	0.0609	-0.1638	0.5004**	0.0221	0.2629**	-0.0882		-0.0201	0.0920
No. of locules/boll	-0.2022*	0.9796**	0.0425	0.4899**	0.0060	-0.0180	-0.1274	-0.0046	-0.0073		0.0779
Seed cotton yield	-0.2931**	0.4348**	5.9364**	0.8558**	0.5137**	0.4409**	0.4566**	0.2117**	0.1374	1.5872**	

A number of bolls per plant had strong positive association with the number of bolls per plant with lint index (g), ginning out turn (%), the number of monopods per plant, plant height (cm) and seed cotton yield per plant (g) at both the levels. (Salahuddin*et al.*, 2010). Boll weight (g) at genotypic level showed a significant positive correlation with seed cotton yield per plant (g), seed index (g), lint index (g), plant height (cm) and the number of seeds per locule and a significant negative correlation with days to 50% flowering at genotypic level (Neelima*et al.*, 2005).

Lint index(g)showed a significant positive association with seed cotton yield per plant (g), seed index (g), the number of bolls per plant, boll weight (g) and ginning out turn(%) at both the levels. Ginning out turn (%) showed a significant positive association with seed cotton yield per plant (g), the number of bolls per plant and lint index (g) at both the levels, while a significant positive correlation with the number of seeds per locules, the number of monopods per plant and boll weight per bol (g)l at genotypic level.

Seed index(g) exhibited a significant positive association with seed cotton yield per plant (g), plant height (cm), boll weight per boll (g) and lint index (g) at both levels. The numbers of seeds per locule exhibited a significant positive association with boll weight(g) and ginning out turn (%) at genotypic level. The number of locules per boll exhibited a significant positive association with seed cotton yield per plant (g), Plant height (cm) and the number of bolls per plant.

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