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Correlation and path cofficient analysis for seed cotton yield and its components in desi cotton (*Gossypium arboreum* L.)

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Abstract
Thirty seven Genotypes comprising of the ten parents, twenty five crosses and two checks were grown in randomized block design with two replications during kharif 2015 to undertake correlation and path analysis studies in cotton. In the present investigation genotypic and phenotypiccorrelation of seed cotton yield with number of bolls per plant were found significant and positive. However, negative association of seed cotton yield with both day to 50 percent flowering and days to maturity suggested the need to longer vegetative phase for sufficient accumulation of sink. The maximum direct effect on seed yield was shown by ginning out turn (%) and it was followed by number of sympodia per plant, number of bolls per plant, staple length (mm) and 100 seed weight. Whereas, days to maturity exhibited highest negative direct effect on seed yield followed by plant height, boll weight, days to 50 per cent flowering and number of monopdia per plant. The negative direct effect of number of seeds perboll on seed cotton yield was nullified by positive indirect effect via, plant height, days to maturity, ginningoutturn, bollweight and days to 50 per cent flowering.

Keywords: Correlation, direct effect, pathanalysis, genotypic

Introduction
Cotton (*Gossypium arboreum* L.) is an important commercial and industrial crop cultivated in India. It provides essential raw material for textile industries and handioams. Indiais one of the motor cotton growing countries and it occupiesprominent place in Indian agriculture. It provide semployment opportunities to nearly 215 million people. Therefore it playspivotal role by providinglint, oil and protein .India has the largest area undercottonwith an average productivity of 374 kg/ha, which is very low as compared to world productivity (564 kg/ha). The knowledge of correlation between yield and yield contributing characters would be of considerable help in evolving suitable plant type. It helps in selecting superiorgeno types from diverse genetic population. The path analysis provides reliable information about cause and effect relationship and helps in under standing the cause of association between two variables. The present investigation was therefore undertaken to study correlation and path analysis in cotton.

Material and Methods
The present investigation was unde taken to study '' Correlation and pathanalysis in desicotton *(Gossypium arboreum* L.) during kharif 2015 at Cotton Research Station, Mahaboob Baugh farm, Vasantrao Naik, Marathwada Krishi Vidyapeeth, Parbhani. The experimental material compresses of 25 crosses along with 10 parents qand 2 checks viz. PKVDH 1 and PKV Suvarna. The experiment was conducted in randomized block design with two replications. Each treatment in each replication consists of two rows of 6 meter length with 60 x 30 cm spacing. The observation were recorded on 5 randomly selected plants for the characters viz. days to 50 per cent flowering, days to maturity, number of monopodia, number of sympodia, plant height (cm), number of bolls per plant (g), 100 seed weight (g), ginning outturn and seed cotton yield per plant (g). All the recommended agronomical and plant protection measures were followed. The analysis was carried out according to Dewey and Lu (1959).

Results and Discussion
The genotypic and phenotypic correlation coefficients are presented in Table 1. Seed cotton yield is complex character and depends on the other agronomic traits. Therefore the relationship of different agronomic characters with one another and with yield become important. It isalso essential to find out the relative contribution of each of the component character on

Seed cotton yield so as to giveweight age during selection. In the present investigation the genotypic and phenotypic correlation of seed cotton yield with component characters was studied.

The results revealed that, days to 50 per cent flowering had highly significant positive correlation with number of sympodia per plant at genotypic level. The seed cotton yield had genotypic and pheno typic correlation with number of bolls per plant. Thus simultaneous selection for above trait mightbring an imporvement in seed cotton yield. The seed cotton yield per plant had negative association with days to 50 per cent flowering and days to maturity at both genotypic and phenotypic level. The negative association was again conformed through significant negative association of ginningoutturn and boll weight with seed cotton yield at both levels indication increase in either of the character will decrease in seed cotton yield. Among the other component traits highly significant positive correlation was observed between days to maturity and test weight, number of monopodia per plant and staplelength, number of bolls per plant and seed cotton yield per plant. This indicated that possibility of increase in the character through the simultaneous imporvement of the corresponding component characters.

The above results are in agreement with the result sreported by Gill and Singh (1981) [3], Singh (1982) [10], Yadhav *et al.* (2000) [11], Gite *et al.* (2006) [4], Patnaik and Sial (2010) [6] and Pujer *et al.* (2014) [7].

Path coefficient analysis helps to understand causal factor which relates to their direct effect and indirect influence to the final biological yield. The path coefficient are presented in Table 2. It reveals that maximum direct effect on seed yield was shown by ginningouttun (%) and it was followed by number of sympodia per plant, number of bolls per plant, staplelength and 100 seed weight (g). Where as days to maturity exhibited highest negative direct effect on seed cotton yield followed by number of seeds per boll, plant height, boll weight, days to 50 per cent flowering and number of monopodia per plant.

The negative direct effect of days to maturity can benullified by positive indirect effect via., ginningoutturn (%), number of monopodia, number of seeds per boll and boll weight. This can beex plained on the basis of ginning out turn had highest direct effect of days to maturity on seed cotton yield as nullified by internal cancellation of various yield components. The negative direct effect of boll weight on seed cotton yield was nullified by staplelength (mm), days to 50 per cent flowering. 100 seed weight, number of sympodia per plant, days to maturity and number of seeds per boll. Number of seeds per bollexerted hightest direct effect through plant height, days to maturity, ginningoutturn and bollweight. Thus, present path analysis revealed that selection prospects for high seed cotton yield seemed to be better through ginning out-turn number of sympodia per plant, number of bolls per plant, staplelength and 100 seed weight. The above results are in accordance with the reports of Rao and Mary (1996) [9], Yadhav (2000) [11], Joshi *et al.* (2006) [5], Rajamani *et al.* (2013) [8] and Asha *et al.* (2015) [1].

Table 1: Genotypic and phenotypic correlation co- efficient among different characters

Characters		Days to 50 % flowering	Days to maturity	No. monopodia/ Plant	No. sympodia/ Plant	Plant height (cm)	No. of bolls/ plant	No of seeds / boll	100 seed weight (g)	Ginning outturn (%)	Staple length of fibre (mm)	Boll weight (g)	Seed cotton yield per plant (g)
Days to 50% flowering	GP	1.000 1.000	0.306 0.180	-.644**0.373*	0.553**0.299	-.0150.021	-0.213-0.244	-0.0810091	0.1460.147	-0.0690.016	-0.284-0.092	-0.052 0.037	-0.213-0.206
Days to maturity	GP		1.0001.000	-0.271-0.206	0.2130.081	0.2570.172	0.1160.061	-0.236 0.212	0.340*0.264	-0.166-0.072	-0.619**0.521**	0.2220.144	-0.124-1.145
No. of monopodia/ Plant	GP			1.000 1.000	0.044-0.061	0.075 0.087	0.234 0.139	0.081 0.031	-0.069 0.022	0.205 0.198	0.395* 0.241	0.268 0.155	0.074 0.039
No. of sympodia/ plant	GP				1.000 1.000	0.135 0.139	-00.57 - 0.074	0.007 -0.013	0.311 0.207	-0.035 -0.304	-0.443** -0.181	0.067 0.108	0.188 0.105
Plant height (cm)	GP					1.000 1.000	0.293 0.178	-0.410*-0.290	0.107 0.094	-0.033 -0.012	0.240 0.118	-0.028-0.067	0.270 0.185
No. of bolls / plant	GP						1.000 1.000	0.1700.156	0.186 0.013	-0.261 -0.225	-0.106 0.019	-0.138-0.074	0.723** 0.665**
No. of seeds/ boll	GP							1.000 1.000	0.2110.179	0.029-0.038	-0.189-0.105	0.0580.084	-0.107-0.078
100 seed weight (g)	GP								1.0001.000	0.501**0.308	-0.406*-0.186	0.277 0.115	-0.200-0.159
Ginning outturn (%)	GP									1.000 1.000	-0.073 0.061	0.421**0.265	-0.476**-0.381*
Staple length of fibre (mm)	GP										1.000 1.000	-0.335*0.153	0.254 0.210
Boll weight (g)	GP											1.000 1.000	-0.441**-0.319
Seed cotton yield per plant (g)	GP												1.000 1.000

Table 2: Direct and indirect effects of yield components on seed cotton yield

Characters	Days to 50 % flowering	Days to maturity	No. monopodia/ Plant	No. sympodi/ Plant	Plant height (cm)	No. of bolls/ plant	No of seeds / boll	100 seed weight (g) (test weight in gm)	Ginning outturn (%)	Staple length of fibre (mm)	Boll weight (g)	Genotypic Correlation with seed cotton yield
Days to 50% flowering	-0.852	-0.260	0.549	0.471	0.013	0.181	0.069	-0.125	0.242	0.045	0.181	-0.213
Days to maturity	-0.048	-0.158	0.043	-0.034	-0.041	-0.018	0.037	-0.054	0.098	-0.035	0.020	-0.124
No. of monopodia/Plant	0.634	0.266	-0.984	-0.043	-0.074	-0.230	-0.080	0.067	-0.389	-0.204	-0.073	0.074
No. of sympodia/ plant	0.388	0.150	0.031	0.702	0.094	-0.040	0.005	0.219	-0.311	0.047	-0.132	0.188
Plant height (cm)	0.005	-0.081	-0.230	-0.042	-0.313	-0.092	0.128	-0.034	-0.075	0.009	-0.085	0.270
No. of bolls / plant	-1.40	0.077	0.154	-0.038	0.193	0.660	0.112	0.123	-0.070	-0.091	0.477	0.723
No. of seeds/ boll	0.22	0.064	-0.022	-0.002	0.111	-0.046	-0.270	-0.057	0.051	-0.016	0.029	-0.107
100 seed weight (g)	0.063	0.146	-0.029	0.134	0.046	0.080	0.091	0.430	-0.174	0.119	-0.086	-2.00
Ginning outturn (%)	-0.276	-0.601	0.383	0.430	0.233	0.103	-0.183	-0.394	0.971	-0.344	0.247	-0.476
Staple length of fibre (mm)	-0.032	0.134	0.162	0.041	-0.017	-0.083	0.035	0.167	-0.214	0.604	0.266	0.254
Boll weight (g)	0.168	0.098	-0.058	0.148	-0.213	-0.569	0.081	0.158	-0.200	0.347	-0.788	-0.441

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