



Correlation and Path Coefficient Analysis in Upland Cotton (*Gossypium hirsutum* L.)

N Vineela, J S V Samba Murthy, P V Rama Kumar and S Ratna Kumari

Department of Genetics and Plant Breeding, Agricultural College, Bapatla 522 101, Andhra Pradesh

ABSTRACT

The present study was conducted on correlation and path coefficient analysis for yield and yield contributing characters in upland cotton. The results of phenotypic and genotypic correlation analysis revealed that plant height, days to 50% flowering, number of monopodia, number of sympodia, number of bolls per plant, boll weight, seed index, lint index and lint yield per plant were significantly and positively correlated with seed cotton yield per plant in present material. Path analysis indicated that lint yield per plant exhibited high direct positive effect on seed cotton yield per plant signifying the importance of this trait while selection made for improvement of seed cotton yield per plant.

Key words : Correlation, Path analysis, Seed cotton yield.

Yield is a complex and polygenically inherited character resulting from multiplicative interaction of its contributing characters. It is highly influenced by the environment hence selection based on yield alone may limit the progress. Where as, the yield component characters are less complex in inheritance and are influenced by environment to a lesser extent. Both correlation and path coefficient analysis form a basis for selection and also helps in understanding those yield components affecting yield improvement through the study of their direct and indirect effects.

MATERIAL AND METHODS

Eighty four hybrids of upland cotton developed from line \times tester crossing (12 lines \times 7 testers) along with two standard check hybrids. The 86 hybrids were grown in randomized block design with two replications during *kharif* 2010-11 at Agricultural Students' Farm, Bapatla. The inter and intra-row spacing adapted was 90cm \times 60cm. Each plot consisted of one row of 6m length and observations were recorded on five randomly selected plants from each genotype per replication for characters viz., plant height (cm), number of monopodia per plant, number of sympodia per plant, relative water content (%), specific leaf weight (mg cm⁻²), crop growth rate at peak flowering stage (g m⁻² day⁻¹), crop growth rate at boll formation stage (g m⁻² day⁻¹), crop growth rate at maturity stage

(g m⁻² day⁻¹), number of bolls per plant, boll weight (g), seed index (g), lint index (g), lint yield per plant and seed cotton yield per plant. Days to 50% flowering, relative water content (%), specific leaf weight (mg cm⁻²), crop growth rate at peak flowering stage (g m⁻² day⁻¹), crop growth rate at boll formation stage (g m⁻² day⁻¹), crop growth rate at maturity stage (g m⁻² day⁻¹), ginning out-turn (%), 2.5% span length (mm), micronaire (10⁻⁶g in⁻¹), bundle strength (g tex⁻¹), uniformity ratio and fibre elongation (%) were recorded on plot basis. The fibre quality characters were analyzed at CIRCOT Regional Unit Lam, Guntur. The data were statistically analyzed to estimate genotypic and phenotypic correlation coefficients (Falconer, 1964) and path coefficient analysis (Dewey and Lu, 1959).

RESULTS AND DISCUSSION

The analysis of variance indicated significant differences among the genotypes for all characters. Genotypic correlation coefficients in general were higher than phenotypic correlation coefficients (Table 1). Plant height, days to 50% flowering, number of monopodia, number of sympodia per plant, relative water content, number of bolls per plant, boll weight, seed index, lint index, micronaire and lint yield per plant showed significant positive correlation with seed cotton yield per plant. Similar results were earlier reported by Mahatesh (2009), Rajanna (2010) and Ashok Kumar and Ravikesavan (2010).

Table 1. Phenotypic (above diagonal) and genotypic (below diagonal) correlations of 21 characters in 86 intra-hirsutum hybrids of cotton (*Gossypium hirsutum* L.)

Characters	Plant height (cm)	Days to 50% flowering	No. of monopodia plant ⁻¹	No. of sympodia plant ⁻¹	Relative water content (%)	Specific leaf weight (mg cm ⁻²)	C.G.R at peak flowering (g m ⁻² day ⁻¹)	C.G.R at boll formation (g m ⁻² day ⁻¹)	C.G.R at maturity (g m ⁻² day ⁻¹)	No. of bolls plant ⁻¹
Plant height (cm)	—	0.2238**	0.1283	0.3109**	-0.0508	-0.1197	0.0105	0.0277	0.1934*	0.1295
Days to 50% flowering	0.2468**	—	0.5571**	0.0815	0.0540	-0.0431	0.0874	0.0119	0.1118	-0.3023**
No. of monopodia plant ⁻¹	0.1738*	0.7703**	—	-0.0335	0.1357	-0.0370	0.0242	0.0171	0.0992	-0.3108**
No. of sympodia plant ⁻¹	0.3316**	0.0700	-0.0134	—	-0.0158	-0.0729	-0.1034	-0.1473	-0.0710	0.4445**
Relative water content (%)	-0.0519	0.0494	0.1866*	-0.0287	—	0.0431	0.0869	-0.0424	0.2418**	-0.0622
Specific leaf weight (mg cm ⁻²)	-0.1208	-0.0506	-0.0490	-0.0736	0.0450	—	-0.0970	-0.0095	0.0015	0.0768
C.G.R at peak flowering (g m ⁻² day ⁻¹)	0.0016	0.0962	0.0341	-0.1073	0.0939	-0.1015	—	0.7617**	0.4956**	-0.0877
C.G.R at boll formation (g m ⁻² day ⁻¹)	0.0290	0.0235	0.0272	-0.1556*	-0.0438	-0.0089	0.8071**	—	0.4918**	-0.0828
C.G.R at maturity (g m ⁻² day ⁻¹)	0.2059**	0.1245	0.1637*	-0.0828	0.2556**	0.0001	0.5227**	0.5287**	—	-0.0104
No. of bolls plant ⁻¹	0.1967**	-0.4789**	-0.6045**	0.6517**	-0.0860	0.0938	-0.1549*	-0.0995	-0.0352	—
Boll weight (g)	0.1691*	0.7085**	0.6989**	0.0405	0.1987**	-0.0490	0.0888	-0.0107	0.1632*	-0.7322**
Ginning out-turn (%)	-0.0349	0.0171	0.0020	0.1308	0.0946	0.1724*	0.0157	0.0196	0.1131	0.2904**
Seed index (g)	0.2317**	0.2172**	0.2199**	0.0548	0.1697*	0.0912	0.1853*	0.1864*	0.2502**	-0.1402
Lint index (g)	0.1483	0.1830*	0.1748*	0.1030	0.1481	0.1968**	0.1591*	0.1580*	0.2655**	0.0778
2.5% span length (mm)	0.0095	0.1450	0.3118**	-0.2142**	0.1501*	-0.1484	0.0051	-0.1328	0.0373	-0.3679**
Micronaire (10 ⁻⁶ g in ⁻¹)	0.0091	0.1834*	0.1211	-0.0889	-0.0136	0.3104**	0.2168**	0.2119**	0.1842*	-0.1682*
Bundle strength (g tex ⁻¹)	-0.2760**	0.0519	0.1555*	-0.1620*	0.0981	-0.2207**	-0.0304	-0.2274**	-0.1108	-0.3332**
Uniformity ratio	-0.1602*	0.0106	-0.1188	-0.0585	-0.0179	0.0008	0.0490	-0.0491	-0.1206	0.0640
Fibre elongation (%)	0.1285	0.0081	0.1683*	-0.0444	0.0647	0.1150	0.0976	0.2571**	0.3009**	-0.1754*
Lint yield plant ⁻¹ (g)	0.3861**	0.3300**	0.2275**	0.7295**	0.2121**	0.1236	-0.0610	-0.1004	0.1919*	0.3392**
Seed cotton yield plant ⁻¹ (g)	0.4918**	0.3397**	0.2811**	0.8147**	0.1866*	0.0168	-0.0866	-0.1424	0.1423	0.2120**

Table 1. (cont.)

Characters	Boll weight (g)	Ginning out-turn (%)	Seed index (g)	Lint index (g)	2.5% span length (mm)	Micronaire (10^{-6} g in $^{-1}$)	Bundle strength (g tex $^{-1}$)	Uniformity ratio (%)	Fibre elongation (%)	Lint yield plant $^{-1}$ (g)	Seed cotton yield plant $^{-1}$ (g)
Plant height (cm)	0.1636*	-0.0388	0.2279**	0.1436	-0.0047	0.0149	-0.2187**	-0.1085	0.1089	0.2801**	0.3326**
Days to 50% flowering	0.6237**	0.0001	0.1956*	0.1558*	0.1132	0.1779*	-0.0286	0.0352	-0.0005	0.2547**	0.2922**
No. of monopodia plant $^{-1}$	0.5090**	-0.0060	0.1639*	0.1302	0.1987**	0.1205	0.1324	-0.0892	0.1032	0.1428	0.1636*
No. of sympodia plant $^{-1}$	0.0408	0.1180	0.0450	0.0936	-0.1708*	-0.0870	-0.1462	-0.0298	-0.0612	0.5399**	0.5573**
Relative water content (%)	0.1925*	0.0901	0.1636*	0.1443	0.1183	-0.0186	0.0606	0.0028	0.0336	0.1543*	0.1224
Specific leaf weight (mg cm $^{-2}$)	-0.0498	0.1705*	0.0905	0.1961**	-0.1237	0.2905**	-0.1618*	-0.0065	0.1000	0.1009	0.0177
C.G.R at peak flowering (g m $^{-2}$ day $^{-1}$)	0.0817	0.0065	0.1799**	0.1479	-0.0149	0.1862*	-0.0439	0.0314	0.0849	-0.0180	-0.0250
C.G.R at boll formation (g m $^{-2}$ day $^{-1}$)	-0.0099	0.0203	0.1840*	0.1554*	-0.0906	0.1868*	-0.1678*	-0.0342	0.2058**	-0.0945	-0.1210
C.G.R at maturity (g m $^{-2}$ day $^{-1}$)	0.1532*	0.1032	0.2418**	0.2569**	0.0213	0.1788*	-0.0753	-0.0912	0.2523**	0.1547*	0.1138
No. of bolls plant $^{-1}$	-0.5466**	0.2492**	-0.1044	0.0744	-0.2122**	-0.1251	-0.1885*	-0.0066	-0.1237	0.4936**	0.4349**
Boll weight (g)	—	-0.1412	0.3835**	0.2033**	0.1612*	0.2043**	0.1554*	-0.0430	0.0948	0.3073**	0.4268**
Ginning out-turn (%)	-0.1431	—	-0.1459	0.5619**	-0.1698*	0.1230	-0.2003**	0.1557*	-0.0787	0.4770**	0.0578
Seed index (g)	0.3911**	-0.1382	—	0.6963**	0.2388**	0.3034**	-0.0009	-0.1106	0.3097**	0.1779*	0.2626**
Lint index (g)	0.2072**	0.5714**	0.7059**	—	0.0516	0.3525**	-0.1264	0.0737	0.2120**	0.4501**	0.2297**
2.5% span length (mm)	0.1843*	-0.2126**	0.2866**	0.0480	—	-0.1548*	0.5492**	-0.3999**	0.2371**	-0.1389	-0.0659
Micronaire (10^{-6} g in $^{-1}$)	0.2224**	0.1346	0.3288**	0.3733**	-0.1736*	—	-0.1988**	0.2207**	0.2563**	0.1532*	0.0908
Bundle strength (g tex $^{-1}$)	0.1971**	-0.3033**	-0.0008	-0.1710*	0.8173**	-0.2728**	—	-0.2382**	0.1833*	-0.1184	-0.0300
Uniformity ratio	-0.0629	0.2003**	-0.1373	0.0957	-0.4641**	0.2783**	-0.3361**	—	0.0135	0.0392	-0.0463
Fibre elongation (%)	0.1229	-0.1015	0.3717**	0.2608**	0.2734**	0.2670**	0.2335**	-0.0589	—	-0.0087	0.0119
Lint yield plant $^{-1}$ (g)	0.3898**	0.5901**	0.2429**	0.5768**	-0.2445**	0.2382**	-0.2003**	0.1047	-0.0445	—	0.9014**
Seed cotton yield plant $^{-1}$ (g)	0.5902**	0.0586	0.3779**	0.3155**	-0.1409	0.1676*	-0.0284	-0.0312	-0.0033	0.8356**	—

*, ** Significant at 5% and 1% level, respectively

Table 2. Direct and indirect effects (genotypic) of 20 traits on seed cotton yield per plant in 86 intra-hirsutum hybrids of cotton (*Gossypium hirsutum* L.)

Characters	Plant height (cm)	Days to 50% flowering	No. of monopodia plant ⁻¹	No. of sympodia plant ⁻¹	Relative water content (%)	Specific leaf weight (mg cm ⁻²)	C.G.R at peak flowering (g m ⁻² day ⁻¹)	C.G.R at boll formation (g m ⁻² day ⁻¹)	C.G.R at maturity (g m ⁻² day ⁻¹)	No. of bolls plant ⁻¹
Plant height (cm)	-0.0026	-0.0007	-0.0005	-0.0009	0.0001	0.0003	0.0000	-0.0001	-0.0005	-0.0005
Days to 50% flowering	0.0019	0.0076	0.0058	0.0005	0.0004	-0.0004	0.0007	0.0002	0.0009	-0.0036
No. of monopodia plant ⁻¹	-0.0127	-0.0564	-0.0732	0.0010	-0.0137	0.0036	-0.0025	-0.0020	-0.0120	0.0443
No. of sympodia plant ⁻¹	0.0375	0.0079	-0.0015	0.1130	-0.0032	-0.0083	-0.0121	-0.0176	-0.0094	0.0736
Relative water content (%)	-0.0004	0.0004	0.0013	-0.0002	0.0072	0.0003	0.0007	-0.0003	0.0018	-0.0006
Specific leaf weight (mg cm ⁻²)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000
C.G.R at peak flowering (g/m ² /day)	0.0000	-0.0025	-0.0009	0.0027	-0.0024	0.0026	-0.0255	-0.0206	-0.0133	0.0040
C.G.R at boll formation (g m ⁻² day ⁻¹)	0.0008	0.0006	0.0007	-0.0042	-0.0012	-0.0002	0.0219	0.0271	0.0144	-0.0027
C.G.R at maturity (g m ⁻² day ⁻¹)	0.0007	0.0004	0.0006	-0.0003	0.0009	0.0000	0.0019	0.0019	0.0036	-0.0001
No. of bolls plant ⁻¹	-0.0155	0.0378	0.0477	-0.0515	0.0068	-0.0074	0.0122	0.0079	0.0028	-0.0789
Boll weight (g)	0.0086	0.0360	0.0355	0.0021	0.0101	-0.0025	0.0045	-0.0005	0.0083	-0.0372
Ginning out-turn (%)	0.0243	-0.0119	-0.0014	-0.0913	-0.0660	-0.1203	-0.0109	-0.0137	-0.0789	-0.2026
Seed index (g)	-0.0286	-0.0268	-0.0272	-0.0068	-0.0210	-0.0113	-0.0229	-0.0230	-0.0309	0.0173
Lint index (g)	0.0200	0.0247	0.0235	0.0139	0.0200	0.0265	0.0214	0.0213	0.0358	0.0105
2.5% span length (mm)	0.0007	0.0100	0.0215	-0.0147	0.0103	-0.0102	0.0003	-0.0091	0.0026	-0.0253
Micronaire (10 ⁻⁶ g inch ⁻¹)	-0.0002	-0.0041	-0.0027	0.0020	0.0003	-0.0069	-0.0048	-0.0047	-0.0041	0.0038
Bundle strength (g tex ⁻¹)	0.0140	-0.0026	-0.0079	0.0082	-0.0050	0.0112	0.0015	0.0116	0.0056	0.0169
Uniformity ratio	0.0021	-0.0001	0.0016	0.0008	0.0002	0.0000	-0.0007	0.0007	0.0016	-0.0009
Fibre elongation (%)	-0.0029	-0.0002	-0.0038	0.0010	-0.0015	-0.0026	-0.0022	-0.0058	-0.0067	0.0039
Lint yield plant ⁻¹ (g)	0.4443	0.3797	0.2618	0.8394	0.2441	0.1423	-0.0702	-0.1155	0.2208	0.3903
Correlation with seed cotton yield plant ⁻¹ (g)	0.4918**	0.3997**	0.2811**	0.8147**	0.1866*	0.0168	-0.0866	-0.1424	0.1423	0.2120**

Table 2. (cont.)

Characters	Boll weight (g)	Ginning out-turn (%)	Seed index (g)	Lint index (g)	2.5% span length (mm)	Micronaire (10 ⁻⁶ g in ⁻¹)	Bundle strength (g tex)	Uniformity ratio (%)	Fibre elongation (%)	Lint yield plant ⁻¹ (g)
Plant height (cm)	-0.0004	0.0001	-0.0006	-0.0004	0.0000	0.0000	0.0007	0.0004	-0.0003	-0.0010
Days to 50% flowering	0.0054	0.0001	0.0016	0.0014	0.0011	0.0014	0.0004	0.0001	0.0001	0.0025
No. of monopodia plant ⁻¹	-0.0512	-0.0001	-0.0161	-0.0128	-0.0228	-0.0089	-0.0114	0.0087	-0.0123	-0.0167
No. of sympodia plant ⁻¹	0.0046	0.0148	0.0062	0.0116	-0.0242	-0.0100	-0.0183	-0.0066	-0.0050	0.0824
Relative water content (%)	0.0014	0.0007	0.0012	0.0011	0.0011	-0.0001	0.0007	-0.0001	0.0005	0.0015
Specific leaf weight (mg cm ⁻²)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C:G.R at peak flowering (g m ⁻² day ⁻¹)	-0.0023	-0.0004	-0.0047	-0.0041	-0.0001	-0.0055	0.0008	-0.0013	-0.0025	0.0016
C:G.R at boll formation (g m ⁻² day ⁻¹)	-0.0003	0.0005	0.0051	0.0043	-0.0036	0.0058	-0.0062	-0.0013	0.0070	-0.0027
C:G.R at maturity (g/m ² /day)	0.0006	0.0004	0.0009	0.0010	0.0001	0.0007	-0.0004	-0.0004	0.0011	0.0007
No. of bolls plant ⁻¹	0.0578	-0.0229	0.0111	-0.0061	0.0290	0.0133	0.0263	-0.0051	0.0139	-0.0268
Boll weight (g)	0.0508	-0.0073	0.0199	0.0105	0.0094	0.0113	0.0100	-0.0032	0.0062	0.0198
Ginning out-turn (%)	0.0999	-0.6978	0.0964	-0.3987	0.1484	-0.0939	0.2117	-0.1397	0.0709	-0.4118
Seed index (g)	-0.0483	0.0171	-0.1236	-0.0873	-0.0354	-0.0406	0.0001	0.0170	-0.0459	-0.0300
Lint index (g)	0.0279	0.0770	0.0951	0.1347	0.0065	0.0503	-0.0230	0.0129	0.0351	0.0777
2.5% span length (mm)	0.0127	-0.0146	0.0197	0.0033	0.0688	-0.0119	0.0562	-0.0319	0.0188	-0.0168
Micronaire (10 ⁻⁶ g in ⁻¹)	-0.0050	-0.0030	-0.0073	-0.0083	0.0039	-0.0223	0.0061	-0.0062	-0.0060	-0.0053
Bundle strength (g tex ⁻¹)	-0.0100	0.0154	0.0000	0.0087	-0.0416	0.0139	-0.0509	0.0171	-0.0119	0.0102
Uniformity ratio	0.0008	-0.0027	0.0018	-0.0013	0.0062	-0.0037	0.0045	-0.0133	0.0008	-0.0014
Fibre elongation (%)	-0.0028	0.0023	-0.0083	-0.0059	-0.0061	-0.0060	-0.0052	0.0013	-0.0224	0.0010
Lint yield plant ⁻¹ (g)	0.4486	0.6790	0.2795	0.6637	-0.2814	0.2741	-0.2305	0.1205	-0.0512	1.1507
Correlation with seed cotton yield plant ⁻¹ (g)	0.5902**	0.0586	0.3779**	0.3155**	-0.1409	0.1676*	-0.0284	-0.0312	-0.0033	0.8356**

* , ** Significant at 5% and 1% level, respectively , Bold and diagonal values indicate direct effect , Residual effect = 0.0915

Table 3. Direct and indirect effects (phenotypic) of 20 traits on seed cotton yield per plant in 86 intra-hirsutum hybrids of cotton (*Gossypium hirsutum* L.)

Characters	Plant height (cm)	Days to 50% flowering	No. of monopodia plant ⁻¹	No. of sympodia plant ⁻¹	Relative water content (%)	Specific leaf weight (mg cm ⁻²)	C.G.R at flowering (g m ⁻² day ⁻¹)	C.G.R at boll formation (g m ⁻² day ⁻¹)	C.G.R at maturity (g m ⁻² day ⁻¹)	No. of bolls plant ⁻¹
Plant height (cm)	-0.0043	-0.0010	-0.0006	-0.0013	0.0002	0.0005	0.0000	-0.0001	-0.0008	-0.0006
Days to 50% flowering	-0.0007	-0.0032	-0.0018	-0.0003	-0.0002	0.0001	-0.0003	0.0000	-0.0004	0.0010
No. of monopodia plant ⁻¹	-0.0012	-0.0051	-0.0091	0.0003	-0.0012	0.0003	-0.0002	-0.0002	-0.0009	0.0028
No. of sympodia plant ⁻¹	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Relative water content (%)	0.0005	-0.0006	-0.0015	0.0002	-0.0107	-0.0005	-0.0009	0.0005	-0.0026	0.0007
Specific leaf weight (mg cm ⁻²)	0.0009	0.0003	0.0003	0.0006	-0.0003	-0.0077	0.0007	0.0001	0.0000	-0.0006
C.G.R at peak flowering (g m ⁻² day ⁻¹)	0.0001	0.0007	0.0002	-0.0008	0.0007	-0.0008	0.0079	0.0060	0.0039	-0.0007
C.G.R at boll formation (g m ⁻² day ⁻¹)	0.0000	0.0000	0.0000	-0.0001	0.0000	0.0000	0.0003	0.0004	0.0002	0.0000
C.G.R at maturity (g m ⁻² day ⁻¹)	-0.0023	-0.0014	-0.0012	0.0009	-0.0029	0.0000	-0.0060	-0.0060	-0.0121	0.0001
No. of bolls plant ⁻¹	0.0043	-0.0100	-0.0103	0.0147	-0.0021	0.0025	-0.0029	-0.0027	-0.0003	0.0330
Boll weight (g)	0.0096	0.0365	0.0298	0.0024	0.0113	-0.0029	0.0048	-0.0006	0.0090	-0.0320
Ginning out-turn (%)	0.0177	0.0000	0.0027	-0.0539	-0.0411	-0.0779	-0.0030	-0.0093	-0.0471	-0.1138
Seed index (g)	-0.0009	-0.0008	-0.0006	-0.0002	-0.0006	-0.0003	-0.0007	-0.0007	-0.0009	0.0004
Lint index (g)	-0.0009	-0.0009	-0.0008	-0.0006	-0.0009	-0.0012	-0.0009	-0.0009	-0.0015	-0.0004
2.5% span length (mm)	0.0000	0.0008	0.0015	-0.0013	0.0009	-0.0009	-0.0001	-0.0007	0.0002	-0.0016
Micronaire (10 ⁶ g inch ⁻¹)	-0.0003	-0.0031	-0.0021	0.0015	0.0003	-0.0051	-0.0033	-0.0033	-0.0032	0.0022
Bundle strength (g tex ⁻¹)	0.0012	0.0002	-0.0007	0.0008	-0.0003	0.0009	0.0002	0.0009	0.0004	0.0010
Uniformity ratio	0.0014	-0.0004	0.0011	0.0004	0.0000	0.0001	-0.0004	0.0004	0.0011	0.0001
Fibre elongation (%)	-0.0005	0.0000	-0.0005	0.0003	-0.0002	-0.0005	-0.0004	-0.0010	-0.0012	0.0006
Lint yield plant ⁻¹ (g)	0.3080	0.2801	0.1571	0.5937	0.1696	0.1110	-0.0198	-0.1039	0.1701	0.5427
Correlation with seed cotton yield plant ⁻¹ (g)	0.3326**	0.2922**	0.1636*	0.5573**	0.1224	0.0177	-0.0250	-0.1210	0.1138	0.4349**

Table 3. (cont.)

Characters	Boll weight (g)	Ginning out-turn (%)	Seed index (g)	Lint index (g)	2.5% span length (mm)	Micronaire (10^{-6} g in $^{-1}$)	Bundle strength (g tex $^{-1}$)	Uniformity ratio (%)	Fibre elongation (%)	Lint yield plant $^{-1}$ (g)
Plant height (cm)	-0.0007	0.0002	-0.0010	-0.0006	0.0000	-0.0001	0.0009	0.0005	-0.0005	-0.0012
Days to 50% flowering	-0.0020	0.0000	-0.0006	-0.0005	-0.0004	-0.0006	0.0001	-0.0001	0.0000	-0.0008
No. of monopodia plant $^{-1}$	-0.0046	0.0001	-0.0015	-0.0012	-0.0018	-0.0011	-0.0012	0.0008	-0.0009	-0.0013
No. of sympodia plant $^{-1}$	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Relative water content (%)	-0.0021	-0.0010	-0.0017	-0.0015	-0.0013	0.0002	-0.0006	0.0000	-0.0004	-0.0017
Specific leaf weight (mg cm $^{-2}$)	0.0004	-0.0013	-0.0007	-0.0015	0.0010	-0.0022	0.0012	0.0000	-0.0008	-0.0008
C.G.R at peak flowering (g m $^{-2}$ day $^{-1}$)	0.0006	0.0001	0.0014	0.0012	-0.0001	0.0015	-0.0003	0.0002	0.0007	-0.0001
C.G.R at boll formation (g m $^{-2}$ day $^{-1}$)	0.0000	0.0000	0.0001	0.0001	0.0000	0.0001	-0.0001	0.0000	0.0001	0.0000
C.G.R at maturity (g m $^{-2}$ day $^{-1}$)	-0.0019	-0.0012	-0.0029	-0.0031	-0.0003	-0.0022	0.0009	0.0011	-0.0031	-0.0019
No. of bolls plant $^{-1}$	-0.0180	0.0082	-0.0034	0.0025	-0.0070	-0.0041	-0.0062	-0.0002	-0.0041	0.0163
Boll weight (g)	0.0586	-0.0083	0.0225	0.0119	0.0094	0.0120	0.0091	-0.0025	0.0056	0.0180
Ginning out-turn (%)	0.0645	-0.4567	0.0666	-0.2566	0.0776	-0.0562	0.0915	-0.0711	0.0359	-0.2178
Seed index (g)	-0.0015	0.0006	-0.0039	-0.0027	-0.0009	-0.0012	0.0000	0.0004	-0.0012	-0.0007
Lint index (g)	-0.0012	-0.0034	-0.0042	-0.0060	-0.0003	-0.0021	0.0008	-0.0004	-0.0013	-0.0027
2.5% span length (mm)	0.0012	-0.0013	0.0018	0.0004	0.0074	-0.0012	0.0041	-0.0030	0.0018	-0.0010
Micronaire (10^{-6} g inch $^{-1}$)	-0.0036	-0.0022	-0.0054	-0.0062	0.0027	-0.0177	0.0035	-0.0039	-0.0045	-0.0027
Bundle strength (g tex $^{-1}$)	-0.0009	0.0011	0.0000	0.0007	-0.0030	0.0011	-0.0055	0.0013	-0.0010	0.0007
Uniformity ratio	0.0005	-0.0019	0.0014	-0.0009	0.0050	-0.0028	0.0030	-0.0125	-0.0002	-0.0005
Fibre elongation (%)	-0.0004	0.0004	-0.0015	-0.0010	-0.0011	-0.0012	-0.0009	-0.0001	-0.0047	0.0000
Lint yield plant $^{-1}$ (g)	0.3379	0.5245	0.1956	0.4949	-0.1528	0.1685	-0.1302	0.0431	-0.0095	1.0996
Correlation with seed cotton yield plant $^{-1}$ (g)	0.4268**	0.0578	0.2626**	0.2297**	-0.0659	0.0908	-0.0300	-0.0463	0.0119	0.9014**

*, ** Significant at 5% and 1% level, respectively, Bold and diagonal values indicate direct effect, Residual effect = 0.0813

Path coefficient analysis revealed that lint yield per plant had high positive direct effect coupled with high significant positive correlation with seed cotton yield per plant. The traits boll weight and number of sympodia per plant had also positive direct effect towards seed cotton yield but their magnitude were negligible than that of lint yield. The high positive correlation with seed cotton yield observed in case of plant height, days to 50% flowering, number of monopodia, number of bolls per plant, seed index and lint index which exerted direct effect either in positive or negative direction at much lower magnitude. This might be assigned to their high indirect effects on seed cotton yield via lint yield per plant and ginning out-turn. Similar results were earlier reported by Kale *et al.*, (2002), Annapurve *et al.*, (2007) and Venkateswarlu *et al.*, (2010).

Hence, from the correlation and path coefficient analysis study it was inferred that, lint yield per plant had significant association and also showed high positive direct effects on seed cotton yield per plant. Hence, in the improvement programmes due importance may be given for this trait to improve genetic yield potential in cotton.

LITERATURE CITED

- Annapurve S N, Deshmukh G S, Kausale S P and Kale U V 2007** Correlation study of yield contributing characters in American cotton. *Journal of Cotton Research and Development*, 21 (1): 16-20.
- Ashok Kumar K and Ravikesavan R 2010** Genetic studies of correlation and path coefficient analysis for seed oil, yield and fibre quality traits in cotton (*Gossypium hirsutum* L.). *Australian Journal of Basic and Applied Sciences*, 4(11): 5496-5499.
- Dewey D R and Lu K H 1959** A correlation and path coefficient analysis of components of crested wheat grass seed production. *Agronomy Journal*, 51(9): 515-518.
- Falconer D S 1964** *An Introduction to Quantitative Genetics – 2nd ed.*. Oliver and Boyd, Edinburgh pp. 312-324.
- Kale U R, Kalpande S, Annapurve S N and Gite V K 2007** Yield components analysis in American cotton (*Gossypium hirsutum* L.). *Madras Agricultural Journal*, 94(7-12): 156-161.
- Mahantesh 2009** Combining ability studies involving new hirsutum lines in cotton (*Gossypium hirsutum* L.). *M.Sc. (Ag) Thesis*. Acharya N G Ranga Agricultural University, Hyderabad, India.
- Rajanna B 2010** Combining ability studies involving new hirsutum lines in cotton (*Gossypium hirsutum* L.). *M.Sc. (Ag) Thesis*. Acharya N G Ranga Agricultural University, Hyderabad, India.
- Venkateswaralu K, Chenga Reddy V, Samba Murthy, J S V, Srinivasa Rao V, Pandu Ranga Rao C, Siva Reddy, K V and Sateesh Babu J 2010** Character association and path coefficient analysis for yield and component traits in upland cotton (*Gossypium hirsutum* L.). *The Andhra Agricultural Journal*, 57 (2): 173-176.