AN INVESTIGATION ON CORRELATION AND REGRESSION ANALYSIS FOR FIELD AND ITS COMPONENTS IN GOSSYPIUM HIRUSTUM L.

A. Hameed Ansari[*] Khalid Ahmed Maher[**]
Rasool Bux Memon[***], Azizullah Memon[***]
and Anis Ahmed Mirza[***]

[*]*Department of Agronomy, Sindh Agriculture University, Tandojam, Sindh, Pakistan*
[**]*Department of Statistics, Sindh Agriculture University, Tandojam, Sindh, Pakistan*
[***]*Department of Statistics, University of Sindh, Sindh, Pakistan*

Abstract

Three cultivars of *Gossypium hirustum* L. viz. Qalandari, TH-1100, and TH-1174 were grown during summer 1985-86 to examine the association among seed cotton field and its contributing traits. The study indicated that plant height had positive correlation with branches and seed cotton yield/plant whereas branches /plant revealed high positive association with bolls/plant and significant positive correlation with seed cotton yield, but negative correlation with days to boll formation. Bolls/plant showed positive and highly significant correlation with seed cotton yield/plant. The seed cotton yield/plant had negative significant association with days to boll formation. Days to flowering showed positive and significant correlation with days to boll formation. However, other traits had positive or negative relation among them but not so pronounced. It is suggested that plant height, branches, bolls/plant and days to boll formation are desirable characters in selection criteria.

Introduction

Yield in any crop is associated with vegetative, reproductive and climatic factors aswell as soil nutrients, (Worley *et al.*, 1976). Studies of relationship of agronomic and morphological characters are helpful in the identification of the components of a complex character such as yield. Keeping the above facts in view

an investigation was conducted to study the correlation and regression between yield and its components in *Gossypium hirustum* L. under agro-ecological conditions of Tandojam.

Materials and Methods

The investigation was conducted at the Agronomy Experimental field A.R.I. Tandojam, during summer 1985-86. The seeds of three cotton cultivars viz. V_1, Qalandari (*G. hirustum* var, M_4 × *G. herbareum*) × (*G. barbadense*, var *Karak*). V2 TH100 (*G. hirustum* 21 × Mc nair TH- 14920) and V_3, TH-1174, (Latifi × Cocker 100 AX), were grown on 15th April, at a rate of 35 kg/ha in four replicated randomized complete block design in a net plot size of 5 × 7 metre. The inter and Intra row spacings of 75 × 25 cm was maintained. A basal dose of 80/kg N and 50 kg P_2O_5/ha was applied in the form of urea and single super phosphate prior to sowing. All the necessary cultural operations were adopted uniformly in all the plots throughout the growing period according to the crop requirements. Five plants in each plot were tagged for recording the following observations: days to flowering, days to boll formation, plant height, no of branches/plant, bolls/plant and seed cotton yield/plant, The correlation and regression were calculated using technique outlined by Gomez and Gomez (1984). The following correlations were studied.

1.	Days to flowering	v/s	days to boll formation.
2.	Days to flowering	v/s	plant height.
3.	Days to flowering	v/s	No. of branches. plant.
4.	Days to flowering	v/s	bolls/plant.
5.	Days to flowering	v/s	seed cotton yield.
6.	Days to boll formation	v/s	plant height.
7.	Days to boll formation	v/s	No. of branches/ plant.
8.	Days to boll formation	v/s	bolls/plant.
9.	Days to boll formation	v/s	seed cotton yield.
10.	Plant height	v/s	No of branches/ plant.
11.	Plant height	v/s	bolls/plant.
12.	Plant height	v/s	seed cotton yield.
13.	No. of branches/ plant	v/s	bolls/ plant.

14. No. of branches/ plant v/s seed cotton yield.

15. No. of Bolls/ plant v/s seed cotton yield.

Results

Inter-relationship of yield and its traits in cotton (Table.1) indicated that plant height had significant and positive association with branches/ plant ($r = 0.359$). The coefficient of determination ($r^2 = 0.129$) suggested that 12.9 percent variation in branches/ plant occurred due to the variation in plant height. The regression coefficient (0.044) revealed that for each unit increase in plant height the number of branches would increase by 0.04/plant. The correlation among plant height and seed cotton yield/ plant was positive and significant ($r = 0.350$); the coefficient of determination ($r^2 = 0.122$) showed that 12.2 percent of the variation in seed cotton yield/ plant occurred due to the variation in plant height. The regression coefficient (0.420) depicts that for each cm increase in plant height the seed cotton yield would increase by 0.42 gm/plant. However, there was no association of plant height with days to flowering days to boll formation and with bolls/plant.

Number of branches has negative and significant correlation with days to boll formation ($r = -0.438$); the coefficient of determination ($r^2 = 0.192$) indicated that 19.20% of the variation in days to boll formation was due to the variation in number of branches/plant, the regression coefficient (0.349) revealed that for the reduction of a single branch/plant the boll formation period would increase by 0.35 days. The high positive correlation ($r = 0.601$) was found among number of branches and bolls/plant, the coefficient of determination ($r^2 = 0.361$) indicated that 36.10% variation in number of bolls/plant occurred due to the variation in the number of branches/plant. The regression coefficient (0.327) indicated that for the increase of a single branch the number of bolls increased by 0.33/plant. The association of the number of branches and seed cotton yield/plant was strong and positive ($r = 0.494$); the coefficient of determination ($r^2 = 0.244$) suggested that 24.4 percent variation in seed cotton may be attributed to the variation in number of branches/ plant, The regression coefficient (2.368) depicted that for an increase of a single branch the seed cotton yield would increase by 2.37 gm/plant whereas there was no relation among number of branches/ plant and days to flowering/plant had a strong positive association with the seed cotton yield/plant ($r = 0.682$), the coefficient of determination ($r^2 = 0,4660$) revealed that 46.6% of the variation in seed cotton yield/plant may be attributed to the variation in number of bolls/plant; the regression coefficient (4.965) suggested that for an increase of a single boll, the seed cotton yield would increase by 4.97 gms/plant.

The relation of bolls/plant with the days to flowering and says to boll formulation were negative but not so pronounced. The seed cotton yield/plant had negative significant correlation with days to boll formation (r = -0.448). The coefficient of determination ($r^2 = 0.200$) shows that 20 percent of the variation in seed cotton yield occurred due to changes in days to boll formation. The regression coefficient (-0.074) indicated that for unit increment in days to boil formation the seed cotton yield would decrease by 0.07/plant. However, negative and non-significant association was found among seed cotton yield and days to flowering. Days to flowering has significant positive relation with days to boll formation ($r = 0.394$); the coefficient of determination ($r^2 = 0.155$) depicts that 1.55 percent variation in day to boll formation is due to the variation in days to flowering. The regression coefficient (0.498) indicated that for a single day increase in flowering the boll formation decreased by 0.45 days.

Discussion

In breeding programmes for increasing yield in cotton, problems are encountered if one attempts to detect positively any one yield component since negative correlation responses generally are found for the other components. This effect is compounded because a change in environmental conditions may favour one yield component over another. The present study indicated that plant height had positive significant relation with branches/plant. Similar results were reported by Channa and Mohiuddin (1982) and Ansari *et al.* (1989). The association of plant height with seed cotton yield/plant was significant and positive. Hancock (1941), Sexena (1963), Rizvi and Khan (1967); Bhardwaj and Simlote (1969) and Ansari *et al.* (1989) also reported similar results. Branches/plant showed significant negative association with days to boll formation but positive high association with boll/plant and the seed cotton yield/plant. These results are in agreement to those of Naidu and Katarki (1968); Singh et al. (1968), Bela and Kotiah (1973) Bolls/plant had highly significant and positive relation with seed cotton yield/plant. Similar results are reported by Ansari *et al.* (1989), Memon *et al.* (1967); Prasad and Katarki (1969); Seed cotton yield/plant had significant but negative association with days to boll formation which means that increasing days to boll formation resulted in depressed yield. The inter-relationship of days to flowering and days to boll formation was positive and significant of days to flowering and days to boll formation was positive and significant withich indicated that increasing days of flowering would increase days to boll formation. Similar results are reported by Young *et al.* (1980). A negative correlation occurs when two developing structures of a plant compete for a common nutrient supply and negative correlation may arise if one structure is favoured over the other in amount of nutrient supply (Adams, 1967).

It may be inferred from the present investigation that plant height, number of branches, number of bolls and days to boll formation are desirable characters for selection criteria.

TABLE – 1

Metrix of coefficient of correlation (r), coefficient of determination (r^2) and regression coefficient (byx) among yield and its components in cotton.

Traits	Days to flowering	Days to formation	Height (cm)	Boll plant branches/ plant.	No. of bran- (gm)	Bolls/ plant	yield/Plant	Seed Cotton
Days of flowering	1.000	–	–	–	–	–	–	–
	1.000	–	–	–	–	–	–	–
	1.000	–	–	–	–	–	–	–
Days to boll formation	0.394*	1.000	–	–	–	–	–	–
	0.155	1.000	–	–	–	–	–	–
	0.498	1.000	–	–	–	–	–	–
Plant height (cm)	–0.224	–0.303	1.000	–	–	–	–	–
	0.050	0.092	1.000	–	–	–	–	–
	–0.035	–0.030	1.000	–	–	–	–	–
No. of branches/ plant	–0.116	–0.438*	0.359*	1.000	–	–	–	–
	0.014	0.192	–0.129	1.000	–	–	–	–
	–0.073	–0.349	0.044	1.000	–	–	–	–
Bolls/ plant	–0.242	–0.250	00.188	0.601**	1.000	–	–	–
	0.059	0.063	0.035	0.361	1.000	–	–	–
	–0.231	–0.306	0.015	0.327	1.000	–	–	–
Seed Cotton Yield/ plant (gm)	–0.063	–0.448	0.350*	0.494	0.682**	1.000	–	–
	0.004	0.200	0.122	0.244	0.466	1.000	–	–
	–0.074	–0.074	0.420	2.368	4.965	1.000	–	–

* Significant at P = 0.05 percent level of probability.

** Significant at P = 0.01 percent level of probability.

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