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INHERITANCE PATTERN OF SOME FIBRE AND OTHER CHARACTERISTICS IN COTTON *(Gossypium hirsutum* L.)

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A 4 x 4 diallel analysis of cotton cultivars under Faisalabad agroclimatic condition revealed additive type of gene action controlling the phenotypic manifestation of seed index, lint index and fibre fineness. The inheritance of fibre length was governed by overdominance type of gene action.

INTRODUCTION

Cotton production in Pakistan is increasing progressively. It reflects, apart from the effect of other cotton production technology factors, the efforts of breeders for evolving varieties with higher yield potential. Without any doubt cotton is the only commodity of commerce which is maintaining and/or strengthening the economy of Pakistan through adding the biggest share in our foreign exchange earnings.

Now with the changing trend of international market about the quality of fibre we should divert our attention towards improving fibre quality particularly fibre fineness and fibre length of our cotton without ignoring the side of higher yield. Apart from this cotton is the biggest oil producing crop in Pakistan. It contributes about 55% (Anonymous, 1991) to our local edible oil production. The characters like seed index can help improving this side of our cotton as there is positive correlation between seed index and oil content of the seed. For literature consult please. Anwar and Khan (1974), Chowhdry (1974), Khan *et at.* (1975), Gururaja Rao *et al.* (1977), Kohel (1978), Mirza and Khan (1984), Khan (1986), Lertprasertrat *et al.* (1987), Khan *et al.,* (1989) and Khan *et al.* (1991).

MATERIALS AND METHODS

The experimental material consisted of a complete set of diallel crosses raised from 4 cotton cultivars including 2 local viz. B-557 and AU-59 and two exotic viz. DPL-70 and Dos-56. The varieties were grown in the pots put in the green house of the Department of plant Breeding and Genetics, University of Agriculture, Faisalabad during 1987 for crossing purposes. The seed of sixteen genotype in the diallel set thus produced was sown in the field using Randomized Complete Block Design with three replications. The experimental plot consisted a line of 10 plants of each genotype. The plant to plant distance within and between the lines was kept 30 cm and 75cm, respectively. After the crop was harvested the observations for seed index, lint index, fibre length and fibre fineness were made from six guarded plants in each experimental plot. The data thus collected was subjected to the variance analysis following steel and Torrie (1980). The gene action was thus ascertained through diallel analysis (Hayman, 1954 and links, 1955).

RESULTS AND DISCUSSION

Analysis of variance indicated highly significant differences among the genotypes of the complete diallel set (Table 1). The variance

Table 1. Mean Values for parents and F1 hybrids

	Seed Index	Lint index	Fibre length	Fibre fineness
B-557	4.10	7.15	27.37	4.36
AV-59	4.14	7.42	25.96	4.20
DPL-70	4.73	8.60	25.83	4.11
Dos-56	4.96	8.87	25.79	4.46
B-557 x AV-59	3.94	7.19	27.31	4.40
B-557 x DPL-70	4.35	7.87	25.73	4.35
B-557 x Dos-56	4.41	7.99	27.48	4.50
AV-59 x DPL-70	4.38	8.01	26.68	4.16
AD-59 x Dos-56	3.88	7.06	27.28	4.41
DPL-70 x Dos-56	4.53	8.07	25.60	4.49

Table 2. Mean square value of characters.

S.O.V.	D.f.	Seed index	Lint index	Staple length	Fibre fineness
Varieties	15	1.39"	0.52"	2.80"	0.146"
Replication	3	0.21	0.23	2.74	0.058
Error	45	0.21	0.07	0.80	0.073

(Vr)/covariance (Wr) graphs for the characters are shown in Figs. 1-4.

Seed index

The regression line with a unit slope cut the Wr axis above the origin. It signifies additive type of gene action with partial dominance involved in the phenotypic manifestation of seed index. From the position of array points on the regression line it is seen that AV-59 being near to origin has maximum dominant genes while Dos-56 is far from the origin so possesses recessive genes. Chowdhry (1974) and Gururaja Rao *et al.* (1977) have reported similar type of results; where as Khan (1986) reported overdominance type of gene action for seed index.

Lint index

Fig. 2 for lint index indicates additive type of gene action with partial dominance as the regression line with unit slope intercept the Wr-axis above the origin. From the position of array points on the regression line AV-59 seems to possess maximum dominant genes while Dos-56 the recessive ones. Different types of gene action for lint index have been reported in the literature. For example Khan (1975) and Gururaja Rao *et al.* (1977) observed partial dominance with additive type of while overdominance was reported by Chowdhry (1974) and Khan (1986).

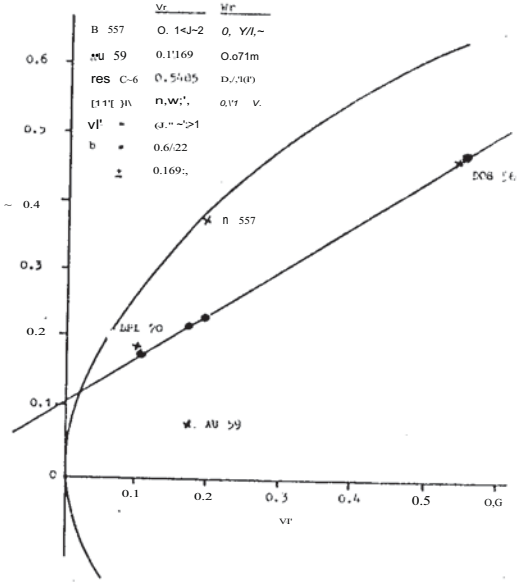
Fibre length

Overdominance type of gene action is revealed for fibre length as regression line with a unit slope passes through the Wr axis below the origin. From array point it is clear that DPL-70 have maximum dominant gene while Dos-56 had recessive ones because of their closer and farther position from the origin. Khan *et al.* (1975), Chowhdry (1974), Mirza and Khan (1984), Khan (1986) and Khan *et al.* (1989) also reported overdominance type of gene action in the inheritance pattern of fibre length.

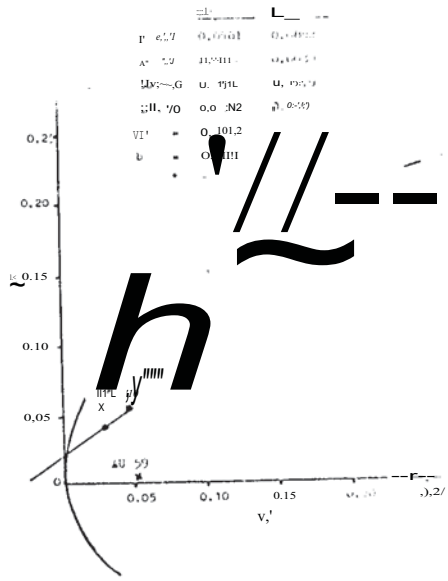
Fibre fineness

Additive type of gene action with partial dominance is observed for fibre fineness as the

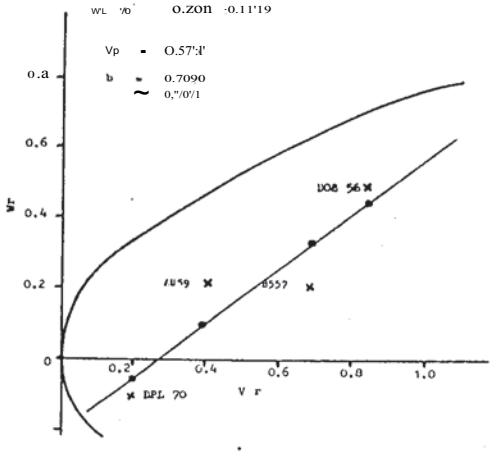
Vr/Wr graph for wool fibres.



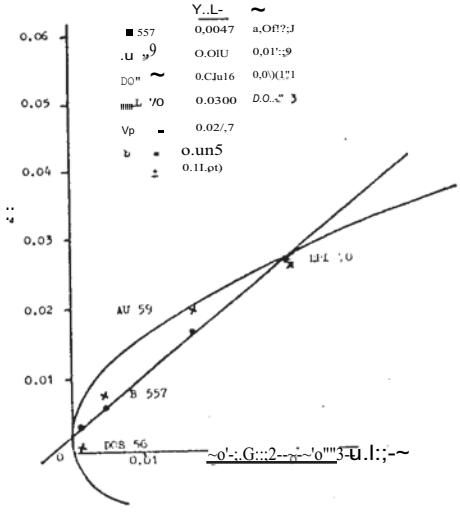
Vr/Wr graph fo.



Vr/Wr graph for fibre length.



Vr/Wr graph for fibre fineness.



regression line with a unit slope in Fig. 4 intercepts the Wr axis above the origin. The array of Dos-56 possesses maximum dominant genes, whereas DPL-70 the recessive ones for this character. The gene action observed for fibre fineness in the present studies supports thc findings of Anwar and Khan (1974), Lertprasertrat *et al.* (1987) and Khan *et al.* (1991).

The genetic patter of seed index, lint index and fibre fineness reported herein indicated the involvement of additive genes but fibre length was controlled by overdorninance type of inheritance pattern. In these situation breeder can improve the character simply through selection.

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