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GENETIC STUDY OF SOME QUANTITATIVE CHARACTERS IN SPRING WHEAT *(T. aestivum L.)*

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ABSTRACT

A 4 x 4 diallel cross experiment involving four wheat varieties/lines viz., Faisalabad 85, Pitic-62, 4072 and 6128-2 revealed that plant parameters like flag leaf area, spike length and number of grains per spike were controlled by partial dominance type of gene action. While number of spikelets per spike, grain yield per plant were controlled by over-dominance type of gene action. Epistasis was observed for grain yield per plant..

INTRODUCTION

Wheat (T. aestivum L.) is the principal food grain in the world and it plays an important role to meet the food requirements' in Pakistan. Grain production can be enhanced through the development of wheat cultivars having wider genetic base under various agro-climatic situations. Exploitation of various genetic mechanisms can greatly help in this endeavour.

An estimate of gene action is important in launching a successful breeding programme. The diallel analysis technique developed and illustrated by Hayman (1954a & 5) and links (1954) is an efficient technique for such a purpose.

MATERIALS AND METHODS

The research work was carried out during March, 1992 using four wheat varieties/lines viz., Faisalabad 85, Pitic-62, 4072 and 6128-2. These were crossed in a diallel fashion and were planted during next growing season (November, 1992). Seeds of F1s alongwith the reciprocals and parents were sown in the field in a triplicated randomized complete block design. The experiment was planted in the experimental area of the department of Plant Breeding and Genetics, University of Agriculture, Faisalabad. Seeds were dibbled in rows and plant to plant and row to row distance was kept at 15 and 30 cm, respectively. A single row of 5 meters lngth served as an experimental unit..

At maturity 10 guarded plants were selected randomly and data were recorded on flag leaf area, spike length, number of spikelets per spike, number of grains per spike and grain yield per plant..

Data thus collected were subjected to analysis of variance technique (Steel and Torrie, 1980). The significant differences among genotypes, were further analysed using diallel technique developed by Hayman (1954a & b) and links (1954).

RESULTS AND DISCUSSION

The analysis of variance showed highly significant differences among

genotypes for flag leaf area, spike length, number of spikelets per spike and grain yield per plant, while significant differences were exhibited for number of grains per spike (Table I).

Table 1. Mean squares for some quantitative characters in wheat.

S.O.V.	D.F.	Flag leaf area	Spike length	Number of spikelets per spike	Number of grains per spike	Grain yield per plant
Replication	2	0,411	0.190	0,408	4.831	0.123
Genotypes	15	34.89**	1.130**	4.310**	34.345**	16.036**
Error	30	3.383	0.130	1.500	12.913	0.513
Total	47					

** = Highly significant
* = Significant

Flag Leaf Area

The *Vr/Wr* graph shows that regression line cuts the Wr-axis above the origin suggesting partial dominance type of gene action (Fig. 1.) The present study also confirmed the findings of Bural *et al.* (1989) and Alam *et al* (1990).

The regression line showed no deviation from unit slope suggesting the absence of the recessive genes. Partial dominance type of gene action and absense ofepistasis. The genotype Pitic-62 was close to the origin, it indicated that most of the dominant genes were present in it, while line 4072 being away from the origin carried most of epistasis revealed that selection in early generations would be effective.

Spike Length

The *Vr/Wr* graph shows that the regression linme cuts the Wr-axis above the origin indicating partial dominance type of gene action (Fig. 11). Similar results were also reported by Chowdhry *et al. (1982)* and khan *et al. (1992).*

The deviation of regression line was not significant from unity which indicates that there was no epistasis. Array points showed that line 6128-2 being nearest to origin had most of the dominant gc. .s while variety Pitic-62 was the farthest from origin so it carried most of the recessive genes.

The present study showed the additive type of gene action so selection in early generation would be very effective and this character can be improved further.

Number of spikelets per spike

From *Vr/Wr* graph pattern it is evident that since the regression line intercepted the Wr-axis below the orgin so overdominance type of gene action was involved for this trait (Fig. 1II). These

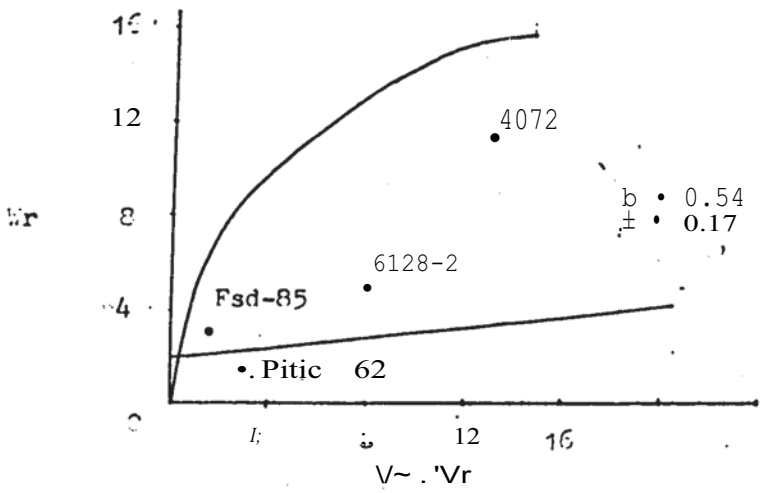

Fig. I. Vr/Wr Graph of Flag Leaf Area.

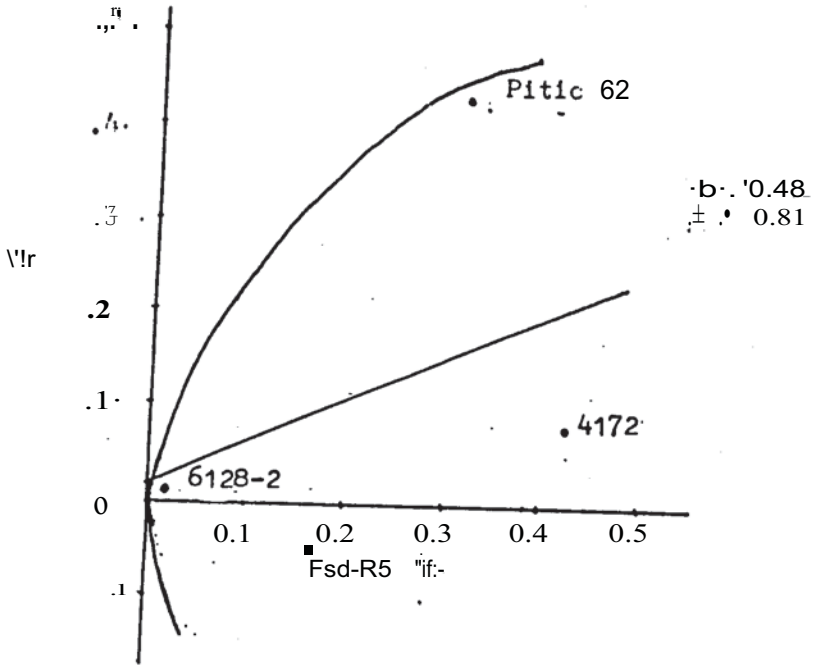

Fig. 11.Vr/Wr Graph of Spike Length.

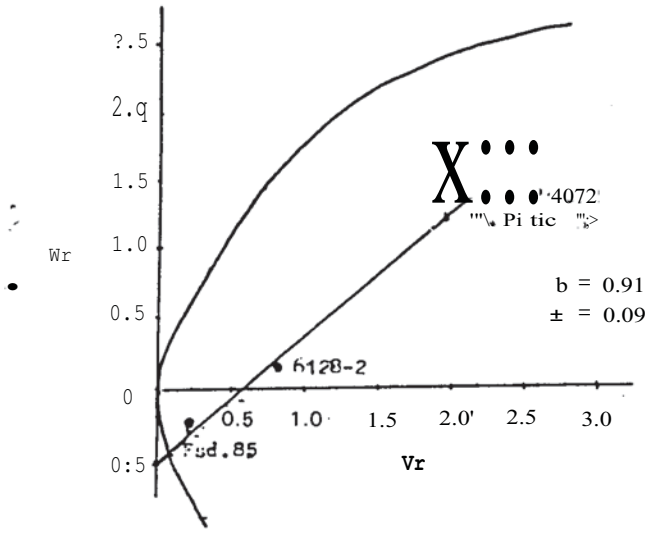

Fig. III. Vr/Wr Graph of Number of Spikelets per Spike.

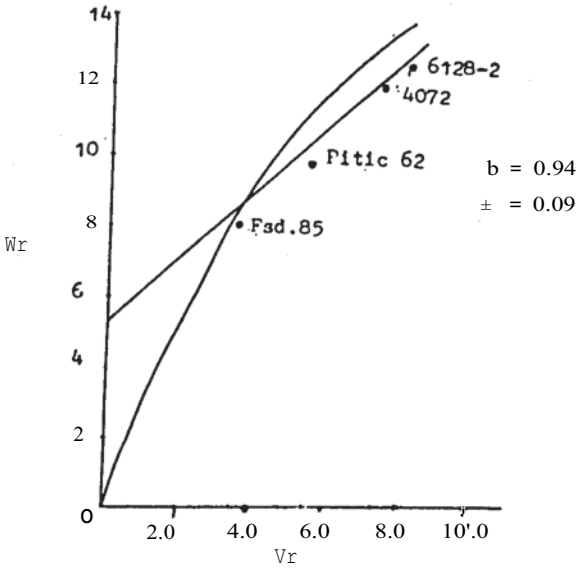

Fig. IV. Vr/Wr Graph of Number of Grain per Spike.

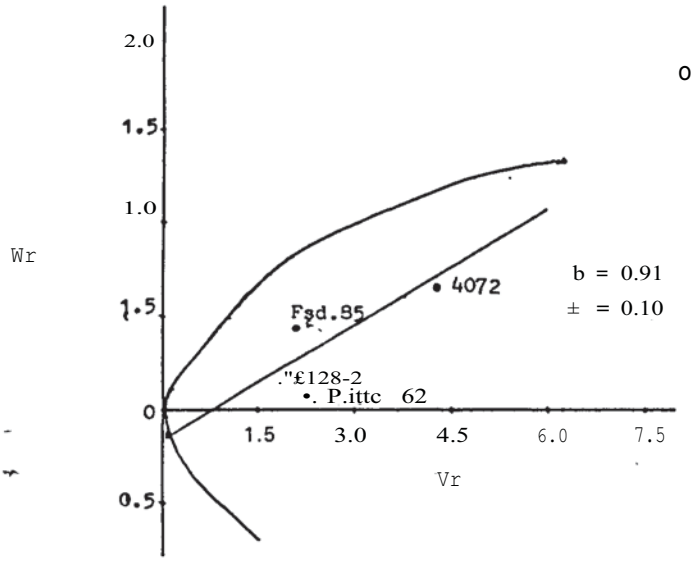

Fig. V. Vr/Wr Graph of Grain Yield per Plant.

results are in accord with the findings of Medvedev (1981) line 6128-2 being nearest to the origin possessed maximum dominant genes. The line 4072 is away from the origin so it contained maximum recessive genes. These results are in accordance with those of Munir *et al.* (1977), Gill *et al.* (1979) and Chowedhry *et al.* (1982). The estimated regression line deviated significantly from unit slope which suggested the presence of non-allelic interaction. Due to epistasis, selection would be difficult in the early generations.

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