

ASSOCIATION OF FLAG LEAF AREA AND SPIKE CHARACTERISTICS WITH GRAIN YIELD IN AESTIVUM SPP.

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Simple correlation coefficients were worked out among flag leaf area, spike length, number of spikelets per spike, number of grains per spike and grain yield per plant. Significant and positive correlation coefficient was obtained for relationship between grain yield and spike length. Number of spikelets per spike and number of grains per spike also showed positive and highly significant association with spike length while number of grains per spike exhibited the positive correlation with grain yield. Significantly positive relationship was also observed between flag leaf area and grain yield.

INTRODUCTION

Wheat (*Triticum aestivum* L.) being the prime food cereal of the country has always attracted maximum interest of the plant breeders for its improvement. Rapid growth in population necessitates matching enhancements in food production. Wheat researches, therefore, need to be more versatile and accelerated to develop more productive genotypes for various agro-ecological situations of Pakistan.

Grain production is a complex phenomenon, entailing several contributing factors. These factors influence grain production both directly and indirectly and the breeder is naturally interested in investigating the extent and type of association of such traits. Correlation studies lead to a clear understanding of the type of genetic association of various plant traits as also their contribution to the final attribute, the yield.

Monyo and Whittington (1973), Sheoran *et al.* (1986), Singh *et al.* (1982), Kumar *et al.* (1986) and Bangarwa *et al.* (1987) reported significant positive correlation of flag leaf area to grain yield. Spike length and grain yield and number of spikelets per spike were also observed to be positively correlated with grain yield.

Dornescu (1984) also reported positive correlation between number of grains per spike and grain yield.

MATERIALS AND METHODS

Four wheat varieties/strains (Pak 81, Pb 85, Chakwal 86 and 4943) and all possible crosses of these genotypes were planted by dibbling in four 10 meter long rows each being 30 cm apart in a randomized complete block design with three replications during the crop season 1992-93. Plant to plant distance was 15 cm. At maturity ten plants of each entry from each replication were selected randomly. Data were recorded for flag leaf area, spike length, number of spikelets per spike, number of grains per spike and grain yield per plant. The data were statistically analysed and simple correlation coefficients were calculated by using the formula of Steel and Torrie (1980).

RESULTS AND DISCUSSION

As seen from the Table 1, the values for flag leaf area lie between 20.0cm² (Pb 85) to 23.7cm² (4943). But for spike length the cross 4943 x Chakwal 86 produced the longest spike

Table 1: Mean values of parents and their F_1 crosses for spike traits and grain yield in wheat plant.

Varieties/Lines	Flag leaf area (cm ²)	Spike length (cm)	Number of Spikelets per spike	Number of grains per spike	Grain yield per plant (g)
Pak 81	22.3	11.0	21.4	63.3	21.9
Pb 85	20.0	10.3	20.2	50.7	19.1
Chakwal 86	22.0	11.7	23.1	63.7	20.9
4943	23.7	11.4	20.3	56.1	25.5
Pak 81 x Pb 85	21.5	10.8	20.3	59.9	23.8
Pak 81 x Chakwal 86	23.1	10.9	21.9	59.4	20.8
Pak 81 x 4943	21.2	10.6	20.7	53.5	20.9
Pb 85 x Pak 81	21.5	10.8	20.3	59.9	20.8
Pb 85 x Chakwal 86	22.8	11.6	22.7	65.0	20.8
Pb 85 x 4943	20.1	10.6	22.8	56.2	23.8
Chakwal 86 x Pak 81	23.1	10.9	21.9	59.4	20.8
Chakwal 86 x Pb 85	22.7	11.6	22.7	65.0	23.1
Chakwal 86 x 4943	21.8	11.9	22.8	62.6	20.8
4943 x Pak 81	21.5	10.6	20.7	53.5	23.4
4943 x Pb 85	20.1	11.3	22.8	56.2	23.1
4943 x Chakwal 86	20.8	11.9	22.8	62.6	25.0

(11.9cm) while Pb 85 produced the smallest one having a mean length of 10.3cm. For number of spikelets per spike Chakwal 86 has the highest value of 23.1 and once again Pb 85 was the lowest with a value of 20.2. Maximum number of grains per spike (65) were produced by cross Pb 85 x Chakwal 86 and its reciprocal, the range was between 50.7 to 65.0 grains per spike. As regards the grain yield it ranged from 19.1 (Pb 85) to 25.5g (4943).

It is obvious from Table 2 that correlation between flag leaf area and grain yield was positive and significant, suggesting that proper attention should be focussed on flag leaf area while selecting varieties for better grain productivity. Whereas a non-significant negative correlation was observed between flag leaf area and

spike length indicating that flag leaf area may not necessarily influence yield by producing longer spikes but other attributes like spikelets per spike and grains per spike might play a more important role by producing numerous grains of larger size and better weight. The idea is supported by the present studies as yield was significantly and positively correlated with number of spikelets per spike and grains per spike. Almost similar findings have earlier been reported by Monyo and Whittington (1973), Singh *et al.* (1982), Dornescu (1984), Kumar *et al.* (1986), Sheoran *et al.* (1986) and Bangarwa *et al.* (1987).

It was further observed that number of spikelets per spike also had a weak positive correlation with grain yield while it exhibited

Table 2: Association of flag leaf area and spike characters with grain yield in *aestivum* spp.

Characters	Spike length	Number of Spikelets per spike	Number of grains per spike	Grain yield per plant
Flag leaf area	-0.1061	0.0871	0.4452	0.4996*
Spike length	-	0.6821**	0.6768**	0.5158**
Number of spikelets per spike	-	-	0.5834*	0.2481
Number of grains per spike	-	-	-	0.2842

* ** Significant at 0.05 and 0.01 probability levels, respectively.

significant positive association with number of grains per spike. The trend is clearly suggestive of a situation where more spikelets may not necessarily produce better grain average per spike. It is thus imperative that attention should be focussed on grains per spike to avoid selection of varieties having high incidence of sterility in spikelets.

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