RESEARCH PAPER

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Study on quality improvement through biometrical approaches in bread wheat (*Triticum aestivum* L.)

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Forty five crosses in F_1 generation of wheat (*Triticum aestivum* L.) were used for studying the character association among grain yield and its related characters. The results showed that the number of grains per spike, grain weight per spike and number of productive tillers per plant were significantly and positively associated with grain yield per plant in parents and F_1 cross combinations.

Key words : Genotypes, Phenotypes, Cultivars correlations, Bread wheat

INTRODUCTION

Grain yield in wheat, is a complex multicomponent character. Fonseca and Patterson (1963) emphasized the significance of component approach in formulating a successful breeding programme. The present study examines the nature of association of yield with other characters by utilizing parental and their all possible F_1 hybrid lines.

MATERIALS AND METHODS

Forty five hybrids were obtained by crossing ten genotypes /cultivars namely, K 8020, K 2021, UP 2425, K 8565, K 9107, HUW 234, PBW 373, K 9351, NW 1012 and HD 2285 in a 10 x 10 diallel mating system excluding reciprocals. The experiment comprising 10 parents and their 45 F_1s was grown in Randomized Complete Block Design with three replications at research farm of C.S.A. University of Agriculture and Technology, Kanpur. The experiment was conducted in two row plots. The length of each row consisted 1.5 m with inter and intra row distance of 25 and 15cm, respectively. Recommended dose of fertilizers with five irrigations were applied to raise a good crop. Ten plants for observations were randomly taken from each parent and F_1 generation. Data were recorded on 10 characters *viz.*, days to reproductive phase, plant height, number of productive tillers per plant, grain weight per spike, number of grains per spike, 1000-grain weight, grain yield per plant, seed hardness, protein content and tryptophan content. Simple correlations were worked out between grain yield and other characters for each parent and hybrid as per method suggested by Al-Jibouri *et al.* (1958). The significance of phenotypic coefficient was tested against 'r' values from 'r' table of Fisher and Yates (1938) for n-2 degree of freedom.

RESULTS AND DISCUSSION

The phenotypic and genotypic associations between all possible 45 combinations involving all the 10 characters separately for parental and first generations were computed. The results are presented in Table 1 and 2 for parents and F_1, accordingly.

In parents, the correlation coefficient were positive and significant for 9 combinations, out of 45 days to reproductive phase, was positively and significantly associated with 1000-grain weight and grain yield per plant. Grain yield was highly significant and positively associated with grain yield per spike number of grains per spike and 1000-grain weight. Grain weight per spike was positively and significantly associated with 1000-grain weight, Tryptophan content was also correlated positively and significantly with seed hardness.

In F_1 generation, the significant associations were recorded in 8 cases out of 45, among these the significant and positive values were found in 10 combinations which were days to reproductive phase with 1000-grain weight; number of spikelets with protein content; number of reproductive tillers per plant with grain yield per plant; grain weight per spike with 1000-grain weight and grain yield per plant; number of grains per spike with grain yield per plant; 1000-grain weight with grain yield per plant; seed hardness with tryptophan content. Negative and significant associations were recorded for grain weight per spike with number of grains per spike; with 1000-grain weight. Rest of the combinations exhibited weak association.