



Combining ability analysis for yield and quality traits under different locations of U.P. in wheat (*Triticum aestivum* L.)

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Abstract : Combining ability analysis was done through a 10 x 10 parent diallel cross, excluding reciprocals, for grain yield and quality traits under varying environmental conditions in wheat. The pooled analysis of variance showed highly significant variances due to general and specific combining ability for all the characters studied in both F_1 and F_2 generations, indicating importance of both additive and non-additive gene effects involved in the inheritance of all the characters studied. The magnitude of additive genetic variance was considerably higher than non-additive genetic variance for all the traits in both the generations, indicating preponderance of additive gene action in controlling the expression of these attributes. Both GCA x environment and SCA x environment interactions also exhibited highly significant differences for all the traits in both F_1 and F_2 generations, indicating both the gene effects were highly influenced by the environments. However, GCA x environment interaction variance was higher than SCA x environment interaction variance for all the characters in both F_1 and F_2 generations which further indicating the importance of additive genetic variance for all the attributes. The parents K 68, K 9107 and K 8027 were the good general combiner for grain yield/plant. The parents K 9107, HP 1633 and K 9644 were observed as good general combiner to breed for high protein content. The best specific combiner for yield and protein content was HP 1633 x K 9644 and K 68 x K 9107, respectively. The breeding approaches like, biparental mating followed by diallel selective mating and reciprocal recurrent selection might be more meaningful to evolve high yield potential cultivars with high protein content and other quality traits in wheat.

Key Words : Wheat, Diallel, Combining ability, Gene action

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INTRODUCTION

Wheat is a most important and widely cultivated cereal crop on the earth. India has tremendous progress in the food grain production, specially wheat. It is grown in India over an area of about 29.1 million hectare with a production of about 84.27 million tones, still maintaining second position in the world (Agriculture Ministry, Govt. of India, 2011). The national productivity is about 2.9 tones/hectare, while in China and US is about 4.7 and 3.1 tones/hectare, respectively

(Chakarbarti, 2011). With all these achievements, the issue ahead is even more challenging. The population of India is growing at 1.8 per cent per year, it is necessary to further increase the productivity level to meet the requirement of 109 million tones up to 2020. It is used in the form of *chapatti*, *bread*, *naan*, *tandori*, *rumali roti*, *puri*, *pudding*, *bhatore*, *bran* and *fodder* etc. In India wheat grain is used by human beings mainly in the form of chapatti, hence wheat cultivars with high baking quality will be preferred. The medium hard, medium grain size and appearance is preferred for non-

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