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Standard heterosis and realized heratability for yield attributes in segregating generations of wheat (*Triticum aestivum* L.)

SHIV KUMAR[1]*, S.S. MALIK[1], A.S. JEENA[2] AND S.K. MALIK[3]
[1]Chaudhary Chhotu Ram Post Graduate College, MUZAFFARNAGAR (U.P.) INDIA
[2]G.B. Pant University of Agriculture and Technology, Krishi Vigyan Kendra, Gwaldam, CHAMOLI (UTTARAKHAND) INDIA
[3]Uttarakhand Seed and Organic produce Certification Agency, DEHRADUN (UTTARAKHAND) INDIA

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SUMMARY

While practicing early generation selection in wheat the information on standard heterosis and realized heritability is of immense importance because it provides guidance for effectiveness of the selection pressure. This study was conducted with five crosses and their segregating generation (F_2, F_3 and F_4) in wheat. Findings indicated differential response of the crosses for different characters in segregating generations. Both positive and negative standard heterosis was observed. The information become more meaningful with positive realized heritability estimates for grain yield in F_3 and F_4 generations.

Key words : Wheat, *Triticum aestivum*, standard heterosis, realized heritability.

Wheat is one of the most important cereal crop, both in the national and global context. India is the second largest wheat producer of the world in area and production after China. The improvement of any crop depends upon the extent of genetic variability of economic characters present in the population. Hybridization followed by selection is an important step in crop improvement. The purpose of selection is to isolate desirable plant types from the segregating populations. Visual selection of individual plants in F_2 for yield is unreliable (De Pauw and Shebeski, 1973). Effective selection depends upon the existence of genetic variability in the population. Heritability has been used as an index of transmissibility of a character from the parents to its offsprings (Lush, 1940). Heritability in addition to genetic advance is of utmost importance in early generation selection. The character selected should have high heritability and genetic advance which can make the selection programme sensible and successful. It is essential to study first the extent of genetic variability and heritability alongwith genetic advance. Briggle (1963) suggested that significant heterosis may be utilized to assess hybrid vigour in advanced generations. Since realized heritability is the description of the selection therefore, traits showing high realized heritability are expected to be improved through selection in the preceding generation. The effectiveness of early generation selection primarily depends on the information about variability, character association, heritability and genetic advance of the characters under study but the information on standard heterosis and realized heritability have its own importance to provide guidance for effective early generation selection. Considering the above points, present investigation was undertaken with the objectives to study the standard heterosis and realized heritability in F_2 and later generations.

MATERIALS AND METHODS

The experimental materials comprised of ten diverse parents and their five F_2 crosses namely 96001 (CPAN 2044/UP 2382), 96003 (CPAN 2063/UP 2425), 96054 (HS 240/K 9413), 96055 (HUW 355/WH 533) and 96094 (WH 613/UP 2425). Five selection procedures were adopted *i.e.* one per cent selection intensity, two per cent selection intensity, single ear selection, random sampling and bulk sampling in each cross in F_2 and F_3 generation to grow F_3 and F_4 generations, respectively. Each of five F_2 crosses and ten parents were space planted at 23 × 10 cm apart in a plot consisting of 10 rows, one row of P_1 (parent 1) on one side and one row of P_2 (parent 2) on another side, each 5 m long. F_3 generation was space planted, while F_4 with dense planting to evaluate the performance of different selection methods with three replications in randomized complete block design. The experiment was planted during 1997-98, 1998-99 and 1999-2000 during Rabi at C.C.R. (P.G.) College Muzaffarnagar (U.P.). All the observations were recorded on individual plant basis for twelve characters in each cross and parent in F_2 and subsequent generations. Observations were recorded in all three generations for days to heading, days to maturity, plant height, number of tillers/plant, ear length, number of

* Author for correspondence.