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COHERITABILITY AMONG DIFFERENT ECONOMIC TRAITS IN BREAD WHEAT

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Ten different wheat varieties/lines were studied to ascertain and compare the heritability, coheritability and genetic advance for grain yield per plant, days to anthesis, grain filling period, plant height, number of tillers per plant, spike length, grains per spike, 1000-kernel weight, biological yield and harvest index. The highest value of coheritability was found between grain yield and harvest index followed by grain filling period while maximum heritability value (99%) was observed in days to anthesis followed by 1000-kernel weigh (96%). The simultaneous selection of these characters would lead to increase in grain yield. Harvest index and grain filling period were the most important determinant for grain yield. While plant height and biological yield seemed to be least important for grain yield.

INTRODUCTION

The heritability provides precise information about the degree to which a given character is controlled by inheritance. It provides confidence in selection strategies and the breeder has often exploited it to incorporate desirable attributes in crop plants. Coheritability ascribed to the coinheritance of different character pairs and indicates the genetic progress which could result from the joint selection for these characters. It is a better genetic parameter than genetic correlation, as correlation does not take account of environmental variance which is also a component of phenotypic variance to which selection is applied (Mehan and Saini, 1962). Therefore, to raise the efficiency of plant selection, an attempt has been made in this paper to present coheritability estimates among different economic traits in a group of ten wheat varieties/lines. Iqbal (1988) reported heritability estimates for spike length ranging from 51.23 to 81.01%. Heritability estimates ranged from 79.96 to 99.7% for 1000-grain weight in wheat (Abid, 1987). Malik *et al.* (1985) estimated moderately high coheritability value between days to maturity and seed yield. However, in general, the coheritability value of yield with all other characters were higher than the heritability of yield itself in green gram. Ahmed (1991) revealed that highest coheritability was found between spikelets per spike and seed yield in wheat.

MATERIALS AND METHODS

The research material comprised of ten different varieties/lines of bread wheat viz., Pak 81, Punjab 85, Faisalabad 85, Satluj 86, Koh-i-Noor 83, Lyallpur 73, LU26S, LU 31, 4072 and 5039. The genotypes were evaluated in a triplicate randomised complete block design during crop season 1990-91. Each replication had one row of 5 meters long for each treatment while plant to plant and row to row distance was 15 and 30 cm, respectively. The experimental population received normal agronomic and plant protection care. Ten guarded plants from each genotype were taken randomly at maturity

Table 1. Coheritability among yield and yield components

Character	Grain yield	Days to anthesis	Grain filling period	Plant height height	Number of tillers plant^{-1}	Spike length	Grains per spike	1000-kernel weight	Biological yield	Harvest index
Days to anthesis	1.006									
Grain filling period	1.766	0.997								
Plant height	0.992	0.998	0.897							
No. of tillers plant^{-1}	1.061	1.006	1.044	1.094						
Spike length	1.051	0.982	0.889	0.872	1.075					
Grains spike^{-1}	1.214	1.009	1.127	1.039	0.954	0.804				
1000-kernel weight	0.951	0.997	0.680	1.001	0.987	1.016	1.009			
Biological yield	0.968	1.026	1.095	0.986	1.219	0.533	1.014	1.024		
Harvest index	2.504	1.007	1.333	0.986	0.856	0.986	1.003	0.999	0.964	
Heritability	76%	99%	82%	93%	69%	77%	79%	96%	86%	60%

for recording data on various plant traits. Analysis of variance technique (Steel and Torrie, 1980) was applied to determine the significant difference among genotypes. Coheirtability was calculated by the formula suggested by Nei (1960).

RESULTS AND DISCUSSION

Heritability values for grain yield, days to anthesis, grain filling period, plant height, number of tillers per plant, spike length, grains per spike, 1000-kernel weight, biological yield and harvest index were 76, 99, 82, 93, 69, 77, 79, 96, 86 and 60%, respectively. The highest coheritability was found between harvest index and grain yield while the later had also high coheritability value with grain filling period indicating that harvest index and grain filling period is the most important characters for making selection to improve the grain yield. Similar findings have also been reported by Malik *et al.* (1985) and Ahmed (1991).

The results indicated that improvement in number of tillers per plant and grains per spike can simultaneously result in the improvement of other important yield components namely, days to anthesis, grain filling period and plant height. Similarly biological yield has high coheritability value with days to anthesis, grain filling period, number of tillers per plant, grains per spike and 1000-kernel weight. While biological yield estimated the lowest coheritability with spike length. While selecting for the traits for enhancing grain yield, the strong coheritability of these traits with plant height should be in view of the breeder and selection for these traits should also be made in relation to plant height and thus plants with desirable height should be selected by the breeder.

From the present study, it can be concluded that selection for high yield may be effective by simultaneous improvement of yield components like days to anthesis, grain filling period, number of tillers per plant, spike length, grains per spike, 1000-kernel weight and harvest index. While yield can be maximally increased through selection of plants with harvest index and more number of grains per spike.

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