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Research Notes

Studies on Inheritance of Some Qualitative Characters in Bread Wheat *(Triticum aestivum* L. (Em.) Thell.)

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Wheat is an important food grain crop of India. In wheat plant height and plant colour are the two important characteristics. The productiveness of semi-dwarf varieties of wheat had stimulated interest towards the development of short statured varieties. Therefore, significant increase in yield of wheat were made possible due to dwarfing genes. Dwarf, semi-dwarf and tall plants are observed in wheat. Similarily, salt resistant cultivars of wheat are invariably hexaploid, tall, awned, red grained, prone to lodging, highly susceptible to diseases and leaves with distinct light green colour (Rana, 1986). However, dark green plant colour is also observed. A study of inheritance of plant height and plant colour will help to strengthen a sound breeding programme and better evalution of segregating population for these characteristics. Few studies have been conducted on the genetics of plant height in wheat. Inheritance pattern of the genes for plant height has been summarized by Ram and Singh (1998). Nieves (1937) reported tallness to be dominant over dwarf ness and controlled by two independent gene pairs. Torrie(1936) , Kuspira and Unrau (1957) , Allan and Vogel (1963) and Kamboj(2003) reported plant height to be controlled by multiple genes and tallness to be partially dominant. Reddy and Heyne(1970) reported a good agreement for a two factor difference.

The material consisted of four genotypes *viz.,* Kh65, HD4530, WS-5 and Job 89, Two crosses *viz.,* HD4530 x Kh 65 and WS-5 x Kh 65 were made between Kh65, a tall wheat cultivar and HD 4530 a semi dwarf and WS-5 a dwarf cultivar. Similarity the two crosses, *viz.,* WS-5 x Kh65 and Job 89 x Kh 65 were made between Kh

Table 1. Inheritance of plant height in wheat

Cross	Generation	Observed segregation			Expected Ratin	χ^2	P
		Dwarf (D)	Semi Dwarf (SD)	Tall (T)			
HD 4530 x Kh 65	F_1	0	10	0	No segregation	--	--
(Semi (Tall)	F_2	13	23	4	9 SP : 6D : IT	0.840	0.50-0.30
Dwarf)	BC_1	0	15	0	No segregation		
	BC_2	12	6	8	2D : ISD : IT	0.462	0.90-0.70
WS-5 x Kh 65	F_1	15	0	0	No segregation		
(Dwarf) (Tall)	F_2	12	10	2	9D: 6SD/IIT	0.444	070-0.50
	BC_1	12	0	0	No segregation		
	BC_2	6	10	4	1D : 2SD. IT	0.400	0.90-0.70

Table 2. Inheritance of plant Colour in wheat

Cross	Generation	Observed segregation		Expected Ratio	χ^2	P
		Light Green	Dark Green			
WS-5 x Kh 65	F_1	0	15	No segregation	--	--
(Dark (Light	F_2	18	37	5:11	0.008	0.95-0.90
Green) Green)						
Job 89 x Kh 65	F_1	10	0	No Segrgation		
(Dark (Light	F_2	169	12	15:1	0.042	0.90-0.70
Green) Green)	BC_1	12	8	3:1	1.667	0.20-0.10
	BC_2	10	0	No Segregation	--	--

65, producing light green plant colour and WS-5 and Job 89 both producing dark green plant colour. The F, and F,, BC, and BC_2 progenies of the crosses were raised at the farms of SKN college of Agriculture, Jobner. Observations on plant height and plant colour in F_1 and pattern of segregation in F_2 back cross generations were recorded. Chi-square test was done to test the goodness of fit for the assumed segregation ratios according to Strickberger (1976).

The result in F_1 on plant height showed that all the plants were semidwarf in the cross HD4530 x Kh 65 while all the plants were dwarf in the cross Kh 65 x WS-5

suggesting the dominance of semi dwarf and dwarf character respectively (Table l). The F_2 generation segregated into 6 dwarf: 9 semidwarf: 1 tall in the cross Kh HD 4530 x 65 x and 9 dwarf: 6 semidwarf: 1 tall in the cross Ws-5 x Kh 65. These observations indicated that two gene pairs were involved in the inheritance of plant height. In the cross SD 4530 x Kh 65 dwarf is dominant over tall phenotype at both the gene paris. Dominants at both the gene paris when present together produced semidwarf character While in the corss Ws-5 x Kh 5 semi dwarf is dominant over tall at both the gene paris and domiants at both the gene pairs when present together produced dwarf character.

The result on segregation pattern for plant colour are presented in table 2. The F_2 plants in the cross WS-5 x Kh 65 showed dark greeen colour suggesting the donminance of dark green plant colour over light green. The F_1 plants in the cross Job 89 x Kh 65 showed light greent plant colour suggesting the dominance of light green plant colour over dark green. The F_2 generation in the cross WS-5 x Kh 65 segregated into 11 dark greeen : 5 light green ratio indicating the presence of two gene paris affecting the expression of plant colour with dark green dominant over light green at both the gene paris. However dominant at both the gene pair when present together produced dark green plant only when the dominant allele at the other gene pair is homozygous. While in the cross Job 89 x Kh 65, F_2 generation segregated into 15 light green : 1 dark green indicating the presence of two genes with dominant duplicate interaction governing the inheritance of plant colour. The segregation pattern in BC_1 and BC_2 coufirmed the F_2 results in all the crosses.

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