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## Correlation analysis for different characteristics in wheat

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### Abstract

The Present investigation entitled “Correlation analysis for different characteristics in Wheat” was undertaken during Rabi 2015. The experiment was carried out to derive Correlation coefficient in two different crosses in Wheat. The experiment was carried out with two different crosses for yield and yield contributing characters. The material consists of two crosses viz., NIAW-1885 X AKAW- 4627, NIDW-15 X NIDW -577. Among the phenotypic correlation of grain yield per plant with seven other characters studied in F<sub>2</sub> of two crosses, significant and positive correlations were observed with plant height, number of grains per spike, productive tillers per plant and 1000 grain weight. These characters also showed significant and positive correlation among themselves uniformly in the F<sub>2</sub> generation of two crosses. The high magnitude of direct effect of number of grains per spike, productive tillers per plants, plant height, 1000 grain weight along with highly significant correlation in the desirable direction towards grain yield per plant indicated the true and perfect relationship between grain yield and these characters suggesting direct selection based on these character would help in selecting the high yielding genotypes in wheat.

**Keywords:** correlation coefficient, wheat, phenotypic correlation

### Introduction

Wheat a cereal grass of the Graminae (Poaceae) family and of the genus *Triticum*, is the world’s largest cereal crop. It has been described as the ‘King of cereals’ because of the acreage it occupies, high productivity and the prominent position it holds in the international food grain trade.

Wheat cultivation in Maharashtra is unique where in all three cultivated species viz., *Triticum aestivum*, *T. durum* and *T. dicoccum* are grown in typical hot tropical climate, characterized by the prevalence of high temperatures during the crop growth.

Wheat compares well with other cereals in nutritive value. Unlike other cereals, wheat contains a high amount of gluten, the protein that provides the elasticity necessary for excellent bread making. Hard wheat is high in protein (10-17%) and yields a flour rich in gluten, making it particularly suitable for yeast breads. The low-protein (6 to 10%) softer type yields flour lower in gluten and therefore, better suited for tender baked products, such as biscuits, pastries and cakes. *Triticum durum* wheat, although high in gluten, is not suitable for baking, but suitable for semolina, the basis for excellent pasta, such as spaghetti and macroni preparation. Yield being a complex character is a function of several component characters and their interaction with environment. Probing of structure of yield involves assessment relationship among various characters contributing to the yield.

Correlation studies provide knowledge of association among different characters and grain yield. The study of association among various traits is useful for breeders in selecting genotypes possessing groups of desired traits. The correlation coefficients become insufficient for using yield components as selection criteria to improve grain yields. It is reasonable to know whether any yield components has a direct or indirect effect on grain yield, so that selection studies can be carried out successfully.

### Material and Methods

The experimental materials consisting two crosses having four different parents of wheat were collected from Agriculture Research Station, Niphad (M.S.). The experiment was laid out at Department of Botany, College of Agriculture, Dhule (M.S.) during Rabi2015. By adopting a spacing of 22.5 cm between rows and 10 cm between plants respectively, at recommended package of practices were followed to raise good and healthy crop stand.

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Data were collected on eight yield and yield contributing characters viz., days to 50% flowering, days to maturity, plant height, spike length, productive tillers per plant, number of grains per spike, 1000 grain weight, grain yield per plant.

Simple correlation coefficients were calculated to determine the degree of association of different characters with grain yield and also among yield components in each of the populations separately. Correlation coefficients were compared against Table 'r' values (Fisher and Yates, 1918) at (n-2) df at the probability levels of 0.05 and 0.01 to test their significance. Simple correlations were computed by using the formula given by Weber and Moorthy (1952) [6].

## Results and Discussion

The phenotypic correlation coefficients between eight pairs of characters as observed in F<sub>2</sub> generation of both crosses have been presented separately. (Table 1 and 2)

Among the phenotypic correlation of grain yield per plant with seven other characters studied in F<sub>2</sub> of two crosses, significant and positive correlations were observed with plant height, number of grains per spike, productive tillers per plant and 1000 grain weight. These characters also showed significant and positive correlation among themselves uniformly in the F<sub>2</sub> generation of both the crosses.

**Table 1:** Phenotypic correlation coefficients between different pairs of characters in F<sub>2</sub> generation of cross NIAW-1885 X NIAW-1415

Characters		2	3	4	5	6	7	8
1.	Days to 50% flowering	-0.0317	-0.0817	0.0877*	0.0173	0.0451	0.0610	0.0164
2.	Days to maturity	-	0.0218	-0.0047	-0.0373	-0.0249	0.0147	-0.0238
3.	Plant height (cm)		-	0.1530**	0.3137**	0.0952*	0.0996*	0.3307**
4.	Spike length (cm)			-	0.1408**	0.3061**	-0.0245	0.2604**
5.	Productive tillers per plant				-	0.1811**	0.0885*	0.6512**
6.	Number of grains per spike					-	-0.0249	0.3741**
7.	1000 grain weight(g)						-	0.2247**
8.	Grain yield per plant(g)							-

\*Significant at 5%, \*\*Significant at 1%, level respectively

**Table 2:** Phenotypic correlation coefficients between different pairs of characters in F<sub>2</sub> generation of cross AKAW- 4627 X Raj4304.

Characters		2	3	4	5	6	7	8
1.	Days to 50% flowering	0.4501**	0.0048	0.0017	-0.0140	0.1096	-0.0486	-0.0311
2.	Days to maturity	-	0.0115**	-0.0307	0.0037	0.0333	0.0119*	0.0243
3.	Plant height (cm)		-	0.2171**	0.1628	0.2390	0.1673**	0.3616**
4.	Spike length (cm)			-	0.1041	0.1929	0.0678	0.2312**
5.	Productive tillers per plant				-	0.1203	0.0764	0.3784**
6.	Number of grains per spike					-	0.0363	0.4414**
7.	1000 grain weight(g)						-	0.4364**
8.	Grain yield per plant(g)							-

\*Significant at 5%, \*\*Significant at 1%, level respectively

Among the phenotypic correlation of grain yield per plant with seven other characters studied in F<sub>2</sub> of four crosses, significant and positive correlations were observed with plant height, number of grains per spike, productive tillers per plant and 1000 grain weight. These characters also showed significant and positive correlation among themselves uniformly in the F<sub>2</sub> generation of two crosses.

Among these association consistent and moderate to high values of correlation coefficient was obtained for grain yield with productive tillers per plant (0.3784 to 0.6512) 1000 grain weight (0.2247 to 0.4364), number of grains per spike (0.3741 to 0.4414) and plant height (0.3307 to 0.3616).

Significant association of these traits with grain yield have been previously reported by Jadhav (1989) [3]. He recorded correlation among yield contributing characters like spike length, grains number per plant, 1000 grain weight as in present study. He also reported maximum correlation (r=0.98) between grain yield and grain number/plant. Patil and Jain (2002) [4] reported grain yield had positive and highly significant correlation with number of tillers per plant and number of grains per spike. Yousaf Ali *et al.* (2008) [7] showed grain yield per plant had highly significant positive correlation with number of productive tillers per plant and number of grains per spike and spike length. Singh *et al.* (2015) [5] observed plant height exhibited positive correlation with tiller per plant and showed positive correlation with yield per plant. Tillers per plant and grains per spike were highly and positively associated with grain yield was reported by

Bhutto *et al.* (2016) [1]

In general, correlation analysis carried concluded that the number of grains per spike, productive tillers per plant, spike length and 1000 grain weight influenced the grain yield more than any of the other characters. Hence, it would be worthwhile to lay more emphasis on these characters in selection programme to improve the grain yield in wheat.

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