*Internat. J. agric. Sci. Vol.2 No.2 July 2006 : (427-428)*

# Association analysis in wheat

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**ABSTRACT**
Twenty seven genotypes of *Triticum aestivum*.L. exhibited genetic variation for Days of heading, days of maturity, plant height, tillers per plant, biological yield, ear length, grains per ear, 100 grain weight, seed weight per plant and harvest index. Heritability estimates were high for biological yield, seed weight per plant and harvest index and low for 100 grain weight, tillers per plant and days to heading. Phenotypic correlation of grain yield per plant were high with biological yield and days to heading, correlation is moderate with ear length, no. of tillers per plant and grains per ear. Hundered seed weight exhibited negative correlation with days to heading, days to maturity and grain per ear. maximum positive direct contribution to grain yield per plant was made by biological yield and days of heading followed by grains per ear.

**Key words** : Wheat, Genotypes, Character association.

## INTRODUCTION

The present day wheat varieties have a potential to yield better than the one available during the early sixties. One of the reason for achieving this is the multi disciplinary co-ordinated approach of the wheat workers in developing widely adopted, disease resistant high yielding genotypes for cultivation under diverse agroclimatic and crop growing conditions genetic variability, heritability and genetic advance of great importance in improving the yield of a genotype (Verma et al., 2000). Hence complete information on these parameters is quite essential. Thus in the present study efforts were made to collect information on the extent of genetic variability in association with other genetic parameters like genetic advance, phenotypic and genotypic coefficient of variation and heritability to draw conclusion more precisely. The correlation gives an idea about the various associations existing between yield and yield components. The knowledge of factors has been rendered difficult since yield is a complex character (Bhatt, 1973). There fore for attaining higher yield levels, the breeder is required to simplify this situation through handling of yield components.

## MATERIALS AND METHODS

The material for the study comprised of 27 wheat genotypes selected from indigenous and exotic sources. The material was grown in randomised complete block design with three replications. Each line was planted in one metre single row plots. The rows were spaced 46 cm apart. The plant to plant distance was maintained at 10 cm. The experiment was conducted under high fertility (120 KgN, 60 Kg $P_2 0_5$ and 40 kg $K_2O$/ha) and irrigated conditions. Observations were recorded on five randomly selected plants of each genotypes per replication for ten different characters. Analysis of variance was carried as per procedure out lined by Panse and Sukhatme (1976). The phenotypic and genotypic coefficients of variation, heritability and genetic advance were worked out by making use of the appropriate formula (Johnson *et al.* 1955). Genotypic and phenotypic correlations were worked out as per Robinson *et al* (1951).

## RESULTS AND DISCUSSION

Analysis of variance indicated that genotypic means differ significantly for all the ten characters. High heritability was observed (Table .1) for biological yield, seed weight per plant and harvest index moderate heritability was observed for days to maturity and plant height. Low heritability was observed for 100 grain weight, tillers per plant and days to heading.

In the present study days to heading showed significantly positive correlation with weight of seeds per plant and significantly negative correlation with harvest index. Similar association between grain yield and days to heading was reported by Adary *et al*. (1987). Days to maturity showed significant positive correlation with biological yield and weight of seed per plant and significantly negative correlation with 100 seed weight. Height of plant showed significant positive correlation with number of tillers per plant. It also showed significant positive correlation with 100 seed weight. This is in agreement with the results obtained by Rawt *et al.* (1977), Sinha and Sharma (1980). Number of tillers per plant showed significant positive correlation with

Table 1:Range, mean, Co – efficients of variation, heritability, and Genetic advance of ten characters studied in wheat

| Character | Range | General mean x | Co - efficients of Variation (%) Genotypic | Phenotypic | Heritability % | Genetic advance % |
|---|---|---|---|---|---|---|
| 1. Days of heading | 84.33 – 94.67 | 89.23 | 1.87 | 5.15 | 13.31 | 1.26 |
| 2. Days of maturity | 120 - 128.33 | 123.38 | 1.83 | 2.35 | 60.99 | 3.63 |
| 3. Plant Height | 70.48 – 90.84 | 80.12 | 2.56 | 12.25 | 43.69 | 0.42 |
| 4. Tillers Per Plant | 12.07 – 20.68 | 16.10 | 8.50 | 25.91 | 10.78 | 0.44 |
| 5. Biological yield | 48.00 – 115.67 | 76.38 | 25.92 | 26.64 | 94.71 | 19.27 |
| 6. Ear Length (cm) | 10.23 – 13.87 | 11.73 | 6.16 | 9.93 | 38.53 | 0.43 |
| 7. Grains per ear | 48.90 – 76.76 | 63.56 | 6.64 | 15.42 | 18.56 | 1.81 |
| 8. 100 grain weight | 3.37 – 4.58 | 3.98 | 4.27 | 13.35 | 10.26 | 0.03 |
| 9. Seed weight per Plant | 20.36 - 40.2 | 26.91 | 20.44 | 21.29 | 92.21 | 5.27 |
| 10. Harvest Index | 27.33 – 43.33 | 35.70 | 12.82 | 15.11 | 72.06 | 3.89 |

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Table 2 : Phenotypic: Correlation coefficients among ten characters in wheat.

| Character | Days to heading | Days to maturity | Plant height | No.of tiller per plant | Biological yield | Ear length | Grains per ear | 100 seed weight | weight of seed per plant | harvest index |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Days of heading | 1 | .30 | -.13 | .13 | .12 | -.27 | .25 | -.17 | .84** | -.77** |
| 2. Days of maturity | | 1 | -.12 | .33 | .50** | .12 | .31 | -59** | .45* | -.27 |
| 3. Plant height | | | 1 | .62** | .24 | -.13 | -.28 | .60** | .23 | -.13 |
| 4. Tillers per Plant | | | | 1 | .67** | .19 | .43* | .13 | .50** | -.30 |
| 5. Biological Yield | | | | | 1 | .30 | .90** | .18 | .84** | -.62** |
| 6. Ear length (cm) | | | | | | 1 | -.24 | .33 | .39* | -.30 |
| 7. Grains per ear | | | | | | | 1 | -.39* | .55** | -.95** |
| 8. 100 grain weight | | | | | | | | 1 | .21 | -.67** |
| 9. Seed weight per Plant | | | | | | | | | 1 | -10 |
| 10. Harvest index | | | | | | | | | | 1 |

biological yield, grains per ear and weight of seeds per plant. Biological yield showed significant positive correlation with grains per ear and weight of seed per plant and negative correlation with harvest index (Table 2). Ear length showed significant positive correlation with weight of seed per plant. Grains per car showed significant positive correlation with weight of seed per plant and significant negative correlation with 100 seed weight and harvest index. Hundred seed weight showed significant negative correlation with harvest index. The positive association of characters which add to the potential of the new genotypes will essentially contribute to the related characters as well as to the overall yield. Improvement in such characters will automatically lead to the gain in yield. Selection for yield or for the components of positive significance will result into simultaneous improvement in both.

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*Received : November, 2005; Accepted : March, 2006*