“EVALUATION OF BREAD WHEAT (*Triticum aestivum* L.) GENOTYPES FOR HEAT TOLERANCE UNDER TIMELY AND LATE SOWN CONDITIONS”

**ABSTRACT**

*Key words:* Heat tolerance, correlation, path analysis, variability parameters, *Triticum aestivum*.

The present study was carried out to assess genetic variability, correlation coefficient and path coefficient analysis with respect to heat tolerance in 50 genotypes of *aestivum* wheat grown in a Randomized Block Design with three replications under normal and late sowing conditions at the Wheat Research Station, Junagadh Agricultural University, Junagadh during rabi 2015-16. The observations were recorded on 13 characters viz., days to heading, days to maturity, grain filling period (day), plant height (cm), number of effective tillers per plant, length of main spike (cm), number of grains per main spike, number of spikelets per main spike (g), grain yield per plant (g), biological yield per plant (g), harvest index (%), 100 grain weight (g), chlorophyll content (*CHL*$_a$ & *CHL*$_b$), canopy temperature depression (*CTD*$_{sg}$ & *CTD*$_{gf}$) (°C) and heat sensitivity index.

The analysis of variance revealed the presence of sufficient variability under normal and late sowing conditions among the genotypes studied. The values of phenotypic coefficient of variation in both sowing conditions were slightly higher than that of genotypic coefficient of variation for all the traits studied, indicating less effect of environment on the expression of characters studied. The high values of GCV were observed under normal sowing condition for biological yield per plant, length of main spike, number of grain per main spike, harvest index, number of effective tillers per plant, 100-grain weight and plant height. While, under late sowing condition for grain yield per plant, biological yield per plant, harvest index, length of main spike, 100-grain weight, number of effective tillers per plant, chlorophyll content at anthesis and grain filling period.

The genetic advance at 5% selection intensity (k=2.06) was found high under normal sowing condition for number of grains per main spike, plant height and days to maturity. While, that moderate for harvest index, biological yield per plant, days to heading, grain filling period, chlorophyll content at anthesis and grain yield per plant, under late sowing condition for harvest index, chlorophyll content at anthesis and biological yield per plant. While, moderate genetic advance was observed for days to heading, plant height, grain filling period and days to maturity.

High heritability coupled with high genetic advance expressed as percentage of mean were observed for all characters except under normal sowing condition for days to maturity, plant height and length of main spike, while, under late sowing condition for days to maturity, grain filling period, length of main spike and 100-grain weight. These may be attributed to the preponderance of additive gene action and possessed...
high selective value and thus, selection pressure could profitably be applied on these characters for their rationale improvement.

The values of genotypic correlation in both sowing conditions were higher as compared to the corresponding phenotypic correlation. This indicated that though there was high degree of association between two variables at genotypic level, its phenotypic expression was deflated by the influence of environment.

The character, grain yield per plant exhibited highly significant and positive genotypic as well as phenotypic correlation under normal sowing condition with harvest index, biological yield per plant and number of grain per main spike, while, it also manifested the highly significant positive correlation days to heading at genotypic level. The character, grain yield per plant under late sowing condition exhibited significant and positive genotypic and phenotypic correlation with biological yield per plant, while it also manifested the significant positive correlation with length of main spike and number of grains per main spike at genotypic level. The yield components exhibited varying trends of association among themselves. Thus, revealed that under normal sowing condition, harvest index, biological yield per plant, 100-grain, length of main spike and plant height, while, under late sowing condition, harvest index, biological yield per plant, plant height length of main spike and number of grains per main spike were the most important traits and may contribute considerably towards higher grain yield. The interrelationship among yield components would help in increasing the yield levels and, therefore, more emphasis should be given to these components, while selecting better types in wheat.

The path coefficient analysis revealed high and positive direct effects under normal sowing condition of harvest index and biological yield, while, under late sowing condition of days to heading, plant height, length of main spike and chlorophyll content at 21 days after anthesis. Thus, these characters turned-out to be the major components of grain yield.

Heat sensitivity index (HSI) had been used for screening heat tolerance genotypes of wheat. According to estimation of HSI, the genotypes GW-2011-347, GW-2011-362, LBPY 2011-9, NIAW 2844, RAJ 4445, HS-557, K-1006, GW-366 and RAJ-3077 had been highly heat tolerant for grain yield per plant. Chlorophyll content at 21 days after anthesis also used as desirable heat tolerance parameter and the result revealed that genotypes under normal sowing condition with high yield than late sowing condition had also high chlorophyll content at anthesis and high CTD means low canopies temperature than late sowing condition. Thus, high CTD favours the grain yield and chlorophyll content at anthesis.

The final conclusion that can be reached from variability, correlations and path coefficient analysis with respect to heat tolerance is that under normal sowing condition with harvest index, biological yield per plant, 100-grain weight, length of main spike and plant height, while under late sowing condition with harvest index, biological yield per plant, plant height and length of main spike found the most important component characters. Hence, these traits should be considered as selection criteria for yield improvement in wheat.