

## Relationship of durum wheat yield to agronomical and physiological growth parameters

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### ABSTRACT

A set of 21 elite genotypes of durum wheat selected based on maturity time were evaluated for grain yield and some agronomical and physiological growth parameters. Variability and association analysis for 13 traits were carried out. Wide range of variation was observed for all the characters. The genotypic coefficient of variation was moderate for all the characters, except days to maturity, vegetative period and grain filling period, for which, the low magnitude was noted. High heritability coupled with high genetic advance was observed for days to ear emergence, plant height, flag leaf area, spike length, spikelets per spike, grains per spike and 100-grain weight. However, low heritability along with moderate genetic advance was observed for grain yield per plant, indicating that direct selection for grain yield would not be effective. Grain yield per plant was correlated in desired direction only with effective tillers per plant, therefore, this character should be considered as an important component of grain yield and emphasis should be given to this trait during selection programme. However, altering in relationships of days to ear emergence, days to maturity and vegetative period with grain yield through breeding programmes utilizing genetic variation, like Kiwi's' identified in this study, was suggested.

**Key words :** *Triticum durum*, Grain filling period, Vegetative period, Yield traits

### INTRODUCTION

Grain weight is a component of grain yield and duration of grain filling is a component of maturity. Both are important traits in applied plant breeding and both depend upon the grain filling process. Further, Bingham (1969) reported that not only grain filling period but duration of vegetative growth is also important for achieving high yield in wheat. He noted that the yield of grain is directly dependent on sink size, which is largely determined during the vegetative period and on the photosynthetic capacity of the crop during the grain filling period. This suggests that it could be possible to increase yield in grain crops by achieving an optimal duration for the vegetative and the grain filling periods of growth. On the other hand, Nass and Reiser (1975) found no correlation between yield and days to anthesis, days to maturity and days from anthesis to maturity. While working with durum wheat, Amar (1999) have suggested that number of grains per spike, number of spike per meter<sup>2</sup>, length of vegetative period, plant height and days to heading were major contributors to grain yield in semi-arid regions. The present study was attempted to know the variation for vegetative and grain filling periods and other agronomic traits as well as the relationship among them and with grain yield in elite genotypes of durum wheat for being utilized in breeding programmes.

### MATERIALS AND METHODS

The material of the present study comprised of a set

of 21 elite genotypes of varying maturity time derived from different origin. Six from Gujarat (JD 98-16, JD 98-50, JU 72, GW1139, GW 1151 and Bansi), four from Madhya Pradesh (HI 8112, HI 8356, HI 8381 and HI 8498), four from Mexico (Kiwi's', Kranich, CPAN 6153 and Altar 84), two from Rajasthan (RD 469 and Raj 1555), two from Maharashtra (NIDW 83 and MACS 2846) and one each from New Delhi (HD 4530), Punjab (PBW 34) and Uttar Pradesh (UPD 64) were included and evaluated for yield and certain agronomical and physiological growth parameters. The experiment was laid out in randomized block design with four replications during *rabi* season under normal sown condition at the Wheat Research Station, Junagadh Agricultural University Junagadh. Each genotype was relegated to the plot of three rows of 3 meter length with the spacing of 22.5 cm and 10 cm between two rows and between two plants within the row, respectively. All recommended practices were followed to raise the good crop.

The measurements were made on ten plants selected randomly prior to ear emergence from the middle row of each plot. The data were collected on individual plant for 13 characters. Days to ear emergence were determined as days from date of sowing to the date on which the ear was emerged beyond the auricles of flag leaf. Physiological maturity was judged as approximately 75% of glumes of main spike turned yellow. Vegetative period was calculated as days from date of sowing to the date of anther extrusion from central florets (date of anthesis)

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