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Effect of maturity date on cultivar variation and association for growth duration characters and grain yield in bread wheat

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ABSTRACT

The study was under taken using 21 selected bread wheat genotypes by classifying according to their maturity time in three maturity group, *i.e.*, early, mid-early and late group for comparative studies to know the effects of maturity time on cultivar variation for the characters related to growth duration and their associations among themselves and with grain yield. Significant variations for the characters under study were observed among the genotypes and genotypes within the maturity group, except for grain yield per plant in mid-early group. GW 173 was earliest among the genotypes studied. Lok 1 and Sonalika had short vegetative and long grain filling period and spent the highest per cent (42%) of total life span to grain filling periods. However, grain yield per plant was the highest in Lok 42. The average value for maturity groups indicated that early group genotypes were 15 days shorter for vegetative and 6 days longer for grain filling periods with 25% higher yield than late group genotypes. The effect of maturity time was observed for correlations among the characters too. Significant positive correlation between days to ear emergence and maturity and significant negative correlation between days to ear emergence and grain filling index of late group became non-significant in early group. The correlation of grain yield per plant with days to ear emergence and maturity shifted from negative in late group to positive in early group. In fact, changes in associations could be due to mating system used for generating variability and selection practiced for obtaining more and more early types with desirable character combinations.

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Key words : Grain filling period, Vegetative period, Grain yield, Maturity effects, Bread wheat

INTRODUCTION

The grain yield 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 (Binghum, 1969). Thus, both vegetative and grain filling periods are important for achieving high yields in wheat. Moreover, many researchers have reported the association between yield and growth duration characters like days to anthesis and days to maturity. If sizeable heritable differences occur within a species in the duration of vegetative and grain filling periods, the opportunity exists for improving yield through altering the length of this two growth periods in a breeding programme. Thus, shortening crop duration is a very important consideration in crop productivity and wheat breeders always tended to select plants for earliness. As a result, the modern varieties of grain crops in general and wheat in particular are more earlier than those of older ones. The present study was designed to know the effect of differences in maturity time on cultivar variation for growth duration characters and grain yield in bread wheat.

MATERIALS AND METHODS

The material consisted of 21 bread wheat genotypes, which were selected based on maturity time and classified into three maturity groups, *i.e.*, early, mid-early and late. Each maturity group included seven genotypes. The experiment was conducted in timely sown condition during *Rabi* season at the Experimental Farm, Wheat Research Station, Junagadh Agricultural University, Junagadh in Randomized Block Design with the additional restriction on randomization that genotypes within the maturity group appear together in each of the three replications. Each genotype was sown in three rows of 3 meter length with the inter- and intra-row spacing of 22.5 x 10 cm. The crop was fertilized by 120-60-0 NPK kg/ha as recommended dose of the region. Half of the nitrogen and total quantity of phosphorus was given as basal dose. The remaining half quantity of nitrogen was applied as topdressing at the 21 days after sowing. Crop was irrigated 11 times during life cycle as per recommended schedule. Pendimethaline (2.5 a.i.ha^{-1}), a pre-emergence weedicide was sprayed 48 hrs after sowing for weed control. Chloropyriphose at the rate of 25 kg a.i. ha^{-1} was applied

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