

Study of heat tolerance in *durum* wheat through timely and late sown condition

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ABSTRACT

The genotype having inbuilt tolerance to drought and high temperature must be characterized for their further use in breeding programme. Accordingly the present investigation was planned to study the tolerance to high temperature by planting the genotype in normal date of sowing (second week of November) and late date of sowing (second week of December) to expose the crop to high temperature during February and March in north Gujarat condition of central zone. Estimated heat tolerance for grain yield per plant by the 'heat susceptibility index (S) which scales the reduction in parental genotype performance from cool to hot condition related to the respective mean reduction over all genotypes. The parental line BAWAJI was found tolerant to heat as it registered minimum heat susceptibility index. The cross combination GW 1239 x GW 1189 was promising for both the sowing conditions for generating heat tolerant segregants in durum wheat. For late sown condition only, the crosses GW 1139 x GW 1240 and GW- 02-51 x VDW- 99-176 found having potential to throw good segregants for tolerance to heat.

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Key words : Tolerance, Drought, Heat susceptibility index, Segregants

INTRODUCTION

Triticum durum Desf, the macaroni wheat is the second most important species of wheat in India. Its cultivation is confined to central and peninsular zones. The best quality *durum* wheat is produced in central zone under rainfed condition. The best quality *durum* wheat is produced in central zone under rainfed condition. Considering the global climate changes, wheat research in India has been now directed with breeding objective of tolerance to high temperature and drought. The genotype having inbuilt tolerance to drought and high temperature must be characterized for their further use in breeding programme. Temperature is critical factor affecting plant growth and development. Normal plant growth and subsequent grain yield are realised under optimum environment conditions. High temperature above 28°C during grain development is the single most important factor that limits productivity of wheat in India (Singh *et al.*, 2005). The present study was undertaken with two planting dates so as to expose the late sown crop to raised temperature during grain filling stage.

MATERIALS AND METHODS

The present investigation consisted of eight diverse parental lines of durum wheat (*Triticum durum* Desf.)

and their twenty-eight F₁s (excluding reciprocals). The parental lines *viz.*, GW-02-51, VDW-99-176, RD-1009, GW1139, GW1239, GW1189, BAWAJI and GW 1240 were selected from germplasm maintained at Wheat Research Station, Vijapur, (North Gujarat), during winter, 2007-08 and these lines were crossed in diallel mating design. The complete set of 36 genotypes comprising eight parental genotypes and 28 F₁'s were evaluated in Randomized Block Design with three replications during winter 2008-09 under two date of sowing (2nd week of November and 2nd week of December). The 'heat susceptibility index' was calculated for each experimental genotype according to Fisher and Maurer (1978). It is calculated by formula $S = (1 - Y/Y_p) / (1 - X/X_p)$, where, Y = Yield under stress condition, Y_p = Yield under without stress condition, X = Mean yield over stress condition, X_p = Mean yield over without stress condition.

RESULTS AND DISCUSSION

The comparison of different growth stages the crop against weekly minimum and maximum temperature is presented in Table 1. The timely sown crop was expected to raised minimum temperatures (5^o C more than average) during initial growth and tillering stage. The crop again exposed to raised maximum temperature (>28^o C) during grain filling stage during standard week 5 to 6.

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