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RESEARCH PAPER

Effect of thermal stress management strategies on yield and yield attributes of wheat (*Triticum aestivum* L.) under late sown conditions

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Abstract : Field experiment was conducted at research farm, Department of Agricultural Meteorology, CCS HAU, Hisar located at 29˚ 10' N latitude, 75˚ 46' E longitude and 215.2 m altitude during *Rabi* season of 2007-08 and 2008-09 (Last week of December) to study the effect of thermal stress management strategies on yield and yield attributes of wheat under late sown conditions. The grain, straw and biological yields were maximum in T_5 (3803, 5829 and 9632 kg ha^{-1}, respectively) and these were lower in T_1 (3504, 5617 and 9121 kg ha^{-1}, respectively) during 2007-08. During 2008-09, the grain, straw and biological yields were maximum in T_5 (3713, 5814 and 9527 kg ha^{-1}, respectively) and these were lowest in T_1 (3417, 5598 and 9016 kg ha^{-1}, respectively). The harvest and attraction index were maximum in T_3 (39.6 and 65.5%, respectively) and these were minimum in T_1 (38.4 and 62.4%, respectively) during 2007-08. During 2008-09, harvest and attraction index were maximum in T_3 (39.1 and 64.1%, respectively) and minimum in T_1 (37.9 and 61.0%, respectively). Among post anthesis strategies, the highest grain and biological (3758 and 9659 kg ha^{-1} in 2007-08) and (3666 and 9551 kg ha^{-1} in 2008-09) was observed in S_3. The harvest and attraction index were statistically at par among all the treatments during both the crop seasons. The pooled LAI (r = 0.94), LAD (r = 0.96), CGR (r = 0.98) at vegetative and the pooled LAI (r = 0.92), LAD (r = 0.98), CGR (r = 0.78) at reproductive phase have shown highly significant and positive correlation with grain yield.

Key Words : Thermal stress management strategies, Yield and yield attributes, Correlation, Wheat

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INTRODUCTION

Wheat (*Triticum aestivum* L.) is the most important food crop of world and is grown under different soil and climatic conditions. In India it is second most important food crop, cultivated extensively in North-Western and Central zones. Wheat is a photo-insensitive and thermo-sensitive long day plant. Temperature plays dominant role to wheat adaptation in India. Cool weather during vegetative growth and warm weather at maturity is deemed ideal for this crop. However, conditions of photoperiod, radiation, temperature, rainfall and humidity vary greatly among the wheat growing regions.

The crop under late sowing suffers due to sub-optimal temperature at sowing, which causes delayed germination by slowing down the rate of physiological activities related to germination namely absorption of water, hydrolysis of nutrient inside the embryo, slow growth, development and low yield. The delayed sowing further causes supra-optimal thermal stress at reproductive phase, which results in forced maturity (Gupta *et al.*, 2002). This high temperature stress at reproductive phase of crop results in poor yield due to reduced number of grains per spike and shriveled grain with poor quality (Sharma *et al*., 2007). Delay in wheat sowing 20 and 40 days from the normal sowing date (15th November) reduced grain yield by 23 kg ha^{-1}day^{-1} and 30 kg ha^{-1}day^{-1}, respectively (Kaur and Pannu, 2008) . Therefore, it becomes imperative to

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