EFFECT OF HEAT AND COLD TREATMENT ON GERMINATION AND EARLY GROWTH STAGE OF TERMINAL HEAT TOLERANT (WH 730) AND INTOLERANT (RAJ 4014) WHEAT GENOTYPES

OM PRAKASH GUPTA*, TIWARI R., VENKATESH K., GUPTA R.K., SHARMA I.
DIRECTORATE OF WHEAT RESEARCH, KARNAL-132001
Presenting author: email: *opguptaiari@gmail.com

INTRODUCTION

Being second important staple food crop globally, wheat (*Triticum aestivum* L.) production is largely limited by heat and cold stress which adversely affects the germination, crop growth and development. Terminal heat stress is a major problem for wheat production which severely affects the grain yield. The objective of the present study was to evaluate the effect of heat and cold stress on the germination potential and early growth stage of WH 730 (terminal heat tolerant) and Raj 4014 (terminal heat intolerant) wheat genotypes identified from previous field experiments to develop a platform for screening the genotypes for terminal heat tolerance at seedling stage.

MATERIALS & METHODS

Experimental materials and treatment condition

- Two wheat genotypes *viz.* WH 730 (heat tolerant) and Raj 4014 (heat intolerant) were procured from the GRU, DWR, Karnal
- Both the genotypes were tested under two temperature regimes *viz.* 35 C and 40 C for 6h for heat stress and 0 C for 2h for cold stress. 25 C was taken as a control throughout the experiment

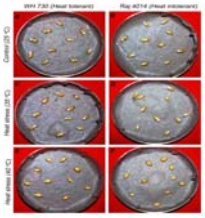
Pedigree details of the genotypes

Genotype	Source	Pedigree
WH 730	HAU, Hisar, India	CPAN 2092 / Improved Lok-1
Raj 4014	Durgapura, Jaipur, India	DL 8025 / K 9011

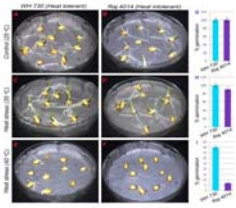
Methods

- Seeds were soaked overnight, transferred to 100 107 20mm Petri dish, @10seeds/Petri dishes
- Heat (35 C and 40 C) and cold (0 C) stress was given for 6h and 2h respectively, 25^{0}C was used as control
- After exposing to stress each petri dish was shifted to room temperature (25 C) for the germination to begin, followed by evaluation of germination and early growth stage at 24 and 48h post treatment.
- Four days old seedlings were then transferred to hydroponic condition to grow up to next nine days for recording the different physiological parameters *viz.* survival rate, root and shoot length.

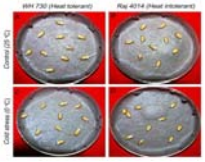
RESULTS



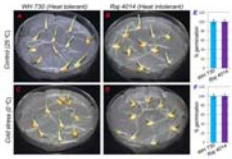
Germination efficiency post 24h heat stress



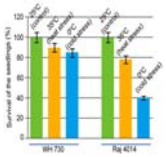
Germination efficiency post 48h heat stress



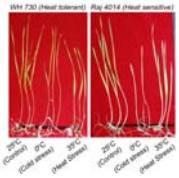
Germination efficiency post 24h cold stress



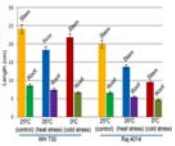
Germination efficiency post 48h cold stress



Survival rate under hydroponic condition



Vigour analysis



Comparison of shoot and root length

CONCLUSION

The study reflected that the genotype WH 730 which was tolerant to terminal heat stress has also shown tolerance during germination and growth at early stage under both heat and cold stress.

ACKNOWLEDGEMENT

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