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Short communication
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Importance of heat tolerant varieties of Wheat (*Triticum aestivum* L.)

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ABSTRACT

The main objective of this study was to analysis heat tolerance in bread wheat (*Triticum aestivum* L.) for grain yield under different environmental conditions. Among diverse parents, some were observed good general combiners for heat tolerance parameters along with grain yield on pooled basis in all environments for grain yield and heat tolerance parameters. Attempting cross combinations involving different parents with high GCA for desirable grain yield along with heat tolerance parameters could be useful.

Keywords: Heat tolerant, wheat yield, *Triticum aestivum*

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Introduction

The study of heat tolerance in bread wheat [*Triticum aestivum* (L.)] genotypes was carried out during *Rabi* 2020-21 at the botany farm of Department of Genetics and Plant Breeding, Rajasthan College of Agriculture, MPUAT, Udaipur (Rajasthan). It is located at an elevation of 579.50 meters above sea level on latitude of 24'35 North and longitude of 73'42 East. The experimental material was comprised of 47 genotypes, including 9 parents, their 36 F_1's and 2 checks *viz*., RAJ 4079 and HI 1544 were evaluated in randomized block design with three replications in three different environments *viz*., E_1 (early sown), E_2 (timely sown) and E_3 (late sown). Observations were recorded on nineteen different characters including yield, yield attributing traits and heat tolerance parameters for *per se* performance, heterosis, combining ability and stability analysis.

Among parents, RAJ 3777, RAJ 4120, HD 2967, DBW 173 and GW 451 were exhibited significant GCA effects for grain yield and other traits. Parent GJW 463 was exhibited maximum GCA effects for proline content (2.64) and DBW 173 for grain yield (1.80) over the environments.

Out of thirty six crosses, four crosses *viz*., HD 2967 x DBW 173, DBW 173 x RAJ 4120, RAJ 3777 x RAJ 4120 and DBW 173 x GW 451 were observed superior with high mean of grain yield than general and high economic heterosis over the best check HI 1544 in three different environments in respect to grain yield. Among the crosses, HD 2967 x DBW 173 and RAJ 3777 x RAJ 4120 were observed maximum positive heterobeltiosis and maximum significant SCA effects for grain yield in all environments, with parents of Good x Good and Average x Good combining ability, respectively. Attempting cross combinations involving different parents with high GCA for desirable grain yield along with heat tolerance parameters could be useful in future breeding programme.

On the basis of heat susceptibility index, the parental genotypes *viz*., RAJ 3777, HD 2967, DBW 173, GW 451 and LOK 1 and among crosses, RAJ 3777 x HI 1620, RAJ 3777 x RAJ 4120, RAJ 3777 x LOK 1, GJW 463 x RAJ 4120, GW 451 x RAJ 4120, JW 3336 x HI 1620, HD 2967 x RAJ 4120 and DBW 173 x GW 451 were observed as heat tolerant genotypes. Out of these crosses, DBW 173 x GW 451, HD 2967 x DBE 173, RAJ 3777 x RAJ 4120, GW 451 x RAJ 4120 and DBW 173 x RAJ 4120 were found superior for heat tolerance traits *viz*., total chlorophyll content, chlorophyll stability index, less heat injury and high proline content.

Table 1: Promising genotypes identified on the basis of *per se* performance, economic heterosis and GCA/SCA for grain yield and proline content on pooled basis

S.N	Genotypes	*Per se* performance (Grain yield)	*Per se* performance (Proline content)	Economic Heterosis	GCA/SCA (Grain yield)	GCA/SCA (Proline content)
1	HD 2967 x DBW 173	16.87	19.63	2.76	4.00	1.43
2	DBW 173 x RAJ 4120	17.38	16.53	0.12	2.56	3.25
3	RAJ 3777 x RAJ 4120	15.30	20.55	4.01	2.92	2.74
4	DBW 173	16.38	19.21		1.80	0.45
5	HD 2967	15.45	13.46		0.85	-0.67
6	RAJ 4120	13.87	15.99		0.73	0.47

Heat tolerance parameters were observed high in these crosses resulted in the augmentation of proline accumulation in response to high temperature (Table 1). Hence their F_2 generations should be raised under stressed environments and examined for proline content along with yield and yield contributing traits to identify some transgressive segregants. Singh *et al.* (2011), Yadav *et al.* (2008) and Singh *et al.* (2020) also confirmed the similar results. It may be concluded that among diverse parents, (Table 1) were observed good general combiners for heat tolerance parameters along with grain yield. These cross combinations involving different parents with high GCA for desirable grain yield along with heat tolerance parameters could be useful.

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