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EFFECT OF HEAT STRESS ON VARIATION IN PARENTAL LINES AND THEIR F_1 HYBRIDS IN WHEAT: A COMPARISON

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ABSTRACT

The question whether the selection practiced in an optimum environment will hold valid under stress condition also, or vice versa, formed the basis of this study. Eight wheat pure lines and their 28 hybrids were exposed to heat stress during two different growth phases and the effect on variation observed. It is suggested that selection should be practiced under the same conditions wherein their use is intended.

Key words: Heat stress, wheat, variation, pure lines, hybrids.

The wheat crop faces high temperature stress during vegetative phase under rainfed conditions and during grain filling period under late plantings. Eight parental lines and their twenty eight hybrids were sown on 25.10.89 and 1.12.89 to expose the early crop to heat stress during vegetative phase and also the late sown crop during grain filling periods.

It was intended to compare the response of parental pure lines and hybrids to high temperature stress during various growth phases. The results (Table 1) indicated that in eight out of nine characters studied, the parents exhibited more variation than hybrids under both sowing conditions. The two exceptions were tillers/plant and grains/spike under normal sown conditions. Such a phenomenon can be explained only if gene effects are predominantly of dominance type. When studied over environments, it was observed that stress caused an increased variation for seven characters among the parents and for six characters among hybrids, out of total nine characters. This implies that differences under

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Table 1. Coefficients of variation (CV) for parents and F_1s under two environments

Character	Sowing condition	CV		Comparison		
		P	F	P/F	S/N	
					P	F
Days to appearance of first node	Stress	21.0	13.7	1.53	1.15	1.36
	Normal	18.2	10.1	1.79		
Days to appearance of flag leaf	Stress	14.9	10.2	1.46	1.37	1.36
	Normal	10.9	7.5	1.45		
Days to ear emergence	Stress	13.6	9.9	1.37	1.12	1.25
	Normal	12.1	7.9	1.53		
Days to anthesis	Stress	11.3	8.8	1.28	0.93	1.14
	Normal	12.1	7.7	1.57		
Duration from anthesis to maturity	Normal	15.9	11.6	1.37	1.51	1.22
	Stress	24.1	14.2	1.69		
Number of tillers per plant	Stress	57.1	55.8	1.02	1.15	0.83
	Normal	49.6	67.1	0.73		
Number of grains per spike	Normal	35.9	39.2	0.91	1.12	0.84
	Stress	40.1	33.1	1.21		
1000-seed weight	Normal	26.7	24.6	1.08	1.16	1.08
	Stress	31.1	26.6	1.17		
Grain yield per plant	Normal	48.9	45.0	1.08	0.83	0.88
	Stress	40.8	39.8	1.02		

P — parents; F — F_1s; N — normal conditions; S — heat stress.

optimum conditions were further magnified under stress conditions. Therefore, results obtained under one environment cannot be extrapolated to other environments hence one has to be vigilent while practicing selection under stress environments.