

Effect on wheat (*Triticum aestivum*) cultivars

The net impact of individual and combined stress on plant growth

The table shows the effect of individual and combined drought and freezing stress on the physiology of maize cultivars

Plant: Wheat (*Triticum aestivum*) cv. Bezostaya-1, Seri-82, Kirac-66, Kiziltan-91, Kunduru 414-44, C1252.
Stress 1: Drought
Stress 2: 5°C for 2 days
Stage of the plant: Seedling

Cultivars	Stress treatments	Plant response to stress (percent reduction over control)				
		Type A parameters *		Type C parameters*		
		Shoot length #	Root length #	β-carotene level (µg/g FW)**	Ascorbate content (µg/g FW)**	Tocopherol content (µg/g FW)**
Bezostaya-1 (T. aestivum)	Drought	30 ↓	-8.3 ↑	85.7	170.4	885.2
	Cold	31.8 ↓	-26.8 ↑	60	718.9	673.6
	Drought +Cold	30.4 ↓	1.8 ↓	64	637.8	1319.2
Seri-82 (T. aestivum)	Drought	15.6 ↓	24.1 ↓	60.9	180.7	667.7
	Cold	14.9 ↓	3.7 ↓	45.3	583.8	828.4
	Drought +Cold	9.1 ↓	47.2 ↓	44.5	697.3	1098.9
Kirac-66 (T. aestivum)	Drought	11.8 ↓	27.4 ↓	89	121.1	975.9
	Cold	21.6 ↓	-17.9 ↑	63.1	270.3	895
	Drought +Cold	18.1 ↓	38.7 ↓	73.6	308.1	1264.8
Kiziltan-91 (T. durum)	Drought	20.1 ↓	38.9 ↓	68.4	191.4	655.5
	Cold	16.9 ↓	-12.7 ↑	63	373	696.8
	Drought +Cold	25.9 ↓	54.8 ↓	67.9	335.1	845.8
Kunduru 414-44 (T. durum)	Drought	26.8 ↓	46.1 ↓	91.6	136.7	1226.5
	Cold	14.5 ↓	6.4 ↓	67.8	346	697.1
	Drought +Cold	27.2 ↓	58.2 ↓	80.8	297.3	912.4
C1252 (T. durum)	Drought	7.5 ↓	-20.9 ↑	117.3	162	1260.4
	Cold	15.5 ↓	-8.2 ↑	59.7	410.8	752.7
	Drought +Cold	12.3 ↓	40.9 ↓	83.2	416.2	879.6



Control- β-carotene level- 58.8(Bezostaya-1), 50.5(Seri-82), 91.1(Kirac-66), 85.3(Kiziltan-91), 78.6(Kunduru 414-44), 79.6(C1252); Ascorbate content-145.4(Bezostaya-1), 165.7(Seri-82), 116(Kirac-66), 141.4(Kiziltan-91), 176.7(Kunduru 414-44), 217(C1252); Tocopherol content-593.8(Bezostaya-1), 525(Seri-82), 787.3(Kirac-66), 638(Kiziltan-91), 615(Kunduru 414-44), 615(C1252)

For raw data – Click here (.xlsx file)

Reference- Keles Y and Oncel I. (2002). Response of antioxidative defence system to temperature and water stress combinations in wheat seedlings. *Plant Science* 163: 783-790.

Note: ‘#’- Values presented in the table were calculated using the formula described below.

$$\text{Reduction over control (\%)} = \frac{(\text{Value Control} - \text{Value Stress})}{\text{Value Control}} \times 100$$

- 1) ‘’- indicates plant parameters affected by stress that lead to high susceptibility (higher the value more the damage).
- 2) ‘’- indicates plant parameters affected by stress that lead to reduced susceptibility (higher the value less the damage).

‘*’ - For more information on parameters classification, please refer to ‘methodology’ tab.

** - Values are presented as it is from the source article without subjecting to the calculation.

The inference from the study: Keles and Oncel (2002) investigated the effect of varying water and temperature levels on growth and antioxidant response of wheat and found that both the individual and combined drought and cold stress decreased the shoot growth of the different maize cultivars as compared to control treatments. The least reduction in shoot length under combined stress were observed in cultivars Seri-82 (*T. aestivum*) and C1252 (*T. durum*). However, the reductions did not differ significantly among the stress treatments. The stress conditions affected the accumulation of antioxidants differently. **The study concluded that the combined drought and cold stress treatment had a similar effect on the different wheat cultivars as the individual stresses and the cultivars Seri-82 and C1252 were relatively more resistant to the combined stress.**