



## Effect on wheat cultivars (*Triticum aestivum* L. cv. Bezostaya-1 , Seri-82, Kirac, -66, Kızıltan-91, Kunduru 414-44, C .1252)

### The net impact of individual and combined stress on plant growth

Crop: Wheat temperature (*Triticum aestivum* L. cv. Bezostaya-1, Seri-82, Kirac, -66, Kızıltan-91, Kunduru 414-44, C .1252)  
 Stress 1: High temperature Day/night (40/30 °C )  
 Stress 2: Flooding/Waterlogging/Submergence (6 days)  
 Stage of plant: 6 day old seedling

The table shows the effect of waterlogging and high temperature alone and in combination on the growth,  $\beta$ -Carotene, xanthophyll content, total ascorbate and  $\alpha$ -tocopherol level of wheat temperature cultivars.

	Treatment	Plant response to stress (reduction over control %)					
		Type A parameters*		Type B parameters*		Type C parameters*	
		Shoot length	Root length	$\beta$ -Carotene	Xanthophyll	Total ascorbate** ( $\mu\text{g/g}$ )	$\alpha$ -tocopherol** ( $\mu\text{g/g}$ )
Bezostaya-1	High temperature (40/30°C )	40.5 ↓	-31.2 ↑	-26.2 ↑	-57.2 ↑	161.4	613.2
	High temperature (40/30°C ) + Waterlogging (6 days) (Simultaneous stress)	42.2 ↓	40.4 ↓	-21.3 ↑	-23.1 ↑	182.4	390.2
Seri-82	High temperature (40/30°C )	31.4 ↓	-22.2 ↑	-83.3 ↑	-105.7 ↑	182.4	641.1
	High temperature (40/30°C ) + Waterlogging (6 days)	33.3 ↓	33.3 ↓	-42.3 ↑	-58.2 ↑	210.5	242.5

	(Simultaneous stress)						
Kır ac- 66	High temperature (40/30°C )	31.7↓	-51.4↑	-5.9↑	-32.1↑	98.2	512.8
	High temperature (40/30°C ) + Waterlogging (6 days) (Simultaneous stress)	36.6↓	56.2↓	10.7↓	-42.9↑	182.4	418.1
Kı zıl an- 91	High temperature (40/30°C )	30.0↓	-27.2↑	6.0↓	-26.0↑	119.2	390.2
	High temperature (40/30°C ) + Waterlogging (6 days) (Simultaneous stress)	28.4↓	39.2↓	11.1↓	2.2↓	189.4	195.1
Ku nd uru 41 4- 44	High temperature (40/30°C )	28.5↓	-10.9↑	18.3↓	-79.7↑	112.2	242.5
	High temperature (40/30°C ) + Waterlogging (6 days) (Simultaneous stress)	27.1↓	28.3↓	-5.5↑	-26.2↑	161.4	306.6
C. 12 52	High temperature (40/30°C )	22.7↓	-44.3↑	21.8↓	-30.3↑	133.3	429.2
	High temperature (40/30°C ) + Waterlogging (6 days) (Simultaneous stress)	26.5↓	23.6↓	-21.0↑	-43.5↑	203.5	373.5

**Reference** - Keles Y, Oncel I (2002) Response of antioxidative defence system to temperature and water stress combinations in wheat temperature seedlings. Plant Science 163(4): 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 less/not affected by stress leading to improved resistance (higher the value lesser the damage).

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

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

**Inference from the study:** Keleş et.al. 2002 studied the interaction of waterlogging and high temperature in six wheat temperature cultivars Bezostaya-1, Seri-82, Kırac,-66, Kızıltan-91, Kunduru 414-44 and C.1252. Plants were subjected to single and simultaneous waterlogging and high temperature stress treatment and analysed for their shoot and root length,  $\beta$ -Carotene, xanthophyll level, total ascorbate, and  $\alpha$ -tocopherol level. Root and shoot length and  $\alpha$ -tocopherol decreased under combined stress treatment and this decrease was more in cultivar Bezostaya-1. However,  $\beta$ -Carotene levels increased for Bezostaya-1, Seri-82, Kunduru 414-44, C.1252. Xanthophyll level increased for all cultivars except Kızıltan-91. Total ascorbate levels increased for all cultivars except Kunduru 414-44, C.1252.  $\alpha$ -tocopherol levels reduced under combined stress condition for all cultivars. **Thus, this stress combination is detrimental to wheat temperature growth and physiology, cultivar Bezostaya-1 being more susceptible.**