



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 (*Triticum aestivum* L. cv. Bezostaya-1, Seri-82, Kirac,-66, Kızıltan-91, Kunduru 414-44, C .1252)
 Stress 1: Low temperature Day/night (5/-5 °C)
 Stress 2: Flooding/Waterlogging/Submergence (6 days)
 Stage of plant: 6 day old seedling

The table shows the effect of waterlogging and low temperature alone and in combination on the growth, β -Carotene, xanthophyll content, total ascorbate, and α -tocopherol level of wheat cultivars.

	Treatment	Plant response to stress (reduction over control %)					
		Type A parameters*		Type B parameters*		Type C parameters*	
		Shoot length	Root length	β -Carotene	Xanthophyll	Total ascorbate**	α -tocopherol**
Bezostaya-1	Low temperature (5/-5°C)	31.9↓	-24.8↑	1.2↓	-13.0↑	725.2	666.3
	Low temperature (5/-5°C) + Waterlogging (6 days) (Simultaneous stress)	37.1↓	-8.3↑	20.6↓	8.7↓	609.1	946.4
Seri-82	Low temperature (5/-5°C)	13.0↓	2.8↓	9.4↓	-22.1↑	582.1	817.7
	Low temperature (5/-5°C) + Waterlogging (6 days)	14.9↓	-2.8↑	14.0↓	-0.6↑	497.8	804.8

	(Simultaneous stress)						
Kırac-66	Low temperature (5/-5°C)	21.7↓	-18.1↑	31.0↓	-17.7↑	275.1	901.4
	Low temperature (5/-5°C) + Waterlogging (6 days) (Simultaneous stress)	22.7↓	-18.1↑	28.6↓	4.8↓	259.2	611.6
Kızıltan-91	Low temperature (5/-5°C)	16.4↓	-13.6↑	26.8↓	-25.3↑	375.3	698.5
	Low temperature (5/-5°C) + Waterlogging (6 days) (Simultaneous stress)	22.2↓	-24.8↑	5.5↓	-17.1↑	470.7	482.8
Kunduru 414-44	Low temperature (5/-5°C)	12.6↓	4.3↓	15.0↓	-67.7↑	349.9	698.5
	Low temperature (5/-5°C) + Waterlogging (6 days) (Simultaneous stress)	21.3↓	19.6↓	12.2↓	-52.3↑	518.4	611.6
C.1252	Low temperature (5/-5°C)	13.4↓	-12.3↑	24.4↓	-4.9↑	413.5	740.4
	Low temperature (5/-5°C) + Waterlogging (6 days) (Simultaneous stress)	15.5↓	-12.3↑	8.6↓	-17.1↑	566.2	441.0

Reference - Keleş Y, Öncel I (2002) Response of antioxidative defence system to temperature and water stress combinations in wheat 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 low temperature in six wheat cultivars Bezostaya-1, Seri-82, Kırac,-66, Kızıltan-91, Kunduru 414-44, C.1252. Plants were subjected to single and simultaneous waterlogging and low temperature stress treatment and analysed for their shoot and root length, β-Carotene, xanthophyll level, total ascorbate, and α-tocopherol level. Shoot length, β-Carotene levels were reduced synergistically under combined stress. Total ascorbate levels increased under stress conditions. α-tocopherol levels also increased synergistically under combined stress treatment. Except in cultivar Kirac-66, Kızıltan-9, and C.1252. **Thus, this stress combination is detrimental to wheat growth and physiology, cultivar Bezostaya-1 and Kunduru 414-44 being more susceptible.**