



Effect on wheat varieties (*Triticum aestivum* L. var. Katya and Sadovo)

The net impact of individual and combined stress on plant growth

Plant- Wheat
Stress 1- Drought
Stress 2- Heat

Table is showing the effect of individual and combined stress on chloroplast, mitochondria and plastoglobule size and number in wheat var. Katya and Sadova

Varieties	Parameters studied	Plant response to stress (reduction over control %)			Parameter type *
		Drought stress (withhold watering for seven days)	Heat stress 40 °C 5 h)	Combined stress (Drought + heat)	
Katya	Mitochondria devoid of cristae (%) ** (Control- 2.03%)	19.06 ↓	25.00 ↓	31.09 ↓	Type B
	Chloroplast size	-25.00 ↑	-63.67 ↑	-52.73 ↑	
	Number of chloroplast per 100 μm ⁻² visible field	-43.97 ↑	-42.71 ↑	-63.61 ↑	
	Mitochondria size	-44.28 ↑	-72.14 ↑	-95.02 ↑	
	Number of mitochondria per 100 μm ² visible field	14.88 ↓	-227.27	-161.16 ↑	
	Plastoglobule size	-51.55 ↑	-27.50 ↑	-62.18 ↑	
	Number of plastoglobule per 100 μm ² visible field	-58.08 ↑	-9.01 ↑	-101.89 ↑	
Sadovo	Mitochondria devoid of cristae (%) ** (Control- 1.09%)	27.81 ↓	27.03 ↓	43.91 ↓	Type B
	Chloroplast size	-10.86 ↑	-64.25 ↑	-42.08 ↑	
	Number of chloroplast per 100 μm ² visible field	-37.85 ↑	-20.80 ↑	-57.98 ↑	
	Mitochondria size	-21.94 ↑	-56.63 ↑	-65.31 ↑	
	Number of mitochondria per 100 μm ² visible field	64.05 ↓	-88.76 ↑	-61.80 ↑	
	Plastoglobule size	-28.23 ↑	-21.73 ↑	-47.07 ↑	

	Number of plastoglobule per 100 μm ² visible field	-33.24 ↑	-6.89 ↑	-103.90 ↑	
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For raw data – Click here (.xlsx file)

Reference- Grigorova *et al.*, 2014

Note: Values presented in the table were calculated using the formula described below.

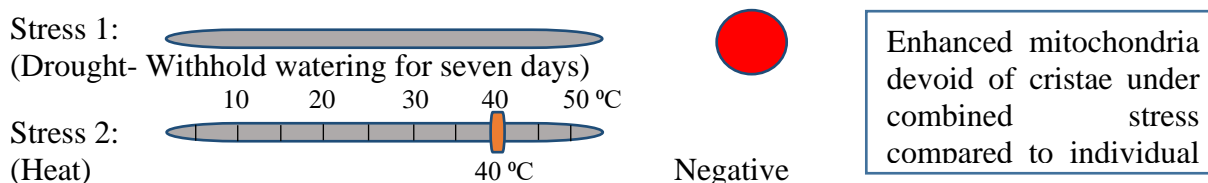
$$\text{Reduction over control (\%)} = \frac{(\text{Value Control} - \text{Value Stress})}{\text{Value Control}} \times 100$$

- 1) '↓' - indicates plant parameters affected by stress that leads to high susceptibility.
- 2) '↑' - indicates plant parameters less/not affected by stress leading to improved resistance.
- 3) Control plants maintained at 21/15 °C day/night temperature.

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

***- Values represented as it is from the source article (without subjecting to calculation).

Bar showing net impact of combined stress over control



Note: The bar is drawn based on 'type B' parameter, i.e., photosynthetic rate. When the cursor dragged, an interaction between two levels of stress shown as a negative outcome (*red*- plants are more affected under combined stress compared to individual stresses) or positive outcome (*green*- plants are less affected under combined stress compared to individual stresses).

The inference from the study: Grigorova *et al.*, 2014 study examined the changes in mesophyll cell ultrastructure in the leaves of two varieties of winter wheat, Katya (the most drought-tolerant Bulgarian variety) and Sadovo (disease resistant and more susceptible to water stress), under individual and combined drought and heat treatments. All the stress treatments affected the cell ultrastructure, and more noticeable damage observed under combined stress treatment. Chloroplast and mitochondria were affected in a variety-specific manner, i.e. in drought-tolerant Katya organelles were better preserved than in the sensitive variety Sadovo under all stress treatments. **Overall data indicates the higher damage to cell ultrastructure under combined drought and heat stress in two wheat varieties Katya and Sadovo compared to individual stresses.**