



Effect on citrus genotypes

[Carrizo citrange (*Poncirus trifoliata* L. Raf. × *Citrus sinensis* L. Osb.) and Cleopatra mandarin (*Citrus reshni* Hort. Ex Tan.)]

1. The net impact of individual and combined stress on plant growth

Plant- Citrus
Stress 1- Drought
Stress 2- Heat

Table showing the effect of individual and combined stress on relative water content, proline and malondialdehyde (MDA) accumulation

Parameters studied	Plant response to stress				Parameter type *
	Control	Heat stress (40 °C for seven days)	Drought stress (transplanting plant to dry perlite for 24 h)	Combined stress (heat + drought)	
Cleopatra mandarin (<i>Citrus reshni</i> Hort. Ex Tan.)					
Relative water content (%)	93.72	69.01	59.66	39.41	Type B
Proline accumulation in leaf (mmol g ⁻¹ FW)	34.37	38.32	50.19	70.26	Type C
Proline accumulation in root (mmol g ⁻¹ FW)	37.8	20.88	66.24	78.12	
Malondialdehyde accumulation in leaf (mmol g ⁻¹ FW)	105	140.00	117.63	233.33	
Malondialdehyde accumulation in root (mmol g ⁻¹ FW)	98.4	119.71	155.22	249.57	
Carrizo citrange (<i>Poncirus trifoliata</i> L. Raf. × <i>Citrus sinensis</i> L. Osb.)					
Relative water content (%)	92.96	75.32	60.32	43.38	Type B
Proline accumulation in leaf (mmol g ⁻¹ FW)	23.12	29.80	35.89	52.02	Type C
Proline accumulation in root (mmol g ⁻¹ FW)	9.72	8.64	22.32	32.76	
Malondialdehyde accumulation in leaf (mmol g ⁻¹ FW)	112.77	120.55	135.14	169.17	
Malondialdehyde accumulation in root (mmol g ⁻¹ FW)	91.3	129.85	112.60	133.91	

FW- fresh weight

For raw data – Click here (.xlsx file)

Reference- Zandalinas *et al.*, 2017



Note:

1) Values presented as it is from the source article without subjecting to the calculation.

2) Control plants maintained at 25 °C temperature.

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

The inference from the study: Zandalinas *et al.*, 2017 study aimed at understanding the effect of oxidative stress induced by drought and heat stress individually and in combination in citrus genotypes, i.e., differential ability of Carrizo citrange and Cleopatra mandarin to cope with stress. Carrizo genotype showed lesser accumulation of malondialdehyde and higher accumulation of proline under both individual and combined stress compared to Cleopatra genotype. Relative water content was also high in Carrizo plants compared to Cleopatra plants. Carrizo plants showed the enhanced activity of superoxide dismutase (SOD), ascorbate peroxidase (APX), catalase (CAT), and glutathione reductase (GR) involved in ROS detoxification along with the maintenance of GSH/GSSG ratio as compared to Cleopatra plants under individual and combined stress. The effect was more severe under combined stress as compared to individual stresses. **Overall results suggest that Carrizo genotype has higher oxidative stress tolerance and less sensibility to combined stress compared to Cleopatra genotype.**