

**Effect on Prosopis species (*Prosopis chilensis* (Algarrobo) and *P. tamarugo* (Tamarugo))**

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

Plant- Prosopis  
Stress 1- Drought  
Stress 2- Heat

Table showing the effect of individual and combined stress on photosynthetic rate of Prosopis plant species

Parameters studied	Plant response to stress (reduction over control %)					Parameter type *
	Drought stress (2.5 MPa)	Heat stress		Combined stress		
		(35 °C for 2h)	(40 °C for 2h)	2.5 MPa+ 35 °C	2.5 MPa+ 40 °C	
<b><i>P. tamarugo</i> (Tamarugo)</b>						
Photosynthetic rate at LSP	23.4 ↓	27.2 ↓	64.3 ↓	28.5 ↓	60.0 ↓	Type B
Photosynthetic rate at LCP	20.8 ↓	31.9 ↓	48 ↓	42.3 ↓	53 ↓	
Quantum yield	6 ↓	-7.1 ↑	23.8 ↓	-1.2 ↑	9.5 ↓	
Dark respiration rate	36.0 ↓	12.0 ↓	-8 ↑	4.0 ↓	8 ↓	
Photochemical efficiency	3.5 ↓	2.3 ↓	3.5 ↓	4.7 ↓	10.5 ↓	
RUBISCO content	18.4 ↓	-34.5 ↑	-14.9 ↑	-1.7 ↑	46.6 ↓	Type C
<b><i>P. chilensis</i> (Algarrobo)</b>						
Photosynthetic rate at LSP	25.1 ↓	41.9 ↓	45.3 ↓	38.5 ↓	85.5 ↓	Type B
Photosynthetic rate at LCP	23.3 ↓	32.2 ↓	48.5 ↓	51.1 ↓	65.2 ↓	
Quantum yield	17.1 ↓	2.6 ↓	25 ↓	-1.3 ↑	50 ↓	
Dark respiration rate	-22.7 ↑	-72.7 ↑	-113.6 ↑	-9.1 ↑	-27.3 ↑	
Photochemical efficiency	1.2 ↓	2.3 ↓	4.7 ↓	3.5 ↓	11.6 ↓	
RUBISCO content	51.3 ↓	2.5 ↓	14.4 ↓	41.9 ↓	63.1 ↓	Type C

LSP- light saturation point; LCP- light compensation point

For raw data – Click here (.xlsx file)

Reference- Delatorre *et al.*, 2008

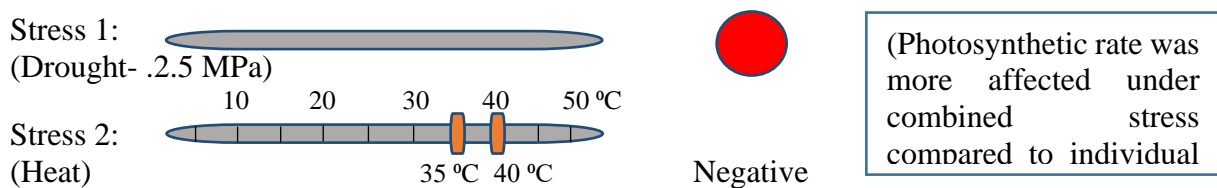
**Note:** Values presented in the table were calculated using the formula described below.

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

- 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 25 °C day temperature and water potential of -0.3 MPa.

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

## 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:** Delatorre *et al.*, 2008 study mainly focused on understanding the effect of drought and heat stress on photosynthetic response of two species of Prosopis, Algarrobo and Tamarugo plants either individually or combined. With the increase in temperature both the species showed a reduction in photosynthetic rate and with water deficit in Algarrobo. At -2.5 MPa and 40 °C temperature, Algarrobo showed a higher reduction in photosynthetic rate compared to Tamarugo. Quantum yield was also decreased with increasing temperature and water deficit conditions on Algarrobo compared to Tamarugo. Dark respiration was increased in Tamarugo while remained unchanged in Algarrobo. Photochemical efficiency decreased under all stress conditions, and there was no difference among the species. RUBISCO content was affected by drought stress in both the species. **Overall results indicated that combined stress affects photosynthesis response greater than individual stresses in Prosopis and the interactive effect was more pronounce in Algarrobo compared to Tamarugo.**