



## Effect on barley cultivars (*Hordeum vulgare* L. cv. CM72, Naso Nijo)

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

Crop: Barley (*Hordeum vulgare* L. cv. CM72, Naso Nijo)  
 Stress 1: Salt (200mM NaCl)  
 Stress 2: Waterlogging (14 days)  
 Stage of plant: 1 week old seedling

The table shows the effect of waterlogging and salt alone and in combination on growth and physiology of barley cultivars.

		Treatment	Plant response to stress (reduction over control %)				
			Type A parameters*				Type B parameters*
			Shoot weight	Shoot dry weight	Root weight	Root dry weight	Chlorophyll content
Sandy loam soil	CM72	Salt (200mM NaCl)	74.5↓	61.0↓	73.4↓	45.7↓	-0.9↑
		Waterlogging (14 days)	68.1↓	62.5↓	66.1↓	37.2↓	15.4↓
		Salt (200mM NaCl) + Waterlogging (Simultaneous stress)	80.9↓	74.8↓	81.9↓	67.0↓	51.8↓
	Naso Nijo	Salt (200mM NaCl)	70.0↓	53.3↓	58.8↓	45.8↓	8.3↓
		Waterlogging (14 days)	75.0↓	67.9↓	73.7↓	51.4↓	42.8↓
		Salt (200mM NaCl) + Waterlogging (Simultaneous stress)	90.0↓	85.7↓	80.7↓	72.2↓	77.9↓
Vermiculite	CM72	Salt (200mM NaCl)	51.7↓	38.1↓	48.2↓	41.2↓	0.5↓
		Waterlogging (14 days)	17.2↓	25.1↓	33.2↓	22.1↓	8.4↓
		Salt (200mM NaCl) + Waterlogging (Simultaneous stress)	65.5↓	61.5↓	74.1↓	70.6↓	18.9↓

Naso Nijo	Salt (200mM NaCl)	56.7↓	46.9↓	47.6↓	36.2↓	-0.6↑
	Waterlogging (14 days)	36.7↓	38.2↓	54.6↓	51.7↓	19.6↓
	Salt (200mM NaCl) + Waterlogging (Simultaneous stress)	83.3↓	74.4↓	82.6↓	79.3↓	58.3↓

**Reference** – Zeng F, Shabala L, Zhou M, Zhang G, Shabala S (2013) Barley responses to combined waterlogging and salinity stress: separating effects of oxygen deprivation and elemental toxicity. *Front. Plant Sci.* 4:313-326.

**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).
- 3) "0.0" value indicates plant parameter behaved similarly under control and stress condition (no damage).

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

**Inference from the study:** Zeng et.al. 2013 studied the interaction of waterlogging and salt in barley cultivars CM72, Naso Nijo. Plants were subjected to single and simultaneous salt and waterlogging stress treatments, in two different soil types: sandy loam soil and vermiculite. Shoot dry weight, shoot weight, root weight, root dry weight, and chlorophyll content were reduced additively under combined stress treatment for both cultivars. This reduction was more in sandy loam soil. Cultivar Naso Nijo was more affected. **Thus, this stress combination affects the growth and physiology of barley cultivars.**