



Effect on ryegrass cultivars (*Lolium* sp. cv. Tophat, Palmer III, Brightstar, Paragon, 10.0815, 10.0824, 10.0825, 10.0876, 10.0798)

The net impact of individual and combined stress on plant growth

Crop: Ryegrass (*Lolium* sp. cv. Tophat, Palmer III, Brightstar, Paragon, 10.0815, 10.0824, 10.0825, 10.0876, 10.0798)
 Stress 1: Salt (12 dS m⁻¹)
 Stress 2: Hypoxia (30 days)
 Stage of plant : 30 day old plugs

The table shows the effect of hypoxia and salt alone and in combination on growth of ryegrass cultivars.


	Treatment	Plant response to stress (reduction over control %) Type A parameters*	
		Clipping yield	Root length
Tophat	Salt (12 dS m ⁻¹)	64.3 ↓	16.7 ↓
	Hypoxia (30 days)	21.4 ↓	-71.7 ↑
	Salt (12 dS m ⁻¹) + Hypoxia (Simultaneous stress)	71.4 ↓	20.7 ↓
Palmer III	Salt (12 dS m ⁻¹)	66.7 ↓	18.8 ↓
	Hypoxia (30 days)	25.0 ↓	-116.7 ↑
	Salt (12 dS m ⁻¹) + Hypoxia (Simultaneous stress)	58.3 ↓	18.1 ↓
Brightstar	Salt (12 dS m ⁻¹)	60.0 ↓	17.9 ↓
	Hypoxia (30 days)	6.0 ↓	-124.1 ↑
	Salt (12 dS m ⁻¹) + Hypoxia (Simultaneous stress)	80.0 ↓	16.2 ↓


Paragon	Salt (12 dS m ⁻¹)	42.6↓	18.1↓
	Hypoxia (30 days)	27.7↓	-196.9↑
	Salt (12 dS m ⁻¹) + Hypoxia (Simultaneous stress)	59.6↓	18.1↓
10.0815	Salt (12 dS m ⁻¹)	57.4↓	16.7↓
	Hypoxia (30 days)	25.5↓	-95.5↑
	Salt (12 dS m ⁻¹) + Hypoxia (Simultaneous stress)	57.4↓	18.4↓
10.0824	Salt (12 dS m ⁻¹)	34.8↓	19.7↓
	Hypoxia (30 days)	4.3↓	-114.8↑
	Salt (12 dS m ⁻¹) + Hypoxia (Simultaneous stress)	41.3↓	17.2↓
10.0825	Salt (12 dS m ⁻¹)	45.7↓	21.5↓
	Hypoxia (30 days)	-69.6↓	-57.6↑
	Salt (12 dS m ⁻¹) + Hypoxia (Simultaneous stress)	63.0↓	21.5↓
10.0876	Salt (12 dS m ⁻¹)	60.0↓	17.9↓
	Hypoxia (30 days)	28.0↓	-158.6↑
	Salt (12 dS m ⁻¹) + Hypoxia (Simultaneous stress)	62.0↓	19.0↓
10.0798	Salt (12 dS m ⁻¹)	59.2↓	17.4↓
	Hypoxia (30 days)	38.8↓	-57.3↑
	Salt (12 dS m ⁻¹) + Hypoxia (Simultaneous stress)	85.7↓	16.7↓

Reference – Isweiri H, Qian Y, Davis JG (2021) Interactive effects of waterlogging and salinity on perennial ryegrass and alkaligrass. *Int Turfgrass Soc. Res J.* 1– 10.

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

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

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.

Inference from the study: Isweiri et.al. 2021, studied the interaction of hypoxia and salinity in nine ryegrass cultivars. Plants were subjected to single and simultaneous salt and hypoxia stress treatment. Clipping yield and root length were reduced synergistically under combined stress for all cultivars but not for cultivar PalmerIII. **Thus, this stress combination is detrimental to the growth of ryegrass cultivars.**