



## Effect on wheat cultivars (*Triticum aestivum* cv. HD2967, C306)

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

Crop: Wheat (*Triticum aestivum* L. cv. HD2967, C306)  
 Stress 1: Nitrogen deficiency  
 Stress 2: Drought (-1.5 MPa)  
 Stage of plant: 18 day old seedling



The table shows the impact of nitrogen deficiency and drought alone and in combination on growth of wheat cultivars.

	Treatment	Plant response to stress (reduction over control %)				
		Type A parameters*				
		Biomass	Root dry weight	Shoot dry weight	Root/Shoot ratio	Total root length
HD2967	Nitrogen deficiency	6.2↓	0.0	14.3↓	-8.2↑	37.6↓
	Drought (-1.5 MPa)	21.0↓	-7.7↑	28.6↓	-37.0↑	41.1↓
	Nitrogen deficiency + Drought (-1.5 MPa) (Simultaneous stress)	16.0↓	-15.4↑	28.6↓	-38.0↑	17.7↓
C306	Nitrogen deficiency	27.8↓	17.6↓	27.3↓	-32.7↑	32.0↓
	Drought (-1.5 MPa)	33.1↓	0.0	36.4↓	-64.1↑	42.4↓
	Nitrogen deficiency + Drought (-1.5 MPa) (Simultaneous stress)	48.9↓	23.5↓	54.5↓	-62.7↑	9.7↓

**Reference** – Mahmoud D, Pandey R, Sathee L, Dalal M, Singh MP, Chinnusamy V (2020) Regulation of expression of genes associated with nitrate response by osmotic stress and combined osmotic and nitrogen deficiency stress in bread wheat (*Triticum aestivum* L.). Plant Physiol. Rep. 25(2):200–215.

**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:** Mahmoud et.al. 2020 studied the interaction of nitrogen deficiency and drought in two wheat cultivars HD2967 and C306. Plants were subjected to simultaneous drought and nitrogen deficiency. Biomass, root dry weight, and shoot dry weight were reduced synergistically under combined stress conditions for cultivar C306 but not for cultivar HD2967. Total root length was reduced but not additively under combined stress. However, root/shoot ratio did not reduce under stress treatment. **Thus, this stress combination is detrimental to wheat cultivar C306.**