



Effect on alfalfa cultivars (*Medicago sativa L. cv. WL323, 3S77*)

The net impact of individual and combined stress on plant growth

Crop: Alfalfa (*Medicago sativa L. cv. WL323, 3S77*)
 Stress 1: Flooding (3 days)
 Stress 2: *Potato Leafhopper (Empoasca fabae [Harris])*
 Stage of plant: 21 days after planting

The table shows the impact of flooding and insect alone and in combination on shoot dry weight, root dry weight and total non-structural carbohydrate of alfalfa plants.

	Treatment	Plant response to stress (reduction over control %) Type A parameters*		Plant response to stress (reduction over control %) Type C parameters*
		Shoot dry matter	Root dry matter	Root Total non-structural carbohydrate
WL323	<i>Empoasca fabae</i> (20 adults/cage)	21.9↓	73.9↓	44.3↓
	Flooding (3 days)	54.3↓	34.8↓	-8.0↑
	Flooding + <i>Empoasca fabae</i> (20 adults/cage) Simultaneous stress	53.0↓	91.3↓	42.1↓
3S77	<i>Empoasca fabae</i> (20 adults/cage)	23.2↓	47.6↓	27.3↓
	Flooding (3 days)	56.8↓	14.3↓	-8.2↑
	Flooding + <i>Empoasca fabae</i> (20 adults/cage) Simultaneous stress	61.6↓	76.2↓	25.1↓

Reference - Barta AL, Sulc RM, Ogle MJ, Hammond RB (2002) Interaction Between Flooding or Drought Stress and Potato Leafhopper Injury in Alfalfa. *Plant Health Progress* 3:1.

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).

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

Inference From the study: Barta et al. studied the interaction of flooding and potato leafhopper in two cultivars of alfalfa; WL323 and 3S77. Stress was given singly and simultaneously. Growth parameters shoot dry weight and root dry weight were observed to reduce under combined stress condition. This reduction was synergistic for cultivar 3S77 but in cultivar WL323 only root dry weight was observed to reduce additively. Percent reduction was more for cultivar WL323. Total non-structured carbohydrate was also observed, which reduced under combined stress condition but not synergistically. **Thus, this stress combination reduces the growth of both cultivars of alfalfa plant synergistically and detrimental to the plant.**