Effect on barley cultivars (*Hordeum vulgare* L. cv. Yerong, ZUG403, Mundah, Gairdner, YSM1, YYXT, Gebeina, ZUG293, Naso Nijo, YU6472, Franklin, CM72)

The net impact of individual and combined stress on plant growth

Crop: Barley (*Hordeum vulgare L.* cv. Yerong, ZUG403, Mundah, Gairdner, YSM1, YYXT, Gebeina, ZUG293, Naso Nijo, YU6472, Franklin, CM72)
Stress 1: Salt (250mM NaCl)
Stress 2: Waterlogging (1 cm)
Stage of plant: 1 week old seedling

The table shows the effect of waterlogging and salt alone and in combination on the 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	Chlorophyll content
Yerong	Salt (250mM NaCl)	43.8↓	33.3↓	-3.4↑
	Waterlogging (1cm)	49.4↓	50.0↓	6.2↓
	Salt (250mM NaCl) + Waterlogging (Simultaneous stress)	77.5↓	77.8↓	22.1↓
ZUG403	Salt (250mM NaCl)	46.7↓	45.5↓	-5.8↑
	Waterlogging (1cm)	64.5↓	63.6↓	20.9↓
	Salt (250mM NaCl) + Waterlogging (Simultaneous stress)	91.1↓	91.4↓	98.2↓
Mundah	Salt (250mM NaCl)	29.4↓	16.7↓	-5.7↑
	Waterlogging (1cm)	64.7↓	61.1↓	17.1↓

	Salt (250mM NaCl) + Waterlogging (Simultaneous stress)	82.4↓	83.3↓	32.1↓
Gairdner	Salt (250mM NaCl)	45.0↓	41.2↓	-7.9↑
	Waterlogging (1cm)	54.4↓	52.9↓	11.2↓
	Salt (250mM NaCl) + Waterlogging (Simultaneous stress)	89.4↓	88.8↓	92.8↓
YSM1	Salt (250mM NaCl)	20.0↓	25.0↓	-9.3↑
	Waterlogging (1cm)	56.3↓	62.5↓	13.7↓
	Salt (250mM NaCl) + Waterlogging (Simultaneous stress)	91.9↓	93.8↓	98.2↓
YYXT	Salt (250mM NaCl)	15.1↓	11.8↓	-14.7↑
	Waterlogging (1cm)	43.4↓	47.1↓	11.8↓
	Salt (250mM NaCl) + Waterlogging (Simultaneous stress)	57.9↓	64.7↓	24.4↓
Gebeina	Salt (250mM NaCl)	12.3↓	11.1↓	1.8↓
	Waterlogging (1cm)	46.1↓	50.0↓	18.0↓
	Salt (250mM NaCl) + Waterlogging (Simultaneous stress)	74.7↓	77.8↓	98.2↓
ZUG293	Salt (250mM NaCl)	26.2↓	20.0↓	-0.8↑
	Waterlogging (1cm)	51.7↓	50.0↓	10.1↓

	Salt (250mM NaCl) + Waterlogging (Simultaneous stress)	69.8↓	75.0↓	23.3↓
Naso Nijo	Salt (250mM NaCl)	14.4↓	25.0↓	-14.5↑
	Waterlogging (1cm)	29.5↓	40.0↓	25.5↓
	Salt (250mM NaCl) + Waterlogging (Simultaneous stress)	82.2↓	90.0↓	96.6↓
YU6472	Salt (250mM NaCl)	21.4↓	35.0↓	-7.3↑
	Waterlogging (1cm)	47.6↓	55.0↓	13.3↓
	Salt (250mM NaCl) + Waterlogging (Simultaneous stress)	71.7↓	80.0↓	92.0↓
Franklin	Salt (250mM NaCl)	28.5↓	20.0↓	-1.1↑
	Waterlogging (1cm)	30.8↓	33.3↓	7.2↓
	Salt (250mM NaCl) + Waterlogging (Simultaneous stress)	60.8↓	66.7↓	94.4↓
CM72	Salt (250mM NaCl)	27.3↓	22.2↓	-3.7↑
	Waterlogging (1cm)	45.3↓	50.0↓	11.4↓
	Salt (250mM NaCl) + Waterlogging (Simultaneous stress)	68.8↓	77.8↓	94.7↓

Reference - Falakboland Z, Zhou M, Zeng F, Kiani-Pouya A, Shabala L, Shabala S (2017) Plant ionic relation and whole-plant physiological responses to waterlogging, salinity and their combination in barley. Funct Plant Biol. 44(9):941-953.

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

$$\textit{Reduction over control (\%)} = \frac{(Value_{Control} - Value_{Stress})}{} \; x100$$

Value $_{Control}$

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: Falakboland et.al. 2017 studied the interaction of waterlogging and salt in barley cultivars Yerong, ZUG403, Mundah, Gairdner, YSM1, YYXT, Gebeina, ZUG293, Naso Nijo, YU6472, Franklin, CM72. Plants were subjected to single and simultaneous salt and waterlogging stress treatment and analyzed for their growth and physiological parameters. Shoot weight and shoot dry weight were reduced additively under combined stress treatment for all cultivars tested. Maximum reduction was observed in cultivar YSM1. Chlorophyll content was also reduced synergistically under combined stress treatment for all cultivars. **Thus, this stress combination affects the growth and physiology of barley cultivars.**