Effect on rapeseed cultivars (*Brassica napus L.* cv. CY36, YY57)

The net impact of individual and combined stress on plant growth

Crop: Rapeseed (*Brassica napus* L. cv. CY36, YY57)
Stress 1: Potassium deficiency (0 mM, 0.1 mM, 1 mM, 10 mM, 100 mM K2SO4)
Stress 2: Drought (40% water holding capacity)
Stage of plant: At sowing

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

	Treatment	Plant response to stress (reduction over control %) Type A parameters*			
		Total length of root	**Primary root length**	**Average diameter of root**	**Surface area of root**
CY36	Potassium deficiency (0mM) + Drought (14 days later (Sequential stress)	29.2⬇	24.1⬇	6.8⬇	34.6⬇
	Potassium deficiency (0.1mM) + Drought (14 days later (Sequential stress)	8.7⬇	17.2⬇	-2.3⬆	0.0
	Potassium deficiency (1mM) + Drought (14 days later (Sequential stress)	-6.4⬆	11.7⬇	-9.1⬆	0.0
	Potassium deficiency (10mM) + Drought (14 days later (Sequential stress)	-17.1⬆	3.4⬇	4.5⬇	-11.5⬆
	Potassium deficiency (100mM) + Drought (14 days later (Sequential stress)	86.3⬇	67.7⬇	9.1⬇	85.0⬇
YY57	Potassium deficiency (0mM) + Drought (14 days later (Sequential stress)	54.2⬇	36.5⬇	-16.2⬆	38.5⬇

Potassium deficiency (0.1mM) + Drought (14 days later (Sequential stress)	42.4⬇	28.6⬇	-21.6⬆	26.9⬇
Potassium deficiency (1mM) + Drought (14 days later (Sequential stress)	39.9⬇	17.7⬇	-27.0⬆	23.1⬇
Potassium deficiency (10mM) + Drought (14 days later (Sequential stress)	16.8⬇	10.4⬇	0.0	15.4⬇
Potassium deficiency (100mM) + Drought (14 days later (Sequential stress)	88.7⬇	67.1⬇	-2.7⬆	83.1⬇

Reference – Meena SK, Pandey R, Sharma S, Gayacharan, Vengavasi K, Dikshit HK, Siddique KHM, Singh MP (2021) Cross tolerance to phosphorus deficiency and drought stress in mungbean is regulated by improved antioxidant capacity, biological N2-fixation, and differential transcript accumulation. Plant Soil 466:337–356.

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

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

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: Xu et.al. 2021 studied the interaction of potassium deficiency and drought in two rapeseed cultivars. Plants were subjected to sequential stress of potassium deficiency and drought. Total length of root, primary root length, average diameter of root and surface area of root was reduced synergistically under deficient and very high concentration of potassium combined stress conditions. However, under 0.1, 1 and 10 mM K2SO4 reduction was less. **Thus, this stress combination is detrimental to both rapeseed cultivars.**