

Supplementary Material

Evaluating growth platforms and stress scenarios to assess the salt tolerance of wheat plants

Harald Hackl^A, Yuncai Hu^A and Urs Schmidhalter^{A,B}

^ADepartment of Plant Sciences, Technische Universität München, Emil-Ramann-Str. 2, 85350 Freising-Weihenstephan, Germany.

^BCorresponding author. Email: schmidhalter@wzw.tum.de

Table S1. Results of an ANOVA (F values and significance) testing the effect of growth platform, cultivar, stress treatment and interactions between them on various plant parameter

Measurements of aerial biomass dry weight (DW) obtained from destructive biomass samplings taken at the beginning of drought cycle 1 (May 11), the end of drought cycle 1 (June 8), and the end of drought cycle 2 (July 6). Measurements of straw and grain DW, thousand grain weight (TGW), grain number per ear and shoot ion contents were all made at final harvest

	Aerial biomass DW at destructive biomass sampling			
	May 11	June 8	July 6	
Growth platform	18.9***	0.0	39.5***	
Cultivar	80.7***	0.7	1.8	
Salinity	47.9***	17.5***	3.6	
Drought	1.7	73.7***	156.2***	
Growth platform * Cultivar	0.7	3.9	0.3	
Growth platform * Salinity	9.9**	1.2	1.8	
Growth platform * Drought	1.5	28.9***	31.1***	
Cultivar * Salinity	3.0	7.9**	3.3	
Cultivar * Drought	3.9	0.3	2.2	
Salinity * Drought	27.7***	2.1	0.8	
	Final harvest			
	Straw DW	Grain DW	TGW	Grain number per ear
Growth platform	227.7***	145.3***	17.9***	6.9*
Cultivar	86.3***	181.0***	204.2***	279.0***
Salinity	69.6***	9.2**	87.9***	14.4***
Drought	928.3***	3233.1***	239.3***	522.7***

Growth platform * Cultivar	14.6***	19.4***	3.3	6.0*
Growth platform * Salinity	12.3***	15.7***	31.5***	19.7***
Growth platform * Drought	48.3***	564.9***	33.2***	80.5***
Cultivar * Salinity	5.6*	75.1***	20.5***	38.2***
Cultivar * Drought	31.4***	140.1***	1.4	42.8***
Salinity * Drought	3.1	112.7***	6.5*	43.4***

	Ion contents of the straw at final harvest			
	Na ⁺	Ca ²⁺	K ⁺	Cl ⁻
Growth platform	31.3***	3.1	395.8***	17.8***
Cultivar	3.2	0.5	5.3*	1.3
Salinity	279.1***	382.5***	80.0***	1644.9***
Drought	8.3**	31.8***	108.4***	104.6***
Growth platform * Cultivar	10.9**	1.3	0.4	1.7
Growth platform * Salinity	26.4***	12.9***	72.1***	41.0***
Growth platform * Drought	0.0	15.5***	1.5	0.0
Cultivar * Salinity	3.5	0.1	5.2*	6.5*
Cultivar * Drought	0.1	1.6	6.8*	0.1
Salinity * Drought	9.7**	12.7***	5.2*	91.2***

*, **, *** = significance at $P \leq 0.05$, $P \leq 0.01$ and $P \leq 0.001$, respectively.

Table S2. Soil matric potential, soil osmotic potential and total soil water potential measured at 20 and 50 cm soil depth in containers and in 20 cm soil depth in pots at the end of drought cycle 1 (EDC 1) and at the end of drought cycle 2 (EDC 2) indicated for the different treatments and the investigated cultivars

Platforms	Cultivars	Treatments	Soil matric potential				Soil osmotic potential				Soil water potential				
			(MPa)												
			Soil depth, 20 cm		Soil depth, 50 cm		Soil depth, 20 cm		Soil depth, 50 cm		Soil depth, 20 cm		Soil depth, 50 cm		
			EDC 1	EDC 2	EDC 1	EDC 2	EDC 1	EDC 2	EDC 1	EDC 2	EDC 1	EDC 2	EDC 1	EDC 2	
Container	Sakha 61	Control	-0.022	-0.016	-0.028	-----	-----	-----	-----	-----	-----	-----	-----	-----	
		Salinity	-0.017	-0.029	-0.012	-0.012	-0.624	-0.617	-0.558	-0.414	-0.641	-0.645	-0.57	-0.4262	
		Drought	-1.234	-1.760	-0.823	-0.953	-----	-----	-----	-----	-----	-----	-----	-----	
		Salinity + Drought	-0.383	-0.783	-0.025	-0.066	-0.557	-0.765	-0.612	-0.738	-0.940	-1.548	-0.6373	-0.8044	
		Sakha 93	Control	-0.029	-0.030	-0.020	-0.026	-----	-----	-----	-----	-----	-----	-----	-----
	Salinity	-0.005	-0.023	-0.005	-0.013	-0.549	-0.525	-0.459	-0.513	-0.554	-0.548	-0.4644	-0.5259		
	Drought	-1.319	-1.763	-0.835	-1.154	-----	-----	-----	-----	-----	-----	-----	-----		
	Salinity + Drought	-0.604	-0.815	-0.032	-0.073	-0.612	-0.801	-0.396	-0.495	-1.216	-1.616	-0.4281	-0.5681		
	Pot	Sakha 61	Control	-0.008	-0.009	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
			Salinity	-0.010	-0.013	-----	-----	-0.702	-0.720	-----	-----	-0.712	-0.733	-----	-----
Drought			-0.893	-0.710	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
Salinity + Drought			-0.618	-0.611	-----	-----	-0.504	-0.756	-----	-----	-1.122	-1.367	-----	-----	
Sakha 93			Control	-0.009	-0.011	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Salinity		-0.010	-0.011	-----	-----	-0.540	-0.630	-----	-----	-0.550	-0.641	-----	-----		
Drought		-0.879	-0.779	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----		
Salinity + Drought		-0.762	-0.690	-----	-----	-0.594	-0.684	-----	-----	-1.356	-1.374	-----	-----		

Table S3. Plant height, dry weights of aerial biomass, grain and straw, tiller number and ear bearing tillers per m², thousand grain weight, grain number per ear, and leaf water potential determined either at the end drought cycles 1 and 2 (EDC 1 and EDC 2, respectively) or at the final harvest

Platforms	Cultivars	Treatments	Plant height		Aerial biomass DW		Grain DW	Straw DW	Tiller number per m ²	Ear bearing tillers per m ²	Thousand grain weight	Grain number per ear	Leaf water potential		
			(cm)		(g m ⁻²)					(g)	(MPa)				
			EDC 1	EDC 2	EDC 1	EDC 2	Final harvest				EDC 1EDC 2				
Container	Sakha 61	Control	77.7	85.1	578.0	1181.0	620.6	734.3	611	579	47.8	22	-1.25	-1.24	
		Salinity	67.0	71.4	528.3	847.3	404.9	562.4	529	503	56.2	15	-1.68	-1.74	
		Drought	72.3	73.2	574.0	800.5	290.0	461.6	554	500	33.4	17	-2.27	-3.02	
		Salinity + Drought	57.7	59.4	398.2	560.6	274.3	360.5	559	531	47.3	11	-2.37	-2.34	
	Sakha 93	Control	77.2	84.7	564.5	1096.1	676.4	803.9	622	590	43.1	27	-1.18	-1.42	
		Salinity	65.3	73.5	535.7	1126.7	614.9	656.1	569	521	47.1	24	-1.54	-1.76	
		Drought	63.4	64.4	555.0	812.6	279.8	500.2	563	475	30.2	18	-2.24	-2.71	
		Salinity + Drought	58.6	63.5	433.0	721.1	331.0	399.2	514	489	36.8	20	-2.24	-2.19	
	Pot	Pot													
	Sakha 61	Control	65.1	71.8	810.0	1408.0	872.5	887.4	842	767	45.6	25	-1.23	-1.03	
Salinity		60.6	64.2	592.5	1404.7	600.5	729.9	883	740	48.1	17	-1.49	-1.56		
Drought		44.4	45.3	494.2	797.3	140.6	519.3	1222	339	40.0	10	-2.89	-2.47		
Salinity + Drought		51.8	52.0	414.2	664.7	240.1	478.2	1073	387	45.7	14	-2.59	-2.03		
Sakha 93	Control	63.5	70.9	626.7	1677.3	1000.9	1039.0	862	774	39.3	33	-1.20	-1.51		
	Salinity	63.7	69.0	715.0	1460.7	1078.9	1070.8	923	821	39.3	34	-1.47	-1.72		
	Drought	44.5	47.0	390.8	511.3	131.9	564.1	1303	305	32.6	13	-3.35	-2.30		
	Salinity + Drought	51.8	53.0	358.3	769.3	258.2	518.2	1120	434	32.7	18	-3.14	-2.32		