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Survival and growth of perennial halophytes on saltland in a Mediterranean environment is affected by depth to watertable in summer as well as subsoil salinity

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Table S1. Soil characteristics down the profile

The soil samples were taken on 30 October 2003 (Wubin), 25 November 2003 (Meckering) and 3 December 2003 (Pingaring) and were analysed by the Chemistry Centre of Western Australia

Depth	Meckering	Pingaring	Wubin
	Texture (% sand)		
0-0.1 m	93 ± 1 (4)	91 ± 4 (5)	85 ± 3 (3)
0.1-0.3 m	90 ± 4 (4)	79 ± 8 (5)	83 ± 2 (4)
0.3-0.5 m	85 ± 3 (3)	61 ± 5 (5)	73 ± 6 (4)
0.5-1.0 m	68 ± 8 (2)	72 ± 1 (5)	58 ± 3 (4)
	Texture (% clay)		
0-0.1 m	3 ± 1 (4)	5 ± 3 (5)	12 ± 2 (3)
0.1-0.3 m	5 ± 2 (4)	17 ± 8 (5)	13 ± 1 (4)
0.3-0.5 m	10 ± 3 (3)	35 ± 4 (5)	22 ± 5 (4)
0.5-1.0 m	30 ± 8 (2)	25 ± 1 (5)	32 ± 1 (4)
	EC_e (dS/m)		
0-0.1 m	31.0 ± 22.4 (4)	3.3 ± 1.5 (5)	11.7 ± 3.2 (3)
0.1-0.3 m	24.9 ± 18.0 (4)	4.2 ± 1.6 (5)	10.2 ± 4.4 (3)
0.3-0.5 m	5.9 ± 4.6 (3)	7.9 ± 2.3 (5)	14.5 ± 8.4 (4)
0.5-1.0 m	1.7 ± 0.9(2)	9.2 ± 3.5 (5)	15.4 ± 8.1 (4)
	pH		
0-0.1 m	6.9 ± 0.4 (4)	6.9 ± 0.4 (5)	7.1 ± 0.5 (3)
0.1-0.3 m	6.5 ± 0.6 (4)	7.5 ± 0.3 (5)	6.8 ± 0.6 (3)
0.3-0.5 m	6.4 ± 0.9 (3)	7.3 ± 0.3 (5)	6.6 ± 0.8 (4)
0.5-1.0 m	7.0 ± 1.2 (2)	5.8 ± 0.4 (5)	6.1 ± 1.0 (4)
	SAR		
0-0.1 m	39 ± 19 (4)	18 ± 6 (5)	17 ± 4 (3)
0.1-0.3 m	56 ± 22 (3)	32 ± 11 (4)	18 ± 5 (3)
0.3-0.5 m	47 ± 17 (2)	44 ± 7 (5)	23 ± 8 (4)
0.5-1.0 m	43 (1)	45 ± 4 (5)	31 ± 6 (4)
	Boron (mg/kg)		
0-0.1 m	4.2 (1)	7.8 (1)	4.2 (1)
0.1-0.3 m	1.2 (1)	7.9 ± 3.2 (3)	6.1 (1)
0.3-0.5 m	1.3 (1)	7.4 ± 2.3 (3)	10.1 ± 4.0 (2)
0.5-1.0 m	1.8 (1)	ND*	12.5 ± 1.5 (2)

* ND = not determined.

Table S2. Availability of mineral nutrients in the topsoil (0–0.1 m)*

The soil samples were taken on 30 October 2003 (Wubin), 25 November 2003 (Meckering) and 3 December 2003 (Pingaring) and were analysed by the Chemistry Centre of Western Australia

Characteristic	Meckering	Pingaring	Wubin
Organic C (%)	0.46 ± 0.06	0.36 ± 0.07	0.40 ± 0.09
N (total %)	0.037 ± 0.009	0.028 ± 0.005	0.032 ± 0.005
P (mg/kg)	25.8 ± 7.5	5.6 ± 1.0	29.0 ± 11.0
K (mg/kg)	55 ± 17	127 ± 54	245 ± 45
S (mg/kg)	78 ± 40	10 ± 5	54 ± 8
Cu (mg/kg)	0.105 ± 0.010	0.124 ± 0.059	0.575 ± 0.065
Fe (mg/kg)	9.6 ± 4.6	14.1 ± 4.8	9.8 ± 0.1
Mn (mg/kg)	5.6 ± 1.4	11.4 ± 2.4	29.0 ± 13.0
Zn (mg/kg)	0.38 ± 0.13	0.15 ± 0.02	0.49 ± 0.03
CEC (me %)	2.5 ± 0.3	3.2 ± 1.0	5.5 ± 1.5

*Values are the mean ± SEM of 5 (Pingaring), 4 (Meckering) or 2-3 replicates (Wubin).

Table S3. Calibration equations used to convert EM38 readings (EC_{ah} and EC_{av}) to EC_e values

Date	Depth interval (m)	Relationship of best fit	Variance accounted for	*P*
Meckering				
28 Nov. 2003	0–0.25	EC_e= 0.149*EC_{av} - 10.15	0.989	< 0.001
	0.25–0.50	EC_e= 0.0953*EC_{av} - 5.51	0.866	< 0.001
21 Jun. 2004	0–0.25	EC_e = 0.628*EC_{ah} - 0.464*EC_{av} + 5.0	0.845	< 0.001
	0.25–0.50	EC_e = 0.190*EC_{ah} - 0.024*EC_{av} - 3.1	0.780	0.002
20 Jun. 2005	0–0.25	EC_e = 0.1247*EC_{av} - 8.21	0.982	< 0.001
	0.25–0.50	Not determined*		
13 Sep. 2005	0–0.25	EC_e = 0.1908*EC_{ah} - 0.062*EC_{av} - 4.91	0.937	< 0.001
	0.25–0.50	EC_e = 0.2233*EC_{ah} - 0.1085*EC_{av} + 1.87	0.977	< 0.001
Pingaring				
3 Dec. 2003	0–0.25	EC_e = 0.031*EC_{ah} - 1.043	0.764	< 0.001
	0.25–0.50	EC_e = 0.1184*EC_{ah} - 0.0501*EC_{av} - 0.62	0.955	< 0.001
16 Jun. 2004	0–0.25	EC_e = 0.2126*EC_{ah} - 0.1703*EC_{av} + 6.9	0.662	0.009
	0.25–0.50	EC_e = 0.1405*EC_{ah} - 0.0730*EC_{av} + 0.58	0.922	< 0.001
28 Jun. 2005	0–0.25	EC_e = 0.288 + 0.122*(1.00912**EC_{ah})	0.963	< 0.001
	0.25–0.50	EC_e = 0.1841*EC_{ah} - 0.1106*EC_{av} + 2.59	0.959	< 0.001
23 Sep. 2005	0–0.25	EC_e = 0.0724*EC_{ah} - 0.0396*EC_{av} + 0.39	0.901	< 0.001
	0.25–0.50	EC_e = 0.0587*EC_{ah} + 0.0136*EC_{av} - 6.49	0.970	< 0.001
Wubin				
30 Oct. 2003	0–0.25	EC_e = 0.1443*EC_{ah} - 6.49	0.521	0.017
	0.25–0.50	EC_e = 0.1345*EC_{ah} - 8.01	0.968	< 0.001
22 Jun. 2004	0–0.25	EC_e = 4.44/(1 - 0.0021767*EC_{av}) - 0.99	0.945	< 0.001
	0.25–0.50	EC_e = 14.2/(1 - 0.001792*EC_{av}) - 14.1	0.812	0.001
21 Jun. 2005	0–0.25	EC_e = 0.0903*EC_{av} - 3.10	0.602	0.003
	0.25–0.50	EC_e = 0.1278*EC_{ah} + 0.0055*EC_{av} - 4.61	0.898	< 0.001
15 Sep. 2005	0–0.25	EC_e = 0.1765*EC_{ah} - 0.95	0.886	< 0.001
	0.25–0.50	EC_e = 0.1697*EC_{ah} - 8.38	0.974	< 0.001

*Subsoil samples were not taken on this day as the soil was partly saturated (waterlogged).

Table S4. Relationships between non-destructive measures of plant growth (volume in m^3; planar area in m^2) and shoot dry mass (kg)

Plants were sampled in June 2004 and February-March 2005

Species	Regression/ source of plants
June 2004	
River saltbush	Dry mass = 0.64*Volume + 0.25; R^2 = 0.64; P < 0.001 (n = 134; 49 from Wubin, 42 from Meckering, 43 from Pingaring)
Rhodes grass	Dry mass = 0.24*Area - 0.91; R^2 = 0.53; P < 0.001 (n = 30; all from Meckering)
February-March 2005	
River saltbush	Dry mass = 1.32*Volume + 0.51; R^2 = 0.49; P < 0.001 (n = 30; 10 from Wubin, 10 from Meckering, 10 from Pingaring)
Small leaf bluebush	Dry mass = 0.86*Volume + 0.02; R^2 = 0.80; P < 0.001 (n = 30; 10 from Wubin, 10 from Meckering, 10 from Pingaring)
Samphire	Dry mass = 3.56*Volume + 0.09; R^2 = 0.78; P < 0.001 (n = 10; all from Meckering)
Rhodes grass	Dry mass = 0.032*Area + 0.036; R^2 = 0.26; P = 0.035 (n = 14; all from Meckering)
Saltwater couch	Not sampled as the plants were obscured by annual weeds