

Saline water irrigation in semiarid region: I – effects on soil chemical properties

Luiz Guilherme Medeiros Pessoa¹, Maria Betânia Galvão dos Santos Freire², Renato Lemos dos Santos³,
Fernando José Freire², Márcio Fléquisson Alves Miranda³, Patrícia Ribeiro dos Santos⁴

Supplementary Table 1. Physical attributes of the two Fluvisols (0-20 cm) used in the experiment.

Soil texture	Sand	Silt	Clay	WDC ¹	FI ²	DI ³	BD ⁴	PD ⁵	TP ⁶	K ₀ ⁷
Sandy loam	546.8	220.0	233.2	169.6	27.27	72.73	1.34	2.50	46	3.89
Silty clay loam	191.6	420.0	388.4	289.6	25.44	74.56	1.21	2.70	55	0.33

¹WDC: Water Dispersible Clay; ²FI: Flocculation Index; ³DI: Dispersion Index; ⁴BD: Bulk Density; ⁵PD: Particle Density; ⁶TP: Total Porosity; ⁷K₀: Saturated Hydraulic Conductivity.

Supplementary Table 2. Chemical attributes of the two Fluvisols (0-20 cm) used in the experiment.

Attribute	Soil texture	
	Sandy loam	Silty clay loam
Exchangeable complex		
pH (1:2.5 – soil:water)	7.3	7.1
Ca ²⁺ (cmol _c dm ⁻³)	7.43	8.54
Mg ²⁺ (cmol _c dm ⁻³)	2.17	3.23
Na ⁺ (cmol _c dm ⁻³)	0.07	0.30
K ⁺ (cmol _c dm ⁻³)	0.57	0.49
CEC ¹ (cmol _c dm ⁻³)	11.63	15.86
ESP ² (%)	0.60	1.89
P _{Bray-1} ³ (mg dm ⁻³)	43.75	23.66
Soluble complex		
pH	8.3	7.4
EC ⁴ (dS m ⁻¹)	0.86	0.85
Ca ²⁺ (mmol _c L ⁻¹)	3.73	5.12
Mg ²⁺ (mmol _c L ⁻¹)	2.89	3.70
Na ⁺ (mmol _c L ⁻¹)	1.97	2.46
K ⁺ (mmol _c L ⁻¹)	1.42	0.61
Cl ⁻ (mmol _c L ⁻¹)	3.00	3.00
HCO ₃ ⁻ (mmol _c L ⁻¹)	2.16	1.76
CO ₃ ²⁻ (mmol _c L ⁻¹)	1.20	0.00
SAR ⁵ (mmol _c L ⁻¹) ^{0.5}	1.08	1.17

¹CEC: Cation Exchange Capacity; ²ESP: Exchangeable Sodium Percentage; ³P_{Bray-1}: Phosphorous extracted by Bray-1; ⁴EC: Electrical Conductivity; ⁵SAR: Sodium Adsorption Ratio.

Supplementary Table 3. Summary of the variance analysis of the evaluated elements in the soluble complex (saturation extract) and in the exchangeable complex of the soils.

Sources of variation	DF ¹	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	Cl ⁻
Soluble Complex						
Soil	1	27.14***	1.66 ^{ns}	5.19*	40.09***	10.23**
EC	2	123.39***	16.18***	455.24***	9.92***	436.17***
SAR	5	74.20***	12.69***	105.05***	3.94**	3.36**
SAR*EC	10	15.43***	0.79 ^{ns}	21.81***	0.77 ^{ns}	1.88 ^{ns}
SAR*Soil	5	2.51*	0.77 ^{ns}	1.70 ^{ns}	2.54*	1.52 ^{ns}
EC*Soil	2	16.21***	6.03**	1.74 ^{ns}	0.35 ^{ns}	1.76 ^{ns}
SAR*EC*Soil	10	1.63 ^{ns}	0.79 ^{ns}	1.48 ^{ns}	0.78 ^{ns}	1.60 ^{ns}
Exchangeable Complex						
Soil	1	792.22***	2069.09***	54.54***	1.13 ^{ns}	-
EC	2	8.66**	173.27***	105.02***	11.88***	-
SAR	5	23.96***	13.47***	52.20***	0.34 ^{ns}	-
SAR*EC	10	8.69***	4.78***	13.20***	2.80**	-
SAR*Soil	5	1.24 ^{ns}	0.35 ^{ns}	3.22**	3.31**	-
EC*Soil	2	2.84 ^{ns}	9.35**	8.31**	21.83***	-
SAR*EC*Soil	10	2.03 ^{ns}	1.12 ^{ns}	1.14 ^{ns}	1.74 ^{ns}	-

¹Degree of Freedom. *, ** and ***: Significant at 5, 1 and 0.1% probability, respectively. ^{ns}: non-significant.

Supplementary Table 4. Summary of the analysis of variable variance - electrical conductivity of the saturation extract (EC), sodium adsorption ratio (SAR), soil pH and exchangeable sodium percentage (ESP).

Sources of variation	DF ¹	pH	EC	SAR	pH	ESP
Soil	1	1.05 ^{ns}	12.94***	42.47***	120.77***	1.91 ^{ns}
EC	2	0.98 ^{ns}	360.79***	392.14***	21.73***	159.84***
SAR	5	1.33 ^{ns}	1.66 ^{ns}	726.97***	48.00***	54.37***
SAR*EC	10	0.92 ^{ns}	1.04 ^{ns}	50.49***	4.42***	22.33***
SAR*Soil	5	1.23 ^{ns}	0.67 ^{ns}	11.53***	1.09 ^{ns}	1.85 ^{ns}
EC*Soil	2	1.79 ^{ns}	3.29*	44.65***	11.36***	2.61 ^{ns}
SAR*EC*Soil	10	1.10 ^{ns}	0.49 ^{ns}	3.20**	2.40 ^{ns}	1.39 ^{ns}

¹Degree of Freedom. *, ** and ***: Significant at 5, 1 and 0.1% probability, respectively. ^{ns}: non-significant.