

Supplementary material

Reclamation of two saline-sodic soils by the combined use of vinegar residue and silicon-potash fertiliser

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Table S1. Effect of amendments on ion concentrations in two saline-sodic soils

Note: The values are means (\pm s.e.) of three replicates and different letters represent significantly different at $P < 0.05$ in different treatments for H-soil and S-soil, respectively. V1F0, V1F1 and V1F2 indicated vinegar residue was applied at 1.3 t ha^{-1} ; and Si-K fertilizer was applied at 130, 260, and 650 kg ha^{-1} , respectively. H-soil and S-soil showed saline soil and saline sodic soil, respectively.

No	Ion concentration in soil solution (g kg^{-1} soil)							
		Ca ²⁺	K ⁺	Mg ²⁺	Na ⁺	SO ₄ ²⁻	HCO ₃ ⁻	Cl ⁻
Control	H	0.20 \pm 0.01a	0.05 \pm 0.00b	0.05 \pm 0.00b	0.07 \pm 0.00a	0.18 \pm 0.02a	0.48 \pm 0.20a	0.19 \pm 0.08a
	S	0.19 \pm 0.02c	0.02 \pm 0.00c	0.10 \pm 0.00c	0.79 \pm 0.06a	0.64 \pm 0.06a	0.84 \pm 0.08a	0.37 \pm 0.04a
V1F0	H	0.20 \pm 0.01a	0.04 \pm 0.00b	0.04 \pm 0.00b	0.05 \pm 0.00b	0.09 \pm 0.01b	0.29 \pm 0.06b	0.20 \pm 0.02ad
	S	0.25 \pm 0.02bc	0.02 \pm 0.00c	0.07 \pm 0.01bc	0.38 \pm 0.01b	0.40 \pm 0.03b	0.29 \pm 0.02d	0.23 \pm 0.02b
V1F1	H	0.23 \pm 0.01a	0.05 \pm 0.00b	0.04 \pm 0.00b	0.05 \pm 0.00b	0.10 \pm 0.01b	0.32 \pm 0.08b	0.17 \pm 0.01a
	S	0.32 \pm 0.01ab	0.03 \pm 0.00b	0.08 \pm 0.01b	0.43 \pm 0.02b	0.53 \pm 0.02ab	0.47 \pm 0.04c	0.27 \pm 0.03ab
V1F2	H	0.15 \pm 0.04b	0.06 \pm 0.00a	0.12 \pm 0.01a	0.05 \pm 0.00b	0.09 \pm 0.01b	0.34 \pm 0.12b	0.15 \pm 0.01a
	S	0.35 \pm 0.04a	0.06 \pm 0.00a	0.15 \pm 0.02a	0.42 \pm 0.06b	0.37 \pm 0.08b	0.59 \pm 0.03b	0.30 \pm 0.03a

Table S2. Effect of amendments on ion concentrations in oat plants under H-soil habitat

Note: The values are means (\pm s.e.) of three replicates and different letters represent significantly different at $P < 0.05$ in different treatments for H-soil and S-soil, respectively. H-soil and S-soil showed saline soil and saline sodic soil, respectively. V1F0, V1F1 and V1F2 indicated vinegar residue was applied at 1.3 t ha^{-1} ; and Si-K fertilizer was applied at 130, 260, and 650 kg ha^{-1} , respectively.

No.	Ion concentration (g kg^{-1})							
	Ca^{2+}	K^+	Mg^{2+}	Na^+	SO_4^{2-}	Cl^-		
H-soil	CK	22.26 \pm 1.16a	30.14 \pm 1.71c	6.12 \pm 0.17a	6.22 \pm 0.12a	4.58 \pm 0.14a	411.29 \pm 8.16a	
	Shoot	V1F0	9.79 \pm 0.27b	34.84 \pm 1.18b	3.30 \pm 0.07c	3.26 \pm 0.04b	4.16 \pm 0.09b	91.29 \pm 2.17b
		V1F1	10.37 \pm 0.15b	36.93 \pm 0.82ab	3.56 \pm 0.14bc	2.62 \pm 0.06d	4.39 \pm 0.06ab	74.88 \pm 1.80d
		V1F2	10.66 \pm 0.19b	40.62 \pm 1.25a	3.85 \pm 0.07b	2.93 \pm 0.05c	4.20 \pm 0.09b	122.68 \pm 4.72c
	Root	CK	2.98 \pm 0.12c	11.18 \pm 0.66b	2.43 \pm 0.16b	8.06 \pm 0.10a	3.79 \pm 0.13a	680.84 \pm 38.54a
		V1F0	12.06 \pm 0.66b	16.16 \pm 0.43a	3.43 \pm 0.15a	6.69 \pm 0.20b	4.00 \pm 0.14a	182.94 \pm 7.58b
		V1F1	13.36 \pm 0.39b	16.99 \pm 0.31a	3.61 \pm 0.19a	6.15 \pm 0.20bc	3.63 \pm 0.13ab	229.48 \pm 12.90b
		V1F2	15.82 \pm 0.33a	15.77 \pm 0.35a	3.62 \pm 0.22a	5.53 \pm 0.27c	3.41 \pm 0.19b	215.85 \pm 11.92b
S-soil	V1F0	8.45 \pm 0.26a	16.16 \pm 1.06c	3.55 \pm 0.17b	18.75 \pm 0.80a	6.36 \pm 0.22a	125.26 \pm 6.34a	
	Shoot	V1F1	6.00 \pm 0.51b	21.30 \pm 0.39b	2.29 \pm 0.14c	8.82 \pm 0.55c	4.54 \pm 0.13b	93.72 \pm 2.59b
		V1F2	8.46 \pm 0.26a	38.78 \pm 1.11a	4.56 \pm 0.24a	14.57 \pm 0.96b	5.07 \pm 0.34b	106.91 \pm 4.96b
		V1F0	14.24 \pm 0.20b	5.87 \pm 0.34b	3.79 \pm 0.11a	12.45 \pm 0.62a	4.62 \pm 0.16a	176.40 \pm 5.35c
	Root	V1F1	15.10 \pm 0.44b	8.69 \pm 0.27a	3.64 \pm 0.11a	12.43 \pm 0.33a	4.70 \pm 0.09a	507.27 \pm 12.03a
		V1F2	16.58 \pm 0.37a	9.68 \pm 0.29a	4.07 \pm 0.16a	10.83 \pm 0.33a	3.62 \pm 0.22b	311.04 \pm 13.23b

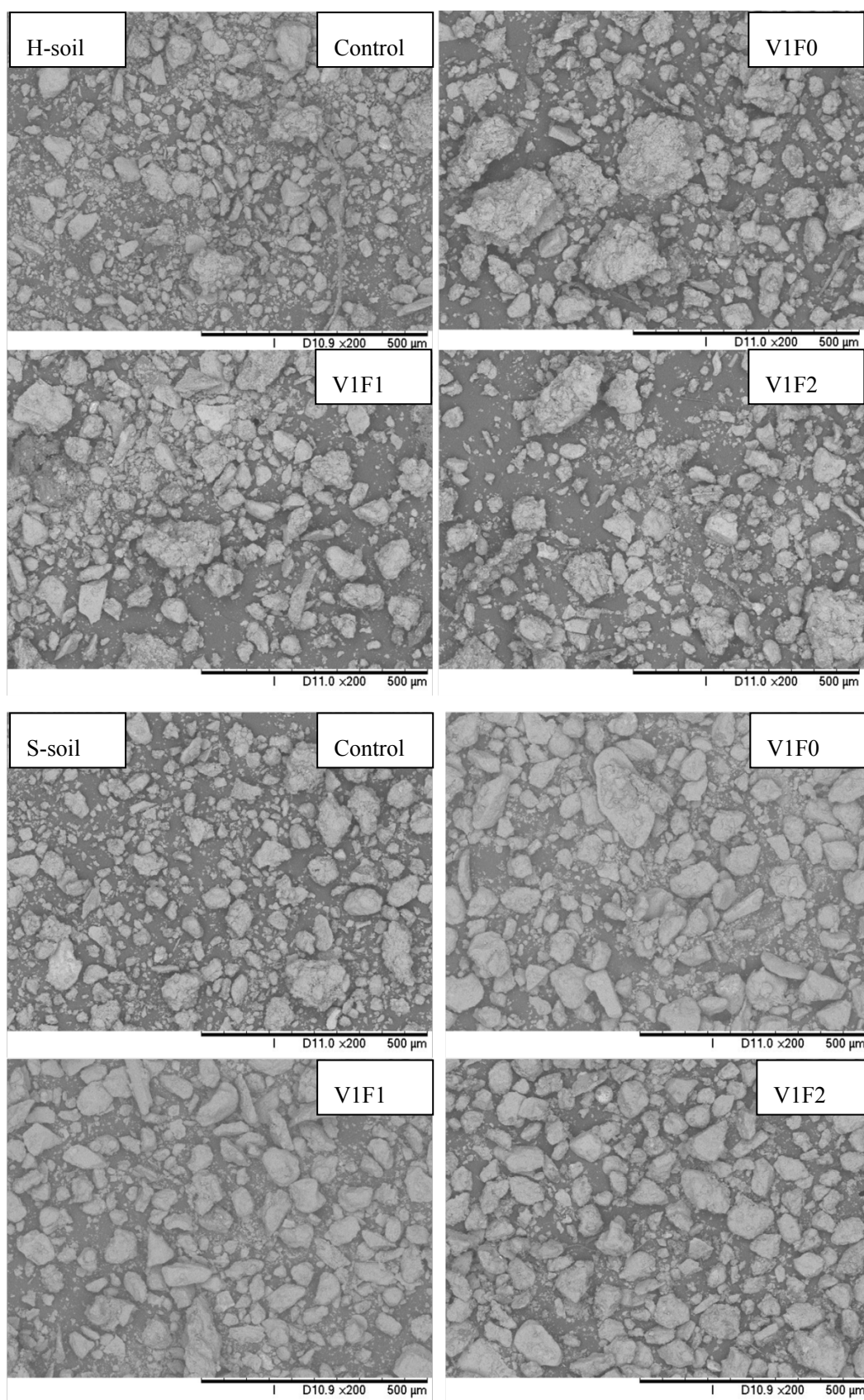


Fig. S1. Effect of amendments on morphological characteristics of macro-aggregates. Note: H-soil and S-soil showed saline soil and saline sodic soil, respectively. V1F0, V1F1 and V1F2 indicated vinegar residue was applied at 1.3 t ha⁻¹; and Si-K fertilizer was applied at 130, 260, and 650 kg ha⁻¹, respectively.

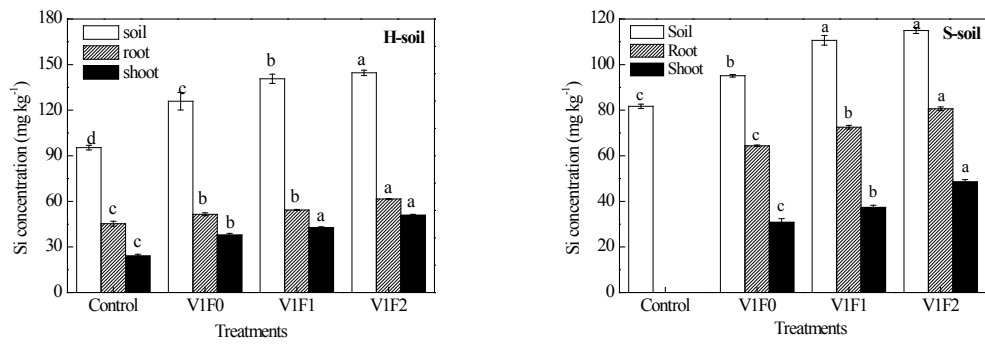


Fig. S2. Effect of amendments on the concentration of Si in plant-soil system. The values are means (\pm s.e.) of three replicates and different letters represent significantly different at $P < 0.05$. H-soil and S-soil showed saline soil and saline sodic soil, respectively. V1F0, V1F1 and V1F2 indicated vinegar residue was applied at 1.3 t ha^{-1} ; and Si-K fertilizer was applied at 130, 260, and 650 kg ha^{-1} , respectively.