

Supplementary material for

Sowing maize as a rotation crop in irrigated cotton cropping systems in a Vertosol: effects on soil properties, greenhouse gas emissions, black root rot incidence, cotton lint yield and fibre quality

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Fig. S1. Flooded corn crop, February 2012.



Fig. S2. Rootless corn syndrome in heat-stressed maize, January 2014.

Table S1. Effect of historical cropping systems on soil properties, average of 2011–2016. ESP, exchangeable sodium percentage, ESI, electrochemical stability index, GMD, geometric mean diameter of soil aggregates formed after puddling (2015 only), s.e.m., standard error of the means, ns, non-significant

0-0.15 m

Tillage method	Crop rotation	pH (0.01M CaCl ₂)	EC _{1:5} (dS m ⁻¹)	Soil organic C (g 100 g ⁻¹)	Exchangeable cations (cmol kg ⁻¹)				ESP	ESI	GMD (mm)
					Ca	Mg	K	Na			
Conventional	Cotton monoculture	7.2	0.12	0.90	21.0	9.9	1.7	0.6	1.9	0.07	5.6
Minimum	Cotton monoculture	7.0	0.13	1.03	19.5	9.1	1.8	0.5	1.6	0.09	2.9
Minimum	Cotton-wheat	7.0	0.13	1.08	19.5	9.1	1.9	0.4	1.4	0.10	3.1
<i>P</i> <		0.01	0.05	0.01	0.05	ns	0.05	0.01	0.001	0.001	0.05
s.e.m.		0.03	0.003	0.021	0.41	0.33	0.05	0.02	0.03	0.003	0.57

0.15-0.30 m

Tillage method	Crop rotation	pH (0.01M CaCl ₂)	EC _{1:5} (dS m ⁻¹)	Soil organic C (g 100 g ⁻¹)	Exchangeable cations (cmol kg ⁻¹)				ESP	ESI	GMD (mm)
					Ca	Mg	K	Na			
Conventional	Cotton monoculture	7.3	0.14	0.68	21.1	10.6	1.2	1.0	2.9	0.05	8.6
Minimum	Cotton monoculture	7.2	0.13	0.72	20.1	10.0	1.2	0.8	2.6	0.06	7.7
Minimum	Cotton-wheat	7.2	0.11	0.72	20.3	10.0	1.1	0.8	2.3	0.05	7.8
<i>P</i> <		0.05	0.01	ns	ns	ns	ns	0.05	0.05	ns	ns
s.e.m.		0.03	0.003	0.020	0.38	0.33	0.05	0.05	0.09	0.002	0.49

0.30-0.45 m

Tillage method	Crop rotation	pH (0.01M CaCl ₂)	EC _{1:5} (dS m ⁻¹)	Soil organic C (g 100 g ⁻¹)	Exchangeable cations (cmol kg ⁻¹)				ESP	ESI	GMD (mm)
					Ca	Mg	K	Na			
Conventional	Cotton monoculture	7.4	0.13	0.59	20.9	11.5	1.0	1.5	4.3	0.03	9.2
Minimum	Cotton monoculture	7.3	0.12	0.61	19.9	10.9	1.0	1.2	3.7	0.04	9.1
Minimum	Cotton-wheat	7.3	0.10	0.63	20.7	11.3	0.9	1.1	3.2	0.04	8.5
<i>P</i> <		ns	0.05	ns	ns	ns	ns	0.05	0.01	0.05	ns
s.e.m.		0.04	0.006	0.014	0.51	0.51	0.05	0.09	0.19	0.001	0.36

0.45-0.60 m

Tillage method	Crop rotation	pH (0.01M CaCl ₂)	EC _{1:5} (dS m ⁻¹)	Soil organic C (g 100 g ⁻¹)	Exchangeable cations (cmol kg ⁻¹)				ESP	ESI	GMD (mm)
					Ca	Mg	K	Na			
Conventional	Cotton monoculture	7.4	0.16	0.58	19.7	12.0	0.9	2.0	5.9	0.03	10.3
Minimum	Cotton monoculture	7.4	0.15	0.60	19.0	11.4	0.9	1.7	5.0	0.04	10.0
Minimum	Cotton-wheat	7.4	0.13	0.62	19.4	11.6	0.8	1.5	4.3	0.03	10.2
<i>P</i> <		ns	0.05	ns	ns	ns	ns	0.05	0.05	ns	ns
s.e.m.		0.02	0.006	0.023	0.28	0.31	0.04	0.12	0.34	0.002	0.57

0.60-1.20 m

Tillage method	Crop rotation	pH (0.01M CaCl ₂)	EC _{1:5} (dS m ⁻¹)	Soil organic C (g 100 g ⁻¹)	Exchangeable cations (cmol kg ⁻¹)				ESP	ESI	GMD (mm)
					Ca	Mg	K	Na			
Conventional	Cotton monoculture	7.4	0.21	0.48	17.8	12.7	1.0	2.9	8.3	0.03	9.1
Minimum	Cotton monoculture	7.4	0.23	0.46	17.5	12.3	0.9	2.3	7.0	0.04	9.4
Minimum	Cotton-wheat	7.4	0.17	0.52	17.6	12.4	0.9	2.2	6.5	0.03	10.0
<i>P</i> <		ns	0.01	ns	ns	ns	ns	ns	0.05	ns	ns
s.e.m.		0.04	0.007	0.022	0.31	0.33	0.05	0.23	0.54	0.004	0.46

Soil carbon storage (Mg ha⁻¹)

Tillage method	Crop rotation	0-0.3 m	0-0.6 m	0.6-1.2 m	0-1.2 m
Conventional	Cotton monoculture	39	76	53	129
Minimum	Cotton monoculture	43	82	54	136
Minimum	Cotton-wheat	44	84	61	145
<i>P</i> <		0.05	ns	ns	ns
s.e.m.		1.1	2.1	3.8	4.8