



Supplement of

Evaluating the Tea Bag Index approach for different management practices in agroecosystems using long-term field experiments in Austria and Sweden

Maria Regina Gmach et al.

Correspondence to: Maria Regina Gmach (gmachmr@gmail.com)

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Supplementary material

Table S1 - Soil properties at different sites in Austria and Sweden.

Site	Experiment	Soil texture	Treatment	Clay	SOC	C:N	pH
				(%)			
<i>Austria</i>							
AT1	CB	Loam	GM	33	2.17	10.6	7.1
			FW	33	2.17	10.6	7.1
			FYM	33	2.17	10.6	7.1
AT2	CB	Loam	BS	33	2.17	10.6	7.1
			GM	33	2.17	10.6	7.1
			FW	33	2.17	10.6	7.1
			FYM	33	2.17	10.6	7.1
			BS	33	2.17	10.6	7.1
AT3	CB	Loamy silt	0 N	17	1.2	8.6	6.9
			40 N	17	1.2	8.8	6.7
			90 N	17	1.2	8.8	6.8
			120 N	17	1.3	9.0	6.9
			CFW	17	1.6	8.9	7.1
			CGM	17	1.6	8.9	7.1
			CS	17	1.5	9.0	7.1
			CSS+80N	17	1.6	9.2	7.3
AT4	CB	Loamy silt	CRR	16	0.8	8.4	5.4
			CRI	16	0.9	8.3	5.6
AT5	CB	Sand loam	CRR	23	2.0	10.3	7.6
			CRI	23	2.2	10.4	7.6
AT6	CB	Sand loam	CRR	23	2.0	10.5	7.5
			CRI	23	2.2	10.2	7.5
AT7	SF	Loam	60 N	34	2.8	11.7	7.7
			90 N	34	2.8	12.1	7.7
			120 N	34	2.9	11.4	7.7
			145 N	34	2.9	11.1	7.7
AT8	SF	Loam	60 N	34	2.8	11.7	7.6
			90 N	34	2.8	12.1	7.7
			120 N	34	2.9	11.3	7.7
			145 N	34	2.9	11.4	7.6
AT9	SF	Loam	60 N	29	3.2	10.5	7.7
			90 N	29	3.3	10.5	7.7
			120 N	29	3.3	10.6	7.7
			145 N	29	3.3	10.3	7.7
AT10	SF	Loam	0 K	18	2.8	11.3	7.7
			150 K	18	2.8	11.3	7.8
			300 K	18	2.8	11.3	7.7
AT11	SF	Silty clay	0 K	30	2.8	10	6.6
			150 K	30	2.8	10	6.8
			300 K	30	2.8	10	6.9
AT12	SF	Loamy	0 N	29	3.2	10.5	7.7
			60 N	29	3.3	10.5	7.7
			120 N	29	3.3	10.6	7.7
			180 N	29	3.3	10.3	7.7
AT13	SF	Loamy	0 N	27	0.9	8.1	6.7
			60 N	27	1.0	8.2	6.4
			120 N	27	1.0	8.4	6.3
			180 N	27	1.0	8.1	6.2

AT14	SF	Loamy silt	0 N	18	1.5	9.6	7.5
			60 N	18	1.6	9.6	7.5
			120 N	18	1.6	9.5	7.5
			180 N	18	1.5	9.4	7.5
AT15	TS	Sand loam	CT	22	1.7	11.0	7.6
			SRT	22	2.2	10.4	7.4
			DRT	22	1.7	10.6	7.5
AT16	TS	Sand loam	CT	22	1.6	10.3	7.6
			SRT	22	2.0	10.0	7.5
			DRT	22	1.7	10.4	7.6
Sweden							
SE1	CMP	Sandy clay loam	FYM/NPK	23	1.3	11.5	7.4
			0 FYM/0 NPK	23	1.3	14.5	7.9
SE2	CMP	Loam	FYM/NPK	18	2.7	12.9	6.8
			0 FYM/0 NPK	18	2.1	13.9	7.2
SE3	CMP	Silty sand	FYM/NPK	10	2.5	14.1	6.2
			FYM/0 NPK	10	1.9	12.8	6.3
			0 FYM/NPK	10	2.1	14.3	6.4
			0 FYM/0 NPK	10	1.6	13.5	6.6
SE4	CMP	Silty clay	FYM/NPK	5.6	2.5	10.2	6.1
			0 FYM/0 NPK	5.6	2.0	10.1	6.6
SE5	CMP	Silty loam	FYM/NPK	13	2.5	12.7	6.1
			0 FYM/0 NPK	13	2.5	12.7	6.2
SE6	CMP	Silty clay	FYM/NPK	50	2.2	10.5	6.8
			FYM/0 NPK	50	2.3	10.8	6.8
			0 FYM/NPK	50	2.3	11.1	6.9
			0 FYM/0 NPK	50	2.0	10.6	7.1
SE7	ROT	Silty clay loam	SC	36	1.8	11.8	6.4
			L	36	2.4	10.7	5.8
SE8	ROT	Sandy clay loam	SC	25	1.4	10.5	6.1
			L	25	2.0	10.7	6.0
SE9	ROT	Silt loam	SC	10	2.1	13.8	5.1
			L	10	1.7	13.8	5.1
SE10	ROT	Silty clay loam	SC	36	2.3	11.0	5.6
			L	36	2.8	10.7	5.6
SE11	TS	Heavy clay	CT	44	2.0	10.7	6.9
			DS	44	2.0	10.7	6.9
SE12	TS	Silty loam	CT	18	2.8	10.7	6.1
			SRT	18	2.8	10.7	6.1
			DRT	18	2.8	10.7	6.1
			DS	18	2.8	10.7	6.1
SE13	TS	Silty clay loam	CT	38	1.2	10.7	6.1
			DRT	38	1.2	10.7	6.1

Table S2 - Statistical analysis comparing effects of A) treatment within sites in Austria; and B) sites for specific treatments on *k* and *S*.

Site	A) Treatment	<i>k</i>	<i>S</i>	B) Site	<i>k</i>	<i>S</i>
Carbon balance						
AT1	GM	.0087 ^{ns}	.132 ^{ns}			
	FW	.0079	.110			
	BS	.0078	.147			
	FYM	.0069	.151			
AT2	GM	.0055 ^{ns}	.423 ab			
	FW	.0061	.439 a			
	BS	.0045	.344 b			
	FYM	.0048	.380 ab			
AT3	0 N	.0177 ^{ns}	.213 ^{ns}			
	40 N	.0147	.182			
	90 N	.0125	.186			
	120 N	.0147	.165			
	CFW	.0143	.176			
	CGM	.0165	.185			
	CS	.0121	.173			
	CSS	.0150	.188			
	CFW+80	.0167	.207			
	CGM+80	.0139	.176			
	CS+80	.0177	.177			
	CSS+80	.0128	.171			
	AT4 & AT6	CRR	.0061 b	.185 ^{ns}	AT4	.0058 b
CRI		.0087 a	.172	AT6	.0089 a	.144 b
AT5	CRR	.0083 ^{ns}	.312 ^{ns}			
	CRI	.0083	.319			
AT5 & AT6	CRR	.0080 b	.231 ^{ns}	AT5	.0083 ^{ns}	.315 a
	CRI	.0093 a	.228	AT6	.0089	.144 b
Soil fertility						
AT7 & AT9	60 N	.0140 ^{ns}	.379 ^{ns}	AT7	.0128 ^{ns}	.338 b
	90 N	.0120	.392	AT9	.0118	.417 a
	120 N	.0115 ^{ns}	.363 ^{ns}			
	145 N	.0127	.392			
AT8	60 N	.0164	.305			
	90 N	.0153	.335			
	120 N	.0130	.335			
	145 N	.0135	.326			
AT10 & AT11	0 P	.0087 ^{ns}	.124 ^{ns}	AT10	.0082 b	.113 b
	150 P	.0093	.140	AT11	.0105 a	.156 a
	300 P	.0095	.129			
AT12 AT13 AT14	0 N	.0066 b	.174 ^{ns}	AT12	.0093 a	.148 b
	60 N	.0090 ab	.150	AT13	.0072 b	.195 a
	120 N	.0084 ab	.162	AT14	.0086 ab	.141 b
	180 N	.0095 a	.160			
Tillage systems						
AT15	CT	.0092 b	.198 a			
	SRT	.0147 a	.154 b			
	DRT	.0105 b	.197 a			
AT16	CT	.0087 ^{ns}	.439 ^{ns}			
	SRT	.0100	.465			
	DRT	.0118	.421			
AT15 & AT16				AT15	.0115 ^{ns}	.183 b
				AT16	.0102	.442 a

Mean values followed by the same letter within treatments and within sites did not differ according to Tukey's test ($p < 0.05$). ns: not significant.

Table S3 - Statistical analysis comparing A) different treatments within sites in Sweden; B) different sites presenting the same treatments in Sweden; and C) different treatments and sites for Tillage System (TS) experiment category in Austria and Sweden.

A) Treatment	<i>k</i>	<i>S</i>	B) Site	<i>k</i>	<i>S</i>
Combined management practices					
FYM/NPK	.0195 a	.253 a	SE1	.0150 ab	.125 d
0FYM/0NPK	.0130 b	.206 b	SE2	.0167 ab	.129 d
			SE3	.0147 ab	.361 a
			SE4	.0084 b	.118 c
			SE5	.0301 a	.270 b
			SE6	.0210 a	.335 ab
			Rotation systems		
SC	.0166 a	.263 ^{ns}	SE7	.0144 b	.323 a
L	.0137 b	.267	SE8	.0133 b	.337 a
			SE9	.0202 a	.199 b
			SE10	.0130 b	.200 b
Tillage systems					
CT	.0122 b	.251 b	SE11	.0145 ^{ns}	.267 ab
SRT	.0130 ab	.275 ab	SE12	.0131	.294 a
DRT	.0153 a	.299 a	SE13	.0130	.247 b
DS	.0126 ab	.279 ab			
C) Tillage systems experiment in Austria and Sweden					
Treatment	<i>k</i>	<i>S</i>	Site	<i>k</i>	<i>S</i>
Tillage systems					
CT	.0113 b	.298 b	SE11	.0175 a	.279 b
SRT	.0115 ab	.370 a	SE12	.0130 a	.294 b
DRT	.0143 a	.336 ab	SE13	.0130 a	.247 b
			AT16	.0102 b	.442 a

Mean values followed by the same letter within treatments and within sites did not differ according to Tukey's test ($p < 0.05$). ns: not significant.

Table S4 – Correlation coefficients between the mean TBI parameters (k and S) and pedo-climatic parameters, in Austria and Sweden.

Parameter	Austria		Sweden		Austria and Sweden	
	k	S	k	S	k	S
MAT	0.410	-0.038	-0.586*	0.016	-0.751***	-0.290
MAT _{TBI}	-0.417	-0.339	-0.073	-0.784**	-0.634***	-0.497*
TAP	-0.580*	-0.020	0.392	-0.233	-0.533**	-0.328
TP _{TBI}	-0.479	-0.026	0.310	-0.216	-0.394	-0.251
PET	-0.289	0.155	-0.263	0.305	-0.656***	-0.174
PET _{TBI}	-0.233	0.133	-0.152	0.208	-0.480*	-0.094
AI	0.428	0.108	-0.465	0.374	-0.232	0.229
AI _{TBI}	0.334	-0.044	-0.323	0.307	0.023	0.198
T x P	-0.617*	-0.059	-0.122	0.003	-0.686***	-0.307
Re_{clim}	-0.707**	-0.756**	-0.067	-0.373	-0.603**	-0.538**
Re_{temp}	-0.597*	-0.829***	-0.167	-0.746**	-0.617**	-0.628**
Re_{wat}	-0.519	-0.013	0.167	-0.034	0.077	0.087
pH	0.480	0.059	-0.077	-0.216	-0.288	-0.237
Clay	0.151	0.098	-0.165	0.237	-0.153	0.150
SOC	0.409	0.049	0.222	0.103	0.243	0.015
C:N ratio	0.044	0.300	0.541*	-0.287	0.642***	0.063

MAT: mean annual temperature; MAT_{TBI}: mean temperature during TBI period; TAP: total annual precipitation; TP_{TBI}: total precipitation during TBI period; PET: potential evapotranspiration; PET_{TBI}: potential evapotranspiration during TBI period; AI: aridity index; AI_{TBI}: aridity index during TBI period; TxP: temperature times precipitation factor; Re_{clim} : climatic factor model; Re_{temp} : temperature factor model; Re_{wat} : soil moisture factor model.