

Supplementary Materials:

Supplemental Table 1: Mineral concentration in oat grain under organic and conventional grain cropping systems at the Farming Systems Trial. Key: LEG (organic legume); MNR (organic manure); CNV (conventional); T or NT (tilled or no-till). Means within a column followed by the same letter are not significantly different (LSD, $\alpha = 0.05$)

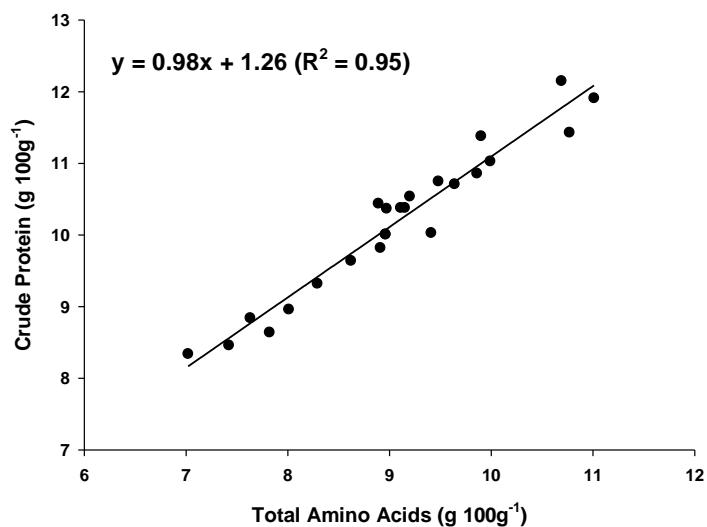
	B	Ba	Ca	Cu	Fe	K	Ni	Cr	Vd	Pb	Cd	As	Al	Str	Na
	-----mg Kg ⁻¹ -----														
CNV-NT	5.515a	5.3675a	770.66a	3.7275a	37.593a	3775.1a	2.175a	3.855a	0.155a	0.0925a	0.07a	0.45a	6.53a	2.1a	41.472a
CNV-T	5.385a	5.2575a	809.13a	4.1025a	39.45a	3782.8a	1.995a	3.48a	0.17a	0.075a	0.0725a	0.4575a	6.115a	1.98a	45.308a
LEG-NT	5.59a	5.43a	756.11a	3.83a	37.855a	3770.9a	1.8375a	3.2425a	0.155a	0.06a	0.0675a	0.4625a	5.21a	2.04a	42.297a
LEG-T	5.3775a	5.245a	790.56a	3.835a	40.935a	3658a	1.7375a	3.46a	0.17a	0.08a	0.0675a	0.4725a	8.1625a	2.01a	40.99a
MNR-NT	5.7575a	5.6025a	812.77a	4.3225a	42.228a	3832.8a	2.3525a	4.4675a	0.1675a	0.1425a	0.07a	0.475a	5.715a	2.15a	45.057a
MNR-T	5.52a	5.3925a	804.53a	4.8775a	38.588a	3942.4a	1.7725a	3.6275a	0.17a	0.0825a	0.0725a	0.495a	6.45a	2.17a	43.98a
	-----Standard Errors-----														
CNV-NT	0.1546	0.1465	23.094	0.1719	0.9628	183.07	0.2688	0.2836	0.002887	0.0149	0	0.0173	1.1784	0.0799	1.0765
CNV-T	0.0656	0.0547	12.505	0.1943	2.2187	71.489	0.1121	0.4233	0.005774	0.0185	0.0025	0.0131	0.6086	0.0261	1.9704
LEG-NT	0.1257	0.1107	14.924	0.0528	1.5901	44.14	0.12	0.3507	0.005	0.01	0.0025	0.0155	0.2333	0.0819	0.8785
LEG-T	0.1063	0.0992	16.185	0.1248	2.3869	98.721	0.1501	0.3711	0.005774	0.005774	0.0025	0.0144	1.7818	0.1125	1.2279
MNR-NT	0.1411	0.1355	28.118	0.6472	1.8566	88.686	0.3057	0.4474	0.004787	0.063	0	0.0126	0.0603	0.1453	0.7725
MNR-T	0.1774	0.1788	18.02	0.7638	0.434	158.33	0.0487	0.0898	0.007071	0.008539	0.0025	0.0202	0.7276	0.0819	0.8987

Supplemental Table 2: Analysis of variance of soil mineral concentration between organic and conventional grain cropping systems at the Farming Systems Trial. Key: LEG (organic legume); MNR (organic manure); CNV (conventional); T or NT (tilled or no-till). Means within a column followed by the same letter are not significantly different (LSD, $\alpha = 0.05$)

	Moisture	SOM	Al	Ars	B	Ba	Ca	Cadm	Co
----- <i>p-Values</i> -----									
Sys (S)	0.3663	0.0714	0.0002	0.128	0.0001	0.5002	0.0004	0.2192	0.648
Till (T)	0.0229	0.7929	0.4869	0.0047	0.7774	0.625	0.547	0.0193	0.1969
S * T	0.0372	0.7496	0.6896	0.3566	0.1098	0.8831	0.3104	0.0426	0.3769
-----Means-----									
CNV-NT	0.9275b	4.325a	14.435bc	0.22ab	0.175c	19.148a	1307.2c	0.055a	0.0525a
CNV-T	0.97ab	4.53a	16.348abc	0.24a	0.225bc	19.335a	1432.8bc	0.0475ab	0.045a
LEG-NT	1.035ab	4.8325a	20.777a	0.215ab	0.24bc	20.04a	1340c	0.055a	0.0525a
LEG-T	0.92b	4.81a	20.207abc	0.2275a	0.215c	19.185a	1404.3bc	0.0425b	0.04a
MNR-NT	1.0725a	4.8775a	11.777c	0.1925b	0.3425a	18.65a	1723.8a	0.045ab	0.0425a
MNR-T	0.9275b	4.8175a	12.997c	0.23a	0.3025ab	17.938a	1637.4ab	0.0475ab	0.045a
-----Standard Errors-----									
CNV-NT	0.0266	0.0851	1.035	0.0168	0.0119	1.9595	49.27	0.005	0.0025
CNV-T	0.0261	0.1361	0.9417	0.0108	0.006455	1.7363	46.454	0.0025	0.006455
LEG-NT	0.0132	0.1197	2.9297	0.0218	0.0227	1.45	103.27	0.002887	0.0025
LEG-T	0.0654	0.1675	2.7175	0.016	0.0185	1.926	85.017	0.0025	0.004082
MNR-NT	0.0602	0.3629	2.3536	0.0322	0.0368	0.7897	99.909	0.002887	0.009465
MNR-T	0.0357	0.0485	1.0651	0.0135	0.0144	1.4232	37.94	0.0025	0.002887

	Chr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni
----- <i>p-Values</i> -----									
Sys (S)	0.0195	0.3975	0.0001	0.2834	0	0.3279	0.0802	0.6381	0.024
Till (T)	0.6091	0.9004	0.4096	0.2223	0.1287	0.0005	0.1038	0.1242	0.0064
S * T	0.1825	0.7861	0.4282	0.917	0.1788	0.5029	0.0802	0.502	0.0047
-----Means-----									
CNV-NT	0.035ab	0.2875a	2.19bc	197.87a	135.32ab	18.315ab	0.02a	29.078a	0.09ab
CNV-T	0.035ab	0.31a	2.0525bc	180.13a	153.94a	14.023bc	0.02a	31.047a	0.08b
LEG-NT	0.04a	0.3425a	2.8775a	177.91a	109.1c	19.22a	0.02a	29.595a	0.11a
LEG-T	0.035ab	0.3a	2.6025ab	151.88a	118.06bc	13.845bc	0.02a	30.483a	0.07b
MNR-NT	0.03b	0.3625a	1.8425c	229.25a	155.47a	16.197abc	0.015b	30.6a	0.07b
MNR-T	0.0325ab	0.3675a	1.9525c	189.35a	151.05a	13.525c	0.02a	30.762a	0.075b
-----Standard Errors-----									
CNV-NT	0.002887	0.052	0.1012	16.843	5.8451	1.4394	0	0.3752	0.005774
CNV-T	0.002887	0.0204	0.0221	19.623	2.8643	1.2221	0	0.4083	0.004082
LEG-NT	0	0.0403	0.1758	15.931	5.4972	1.4054	0	1.0535	0.0115
LEG-T	0.002887	0.0453	0.2544	17.836	6.3627	0.8646	0	0.3061	0.007071
MNR-NT	0	0.0762	0.197	46.561	7.1997	0.46	0.002887	0.9134	0.007071
MNR-T	0.0025	0.0572	0.0559	25.973	7.1759	0.6036	0	0.8369	0.009574

	P	Pb	S	Se	Si	Stron	Tit	Vd	Zn
	----- <i>p-Value</i> -----								
Sys (S)	0.0728	0.94	0	0.3519	0.3141	0.0039	0.0164	0.6666	0.2077
Till (T)	0.7788	0.4586	0.3741	0.0539	0.4958	0.9006	0.3201	0.2162	0.0335
S * T	0.8579	0.54	0.0179	0.5184	0.3252	0.3839	0.065	0.0851	0.0294
	-----Means-----								
CNV-NT	7.367a	0.3275a	6.885b	0.0775a	15.55a	3.5475b	0.7525b	0.0225a	0.955ab
CNV-T	8.54a	0.2775a	7.883b	0.0875a	16.645a	3.8825ab	0.8475ab	0.02a	0.775ab
LEG-NT	7.455a	0.3225a	10.955a	0.08a	13.06a	3.9775ab	0.88a	0.025a	1.11a
LEG-T	7.095a	0.2475a	10.03a	0.0825a	15.41a	3.995ab	0.91a	0.02a	0.65b
MNR-NT	10.508a	0.2775a	10.883a	0.0675a	16.262a	4.7175a	0.88a	0.02a	0.9725ab
MNR-T	10.675a	0.31a	10.067a	0.0825a	14.895a	4.4325a	0.8275ab	0.0225a	1.075a
	-----Standard Errors-----								
CNV-NT	1.8281	0.0409	0.2907	0.006292	1.3811	0.1467	0.018	0.0025	0.0411
CNV-T	1.0081	0.0715	0.2238	0.0025	0.3759	0.1487	0.0361	0	0.0693
LEG-NT	1.2173	0.0592	0.2843	0.01	1.647	0.2254	0.0268	0.002887	0.1428
LEG-T	1.6849	0.0585	0.3641	0.004787	1.6034	0.2318	0.0406	0	0.0967
MNR-NT	2.3811	0.0368	0.6522	0.016	1.9995	0.3284	0.0729	0	0.104
MNR-T	2.3599	0.0481	0.2098	0.004787	1.4496	0.0846	0.0442	0.0025	0.1925



Supplemental Figure 1: The relationship between total amino acids and protein content of oat grains

Supplemental Table 3: Yield of oats between treatments at the FST. Key: LEG (organic legume); MNR (organic manure); CNV (conventional); T or NT (tilled or no-till).

Treatments	Yield of oats Kg ha ⁻¹
LEG-NT	944.7a
LEG-T	918.1a
MNR-NT	882.3ab
MNR-T	834.1ab
CNV-NT	338.2b
CNV-T	898.2a

Means within a column followed by the same letter are not significantly different (LSD, $\alpha < 0.1$).