

**Table S1.** Descriptive statistics of soil properties at the four sub-plots between 2020 and 2021 (n = 3).

Depth (cm)	2020					2021				
	Minimum	Maximum	Mean	Standard Deviation	Variance	Minimum	Maximum	Mean	Standard Deviation	Variance
<b>Barley (BA)</b>										
<i>pH</i>										
0-15	7.50	7.80	7.63 ± 0.09	0.15	0.02	7.50	7.70	7.60 ± 0.06	0.10	0.01
15-30	7.60	7.80	7.70 ± 0.06	0.10	0.01	7.50	7.60	7.57 ± 0.03	0.06	0.00
30-45	7.70	7.80	7.73 ± 0.03	0.06	0.00	7.70	7.90	7.77 ± 0.07	0.12	0.01
45-60	7.60	7.80	7.73 ± 0.07	0.12	0.01	7.70	7.80	7.77 ± 0.03	0.06	0.00
<i>EC (mS/cm)</i>										
0-15	2.60	5.30	3.80 ± 0.79	1.37	1.89	2.5	5.50	4.03 ± 0.87	1.5	2.25
15-30	2.30	5.60	3.67 ± 0.99	1.72	2.96	2.2	5.40	3.43 ± 0.99	1.72	2.96
30-45	2.40	3.90	3.30 ± 0.46	0.79	0.63	2.2	5.60	3.60 ± 01.03	1.78	3.16
45-60	4.40	5.90	5.07 ± 0.44	0.76	0.58	2.1	5.60	3.33 ± 01.13	1.97	3.86
<i>C (%)</i>										
0-15	1.43	1.45	1.44 ± 0.01	0.01	0.00	1.36	1.39	1.38 ± 0.01	0.02	0.00
15-30	1.10	1.15	1.13 ± 0.01	0.03	0.00	1.08	1.09	1.08 ± 0.00	0.01	0.00
30-45	0.86	0.90	0.88 ± 0.01	0.02	0.00	0.85	0.87	0.86 ± 0.01	0.01	0.00
45-60	0.30	0.33	0.32 ± 0.01	0.02	0.00	0.44	0.46	0.45 ± 0.01	0.01	0.00
<i>N (%)</i>										
0-15	0.08	0.10	0.09 ± 0.01	0.01	0.00	0.06	0.08	0.07 ± 0.01	0.01	0.00
15-30	0.07	0.09	0.08 ± 0.01	0.01	0.00	0.06	0.07	0.07 ± 0.00	0.01	0.00
30-45	0.08	0.09	0.09 ± 0.00	0.01	0.00	0.08	0.09	0.08 ± 0.00	0.01	0.00
45-60	0.05	0.07	0.06 ± 0.01	0.01	0.00	0.07	0.08	0.08 ± 0.00	0.01	0.00
<i>C/N</i>										
0-15	14.30	18.10	16.13 ± 1.10	1.90	3.62	17.40	22.70	19.93 ± 1.53	2.66	7.06
15-30	12.80	15.70	14.20 ± 0.84	1.45	2.11	15.40	18.20	16.33 ± 0.93	1.62	2.61
30-45	9.60	11.00	10.20 ± 0.42	0.72	0.52	9.60	10.90	10.37 ± 0.39	0.68	0.46
45-60	4.30	6.60	5.40 ± 0.67	1.15	1.33	5.60	6.30	5.90 ± 0.21	0.36	0.13
<i>BD (g/cm³)</i>										
0-15	1.45	1.50	1.48 ± 0.01	0.03	0.00	1.48	1.49	1.48 ± 0.00	0.01	0.00

15-30	1.50	1.51	1.51 ± 0.00	0.01	0.00	1.53	1.54	1.54 ± 0.00	0.01	0.00
30-45	1.52	1.54	1.53 ± 0.01	0.01	0.00	1.55	1.56	1.55 ± 0.00	0.01	0.00
45-60	1.70	1.71	1.70 ± 0.00	0.01	0.00	1.70	1.72	1.71 ± 0.01	0.01	0.00
<b>Alfalfa (AL)</b>										
<i>pH</i>										
0-15	7.30	7.50	7.40 ± 0.06	0.10	0.01	7.30	7.40	7.33 ± 0.03	0.06	0.00
15-30	7.50	7.60	7.53 ± 0.03	0.06	0.00	7.30	7.50	7.40 ± 0.06	0.10	0.01
30-45	7.50	7.70	7.60 ± 0.06	0.10	0.01	7.40	7.50	7.43 ± 0.03	0.06	0.00
45-60	7.70	7.80	7.76 ± 0.03	0.06	0.00	7.60	7.80	7.70 ± 0.06	0.10	0.01
<i>EC (mS/cm)</i>										
0-15	4.20	4.30	4.23 ± 0.03	0.06	0.00	3.80	3.90	3.83 ± 0.03	0.06	0.00
15-30	4.30	4.30	4.30 ± 0.00	0.00	0.00	3.40	4.10	3.73 ± 0.20	0.35	0.12
30-45	4.80	5.00	4.90 ± 0.06	0.10	0.01	4.60	4.90	4.77 ± 0.09	0.15	0.02
45-60	5.50	5.60	5.57 ± 0.03	0.06	0.00	5.10	5.20	5.13 ± 0.03	0.06	0.00
<i>C (%)</i>										
0-15	1.44	1.46	1.45 ± 0.01	0.01	0.00	1.55	1.56	1.56 ± 0.00	0.01	0.00
15-30	1.01	1.11	1.06 ± 0.03	0.05	0.00	1.36	1.46	1.39 ± 0.03	0.06	0.00
30-45	1.02	1.12	1.06 ± 0.03	0.05	0.00	0.72	0.88	0.81 ± 0.05	0.08	0.01
45-60	0.44	0.47	0.45 ± 0.01	0.02	0.00	0.40	0.46	0.43 ± 0.02	0.03	0.00
<i>N (%)</i>										
0-15	0.11	0.13	0.12 ± 0.01	0.01	0.00	0.13	0.16	0.14 ± 0.01	0.02	0.00
15-30	0.09	0.11	0.10 ± 0.01	0.01	0.00	0.18	0.22	0.20 ± 0.01	0.02	0.00
30-45	0.11	0.15	0.13 ± 0.01	0.02	0.00	0.17	0.20	0.18 ± 0.01	0.02	0.00
45-60	0.08	0.1	0.09 ± 0.01	0.01	0.00	0.09	0.12	0.10 ± 0.01	0.02	0.00
<i>C/N</i>										
0-15	11.20	13.20	12.13 ± 0.58	1.01	1.01	9.70	120.00	10.93 ± 0.67	1.16	1.34
15-30	9.20	12.30	10.33 ± 0.99	1.71	2.92	6.60	7.60	7.00 ± 0.31	0.53	0.28
30-45	7.50	9.50	8.27 ± 0.62	1.08	1.16	3.60	5.20	4.47 ± 0.47	0.81	0.65
45-60	4.70	5.60	5.07 ± 0.27	0.47	0.22	3.70	5.10	4.40 ± 0.40	0.70	0.49
<i>BD (g/cm³)</i>										
0-15	1.45	1.46	1.46 ± 0.00	0.01	0.00	1.44	1.46	1.45 ± 0.01	0.01	0.00
15-30	1.49	1.53	1.51 ± 0.01	0.02	0.00	1.52	1.54	1.53 ± 0.01	0.01	0.00
30-45	1.52	1.53	1.53 ± 0.00	0.01	0.00	1.65	1.66	1.66 ± 0.00	0.01	0.00
45-60	1.69	1.73	1.71 ± 0.02	0.02	0.00	1.70	1.72	1.71 ± 0.01	0.01	0.00

Barley-Alfalfa (BA/AL)										
<i>pH</i>										
0-15	7.20	7.30	7.24 ± 0.03	0.06	0.00	7.20	7.30	7.23 ± 0.03	0.06	0.00
15-30	7.20	7.30	7.27 ± 0.03	0.06	0.00	7.00	7.10	7.07 ± 0.03	0.06	0.00
30-45	7.20	7.30	7.23 ± 0.03	0.06	0.00	7.18	7.21	7.20 ± 0.01	0.02	0.00
45-60	7.40	7.50	7.43 ± 0.03	0.06	0.00	7.10	7.20	7.17 ± 0.03	0.06	0.00
<i>EC (mS/cm)</i>										
0-15	3.80	3.90	3.83 ± 0.03	0.06	0.00	2.40	2.50	2.43 ± 0.03	0.06	0.00
15-30	3.80	3.80	3.80 ± 0.00	0.00	0.00	2.30	2.50	2.40 ± 0.06	0.1	0.01
30-45	4.20	4.45	4.30 ± 0.08	0.13	0.02	2.90	3.70	3.33 ± 0.23	0.4	0.16
45-60	4.60	4.80	4.73 ± 0.07	0.12	0.01	3.70	3.90	3.80 ± 0.06	0.1	0.01
<i>C (%)</i>										
0-15	1.86	1.88	1.87 ± 0.01	0.01	0.00	3.88	4.12	3.96 ± 0.08	0.14	0.02
15-30	1.60	1.66	1.64 ± 0.02	0.03	0.00	2.16	3.17	2.51 ± 0.33	0.57	0.33
30-45	1.36	1.38	1.37 ± 0.01	0.01	0.00	1.44	1.45	1.44 ± 0.00	0.01	0.00
45-60	0.77	0.79	0.78 ± 0.01	0.01	0.00	0.86	0.90	0.88 ± 0.01	0.02	0.00
<i>N (%)</i>										
0-15	0.13	0.14	0.14 ± 0.00	0.01	0.00	0.32	0.34	0.33 ± 0.01	0.01	0.00
15-30	0.18	0.21	0.20 ± 0.01	0.02	0.00	0.22	0.24	0.23 ± 0.01	0.01	0.00
30-45	0.18	0.19	0.18 ± 0.00	0.01	0.00	0.17	0.22	0.20 ± 0.02	0.03	0.00
45-60	0.17	0.18	0.17 ± 0.00	0.01	0.00	0.15	0.20	0.18 ± 0.01	0.03	0.00
<i>C/N</i>										
0-15	13.40	14.30	13.70 ± 0.30	0.52	0.27	11.80	12.1	12.00 ± 0.10	0.17	0.03
15-30	7.90	9.20	8.37 ± 0.42	0.72	0.52	9.20	14.4	11.00 ± 1.70	2.95	8.68
30-45	7.20	7.70	7.50 ± 0.15	0.26	0.07	6.50	8.50	7.40 ± 0.59	1.01	1.03
45-60	4.40	4.60	4.50 ± 0.06	0.10	0.01	4.30	6.00	5.07 ± 0.50	0.86	0.74
<i>BD (g/cm³)</i>										
0-15	1.43	1.44	1.44 ± 0.00	0.01	0.00	1.40	1.44	1.42 ± 0.01	0.02	0.00
15-30	1.40	1.48	1.44 ± 0.02	0.04	0.00	1.42	1.44	1.43 ± 0.01	0.01	0.00
30-45	1.51	1.58	1.54 ± 0.02	0.04	0.00	1.46	1.56	1.50 ± 0.03	0.05	0.00
45-60	1.58	1.73	1.67 ± 0.05	0.08	0.01	1.54	1.89	1.71 ± 0.10	0.18	0.03
Fallow (FA)										
<i>pH</i>										
0-15	7.70	7.78	7.74 ± 0.02	0.04	0.00	7.65	7.72	7.69 ± 0.02	0.04	0.00

15-30	7.60	7.80	$7.72 \pm 0.06$	0.11	0.01	7.60	7.74	$7.68 \pm 0.04$	0.07	0.01
30-45	7.70	7.88	$7.80 \pm 0.05$	0.09	0.01	7.70	7.77	$7.74 \pm 0.02$	0.04	0.00
45-60	7.80	7.89	$7.85 \pm 0.03$	0.05	0.00	7.80	7.86	$7.83 \pm 0.02$	0.03	0.00
<i>EC (mS/cm)</i>										
0-15	4.20	4.40	$4.30 \pm 0.06$	0.10	0.01	2.50	5.60	$4.23 \pm 0.91$	1.58	2.50
15-30	3.80	5.10	$4.26 \pm 0.42$	0.72	0.52	2.80	4.80	$4.07 \pm 0.64$	1.10	1.21
30-45	4.50	4.90	$4.76 \pm 0.13$	0.23	0.05	3.40	5.20	$4.37 \pm 0.52$	0.91	0.82
45-60	5.90	7.60	$6.76 \pm 0.49$	0.85	0.72	5.60	6.80	$6.07 \pm 0.37$	0.64	0.41
<i>C (%)</i>										
0-15	0.76	0.88	$0.82 \pm 0.03$	0.06	0.00	0.68	0.77	$0.72 \pm 0.03$	0.05	0.00
15-30	0.58	0.66	$0.61 \pm 0.2$	0.04	0.00	0.61	0.66	$0.64 \pm 0.01$	0.03	0.00
30-45	0.50	0.54	$0.52 \pm 0.01$	0.02	0.00	0.41	0.46	$0.44 \pm 0.01$	0.03	0.00
45-60	0.25	0.33	$0.29 \pm 0.02$	0.04	0.00	0.25	0.32	$0.29 \pm 0.02$	0.04	0.00
<i>N (%)</i>										
0-15	0.08	0.08	$0.08 \pm 0.00$	0.00	0.00	0.05	0.05	$0.05 \pm 0.00$	0.00	0.00
15-30	0.06	0.06	$0.06 \pm 0.00$	0.00	0.00	0.05	0.06	$0.06 \pm 0.00$	0.01	0.00
30-45	0.06	0.07	$0.07 \pm 0.00$	0.01	0.00	0.05	0.07	$0.06 \pm 0.00$	0.01	0.00
45-60	0.05	0.07	$0.06 \pm 0.01$	0.01	0.00	0.06	0.06	$0.06 \pm 0.00$	0.00	0.00
<i>C/N</i>										
0-15	9.50	11.00	$10.43 \pm 0.47$	0.81	0.66	13.6	14.8	$14.27 \pm 0.35$	0.61	0.37
15-30	9.70	10.60	$10.10 \pm 0.26$	0.46	0.21	10.5	12.9	$11.30 \pm 0.80$	1.39	1.92
30-45	7.00	9.00	$7.87 \pm 0.59$	1.03	1.05	6.70	7.70	$7.30 \pm 0.31$	0.53	0.28
45-60	3.50	5.60	$4.87 \pm 0.68$	1.18	1.40	4.20	5.20	$4.87 \pm 0.33$	0.58	0.33
<i>BD (g/cm<sup>3</sup>)</i>										
0-15	1.55	1.61	$1.57 \pm 0.02$	0.03	0.00	1.55	1.60	$1.57 \pm 0.02$	0.03	0.00
15-30	1.54	1.55	$1.54 \pm 0.00$	0.01	0.00	1.54	1.66	$1.58 \pm 0.04$	0.07	0.00
30-45	1.60	1.62	$1.61 \pm 0.01$	0.01	0.00	1.57	1.70	$1.65 \pm 0.04$	0.07	0.00
45-60	1.70	1.73	$1.72 \pm 0.01$	0.02	0.00	1.70	1.75	$1.72 \pm 0.02$	0.03	0.00