

Table S1. Summary table of the quadrat vegetation survey, forming the base data for the vegetation map.

Sampling ID	WGS84 Latitude	WGS84 Longitude	B6	F1b	F2	F5	F5bs	H5a
A1	47° 22' 10.61" N	21° 4' 26.91" E		100				
A2	47° 22' 10.53" N	21° 4' 31.68" E		100				
A3	47° 22' 10.45" N	21° 4' 36.44" E			100			
A4	47° 22' 10.36" N	21° 4' 41.2" E	70		30			
A5	47° 22' 10.28" N	21° 4' 45.97" E			100			
A6	47° 22' 10.19" N	21° 4' 50.73" E		90			10	
A7	47° 22' 10.11" N	21° 4' 55.5" E			100			
A8	47° 22' 10.03" N	21° 5' 0.26" E			100			
A9	47° 22' 9.94" N	21° 5' 5.03" E		30	70			
A10	47° 22' 9.86" N	21° 5' 9.79" E				100		
B1	47° 22' 13.85" N	21° 4' 27.03" E			100			
B2	47° 22' 13.77" N	21° 4' 31.8" E				100		
B3	47° 22' 13.68" N	21° 4' 36.56" E			40	60		
B4	47° 22' 13.6" N	21° 4' 41.33" E				100		
B5	47° 22' 13.52" N	21° 4' 46.09" E				100		
B6	47° 22' 13.43" N	21° 4' 50.86" E			100			
B7	47° 22' 13.35" N	21° 4' 55.62" E		90	10			
B8	47° 22' 13.26" N	21° 5' 0.39" E			100			
B9	47° 22' 13.18" N	21° 5' 5.15" E			100			
B10	47° 22' 13.09" N	21° 5' 9.92" E	100					
C1	47° 22' 17.09" N	21° 4' 27.16" E		100				
C2	47° 22' 17" N	21° 4' 31.92" E				100		
C3	47° 22' 16.92" N	21° 4' 36.69" E			90	10		
C4	47° 22' 16.84" N	21° 4' 41.45" E				100		
C5	47° 22' 16.75" N	21° 4' 46.22" E				100		
C6	47° 22' 16.67" N	21° 4' 50.98" E				100		
C7	47° 22' 16.58" N	21° 4' 55.75" E		100				
C8	47° 22' 16.5" N	21° 5' 0.51" E		100				
C9	47° 22' 16.42" N	21° 5' 5.28" E				100		
C10	47° 22' 16.33" N	21° 5' 10.04" E	75		25			
D1	47° 22' 20.33" N	21° 4' 27.28" E			100			
D2	47° 22' 20.24" N	21° 4' 32.05" E		15	85			
D3	47° 22' 20.16" N	21° 4' 36.81" E				100		
D4	47° 22' 20.07" N	21° 4' 41.58" E		60				
D5	47° 22' 19.99" N	21° 4' 46.34" E		30	60			
D6	47° 22' 19.91" N	21° 4' 51.11" E		5	94			1
D7	47° 22' 19.82" N	21° 4' 55.87" E				100		

D8	47° 22' 19.74" N	21° 5' 0.64" E	100			
D9	47° 22' 19.65" N	21° 5' 5.4" E	100			
D10	47° 22' 19.57" N	21° 5' 10.17" E	60	40		
E1	47° 22' 23.56" N	21° 4' 27.4" E			100	
E2	47° 22' 23.48" N	21° 4' 32.17" E			100	
E3	47° 22' 23.4" N	21° 4' 36.93" E		100		
E4	47° 22' 23.31" N	21° 4' 41.7" E		100		
E5	47° 22' 23.23" N	21° 4' 46.47" E		20	80	
E6	47° 22' 23.14" N	21° 4' 51.23" E	100			
E7	47° 22' 23.06" N	21° 4' 56" E		10	90	
E8	47° 22' 22.97" N	21° 5' 0.76" E	90		10	
E9	47° 22' 22.89" N	21° 5' 5.53" E	90			10
E10	47° 22' 22.81" N	21° 5' 10.29" E	95	5		
F1	47° 22' 26.8" N	21° 4' 27.53" E			3	
F2	47° 22' 26.72" N	21° 4' 32.29" E	25	75		
F3	47° 22' 26.63" N	21° 4' 37.06" E			100	
F4	47° 22' 26.55" N	21° 4' 41.82" E		100		
F5	47° 22' 26.46" N	21° 4' 46.59" E	100			
F6	47° 22' 26.38" N	21° 4' 51.35" E	100			
F7	47° 22' 26.3" N	21° 4' 56.12" E			95	5
F8	47° 22' 26.21" N	21° 5' 0.89" E			100	
F9	47° 22' 26.13" N	21° 5' 5.65" E				100
F10	47° 22' 26.04" N	21° 5' 10.42" E				100
G1	47° 22' 30.04" N	21° 4' 27.65" E			100	
G2	47° 22' 29.95" N	21° 4' 32.42" E	70	30		
G3	47° 22' 29.87" N	21° 4' 37.18" E	100			
G4	47° 22' 29.76" N	21° 4' 42.35" E		60	40	
G5	47° 22' 29.7" N	21° 4' 46.71" E		100		
G6	47° 22' 29.63" N	21° 4' 52.68" E	100			
G7	47° 22' 29.53" N	21° 4' 56.24" E		100		
G8	47° 22' 29.45" N	21° 5' 1.01" E			100	
G9	47° 22' 29.36" N	21° 5' 5.77" E			100	
G10	47° 22' 29.28" N	21° 5' 10.54" E				100
H1	47° 22' 33.27" N	21° 4' 27.77" E			100	
H2	47° 22' 33.19" N	21° 4' 32.54" E			100	
H3	47° 22' 33.11" N	21° 4' 37.31" E			100	
H4	47° 22' 33.02" N	21° 4' 42.07" E			100	
H5	47° 22' 32.94" N	21° 4' 46.84" E		100		
H6	47° 22' 32.85" N	21° 4' 51.6" E	100			
H7	47° 22' 32.77" N	21° 4' 56.37" E		100		

H8	47° 22' 32.69" N	21° 5' 1.13" E		100	
H9	47° 22' 32.6" N	21° 5' 5.9" E			100
H10	47° 22' 32.52" N	21° 5' 10.66" E	100		
I1	47° 22' 36.51" N	21° 4' 27.9" E		100	
I2	47° 22' 36.43" N	21° 4' 32.66" E			100
I3	47° 22' 36.34" N	21° 4' 37.43" E			100
I4	47° 22' 36.26" N	21° 4' 42.2" E			100
I5	47° 22' 36.18" N	21° 4' 46.96" E			100
I6	47° 22' 36.09" N	21° 4' 51.73" E	20	15	65
I7	47° 22' 36.01" N	21° 4' 56.49" E	100		
I8	47° 22' 35.92" N	21° 5' 1.26" E	100		
I9	47° 22' 35.84" N	21° 5' 6.02" E	2	98	
I10	47° 22' 35.75" N	21° 5' 10.79" E			100
J1	47° 22' 39.75" N	21° 4' 28.02" E		100	
J2	47° 22' 39.66" N	21° 4' 32.79" E		100	
J3	47° 22' 39.58" N	21° 4' 37.55" E		60	
J4	47° 22' 39.5" N	21° 4' 42.32" E		10	
J5	47° 22' 39.41" N	21° 4' 47.08" E			100
J6	47° 22' 39.33" N	21° 4' 51.85" E		95	5
J7	47° 22' 39.24" N	21° 4' 56.62" E	100		
J8	47° 22' 39.16" N	21° 5' 1.38" E	20	80	
J9	47° 22' 39.08" N	21° 5' 6.15" E	100		
J10	47° 22' 38.99" N	21° 5' 10.91" E			100

	B6	F1b	F2	F5	F5bs	H5a	U9
B6	916	0	2	0	0	0	0
F1b	0	1299	8	15	0	0	0
F2	15	1	2341	6	0	0	0
F5	0	11	5	3630	36	1	0
F5bs	0	0	0	11	1021	0	0
H5a	0	0	0	0	0	389	0
U9	0	0	0	0	0	0	371

[illegible]

Table S4. Laboratory measured soil parameters applied in thematic mapping.

Sampling ID	WGS84 Latitude	WGS84 Longitude	Altitude ¹	TSC ²	Na ³	YTA ⁴	GSC ⁵	pH	ANC ⁶
A1	47° 22' 10.61" N	21° 4' 26.91" E	128.21	0.02	615	41	3	4.66	F1b
A2	47° 22' 10.53" N	21° 4' 31.68" E	128.08	0.23	2700	38	3	6.29	F1b
A3	47° 22' 10.45" N	21° 4' 36.44" E	127.65	0.04	586	68	6	5.52	F2
A4	47° 22' 10.36" N	21° 4' 41.2" E	127.39	0.06	525	49	4	4.6	B6
A5	47° 22' 10.28" N	21° 4' 45.97" E	127.62	0.04	585	48	4	4.68	F2
A6	47° 22' 10.19" N	21° 4' 50.73" E	128.06	0.15	2070	42	3	6.84	F1b
A7	47° 22' 10.11" N	21° 4' 55.5" E	127.66	0.1	558	45	4	6.52	F2
A8	47° 22' 10.03" N	21° 5' 0.26" E	127.54	0.16	1420	43	4	5.75	F2
A9	47° 22' 9.94" N	21° 5' 5.03" E	127.66	0.16	1750	47	4	6.01	F2
A10	47° 22' 9.86" N	21° 5' 9.79" E	127.82	0.23	1990	45	4	5.43	F1b
B1	47° 22' 13.85" N	21° 4' 27.03" E	128.30	n.d.	n.d.	n.d.	n.d.	n.d.	F2
B2	47° 22' 13.77" N	21° 4' 31.8" E	128.10	0.15	2090	46	4	6.87	F1a
B3	47° 22' 13.68" N	21° 4' 36.56" E	128.07	n.d.	n.d.	n.d.	n.d.	n.d.	F1a
B4	47° 22' 13.6" N	21° 4' 41.33" E	128.11	0.2	3630	43	4	7.32	F1a
B5	47° 22' 13.52" N	21° 4' 46.09" E	127.67	n.d.	n.d.	n.d.	n.d.	n.d.	F4
B6	47° 22' 13.43" N	21° 4' 50.86" E	127.39	0.04	573	50	4	4.69	F2
B7	47° 22' 13.35" N	21° 4' 55.62" E	127.67	n.d.	n.d.	n.d.	n.d.	n.d.	F1b
B8	47° 22' 13.26" N	21° 5' 0.39" E	127.53	0.23	2520	45	4	6.32	F2
B9	47° 22' 13.18" N	21° 5' 5.15" E	127.39	n.d.	n.d.	n.d.	n.d.	n.d.	F2
B10	47° 22' 13.09" N	21° 5' 9.92" E	127.37	0.04	170	52	5	4.31	D34
C1	47° 22' 17.09" N	21° 4' 27.16" E	128.32	0.34	3450	47	4	5.64	F1b
C2	47° 22' 17" N	21° 4' 31.92" E	128.06	0.13	2440	43	4	6.62	F1a
C3	47° 22' 16.92" N	21° 4' 36.69" E	128.19	0.1	1380	42	3	6.34	F2
C4	47° 22' 16.84" N	21° 4' 41.45" E	128.17	0.1	1580	47	4	5.56	F1a
C5	47° 22' 16.75" N	21° 4' 46.22" E	128.24	n.d.	n.d.	n.d.	n.d.	n.d.	F1a
C6	47° 22' 16.67" N	21° 4' 50.98" E	128.22	n.d.	n.d.	n.d.	n.d.	n.d.	F1a
C7	47° 22' 16.58" N	21° 4' 55.75" E	127.83	0.39	2320	42	3	5.32	F1b
C8	47° 22' 16.5" N	21° 5' 0.51" E	127.87	0.26	3240	47	4	5.59	F1b
C9	47° 22' 16.42" N	21° 5' 5.28" E	127.80	n.d.	n.d.	n.d.	n.d.	n.d.	F1b
C10	47° 22' 16.33" N	21° 5' 10.04" E	127.34	n.d.	n.d.	n.d.	n.d.	n.d.	D34
D1	47° 22' 20.33" N	21° 4' 27.28" E	127.80	0.1	1120	42	3	6.61	F2
D2	47° 22' 20.24" N	21° 4' 32.05" E	127.96	n.d.	n.d.	n.d.	n.d.	n.d.	F2
D3	47° 22' 20.16" N	21° 4' 36.81" E	128.07	0.1	2000	36	2	6.39	F1b
D4	47° 22' 20.07" N	21° 4' 41.58" E	128.30	n.d.	n.d.	n.d.	n.d.	n.d.	F1b
D5	47° 22' 19.99" N	21° 4' 46.34" E	128.11	0.13	2400	38	3	6.36	F2
D6	47° 22' 19.91" N	21° 4' 51.11" E	128.22	n.d.	n.d.	n.d.	n.d.	n.d.	F2
D7	47° 22' 19.82" N	21° 4' 55.87" E	128.38	0.13	2600	37	2	5.97	F1b
D8	47° 22' 19.74" N	21° 5' 0.64" E	128.12	n.d.	n.d.	n.d.	n.d.	n.d.	F1b
D9	47° 22' 19.65" N	21° 5' 5.4" E	127.94	0.2	2140	42	3	5.72	F1b

D10	47° 22' 19.57" N	21° 5' 10.17" E	127.63	n.d.	n.d.	n.d.	n.d.	n.d.	F2
E1	47° 22' 23.56" N	21° 4' 27.4" E	128.17	n.d.	n.d.	n.d.	n.d.	n.d.	F1a
E2	47° 22' 23.48" N	21° 4' 32.17" E	128.24	0.11	1980	42	3	5.45	F1b
E3	47° 22' 23.4" N	21° 4' 36.93" E	127.93	n.d.	n.d.	n.d.	n.d.	n.d.	F2
E4	47° 22' 23.31" N	21° 4' 41.7" E	127.86	0.09	1170	55	5	5.43	F2
E5	47° 22' 23.23" N	21° 4' 46.47" E	127.97	n.d.	n.d.	n.d.	n.d.	n.d.	F1a
E6	47° 22' 23.14" N	21° 4' 51.23" E	128.33	0.1	2740	39	3	5.7	F1b
E7	47° 22' 23.06" N	21° 4' 56" E	128.25	n.d.	n.d.	n.d.	n.d.	n.d.	F1a
E8	47° 22' 22.97" N	21° 5' 0.76" E	128.38	0.09	1270	46	4	4.87	F1b
E9	47° 22' 22.89" N	21° 5' 5.53" E	128.38	n.d.	n.d.	n.d.	n.d.	n.d.	F1b
E10	47° 22' 22.81" N	21° 5' 10.29" E	127.86	0.1	1180	45	4	5.27	F1b
F1	47° 22' 26.8" N	21° 4' 27.53" E	127.93	0.26	5020	45	4	8.04	F1a
F2	47° 22' 26.72" N	21° 4' 32.29" E	127.88	n.d.	n.d.	n.d.	n.d.	n.d.	B6
F3	47° 22' 26.63" N	21° 4' 37.06" E	128.09	0.15	2890	45	4	6.27	F1a
F4	47° 22' 26.55" N	21° 4' 41.82" E	127.81	n.d.	n.d.	n.d.	n.d.	n.d.	F2
F5	47° 22' 26.46" N	21° 4' 46.59" E	127.80	0.1	1400	49	4	5.68	B3
F6	47° 22' 26.38" N	21° 4' 51.35" E	127.80	n.d.	n.d.	n.d.	n.d.	n.d.	B3
F7	47° 22' 26.3" N	21° 4' 56.12" E	128.24	0.2	3250	43	4	7.46	F1a
F8	47° 22' 26.21" N	21° 5' 0.89" E	128.15	n.d.	n.d.	n.d.	n.d.	n.d.	F1a
F9	47° 22' 26.13" N	21° 5' 5.65" E	128.30	0.07	1040	50	4	4.78	F4
F10	47° 22' 26.04" N	21° 5' 10.42" E	128.51	n.d.	n.d.	n.d.	n.d.	n.d.	F4
G1	47° 22' 30.04" N	21° 4' 27.65" E	128.23	n.d.	n.d.	n.d.	n.d.	n.d.	F1a
G2	47° 22' 29.95" N	21° 4' 32.42" E	127.80	0.08	1240	47	4	5.18	B1a
G3	47° 22' 29.87" N	21° 4' 37.18" E	127.86	n.d.	n.d.	n.d.	n.d.	n.d.	B6
G4	47° 22' 29.76" N	21° 4' 42.35" E	127.95	0.1	2060	44	4	6.59	F2
G5	47° 22' 29.7" N	21° 4' 46.71" E	127.80	n.d.	n.d.	n.d.	n.d.	n.d.	F2
G6	47° 22' 29.63" N	21° 4' 52.68" E	127.73	0.09	1120	50	4	4.84	B6
G7	47° 22' 29.53" N	21° 4' 56.24" E	127.93	n.d.	n.d.	n.d.	n.d.	n.d.	F2
G8	47° 22' 29.45" N	21° 5' 1.01" E	128.43	0.23	3810	42	3	6.9	F1b
G9	47° 22' 29.36" N	21° 5' 5.77" E	128.17	n.d.	n.d.	n.d.	n.d.	n.d.	F4
G10	47° 22' 29.28" N	21° 5' 10.54" E	128.51	0.02	440	50	4	4.22	H5a
H1	47° 22' 33.27" N	21° 4' 27.77" E	128.12	0.13	2740	40	3	7.16	F4
H2	47° 22' 33.19" N	21° 4' 32.54" E	128.33	n.d.	n.d.	n.d.	n.d.	n.d.	F1a
H3	47° 22' 33.11" N	21° 4' 37.31" E	128.39	0.23	4270	46	4	7.76	F1a
H4	47° 22' 33.02" N	21° 4' 42.07" E	127.92	n.d.	n.d.	n.d.	n.d.	n.d.	F1a
H5	47° 22' 32.94" N	21° 4' 46.84" E	127.73	0.13	1710	52	5	5.26	F2
H6	47° 22' 32.85" N	21° 4' 51.6" E	127.93	n.d.	n.d.	n.d.	n.d.	n.d.	D34
H7	47° 22' 32.77" N	21° 4' 56.37" E	127.94	n.d.	n.d.	n.d.	n.d.	n.d.	F2
H8	47° 22' 32.69" N	21° 5' 1.13" E	127.96	0.07	977	45	4	4.82	F2
H9	47° 22' 32.6" N	21° 5' 5.9" E	128.26	n.d.	n.d.	n.d.	n.d.	n.d.	F1a
H10	47° 22' 32.52" N	21° 5' 10.66" E	128.26	n.d.	n.d.	n.d.	n.d.	n.d.	F1b
I1	47° 22' 36.51" N	21° 4' 27.9" E	128.48	n.d.	n.d.	n.d.	n.d.	n.d.	F2

I2	47° 22' 36.43" N	21° 4' 32.66" E	128.28	0.26	4550	45	5	7.48	F5
I3	47° 22' 36.34" N	21° 4' 37.43" E	128.38	n.d.	n.d.	n.d.	n.d.	n.d.	F1a
I4	47° 22' 36.26" N	21° 4' 42.2" E	128.30	0.1	2450	38	3	5.67	F1b
I5	47° 22' 36.18" N	21° 4' 46.96" E	128.29	n.d.	n.d.	n.d.	n.d.	n.d.	F1a
I6	47° 22' 36.09" N	21° 4' 51.73" E	128.33	0.05	466	43	4	5.01	F1b
I7	47° 22' 36.01" N	21° 4' 56.49" E	128.05	n.d.	n.d.	n.d.	n.d.	n.d.	D34
I8	47° 22' 35.92" N	21° 5' 1.26" E	128.13	n.d.	n.d.	n.d.	n.d.	n.d.	D34
I9	47° 22' 35.84" N	21° 5' 6.02" E	127.94	n.d.	n.d.	n.d.	n.d.	n.d.	F2
I10	47° 22' 35.75" N	21° 5' 10.79" E	128.23	0.43	4460	43	4	7.2	F1a
J1	47° 22' 39.75" N	21° 4' 28.02" E	128.03	0.11	1440	47	4	4.94	F2
J2	47° 22' 39.66" N	21° 4' 32.79" E	127.89	n.d.	n.d.	n.d.	n.d.	n.d.	F2
J3	47° 22' 39.58" N	21° 4' 37.55" E	127.97	0.09	1740	44	4	5.73	F2
J4	47° 22' 39.5" N	21° 4' 42.32" E	128.20	n.d.	n.d.	n.d.	n.d.	n.d.	F1a
J5	47° 22' 39.41" N	21° 4' 47.08" E	128.27	0.15	3030	43	4	6.31	F1a
J6	47° 22' 39.33" N	21° 4' 51.85" E	128.26	n.d.	n.d.	n.d.	n.d.	n.d.	F2
J7	47° 22' 39.24" N	21° 4' 56.62" E	128.25	0.1	2070	45	4	5.12	F1b
J8	47° 22' 39.16" N	21° 5' 1.38" E	127.79	n.d.	n.d.	n.d.	n.d.	n.d.	F2
J9	47° 22' 39.08" N	21° 5' 6.15" E	128.34	0.05	1010	50	4	5.26	F1b
J10	47° 22' 38.99" N	21° 5' 10.91" E	128.17	n.d.	n.d.	n.d.	n.d.	n.d.	F1a

¹Altitude= Altitude based on DSM (AMSL)

²TSC= Total Salt Concentration [m/m%]

³Na= Na⁺-concentration of the soil (extracted with ammonium lactate)

⁴YTA= yarn test of Arany

⁵GSC= grain size category: 1: sand, 2: sandy loam, 3: loam, 4: clayey loam, 5: clay, 6: heavy clay

⁶ANC= A-Ner Code of vegetation category (6 July 2020) (META Program)

BA – Fine scale mosaic or zonation of marsh communities,

B1a –Eu- and mesotrophic reed and Typha beds,

B3 –Water-fringing helophyte beds with Butomus, Eleocharis or Alisma

B6 –Salt marshes,

D34 – Mesotrophic wet meadows,

F1a – Artemisia salt steppes,

F1b – Achillea steppes on meadow solonetz,

F2 – Salt meadows,

F4 – Dense and tall Puccinellia swards,

F5 – Annual salt pioneer swards of steppes and lakes

H5a - Closed steppes on loess,

n.d. = no data

Table S5. Site Soil Investigation Reports of the 3 soil Profiles.

Sampling Location:		Date of On-site Investigation				Soil Profile Code		
Hortobágy		Year: 2020	Month: July	Day: 8		A1		
Description of the Environment: soil profile in an Achillea steppe in meadow solonetz								
Soil Profile Location: E 21° 04' 27,07"; N 47° 22' 10,67", near sampling point A1								
Soil Profile Depth:		Thickness of Humus Layer:		Depth of Calcic Layer: 65-90 cm	Depth of Phenolphthalein Alkalinity: -		Depth of Water Table from Surface: standing water table: 330 cm	
100 cm		10 cm						
DESCRIPTION OF THE SOIL PROFILE								
Genetic horizon	Sampling depth (cm)	Color	Soil texture	Structure	Moisture state	Effervescence (CaCO ₃) Phenolphtale in alkalinity	Concretions	Transitions
A	0–10	2,5Y3/2	silt loam	moderately structured, subangular blocky, very fine		- -	abundant roots	gradual
E	10–16	2,5Y4/2	silt loam	angular-subangular blocky fine-medium, strongly structured		- -	roots; numerous rust spots	
Btn ₁	16–45	2,5Y2,5/1	silty clay loam	strongly structured, angular blocky, very fine		- -	abundant iron depositions, roots	distinct
Btn ₂	45–65	2,5Y3/2	silty clay loam	strongly structured, angular blocky, very fine-fine		- -	gypsum	
BC _k	65–90	2,5Y4/2	silty clay loam	weakly structured, angular-subangular blocky, very fine-fine-		++ -	Mn and limestone concretions	gradual
Hungarian Soil Name: medium meadow solonetz								
WRB: Endoprotocalcic Epistagnic Solonetz (Albic, Katoclayic)								
Soil Taxonomy: Typic Natrustaf								

Sampling Location:		Date of On-site Investigation				Soil Profile Code			
Hortobágy		Year: 2020	Month: July		Day: 8		B8		
Description of the Environment: soil profile in an Achillea steppe in meadow solonetz									
Soil Profile Location: E 21° 04' 27,07"; N 47° 22' 10,67", near sampling point A1									
Soil Profile Depth:		Thickness of Humus Layer:		Depth of Calcic Layer:		Depth of Phenolphthalein Alkalinity: -		Depth of Water Table from Surface: standing water table: 360 cm	
120 cm		12 cm		65- cm					
DESCRIPTION OF THE SOIL PROFILE									
Genetic horizon	Sampling depth (cm)	Color	Soil texture	Structure	Moisture state	Effervescence (CaCO ₃) Phenolphtale in alkalinity	Concretions	Transitions	
A	0–12	10YR3/1	silt loam	angular blocky, medium		- -	abundant roots; top part matted iron nodules	wave-like interrupted	
E	12–30	2,5Y3/1, 2,5Y 5/2 at cracks	silt loam	angular blocky, fine-medium, strongly structured		- -	lime particles		
B	30–65	2,5Y2,5/1	silty clay loam	polyhedral, strongly structured, angular blocky, fine-medium		- -	rust spots	gradual	
BC	65–110	2,5Y3/1	silty clay loam	strongly structured, angular blocky, polyhedral, fine-medium angular blocky		++ -	matrix effervesces; iron nodules; lime concretions	gradual	
C	110–	2,5Y4/3, mottled	silty clay loam	weakly structured, angular-subangular blocky, fine-medium		+++ -	Mn, Fe, limestone depositions	gradual	
Hungarian Soil Name: deep meadow solonetz									
WRB: Endoprotocalcic Protostagnic Solonetz (Albic, Epiloamic, Katoclayic)									
Soil Taxonomy: Typic Natrustaf									

Sampling Location: Hortobágy		Date of On-site Investigation				Soil Profile Code I4		
		Year: 2020	Month: July	Day: 8				
Description of the Environment: soil profile in an Achillea steppe in meadow solonetz								
Soil Profile Location: E 21° 04' 27,07"; N 47° 22' 10,67", near sampling point A1								
Soil Profile Depth: 75 cm		Thickness of Humus Layer:		Depth of Calcic Layer:	Depth of Phenolphthalein Alkalinity: -		Depth of Water Table from Surface: standing water table: 439 cm	
DESCRIPTION OF THE SOIL PROFILE								
Genetic horizon	Sampling depth (cm)	Color	Soil texture	Structure	Moisture state	Effervescence (CaCO ₃) Phenolphthale in alkalinity	Concretions	Transitions
	E	0-2-8	2,5Y4/2	silt loam	weakly structured, angular blocky, very fine, granular	- -	occasional pale rust spots	wave-like distinct gradual distinct
	B1	2-8-28	10YR2/1; mottled with 10YR 3/2	silty clayey loam	angular-subangular blocky, fine-very fine, strongly structured	- -	clay-humus film;mottled due to clay deposits from above(almost marbled)	
	B2tnk	28-55	10YR2/1; color of concretion 10YR5/3	silty clayey loam	strongly structured, angular blocky, very fine- fine, diamicton	matrix traces; surface of structural elements effervesces, -	lime; gypsum	
	Bck	55-70	2,5Y4/3	silty clayey loam	weakly structured, subangular blocky, very fine-fine	+++ -	lime, Fe, Mn depositions	
Hungarian Soil Name: crusty meadow solonetz WRB: Endoprotocalcic Solonetz (Albic, Katoclayic, Humic) Soil Taxonomy: Typic Natrustaf								

Table S6. Groundwater chemistry data.

Sampling ID	WGS84 Latitude	WGS84 Longitude	Date	Depth	pH	EC ($\mu\text{S}/\text{cm}$)	Total salt content ¹ (mg/l)	CaM (mg/l)	CaEq (meq/l)	KM (mg/l)	Keq (meq/l)	MgM (mg/l)	MgEq (meq/l)	NaM (mg/l)	NaEq (meq/l)	Summa Cation (meq/l)	SAR ²
A1	47° 22' 10.61" N	21° 4' 26.91" E	08/08/2020	330	7.59	5800	3712.0	56.11	2.80	12.82	0.33	55.64	4.58	1170.27	50.88	58.58	26.50
B8	47° 22' 13.26" N	21° 5' 0.39" E	08/08/2020	360	7.65	1399	889.6	29.15	1.45	0.86	0.02	19.41	1.60	272.28	11.84	14.91	9.58
H3	47° 22' 33.11" N	21° 4' 37.31" E	21/05/2020	420	8.08	1360	870.4	8.05	0.40	1.37	0.04	4.39	0.36	358.86	15.60	16.40	25.26
H8	47° 22' 32.69" N	21° 5' 1.13" E	21/05/2020	450	7.30	1208	768.0	62.19	3.10	0.00	0.00	30.57	2.51	183.94	8.00	13.61	4.77
I4	47° 22' 36.26" N	21° 4' 42.2" E	08/08/2020	439	7.77	936	601.6	21.80	1.09	0.00	0.00	5.99	0.49	226.36	9.84	11.42	11.07

¹: calculated from EC according to $\text{TSC} = \text{E.C.} \times 0.64$

²: calculated based on Eq(1)