

Lampela M, Minkkinen K, Straková P, Bhuiyan R, He W, Mäkiranta P, Ojanen P, Penttilä T, Laiho R:
Effects of persistent water-table level drawdown on fine-root biomass and
production in different site types of a boreal forested peatland

Supplementary tables

Table S1. Results of the t-tests.

S1a) The mean differences between the undrained and drained pairs of the same site type for FRB (root diameter < 0.5 mm), with independent samples t-tests. Results with $p < 0.05$ are marked with *. ANOVA between sites for fine root biomass (FRB; root diameter < 0.5 mm) showed a significant site effect ($F(7, 64) = 3.655$, $p = 0.002$).

FRB					T-test		
	N	Mean	SD	SE	df	t	p
DP	9	191.8	78.7	26.2			
DPdr	9	179.9	63.3	21.1	16	0.35	0.729
TP	9	250.3	123.5	41.2			
TPdr	9	120.6	39.8	13.3	16	3.00	0.008*
VS	9	205.7	131.2	43.7			
VSdr	9	267.3	80.5	26.8	16	-1.20	0.248
HS	9	155.5	94.7	31.6			
HSdr	9	342.2	193.0	64.3	16	-2.61	0.019*

S1b) The mean differences between the undrained and drained pairs of the same site type for biomass of different root diameter classes, with independent samples t-tests. Results with $p < 0.05$ are marked with *

FRB						T-test		
Site	Diam. class	N	Mean	SD	SE	df	t	p
DP	Other species < 0.5 mm	9	68.16	37.61	12.54			
DPdr	Other species < 0.5 mm	9	45.01	18.60	6.20	16	1.66	0.117
DP	Trees < 0.5 mm	9	123.61	59.87	19.96			
DPdr	Trees < 0.5 mm	9	134.89	69.02	23.01	16	-0.37	0.716
DP	Trees 0.5-1 mm	9	122.69	55.42	18.47			
DPdr	Trees 0.5-1 mm	9	71.42	29.68	9.89	16	2.45	0.026*
DP	Trees 1-2 mm	9	149.97	124.06	41.35			
DPdr	Trees 1-2 mm	9	113.31	44.58	14.86	16	0.83	0.416
DP	Altogehter 0-2 mm	9	464.43	231.44	77.15			
DPdr	Altogehter 0-2 mm	9	364.63	92.21	30.74	10.5 ^{a)}	1.20	0.256
TP	Other species < 0.5 mm	9	227.74	133.84	44.61			
TPdr	Other species < 0.5 mm	9	15.88	23.70	7.90	8.5 ^{a)}	4.68	0.001*
TP	Trees < 0.5 mm	9	22.57	29.28	9.76			
TPdr	Trees < 0.5 mm	9	104.71	45.31	15.10	16	-4.57	0.000*
TP	Trees 0.5-1 mm	9	14.11	17.11	5.70			
TPdr	Trees 0.5-1 mm	9	89.66	38.17	12.72	16	-5.42	0.000*
TP	Trees 1-2 mm	9	4.00	7.76	2.59			
TPdr	Trees 1-2 mm	9	76.57	35.17	11.72	8.8 ^{a)}	-6.04	0.000*
TP	Altogehter 0-2 mm	9	268.43	116.42	38.81			
TPdr	Altogehter 0-2 mm	9	286.81	87.69	29.23	16	-0.38	0.710
VS	Other species < 0.5 mm	9	39.76	32.75	10.92			
VSdr	Other species < 0.5 mm	9	16.21	11.25	3.75	16	2.04	0.058
VS	Trees < 0.5 mm	9	165.98	119.06	39.69			
VSdr	Trees < 0.5 mm	9	251.04	72.39	24.13	16	-1.83	0.086
VS	Trees 0.5-1 mm	9	61.01	27.84	9.28			
VSdr	Trees 0.5-1 mm	9	130.15	32.45	10.82	16	-4.85	0.000*
VS	Trees 1-2 mm	9	91.05	46.16	15.39			
VSdr	Trees 1-2 mm	9	141.97	72.19	24.06	16	-1.78	0.094
VS	Altogehter 0-2 mm	9	357.80	167.72	55.91			
VSdr	Altogehter 0-2 mm	9	539.37	145.33	48.44	16	-2.45	0.026*
HS	Other species < 0.5 mm	9	12.29	10.88	3.63			
HSdr	Other species < 0.5 mm	9	3.64	5.31	1.77	11.6 ^{a)}	2.15	0.054
HS	Trees < 0.5 mm	9	143.22	95.89	31.96			
HSdr	Trees < 0.5 mm	9	338.51	190.33	63.44	16	-2.75	0.014*
HS	Trees 0.5-1 mm	9	123.58	114.69	38.23			
HSdr	Trees 0.5-1 mm	9	144.41	81.15	27.05	16	-0.44	0.662
HS	Trees 1-2 mm	9	228.56	210.74	70.25			
HSdr	Trees 1-2 mm	9	188.34	87.06	29.02	16	0.53	0.604
HS	Altogehter 0-2 mm	9	507.66	322.11	107.37			
HSdr	Altogehter 0-2 mm	9	674.90	322.93	107.64	16	-1.10	0.288
a) equal variances not assumed								

S1c) The mean differences between the undrained and drained pairs of the same site type for FRP with independent samples t-tests. No p-values < 0.05 were found. ANOVA between sites for fine root production (FRP) showed a significant site effect ($F(7, 112) = 6.324$, $p = 0.001$).

FRP					T-test		
	N	Mean	SD	SE	df	t	p
DP	14	95.45	82.26	21.98			
DPdr	16	92.67	42.83	10.71	28	0.12	0.907
TP	16	118.38	66.49	16.62			
TPdr	18	119.94	47.57	11.21	32	-0.08	0.937
VS	14	42.28	47.02	12.57			
VSdr	16	69.98	58.04	14.51	28	-1.42	0.166
HS	9	53.58	32.42	10.81			
HSdr	17	30.64	30.07	7.29	24	1.80	0.084

Table S2. Results from LMM models comparing the FRB and FRP with environmental variables. The first five response variables in FRB are comparable to the five response variables in FRP (lowest in the table). In this table are those variables that were taken into the final models. For the full list of tested variables see text. Our intention was to keep all the three random variables corresponding to the clustered sampling procedure in all the models. In some cases the plot level part of the random structure prevented the model functioning and had to be removed. These cases are marked with “parameter not in the model”.

Response variable	Fixed effects estimates		Subplot level:					Plot level:				Random effects estimates			
			Pine basal area, m ²	Spruce basal area, m ²	Birch basal area, m ²	Alder basal area, m ²	Graminoid cov. %	Forbs cov. %	WT 2016&2017 July and August mean, cm	Soil temp. 5 cm, cum. mean 2016&2017	C/N ratio	K mg g ⁻¹	site	plot nested within site	residual
FRB, all roots	Parameter	174.83				14.43							8555.74	1103.25	9753.84
	SE	39.41				5.05							6991.15	1942.51	2128.46
	p	0.01				0.01							0.22	0.57	0.00
FRB, Conifers	Parameter	222.58		-11.73									40720.76	783.51	5607.21
	SE	79.53		2.08									26469.08	1155.21	1223.59
	p	0.03		0.00									0.12	0.50	0.00
FRB, Shrubs and Broadleaf trees	Parameter	53.60				2.96	4.45	-1.53					189.91	parameter is redundant	738.65
	SE	8.99				0.97	1.45	0.55					206.64		156.37
	p	0.00				0.00	0.01	0.01					0.36		0.00
FRB, Graminoids	Parameter	-4.07					4.37						733.38	414.65	676.10
	SE	13.28					0.91						807.07	290.32	147.54
	p	0.77					0.00						0.36	0.15	0.00

Response variable	Fixed effects estimates		Subplot level:								Plot level:		Random effects estimates		
									WT 2016&2017 July and August mean, cm	Soil temp. 5 cm, cum. mean 2016&2017					
		Intercept	Pine basal area, m ²	Spruce basal area, m ²	Birch basal area, m ²	Alder basal area, m ²	Graminoid cov. %	Forbs cov. %			C/N ratio	K mg g ⁻¹	site	plot nested within site	residual
FRB, Forbs	Parameter	5.15					1.04						parameter is redundant	parameter is redundant	1053.42
	SE	5.06					0.42								190.74
	p	0.31					0.02								0.00
FRB, Shrubs	Parameter	-184.72								0.09	1.81		44.25	parameter not in the model	384.43
	SE	66.49								0.04	0.51		59.97		79.38
	p	0.01								0.04	0.01		0.46		0.00
FRB, Pine	Parameter	-66.91	3.70									3.05	parameter is redundant	497.92	1581.54
	SE	24.41	0.79									0.88		360.55	345.12
	p	0.01	0.00									0.00		0.17	0.00
FRB, Spruce	Parameter	-18.99			7.35	20.96							16740.07	673.72	3392.87
	SE	51.19			2.75	3.76							10696.11	792.00	740.38
	p	0.72			0.02	0.00							0.12	0.40	0.00
FRB, Birch	Parameter	-22.28		0.90	3.57				-1.25				18.03	74.01	256.77
	SE	10.35		0.39	0.73				0.51				60.75	74.01	60.52
	p	0.07		0.05	0.00				0.05				0.77	0.32	0.00
FRB, Alder	Parameter	-45.76						-2.54				207.28	383.38	parameter not in the model	276.24
	SE	20.12						0.41				58.96	263.83		52.70
	p	0.07						0.00				0.02	0.15		0.00

Response variable	Fixed effects estimates		Subplot level:								Plot level:		Random effects estimates		
			Pine basal area, m ²	Spruce basal area, m ²	Birch basal area, m ²	Alder basal area, m ²	Graminoid cov. %	Forbs cov. %	WT 2016&2017 July and August mean, cm	Soil temp. 5 cm, cum. mean 2016&2017	C/N ratio	K mg g ⁻¹	site	plot nested within site	residual
FRP, all roots	Parameter	48.70	2.94										295.04	323.00	2524.17
	SE	13.25	0.92										362.63	304.12	385.43
	p	0.01	0.01										0.42	0.29	0.00
FRP, Conifers (FTIR)	Parameter	21.51	1.33										parameter is redundant	31.59	721.31
	SE	4.57	0.32											63.01	117.16
	p	0.00	0.00											0.62	0.00
FRP, Shrubs and Birch (FTIR)	Parameter	10.29	1.75										63.42	parameter not in the model	340.20
	SE	5.01	0.34										58.97		51.85
	p	0.08	0.00										0.28		0.00
FRP, Graminoids (FTIR)	Parameter	0.73					1.73						18.10	25.72	296.48
	SE	3.26					0.25						29.88	32.00	47.65
	p	0.83					0.00						0.55	0.42	0.00
FRP, Forbs (FTIR)	Parameter	2.88					0.44						1.76	3.25	66.65
	SE	1.32					0.10						5.15	6.21	10.71
	p	0.07					0.00						0.73	0.60	0.00