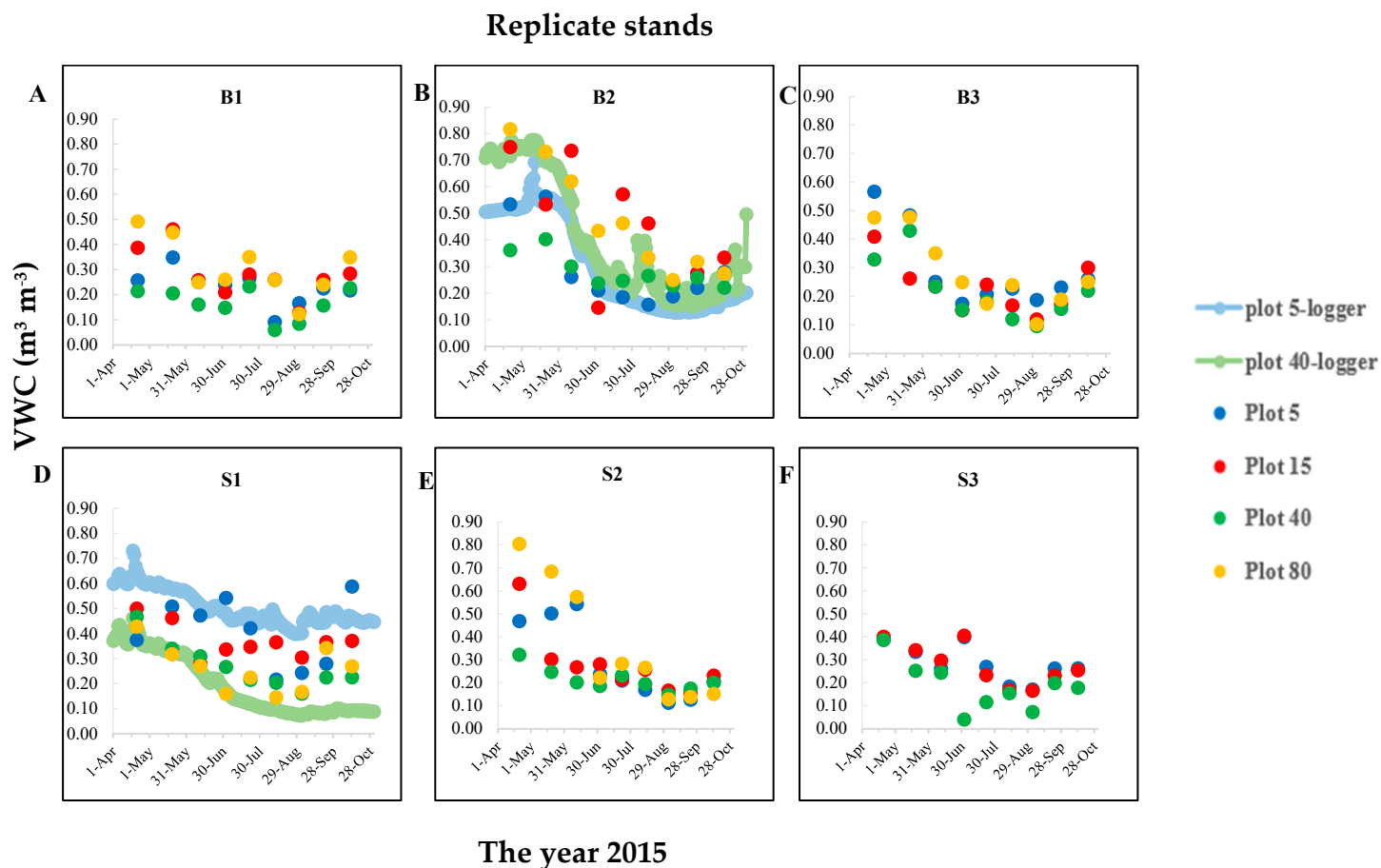


Supplementary Information

1. Supplementary Figures and Tables

1.1. Supplementary Figure



Figures S1A-F. Soil volumetric water content (VWC, $\text{m}^3 \text{m}^{-3}$) was recorded monthly in the 5–10 cm layer using a ProCheck reader equipped with a GS3 sensor (Decagon Devices Inc.) at four sampling plots of 5, 15, 40, and 80 (m) of distances from the ditch for replicate stands of birch (B1- B3) and spruce (S1-S3) during April-October 2015. Figure S1 (B and D) also shows the soil VWC measured with reflectometers (model CS615, Campbell Scientific Inc., Logan, UT, USA) collected in 1 min intervals and stored as 10 min averages on a data logger (CR1000, Campbell Scientific Inc., Logan, UT, USA) measured at plot 5 and plot 40 in B2 and S1 in 2015. Reflectometers installed 3-5 cm deeper than ProCheck reader equipped with a GS3 sensor (Decagon Devices Inc.).

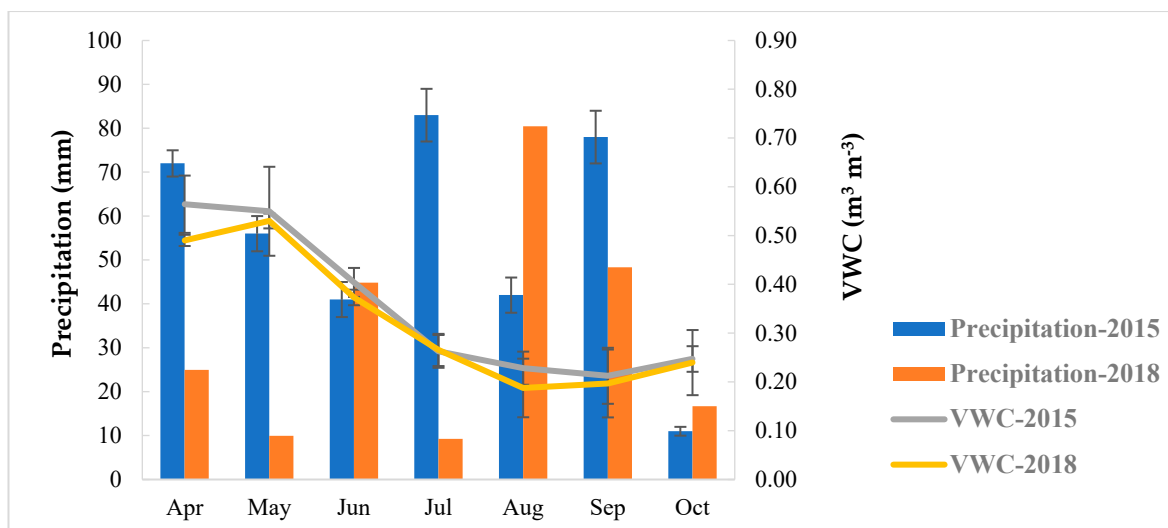
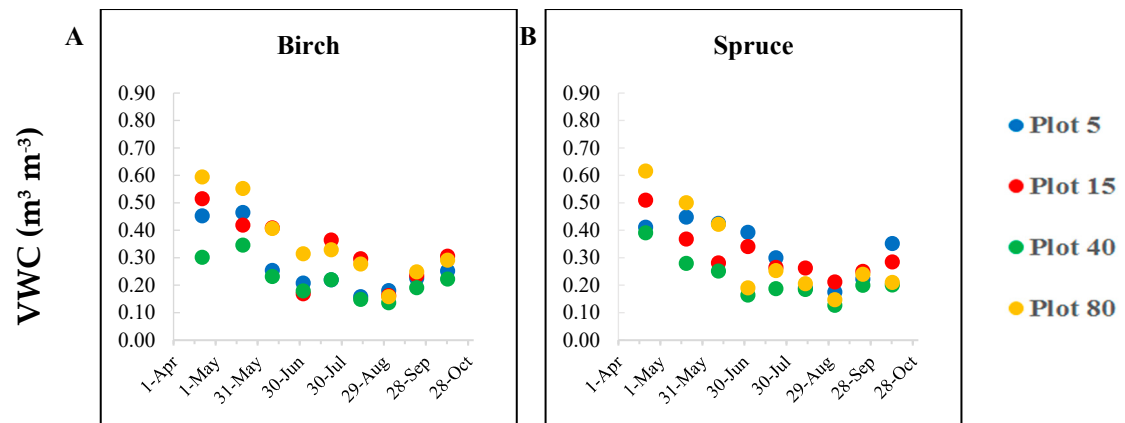


Figure S2. The sum of monthly precipitation (mm) was averaged over ten weather stations in South-Estonia for 2015 (means \pm standard errors) and measured at SMEAR station for 2018. Means \pm standard errors of the soil volumetric water content (VWC, $\text{m}^3 \text{m}^{-3}$) from CR1000 logger data of two sampling plots (5 and 40), and of replicate stands (B2 and S1) from April-October for 2015 and 2018.



Figures S3A,B. Means of soil volumetric water content (VWC, $\text{m}^3 \text{m}^{-3}$) were recorded monthly in the 5-10 cm layer at four sampling plots of 5, 15, 40, and 80 (m) distances from the ditch for birch and spruce averaged over relevant replicate stands during April-October 2015.

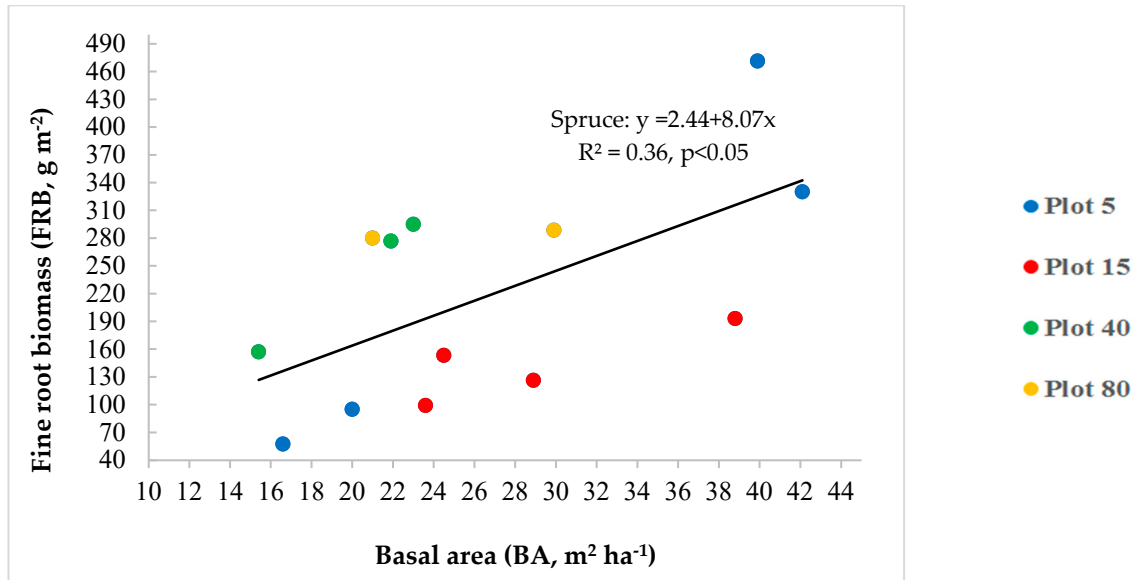


Figure S4. Relationship between fine root biomass (FRB, g m⁻²) and stand basal area (BA, m² ha⁻¹) in four sampling plots of Norway spruce stand.

1.2. Supplementary Tables

Table S1. Means \pm standard errors of absorptive root morphological traits per each sampling plot at distances of 5, 15, 40, and 80 m from the ditch in each replicate stand of birch (B1-B3) and spruce (S1-S3) (n=20), and of four sampling plots per each replicate stand. D—diameter (mm), L—length (mm), W—dry weight (mg), BL—branching intensity per length (cm^{-1}), BL_w—branching intensity per mass (mg^{-1}), SRA—specific root area ($\text{m}^2 \text{kg}^{-1}$), SRL—specific root length (m g^{-1}), and RTD—root tissue density (kg m^{-3}). Small letters indicate a statistically significant difference (one-way ANOVA, followed by Tukey's HSD; $p < 0.05$) of the mean absorptive root morphological traits between four sampling plots in each stand. Capital letters denote a statistically significant difference (one-way ANOVA, followed by Tukey's HSD; $p < 0.05$) of the mean absorptive root morphological traits of four sampling plots among three birch and three spruce stands.

Root traits	Replicate Stand	Distances from the drainage ditch (m)				Means of four sampling plots
		5	15	40	80	
D (mm)	B1	0.252 \pm 0.004 ^{ab}	0.253 \pm 0.005 ^{ab}	0.216 \pm 0.008 ^c	0.236 \pm 0.006 ^{abc}	0.239 \pm 0.009 ^A
	B2	0.220 \pm 0.006	0.211 \pm 0.003	0.225 \pm 0.004	0.208 \pm 0.006	0.216 \pm 0.004 ^B
	B3	0.210 \pm 0.007 ^c	0.228 \pm 0.006 ^{abc}	0.221 \pm 0.006 ^{abc}	0.243 \pm 0.009 ^a	0.226 \pm 0.007 ^B
	S1	0.295 \pm 0.009 ^a	0.273 \pm 0.004 ^{bc}	0.263 \pm 0.002 ^{bc}	0.272 \pm 0.003 ^{bc}	0.276 \pm 0.007
	S2	0.279 \pm 0.004 ^{abc}	0.267 \pm 0.004 ^{bc}	0.271 \pm 0.004 ^{bc}	0.289 \pm 0.006 ^a	0.277 \pm 0.005
	S3	0.269 \pm 0.003 ^{abc}	0.260 \pm 0.003 ^c	0.281 \pm 0.007 ^a		0.270 \pm 0.006
L (mm)	B1	1.39 \pm 0.06	1.42 \pm 0.08	1.38 \pm 0.06	1.38 \pm 0.05	1.39 \pm 0.01 ^A
	B2	0.95 \pm 0.05 ^{abc}	1.12 \pm 0.07 ^a	0.86 \pm 0.06 ^c	0.92 \pm 0.04 ^{abc}	0.96 \pm 0.06 ^B
	B3	1.01 \pm 0.04 ^{bc}	1.27 \pm 0.04 ^a	0.79 \pm 0.05 ^c	1.19 \pm 0.10 ^{ab}	1.07 \pm 0.11 ^B
	S1	2.06 \pm 0.11 ^a	1.73 \pm 0.05 ^c	1.95 \pm 0.09 ^{abc}	1.80 \pm 0.06 ^{abc}	1.89 \pm 0.07
	S2	1.84 \pm 0.06	1.68 \pm 0.06	1.72 \pm 0.07	1.76 \pm 0.05	1.75 \pm 0.03
	S3	1.84 \pm 0.04	1.94 \pm 0.03	1.92 \pm 0.05		1.90 \pm 0.03
W (mg)	B1	0.0194 \pm 0.0008	0.0190 \pm 0.0013	0.0154 \pm 0.0013	0.0162 \pm 0.0012	0.0175 \pm 0.0010 ^A
	B2	0.0088 \pm 0.0007	0.0100 \pm 0.0006	0.0088 \pm 0.0010	0.0072 \pm 0.0006	0.0087 \pm 0.0006 ^C
	B3	0.0089 \pm 0.0004 ^c	0.0134 \pm 0.0008 ^a	0.0074 \pm 0.0007 ^c	0.0135 \pm 0.0018 ^a	0.0108 \pm 0.0016 ^B
	S1	0.0397 \pm 0.0025 ^a	0.0291 \pm 0.0011 ^{bc}	0.0316 \pm 0.0016 ^{bc}	0.0289 \pm 0.0014 ^{bc}	0.0323 \pm 0.0025
	S2	0.0315 \pm 0.0010	0.0273 \pm 0.0011	0.0293 \pm 0.0014	0.0321 \pm 0.0017	0.0301 \pm 0.0011
	S3	0.0321 \pm 0.0011	0.0319 \pm 0.0009	0.0362 \pm 0.0011		0.0334 \pm 0.0014
BL (cm^{-1})	B1	7.45 \pm 0.34	7.53 \pm 0.46	7.49 \pm 0.32	7.37 \pm 0.24	7.46 \pm 0.03 ^B
	B2	11.11 \pm 0.59 ^{abc}	9.76 \pm 0.77 ^c	12.76 \pm 0.87 ^a	11.34 \pm 0.54 ^{abc}	11.24 \pm 0.61 ^A
	B3	10.17 \pm 0.40 ^{bc}	8.07 \pm 0.29 ^{bc}	13.52 \pm 0.74 ^a	9.50 \pm 0.75 ^{bc}	10.32 \pm 1.15 ^A
	S1	5.09 \pm 0.24	5.88 \pm 0.19	5.32 \pm 0.23	5.70 \pm 0.22	5.50 \pm 0.18
	S2	5.55 \pm 0.17	6.10 \pm 0.23	5.99 \pm 0.25	5.76 \pm 0.17	5.85 \pm 0.12
	S3	5.56 \pm 0.14	5.20 \pm 0.09	5.28 \pm 0.15		5.35 \pm 0.11
BL _w (mg^{-1})	B1	53.5 \pm 2.3 ^{bc}	57.4 \pm 4.1 ^{bc}	74.3 \pm 6.0 ^a	67.7 \pm 4.7 ^{abc}	63.2 \pm 4.8 ^C
	B2	125.9 \pm 9.0 ^{abc}	110.4 \pm 8.9 ^c	132.4 \pm 10.2 ^{abc}	157.9 \pm 13.7 ^a	131.7 \pm 9.9 ^A
	B3	117.6 \pm 6.9 ^b	78.7 \pm 3.8 ^c	157.5 \pm 13.1 ^a	93.2 \pm 8.8 ^{bc}	111.8 \pm 17.2 ^B
	S1	26.8 \pm 1.4 ^c	35.4 \pm 1.5 ^{ab}	33.2 \pm 1.6 ^{ab}	36.1 \pm 1.7 ^{ab}	32.9 \pm 2.1

	S2	32.3±1.0	37.6±1.4	36.1±2.2	33.0±1.8	34.8±1.3
	S3	32.6±1.2 ^a	32.2±0.8 ^{abc}	28.1±0.9 ^c		31.0±1.4
SRA (m ² kg ⁻¹)	B1	57±1 ^c	60±1 ^{abc}	64±2 ^{ab}	66±2 ^{ab}	62±2 ^C
	B2	76±2 ^{bc}	75±1 ^{bc}	72±2 ^{bc}	87±3 ^a	78±3 ^A
	B3	75±2	69±2	77±2	72±2	73±2 ^B
	S1	49±2 ^c	52±1 ^{abc}	51±1 ^{abc}	54±1 ^a	52±1
	S2	51±1	52±1	51±1	51±1	51±0
	S3	49±1 ^{abc}	50±1 ^a	47±1 ^c		49±1
SRL (m g ⁻¹)	B1	73±2 ^c	76±3 ^{bc}	99±7 ^a	91±5 ^{ab}	85±6 ^C
	B2	112±4 ^{bc}	113±3 ^{bc}	103±4 ^{bc}	136±7 ^a	116±7 ^A
	B3	116±4 ^a	97±3 ^c	114±5 ^{abc}	98±6 ^{abc}	106±5 ^B
	S1	54±3 ^c	60±2 ^{abc}	62±1 ^{ab}	63±1 ^{ab}	60±2
	S2	58±1	62±1	60±2	57±2	59±1
	S3	58±1 ^{abc}	62±1 ^a	54±2 ^c		58±2
RTD (kg m ⁻³)	B1	281±5 ^{abc}	269±8 ^{bc}	297±7 ^a	262±5 ^{bc}	277±8 ^A
	B2	243±9	255±6	253±8	227±8	245±6 ^B
	B3	263±11	262±11	242±10	236±5	251±7 ^B
	S1	285±7	286±6	299±5	276±8	287±5 ^B
	S2	284±5 ^{abc}	291±5 ^{abc}	293±5 ^a	275±4 ^c	286±4 ^B
	S3	305±3	310±5	308±6		308±2 ^A

Table S2. Pearson's correlation analyses between soil parameters of the forest stands for birch and spruce. The correlation coefficient (r) is presented and statistical significance (p value) is shown as p<0.05 *, p<0.01 **, and p<0.001 ***. Ns. indicates statistically non-significant correlations.

Soil parameters	Tree species	Peat depth	pH-H ₂ O	Ca	C/N
Peat depth	Birch	-	0.87 ***	0.87 ***	Ns.
	Spruce	-	- 0.70 **	Ns.	0.57 *
pH-H ₂ O	Birch	0.87 ***	-	0.64 *	Ns.
	Spruce	- 0.70 **	-	0.69 **	- 0.77 **
Ca	Birch	0.87 ***	0.64 *	-	Ns.
	Spruce	Ns.	0.69 **	-	- 0.56 *
C/N	Birch	Ns.	Ns.	Ns.	-
	Spruce	0.57 *	- 0.77 **	- 0.56 *	-

Table S3. Effect of the forest stand, and distance from the ditch (m) on absorptive root morphological traits in birch and spruce, analyzed by type III general linear model (GLM). L- Length (mm), BIL- branching intensity per length (cm⁻¹), and RTD- root tissue density (kg m⁻³). The statistical significance (p value) is presented for significant effects as p<0.05. Ns. indicates statistically non-significant effects.

Variables	Tree species	L (mm)		BIL (cm ⁻¹)		RTD (kg m ⁻³)	
		<i>F</i>	<i>P</i>	<i>F</i>	<i>P</i>	<i>F</i>	<i>P</i>
Forest stand	Birch	10.04	<0.05	10.06	<0.05	25.66	<0.05
	Spruce	-	Ns.	-	Ns.	-	Ns.
Distance from the ditch (m)	Birch	-	Ns.	-	Ns.	9.43	<0.05
	Spruce	-	Ns.	-	Ns.	-	Ns.

