

Supplement

Title: Root-shoot allometry and drought response of dominant and co-dominant European beech (*Fagus sylvatica* [L.]) and Norway spruce (*Picea abies* [L.] Karst.) in monospecific versus mixed-species stands in Bavaria, Germany

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Tab. S1: Forest yield data at forest stand level by triplet (ARN: Arnstein, KEL: Kelheim, ALL: Allershausen, WAS: Wasserburg, TRA: Traunstein, SP: Spruce monospecific, BP: Beech monospecific, SM: Spruce mixed, BM: Beech mixed, Sa. M: Sum mixed stand, N: Number of trees, HO: Height of the 100 thickest trees per ha, HO100: Height of the 100 thickest trees per ha in the age 100, HG: Quadratic mean height, DO: Quadratic mean diameter of the 100 thickest trees per ha, DG: Quadratic mean diameter, G: Basal area, iG: Current annual basal increment, V: Growing stock, iV: Current annual volume increment, SDI: Stand density index)

Triplet	Stand type	Age	N	HO [m]	HO100 [m]	HG [m]	DO [cm]	DG [cm]	G [m ²]	iG [m ² /a]	V [m ³]	iV [m ³ /a]	SDI
ARN	SP	70	484	32.7	39.0	30.4	41.6	33.5	42.6	0.8	623.8	16.9	774
ARN	BP	85	1018	26.9	30.0	22.7	38.4	21.7	37.5	0.9	452.8	16.0	822
ARN	SM	77	269	31.2	35.4	27.7	45.0	31.1	20.4	0.3	275.8	6.3	825
ARN	BM	77	514	27.3	32.4	23.9	37.3	22.1	19.8	0.6	248.9	11.1	825
ARN	Sa. M		783						40.2	0.9	524.6	17.4	
KEL	SP	60	889	30.5	40.0	26.9	45.5	28.7	57.6	1.6	755.8	32.6	1128
KEL	BP	95	470	32.7	33.7	30.5	39.6	30.7	34.8	0.7	558.0	14.7	654
KEL	SM	90	136	36.3	37.9	33.9	53.3	42.2	19.0	0.4	297.6	6.5	660
KEL	BM	90	214	32.8	34.9	30.4	47.3	33.8	19.3	0.6	315.6	12.5	660
KEL	Sa. M		350						38.3	1.0	613.2	19.0	
ALL	SP	55	1095	24.0	34.5	20.6	32.4	21.7	40.7	1.1	417.1	18.0	872
ALL	BP	55	964	22.3	34.1	19.9	40.4	22.5	38.3	1.1	395.4	19.5	828
ALL	SM	80	248	29.7	33.1	26.8	45.1	31.3	19.1	0.6	242.9	8.5	647
ALL	BM	80	210	26.0	30.2	24.1	48.2	33.6	18.5	0.3	239.6	6.8	647
ALL	Sa. M		458						37.6	0.9	482.5	15.3	
WAS	SP	50	733	25.1	38.4	22.8	38.4	27.9	44.7	1.8	497.6	27.5	875
WAS	BP	55	595	24.4	36.6	22.5	36.6	24.7	28.4	0.9	327.7	17.0	584
WAS	SM	60	208	28.6	37.9	25.4	40.7	28.3	13.1	0.5	162.1	8.1	607
WAS	BM	60	433	24.6	34.8	22.2	34.5	22.3	16.9	0.8	192.0	12.3	607
WAS	Sa. M		641						30.0	1.3	354.1	20.5	
TRA	SP	50	523	28.6	43.1	26.9	41.4	33.0	44.7	1.4	579.0	26.4	815
TRA	BP	65	375	26.5	35.3	24.9	42.3	30.8	28.0	0.9	366.7	16.5	524
TRA	SM	67	294	33.8	41.4	31.3	46.8	36.0	29.9	0.6	445.4	12.3	760
TRA	BM	67	143	30.2	39.0	29.1	41.0	34.0	13.0	0.3	197.1	7.2	760
TRA	Sa. M		437						42.9	0.9	642.6	19.5	

$$SDI = N \times \left(\frac{25}{dg}\right)^{-1.605} \quad (\text{Equation S1})$$

SDI: Stand density index

N: Number of trees per hectare

dg: Diameter of the mean basal area tree

Tab. S2: Standard deviation of the random effects of the intercepts and residuals by Lloret indices resistance, resilience and recovery and by compartments root growth, shoot growth and quotient of root growth and shoot growth (Dep. Variable: Dependent variable, Std. dev.: Standard deviation, Root-Shoot: Quotient of root growth and shoot growth)

Compartment	Dep. variable	Std. dev.	Std. dev.	Residual
		Random effect	Random effect	
		Triplet	Plot in triplet	
Root growth	Resilience	0.2313	0.1694	0.3562
Root growth	Resistance	0.1239	0.0597	0.2992
Root growth	Recovery	0.2526	3.2290e ⁻⁰⁵	0.4504
Shoot growth	Resilience	0.1598	0.0790	0.2509
Shoot growth	Resistance	0.0930	0.0270	0.1886
Shoot growth	Recovery	0.1505	0.0972	0.3177
Root-Shoot	Resilience	0.1690	0.0944	0.4712
Root-Shoot	Resistance	3.2347e ⁻⁰⁵	0.0961	0.4323
Root-Shoot	Recovery	0.1336	1.6626e ⁻⁰⁵	0.3826

Tab. S3: Resistance, resilience and recovery (calculated according to Equations S2 - S4 in the supplementary section) of European beech and Norway spruce by root growth, shoot growth and quotient of root growth and shoot growth and by stand types monospecific and mixed. The standard errors of the arithmetic means are enclosed in brackets (Resist.: Resistance, Recov.: Recovery, Resil.: Resilience, Root growth/Shoot growth: Quotient of root growth and shoot growth)

	Root growth			Shoot growth			Root growth/Shoot growth		
	Resist.	Recov.	Resil.	Resist.	Recov.	Resil.	Resist.	Recov.	Resil.
SP	0.76	0.95	0.70	0.63	1.18	0.72	1.19	0.84	0.97
	(±0.04)	(±0.06)	(±0.06)	(±0.02)	(±0.04)	(±0.02)	(±0.06)	(±0.05)	(±0.07)
BP	0.86	1.25	1.05	0.85	1.14	0.95	1.02	1.14	1.11
	(±0.05)	(±0.07)	(±0.08)	(±0.04)	(±0.04)	(±0.05)	(±0.06)	(±0.05)	(±0.06)
SM	0.74	1.07	0.73	0.61	1.19	0.71	1.25	0.96	1.15
	(±0.04)	(±0.07)	(±0.05)	(±0.02)	(±0.05)	(±0.03)	(±0.07)	(±0.07)	(±0.09)
BM	0.76	1.18	0.82	0.78	1.19	0.91	0.97	1.04	0.97
	(±0.05)	(±0.07)	(±0.05)	(±0.03)	(±0.05)	(±0.05)	(±0.05)	(±0.04)	(±0.05)

Tab. S4: Pairwise comparison of resistance, resilience and recovery (calculated according to equation 2) between the stand types SP-SM, BP-BM, SP-BP and SM-BM by root growth, shoot growth and quotient of root growth and shoot growth (Pe: Parameter estimate; p: p-value; Sig.: Level of significance). Significant differences are marked with asterisks (*: $p \leq 0.05$, **: $p \leq 0.01$, *: $p \leq 0.001$)**

Pairs		Root growth			Shoot growth			Root growth/Shoot growth		
		Resist.	Recov.	Resil.	Resist.	Recov.	Resil.	Resist.	Recov.	Resil.
SP-SM	Pe	0.0156	-0.1335	-0.0284	0.0093	-0.0365	-0.0183	-0.0371	-0.1258	-0.1543
	p	0.9950	0.3605	0.9952	0.9940	0.9690	0.9920	0.9802	0.2710	0.4360
	Sig.									
BP-BM	Pe	0.0607	0.0414	0.1322	0.0503	-0.1125	-0.0251	0.0426	0.1112	0.1510
	p	0.8010	0.9605	0.6994	0.5180	0.5020	0.9794	0.9730	0.4180	0.4870
	Sig.									
SP-BP	Pe	-0.0886	-0.2873	-0.2860	-0.2218	0.0642	-0.2144	0.1932	-0.3002	-0.1156
	p	0.5330	0.0044	0.0931	<0.001	0.8530	0.0072	0.2126	<0.001	0.6780
	Sig.		**		***		**		***	
SM-BM	Pe	-0.0435	-0.1125	-0.1254	-0.1808	-0.0118	-0.2212	0.2728	-0.0632	0.1897
	p	0.8550	0.5186	0.2353	<0.001	0.9970	<0.001	0.0051	0.7970	0.1360
	Sig.				***		***	**		