

Online Material

Table S1. Overview on the 23 mixed Norway spruce-European beech observation plots included in this analysis. Explanation of variables: In the column age span the lowest and highest ages for Norway spruce are listed. The age of European beech can deviate from that by some 5–10 y. For explanation of eco-regions see Arbeitskreis Standortkartierung (1985).

Experimental location	Age span (y)	Geographic position		Eco-region	Elevation a. s. l. (m)	Mean annual Temperature (°C)	Annual Precipitation (mm y ⁻¹)	Substrate
		N-longitude	E-latitude					
Murten 020, 041	34–98	46° 55′–46° 56′	7° 09′–7° 10′	Prévondavaux	520–580	7.9–8.5	845–1.028	Loam, sea molasse
Galmwald 21	34–111	46° 54′	7° 10′–7° 11′	Jeuseck, Galm	580–590	7.9–8.5	845–1.028	Loam, sea molasse
Schongau814	45–120	47° 31′–47° 32′	10° 28′–10° 31′	Kalkalpine Jungmoräne	785–800	6.8	1.114	Loam, pleistocene
Denklingen 43	71–76	47° 54′	10° 47′	Kalkalpine Jungmoräne	740	6.8	1.100	Loam, brash
Freising 813	37–120	48° 14′–48° 30′	11° 23′–11° 31′	Bay. Tertiär-Hügelland	480–515	7.7	814	Loess, molasse
Ehingen 51	34–39	48° 16′	9° 37′	Schwäbische Alb	635	7.7–8.0	850–900	Marl lime, jurassic
Geislingen 76	27–48	48° 36′	9° 52′	Schwäbische Alb	650	6.8	1.050	Marl silt, jurassic
Zwiesel 111	59–107	49° 04′	13° 18′	Innerer Bay. Wald	760	6.2	1.270	Loam, granite
Zwiesel 134	74–93	49° 04′	13° 15′	Innerer Bayer. Wald	710	5.9	1.200	Loam, granite
Zwiesel 135	57–76	49° 04′	13° 15′	Innerer Bayer. Wald	700	5.9	1.200	Loam, granite
Morbach 1501	80–97	49° 51′	7° 08′	Hunsrück	640	6.5	950	Loamy sand, quartzite
Mitterteich 101	57–123	49° 57′	12° 09′	Basaltgebiet Mitterteich	640–650	5.5	900	Loam, basalt
Daun 1206, 1207	32–72	50° 18′	7° 01′	Östliche Hocheifel	445	7.0	750	Para-brown soil, greywacke
Dillenburg 91/92/93	40–56	50° 44′	08° 17′	Westerwald	238	8.2	750	Sandy loam, greywacke
Zobten 39	72–82	50° 54′	16° 45′	Schlesisches Bergland	150	7.5	700–800	Loess-loam, over granite
Uslar 57	48–119	51° 38′	09° 42′	Solling	340	8.2	770–800	Sandy loam, sand stone
Kupferhütte 11	97–107	51° 38′	10° 27′	Oberharz	350	7.5	950	Stonyloam, greywacke
Wieda 114	46–103	51° 38′	10° 34′	Südlicher Mittelharz	480	6.0	1.150	Loam, schist
Neuenheerse 106	59–70	51° 40′	08° 59′	Rothaargebirge	282	8.0	725–1.000	Loamy sand, sand stone
Knobben 44	69–112	51° 41′	09° 36′	Solling	257	8.2	770–800	Sandy loam, sand stone

Table S2. Descriptive statistics for the pure stands of Norway spruce and European beech, the mixed stands and the mixing effects on growth. Listed are for Norway spruce (sp) and beech (be) stand age of pure stands (age_{sp} , age_{be}), dominant height of pure stands at age 100 (h_o), periodic mean annual volume increment of pure stands (PAIV), ratio between productivity of spruce and beech in pure stands ($PAIV_{sp}:PAIV_{be}$), mixing proportions (m), ratio between productivity of spruce and beech in mixed stands ($PAIV_{sp,(be)}:PAIV_{(sp),be}$) mixing proportion of spruce and beech (m_{sp} , m_{be}); mixing effect absolute with respect to stand volume growth ($MEAV_{sp,(be)}$), mixing effect relative with respect to dry mass growth of spruce and beech in the mixed stand ($MERW_{sp,(be)}$; $MERW_{(sp),be}$) and the mixed stand in total ($MERW_{sp,be}$).

Variable	Unit	Sample size <i>n</i>	Mean	Standard deviation	Minimum	Maximum	Range Max.-Min.
Age_{sp}	years	141	83.36	23.29	33.00	150.00	117.00
Age_{be}	years	141	89.41	24.80	33.00	150.00	117.00
h_o_{sp} at age 100	m	140	35.10	4.15	19.70	52.10	32.40
h_o_{be} at age 100	m	140	29.90	2.65	18.80	45.10	26.30
$PAIV_{sp}$	m ³ ha ⁻¹ y ⁻¹	141	14.70	5.24	4.80	36.50	31.70
$PAIV_{be}$	m ³ ha ⁻¹ y ⁻¹	141	10.50	2.92	4.30	29.90	25.60
$PAIV_{sp}:PAIV_{be}$	–	141	1.40	0.44	0.44	2.37	1.93
m_{sp}	–	128	0.61	0.13	0.05	0.95	0.90
m_{be}	–	128	0.39	0.13	0.05	0.95	0.90
$PAIV_{sp,(be)}:PAIV_{(sp),be}$	–	128	1.09	0.36	0.29	2.13	1.84
$MEAV_{sp,be}$	m ³ ha ⁻¹ y ⁻¹	125	+0.51	2.31	–7.23	11.06	18.29
$MERW_{sp,(be)}$	–	124	1.01	0.21	0.43	2.41	1.98
$MERW_{(sp),be}$	–	126	1.41	0.33	0.42	4.80	4.38
$MERW_{sp,be}$	–	125	1.08	0.20	0.54	2.38	1.84

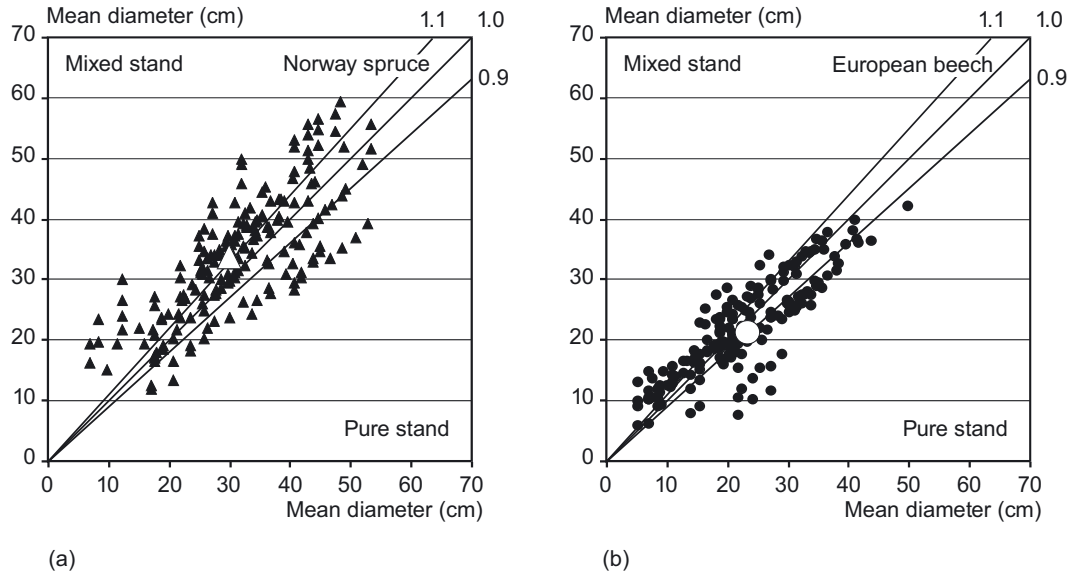


Figure S1. Comparison between the quadratic mean diameter d_q in mixed and pure stand. Mean diameter of (a) Norway spruce and (b) European beech in the mixed stand plotted over the diameter in the neighbouring pure stand. Means (rhombi) for Norway spruce amount to 30.4 cm and 34.0 cm in the pure and mixed stand, respectively. European beech achieves 23.1 in pure and 21.9 in mixed stands.

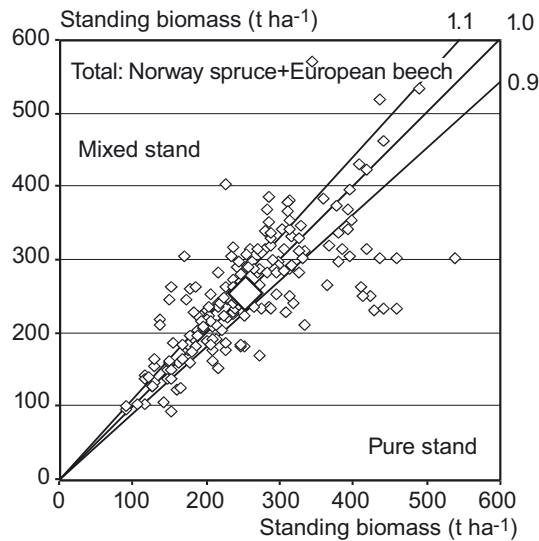


Figure S2. Standing above ground dry mass (t ha⁻¹) in the mixed stand plotted over the expectation values derived from the pure stands. On average (rhombus) the mixed stand achieve 254 t ha⁻¹ while the pure stand deliver an expectation value of 255 t ha⁻¹.