SUPPORTING INFORMATION

Table S1. Species present in the experiment and their respective trait values used in analyses. Traits included: leaf nitrogen content per mass (Leaf Nmass, mg g-1), leaf nitrogen content per area (Leaf Narea, g m-2), specific leaf area (SLA, mm2 mg-1), specific root length (SRL, m g-1), net maximum photosynthesis by leaf mass (A_mass, µmol g-1 s-1), seed mass (log transformed values; Seed Mass), and wood density (WD, g cm-3).

Species	Code	Leaf Nmass	Leaf Narea	SLA	A mass	SRL	Seed Mass	WD
Abies balsamea	Ab	12.23	1.60	7.57	0.06	23.98	0.88	0.37
Acer rubrum	Ar	16.81	1.12	16.52	0.12	64.45	1.35	0.52
Acer saccharum	As	18.69	1.06	19.95	0.11	57.78	1.80	0.62
Betula alleghaniensis	Ba	20.01	0.84	17.52	0.21	90.34	0.34	0.61
Betula papyrifera	Bp	23.14	1.42	16.33	0.26	73.98	-0.47	0.54
Larix laricina	Ll	16.26	1.89	8.67	0.23	41.32	0.20	0.53
Picea glauca	Pg	12.08	3.00	4.51	0.06	48.28	0.35	0.38
Picea rubens	Pru	11.03	1.05	4.24	0.03	68.25	0.52	0.39
Pinus resinosa	Pre	12.46	3.04	3.49	0.08	27.89	0.95	0.46
Pinus strobus	Ps	14.48	2.90	7.67	0.12	16.10	1.18	0.36
Quercus rubra	Qr	20.18	1.50	13.35	0.15	71.94	3.44	0.61
Thuja occidentalis	To	11.85	2.025	4.92	0.12	13.88	0.12	0.31

Trait data source: IDENT TRAIT DATABASE (Belluau, 2020)

672 **Table S2**. Correlation table of each functional trait and the both Principal Components (i.e. PC1
673 and PC2) extracted from the PCA analysis.

Functional Trait	PC1	PC2
Amass	0.6904798	-0.60880949
LNarea	-0.6537786	-0.263928172
LNmass	0.9485813	-0.151553488
SLA	0.9209959	0.107663377
WD	0.9404454	0.141932394
SRL	0.8088467	-0.064570846
Seed mass	0.2378572	0.887808339

Table S3. Summary of the data from IDENT-MTL tree diversity experiment used in this study.

	IDENT-MTL
Location	45°25'30.1"N, 73°56'19.9"W
No. of plots	148 plots (100 mixtures, 48 monocultures) arranged in four blocks
No. of species	12 native species – 6 x deciduous 6 x evergreen (Table S1 to see the species)
Plot size	4 x 4 m (16 m^2)
Trees per plot	64 (40000 trees ha^{-1})
Stand age	11 years (2009-2019)
Study design	12 x monocultures 14 x 2-species mixtures 10 x 4-species mixtures 1 x 12-species mixtures
Sampling design	Annual basal diameter measurement of every alive tree
No. of observations	1100 observations (100 mixtures x 11 years) - Deviation of yield in mixture against the respective monocultures

Figure S4. Cumulative stand basal area (G ± 95 % confidence interval of the means across mixtures and blocks) as a proxy of competition intensity over time in IDENT-MTL. The graph shows that the stand basal area increases steadily during the first years until around years 5 or 6 when competition intensity among trees begins to regulate growth. The moment when stand basal area saturates matches with the moment when complementarity effects begin to increase progressively over time (Fig. 2), suggesting that resource partitioning or facilitation (*sensu* Loreau & Hector 2001) are key mechanisms promoting positive diversity effects under harsher conditions due to competition for resources.

Figure S5. Stand basal area (G ± standard deviation across blocks) by monocultures (blue bars) and mixtures (red bars) for the final year of the experiment (i.e. year 11). Mixtures with significant net diversity effects are annotated with # (positive effect) or - # (negative effect), whereas significant transgressive overyielding is noted using * ($P < 0.05$).

Figure S6. (A) Cumulative stand basal area (*G*) and (B) cumulative mortality through time for each monoculture (blue) and mixture (red). The black lines and the colored area surrounding them represent the mean values ± 95 % confidence intervals.

Appendix S7 – Correction for diameters measured at different heights

From years 1 to 8, tree diameters were measured at 5 cm from ground, and 15 cm onwards. In year 9 we measured diameters of every tree still alive (6742) at both heights. To ensure the change in measurement height did not bias estimates of tree growth, we modelled the difference in diameter measured at 15cm and 5cm using year 9 data through a mixed effect model with species nested in diameter values at 5cm as random factor (noted *R*).

$$D_{15} = D_5 + D_5[Species](R) \quad (1)$$