Supporting Information for

Species mixing promotes plant biomass accumulation and nutrient cycling in forest plantations

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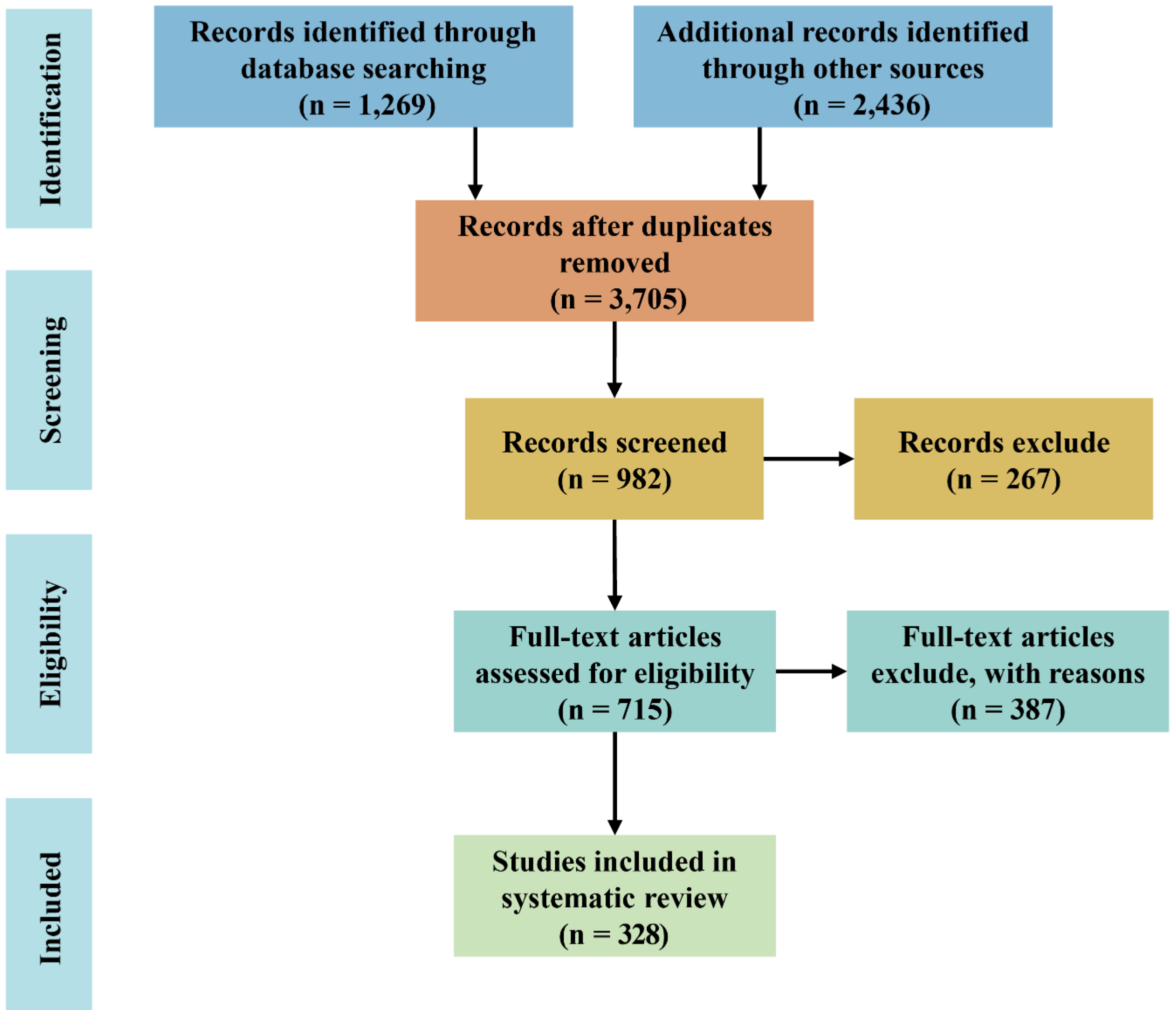
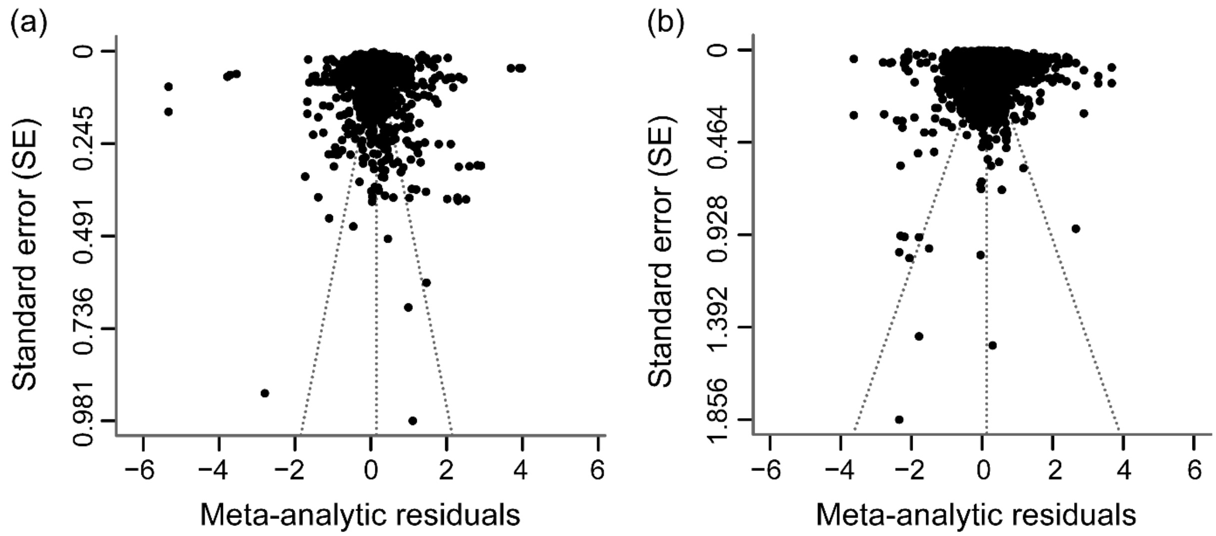
Additional supplementary materials for this manuscript include in the following:

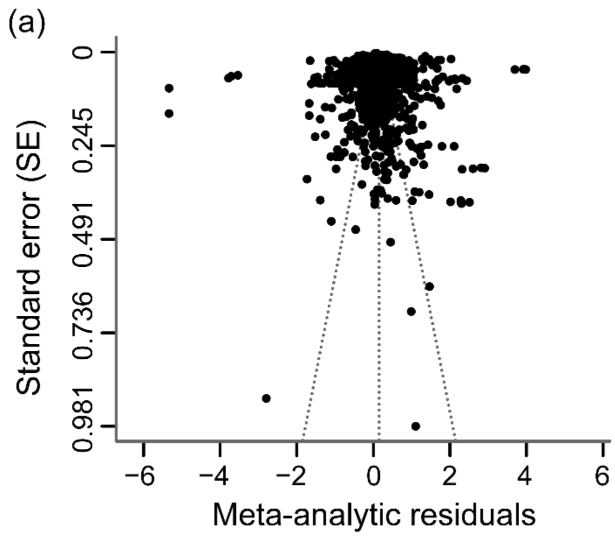
Supplementary Data 1 and 2



Supplementary Fig. 1. Preferred reporting items for systematic reviews and meta-analyses (PRISM) diagram showing the process and locating in this meta-analysis.



Supplementary Fig. 2. Funnel plots showing the relationship between meta-analytic residuals and standard error are used to detect funnel plot asymmetry for plant biomass dataset (a) and nutrient cycling dataset (b).



Supplementary Fig. 3. Trim-and-fill analysis for assessing publication bias for plant biomass dataset (a) and nutrient cycling dataset (b). Filled and open circles denote original and imputed studies, respectively.

Supplementary Table 1. Summary of the results of the meta-analysis on the response of species mixing on plant biomass and nutrient cycling at a global scale, using the response metric *RR* (%).

Response object	N	Mean	LCI	UCI	*P*-value
Biomass	1728	16.4	13.5	19.3	**<0.0001**
Nutrients	6722	14.4	13.3	15.5	**<0.0001**

LCI and UCI represent the lower and upper bounds of the 95% confidence intervals. N represent the sample sizes. Bold values are significant ($P < 0.05$).

Supplementary Table 2. Summary of the results of the meta-analysis on the response of species mixing to the biomass of trees, shrubs, herbs, and litterfall at a global scale, using the response metric *RR* (%).

RR	N	Mean	LCI	UCI	*P*-value
AGB	76	29.0	9.1	48.8	**0.0022**
BGB	69	24.2	4.9	43.6	**0.0107**
TTB	57	19.3	11.1	27.6	**<0.0001**
TAB	31	25.8	11.8	39.8	**<0.0001**
TBB	27	22.0	9.1	35.0	**0.0004**
STB	39	31.7	1.0	62.5	**0.0409**
SAB	18	84.1	8.3	159.9	**0.0206**
SBB	21	49.7	–11.1	110.5	0.1538
HTB	53	19.2	–22.8	61.1	0.5601
HAB	19	22.1	–26.7	70.8	0.6016
HBB	21	17.8	–15.3	50.9	0.4041
UVB	8	9.8	–20.3	40.0	0.7053
LTB	223	36.3	25.0	47.7	**<0.0001**

LCI and UCI represent the lower and upper bounds of the 95% confidence intervals. N represent the sample sizes. AGB, aboveground biomass; BGB, belowground biomass; TTB, tree total biomass; TAB, tree aboveground biomass; TBB, tree belowground biomass; STB, shrub total biomass; SAB, shrub aboveground biomass; SBB, shrub belowground biomass; HTB, herb total biomass; HAB, herb aboveground biomass; HBB, herb belowground biomass; UVB, understory vegetation biomass; LTB, litterfall biomass. Bold values are significant ($P < 0.05$).

Supplementary Table 3. Summary of the results of the meta-analysis on the response of species mixing to the growth indicators and component biomass of trees at a global scale, using the response metric *RR* (%).

RR	N	Mean	LCI	UCI	*P*-value
CL	12	12.4	6.6	18.3	**<0.0001**
CW	91	6.8	2.5	11.2	**0.0018**
DBH	254	7.5	5.2	9.8	**<0.0001**
Height	254	4.9	2.5	7.3	**<0.0001**
Leaf	61	13.0	0.9	25.1	**0.0344**
Shoot	65	18.0	4.4	31.7	**0.0071**
Stem	65	20.9	6.9	34.9	**0.0020**
Bark	13	13.2	–10.8	37.3	0.3566
Root	39	14.0	1.2	26.7	**0.0304**
Coarse root	24	15.6	2.7	28.6	**0.0156**
Fine root	24	8.8	–17.5	35.1	0.6656
Stump	19	36.3	20.5	52.1	**<0.0001**
Volume	177	14.1	0.4	27.8	**0.0425**
MIV	102	37.7	30.4	45.1	**<0.0001**

LCI and UCI represent the lower and upper bounds of the 95% confidence intervals. N represent the sample sizes. CL, crown length; CW, crown width; DBH, diameter at breast height; MIV, mean individual volume. Bold values are significant ($P < 0.05$).

Supplementary Table 4. Summary of the results of the meta-analysis on the response of species mixing to soil nutrient content at a global scale, using the response metric *RR* (%).

RR	N	Mean	LCI	UCI	*P*-value
TC	209	10.1	6.5	13.7	**<0.0001**
SOC	225	20.2	14.6	25.8	**<0.0001**
SCS	20	29.2	8.8	49.6	**0.0028**
MBC	78	14.2	6.6	21.9	**0.0001**
TOC	12	6.0	–16.0	28.1	0.7360
TN	1168	14.7	12.5	16.9	**<0.0001**
AN	684	22.0	18.7	25.3	**<0.0001**
MBN	60	22.3	12.6	32.0	**<0.0001**
TP	728	7.8	4.1	11.5	**<0.0001**
AP	891	24.9	19.6	30.3	**<0.0001**
MBP	20	29.4	–17.5	76.2	0.3329
TK	386	12.3	8.9	15.7	**<0.0001**
AK	774	10.2	7.1	13.2	**<0.0001**
C:N	282	–1.9	–4.8	1.0	0.1870
C:P	75	8.9	–2.7	20.4	0.1441
MBC:MBN	26	–9.1	–20.9	2.7	0.1202
SOM	875	15.5	12.9	18.2	**<0.0001**

LCI and UCI represent the lower and upper bounds of the 95% confidence intervals. N represent the sample sizes. TC, soil total carbon; SOC, soil organic carbon; SCS, soil carbon stock ;MBC, microbial biomass carbon; TOC, soil total organic carbon; TN, total nitrogen; AN, available nitrogen; MBN, microbial biomass nitrogen; TP, total phosphorus; AP, available phosphorus; MBP, microbial biomass phosphorus; TK, total potassium; AK, available potassium; C:N, soil carbon to nitrogen ratio; C:P, soil carbon to phosphorus ratio; MBC:MBN, microbial biomass carbon to nitrogen ratio; SOM, soil organic matter. Bold values are significant ($P < 0.05$).

Supplementary Table 5. Summary of the results of the meta-analysis on the response of species mixing to litterfall nutrient content at a global scale, using the response metric *RR* (%).

RR	N	Mean	LCI	UCI	*P*-value
LTC	7	12.3	–3.2	27.9	0.1333
LTN	17	42.1	12.3	71.9	**0.0024**
LTP	17	28.5	–0.3	57.4	0.0531
LTK	11	46.7	2.1	91.4	**0.0368**
LTC:LTN	7	–10.9	–25.6	3.9	0.1314
LTC:LTP	7	–5.0	–24.9	15.0	0.4977
LTN:LTP	7	8.8	–2.8	20.4	0.1511
LC	10	–1.4	–3.9	1.0	0.2498
LN	29	6.8	1.1	12.6	**0.0180**
LP	29	9.2	4.4	14.0	**0.0001**
LK	5	0.8	–24.3	25.8	0.8509
LC:LN	8	–18.8	–29.0	–8.7	**0.0007**
LC:LP	6	–7.2	–14.6	0.1	0.0529
LN:LP	25	–1.0	–4.0	2.0	0.5079

LCI and UCI represent the lower and upper bounds of the 95% confidence intervals. N represent the sample sizes. LTC, litterfall carbon content; LTN, litterfall nitrogen content; LTP, litterfall phosphorus content; LTK, litterfall potassium content; LTC:LTN, litterfall carbon to nitrogen ratio; LTC:LTP, litterfall carbon to phosphorus ratio; LTN:LTP, litterfall nitrogen to phosphorus ratio; LC, leaf carbon content; LN, leaf nitrogen content; LP, leaf phosphorus content; LK, leaf potassium content; LC:LN, leaf carbon to nitrogen ratio; LC:LP, leaf carbon to phosphorus ratio; LN:LP, leaf nitrogen to phosphorus ratio. Bold values are significant ($P < 0.05$).

Supplementary Table 6. Summary of global meta-analysis of the effects of species mixing on plant biomass and nutrient cycling in forest plantations.

Response object	k	τ^2	Q_t	P-value (Q_t)	I^2
Biomass	1728	0.27	224,881.2	< 0.0001	99.70%
Nutrients	6722	0.16	777,980.3	< 0.0001	99.39%

k is the number of effect sizes; τ^2 represent study-level variance; Q_t is the total heterogeneity of effect sizes; I^2 is metric quantifying the heterogeneity to sampling variance.

Supplementary Data 1 (separate file).
Global dataset of plant biomass accumulation response to species mixing in forest plantations.

Supplementary Data 2 (separate file).
Global dataset of forest nutrient cycling response to species mixing in forest plantations.