

Fig. S1 Preferred reporting items for systematic reviews and meta-analyses (PRISM) diagram showing the process and locating in this meta-analysis.

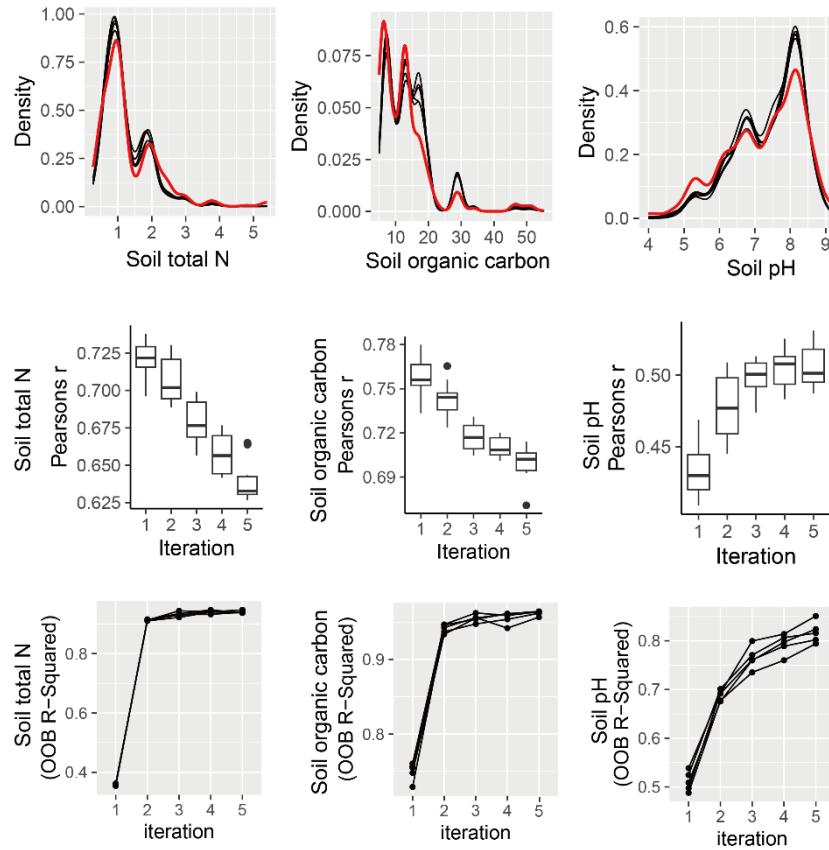


Fig. S2 Interpolation results of soil nutrients and physicochemical properties obtained by chain equation multivariate interpolation method based on random forest.

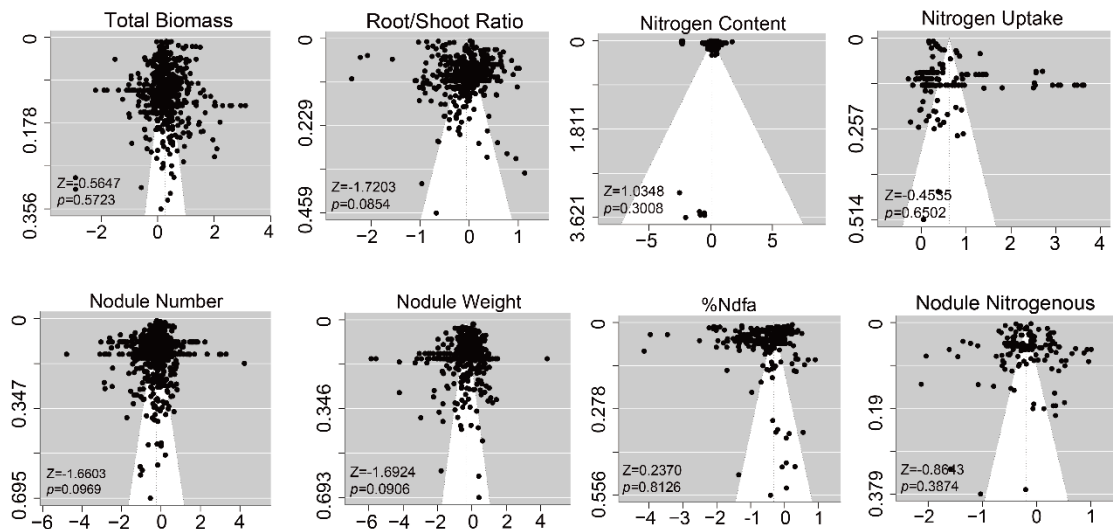


Fig. S3 Overall analysis preference tests. Horizontal coordinates indicate standard errors and vertical coordinates indicate response ratios. The top of each panel contains the results of publication bias tests using Egger's regression (z and p-value). $p < 0.05$

indicate the presence of publication bias. Percentage of Nitrogen Fixation (%Ndfa).

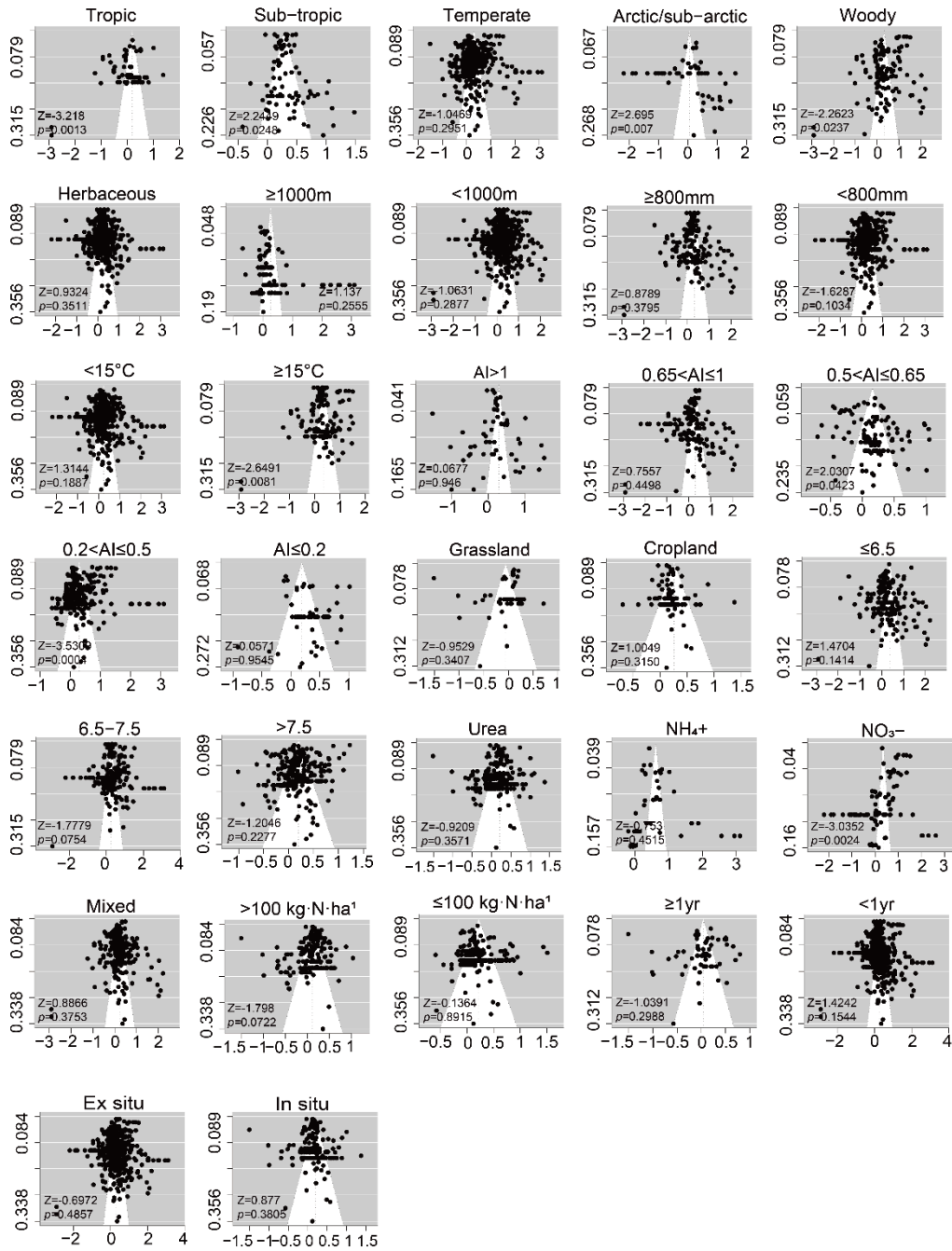


Fig. S4 Subgroup analysis preference tests of total biomass. Horizontal coordinates

indicate standard errors and vertical coordinates indicate response ratios. The top of

each panel contains the results of publication bias tests using Egger's regression (z and

p -value). $p < 0.05$ indicate the presence of publication bias.

Indicators	Effect sizes	95% confidence interval
Total biomass	0.2694	0.1706~0.3682
Root/shoot ratio	-0.0601	-0.1133~-0.0068
Nitrogen content	0.1242	0.0144~0.234
Nitrogen uptake	0.6204	0.1983~1.0424
Nodule number	-0.2376	-0.3842~-0.0911
Nodule weight	-0.3469	-0.5199~-0.174
Nitrogen fixation (%)	-0.3156	-0.4602~-0.1711
Nodule nitrogenous	-0.1888	-0.4298~0.0521

Fig. S5 Effect sizes and confidence intervals for overall analyses of the effects of nitrogen enrichment on the growth and nitrogen fixation capacity of legumes.

Indicators	Indicator types	Effect sizes	95% confidence interval
Latitude	Tropic	0.1879	-0.1149~0.4907
	Sub-tropic	0.2852	0.1547~0.4157
	Temperate	0.3044	0.1725~0.4363
	Arctic/sub-arctic	0.0495	-0.3630~0.4619
Plant species	Woody	0.3197	0.0961~0.5433
	Herbaceous	0.2300	0.1302~0.3297
Altitude	$\geq 1000\text{m}$	0.2594	-0.1047~0.6236
	$< 1000\text{m}$	0.2710	0.1737~0.3684
MAP	$\geq 800\text{mm}$	0.3125	0.1223~0.5027
	$< 800\text{mm}$	0.2502	0.1434~0.3569
MAT	$< 15^{\circ}\text{C}$	0.2402	0.1227~0.3577
	$\geq 15^{\circ}\text{C}$	0.3499	0.1736~0.5261
AI	$\text{AI} > 1.0$	0.2838	-0.0464~0.6141
	$0.65 < \text{AI} \leq 1.0$	0.3036	0.1032~0.5041
	$0.50 < \text{AI} \leq 0.65$	0.1586	0.0118~0.3055
	$0.20 < \text{AI} \leq 0.50$	0.2976	0.1314~0.4637
	$\text{AI} \leq 0.2$	0.1918	-0.0041~0.3877
Terrestrial ecosystem	Grassland	-0.0569	-0.3305~0.2167
	Cropland	0.2609	0.0945~0.4273
Soil pH	≤ 6.5	0.3670	0.1782~0.5558
	6.5-7.5	0.2576	0.0759~0.4394
	> 7.5	0.2004	0.1170~0.2838
Nitrogen fertilizer type	Urea	0.2097	0.0915~0.3279
	$\text{NH}_4^+\text{-N}$	0.6152	0.1481~1.0822
	$\text{NO}_3^-\text{-N}$	0.3481	0.0139~0.6823
	Mixed	0.2264	0.0734~0.3793
Nitrogen addition rate	$> 100 \text{ kg N ha}^{-1}$	0.1171	0.0111~0.2231
	$\leq 100 \text{ kg N ha}^{-1}$	0.2199	0.1397~0.3002
Experimental duration	$\geq 1\text{year}$	0.0402	-0.1451~0.2256
	$< 1\text{year}$	0.2775	0.1580~0.3971
Experimental site	Indoor	0.3028	0.1752~0.4305
	Field	0.1956	0.0640~0.3272

Fig. S6 Effect sizes and confidence intervals for subgroup analyses of the effect of

nitrogen enrichment on total biomass in legumes.