

Supplementary material

New soil carbon sequestration with nitrogen enrichment: a meta-analysis

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Fig. S2 The relationship between N-induced effects on soil C input proxies ($\ln R_I$) and N-induced effects on new soil C stocks ($\ln R_N$).

Data S1. New C stocks and experimental conditions for all studies included in our meta-analysis.

Data S2. Soil C input proxies and experimental conditions for all studies included in our meta-analysis.

Data S3. Old C stocks and experimental conditions for all studies included in our meta-analysis.

Data S4. Total C stocks and experimental conditions for all studies included in our meta-analysis.

Data S5. Respiration of old soil C and experimental conditions for all studies included in our meta-analysis.

Table S1 Overview of the models with the most explanatory power for N-induced effects on new soil C stocks ($\ln R_N$). All models within two AICc units of the top-supported model are shown.

Best-models	Moderator	AICc
1 st	$\ln R_N \sim 1 + \text{Control N}$	135.7106
2 nd	$\ln R_N \sim 1 + \text{Control N} + \text{Clay}$	136.5874
3 rd	$\ln R_N \sim 1 + \text{Plant type} + \text{Control N} + \Delta N$	136.7315
4 th	$\ln R_N \sim 1 + \text{Control N} + \Delta N$	136.7574
5 th	$\ln R_N \sim 1 + \text{Control N} + \text{CN ratio}$	136.8038
6 th	$\ln R_N \sim 1 + \text{Plant type} + \text{Control N}$	136.8182
7 th	$\ln R_N \sim 1 + \text{Control N} + \Delta N + \text{Clay}$	137.2498
8 th	$\ln R_N \sim 1 + \text{Control N} + \text{Clay} + \text{CN ratio}$	137.3919
9 th	$\ln R_N \sim 1 + \text{Other nutrients} + \text{Control N}$	137.4739
10 th	$\ln R_N \sim 1 + \text{Plant type} + \text{Control N} + \Delta N + \text{Clay}$	137.5201
11 th	$\ln R_N \sim 1 + \text{Control N} + \text{CO}_2 \text{ ppm}$	137.6023

Table S2 Overview of the models with the most explanatory power for N-induced effects on soil C input ($\ln R_I$). All models within two AICc units of the top-supported model are shown.

Best-models	Moderator	AICc
1 st	$\ln R_I \sim 1 + \text{Control N} + \text{CN ratio}$	120.6579
2 nd	$\ln R_I \sim 1 + \text{Control N}$	121.0118
3 rd	$\ln R_I \sim 1 + \text{Plant type} + \text{Control N} + \text{CN ratio}$	121.1872
4 th	$\ln R_I \sim 1 + \text{Control N} + \text{CO}_2 \text{ ppm} + \text{CN ratio}$	121.7603
5 th	$\ln R_I \sim 1 + \text{Other nutrients} + \text{Control N} + \text{CN ratio}$	121.8924
6 th	$\ln R_I \sim 1 + \text{Plant type} + \text{Control N} + \Delta N + \text{CN ratio}$	122.0628
7 th	$\ln R_I \sim 1 + \text{Method} + \text{Control N} + \text{CN ratio}$	122.1707
8 th	$\ln R_I \sim 1 + \text{Label type} + \text{Control N}$	122.1965
9 th	$\ln R_I \sim 1 + \text{Plant type} + \text{Other nutrients} + \text{Control N} + \text{CN ratio}$	122.2396
10 th	$\ln R_I \sim 1 + \text{Control N} + \Delta N + \text{CN ratio}$	122.2457
11 th	$\ln R_I \sim 1 + \text{Control N} + \Delta N$	122.3899
12 th	$\ln R_I \sim 1 + \text{Plant type} + \text{Control N} + \text{CO}_2 \text{ ppm} + \text{CN ratio}$	122.4051
13 th	$\ln R_I \sim 1 + \text{Control N} + \text{Clay} + \text{CN ratio}$	122.5674
14 th	$\ln R_I \sim 1 + \text{Control N} + \text{CO}_2 \text{ ppm}$	122.6186

Table S3 Overview of the models with the most explanatory power for N-induced effects on old soil C respiration ($\ln R_{OR}$). All models within two AICc units of the top-supported model are shown.

Best-models	Moderator	AICc
1 st	$\ln R_{OR} \sim 1 + \text{Other nutrients} + \text{Control N} + \Delta N$	19.49341
2 nd	$\ln R_{OR} \sim 1 + \text{Control N} + \Delta N$	19.57815
3 rd	$\ln R_{OR} \sim 1 + \Delta N$	19.58053
4 th	$\ln R_{OR} \sim 1 + \text{Other nutrients} + \Delta N$	20.24332

Table S4 Overview of the models with the most explanatory power for N-induced effects on old soil C stocks ($\ln R_O$). All models within two AICc units of the top-supported model are shown.

Best-models	Moderator	AICc
1 st	$\ln R_O \sim 1 + \text{Control N} + \Delta N + \text{Clay} + \text{CO}_2 \text{ ppm} + \text{CN ratio}$	-196.9888
2 nd	$\ln R_O \sim 1 + \text{Control N} + \Delta N + \text{Duration} + \text{CO}_2 \text{ ppm} + \text{CN ratio}$	-196.6015
3 rd	$\ln R_O \sim 1 + \text{Control N} + \Delta N + \text{CO}_2 \text{ ppm} + \text{CN ratio}$	-196.5938
4 th	$\ln R_O \sim 1 + \text{Method} + \text{Control N} + \Delta N + \text{CO}_2 \text{ ppm} + \text{CN ratio}$	-195.8358
5 th	$\ln R_O \sim 1 + \text{Control N} + \Delta N + \text{Clay} + \text{Duration} + \text{CO}_2 \text{ ppm} + \text{CN ratio}$	-195.4151
6 th	$\ln R_O \sim 1 + \text{Control N} + \Delta N + \text{CO}_2 \text{ ppm}$	-195.3538

Table S5 Overview of the models with the most explanatory power for N-induced effects on total soil C stocks ($\ln R_T$). All models within two AICc units of the top-supported model are shown.

Best-models	Moderator	AICc
1 st	$\ln R_T \sim 1 + \text{CO}_2 \text{ ppm}$	-209.8029
2 nd	$\ln R_T \sim 1 + \text{Control N} + \text{CO}_2 \text{ ppm}$	-208.7923
3 rd	$\ln R_T \sim 1 + \text{Duration} + \text{CO}_2 \text{ ppm}$	-208.1367
4 th	$\ln R_T \sim 1 + \text{CO}_2 \text{ ppm} + \text{pH}$	-208.0492

Fig. S1 Fig. 1 Results of a meta-analysis on the responses of new soil C stocks, old soil C stocks, total soil C stocks and soil C input proxies to N addition in long-term field experiments. The number of observations (n) and total number of independent studies included in each analysis are displayed below each bar. Error bars indicate 95% confidence intervals. ** and *** indicate significance at $p < 0.01$ and $p < 0.001$, respectively.

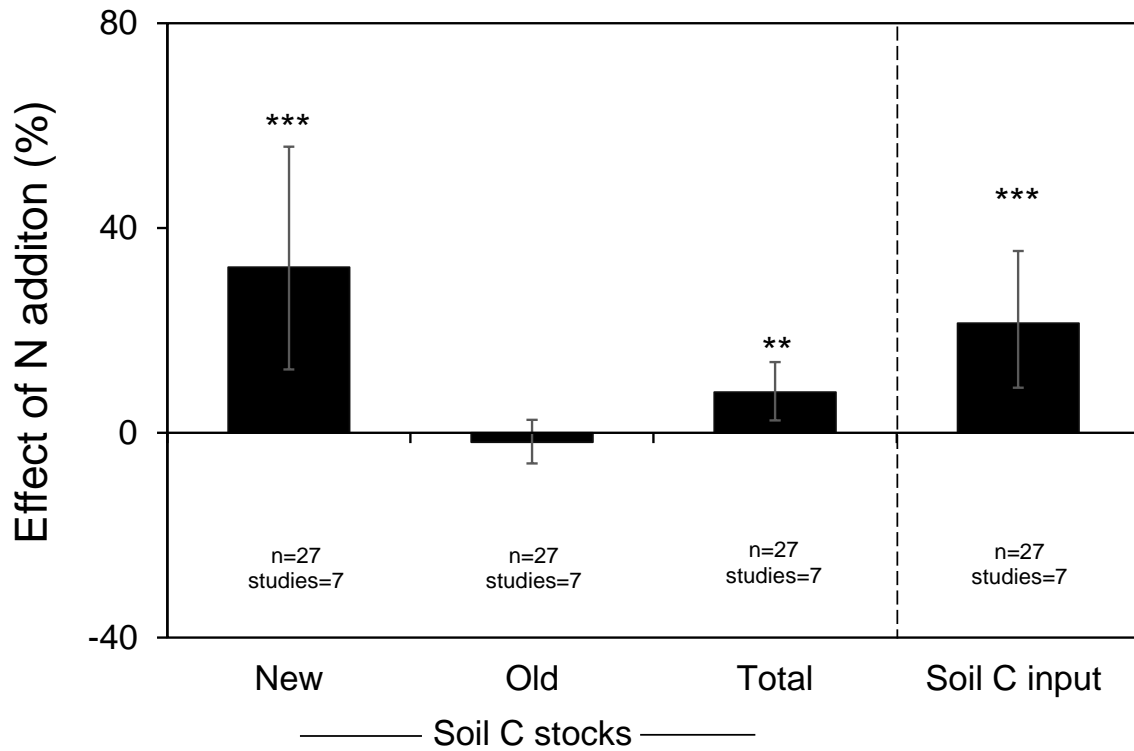


Fig. S2 The relationship between N-induced effects on soil C input proxies ($\ln R_I$) and N-induced effects on new soil C stocks ($\ln R_N$). The analysis is based on 134 paired observations of $\ln R_I$ and $\ln R_N$, derived from 28 independent studies.

