Supplementary

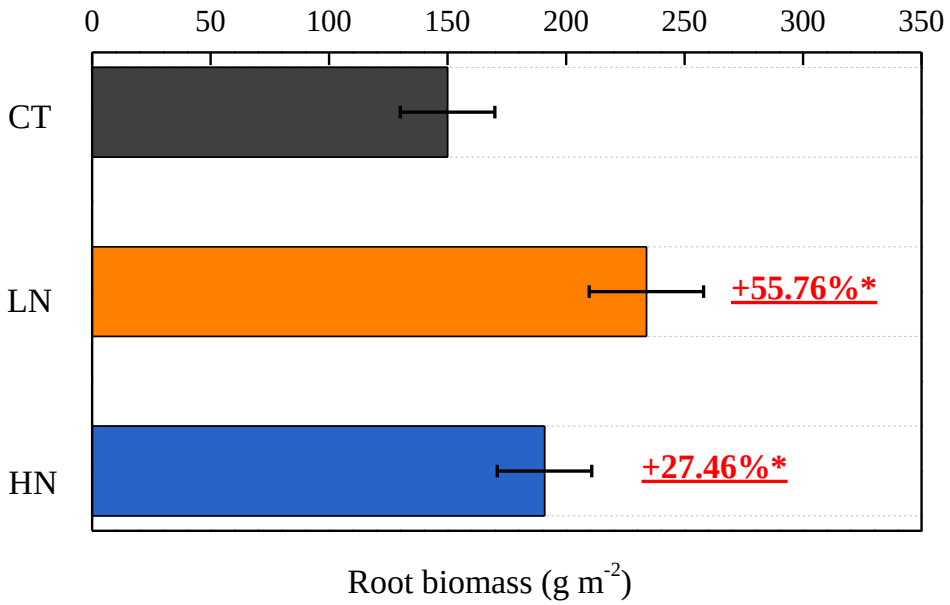

Figure S1 Changes in root biomass under different N addition treatments. Values are means ± standard error (n = 4). * indicates statistically significant differences at $P < 0.05$. CT: control, LN: low nitrogen, HN: high nitrogen.

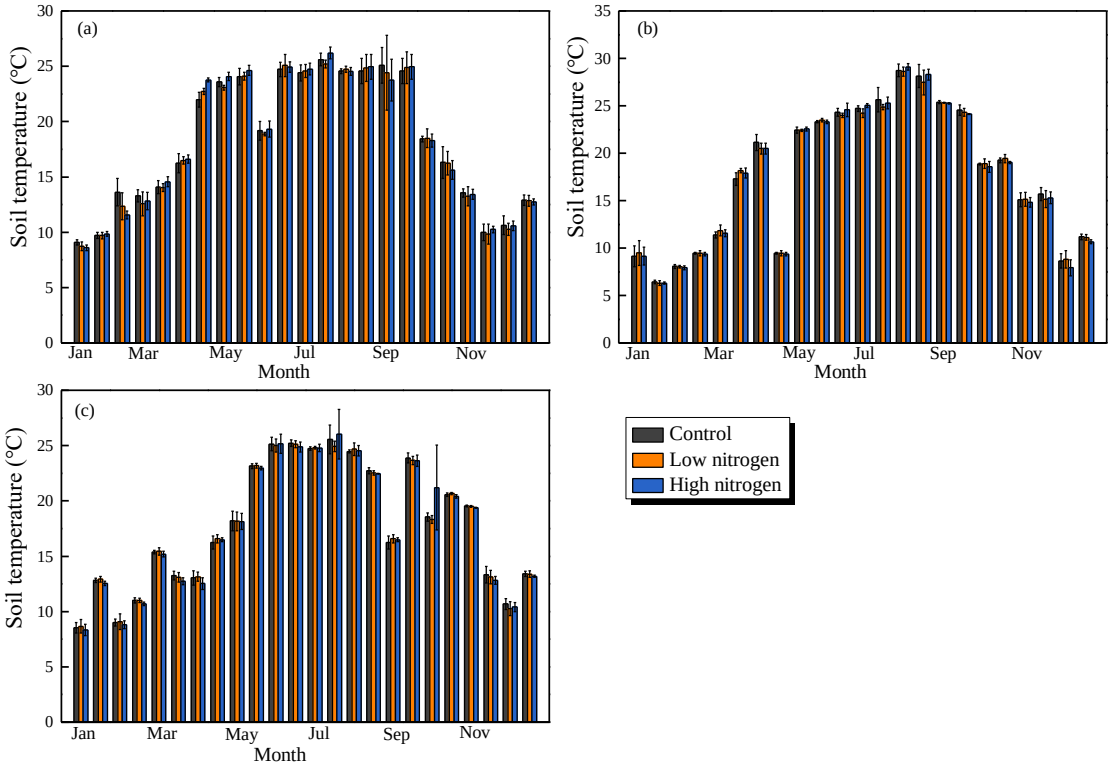

Figure S2 Monthly soil temperature dynamics in 2013 (a), 2014 (b), and 2015 (c).

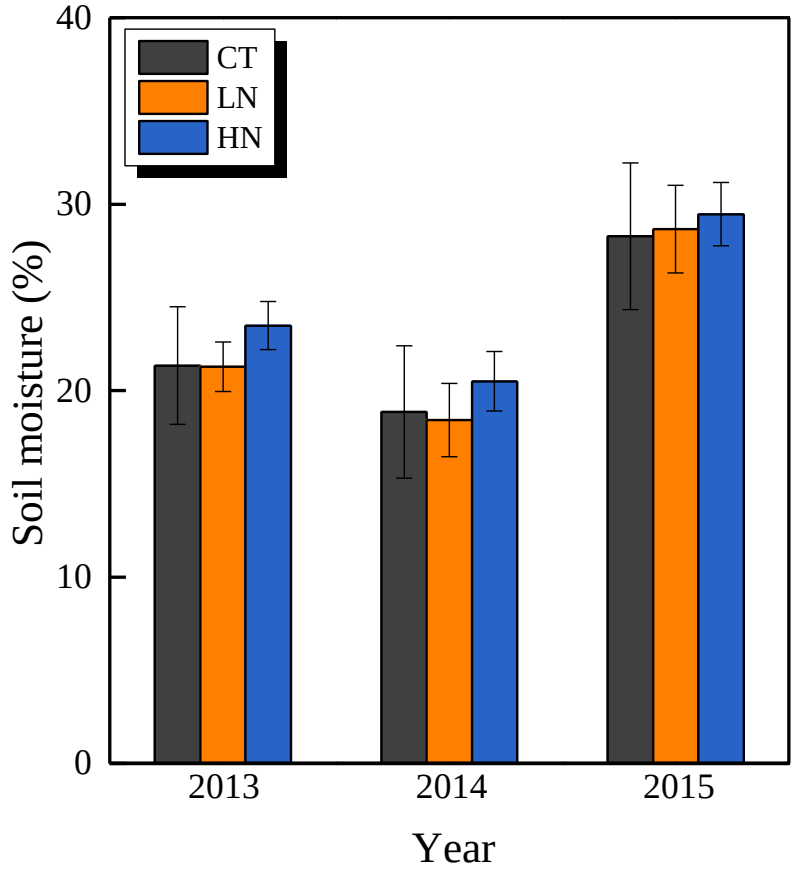

Figure S3 Soil moisture under N addition from 2013 to 2015.

Table S1 Relative carbon (C) distribution (%) in different chemical shift regions in ^{13}C cross-polarization magic-angle spinning of soil under different nitrogen addition treatments.

	CT	LN	HN
Alkyl C	40.56	40.52	35.00
(0-50 ppm)			
Methoxyl and N-alkyl C	8.49	8.59	7.77
(50-60 ppm)			
O-alkyl C	30.81	31.61	29.31
(60-93 ppm)			
Di-O-alkyl and some aromatic C	6.44	6.53	6.60
(93-112 ppm)			
Aromatic C	8.22	7.61	10.81
(112-140 ppm)			
Phenolic C	2.12	1.75	3.98
(140-165 ppm)			
Carboxyl/ carbonyl C	3.37	0.34	6.53
(165-190 ppm)			
Alkyl C/O-alkyl C ratio	0.89	0.87	0.80
Aromaticity	0.11	0.10	0.16

Table S2 The exponential relationship between soil CO_2 emission rate and soil temperature in each subplots under different nitrogen addition treatments.

Treatment	Subplots	Formulas	R^2	p	Q_{10}	Mean of Q_{10}
Control	1	$y=0.792e^{0.069x}$	0.73	<0.001	1.99	2.07±0.11
	2	$y=0.587e^{0.080x}$	0.72	<0.001	2.23	
	3	$y=0.738e^{0.070x}$	0.75	<0.001	2.01	
	4	$y=0.658e^{0.072x}$	0.76	<0.001	2.05	
Low nitrogen	1	$y=0.868e^{0.074x}$	0.72	<0.001	2.10	2.09±0.36
	2	$y=0.804e^{0.075x}$	0.78	<0.001	2.12	
	3	$y=0.875e^{0.071x}$	0.71	<0.001	2.03	
	4	$y=0.749e^{0.074x}$	0.73	<0.001	2.10	
High nitrogen	1	$y=0.544e^{0.076x}$	0.79	<0.001	2.14	2.00±0.12

2	$y=0.651e^{0.072x}$	0.79	<0.001	2.05
3	$y=0.783e^{0.062x}$	0.83	<0.001	1.86
4	$y=0.780e^{0.066x}$	0.78	<0.001	1.94

Table S3 Effects of N addition on the phospholipid fatty acid biomarker concentration (nmol g^{-1} soil). Error bars represent standard deviation (n = 4). The different letters indicate significant differences between treatments at $p < 0.05$. G^+: gram-positive bacteria; G^-: gram-negative bacteria; Bacteria: sum of G^+ and G^-; Unclassified: unclassified biomarkers; ACT: actinomycetes; Total: total PLFA.

	CT	LN	HN
G^+	15.72±1.71a	16.00±1.37a	12.23±1.05b
G^-	14.53±2.18a	13.56±0.87a	8.14±0.92b
Bacteria	30.25±3.28a	29.56±1.62a	20.36±1.48b
Fungi	9.08±0.26a	8.79±0.88a	5.26±0.46b
ACT	7.04±0.75a	6.96±0.52a	5.32±0.46b
Unclassified	16.78±0.75a	16.96±0.99a	11.30±0.66b
Total	48.37±4.09a	47.13±1.80a	32.01±2.33b
G^+: G^- ratio	1.10±0.14a	1.18±0.13a	1.51±0.19b
F: B ratio	0.31±0.04a	0.30±0.05a	0.26±0.01a

Table S4 Characteristics of 16 studies site. *RRs*: Response ratio of soil respiration.

Studies	Ecosystem	N addition (kg N ha^{-1} yr^{-1})	Duration (year)	Species	*RRs*
Lee and Jose (2003)	subtropical plantation	56	1	loblolly pine	-0.11
		112	1		-0.06
		224	1		0.00
		56	1	cottonwood	-0.05
		112	1		-0.16
		224	1		-0.16
Mo et al. (2007)	Tropical disturbed forest	50	2		-0.04
		100	2		-0.08
	Tropical rehabilitated forest	50	2		-0.22
		100	2		-0.11
Mo et al. (2008)	Tropical mature forest	50	2		0.06
		100	2		-0.08
		150	2		-0.16
Koehler et al. (2009)	Tropical forest	125	1		0.10
		125	2		-0.15
		125	3		-0.08
		125	9		-0.05
		125	10		-0.01
		125	11		0.02
Deng et al. (2010)	Subtropical forest	100	3		-0.15

Liu et al. (2010)	Subtropical forest	100	1		0.10
		100	2		0.02
		100	3		0.02
Cao et al. (2011)	Subtropical plantation	50	1	*Acacia mangium Eucalyptus urophylla Pleioblastus amarus*	0.04
		50	1		-0.30
Deng et al. (2013)	Subtropical forest	100	4		0.16
Fan et al. (2014)	Subtropical plantation	60	5	Chinese fir	-0.09
		120	5		-0.20
		240	5		-0.27
		60	6		-0.19
		120	6		-0.43
		240	6		-0.67
Gao et al. (2014)	Subtropical evergreen forest	50	1	*Schima superba, Lithocarpus glaber and Symplocos sumuntia*	0.34
		100	1		0.18
Wang et al. (2016)	Subtropical forest	50	2 month		0.02
		100	2 month		0.14
		150	2 month		0.36
		50	3 month		0.03
		100	3 month		0.14
		150	3 month		0.39
		50	10 month		0.06

		100	10 month		0.14
		150	10 month		0.34
Liu et al. (2017)	Subtropical plantation	40	1	Chinese fir	-0.05
		80	1		0.00
Peng et al. (2017)	Subtropical forest	50	3		-0.06
Gao et al. (2018)	Subtropical forest	50	1	*Schima superba*	0.25
		100	1		0.21
		150	3		-0.36
Li et al. (2019)	Subtropical plantation	30	4	Moso bamboo	0.38
		60	4		0.32
		90	4		0.12
This study	Subtropical natural forest	40	1	*Castanopsis kawakamii*	0.15
		80	1		-0.04
		40	2		0.17
		80	2		-0.13
		40	3		0.21
		80	3		-0.19

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