

Long-term simulated nitrogen deposition has moderate impacts on soil microbial communities across three bioclimatic domains of the eastern Canadian forest

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Supplementary information

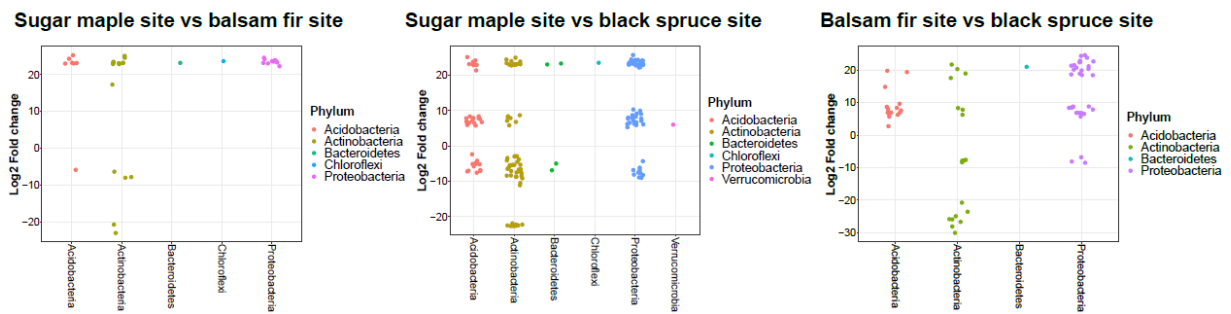
Table S1: Environmental characteristics of the experimental sites selected for this study (from Ste-Marie and Houle, 2006).

	Sugar maple site (Lac Clair)	Balsam fir site (Lac Laflamme)	Black spruce site (Lac Tirasse)
General characteristics			
GPS coordinates	46°57'N 71°40'W	47°17'N 71°14'W	49°12'N 73°29'W
Elevation (m)	270-390	800	400
Mean annual temperature (°C)	3.4	-0.6	0
Mean annual precipitation (mm)	1210	1133	823
N deposition (kg ha ⁻¹ yr ⁻¹)	8.5	5.7	3.0
Vegetation			
Bioclimatic domain	Sugar maple – yellow birch	Balsam fir – white birch	Black spruce – moss
Dominant tree species	<i>Acer saccharum</i>	<i>Abies balsamea</i>	<i>Picea mariana</i>
Associated vegetation	<i>Betula alleghaniensis</i> <i>Fagus grandifolia</i>	Moss	Moss
Forest origin	Partial cutting	Clear cut	Forest fire
Forest age (yr)	>130	70	70
Forest cover (%)	97	100	95
F-H horizons properties			
Humus type	Mor-moder	Mor	Mor
Layer depth (cm)	12	7	6
Rooting depth (m)	0.6	0.6	0.3
pH	3.72	4.08	2.88
Mean annual temperature (°C)	5.0	3.6	4.0
Water content (%)	75	72	74

Table S2: Results of one-way ANOVA and Kruskal-Wallis tests showing soil N concentration, C:N, and pH statistical differences between N addition treatments in F and H horizons at the sugar maple, balsam fir, and black spruce experimental sites. For all statistical tests, degrees of freedom are equal to two. Stars indicate statistically significant *p* values.

(a) Sugar maple site						
	F horizon			H horizon		
	N	C:N	pH	N	C:N	pH
2013	F = 0.35 <i>p</i> = 0.7200	F = 1.64 <i>p</i> = 0.2700	Control > High N F = 6.46 <i>p</i> = 0.0367 *	$\chi^2 = 2.51$ <i>p</i> = 0.2851	$\chi^2 = 1.69$ <i>p</i> = 0.4298	F = 1.84 <i>p</i> = 0.238
2021	$\chi^2 = 2.49$ <i>p</i> = 0.2881	F = 0.34 <i>p</i> = 0.7230	F = 2.34 <i>p</i> = 0.1770	F = 0.66 <i>p</i> = 0.5520	$\chi^2 = 2.98$ <i>p</i> = 0.2253	F = 0.11 <i>p</i> = 0.8970
(b) Balsam fir site						
	F horizon			H horizon		
	N	C:N	pH	N	C:N	pH
2013	High N > Control F = 9.08 <i>p</i> = 0.0217 * High N > Low N F = 9.08 <i>p</i> = 0.0262 *	High N < Control F = 8.59 <i>p</i> = 0.0242 * High N < Low N F = 8.59 <i>p</i> = 0.0297 *	F = 0.79 <i>p</i> = 0.4940	F = 1.12 <i>p</i> = 0.3860	F = 1.40 <i>p</i> = 0.3160	F = 0.63 <i>p</i> = 0.5630
2021	F = 2 <i>p</i> = 0.2160	F = 3.32 <i>p</i> = 0.1070	F = 0.92 <i>p</i> = 0.4470	F = 0.50 <i>p</i> = 0.6280	F = 1.43 <i>p</i> = 0.3090	F = 0.27 <i>p</i> = 0.7690
(c) Black spruce site						
	F horizon			H horizon		
	N	C:N	pH	N	C:N	pH
2013	F = 0.16 <i>p</i> = 0.8550	F = 0.35 <i>p</i> = 0.7180	F = 0.02 <i>p</i> = 0.9820	F = 0.25 <i>p</i> = 0.7900	F = 0.53 <i>p</i> = 0.6190	$\chi^2 = 0.55$ <i>p</i> = 0.7575
2021	$\chi^2 = 1.48$ <i>p</i> = 0.4772	F = 0.75 <i>p</i> = 0.5180	F = 0.09 <i>p</i> = 0.9140	F = 1.51 <i>p</i> = 0.3060	F = 1.41 <i>p</i> = 0.3280	F = 0.01 <i>p</i> = 0.9880

(a)



(b)

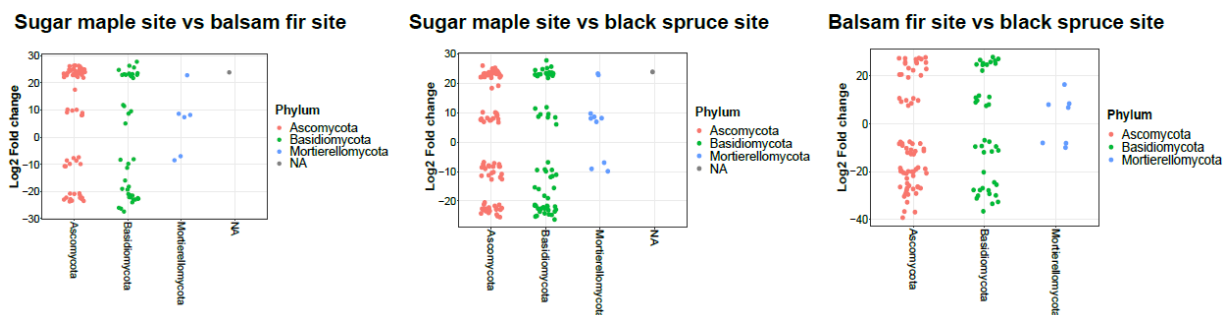
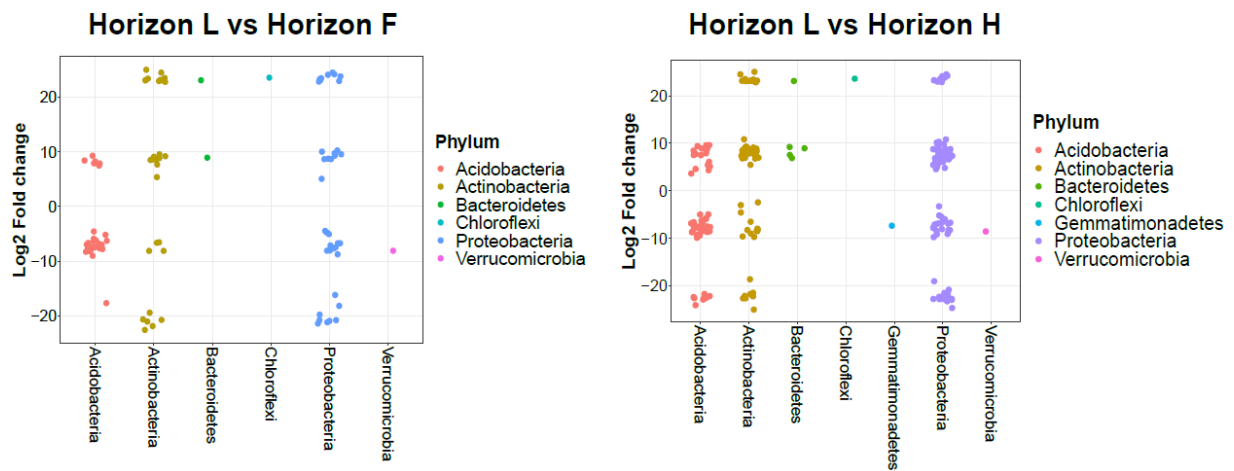


Figure S1: Soil bacterial (a) and fungal (b) ASVs differential abundance analysis between study sites in control plots. Points represent ASVs with abundance differing significantly ($p < 0.05$) between treatments. Colors were assigned to phyla.

(a)



(b)

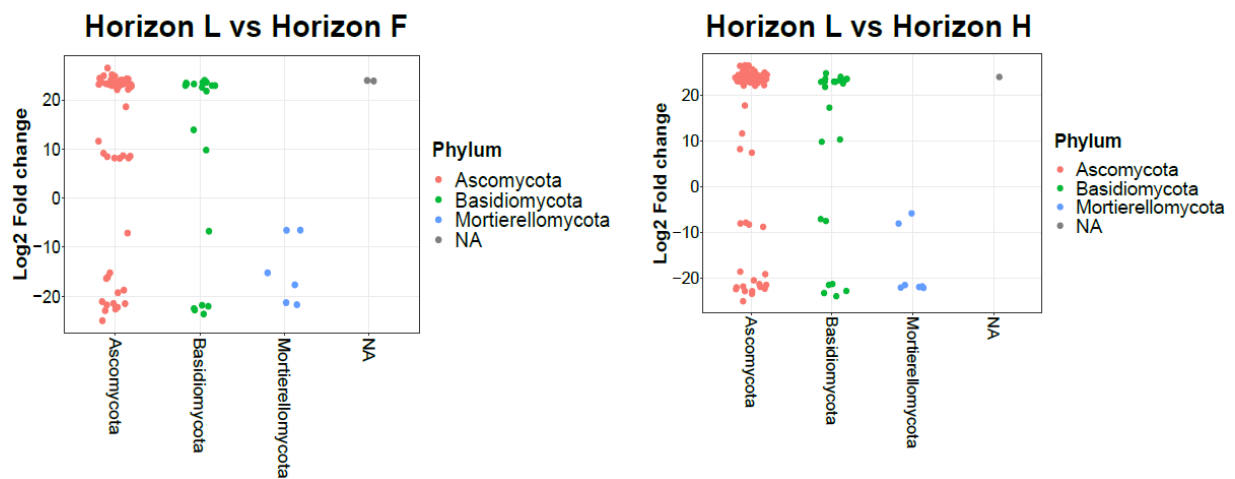


Figure S2: Soil bacterial (a) and fungal (b) ASVs differential abundance analysis between L, F, and H horizons in control plots at the sugar maple, the balsam fir, and the black spruce sites. Points represent ASVs with abundance differing significantly ($p < 0.05$) between treatments. Colors were assigned to phyla.

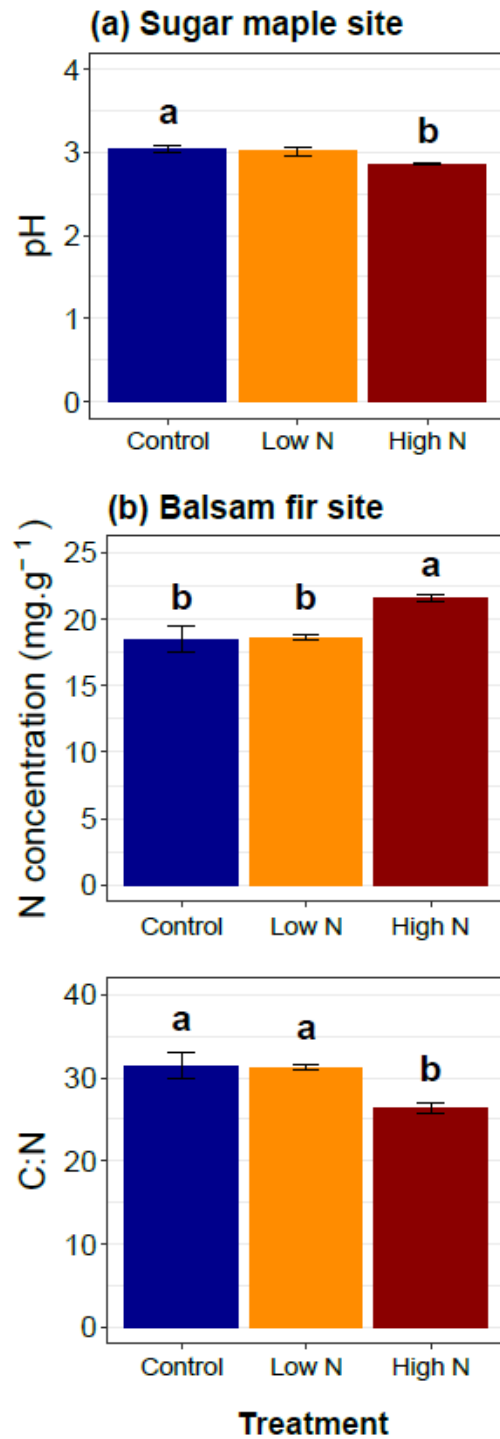


Figure S3: Soil pH (at the sugar maple site), N concentration, and C:N (at the balsam fir site) under control, low N, and high N treatments measured in the F horizon in 2013. Letters indicate statistical differences between treatments.