Appendix A. Supplementary results, including carbon pool sizes with respect to invasion and land use, supported models for explaining the differences in carbon pools, specific enzyme activities and litter mass, and interaction plots for total soil organic carbon.

TABLE A1. Carbon pool sizes in invaded and uninvaded areas embedded within forested (For), agricultural (Ag), and urban landscapes. Data for total C, particulate organic C (POMC), mineral-associated organic C (MAOMC), microbial biomass C and root C are shown as means (SE). Units are g m^{-2}. *P* value is reported for the effect of invasion within each land use. Values <0.05 are shown in bold. Asterisks indicate a significant ($P < 0.05$) main effect of invasion averaged over land use. The main effect of land use was never significant.

Land Use	Invasion Status	Total C*	POMC*	MAOMC	Microbial C*	Root C*
For	Uninvaded	2237.9 (246.9)	924.8 (126.2)	1313.1 (155.0)	10.3 (1.6)	53.6 (6.0)
	Invaded	1764.9 (140.1)	631.8 (58.3)	1133.1 (106.1)	6.1 (1.1)	27.6 (4.3)
	P-value	***0.034***	***0.005***	*0.202*	***0.001***	***<0.001***
Ag	Uninvaded	2994.4 (507.9)	1099.3 (219.6)	1895.0 (297.1)	6.8 (0.7)	48.2 (8.0)
	Invaded	2118.3 (125.1)	778.7 (63.1)	1339.6 (92.3)	4.5 (0.6)	41.8 (7.6)
	P-value	*0.099*	*0.275*	*0.086*	*0.054*	*0.400*
Urb	Uninvaded	2855.6 (248.1)	1230.3 (109.0)	1625.2 (166.6)	9.9 (2.0)	50.0 (7.5)
	Invaded	2681.1 (226.6)	1016.6 (98.4)	1664.5 (98.4)	7.8 (1.7)	29.7 (4.9)
	P value	*0.636*	*0.090*	*0.783*	*0.151*	***0.010***

TABLE A2. Most supported models for explaining the differences in carbon pools and specific enzyme activities between invaded and adjacent uninvaded soils. Table shows the difference between model AICc and best-model AICc (ΔAICc), Akaike weights (ω_i), log-likelihood (log(L)), and number of parameters (K). Only models with ΔAICc ≤ 2 are included. Change in microbial biomass C is designated as ΔCFE C. Main effects include ambient soil moisture (M), pH, NO_3^- (N), and *M. vimineum* biomass (MV).

						Parameter estimates						
Carbon Pool	Model	K	log(L)	ΔAICc	ωi	MV	M	N	pH	R	N*MV	pH*MV
ΔTOC	M + pH +N*MV	6	-359.85	0.00	0.26	-	-7244 ± 1108	-	500.5 ± 234.3	-	1.968 ± 0.555	-
	M + N*MV	5	-361.65	0.93	0.16	-	-6032 ± 1711	-	-	-	2.160 ± 0.571	-
	M + MV + N*MV	5	-362.00	1.63	0.11	-10.70 ± 5.48	-6055 ± 1609	-	-	-	3.647 ± 0.918	-
	M + N +MV	6	-360.70	1.70	0.11	-	-6224 ± 1710	78.08 ± 68.02	-	-	1.703 ± 0.695	-
ΔPOMC	M + MV + pH*MV	6	-333.15	0.00	0.16	-31.46 ± 12.63	-3341 ± 1015	-	-	-	-	6.704 ± 2.476
	M + pH + N*MV	6	-333.40	0.50	0.13	-	-3276 ± 992	-	266.6 ±133	-	0.5967 ± 0.3176	-
	M + pH	5	-334.85	0.73	0.11	-	-3431 ± 965	-	327.1 ± 121	-	-	-
	M + pH + pH*MV	6	-334.05	1.80	0.07	-	-3510 ± 983	-	302.6 ±127	-	-	0.4287 ± 0.3602
	M + N*MV	5	-335.40	1.83	0.07	-	-2566 ± 978	-	-	-	0.7020 ± 0.3261	-
ΔMAOMC	M + N + N*MV	5	-337.95	0.00	0.47	-	-3423 ± 999	35.80 ± 41.37	-	-	1.275 ± 0.423	-
ΔCFE	pH*MV + MV	4	-132.35	0.00	0.22	-0.3029 ± 0.1061	-	-	-	-	-	0.05629 ± 0.02065
	N*MV + MV + pH*MV	5	-131.83	1.50	0.10	-0.2830 ± 0.1066	-	-	-	-	0.005835 ± 0.005887	0.04634 ± 0.02248
Δtotox/cfe	N*MV + MV	4	123.65	0.00	0.12	0.000286 ± 0.000125	-	-	-	-	-0.00005 ± 0.00002	-
	N + N*MV +MV	5	124.67	0.50	0.09	0.000438 ± 0.000167	-	0.002758 ± 0.002033	-	-	-0.00008 ± 0.00004	-
	Intercept-only	2	120.79	1.00	0.07	-	-	-	-	-	-	-
	M + N*MV + MV	5	124.32	1.20	0.07	0.000283 ± 0.000124	0.03717 ± 0.03464	-	-	-	-0.00005 ± 0.00002	-
	pH * MV + N*MV	4	123.05	1.20	0.07	-	-	-	-	-	-0.00005 ± 0.00002	5.3E-5 ± 2.7E-5
Δnag/cfe	pH + MV + pH*MV	5	249.87	0.00	0.22	0.000123 ± 0.000045	-	-	0.000825 ± 0.000481	-	-	-2.00E-5 ± 8.93E-6
	N*MV + MV	4	247.95	1.30	0.12	1.7E-5 ± 8.36E-6	-	-	-	-	-2.70E-6 ± 1.37E-6	-
	N*MV + MV + pH*MV	5	249.07	1.60	0.10	5.70E-5 ± 2.80E-5	-	-	-	-	-1.64E-6 ± 1.51E-6	-9.04E-6 ± 5.86E-6
Δbg/cfe	Intercept-only	2	195.74	0.00	0.13	-	-	-	-	-	-	-
	N*MV + MV	4	197.30	1.60	0.06	4.0E-5 ± 3.0E-5	-	-	-	-	-7.01E-6 ± 4.13E-6	-
	pH*MV + N*MV	4	197.30	1.60	0.06	-	-	-	-	-	-7.64E-6 ± 4.48E-6	8.35E-6 ± 5.30E-6
	M	3	196.04	1.70	0.05	-	0.005115 ± 0.006721	-	-	-	-	-
	N*MV	3	195.99	1.80	0.05	-	-	-	-	-	-1.54E-6 ± 2.31E-6	-
	N	3	195.99	1.80	0.05	-	-	-0.00016 ± 00024	-	-	-	-

TABLE A3. Akaike weights summed across all models for each parameter used to explain invasion-associated changes in carbon pools and specific enzyme activities. Change in microbial biomass C is designated as ΔCFE C. Main effects include ambient soil moisture (M), pH, NO_3^- (N), and *M. vimineum* biomass (MV).

	Model Parameter						
Carbon Pool	MV	M	N	pH	R	N*MV	pH*MV
ΔTOC	0.21	0.98	0.15	0.37	0.06	0.75	0.20
ΔPOMC	0.28	0.91	0.11	0.41	0.15	0.29	0.31
ΔMAOMC	0.08	0.91	0.51	0.09	0.14	0.83	0.09
ΔCFE C	0.75	0.16	0.17	0.33	-	0.30	0.62
Δtotox/cfe	0.50	0.25	0.26	0.18	-	0.58	0.32
Δnag/cfe	0.73	0.15	0.17	0.33	-	0.46	0.55
Δbg/cfe	0.29	0.26	0.25	0.20	-	0.41	0.28

TABLE A4. Most supported models of litter mass remaining by peak *Microstegium vimineum* biomass. Table shows the difference between model AICc and best-model AICc (ΔAICc), Akaike weights (ω_i), log-likelihood (log(L)), number of parameters (K), and parameter estimates ± 1 SE. Only models with ΔAICc ≤ 2 are included. Main effects include ambient soil moisture (M), pH, NO_3^- (N), and *M. vimineum* biomass (MV).

Model	K	log(L)	ΔAICc	ωi	MV	M	N	pH	N*MV	pH*MV
N*MV	3	-29.9	0.00	0.17	-	-	-	-	-0.00085 ± 0.00032	-
N*MV + pH	4	-29.5	1.70	0.07	-	-	-	0.1015 ± 0.1226	-0.00091 ± 0.00033	-
MV	3	-30.9	2.00	0.06	-0.00438 ± 0.00198	-	-	-	-	-

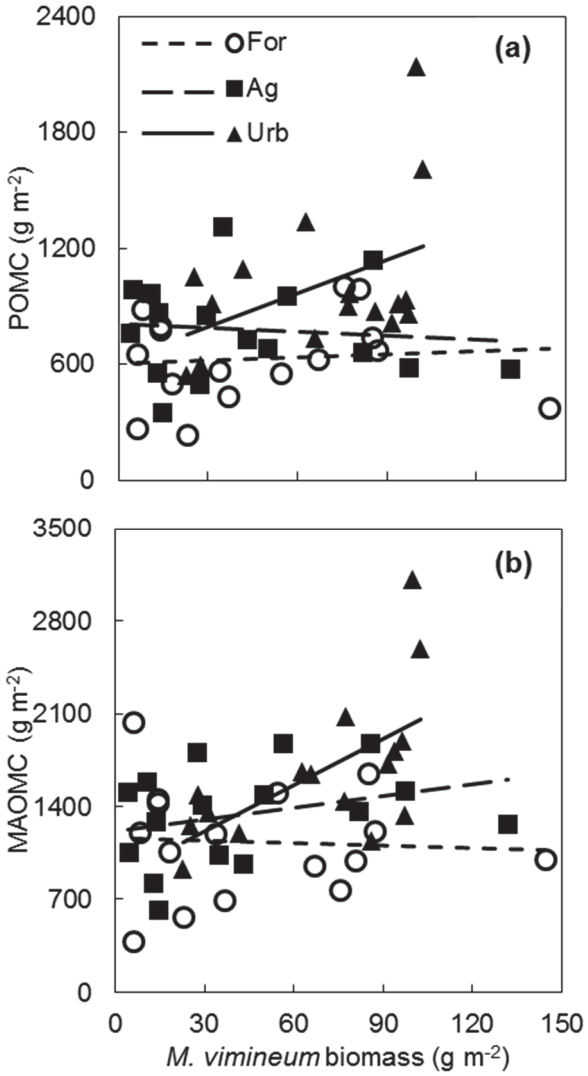

FIG. A1. Relationship between *M. vimineum* biomass and particulate organic carbon (a) and mineral-associated organic carbon (b) for sites located in a forested (For), agricultural (Ag), and urban (Urb) landscape matrix.

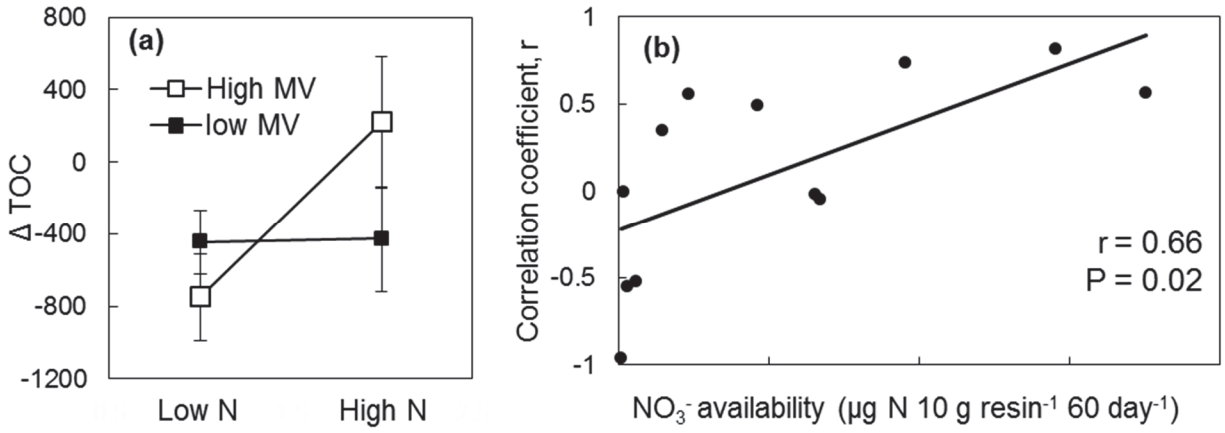

FIG. A2. Context-dependence of the effects of *M. vimineum* biomass on belowground total organic carbon. (a) Interaction plot showing the effects of high and low invader biomass on the changes in carbon content at sites with high and low ambient NO_x. Error bars show ± 1 SE. (b) Regression plot showing the dependence of the relationship between *M. vimineum* biomass and C impacts on N availability. Each data point is a within-site Pearson correlation between *M. vimineum* biomass and change in total organic carbon.