

# Soil carbon accrual and biopore formation across a plant diversity gradient

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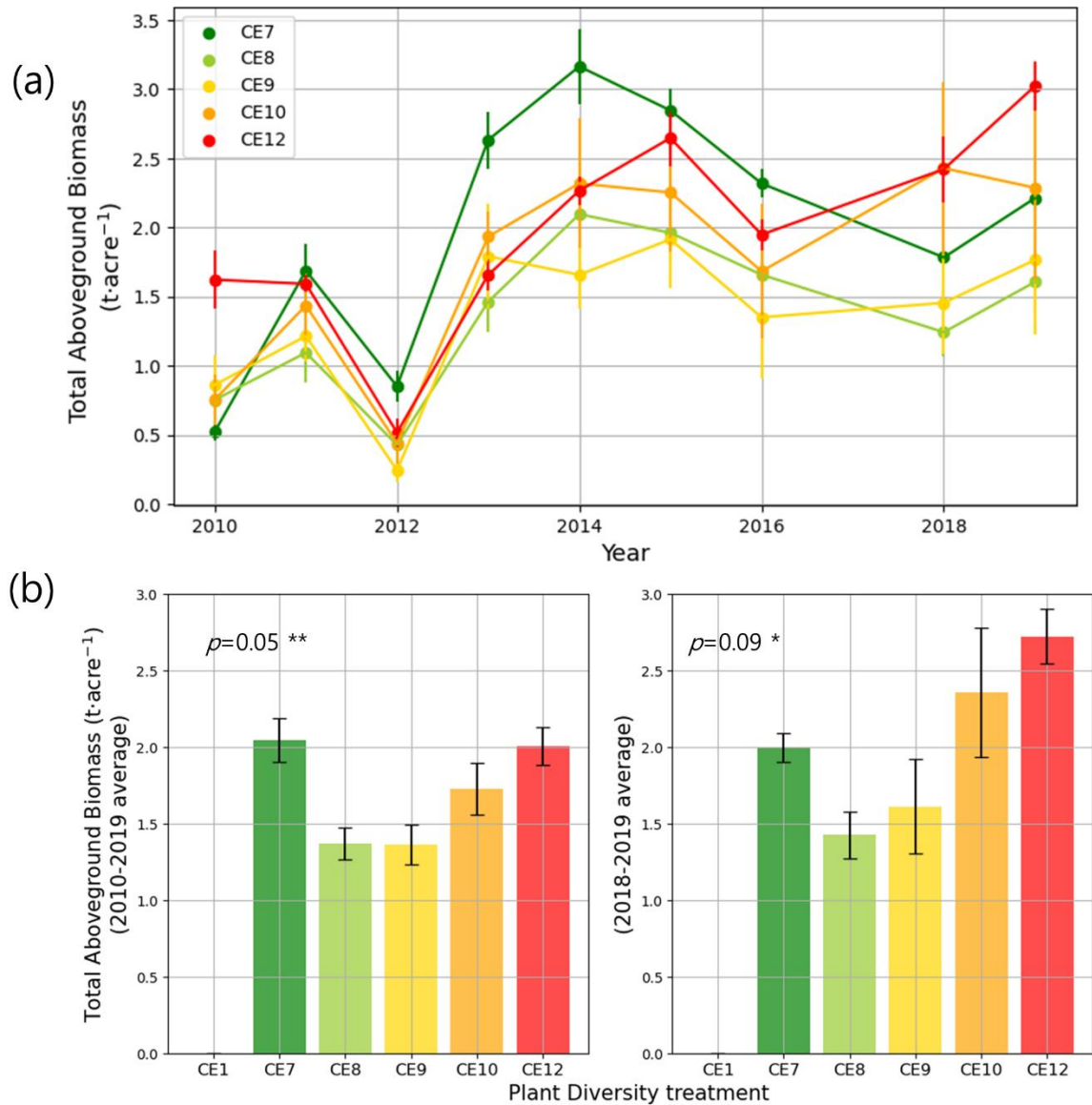
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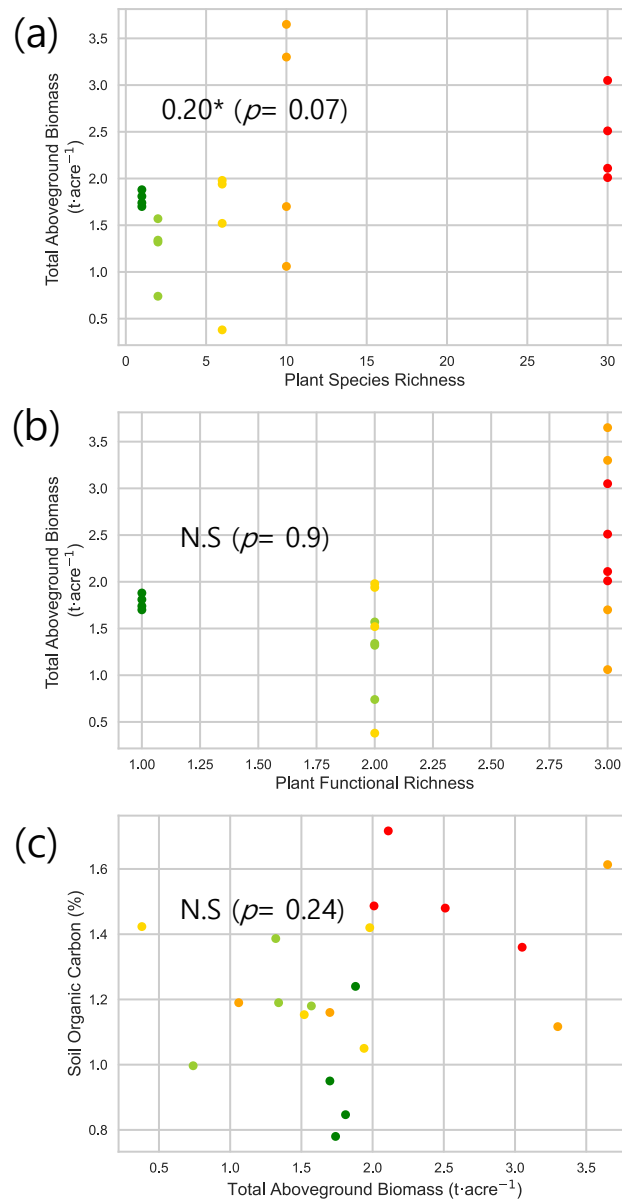
Supplementary Information

**Table S1. Plant species and diversity information in the studied diversity systems**

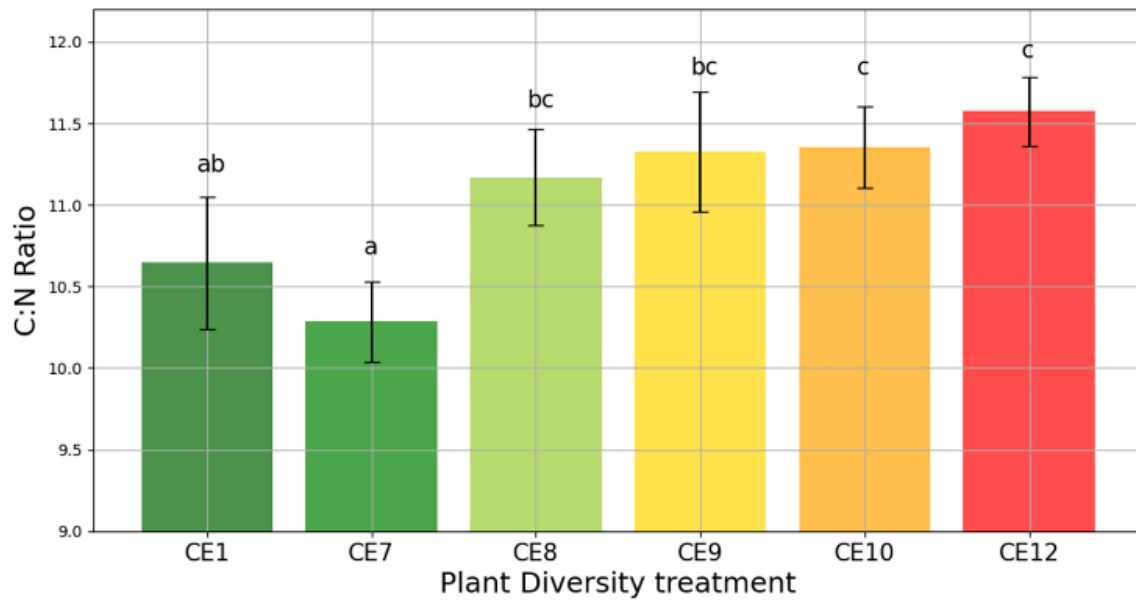
Treatment	CE1	CE7	CE8	CE9	CE10	CE12
Plant species	- (Bare soil)	Switchgrass ( <i>Panicum virgatum</i> ), C4	Switchgrass ( <i>Panicum virgatum</i> ), C4 Canada wild rye ( <i>Elymus canadensis</i> ), C3	Switchgrass ( <i>Panicum virgatum</i> ), C4 Big bluestem ( <i>Andropogon gerardii</i> ), C4 Little bluestem ( <i>Schizachyrium scoparium</i> ), C4 Indian grass ( <i>Sorghastrum nutans</i> ), C4 Canada wild rye ( <i>Elymus canadensis</i> ), C3 Prairie June grass ( <i>Koeleria cristata</i> ), C3	Switchgrass ( <i>Panicum virgatum</i> ), C4 Big bluestem ( <i>Andropogon gerardii</i> ), C4 Little bluestem ( <i>Schizachyrium scoparium</i> ), C4 Indian grass ( <i>Sorghastrum nutans</i> ), C4 Canada wild rye ( <i>Elymus canadensis</i> ), C3 Prairie June grass ( <i>Koeleria cristata</i> ), C3 <i>Desmodium canadense</i> , forb <i>Rudbeckia hirta</i> L., forb <i>Monarda Firstulosa</i> , forb <i>Solidago rigida</i> , forb <i>Lespedeza capitata</i> , forb <i>Baptisia leucanta</i> , forb <i>Amorpha canescens</i> , forb <i>Desmodium illinoense</i> , forb <i>Dalea purpureum</i> , forb <i>Anemone canadensis</i> L., forb <i>Asclepias tuberosa</i> L., forb <i>Euphorbia corollata</i> L., forb <i>Tradescantia ohiensis</i> , forb <i>Zizia aurea</i> , forb <i>Silphium perfoliatum</i> L., forb <i>Ratibida pinnata</i> , forb <i>Coreopsis tripteris</i> L., forb <i>Asclepias syriaca</i> L., forb <i>Oenothera biennis</i> L., forb <i>Solidago speciosa</i> L., forb <i>Aster novae-angliae</i> L., forb <i>Aster pilosus</i> , forb <i>Solidago nemoralis</i> , forb <i>Aster laevis</i> L., forb	Switchgrass ( <i>Panicum virgatum</i> ), C4 Big bluestem ( <i>Andropogon gerardii</i> ), C4 Little bluestem ( <i>Schizachyrium scoparium</i> ), C4 Indian grass ( <i>Sorghastrum nutans</i> ), C4 Canada wild rye ( <i>Elymus canadensis</i> ), C3 Prairie June grass ( <i>Koeleria cristata</i> ), C3 <i>Desmodium canadense</i> , forb <i>Rudbeckia hirta</i> L., forb <i>Monarda Firstulosa</i> , forb <i>Solidago rigida</i> , forb <i>Lespedeza capitata</i> , forb <i>Baptisia leucanta</i> , forb <i>Amorpha canescens</i> , forb <i>Desmodium illinoense</i> , forb <i>Dalea purpureum</i> , forb <i>Anemone canadensis</i> L., forb <i>Asclepias tuberosa</i> L., forb <i>Euphorbia corollata</i> L., forb <i>Tradescantia ohiensis</i> , forb <i>Zizia aurea</i> , forb <i>Silphium perfoliatum</i> L., forb <i>Ratibida pinnata</i> , forb <i>Coreopsis tripteris</i> L., forb <i>Asclepias syriaca</i> L., forb <i>Oenothera biennis</i> L., forb <i>Solidago speciosa</i> L., forb <i>Aster novae-angliae</i> L., forb <i>Aster pilosus</i> , forb <i>Solidago nemoralis</i> , forb <i>Aster laevis</i> L., forb
Plant species diversity	0	1	2	6	10	30
Plant functional Diversity	0	1	2	2	3	3



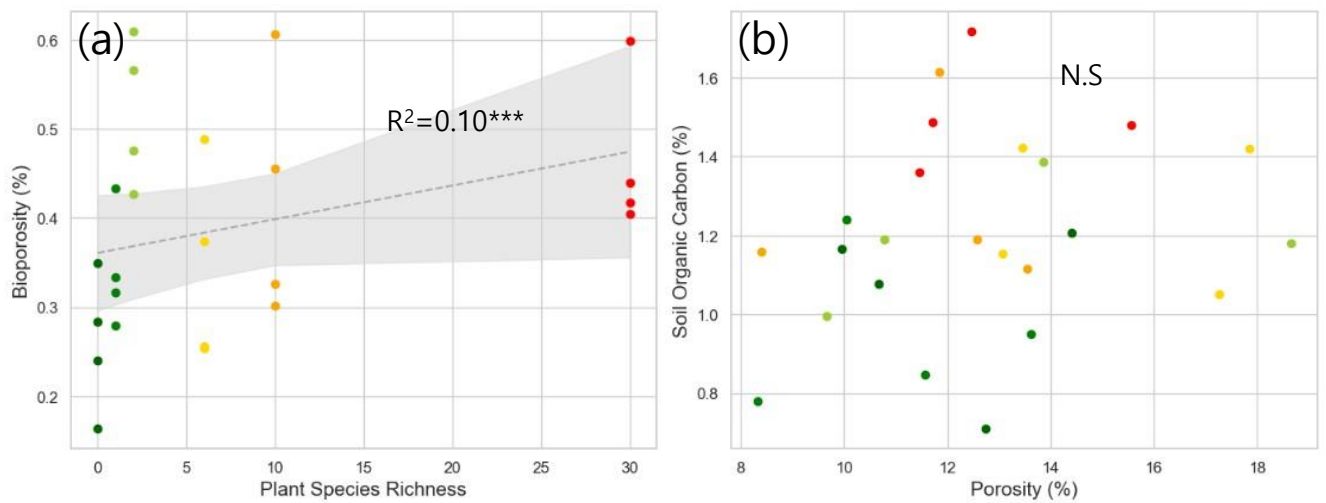
**Figure S1:** Total aboveground biomass during the entire study period (a), and the average total aboveground biomass (b) during the same period (2010-2019) (left) and from 2018 to 2019 (right). Asterisks \* and \*\* indicate statistically significant differences among plant diversity treatments at  $p < 0.10$  and  $0.05$ , respectively. Letters indicate significant differences between plant diversity treatments ( $p < 0.05$ ).



**Figure S2:** Correlation between plant species richness and total aboveground biomass in 2018 8/18/2025(a), plant functional richness and total aboveground biomass (b), and between total aboveground biomass and soil organic carbon (c). When  $p < 0.10$ ,  $R^2$  values are provided. Asterisk \* indicates statistically significant regression models at  $p < 0.10$ , and N.S. indicates no significant regression.



**Figure S3:** Carbon to Nitrogen ratio (C:N) of the soil in different plant diversity systems. Letters indicate significant differences between plant diversity treatments ( $p < 0.05$ ).



**Figure S4:** Correlation between plant species richness and bioporosity (a), and between porosity and soil organic carbon (b).  $R^2$  values are provided for each model. Dotted gray lines represent fitted regression models, with light gray shaded area denoting 95% confidence interval. Asterisks \*\*\* indicate statistically significant regression models at  $p < 0.01$ , and N.S indicates no significant regression.