Soil carbon accrual and biopore formation across a plant diversity gradient

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

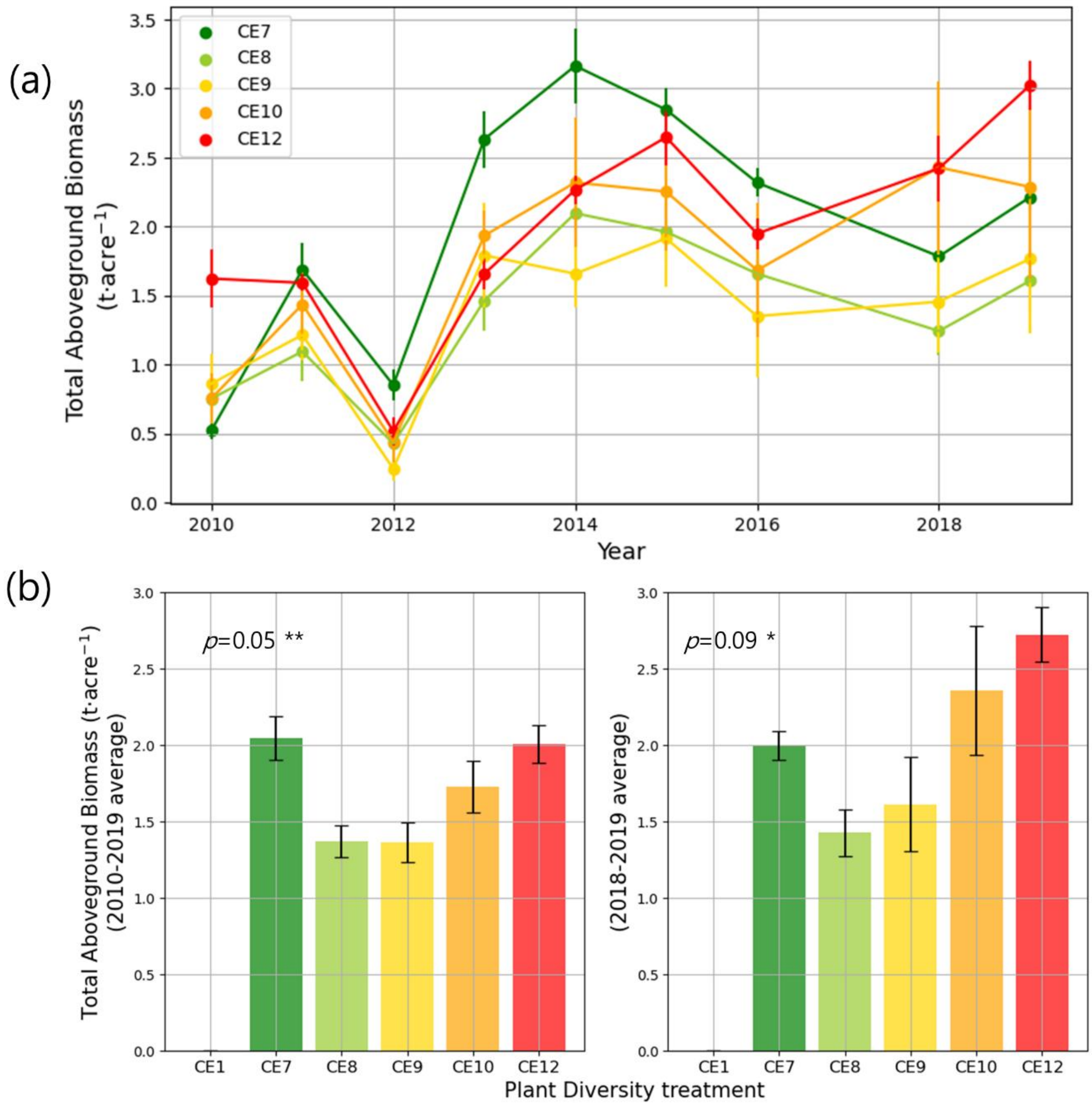

Figure S1: Total aboveground biomass during the entire study period (a), and the average total aboveground biomass (b) during the same period (2010-2019) (left) and from 2018 to 2019 (right). Asterisks * and ** indicate statistically significant differences among plant diversity treatments at $p < 0.10$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

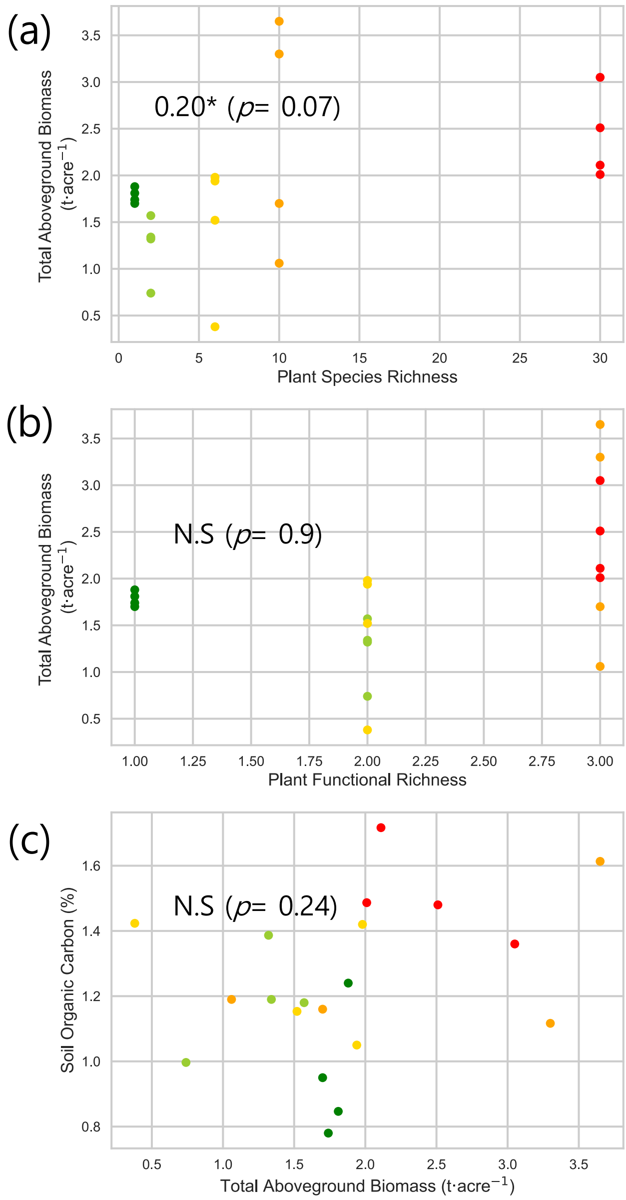

Figure S2: Correlation between plant species richness and total aboveground biomass in 2018 6/2/2025(a), plant functional richness and total aboveground biomass (b), and between total aboveground biomass and soil organic carbon (c). When p< 0.10, R^2 values are provided. Asterisk * indicates statistically significant regression models at *p*< 0.10, and N.S indicates no significant regression.

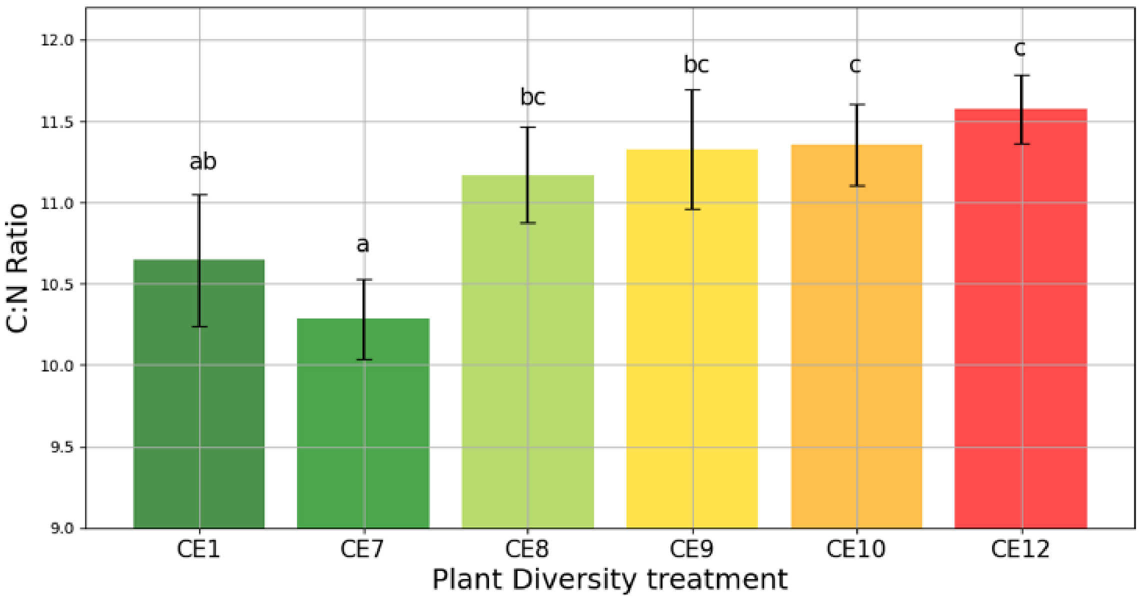

Figure S3: Carbon to Nitrogen ratio (C:N) of the soil in different plant diversity systems. Letters indicate significant differences between plant diversity treatments ($p < 0.05$).

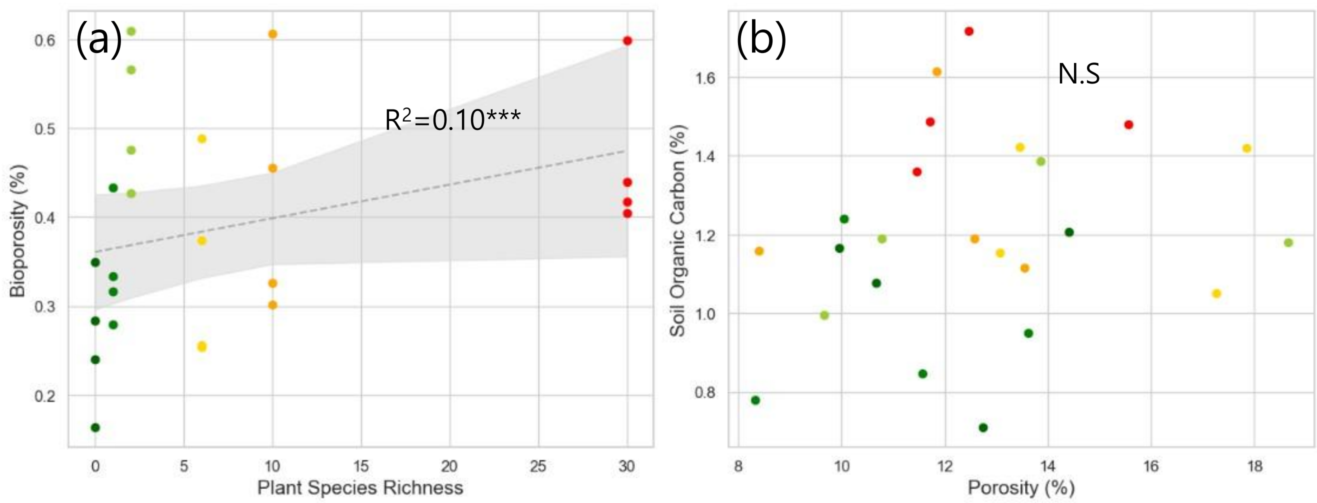

Figure S4: Correlation between plant species richness and bioporosity (a), and between porosity and soil organic carbon (b). R^2 values are provided for each model. Dotted gray lines represent fitted regression models, with light gray shaded area denoting 95% confidence interval. Asterisks *** indicate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