Data repository readme for the manuscript *[Accounting for forest community type gives]Novel insights into how the mean and heterogeneity of abiotic conditions together shape forb species richness patterns in the Allegheny plateau ecoregion.*

All files last updated June 20, 2019

Folders:

- **original abiotic factor predictors** measured in each subplot (light, 13 soil chemistry variables, as well as litter, organic layer, and restrictive layer depths), from which we calculated 29 plot-level means and coefficients of variation. These three measurements (raw subplot values α_j, means calculated from raw subplot values $\bar{\alpha}_j$, and coefficients of variation calculated from raw subplot values for each plot $cv(\alpha_j)$) were transformed (indicated by a t in the output file name) and normalized (indicated by a z in the output file name) for comparison.
    - **input**
        - SPRING 2015 soil1.csv and SPRING 2015 soil2.csv
        - SPRING 2015 light.csv
        - SPRING 2015 litter_rd.csv
        - SPRING 2015 abiotic predictors.R
        - SUMMER 2015 soil1.csv and SUMMER 2015 soil2.csv
        - SUMMER 2015 light.csv
        - SUMMER 2015 litter_rd.csv
        - SUMMER 2015 abiotic predictors.R
    - **output**

        - spalpha.ab.t.z.csv (n=114 of 17 variables)
        - spplot.ab.t.z.csv (n=29 of 34 variables)
        - summalpha.ab.t.z.csv (n=114 of 17 variables)
        - summplot.ab.t.z.csv (n=29 of 34 variables)

- **original community data** measured in each subplot (% cover of each species in each subplot) and in each plot (% cover of each species in each plot). Cover data was converted to presence-absence data to obtain subplot- and plot-level species counts (alpha and gamma species richness, γ_S and α_S).
    - **input**
        - SPRING 2015 seasonal designations.csv
        - SPRING 2015 response.csv
        - SUMMER 2015 seasonal designations.csv
        - SUMMER 2015 response.csv
    - **output**
        - spalpha.patterns.forbs.csv and spplot.patterns.forbs.csv
        - summalpha.patterns.forbs.csv and summplot.patterns.forbs.csv
- **categorical data** contained information on which land holding plots were located, and what tree species dominated the canopy.
    - **land holdings:**
        - Brecksville Reservation (BR)
        - Hinckley Reservation (HI)
        - Mill Stream Run Reservation (MS)

- North Chagrin Reservation (NC)
- Rocky River Reservation (RR)
- West Creek Reservation (WC)

- **forest community types:**
  - Beech-Maple (BM) (Beech and/or Sugar Maple canopies, or Beech-Red Oak canopies)
  - Floodplain (FP) (Sycamore, Cottonwood, and/or Black Walnut canopies)
  - Mixed (M) (Tulip, Cherry, and/or Mixed canopy containing species from multiple other categories)
  - Oak (OAK) (Red, White, Black, Scarlet, and/or Chinkapin Oak canopies)

- **analyses**
  - **modeling**
    - in which we dredge and compare models of species richness at the plot- and subplot-levels using different abiotic measurements and different model structures (Table 1).
  - varpartitioning.R partitions contributions to plot-level species richness, γ_S that come from mean abiotic predictors compared to the heterogeneity in abiotic predictors
    - EXCLUDING trends along abiotic factors that change with forest type:
      - $\bar{\alpha}_{Ca}$, $cv(\alpha_P)$, and $cv(\alpha_K)$ in spring
      - $\bar{\alpha}_{Ca}$, $\bar{\alpha}_P$, $\bar{\alpha}_K$, $cv(\alpha_{pH})$, and $cv(\alpha_N)$ in summer

- INCLUDING trends along pairs of abiotic factors that changed with forest type:
    - $\bar{\alpha}_{Ca}$ and $cv(\alpha_P)$, $\bar{\alpha}_{Ca}$ and $cv(\alpha_K)$, $\bar{\alpha}_{rd}$ and $cv(\alpha_P)$, $\bar{\alpha}_{rd}$ and $cv(\alpha_K)$, $\bar{\alpha}_N$ and $cv(\alpha_P)$, $\bar{\alpha}_N$ and $cv(\alpha_K)$ in each forest type in spring
    - $\bar{\alpha}_{Ca}$ and $cv\left(\alpha_{pH}\right)$, $\bar{\alpha}_{Ca}$ and $cv(\alpha_N)$, $\bar{\alpha}_{Ca}$ and $cv(\alpha_{CEC})$, $\bar{\alpha}_P$ and $cv\left(\alpha_{pH}\right)$, $\bar{\alpha}_P$ and $cv(\alpha_N)$, $\bar{\alpha}_P$ and $cv(\alpha_{CEC})$, $\bar{\alpha}_K$ and $cv\left(\alpha_{pH}\right)$, $\bar{\alpha}_K$ and $cv(\alpha_N)$, $\bar{\alpha}_K$ and $cv(\alpha_{CEC})$ in each forest type in summer

Table 1: Location of the code for each type of full model compared in our analysis.

	abiotic predictor variables used in the full model			
model structure used	$\bar{\alpha}_j$	$cv(\alpha_j)$	$\bar{\alpha}_j$ & $cv(\alpha_j)$	α_j
A: linear model	SPRING2015(1).R and SUMMER2015(1).R	SPRING2015(2).R and SUMMER2015(2).R	SPRING2015(1&2).R and SUMMER2015(1&2).R	n/a
B: null linear mixed-effects model with grouping structure but no predictors	SPRING2015(1).R and SUMMER2015(1).R	SPRING2015(2).R and SUMMER2015(2).R	SPRING2015(1&2).R and SUMMER2015(1&2).R	SPRING2015(4).R and SUMMER2015(4).R
C1: linear mixed-effects model with variable intercepts	SPRING2015(1).R and SUMMER2015(1).R	SPRING2015(2).R and SUMMER2015(2).R	SPRING2015(1&2).R and SUMMER2015(1&2).R	SPRING2015(4).R and SUMMER2015(4).R
C2: linear mixed-effects model with variable slopes	SPRING2015(1).R and SUMMER2015(1).R	SPRING2015(2).R and SUMMER2015(2).R	SPRING2015(1&2).R and SUMMER2015(1&2).R	SPRING2015(4).R and SUMMER2015(4).R
D1: best linear mixed-effect(s) model(s) from C1 with variable slopes	SPRING2015(1).R and SUMMER2015(1).R	SPRING2015(2).R and SUMMER2015(2).R	SPRING2015(1&2).R and SUMMER2015(1&2).R	SPRING2015(4).R and SUMMER2015(4).R
D2: best linear mixed-effect(s) model(s) from C2 with variable intercepts	SPRING2015(1).R and SUMMER2015(1).R	SPRING2015(2).R and SUMMER2015(2).R	SPRING2015(1&2).R and SUMMER2015(1&2).R	SPRING2015(4).R and SUMMER2015(4).R