Data repository readme for the manuscript *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 , means calculated from raw subplot values , and coefficients of variation calculated from raw subplot values for each plot ) 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, and ).
  + **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) (n = 5)
    - Hinckley Reservation (HI) (n = 5)
    - Mill Stream Run Reservation (MS) (n = 5)
    - North Chagrin Reservation (NC) (n = 5)
    - Rocky River Reservation (RR) (n = 4)
    - West Creek Reservation (WC) (n = 5)
  + **forest community types:**
    - Beech-Maple (BM) (Beech and/or Sugar Maple canopies, or Beech-Red Oak canopies) (n = 6)
    - Floodplain (FP) (Sycamore, Cottonwood, and/or Black Walnut canopies) (n = 9)
    - Mixed (M) (Tulip, Cherry, and/or Mixed canopy containing species from multiple other categories) (n = 5)
    - Oak (OAK) (Red, White, Black, Scarlet, and/or Chinkapin Oak canopies) (n = 9)
* **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,

that come from mean abiotic predictors compared to the heterogeneity in abiotic predictors

* + - EXCLUDING trends along abiotic factors that change with forest type:
      * , and in spring
      * , ,, and in summer
    - INCLUDING trends along pairs of abiotic factors that changed with forest type:
      * and , and , and , and , and , and in each forest type in spring
      * and , and , and , and , and , and , and , and , and in each forest type in summer

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **abiotic predictor variables used in the full model** | | | |
| **model structure used** |  |  |  |  |
| **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 |

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