**Assessing arthropod diversity using sweep nets**

Students will be pre-assigned to groups of 3 to complete this study.

**Materials**

*Each student will need*

* Research badge
* 1 sweep net (to sample arthropods along the transect)
* 1 lupe (to aid in identification via magnification)
* 1 tupperware container (to hold arthropods until they are identified
* Smart phone or tablet with iNaturalist app installed
* 1 meter stick (to measure height of vegetation, i.e., grass)

*Each group will need*

* transect tapes (to measure transect)
* Marker flags (3/student), to mark the ends and midpoint of each transect
* Field guides to identify arthropods (in addition to iNaturalist)

**Preparatory Readings**

1. Joern, A., & Laws, A. N. (2013). Ecological mechanisms underlying arthropod species diversity in grasslands. *Annual review of entomology*, *58*(1), 19-36.
2. Prather, R. M., & Kaspari, M. (2019). Plants regulate grassland arthropod communities through biomass, quality, and habitat heterogeneity. *Ecosphere*, *10*(10), e02909.

**Assignments**

Week 1

* Each student will read either A) Joern 2013 or B) Prather 2019 (above)
  + Use Hypothes.is to annotate your assigned paper.
  + Add 5 annotations to their paper by 8:30am on 8/25.
* Draft a research plan with your group

Week 2

* Tag sweep net sites on shared Google Earth map
* Record identification and abundance of arthropod species

Week 3

* analyze class dataset using RStudio
* Plot figures
* Interpret results and discuss broader implications in the context of published literature

**Activities**

WEEK 1

Thursday (read and annotate assigned paper and look at shared Google Earth map before lab)

* Meet at teaching lab → load equipment and ride bus to NCMA
* Jigsaw activity to discuss both papers (20-25 minutes)
* Regroup as a class (20-30 minutes)
  + Compare notes
  + Identify research questions
* Explore adjacent lawn and uncut environments
  + Record and discuss observations
  + Plot transects on shared Google Earth map
  + Practice sweep net technique
    - Collect arthropods into tupperware; photograph each
    - Upload photos to iNaturalist → build a database for faster ID next week
    - Record species and abundance encountered
      * Compare any unidentified specimens with other groups to avoid false inflation of species richness
  + Share and discuss scientific questions, experimental design ideas

WEEK 2

Tuesday

* Submit research plan for your group (due before class starts)
* Share and compare scientific questions and data / measurements needed
* Draft [class data spreadsheet](https://docs.google.com/spreadsheets/d/1g1izTS2OSi5KXD_lftjgCcPPhCG_HHooqjXRW-qcgII/edit?usp=drive_link)
* What data curation and statistics needed?

Revise / update group research plan as needed

Thursday

* Meet at teaching lab to pick up equipment → bus to NCMA.
* Disseminate to your group’s designated sampling sites.
* Gather data
  + Note GPS location, weather / conditions
  + Measure height of vegetation at ends and midpoint of each transect
  + Perform sweep net sampling per class protocol
  + Collect arthropods into tupperware; isolate and photograph each
  + Upload photos to iNaturalist
  + Record taxonomy and abundance encountered for each unique arthropod
    - Be sure to note any unidentified specimens
* Regroup (in shade!) to compare unidentified specimens (avoid repeats!)
  + The goal is class consensus.
  + Without consensus, we risk overestimation (false inflation) of species richness.

WEEK 3

Tuesday

* TA gives lecture on data analysis and how to select the appropriate statistical tests for your data

Thursday

* Computer lab: data analysis workshop
  + Work through the tutorial “base code” provided by instructor and TA. Make sure you can produce the plots and complete the practice prompts.
  + Work with your group to adapt the base code to analyze your dataset. Use Google Sheets to create a pivot table and use the filter() command in R to create data subsets where necessary to address your hypothesis.
  + Partway through lab, the instructor will give a “minilecture” on data visualization.
  + Upload your personal Rscript with documentation, and any figures you have produced, to your group’s project folder at the end of lab.