# TIEE

Teaching Issues and Experiments in Ecology - Volume 20, February 2024

**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
A. Joern, A., & Laws, A. N. (2013). Ecological mechanisms underlying arthropod species diversity in grasslands. *Annual review of entomology*, *58*(1), 19-36.
B. 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)

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- 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
- 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.

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WEEK 3

<u>Tuesday</u>
- TA gives lecture on data analysis and how to select the appropriate statistical tests for your data

<u>Thursday</u>
- 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.