Diversity and identification of Appalachian leaf litter arthropods
Summer, 2022 - SYLLABUS

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Dates: June 20-24, 2022 (5 days, M-F)

Course description: A hands-on introduction to field and lab methods for the sampling and identification of arthropods living in leaf litter. Litter sifting will be practiced in multiple habitats. Following Berlese extraction of specimens, students will learn to identify the major groups and conduct preliminary comparisons of diversity among samples and habitat types.

Pre-requisites: General biology required. A course in general entomology would be useful, but not critical.

Daily schedule: We will take field trips on days 1 and 3, occupying approximately half a day each. Other days will be spent in the laboratory, processing, sorting, and identifying arthropods. Lectures on diversity, morphology, and identification characters of each major group will be interspersed with hands-on lab work working with specimens and keys. Students are expected to be in the lab by 8:30 each morning. Some lectures will be presented during evening hours.

Lecture material will cover the following topics:

1. Introduction to the biodiversity and ecological importance of leaf litter
2. Diversity, natural history, and identification:
    a. Arachnida – mites, spiders, pseudoscorpions and harvestmen
    b. Myriapoda – millipedes, centipedes, symphylans and pauropods
    c. Hexapoda – insects and their allies
3. Estimating and quantifying litter diversity
4. Alternative methods of inventory (DNA barcoding, eDNA)

Assessment:
Students will write a final report, in the format of a scientific article (Intro, Materials & Methods, Results, Conclusions), comparing the diversity between sampling sites, addressing overall diversity, abundance patterns of different taxa, and estimated proportion of shared taxa between sites, with considerations for patterns of broader regional diversity.

Potential field trips:

- Whiteside Mt
- Ammons Branch
- Panthertown Creek
- Dry Falls

Required supplies:

Provided by instructors/HBS:

- Litter sifters
- Berlese funnels, mini-Winklers
- Subterranean pitfalls
- Stereo and compound microscopes
- microscope slides & cover slips
- Fluids (glycerin, ethanol)
- temporary storage vials (students wanting to keep collections long-term will want to look at other options, like BioQuip 8802P or 8804P)

To be provided by students:

- Field clothing (long pants, hat, sturdy hiking shoes/boots), bug spray, sunscreen
- backpack (~20L) to carry samples, water, lunches/snacks
- 1-2 pairs high quality forceps (e.g. Bioquip Cat. No. 4524: https://www.bioquip.com/search/DispProduct.asp?pid=4522),
- hand lens
- head lamp (helpful even during the day for looking beneath ground debris)
- work gloves
- GPS unit (on smartphone is OK)
- laptop for viewing pdfs and data capture
- field notebook (e.g. Rite in the rain: https://www.riteintherain.com/4-625x7-side-spiral-notebook#cover-colors_yellow_page-patterns_universal-numbered#373N)
- alcohol proof pens (Pigma Micron 005 black: https://www.dickblick.com/items/sakura-pigma-micron-pen-set-black-005-set-of-3/)

Litter sifting/processing overview: https://www.youtube.com/watch?v=arkNzd8aO6M

Required texts:

Triplehorn & Johnson. Borror's Introduction to the Study of Insects (7th Edition). Cengage Learning. https://www.amazon.com/Borror-DeLongs-Introduction-Study-Insects/dp/0030968356

Other taxon-specific references will be provided as pdfs or hardcopy by instructors