Program and Abstracts

2025 Annual Conference
Mid-Atlantic Chapter
Ecological Society of America

April 4th – 6th

Hosted by
Longwood Gardens
Land Stewardship and Ecology Program,
Science Division, Department of Horticulture

LONGWOOD
GARDENS

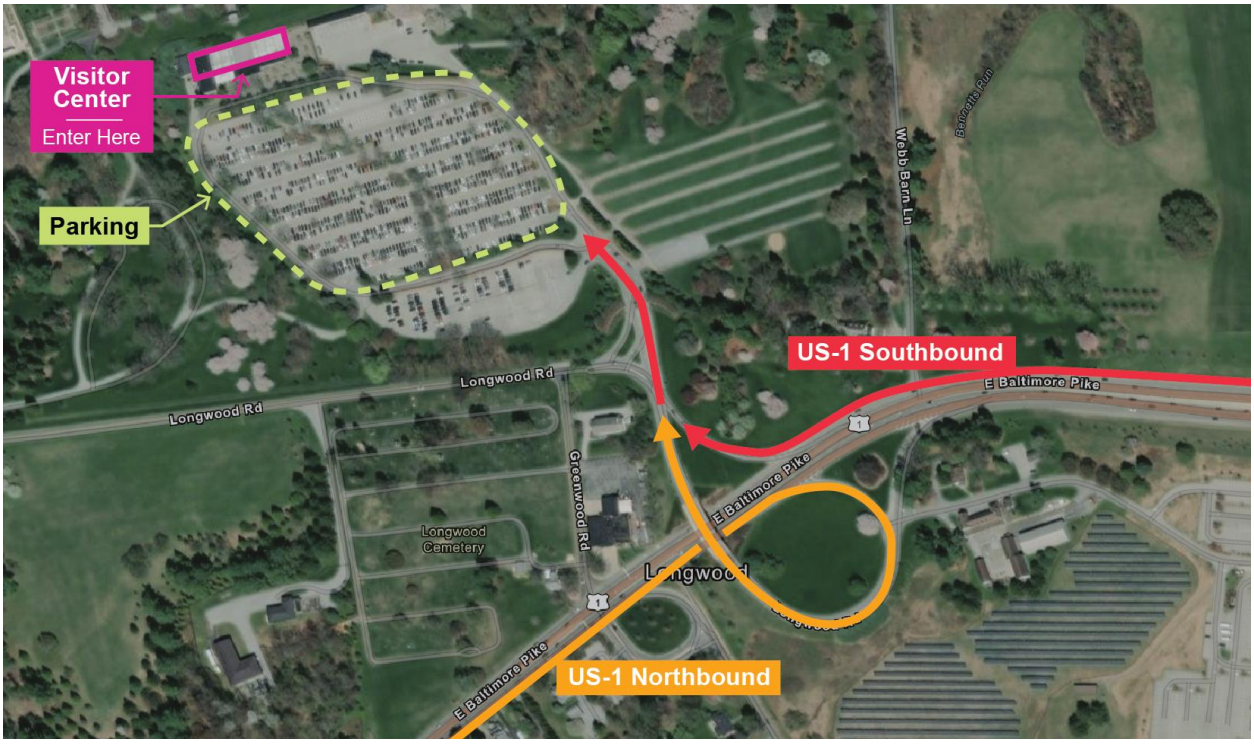
Conference Location and Directions

The 2025 Annual Conference of the Mid-Atlantic Chapter of the Ecological Society of America will be held at Longwood Gardens. Check-in and registration will be located in the Visitor Center.

From Interstate 95 (northbound): Take Exit 93 for MD-222 N; continue straight as the road becomes MD-275 N, and follow for 2 miles. Turn right (northeast) onto MD-276 N and follow for 5 miles. Turn right (northeast) onto US-1 North and follow for 27 miles. As you approach the gardens, drive under the overpass bridge then take the exit on the right, taking the overpass and following signs for Longwood Gardens.

From Interstate 95 (southbound): Take Exit 3A for US-322 West and follow for 7 miles. Turn left (west) on US-1 South/Baltimore Pike, and follow for another 7 miles. Take the exit ramp to the right following signs for Longwood Gardens.

Parking: Follow signs for car parking in the Visitor Center lot. We ask for any conference attendees who are able to park toward the back of the lot, reserving spots closer to the Visitor Center for guests of the gardens with more limited mobility.



MA-ESA 2025 Meeting Schedule

Friday, April 4, 2025

6:00 – 9:00 pm No-host Evening Social at Longwood Gardens
Beer Garden at the Terrace Café, Longwood Gardens
Food and beverages available for purchase. Only the Beer Garden is open to conference attendees after 6 pm. Complimentary entry starting at 10 am for all attendees.

Saturday, April 5, 2025

8:30 – 9:30 am Registration
Visitor Center, Longwood Gardens
Coffee and Light Breakfast
Lobby, Conservatory Lower Level
Register in the Visitor Center when you arrive, then proceed through the Main Fountain Garden to the Lower Conservatory Lobby for coffee and light breakfast. Posters may be hung upstairs in the Ballroom at any time.

9:30 – 9:45 am Welcome & Opening Remarks from Longwood Gardens
Fountain Room, Conservatory Lower Level
The Fountain Room can be accessed from the Main Fountain Garden or by stairs from the upper West Conservatory.

9:45 – 11:00 am Plenary Symposium: Seeding the Future with Native Plants
John Price (Mid-Atlantic Regional Seed Bank), Lucy Rubino (Greenbelt Native Plant Center, NYC Parks), Tom Knezick (Pinelands Nursery), Phoebe Judge (School of Plant and Environmental Sciences, Virginia Tech)
Fountain Room, Conservatory Lower Level

11:00 – 11:30 am Pick Up Lunch Box & Transition
Music Room, Conservatory Upper Level
Pick up your lunch in the Music Room and take it to your Lunchtime Workshop.

11:30 am – 12:45 pm Lunchtime Workshop Sessions
Various locations, see details below

11:30 am – 12:45 pm Mid-Atlantic Chapter Business Meeting
Executive Conference Room, The Grove
Concurrent with the Lunchtime Workshop Sessions. Election of next Chapter Chair and other Chapter business and updates. Location is on the second floor, far end of the building from stairs & elevators.

12:45 – 1:00 pm Transition

1:00 – 2:30 pm Oral Sessions 1-5
Various locations, see details below

2:30 – 3:00 pm Coffee Break and Transition
Music Room, Conservatory Upper Level

3:00 – 4:30 pm Oral Sessions 6-9
Various locations, see details below

4:30 – 5:15 pm Poster Session 1
Ballroom, Conservatory Upper Level
Odd-numbered posters will present during this session.

5:15 – 6:00 pm Poster Session 2
Ballroom, Conservatory Upper Level
Even-numbered posters will present during this session.

6:00 – 8:00 pm Awards Banquet
Fountain Room, Conservatory Lower Level

Sunday, April 6, 2025

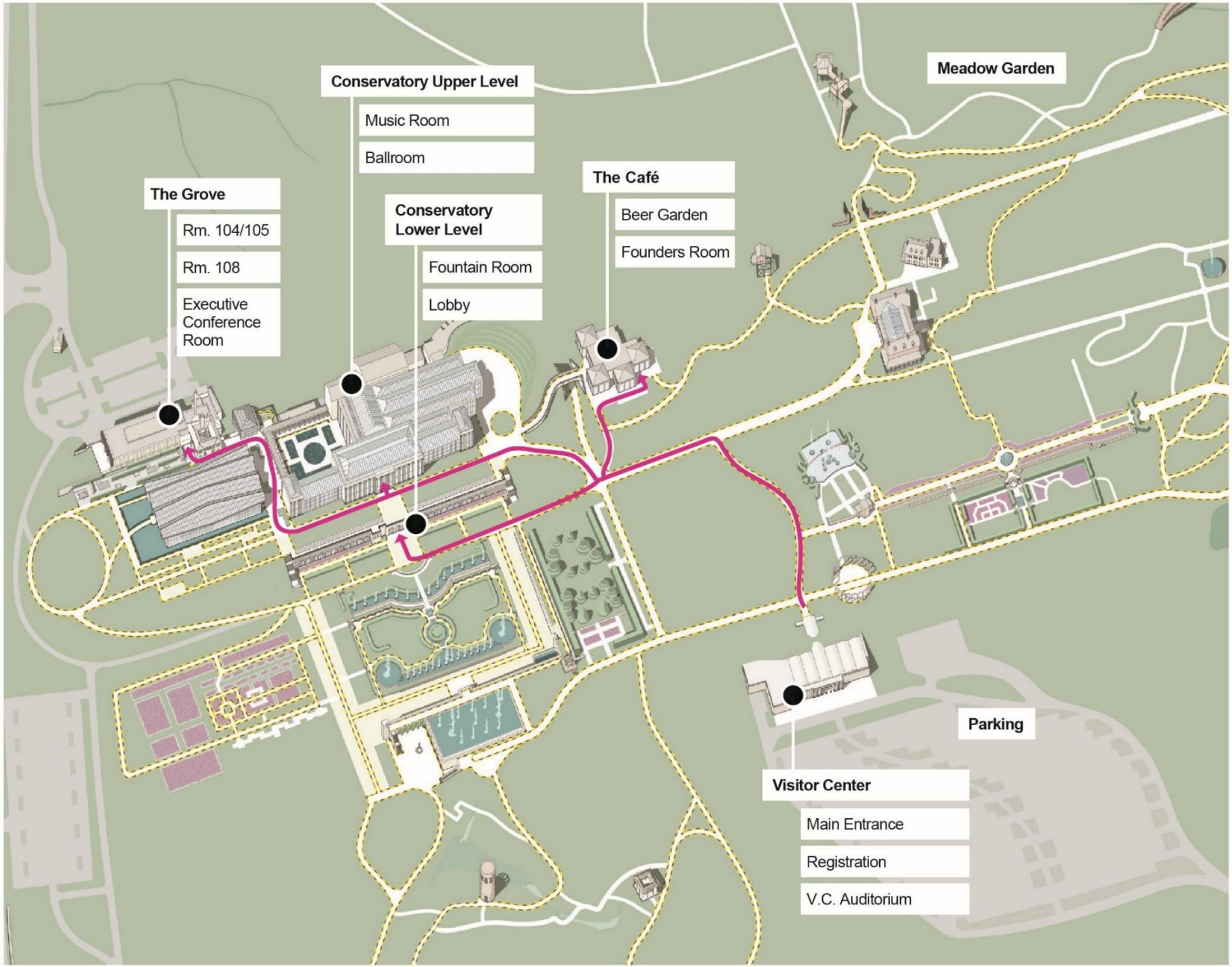
10:00 am – 12:00 pm Field Trip: Land Stewardship and Ecology at Longwood Gardens
Bus Entrance, Visitor Center

Longwood Gardens is one of the nation's most visited public gardens. Longwood's fine horticulture, intricate fountain systems, and architectural grandeur are complemented by 750 acres of natural areas, including the 86-acre Meadow Garden composed of native prairie species. Join Longwood's Land Stewardship and Ecology team for a behind the scenes tour of natural areas as well as gardens where native plants are the focus. We will visit ecological restoration and research sties and engage with land stewards who operate in this unique social-ecological space where both biodiversity and beauty are valued.

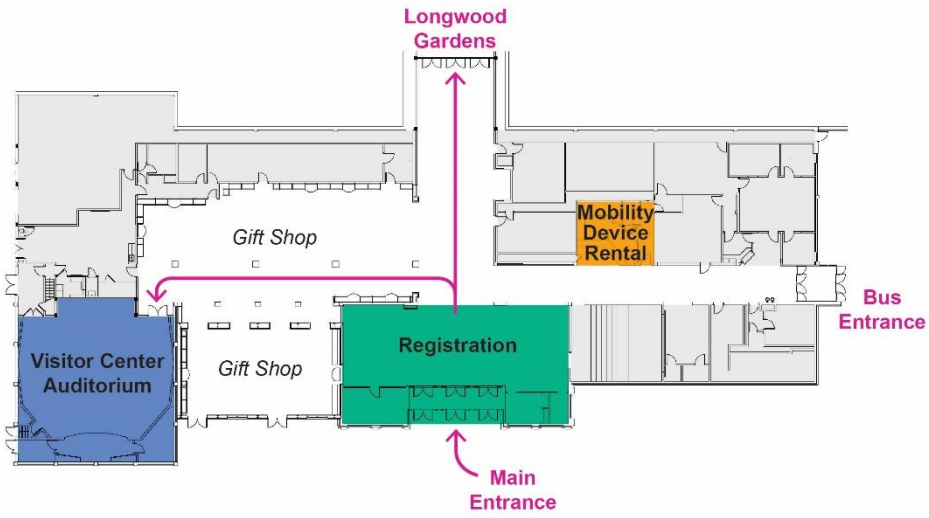
Please arrive at the bus loading area, located on the right side of the main entrance building, by 9:45 am. The field trip will include walking at least a mile and will include paved surfaces, gravel, and dirt/grass trails. Please wear sturdy, comfortable walking shoes and dress for the predicted weather. A limited number of mobility devices are available upon request.

Wifi

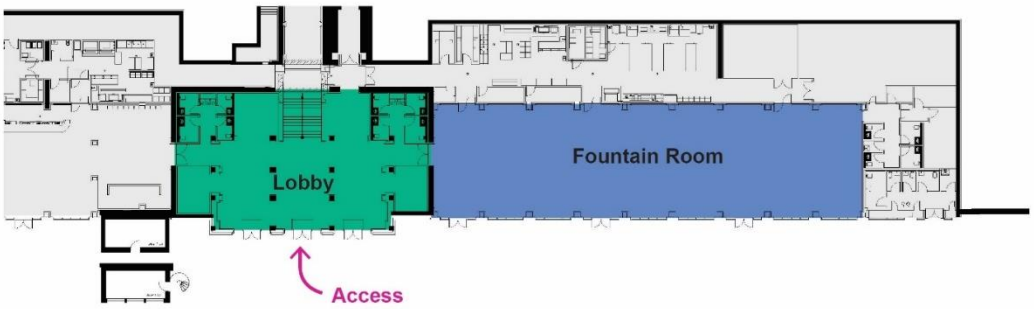
Free public wifi is available across Longwood Gardens using the **FreeGardenWIFI** network. No sign up or password is required.


Meadow Garden
Conservatory Upper Level
Music Room
Ballroom
The Café
Beer Garden
Founders Room
The Grove
Rm. 104/105
Rm. 108
Executive Conference Room
Conservatory Lower Level
Fountain Room
Lobby
Parking
Visitor Center
Main Entrance
Registration
V.C. Auditorium

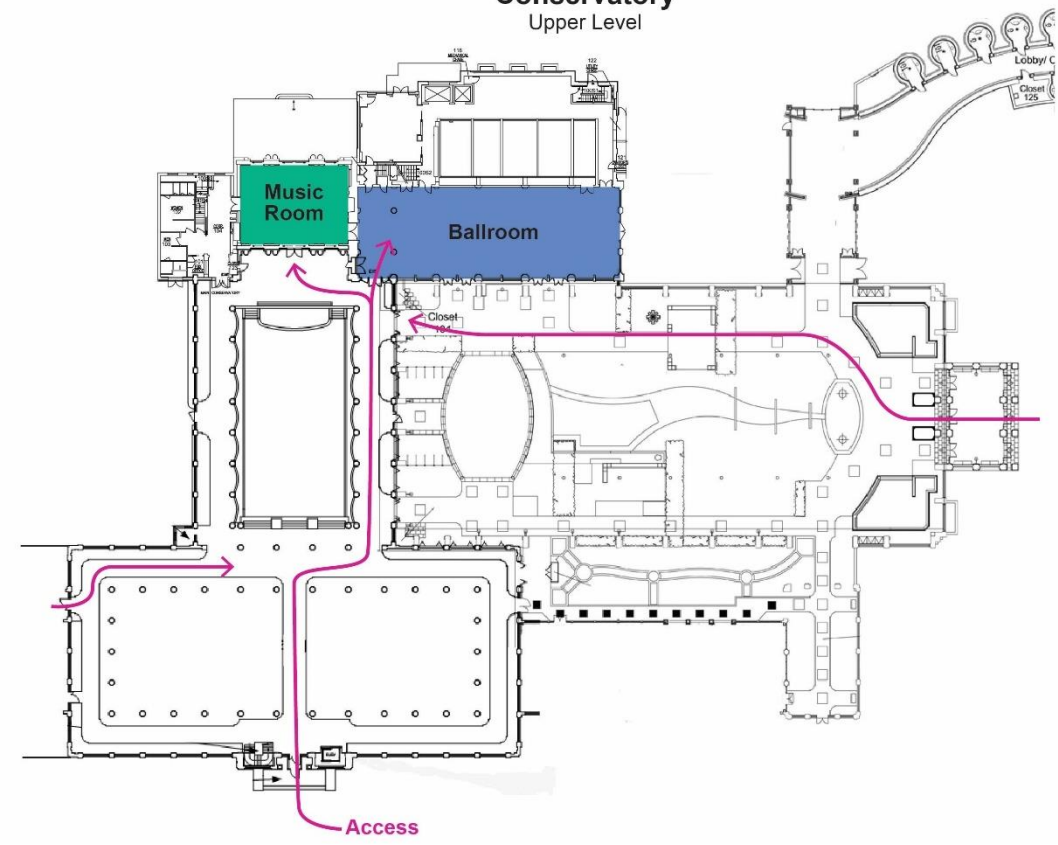
Visitor Center



Conservatory
Lower Level

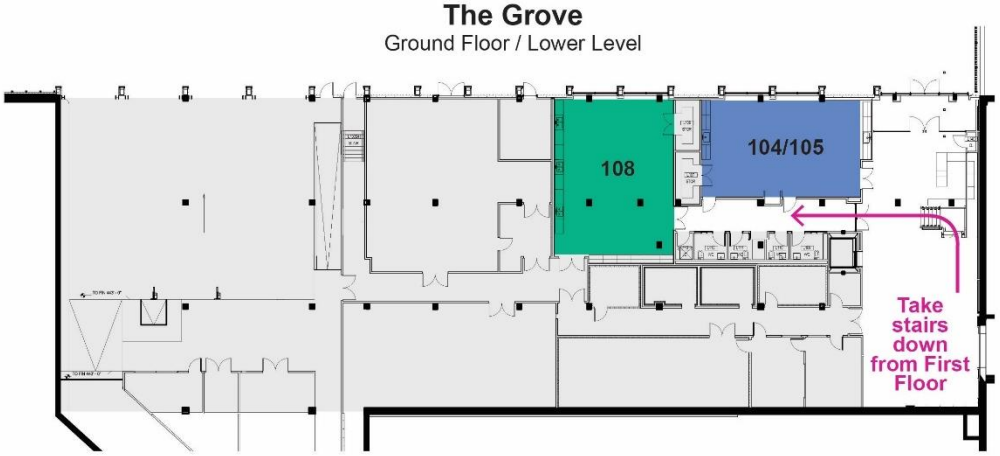


Conservatory
Upper Level

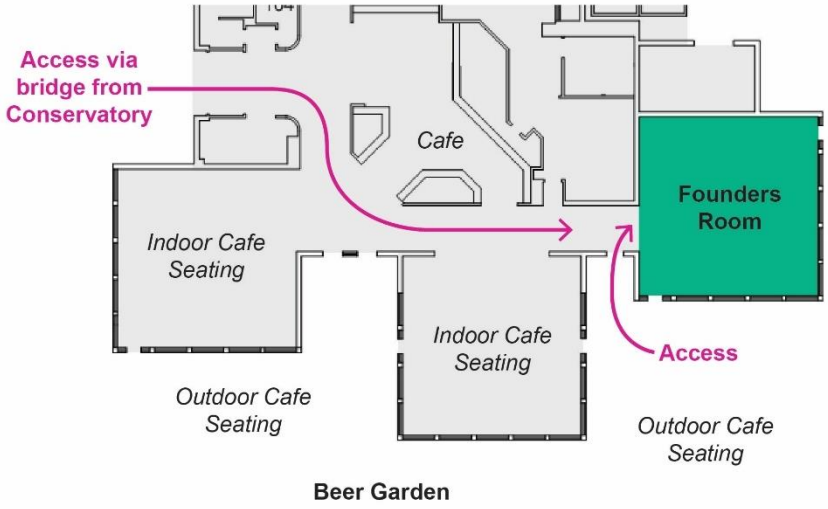


The Grove

Ground Floor / Lower Level

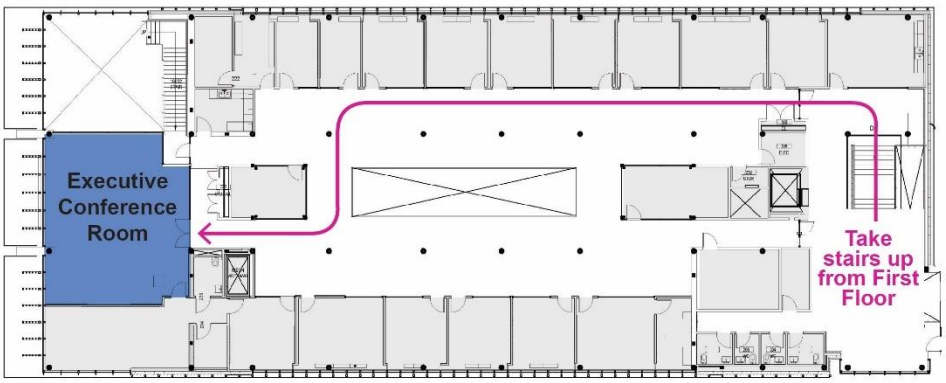


The Cafe



The Grove

Second Floor / Upper Level



Plenary Symposium:
Seeding the Future with Native Plants

Native plants are both biodiverse in their own right and serve as the foundation of ecological systems, supporting ecosystem functions from nutrient cycling to habitat. A wide variety of efforts to improve the ecological condition of Mid-Atlantic landscapes – from restoration of salt marshes and forests to pollinator habitat in cities – require seeds of native plants. The Plenary Symposium brings together experts from multiple sectors engaged in the science and practice of collecting, amplifying, and making available seeds of native plants to showcase current efforts and discuss needs for research and action.

Speakers

Phoebe Judge

Research Associate, School of Plant and Environmental Sciences, Virginia Tech

Phoebe is a Research Associate in the Restoration Ecology lab at Virginia Tech and the Project Coordinator for the Southside Native Seed Project. She works with native seed stakeholders across southern Virginia to increase the availability of native Piedmont grassland seed for restoration and re-vegetation projects. Prior to this position, Phoebe was the Seed Program Manager at the Southeastern Grasslands Institute, where she worked on the Seeds of Success project, as well as grassland restoration projects across Tennessee. Her background is in grassland plant community ecology and ecophysiology.

John Price

Seed Collection Coordinator, Mid Atlantic Regional Seed Bank

John Price is a botanist and restoration ecologist based in New York, and the Seed Collection Coordinator for Mid Atlantic Regional Seed Bank, focusing on the sourcing and collection of critical restoration species. He has nearly twenty years' experience building habitat and establishing rare species populations in the Northeast and Mid-Atlantic. Prior to joining MARSB, John specialized in the design and implementation of numerous Karner blue butterfly habitat restorations in the Glacial Lake Albany Recovery Unit. As part of this effort, John acted as Project Manager for the Albany Landfill Restoration, operating a conservation seed production nursery and overseeing the hand-collection of hundreds of individual species. With MARSB, John directs programmatic wild collections across seven states.

Tom Knezick

President, Pinelands Nursery & Supply

Tom Knezick is the President of Pinelands Nursery & Supply. He became interested in the agricultural and the nursery industry as a child when he planted his first pussy willow at age 2. As 2nd generation nurseryman, Tom's primary focus is bringing a business-minded approach to growing, selling, and marketing native plants. Tom is the President of the New Jersey Nursery & Landscape Association Board of Directors, co-hosts the Native Plants Healthy Planet Podcast, and recently welcomed his 2nd child with his wife Melissa.

Lucy Rubino

Director, Greenbelt Native Plant Center

Lucy Rubino is Director of Greenbelt Native Plant Center, a facility of the New York City Department of Parks & Recreation with a 13-acre greenhouse, nursery, and seed bank complex located on Staten Island, NY. Greenbelt's mission is to provide native plants and seeds from local plant populations in support of the restoration and management of the City's natural areas. Together with colleagues in Parks and partners throughout the region — local conservation, research, education, botanic, and cultural institutions — Greenbelt works towards the long–term sustainability of natural resources through programming and research to improve the conservation value of the City's parkland. Greenbelt provides locally appropriate seed and plants to New York City and offers guidance in planning projects.

Facilitator

Lea Johnson

Associate Director, Land Stewardship and Ecology, Longwood Gardens

As Associate Director of Land Stewardship and Ecology at Longwood Gardens, Dr. Johnson directs a multidisciplinary team to advance science-driven land stewardship in a variety of temperate habitat types including forests, meadows, wetlands, and agricultural lands. She is a broadly trained ecologist with expertise in plant communities, urban ecosystems, and ecological restoration who joins basic research with applications to land management and design. She currently serves ESA as Chair of the Mid-Atlantic Chapter and host of this meeting, Co-Chair of the Urban Ecosystems Ecology Section, and member of the MacArthur Award Committee.

Workshops

All workshops take place 11:30 am - 12:45 pm

	Session	Presenter	Location
A	*Aligning Your Teaching with ESA's Four-Dimensional Ecology Education (4DEE) Framework*	Justin St. Juliana, Senior Lecturer, Cornell University	Room 104/105, The Grove
B	*Last Step of the Scientific Method: Communicating Science*	Jessica Turner-Skoff, Associate Director of Science Communications, Longwood Gardens	Room 108, The Grove
C	*Navigating Ecology Careers*	Phyllis Pouyat Thibodeau, CareerEcologia	Fountain Room, Conservatory Lower Level
D	*Mentorship 101: Building Foundations for Effective Guidance and Growth*	Suhey Ortega, ESA Diversity Programs Coordinator	Founder's Room, Café
E	*From Ecology to Advocacy: How to channel your passion for nature into effective climate action*	Leila Hadj-Chikh, Climate Change Lobby	Visitor Center Auditorium

Oral Presentation Concurrent Session 1

Time	Session 1 **Stream Ecology** *The Grove, 104/105*	Session 2 **Invasive Species** *The Grove, 108*	Session 3 **Restoration & Land Management** *Fountain Room*
1:00 PM	*Evaluating Macroinvertebrate Communities and Stream Health in Two Tributary Streams Influenced by Urbanization* Bally, Wood – West Liberty University	*Invasive spotted lanternfly (Lycorma delicatula) honeydew is a novel resource subsidy for Hymenoptera* Cannon, Helmus – Temple University	*The effects of pre-planting treatment strategies on understory vegetation in an urban forest patch* Fuentes-Gigliotti, Aronson – Rutgers University Piana – University of Massachusetts Hallett – USFS
1:15 PM	*Restoration of Podostemum ceratophyllum increases benthic macroinvertebrate communities.* Cika, Wood – West Liberty University	*Tracking Adult Spotted Lanternfly with Photo-Recapture in an Urban Environment* Gibson, Behm – Temple University	*A decade of deer exclosure in suburban forests: responses of woody versus herbaceous plants in the indigenous and nonindigenous herb layer community* Kafas – The College of New Jersey
1:30 PM	*Growth patterns of Channel Catfish in the Susquehanna River* Dietterich – Haverford College McKay – USACE ERDC	*Quantifying and contextualizing spotted lanternfly speed of spread* Hendrickson – Temple University	*Public Garden Biodiversity: A Case Study at Chanticleer* Sarver, Bird – Sarver Ecological
1:45 PM	*Comparing Stream Condition Indices in Restored and Unrestored Sections of Conoy Creek in Elizabethtown, PA* Kauffman – Elizabethtown College	*Females prefer Heaven? A Female Bias of Wild-Caught Spotted Lanternfly Populations Observed on Tree of Heaven* Hodges, Traylor, LeClair, Banks, Swartz, Sewall – Temple University	*How is assisted migration of Quercus macrocarpa impacted by experimental warming and drought?* Sendall, Stefanski – Rider University
2:00 pm	*Distinct microbial communities in riparian terrace soils following dam removal and drainage* Moore, Rahman, Galella, Sena, Joshi, Yaculak, Inamdar – University of Delaware Kan, Peipoch – Stroud Water Research Center	*Context-Dependent Host Use by the Invasive Spotted Lanternfly (Lycorma delicatula)* Schneider, Behm – Temple University	
2:15 pm	*Insights into the ecology of the rheophytic macrophyte Podostemum ceratophyllum (Podostemaceae) effects of turbidity and the identification of the microbial diversity on the haptera.* Wood, Vankirk – West Liberty University		

Oral Presentation Concurrent Session 1

Time	Session 4 **Community Ecology** *Founder's Room, Café*	Session 5 **Wildlife** *Visitor Center Auditorium*
1:00 PM	*Patch Burn Grazing Effects on Prairie Microbial Communities* Arbogast, Avolio – Johns Hopkins University	*An exploration of banding success in hibernating bats of Pennsylvania, Ohio, and West Virginia* Aguiar – Temple University Sewall – Temple University
1:15 PM	*Pollinator-Prey Conflict with Carnivorous Plants in the New Jersey Pine Barrens* Brodhead, Daneshgar – Monmouth University	*Consequences of reproductive mode variation in co-occurring sea anemones* Bliss, Ryan – Towson University
1:30 PM	*Plant Community Assembly Dynamics on Rock Walls: The Role of Environmental Filtering and Dispersal Syndrome* Kryger – SUNY Binghamton University	*Eusocial reproduction selects for longevity* D'Andrea, Futcher, Kocher – Stony Brook University
1:45 PM	*Does migration constrain glucocorticoid phenotypes?* Uehling, Regnier – West Chester University	*Bacterial Diversity in Leaf-Cutter Ant Species: Host-microbe Interactions and Environmental Effects* Gianaris, Ramalho – West Chester University Aparecida de Oliveira, Bueno – University of São Paulo Morini – Universidade de Mogi das Cruzes Martins – Universidade Federal do Delta do Parnaíba
2:00 pm	Shrub populations decline in the presence of deer: A meta-analysis on deer herbivory Yannayon, Coyne, Gastonguay, Utz – Chatham University Carson – University of Nevada	*Microbial Antics: The Impact of Rising Temperatures on the Bacterial Communities of Aphaenogaster Ants* Kelleher – West Chester University
2:15 pm		*Accounting for disease-induced mortality and spillover from scavenging can change disease dynamics in scavenger populations* Mark, Maslo – Rutgers University

Oral Presentation Concurrent Session 2

Time	Session 6 **Wetlands & Water Quality** *The Grove, 104/105*	Session 7 **Modeling & Spatial Analysis** *The Grove, 108*
3:00 PM	*Comparative assessment of Carbon-dioxide (CO2) and Methane (CH4) fluxes and their predictors of a natural and restored mesohaline tidal wetlands in New Jersey* Dhakal, Schäfer – Rutgers University Oikawa – California State University, East Bay Knox – McGill University Duman – University of New Mexico Poppe – University of British Columbia	*Body size drives patterns of solitary Hymenoptera richness over elevation* Camber, Cahan – University of Vermont
3:15 PM	*Presence of Antibiotic-Resistant Bacteria within the Maiden Creek Watershed in Reading, Pennsylvania* Duarte, Duff, Stuart, Felker, Mysliwiec – Penn State University	*Episodic gregariousness leads to level-dependent core habitats in eastern copperheads (Agkistrodon contortrix)* Christensen, Kwait, Maslo – Rutgers University Clef – Friends of Hopewell Valley Open Spac
3:30 PM	*Clonal genetic architecture and landscape genetics of the high salt marsh plant Spartina patens in New York* Hamilton, Minsavage-Davis, Gedan – Georgetown University Kottler – University of the Pacific	*Long-eared owl stopover site selection: a novel approach to measuring habitat selection during migration* Drake – Felician University Christensen – Rutgers University
3:45 PM	*Water chemistry's effects on ecosystem functions observable across watersheds of different sizes and degrees of impairment* Huff, Wood – West Liberty University	*Predicting avian species richness: Patch attributes of threshold site occupancy* Keller – Habitat by Design, LLC
4:00 pm	*Analysis of Microplastics and Microbial Hitchhikers at Blue Marsh Lake in Reading, Pennsylvania* Zavecz, Felker, Mysliwiec, Lu, Savage, Bausher – Penn State University	*Macroalgal coexistence through space and time in North Carolina Hardbottoms* Long – UNC Wilmington
4:15 pm		*Simple Machine Learning with Aerial Imagery Reveals Severe Loss of a Salt Marsh Foundation Species* Minsavage-Davis, Rippel, Shirey, Wimp – Georgetown University

Oral Presentation Concurrent Session 2

Time	Session 8 **Urban Ecology** *Founder's Room, Café*	Session 9 **Plant Traits** *Visitor Center Auditorium*
3:00 PM	*Ecosystem service production in lawns: Urban grassy spaces provide substantial nitrogen fixation, water infiltration, and pollinator benefits even with limited species diversity in Prince Georgeâ€™s County, MD* Clarke, Ahmed – Prince George's Community College	*An Analysis of Neutral Outcomes in Niche Models* Chao – Stony Brook University
3:15 PM	*Links Between Campus Protected Landscape Awareness and Support for Conservation in a Student Sample* Joo, Aronson – Rutgers University Clark – Nature Areas Conservancy	*Environmental variability in sap flow-based canopy stomatal conductance in eleven dominant hardwood species of Eastern Temperate Forests of New Jersey* Khanal, Lathrop, Chen, Schafer – Rutgers University Vanderklein – Montclair State University
3:30 PM	*Native Trees May Struggle to Regenerate in Canopy Gaps of Invaded Urban Forest Patches* Levy-Diedrich, Trammell – University of Delaware Piana – Harvard University D'Amico – USFS	*Investigating Plant Morphological Trait Change in Four Cities in the Eastern United States* King, Aronson, Struwe – Rutgers University Schmidt – Harvard University
3:45 PM	*Modelling tree growth and climate response across Mid-Atlantic urban forests* McCoach, Trammell – University of Delaware D'Amico – USFS	*Morphological and phenological trait change in herbaceous wetland plants in relation to temperature and precipitation patterns over the last century* Latargia, Aronson – Rutgers University
4:00 pm	*Beating the heat: Investigating the impact of urban heat islands on thermoregulatory traits in the common butterfly Pieris rapae* McManus – Temple University	*Rhizobia strain diversity promotes stable plant functional traits and resilience under simultaneous drought and herbivore stress* Randall, McGurrin, Rieger-Erwin, Burghardt – University of Maryland Komatsu – University of North Carolina, Greensboro Parker – Smithsonian Institute
4:15 pm	*Evaluating and Understanding Biodiversity of Urban Cemeteries in Philadelphia, PA, USA* Kostick – Drexel University	*Photosynthetic induction and sunfleck responses of three understory tree species in Mid-Atlantic broadleaf forests* Schedlbauer, Paynter – West Chester University

Poster Session

	Title	Author(s)	Primary Affiliation
1	*Assessing Seed Bank Viability Within Legacy Sediment*	Delaney, Beauchamp	Towson University
2	*Nine Years Later: Investigating the Impact of Arctic Wildfires on Methane and Carbon Dioxide Fluxes in a Tundra Site in Northern Alaska*	Chandler, Del Cid, Moody, Vaz, Larson, Fetcher	West Chester University of Pennsylvania
3	*The role of extended leaf phenology in the success of invasive Amur Honeysuckle (L. maackii) across a latitudinal gradient in the central U.S.*	Jefferis, Gurevitch	Purdue University
4	*Hyphosphere Influence on Mineral-Associated Organic Matter Under Nitrogen-Limiting Conditions*	Cancel, Wick Hestrin, Keiser	University of Massachusetts Amherst
5	*Ecological genetics for several populations of the high salt marsh foundation plant Spartina patens across the mid-Atlantic, USA*	Peterson, Cole, Minsavage-Davis, Kang, Simon, Reif, Ng, Hamilton,	Georgetown University
6	*Drought Response of an Appalachian Green Roof with a Distinct Native Prairie Community*	Wallace, Rosenthal,	Ohio University
7	*Identifying patterns and drivers of avian species co-occurrence along a seasonal migration route in the eastern United States*	Logan	Rutgers University-Newark
8	*Investigating Ant Diversity in Urban Ecosystems with High Heat Vulnerability*	Tanoue, Garcia, Savage	Rutgers University
9	*Exploring Factors Influencing Agrobacterium-Mediated Genetic Transformation in the Unicellular Green Algae Chlorella sp.*	Parsaeimehr, Ozbay	Delaware State University
10	*Plastic mulching effects on microbiomes in Colocasia esculenta cultivars*	Croft, Opoku, Puzey, Dalgleish, Kahn	William and Mary
11	*Fifty years of Phragmites australis landscape change on Long Islandâ€™s South Shore Estuaries*	Singh, Watson, Lopez	Stony Brook University
12	*The effects of floodplain restoration on reptiles and amphibians*	Pacheco, Reed,	Elizabethtown College
13	*Negative Effects of Acid Mine Drainage on Stream pH Levels and Ecological Health*	Sessums, Wood	West Liberty University
14	*Freshwater Snail Inventory of the Upper Delaware River*	Dapkey, Guelzow, Weber,	Academy of Natural Sciences
15	*Assessing different management actions for the conservation of the grand skink (Oligosoma grande)*	Dean, Zheng, D'Andrea	Stony Brook University
16	*Ecotypic Differentiation in Photosynthesis and Respiration of Eriophorum vaginatum Across a Latitudinal Gradient in a Common Garden Setting*	Edwards, Fetcher, Vas, Larson	Wilkes University
17	*The Effect of Elevation and Soil Moisture on Water Use Efficiency of Understory Plants*	Khambete	Union College
18	*Impacts of Tornado Disturbance on Soil Carbon Fluxes in a Temperate Deciduous Forest*	Kern, Caplan, Sutter, Bonfim, Flores, LeClair Stonefield, Sewall, Freestone, Eisenman	Temple University
19	*Methods for managing the invasive grass Microstegium vimineum differ in effectiveness, effort required, and regeneration of native plants over three years of treatment.*	Petri, Oordt, Horne, Thomas, Johnson	Longwood Gardens
20	*An exploration of traumatic resin duct (TRD) formation tree rings from three Himalayan conifer species*	Stewart, Druckenbrod, Filipowicz, Burns	Rider University

Poster Session

	Title	Author(s)	Primary Affiliation
21	*Plant Native: Comparing biodiversity benefits, ecosystem services provisioning, and physiological performance of native and non-native plants in urban horticulture*	Tartaglia, Aronson	Rutgers, The State University of New Jersey
22	*Effects of warming and precipitation on emergence and survival of red maple and green ash seedlings*	Apuzzo, Sendall	Rider University
23	*Examining Patterns of Urban Weed Adaptation to Elevated Salt Levels*	Carroll, Avolio	Johns Hopkins University
24	*Identifying transport hubs for invasive species jump dispersal using stakeholder derived spatiotemporal occurrences: Forecasting the spotted lanternfly (Lycorma delicatula) invasion*	Keller, Helmus	Temple University
25	*Evaluating the BirdWeather PUC for research-grade bioacoustic monitoring and potential applications*	Slesinski, Behm	Temple University
26	*Understory Complexity, Soil Conditions, and Landscape Characteristics as Potential Drivers of Eastern Red-backed Salamander Presence in Varied Forest Habitats*	Sehnert, Sober	Stevenson University
27	*Vertebrate and invertebrate herbivory vary with vegetation type and experimental warming conditions in high-Arctic Svalbard*	Bandet	University of Pennsylvania
28	*Maternal Investment Strategies in Mammals: A Phylogenetic Comparative Approach*	Forgione, Maresh	West Chester University of Pennsylvania
29	*Cropping systems variations impact on organic and inorganic nitrogen losses.*	Abe	University of Delaware
30	*Impact of Grazing and Fire treatments on Sagebrush and Associated Gall-Inducing Insects*	Smith, Whalen, Wilmer, Strong, Witiak	Virginia State University
31	*Antibiotic resistant gene presence within stream sediment in two mid-order Appalachian streams*	Meyer, Wood, Garrison, Cantley	West Liberty University
32	*Termite Mound Water Management*	Dibia, King	Rutgers University-Camden
33	*Impact of Environmental and Sociodemographic Factors on the Spatial Spread of Lyme Disease in the United States*	Williams, Agusto	University of Kansas
34	*Meta-analytical synthesis of the impacts of garlic mustard on the diversity and productivity of understory plants, invertebrates, and fungi in North American forests*	Brown, Habeck	Kutztown University
35	*Darwin's Naturalization Conundrum revisited: The limited role of phylogenetic and trait distances as predictors of non-native plant success*	Dunham	Union College
36	*Sex Specific Feeding Choices of Adult Lycorma delicatula*	Knightly, Knightly, LeClair, Traylor, Bonfim, Caplan, Banks, Swartz, Freestone, Sewall	Temple University
37	*Green burial promotes important pollinator habitat: Arthropod Biodiversity in Green vs. Traditional Burial Sites*	Shtino, Joseph, Helmus	Temple University
38	*Gene Expression and Dispersal: Investigating the for Gene in the Enchenopa binotata Species Complex*	Merola, Hawkins, Stearns	Stevenson University
39	*Evaluating Applied Nucleation for Urban Reforestation in Harford County, Maryland*	Romm, Beauchamp	Towson University

Poster Session

	Title	Author(s)	Primary Affiliation
40	*Growth and survival of red oak seedlings from several northeast provenances in a New Jersey common garden experiment*	Filipowicz, Sendall	Rider University
41	*Characterization of Sarracenia purpurea purpurea Communities in the New Jersey Pine Barrens*	Santasiero, Phelps, Dillon, Daneshgar	Monmouth University
42	*Biochar in Wetland Restoration: Soil Biogeochemistry and Plant Recruitment Impacts*	Barufaldi, Watson, Ikeh, Fountain	Drexel University
43	*Invasive spotted lanternfly planthopper (Lycorma delicatula) honeydew and its effects on U.S. forest ant assemblages*	Becker, Zimmerman, Hepler, Leskey, Helmus	Temple University
44	*Exploring the Complex Relationship Between Race, Gender, and Perspectives on Existing Terminology in Myrmecology*	Scolastico, Ramalho	West Chester University
45	*Tree community structure and patterns of bird activity within a permanent forest plot in the Ramapo Mountains*	Myszko, Eric Wiener	Ramapo College of New Jersey
46	*Biodiversity Illuminated: A Two-Year Urban Moth Portfolio*	Harris, Grant	Widener University
47	*Assessing the Effects of Historical Land Use and Environmental Variables on Rare Plant Distribution at Antietam National Battlefield*	Obermaier, Beauchamp	Towson University
48	*Does Forest Management have Unintended Consequences for Habitat Restoration?*	Mitchell, Corbin	Union College
49	*Impact of Climate Change on the Phenology of Native and Invasive Plants*	Abdur-Rahman,Obae	Stevenson University
51	*Contrasting Exotic and Native Geckos to Explore Drivers of Caribbean Homogenization*	Mann	Temple University
52	*Residence Patterns and host use of female Tropical Lanternfly, Enchophora sanguinea, in Costa Rica*	Weigand, Lam, Cannon, Helmus	Temple University
53	*Variability in Organic Carbon Storage of Chesapeake Bay Submerged Aquatic Vegetation (SAV) Systems*	McCarthy	Johns Hopkins University
54	*Microclimate and thermal tolerances structure ground beetle assemblages across a tree diversity gradient in a planted forest*	Obenaus, Bennett, Parker Nowakowski	Smithsonian Environmental Research Center
55	*Rapid eastern hemlock decline alters litter decomposition following hemlock woolly adelgid infestation*	Palmer, Barker-Plotkin, Keiser	University of Massachusetts Amherst
56	*Nitrogen and Salt Pollution in Connecticut Streams: A Preliminary Study*	Kliczewski, Verheyden	Union College
57	*Phytoplankton community dynamics in a small reservoir after the elimination of Ceratophyllum demersum*	Kubalak, Rose, Packer, Holt	Susquehanna University
58	*Changes in Insect Biomass During the Tree Swallow Breeding Season*	Smith	West Chester University
59	*Vouchering Specimens at the Delaware Museum of Nature and Science*	Kittle, Kempken, Halley, Shea	Delaware Museum of Nature and Science

Poster Session

	Title	Author(s)	Primary Affiliation
60	*Functional Diversity and Trait Shifts in Sapling Communities of Post-Disturbance Old-Growth Forests*	Stonefield	Temple University
61	*A comparison in the changes of the zooplankton communities in the fall of 2022 and 2024 Faylor lake.*	Packer, Holt, Kubalak	Susquehanna University
62	*Bryophytes and Lichens of Liberty: Baseline survey of the cryptogam community in the brownfields of Liberty State Park before park redevelopment.*	Howe, Cicco, Fashek, Gallagher, Hafstad, Holzapfel, Kaishian, Lendemer, Simpson, Smullen, Waters, Young	George Mason University
63	*Selective insecticide treatment reduces mortality of white ash (Fraxinus americana) on the Allegheny National Forest*	Kovalchick, Kilgore, Karamcheti, Knight, Flower, Royo	Washington & Jefferson College
64	*Method Development and Comparison of Methods for Quantifying Total Phosphorus in Goose Creek*	Myers, Fork	West Chester University
65	*Advances in Understanding the Microbiota of Ants in Brazil: Review and Future Perspectives*	Gianaris, Rocha, Pinheiro, Bueno, Ramalho, Martins	West Chester University
66	*Does Greening Philadelphiaâ€™s Vacant Lots Result in Lower Arthropod Diversity?*	Bagdonas, Behm, Swartz	Temple University
68	*The ecological significance of Asclepias syriaca and Cirsium vulgere for insect pollinators*	Morris	William & Mary
69	*Behavioral Insights into Residence Time and Site Fidelity of Male Enchophora sanguinea, the Tropical Lanternfly*	Lam, Helmus, Cannon, Weigand	Temple University
70	*The importance of small herbaria for revealing tropical biodiversity patterns*	Ertem, Moonlight	Trinity College Dublin and University of Maryland
71	*Soil Greenhouse Gas Fluxes in Perennial & Annual Forage Systems Under Livestock Grazing Management*	Brown	University of Delaware
72	*Exploring the Impact of Land Use and Fragmentation on Wetlands and Ecosystem Services in Delaware*	Cotten, Tripp, Smith	Delaware State Univeristy
73	*Impact of stand age on forest structure and carbon storage in a Pennsylvania forest*	Fitzgerald, Schedlbauer	West Chester University
74	*Detection Rates of Predators and Prey in Fragmented vs Intact Forests*	Mathiesen	Susquehanna University
75	*Soil nitrogen in canopy gaps: Patterns of nitrogen distribution in northeastern urban forests*	Kang, Trammell, D'Amico	University of Delaware
76	*Impact of coarse fragments for estimating soil carbon pools in Paramo soils*	Srinath	Swarthmore College
77	*I-Assisted Tree Species Identification for Fine-Scale Biodiversity Mapping*	Potapov, Williams, McMackin	Bryn Athyn College
78	*Stream Water Quality Monitoring in the Raritan River Headwaters Region in Central New Jersey*	Scarpantonio, Scricco, Stander	Raritan Valley Community College
79	*Examining urban tree health as a method of predicting species-specific climate adaptation*	Schaefer, McGurrin, McCloskey, Pierre, Burghardt	University of Maryland College Park

Poster Session

	Title	Author(s)	Primary Affiliation
80	*Investigation into elemental composition and physical characteristics of Podostemum ceratophyllum (Podostemaceae)*	Braun, Wood	West Liberty University
81	*Comparison of Pollinator Visitation to Native and Tropical Milkweed (Asclepias) species in Pennsylvania*	Polter, Sacchi	Kutztown University
82	*Mapping the risk of Lycorma delicatula (spotted lanternfly) invasion hubs across the U.S.A. with interactive web applications*	Joseph, Helmus	Temple University
83	*"Bug roads": Modeling the potential dispersal routes of hymenopteran pollinators in New York City*	Fay, Lundquist	Marymount Manhattan College
84	*Drivers of Arthropod Diversity Across a Tornado Disturbance Gradient*	Miller	Temple University
85	*Forest development in the seven years following experimental reforestation treatment establishment*	Stoltz, Schedlbauer,	West Chester University of Pennsylvania
86	*Exploring Ant Diversity and Diapause Patterns in West Chester, PA in response to Environmental Contexts*	McFadden, Ulyssea, Morgan, Ramalho,	Dr. Manuela Ramalho, West Chester University of Pennsylvania
87	*Temperature Influences Patterns of Staggered Egg Hatching in the Eastern Treehole Mosquito (Aedes triseriatus)*	Zimmerman	Montclair State University
88	*The Lingering Effects of the Asian Longhorned Beetle: Impact on the Changing Composition of a New England Campus Arboretum*	Silver, Cleary, Wolfe-Bellin	College of the Holy Cross
89	*Validating the Metabolic Scaling Exponent Estimated from Maximum Entropy Theory and Individual Size Data*	Xu	Pace University
90	*Digitization and Collection Trends of the Frostburg State University Herbarium (FSUH)*	Thiel, Ridgell	Frostburg State University
91	*Disturbed and Diverse - Soil Microbial Communities of Green-Wood Cemetery*	Luster	UPROSE
92	*Amplifying Fungal Knowledge: Ribosomal DNA Barcoding and the Future of Biodiversity Identification and Assessment*	Simmons, DiLucido, Mistry, Grant	Widener University
93	*Relationships between Wind Direction and Concentrations of Four Raptor Species During Autumn Migration in the Ramapo Mountains*	Kasauskas, Thatcher, Wiener	Ramapo College of New Jersey
94	*Hybrid Group-Based Concept Mapping*	Ruhl	Rowan University
95	*Microbial Partners: Decoding Host-Microbe Interactions in the Spotted Lanternfly (Lycorma delicatula)*	Munshower	West Chester University
96	*Effects of heavy metal pollution and phytoremediation on belowground ecology in a grassland mountainside*	Noonan, Kelm, Litchfield, Dietterich, Miller	Haverford College
97	*Integrating ecological science and stewardship practices to manage invasive species: A case study of an emerging invasive shrub, Symplocos paniculata*	Oordt, Anderson, Johnson	Longwood Gardens
98	*Nectar microbes identified as detrimental to pollinia germination in Asclepias syriaca*	Waynick	William & Mary

Poster Session

	Title	Author(s)	Primary Affiliation
100	*Species Diversity and Distribution within Edge-Interior and Canopy-Understory Quercus rubras in a Temperate Deciduous Forest*	Connell	Stevenson University
101	*Population Trends and Influence of Wind Direction on Autumn Migration of Monarch Butterflies and Canada Geese in the Atlantic Flyway*	Germinario, Sheldon, Wiener	Ramapo College of New Jersey
102	*Soil Respiration Drivers and Challenges in a Changing Environment*	Haas	Montclair State University
103	*Seasonality of Harmful Algal Bloom Occurrences and Correlations to Nitrate Concentrations in the Spruce Run Recreational Area, Clinton, NJ*	Bonzano, Stander	Raritan Valley Community College
104	*The Effects of Road Salt on EPT within Western New York*	Dziezewski, Law	Daemen University
105	*Picky eaters or anything goes: Seasonal timing and specialization among greater fritillary butterflies*	Cano, Swartz, Tilden, McKinney, Thomas, Zografou, Banks, Sewall	Temple University
106	*Management of Microstegium vimineum: A meta analysis*	Farchione	Chatham University
107	*Investigating the Possible Effect of cGMP-Dependent Protein Kinase on Dispersal Behavior in Chinese Praying Mantis (Tenodera sinensis) Nymphs*	Hawkins, Merola, Stearns	Stevenson University
108	*Trophic ecology of blacknose dace (Rhinichthys atratulus) in the Bronx River, NY, USA*	Hernandez, Lundquist,	Marymount Manhattan College
109	*Water quality testing across Wheeling Creek shows recent SPC spikes across all sites*	Martin, Wood	West Liberty University
110	*Tritrophic interactions between Eastern Redbud (Cercis canadensis) cultivars, a seed predator (Gibbobruchus mimus) and parasitoid wasps*	Rolecki	Susquehanna University

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Oral Session Abstracts
Session 1: Stream Ecology

1. Evaluating Macroinvertebrate Communities and Stream Health in Two Tributary Streams Influenced by Urbanization

Reagan Bally, West Liberty University
James Wood, West Liberty University
Noah Meyer, West Liberty University

Urbanization in watersheds is known to alter water chemistry and hydrology, which can subsequently impact macroinvertebrate communities. Additionally, sedimentation, often linked to human activities such as agriculture and construction, can further exacerbate these effects. In this study, we compared the macroinvertebrate communities of two small stream systems that differ in urbanization levels. The first site, Castlemanâ€™s Run, is a forested stream and a third-order tributary of Buffalo Creek, while the second site, Long Run, is located in a highly urbanized area and is a second-order tributary of Wheeling Creek. Using multi-year water chemistry data and macroinvertebrate sampling, we evaluated trends in water quality and examined differences in macroinvertebrate communities between the two sites. We also provided an overall assessment of stream health for both Castlemanâ€™s Run and Long Run. Macroinvertebrate samples were identified to the family level, which allowed us to assess group-specific tolerance values and better understand their relationship to ecosystem quality.
Macroinvertebrates, Stream Health, Biodiversity

2. Restoration of Podostemum ceratophyllum increases benthic macroinvertebrate communities.

Elizabeth Cika, West Liberty University
James Wood, West Liberty University

The aquatic plant Podostemum ceratophyllum, henceforth referred to as Podostemum, is a foundation species in Appalachian rivers. Podostemum provides benefits to the benthic community and is one of the only macrophytes inhabiting swiftwater mid-order rivers. Macroinvertebrates utilize this macrophyte as a food source and refugia. Across much of the mid-Atlantic region, Podostemum appears to be in decline and has been extirpated in areas where it was previously documented. Specific reasons for the species decline are unclear, but likely include sedimentation, altered water chemistry, and flow alteration.

We sought to evaluate the effects of Podostemum restoration by focusing on the structural influence of the plant on macroinvertebrate communities. Artificial plants with stem lengths of 5cm, 15cm, and a control (bare rock) were deployed into four rivers in the Appalachian region and left to be colonized for ~8 weeks. We hypothesized that increased Podostemum stem length would be correlated with increased macroinvertebrate abundance, diversity, and species richness present on the macrophyte.

Preliminary data indicates that artificial 5cm stem length plants contain ~300% more macroinvertebrates than controls, and artificial 15cm stem length plants contain ~600% more macroinvertebrates than controls. Additionally, preliminary data indicated a shift in functional feeding groups (FFG) in the artificial plant, with collector-gatherers becoming more abundant with stem increase. This study will provide novel insight into the structural benefits that Podostemum restoration could have in rivers across the mid-Atlantic region where the plant has been extirpated.
macrophyte, macroinvertebrate, Podostemum

3. The riverweed model suggests strong biomass loss mechanisms for a foundational riverine macrophyte

Lee Dietterich, Haverford College
S. Kyle McKay, US Army Engineer Research and Development Center

Riverine macrophytes play diverse and foundational roles in their ecosystems, including shaping food webs, nutrient spirals, and the dynamics of sediment and hydraulic flow. Models of riverine macrophyte growth can thus inform our understanding of how river habitats, ecosystems, and elemental stocks and fluxes will change over time or in response to environmental or management conditions. However, models designed for other ecosystems may not apply readily to rivers due to unique constraints such as their linearity and unidirectional water flow. We developed the riverweed R package to model riverine macrophyte growth and used it to simulate the biomass of Podostemum ceratophyllum Michx. (Podostemaceae; hornleaf riverweed), a flowering plant native to eastern North American rivers, where it typically grows attached to hard substrates in fast-moving water. We used the riverweed package to evaluate 38 candidate models against ~1.5 years of biomass data from the Middle Oconee River in Athens, Georgia, USA. Candidate models were generated as all nonredundant combinations of a set of biomass growth and loss functions, such that each model represented a set of hypotheses about the biology of P. ceratophyllum. Results so far indicate that modeled plant growth tended to exceed empirical measurements unless modeled biomass was capped by a function such as logistic growth or stem breakage. This suggests either that P. ceratophyllum biomass per unit area is strongly constrained, perhaps by a physical mechanism, or that the current model parameterization underestimates the strength of other biomass loss processes such as herbivory. We find the latter hypothesis to be more likely, based on observations by ourselves and others of field populations persisting at substantially less than their apparent maximum possible size and density. Moving forward, we aim to better understand the conditions that would allow strengthened model biomass loss processes to more accurately simulate P. ceratophyllum biomass, to apply the modeling tools in the riverweed package to populations in additional rivers, and to use it in combination with spatially explicit models of hydraulic flow and sediment dynamics.
Rivers, Plant growth, Modeling

4. Comparing Stream Condition Indices in Restored and Unrestored Sections of Conoy Creek in Elizabethtown, PA

Amanda Kauffman, Elizabethtown College

Stream restoration converts degraded streams to a state prior to human disturbance through various methods including legacy sediment removal and floodplain reconnection. Although restoration is common, data is not always available to assess pre- or post- restoration of streams. Biological indices are commonly used to assess stream condition by combining biological, physical and chemical attributes to obtain scores for comparison between sites. The aim of this study is to identify the effectiveness of restoration using biological indices and to provide more data for local restorations where data is lacking. This study was done during fall 2024, comparing restored and unrestored sections of a stream in Elizabethtown, PA. It is hypothesized that the biological index scores will be higher in the restored compared to the unrestored site, and that the physical and chemical features of the restored site will be more similar to a natural system compared the unrestored, degraded stream. Preliminary data indicate that physical components of streams were the best predictor of Hilsenhoff biotic index (HBI) and macroinvertebrate diversity. On the other hand, sensitive and EPT taxa were more related to inorganic nitrogen concentrations. Conditions in the restored and unrestored site led to variations in nitrogen, likely a result of stream velocity. Further research will investigate biological, physical, and chemical factors during or immediately following a current restoration in this same system.
restoration, macroinvertebrates, biotic indices

5. Distinct microbial communities in riparian terrace soils following dam removal and drainage

Eric Moore, University of Delaware
Md. Moklesur Rahman, University of Delaware
Joseph Galella, University of Delaware
Matthew Sena, University of Delaware
Bisesh Joshi, University of Delaware
Alexis Yaculak, University of Delaware
Jinjun Kan, Stroud Water Research Center
Marc Peipoch, Stroud Water Research Center
Shreeram Inamdar, University of Delaware

Human activities have left persistent legacies that alter ecosystem structure and function. Soils are especially vulnerable to disturbances, yet changes in microbial composition and nutrient cycling processes following disturbance and mitigation remain poorly understood. Milldam construction over the past 2-3 centuries has resulted in large deposits of legacy sediments along eastern U.S. waterways. After dam removal, the resulting riparian terrace is transformed from a persistently anoxic state to a drier, oxic state; however, we lack knowledge of how soil development and nutrient concentrations affect soil microbial communities and ecosystem functions following drainage. Using a space-for-time substitution, we sampled 12 riparian terrace soils (1.3 â€“ 4 m depth) across three Mid-Atlantic watersheds (coastal plain and piedmont physiographic provinces) with existing or removed/breached (6-235 years ago) milldams to characterize their physical, chemical, and biological properties. High throughput sequencing was used to elucidate detailed bacterial and archaeal composition and diversity, while phospholipid fatty acid (PLFA) analysis was used to quantify living microbial biomass. We found distinct relationships among soil physicochemical properties and microbial communities that varied with depth and time. Proteobacteria, Acidobacteria, Chloroflexi, Firmicutes, and Actinobacteria were the most abundant prokaryotic phyla across our study sites; other top phyla show clear preferences for drained, oxic zone (e.g., Methylomirabilota) or saturated, anoxic zone (e.g., Patescibacteria, Thermoplasmatota). Microbial biomass is highest at the terrace surface, declines with depth, and is greater where dams have been breached or removed. Principal components analysis (PCA) revealed that sediment ammonium-N, Fe, organic carbon, pH, bulk density, and texture (% sand, silt, and clay) varied with depth and are related to time since dam removal, though relationships differ among watersheds. Non-metric multidimensional scaling (NMDS) revealed shifts in community composition are significantly related to changes in element concentrations (Fe, Mn, Na, P), pH, soil moisture, denitrification, respiration, and soil aggregation, reflecting the effects of changes in redox conditions, biogeochemical nutrient cycling, and hydrology due to dam removal. Additionally, sediment ammonium-N and bioavailable Fe concentrations are very low at sites where dams were breached long ago, but are elevated and increase with depth where dams still exist. This suggests that ammonium-N declines following dam removal due to nitrification and subsequent loss of nitrate-N via drainage/leaching or denitrification. Overall, this study advances our understanding of dynamic microbial composition and functions in riparian soils impacted by dam inundation, and how these microbial communities respond to soil drainage following dam removals.
Microbial composition, riparian, dam

6. Insights into the ecology of the rheophytic macrophyte Podostemum ceratophyllum (Podostemaceae) â€“ effects of turbidity and the identification of the microbial diversity on the haptera.

James Wood, West Liberty University
Ashley Vankirk, West Liberty University

The swiftwater macrophyte Podostemum ceratophyllum is the only member of the strictly aquatic plant family Podostemaceae. Podostemum ceratophyllum, hereafter referred to as Podostemum, has a range extending throughout the Piedmont and Montane regions of eastern North America with disjunct populations in Central America. The ecology of

the species is understudied, and the primary habitat is described as submerged stable substrates in swift waters with ample sunlight. The mechanism of attachment of the plant to the substrate is also unresolved, but observational studies suggested that attachment is driven by cyanobacteria. Observations of the plant growing in subprime habitats suggest that the plant is easily detached from benthic substrates when stressed, possibly leading to local extirpation. Here we report the results of a study that examined the response of the plant to stream water turbidity, and a second study that examined the microbiome of the attachment structures (haptera) using phylogenetics. We found a negative relationship between the plant and increasing stream water turbidity, and we identified a diverse assemblage of microbes that may be related to attached. Collectively, these studies provide insight into how environmental conditions may lead to the extirpation of the plant from eastern rivers.
Aquatic Plant, Stream Ecology, Biofilm

Session 2: Invasive Species

1. Invasive spotted lanternfly (Lycorma delicatula) honeydew is a novel resource subsidy for Hymenoptera

Stefani Cannon, Temple University
Matthew R. Helmus, Temple University

When species invade ecosystems, they can create novel resource subsidies by exposing previously unavailable resources, such as sugars and nutrients, thereby altering resident consumer interactions and ecosystem processes. The invasive spotted lanternfly (SLF), Lycorma delicatula, a planthopper native to Asia, has spread to over 18 U.S. states since its 2014 detection in Pennsylvania. SLF feeds heavily on the invasive tree-of-heaven (Ailanthus altissima), which has naturalized throughout the US but previously lacked vascular herbivores, potentially providing novel resources to resident organisms through carbohydrate-rich honeydew and sap-exuding feeding holes. We documented insects feeding on SLF honeydew and tree-of-heaven exudate at 43 southeastern Pennsylvania sites, focusing on Hymenoptera. Using visual observations and trunk trapping, we sampled throughout the growing season while measuring environmental factors. Redundancy analysis evaluated which variables, including SLF biomass, influenced Hymenoptera community composition. We observed diverse native and introduced insects from six orders consuming these resources, including 33 Hymenoptera species (30 native, 3 introduced) from 13 families, four containing important pollinators. Site environments varied little spatially, with community composition unexplained by spatial factors. Instead, temporal variation was equally explained by temperature and SLF biomass, making SLF as important as temperature in determining Hymenoptera community composition. Almost a decade into the invasion, our findings from the invasion core reveal that the spotted lanternfly invasion has created a novel resource subsidy that is used by many insect species and affects the temporal dynamics of resident Hymenoptera communities throughout the growing season.
resource subsidies, ecosystem effects, invasive species

2. Tracking Adult Spotted Lanternfly with Photo-Recapture in an Urban Environment

Katie Gibson, Temple University
Dr. Jocelyn Behm, Temple University

The spotted lanternfly Lycorma delicatula (SLF) is an invasive pest that has expanded its range through states in the Northeast and Mid-Atlantic regions, which poses threats to local vineyards and the agriculture industry. There is currently limited information on local habitat use by SLF, particularly concerning the residency time of adults on trees and local habitat use during their egg-laying stage. This study investigates the residency time of adult SLF on trees in an urban area

of Philadelphia on Temple Universityâ€™s campus by grouping repeated sightings of individuals from field photographs. The photo-identification software I3S Classic is used to track the location individuals across 21 trees within 5 sites by plotting and comparing their unique wing spot patterns, allowing for residency times of individuals to be calculated, and for temporal and spatial patterns of movement to be examined. A high rate of photo-recapture was observed on trees, with evidence of individual movement both among trees within sites and travel across sites at a maximum of 450m. This approach will improve understanding of SLF habitat use in urban settings, which could inform future management strategies by measuring how SLF establish themselves on specific trees and disperse locally.
invasive species, residence time, local dispersal

3. Quantifying and contextualizing spotted lanternfly speed of spread

Robert Hendrickson, Temple University

The invasive spotted lanternfly (SLF), Lycorma delicatula, has spread from eastern Pennsylvania as far west as Indiana since its 2014 introduction and has been an agriculturally important invasive species. Many factors including the co-invasion of its host tree, Ailanthus altissima, the Tree of Heaven, and human mediated dispersal events have been able to explain the spread of spotted lanternflies into novel areas. My research aims to quantify how spread speed varies over different geographic gradients and land covers. This will be accomplished through the use of data compiled from numerous state and federal agencies on spotted lanternfly occurrences that is available as an anonymized dataset in our labâ€™s R package, lydemapR. Of particular interest for this talk, I will detail a speed of spread model created based on these data from federal and state agencies, as well as analyses on how speed of spread varies of geographic space based on different land covers. These findings will help understand how SLF spread through different geographies and inform management and protection strategies for agriculture.
Spotted lanternfly, Invasive species, Geospatial

4. Females prefer Heaven? A Female Bias of Wild-Caught Spotted Lanternfly Populations Observed on Tree of Heaven

Grace E. Hodges, Temple University
Clayton R. Traylor, Temple University
Christopher LeClair, Temple University
Matthew A. Banks, Temple University, Fort Indiantown Gap National Guard Training Center
Mark T. Swartz, Fort Indiantown Gap National Guard Training Center
Brent J. Sewall, Temple University

The spotted lanternfly, Lycorma delicatula (SLF), is an invasive fulgorid originating from eastern China that continues to descend across the United States. Their co-conspirator, the invasive tree of heaven, Ailanthus altissima, has significantly contributed to this spread. A known preferred host for the SLF, A. altissima particularly supports adult aggregations later in the season. Although knowledge regarding mating behavior continues to accumulate, little has been documented regarding the sex ratios of these aggregations. This study aims to explore shifts in adult sex ratios across several seasons of observation. Previous evidence indicates a general preference of SLF for A. Altissima, based on their overlapping native ranges. Consistent and reliable food sources will be important to gravid females dedicating energetic resources to the growth of eggs. Therefore, sex ratios were expected to be female-biased on A. altissima across several years. Additionally, we anticipate those female-biased ratios to peak after adult emergence, during peak reproductive period. We observed SLF presence on select tree species present on the Temple Ambler campus from 2022 to 2024. Mesh circle traps were affixed to trees and visited every two weeks to monitor adult SLF populations from August to November. Greater quantities of SLF were collected on A. altissima compared to native focal species Quercus rubra, Acer rubrum, and Nyssa

sylvatica. Greater proportions of adult female SLF were collected on A. Altissima, while greater proportions of males were recorded on the other tree species. Indications of female SLF bias towards specific tree species may indicate potential for further insights to effective management and response to spotted lanternfly invasions.
Spotted Lanternfly, Sex Ratios, Invasive Species

5. Context-Dependent Host Use by the Invasive Spotted Lanternfly (Lycorma delicatula)

Owen Schneider, Temple University
Dr. Jocelyn Behm, Temple University

Generalist insect herbivores interact with diverse plant communities, yet the extent to which community-level factorsâ€”such as host availability, species composition, and abiotic conditionsâ€”shape host preferences and herbivore abundance remains unclear. Investigating patterns of host use across different plant communities can help identify key factors influencing the context-dependent interactions between host and herbivore. The invasive Spotted Lanternfly (Lycorma delicatula) is a highly polyphagous phloem-feeder that utilizes a wide range of host plants throughout its life cycle. However, the degree to which its abundance and host preferences shift in response to local plant community composition and environmental conditions is not well understood. In this study, we surveyed L. delicatula abundance and host-use across 10 forest fragments in the mid-Atlantic throughout the 2024 lifecycle. We analyzed variation in host preference and abundance in relation to plant community species richness, composition, and abiotic factors. Preliminary observations suggest that L.delictula exhibits strong preferences for Ailanthus altissima, but secondary host preference varies depending on local tree and vine composition. Additionally, sites with higher tree and shrub species richness and longer time-since-invasion may support lower lanternfly densities and dilute host preference. These preliminary findings provide insight into the context-dependent nature of L. delicatula host-use and may inform management strategies aimed at mitigating its impact on forests across the mid-Atlantic.
Context-Dependency, Invasive Species, Plant Community Composition

Session 3: Restoration & Land Management

1. The effects of pre-planting treatment strategies on understory vegetation in an urban forest patch

Samantha E. Fuentes-Gigliotti, Rutgers University
Max R. Piana, University of Massachusetts Amherst
Richard A. Hallett, New York City Urban Field Station
Myla F.J. Aronson, Rutgers University

Urban forest patches forests experience a wide variety of anthropogenic and environmental stressors, including recurrent canopy gap-creating events, herbivory pressure, and invasive species. Forest restoration strategies to overcome these stressors frequently rely on enhancing tree regeneration, including tree-planting. Pre-planting treatment strategies are a crucial preparatory step in establishing appropriate site conditions to ensure successful long-term tree regeneration. However, many pre-planting treatments rely on synthetic herbicide, which can have negative effects on biodiversity and human health. Because of the negative effects and perceptions of synthetic herbicides, many cities, towns, and parks have begun to ban the use of these chemicals. Our objective was to determine which pre-planting strategy (mechanical removal, synthetic herbicide application, organic herbicide application) was most effective at controlling invasive plants and enhancing native plant cover to inform park managers responding to new or potential herbicide ordinances. We conducted our study within a 16-hectare Liriodendron-Quercus urban forest patch over a two-year period. Organic herbicide demonstrated the lowest efficacy at reducing non-native plants (-14.2% reduction), followed by mechanical removal (-

18.6%). Synthetic herbicide application had the highest efficacy (-46.1%). Although organic herbicide had the lowest efficacy, it did reduce invasive cover. Species-specific responses showed similar trends among pre-planting treatments. Additionally, we found that the timing of herbicide application can support higher efficacy in organic herbicide use. Our study supports species-specific management focused on above- and below-ground control mechanisms. Future monitoring of the treatment sites will be vital to assess the impacts these treatments will have on diversity, composition, and restoration success.
restoration, forests, management

2. A decade of deer exclosure in suburban forests: responses of woody versus herbaceous plants in the indigenous and nonindigenous herb layer community

Jenny Kafas, The College of New Jersey

The forest herb layer has both herbaceous plants and juvenile woody plants, and in urbanizing landscapes these typically include many nonindigenous species, including invasives. Their spread is facilitated by fragmented forest structure, proximity to seed sources, and frequent disturbances by nearby humans. Additionally, forest fragmentation, minimal predation, and very limited hunting in urbanizing regions can result in very high densities of white-tailed deer, which can profoundly alter plant communities. Dense deer populations have been shown to facilitate invasion by certain nonindigenous plant species, resulting in a common perception that they do so in general. We investigated the effect of deer and other factors on indigenous and nonindigenous herbaceous and woody plants to understand if deer do, in fact, facilitate the nonindigenous component of the plant community at the expense of the indigenous component. We conducted a decadal deer exclosure experiment within five forested sites in suburban, central New Jersey, USA. It consisted of 184 16 m^2 plots, with half fenced in 2013 to exclude deer. In fall 2023, percent cover of each species in the herb layer was measured within 16 0.25 m^2 subplots/plot, with a relevé method that assigned each species to a cover interval: >0-10%, 11-20%, 21-30%, etc. The average of the 16 interval midpoints was then used as a cover score for each species in each plot. The scores for all indigenous herbaceous and woody species in a plot were then added separately, as were those for the nonindigenous herbaceous and woody species This provided four vegetation variables per plot, to be used in structural equation modeling (SEM; using piecewiseSEM in R), along with variables for forest age, soil pH and nitrogen, a deer pressure index that incorporated exclosure or ambient deer pressure in each specific forest, canopy gap light fraction, and an earthworm activity score. The final, fitted model (Fisher's C=28; P=0.24; df=24) indicated that deer had only positive direct and/or indirect effects (via increasing light gap fraction) on the nonindigenous groups, but had direct negative effects and indirect positive effects on the indigenous groups. The strongest deer effects were the positive path to nonindigenous herbaceous cover and the negative path to indigenous woody cover. At the high densities in these suburban forests, deer have both negative and positive effects that differ between the four vegetation groups; but overall, the nonindigenous plants only benefitted, while the indigenous plants experienced more negative effects from deer.
suburban forests, deer, invasive plants

3. Public Garden Biodiversity: A Case Study at Chanticleer

Matthew Sarver, Sarver Ecological
Katherine Bird, Sarver Ecological

Public gardens are increasingly recognized as important hotspots for biodiversity, particularly for insects. We report on a multi-year biodiversity survey of Chanticleer, a 50-acre exurban public garden near Philadelphia. The survey focused on bees and moths, two taxonomic groups of primary consumers critical in both trophic webs and pollination ecology. Using complementary methods including pan trapping, blue vane trapping, netting, and UV light trapping, we assessed species richness and assemblages of both bees and moths and analyzed functional guilds and host plant associations. We found

high species richness in both taxa, with a significant proportion of diet specialists represented. Because specialists have the potential to be of greater conservation concern than generalists, we further divided specialists into guilds based upon the habitat type and life form of their hostplants. We present the results of this analysis along with species highlights and recommendations for improving pubic garden habitat for insect biodiversity. Our survey documented a new bee species for Pennsylvania as well as several new moth species and numerous new county records and resulted in ongoing changes to garden management to better support insect biodiversity.
Biodiversity, Pollinator, Garden

4. How is assisted migration of Quercus macrocarpa impacted by experimental warming and drought?

Kerrie Sendall, Rider University
Artur Stefanski, University of Wisconsin Stevens Point
Rebecca Montgomery, University of Minnesota
Peter Reich, University of Minnesota

Cold temperate, deciduous tree species are sensitive to changes in temperature and water availability, but whether specific provenances are better-able to withstand changes in climate conditions remains uncertain. Prior exploration of this question has largely involved the movement of provenances over varying ecodistances, but few studies have further manipulated growing conditions in the introduced location. To address this knowledge gap, we planted red oak seedlings from Oklahoma, Illinois, and Minnesota into an existing climate change study located in northern Minnesota. In situ phenological, physiological, and growth responses were measured for seedlings growing in one of four temperature and precipitation treatments. We found strong support for local adaptation, as seedlings moved intermediate and long distances north exhibited longer growing seasons and higher growth rates compared to seedlings sourced from nearby locations. All red oak seedlings responded similarly to the warming treatment, with neutral or positive effects observed during wetter growing season, but increasingly negative impacts observed as soils dried. For example, despite seedlings in the warming treatment having their growing season extended by 25-30 days compared to seedlings growing in ambient temperatures, both groups experienced similar rates of growth during drier growing seasons. Only in 2024 when plants received substantially more rainfall did seedlings in the warming treatment outgrow those in ambient conditions, and importantly, growing season lengths were minimally affected by the warming treatment in that year. Overall, these results indicate that assisted migration efforts involving red oak should consider both predicted temperatures and precipitation rates in introduced locations. Moving a provenance to a cooler location could be beneficial, as could moving a provenance to location predicted to become warmer, so long as the area receives ample precipitation.
assisted migration, climate change, red oak

Session 4: Community Ecology

1. Patch Burn Grazing Effects on Prairie Microbial Communities

Olivia Arbogast, Johns Hopkins University
Meghan Avolio, Johns Hopkins University

Management of grassland ecosystems is critical to preserving the ecological, agricultural, and experiential benefits of Americaâ€™s prairies. The effects of a â€œPatch Burn Grazeâ€• (PBG) management compared to conventional â€œAnnual Burn and Grazeâ€• (ABG) on communities at every trophic level were previously under-researched. PBG management rotates where fires are applied across the landscape to increase landscape heterogeneity, while ABG homogenizes the landscape with a single management practice across an area. The impact of PBG on complex microbial

activity is critical to a comprehensive understanding of this type of land management. Soil bacteria and fungi are crucial for decomposition, nutrient storage and conversion, and ecosystem health. We sought to understand changes in the microbial community under PBG management compared with ABG management, including bacteria and fungi responsible for plant symbiosis, decomposition, and soil chemistry. We anticipated no community-level changes in species richness, evenness, or diversity between treatments, due to the large variation between watersheds and high number of samples. Additional work was conducted to understand specific functional groups within the soil microbe population. Six long-term PBG and two long-term ABG watersheds at the Konza Prairie Research Station were marked with four ridgeline transects for consistent sampling location across all studies and years. From 2021 to 2023, soil cores were taken for genetic analysis (n=5) and root analysis (n=2) at each transect every year in early August. Genetic analysis was performed using Illumina sequencing and processed using QIIME2 software, then analyzed in R to identify taxa, functional guild, and trophic mode. Mycorrhizal root colonization was analyzed by manually quantifying arbuscular colonization of fungi on stained fine grass roots under a microscope. Our results indicated that PBG soils show a significant increase in bacterial species diversity by treatment ($p=0.029$), but no differences in species evenness or richness. Unexpectedly, soil fungi responded more strongly to PBG. Fungi decreased in species richness ($p=0.007$) and diversity ($p=0.003$) in the PBG treatment accounting for year. Fungal species evenness ($p=0.002$) also decreased in the PBG treatment. We also observed a trend towards a decrease in mycorrhizal root colonization ($p=0.117$) on fine grass roots collected from PBG soils. Based on these results, we conclude that the PBG management system alters the soil microbe community on a species level, but causes minimal change on a phyla level. This indicates that a PBG management system will not negatively impact soil microbes while simultaneously benefitting higher trophic levels within the prairie ecosystem.
microbial, grassland, agricultural

2. Pollinator-Prey Conflict with Carnivorous Plants in the New Jersey Pine Barrens

Shelby Brodhead, Monmouth University
Dr. Pedram Daneshgar, Monmouth University
Kelly Zimmerman, Monmouth University

The New Jersey Pine Barrens, an ecosystem unlike any other found in the world, has unique conditions that support highly specialized plants such as orchids and carnivorous plants. Pitcher plants are one of these carnivorous species that have evolved to trap insects to obtain nutrients in areas where they are lacking. Pitcher plants with access to a sufficient amount of nutrients, such as nitrogen, will grow larger phyllodia to perform photosynthesis; however, when pitcher plants do not have access to a sufficient amount of nutrients in the soil, they begin to grow larger pitchers to catch more prey for their needed nutrition. Recent work has examined the carnivory of pitcher plants but has not thoroughly investigated their pollination, leaving the remaining question: how do pitcher plants avoid trapping the insects they need for pollination? Research was conducted over the summer of 2024 during June and July (flowering season) to analyze the flower height and count per plant, pitcher fluid analysis, and types of insects/duration of visit to the plant. The data analysis indicated that black ants (Lasius niger), wolf spiders (Lycosidae), and larval/adult pitcher plant mosquitos (Wyeomyia smithii) were found inside the pitchers, meaning they are the prey of the pitcher plants. On the contrary, winged insects such as damselflies (Zygoptera) and dragonflies (Odonata), along with jumping spiders (Salticidae) were found almost exclusively on the flowers, meaning they are the pollinators since they were not found inside the pitcher fluid samples. A likely reason for this occurrence is that the winged organisms/organisms that can jump are attracted to the flowers and are able to pollinate without becoming trapped in the pitchers. The prey however, are organisms that move by walking alone and cannot make their way out of the pitchers once they fall inside the fluid.
plant ecology, pitcher plants, insect interaction

3. Plant Community Assembly Dynamics on Rock Walls: The Role of Environmental Filtering and Dispersal Syndrome

Alison Kryger, SUNY Binghamton University

Natural rock walls provide habitat patches for many plant species, offering protection from competition, predation, and anthropogenic disturbance. We investigated how plants assemble on rock walls, whether plants are primarily filtered from top or bottom communities, and how dispersal methods affect colonization success. Plant species abundance and richness were sampled at six locations across New York State using quadrats at the top and bottom of rock walls and transects on the walls ranging from 0-18 meters above the ground. Of the 97 genera identified across all sites, 15 (15.5%) were found exclusively on the rock wall. As height on the rock wall increased, the dissimilarity to top communities decreased ($p = 0.005$) by 10% for every one meter increase in height. There was no significant effect of height on dissimilarity to the bottom communities. Additionally, as slope increased, dissimilarity to both the top ($\hat{I}^2 = 0.009$, $p < 0.001$) and bottom ($\hat{I}^2 = 0.015$, $p < 0.001$) communities increased indicating that colonization was more successful on shallower slopes. There was a significant effect of wall micro-features (i.e. crack, face, or ledge) on observed variation in dissimilarity ($p = 0.013$, $df=2$). Of the genera sampled, 48% were dispersed by wind, 7% by gravity, 3% by ballistic mechanisms, 6% by myrmecochory, and 36% by other animals. These results suggest that communities are primarily filtered from top communities and provide insight into the persistence of plant communities in this extreme environment.
Plant communities, Rock Walls, Dispersal

4. Does migration constrain glucocorticoid phenotypes?

Jenny Uehling, West Chester University
Emma Regnier, Cornell University, Science Illustration Certificate Program, California State University Monterey Bay
Maren Vitousek, Cornell University

Corticosterone, the main glucocorticoid in birds, is a major mediator of the incredible physiological feat of migration. Corticosterone plays important roles in migration, from preparation to in-flight energy mobilization to refueling, and corticosterone levels often show distinct elevations or depressions during certain stages of migration. Here, we ask whether corticosterone's role in migration shapes its modulation during other life-history stages, as is the case with some other phenotypically flexible traits involved in migration. Specifically, we use a global dataset of corticosterone measures to test whether birdsâ€™ migratory status (migrant versus resident) predicts corticosterone levels during breeding. Our results indicate that migratory status predicts neither baseline nor stress-induced corticosterone levels in breeding birds; despite corticosteroneâ€™s role in migration, we find no evidence that migratory corticosterone phenotypes carry over to breeding. We encourage future studies to continue to explore corticosterone in migrants versus residents across the annual cycle. Additionally, future efforts should aim to disentangle the potentially interacting effects of environmental conditions and migratory status on corticosterone phenotypes. Overall, insights from work in this area could demonstrate whether migration shapes traits during other important life stages, identify tradeoffs or limitations associated with the migratory lifestyle, and ultimately shed light on the evolution of flexible traits and migration. This abstract is a modified version of a previous synopsis published in Integrative and Comparative Biology: https://doi.org/10.1093/icb/icae110
Migration, Ornithology, Hormones

5. Shrub populations decline in the presence of deer: A meta-analysisâ€¯on deer herbivory

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Rachel Coyne, Chatham University
Abigail Gastonguay, Chatham University

Ryan Utz, Chatham University
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White-tailed deer (Ododcoileus virginiana, hereafter deer) can induce strong trophic cascades in forest ecosystems. Deer herbivory strongly influences floristic composition when populations grow to high density, with especially strong effects on the presence and abundance of shrub species. However, it was believed deer preferentially browse nutritious and palatable species. Although the impact of deer over-browsing on trees and groundcover plants has been well studied, the consequences of deer herbivory on shrubs have received relatively less attention. We performed a meta-analysis to examine the effects that deer have on shrub populations in North America by quantitatively assessing experimental control methods. Data from 21 papers that provide species-level responses from ecosystems in the United States were aggregated to identify genera that appear to be most vulnerable and resistant to deer browsing.â€¯

Among the 24 genera reviewed, most appeared to be negatively impacted by deer and native and invasive species were nearly equally impacted. Genera Lindera and Euonymus were most adversely impacted by the presence of deer, with large negative effect sizes, with Cornus and Parthenocissus being the two genera most positively impacted, exhibiting large positive effect sizes. Based on our findings, we recommend the implementation of mitigation and restoration strategies to conserve shrub populations, which are particularly vulnerable to deer herbivory. Shrubs lack a protective canopy to shield them from browsing, making them acutely susceptible to damage caused by herbivory. Furthermore, shrubs have been understudied in this context, and our results highlight the necessity of further research to better understand the factors influencing their vulnerability and inform more applicable conservation efforts.
Shrubs, Deer, Herbivory

Session 5: Wildlife

1. An exploration of banding success in hibernating bats of Pennsylvania, Ohio, and West Virginia

Olivia Aguiar, Temple University
Brent Sewall, Temple University

Many hibernating bat species in North America have experienced precipitous declines following the introduction and spread of the fungal pathogen Pseudogymnoascus destrucans. Central to the conservation and management of affected species is regular sampling of bat hibernacula for not only infection prevalence but also relative abundance. Banding bats allows for research into movement behavior and trends in the prevalence and severity of white-nose syndrome infection. However it remains to be seen whether banding of bats is an effective tool for scientists and managers in long-term, individual-based studies. In my study I investigate the likelihood of recapture of banded individuals in annual studies of hibernating bats in Pennsylvania, Ohio, and West Virginia from 2018 to present. I found that of the four species banded during this period, only two were recaptured: the little brown bat and the big brown bat. After fitting an exponential decay model to the recapture rates up to five years post-banding, I found that the big brown bat had a lower exponential decay rate than the small brown bat. These results can assist researchers by advising which species to target and the amount of banding that is required for long-term, individual-based studies.
recaptures, bats, banding

2. Consequences of reproductive mode variation in co-occurring sea anemones

Josh Bliss, Towson University
Will Ryan, Towson University

Partial clonality is a common life strategy in marine species, yet there is not a full understanding of the factors that determine the adaptive value of investing in sexual or asexual reproduction. Sea anemones display a range of methods of asexual reproduction, making them an ideal group for investigating these factors. Here we compare the population trends and investment strategies of two co-occurring partially clonal species who differ in their method of asexual reproduction: Diadumene lineata, which undergoes binary fission, and Aiptasiogeton eruptaurantia, which performs pedal laceration. Repeated sampling over six years has captured a nearly complete replacement of the exotic D. lineata by the native A. eruptaurantia at one site. To determine if differences in growth and asexual investment patterns across seasons can help explain the competitive superiority of the native species at this site, we have initiated a combination of field sampling and manipulative studies to directly measure the influence of temperature and seasonal temperature fluctuation on the growth, gametogenesis, and asexual reproduction patterns of A. eruptaurantia. These data will mirror patterns previously measured for D. lineata and will contribute to our understanding of the tradeoffs that shape the evolution of diverse reproductive modes.
Partial Clonality, Phenology, Marine Fouling Community

3. Eusocial reproduction selects for longevity

Rafael D'Andrea, Stony Brook University
Bruce Futcher, Stony Brook University
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Naked mole rats have exceptionally long lifespans and exhibit eusocial reproduction, with a single femaleâ€”the Queenâ€”producing all offspring in the colony. Other eusocial species, such as bees, ants, and termites, also display extended lifespans relative to their solitary kin. We propose that eusociality itself drives the evolution of longevity through three key mechanisms: first, individuals in eusocial populations tend to be older than in non-eusocial populations, and thus genes favoring survival at later ages are more likely to be subject to selection; second, slower growth in eusocial populations reduces early mortality from resource scarcity, making senescence a more significant cause of death. Finally, the fitness benefits of longer lifespans are stronger when the population's reproductive success rests on the survival of a single individual. We demonstrate those three mechanisms using mathematical models and computer simulations, highlighting longevity as a plastic and evolutionarily selectable trait. Our findings align with life history theory while offering new insights on how social structure shapes aging and survival.
Longevity, Eusocial reproduction, Life history theory

4. Bacterial Diversity in Leaf-Cutter Ant Species: Host-microbe Interactions and Environmental Effects

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Manuela Ramalho, West Chester University
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Odair Correa Bueno, São Paulo State University

Historically, studies have sought to identify host-specific factors in host-microbe interactions as a means of understanding evolutionary success. The genus Atta, comprising leaf-cutter ants, is a mutualistic species native to the southern Neotropics. It hosts a remarkably diverse range of bacterial communities, yet the specific host factors that influence host-microbe interactions remain poorly understood. Using high-throughput amplicon sequencing of the 16S rRNA genes of the whole worker, we showed significant difference between the bacterial communities among 4 dominant Atta species:

A. sexdens, A. levigata, A. capiguara, and A. bisphaerica. We also discovered significant differences in bacterial communities from laboratory conditions, pesticide treatment, and the fungal garden symbiont. Surprisingly, bacterial communities of Atta spp. kept in the laboratory were not significantly different from pesticide treated Atta spp., laying the groundwork for potential refinement of standard research methods. We showed that this multifarious bacterial community diversity is common to the Atta genus and is paramount in non-host specificity.
Microbial Ecology, Bacterial Diversity, Mutualist

5. Microbial Antics: The Impact of Rising Temperatures on the Bacterial Communities of Aphaenogaster Ants

Lily Kelleher, West Chester University

Studies have shown that insects will be significantly impacted by global climate change. Ants (Formicidae) make up two-thirds of the biomass of all insects and are essential for basic ecosystem functionality. The impact of global climate change on ants has just begun to be documented, but the impact of these changes on ant symbiotic bacterial communities remains understudied. Studying the interaction between ants and their bacteria is important because of the crucial role that they play in overall ant health. Aphaenogaster Mayr, 1853, are important seed dispersing ants in deciduous forest ecosystems and their bacterial communities have just recently been uncovered; however, much is still unknown about how environmental factors influence their symbiotic bacterial interactions. This study aims to determine the impact that warming temperatures will have on their survival and on the taxonomic composition and abundance of Aphaenogaster bacterial communities. For this study, ants from several colonies were collected from the Gordon Natural Area in West Chester, Pennsylvania, USA and samples were subjected to a control temperature (22 Â°C) or an experimental temperature (32 Â°C). After experimentation DNA was extracted from the ants of all development stages and the 16S rRNA gene was amplified and sequencing following the NGS amplicon approach. The findings from this study revealed that Aphaenogaster ant mortality rates increased and brood production decreased in warmer temperatures. Additionally the symbiotic bacterial communities associated with Aphaenogaster ants changed in warmer temperatures which resulted in a decrease in the presence of Wolbachia spp.. This study reveals important information about the impact of warming temperature on Aphaenogaster ants and this data will allow us to predict the survival of these ants in the future.
Microbiome, Insects, Climate Change

6. Accounting for disease-induced mortality and spillover from scavenging can change disease dynamics in scavenger populations

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Brooke Maslo, Rutgers University

Studying wildlife disease dynamics is crucial for managing impacts to biodiversity and public health but is also challenging because disease risk is not distributed evenly across guilds. Certain guilds, such as scavengers, may disproportionately influence disease spread because of their close association with carcasses. Conventionally, scavengers are considered to reduce disease spread by removing potentially infectious carrion and neutralizing pathogens. In some cases however, scavengers may increase disease prevalence by becoming infected by pathogens that can spill over from carcass to scavenger. Because scavengers remove nearly 75% of carrion in terrestrial environments, diseases that cause mortality in scavengers can potentially disrupt ecosystem services and functioning. Here, we use a set of susceptible-infected-resistant (SIR) and susceptible-infected-resistant-deceased (SIRD) models for scavenger populations to investigate how accounting for scavenging-induced spillover and disease-induced mortality may impact scavenger populations. We found that our scavenging models parameterized with literature values for anthrax predicted faster times to peak and complete infections than their traditional counterparts. However, using hypothetical disease scenarios generated using combinations of possible parameter values, we demonstrated that outcomes are highly contingent upon the values of the intraspecific transmission rate Î² and recovery rate Î³. Therefore, considering the increasing prevalence of

multi-host diseases, including zoonoses that can spill over to humans, it is important to understand how scavengers and the ecosystem services they provide may be affected by novel diseases. More theoretical and applied research on scavengers and diseases are needed to guide effective disease management that can protect both wildlife and public health.
Epidemiology, Scavengers, Modeling

Session 6: Wetlands & Water Quality

1. Comparative assessment of Carbon-dioxide (CO2) and Methane (CH4) fluxes and their predictors of a natural and restored mesohaline tidal wetlands in New Jersey

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Sara H. Knox, McGill University
Tomer Duman, University of New Mexico
Katrina Poppe, University of British Columbia

Degraded tidal wetlands are being restored to re-establish their ecosystem services including carbon sequestration. Although benefit of wetland restoration in carbon sequestration is vital to assess overall emission scenarios and climate change feedback analysis, it is still unclear how restoration affects C sequestration in the short and long term. This study was conducted in a restored and a natural tidal wetland in the New Jersey Meadowlands to assess and compare carbon dioxide (CO2) and methane (CH4) fluxes and identify their dominant predictors. We analyzed eddy covariance data from 2012 to 2019 from these two sites. Random forest (RF) regression was deployed to evaluate major predictors of both fluxes. Artificial neural network (ANN) and marginal distribution sampling (MDS) were used to gap-fill CO2 flux. In addition, we used ANN and RF to gap-fill CH4 flux.

Major predictors of CO2 fluxes found in the restored site were latent heat flux (LE), net radiation (NETRAD), soil temperature (TS) and its time lags, air temperature (TA) and vapor pressure deficit (VPD), and those for natural site were LE, TS and NETRAD. We found TS lag of 1 day, followed by TS, TA as major predictors of CH4 fluxes in the restored site whereas wind direction (WD), sensible heat (H), NETRAD and TS were prominent in natural site. The influence of water table depth (WTD) was found negligible in both sites. For most of the years natural site absorbed CO2 whereas restored site was a source of CO2. At both sites, large interannual variation was observed with daily CO2 flux peaking around noon and showing a large uptake during the growing season. Both sites acted as source of CH4 flux. Restored site was found releasing 4-5 times more CH4 as compared to the natural site. Seasonality of CH4 flux was more pronounced at the restored site where summer-time fluxes were larger. On a diurnal basis, CH4 flux peaked during noon at the natural site, but no such trend observed at the restored site. Since investigated sites do not differ in meteorology yet differ in vegetation types, vegetation cover may explain some of the observed seasonal and interannual variations. Thus, along with meteorology, vegetation and soil biochemical processes might be included to demonstrate their influence in the net exchange of carbon flux on diurnal, seasonal and annual fluxes. Finally, to enhance carbon sequestration and other restoration benefits of wetlands, different restoration approaches might be required.
Tidal Wetlands, Carbon di-oxide flux, Methane flux

2. Presence of Antibiotic-Resistant Bacteria within the Maiden Creek Watershed in Reading, Pennsylvania.

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Dior A. Stuart, Penn State Univeristy
Dr. Jill Felker, Penn State Univeristy
Dr. Tami Mysliwiec, Penn State University

Emerging contaminants, such as chemical pollutants within water resources, can promote selective pressure on microorganisms, allowing for microorganisms to become antibiotic-resistant. Bacteria resistant to commonly used antibiotics is a growing global health concern. The Environmental Protection Agency (EPA) uses Enterococci and Escherichia coli as indicator species for detecting potential pathogens in drinking water supplies. This study identifies the presence of antibiotic-resistant Enterococci and E.coli bacteria within the Maiden Creek Watershed located in Berks County, Pennsylvania. The watershed serves as a primary water source for locations in Berks County and the City of Reading, where 25 million gallons of water is used daily. Three sample sites within the watershed were chosen to look for both indicator species: Ontelaunee Lake, Maiden Creek, and Peters Creek. Each sample site may be affected by recreational, agricultural, and industrial activities and emerging contaminants from those activities. Water and sediment samples from each site were collected monthly from January 2024 to December 2024. Enterococci and E.coli were isolated from water and sediment samples using EPA standard membrane filtration protocols for recreational waters. Approximately 10% of the isolated Enterococci and E.coli colonies were subjected to antibiotic sensitivity profiling of six common antibiotics: tetracycline, streptomycin, colistin, ampicillin, ciprofloxacin, and trimethoprim/sulfamethoxazole. Ampicillin-resistant isolates were found throughout the watershed. Isolated Enterococci and E. coli were found to be resistant to multiple antibiotics. Further testing is underway to determine the mechanisms of antibiotic resistance.
Antibiotic Resistance, Watershed, Superbugs

3. Clonal genetic architecture and landscape genetics of the high salt marsh plant Spartina patens in New York.

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Charli D. Minsavage-Davis, Georgetown University
Ezra J. Kottler, University of the Pacific
Keryn Gedan, George Washington University

Coastal salt marshes found worldwide are formed by grass species which act as the foundations of diverse, productive ecosystems that provide benefits including coastal storm protection and carbon sequestration. On the mid-Atlantic coast of North America, saltmeadow cordgrass (Spartina patens) forms high elevation salt marsh with a relatively low tolerance to rising sea levels. It is uncertain if high marsh habitats will persist by migrating to higher elevations given constraints of topography, land development, and urbanization. Further, S. patens reproduces both sexually and vegetatively, and little is known about how vegetative reproduction shapes the amount and spatial patterns of genotype variation. Saltmeadow cordgrass was sampled on spatial grid transects within ten salt marshes in New York state, USA, and samples genotyped with twelve microsatellite loci. Landscape imagery from 1974 and 2019 was used to estimate marsh habitat area and categorize landscape variation. High salt marsh area declined at all locations over 45 years. Genetic markers showed that about 60% of the 1060 samples were unique genotypes with 40% of samples were vegetative ramets. Vegetative ramets per genotype varied among marshes and were not different from Poisson distributions expected by random sampling. Genetic differentiation between populations was explained by Euclidean distance and by landscape connectivity but not by coastal distance nor by temporal change in habitat area. These results show that high salt marsh habitats have been replaced by low marsh and by unvegetated habitat. Within marshes, S. patens has a wide range of ramets per genotype consistent with random sampling and with intermediate spatial aggregation. Among marsh populations, S. patens exhibits genetic differentiation that is associated with Euclidean distance between populations and with landscape variation, but not with coastal distance nor change in high marsh area over 45 years.
ecological genetics, salt marsh, Spartina patens

4. Water chemistry's effects on ecosystem functions observable across watersheds of different sizes and degrees of impairment

Emily Huff, West Liberty University
James Wood, West Liberty University

Microbial carbon processing in streams can be affected by nutrient enrichment and exposure to toxic chemicals, but there is a need to better understand the nature of these effects across a variety of watershed sizes. At 13 sites in the upper Ohio River watershed, we investigated the effects of water chemistry on microbial processing using two types of standardized carbon substrates to test the hypothesis that chemical stressors can override the stimulatory effects of nutrients on microbial processing rates. We assessed microbial respiration and breakdown rates using a labile cellulose sponge, and a recalcitrant red oak wood veneer after four or six weeks, respectively across a range of watershed sizes. Labile substrates respiration rate was positively correlated with chloride, SRP and temperature; breakdown rate was also positively correlated with SRP and temperature. On wood substrates respiration was negatively correlated with nitrate; but breakdown rates were not significantly influenced by any of the parameters looked at. Our results indicate that differences that local stressors and in stream conditions can exert strong effects on microbial processing potentially overshadowing the effects of nutrient stimulation.
water chemistry, nutrients, microbial

5. Analysis of Microplastics and Microbial Hitchhikers at Blue Marsh Lake in Reading, Pennsylvania

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Jill Felker, Penn State University at Berks campus
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Vinh Lu, Penn State University at Berks campus
Jada Savage, Penn State University at Berks campus
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Globally, the increasing demand for plastic products has caused an influx of microplastic contamination due to the degradation of manufactured plastics. Microplastics are plastic particles less than 5 mm in diameter and constitute a wide variety of appearances and chemical compositions. Microplastics have been identified from Mount Everest to the deep seas of the Northeast Atlantic Ocean. Contaminated aquatic ecosystems expose vulnerable organisms, like fish, who mistakenly ingest microplastics. Microplastics can lead to bioaccumulation in numerous species and travel up trophic levels of the ecosystem as organisms consume other organisms that have ingested microplastic. Microplastic exposure can negatively impact human health and disrupt the function of the endocrine and gastrointestinal systems. Waterways act as highways for microplastics, allowing them to saturate the ecosystem and contaminate water sources. Microplastics can behave as a substrate for microorganisms, acting as hitchhikers throughout contaminated waterways. Blue Marsh Lake is a tributary to the Delaware River Watershed. The Delaware River Watershed is a source of essential drinking water for over 2 million Philadelphia residents. This study classified and quantified the presence of microplastics in Blue Marsh Lake alongside the analysis of microorganisms harboring on isolated microplastics.

Samples were collected from a shore location of Blue Marsh Lake and alongside a downstream basin location following a modified version of the NOAA microplastic collection protocol. After drying, microplastic samples were classified and quantified using a dissecting microscope. A total of 201 microplastics were counted in 100 L samples of water collected during August, September, and October of 2024. From the samples isolated, fibers comprised 90.5%, fragments made up 8.9%, and film (nurdles and miscellaneous microplastics) comprised 0.4%. Microorganisms residing on microplastics were cultivated using R2A media and isolated for antibiotic susceptibility profiling and DNA sequencing. Preliminary DNA sequencing results indicate two types of bacteria that microplastics are capable of harboring: Pseudomonas spp. and Aeromonas hydrophila. These results suggest that the presence of microplastics and their microbial hitchhikers contaminate the water quality of Blue Marsh and may threaten the water supplies of individuals living downstream.
Microplastics, Contamination, Microbial Hitchhikers

Session 7: Modeling & Spatial Analysis

1. Body size drives patterns of solitary Hymenoptera richness over elevation

Ben Camber, University of Vermont
Dr. Sara Helms Cahan, University of Vermont

Biodiversity typically declines with latitude and altitude , but a few taxonomic groups, including parasitoid wasps, contradict this expectation. We hypothesized that two quantitative traits drive differences between parasitoid wasps and their predacious and pollinating kin: mean body size and host efficiency, or how many progeny can be produced from a single host. To test these hypotheses, we assessed how body size, host efficiency, and environmental factors shape richness-elevation relationships of 51 solitary Hymenoptera families along three elevational transects from ~25 to 1325m.a.s.l. in the Green Mountains of Vermont, USA. A familyâ€™s mean body size, but not host efficiency, was negatively correlated with the slope of its richness-elevation (pseudo-R2 = 0.344) and abundance-elevation relationships (pseudo-R2 = 0.296). Climate and habitat factors influenced richness and community dissimilarity of parasitoid groups in different ways. Aculeates were strongly associated with warm, dry lowlands and declined to virtually zero species after 750m. In contrast, the small-bodied Proctotrupomorpha were most influenced by climate*habitat interactions, with richness peaking at both 125m and 1325m. Intermediate-sized Ichneumonoidea showed moderate associations with both climate and the climate*habitat interaction and declined gradually. These findings reveal how body size, as a proxy for energy efficiency, shapes the relationship between richness, climate, and habitat, and underscore the need to document and protect understudied insect communities in ecosystems vulnerable to upslope migration.
Richness, Elevation, Hymenoptera

2. Episodic gregariousness leads to level-dependent core habitats in eastern copperheads (Agkistrodon contortrix)

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Robert Kwait, Rutgers University
Michael Van Clef, Friends of Hopewell Valley Open Space
Brooke Maslo, Rutgers University

Wildlife habitat selection is influenced by multiple life history requirements, which act over varying spatial and temporal scales, and result in dispersion patterns that can differ across ecological levels. For example, sites that attract intense communal use (e.g., bat hibernacula, fish spawning areas, amphibian breeding pools, etc.) are often a subset of the habitats required by individuals for survival. Despite the conservation importance of both individually and communally significant habitats, habitat models for snakes rarely incorporate information about both individual and population level activity. We used four years of radiotelemetry data from eastern copperheads (Agkistrodon contortrix) to evaluate the presence of multilevel spatial habitat responses and whether they revealed conservation-relevant information. We related individual and population space use intensity to underlying habitat covariates to determine whether predictors of copperhead spatial activity were level-dependent, and whether individual core habitats differed by sex and reproductive state. Copperheadsâ€™ episodic gregariousness at hibernacula and spring basking sites resulted in spatial and environmental separation between individual and communal core habitats: Population-level core areas were in rocky, forested habitats associated with winter brumation and spring basking, whereas individual-level core areas were open habitats with woody debris associated with foraging and reproductive behaviors. Male core habitats were open and thickly vegetated while those of females were moderately forested, with gravid female core habitats containing ample woody debris. Our findings demonstrate that multilevel spatial patterns carry conservation-relevant information about snake-

habitat relationships. We suspect that behaviors leading to multilevel spatial patterns exist in many wildlife species whose individual spatial activities overlap around shared resources.
wildlife-habitat models, radiotelemetry, herpetology

3. Long-eared owl stopover site selection: a novel approach to measuring habitat selection during migration

Evan Drake, Felician University
Tyler Christensen, Rutgers University

As new technology allows more species to be tracked via GPS, studies of migratory behavior (e.g., habitat selection) are likely to increase in resolution and data richness. Best practices for the collection and analysis of these data may be in need of reform in anticipation of this burgeoning field of research. The relatively poorly-studied long-eared owl is an example of a species whose migrations have only recently been feasible to describe. We used migration data from 8 owls over three years to provide the first description of their stopover site selection during their spring migration northward. In doing so, we compare alternative methods of defining "used" and "available" habitat. The conventional approach is to define available habitat by randomly generating comparable points within a designated radius of a used point. We desired to take the inherent directionality of a migration into account by generating our available points from an informed distribution of distances and directions based on our owl movement data. While these approaches produce different results in some respects, major patterns were preserved regardless of technique. Our results show that long-eared owls prefer to roost in evergreen, rather than deciduous, forests that are in close proximity to shrublands. They also selected sites that had greater percentages of wetlands in the surrounding landscape and lower percentage of closed-canopy forests. However, the two modeling approaches differed in the strength and significance of other variables. Depending on the study species, utilizing conventional modeling approaches may lead to erroneous conclusions.
Habitat selection, Migration, Landscape ecology

4. Predicting avian species richness: Patch attributes of threshold site occupancy

Jeff Keller, HABITAT BY DESIGN, LLC

Despite decades of research, the influence of different landscape attributes on assemblage species richness remains of great interest to conservation biologists. To investigate the observed composition of 19 guilds comprising 59 species of primarily insectivorous breeding birds over a range of successional stages in central New York, I tested within-guild richness against a suite of predictors associated with 4 hypothesized determinants of species richness. Using high resolution aerial photography, I defined 16 guild-associated patch types and assigned one or more types to each guild. Functional patch size, measured as the largest circle that fit within each patch type occurring in a local landscape, was the primary predictor in regression models of species richness for 13 of the 19 guilds. Consistent with the relationship of body size to territory size, the smallest (by weight) species in the guild was the first to appear and/or larger guild members occurred only in larger patches in 12 of 13 multispecies guilds. Leaf area (patch productivity) and within-patch structural heterogeneity explained significant portions of the variation in species richness not accounted for by patch size. Results suggest that the first, often smallest, member of an avian guild appears in the landscape when the patch type appropriate to the guild reaches a threshold functional size. Additional guild members are added as patch size, heterogeneity, productivity, and/or connectivity increase. Models based on guild-associated metrics used here can facilitate assessment of habitat availability and the direction of changes in species richness and composition associated with habitat alteration.
species richness, functional patch size, structural heterogeneity

5. Macroalgal coexistence through space and time in North Carolina Hardbottoms

Zachary Long, University of North Carolina Wilmington

Community composition can be influenced by both deterministic and random processes. Here, we investigate the relative contributions of deterministic or â€œnicheâ€• versus random or â€œneutralâ€• processes in structuring algal communities in North Carolina hard bottoms. Hard bottoms provide substrate for macroalgae and sites are separated by large expanses of uninhabitable sand. Hard bottom â€˜islandsâ€™ experience different environmental conditions based on their depth and location along the continental shelf. We monitored temperature and the distribution of algae in offshore benthic hardbottom communities among five spatially distinct sites along a depth gradient (18-37m) over 2 years in Onslow Bay, North Carolina. We used joint species distribution modelling to determine the relative influence of stochasticity due to environmental variables and deterministic processes due to species interactions. We found different sites had different algal communities. Temperature influenced the abundance and persistence of certain species within habitats but did not play a large role in determining differences in overall species composition among sites over time. Instead, we found that some species were strong interactors in the community and set the abundance and persistence of subordinate species. This suggests that species composition in Onslow Bay hard bottom communities is likely driven by species-specific interactions.
Biodiveristy, Competition, Joint Species Distribution Modeling

6. Simple Machine Learning with Aerial Imagery Reveals Severe Loss of a Salt Marsh Foundation Species

Charli Minsavage-Davis, Georgetown University
Tyler M. Rippel, Georgetown University
Vaughn Shirey, Georgetown University
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Salt marshes are globally important ecosystems, but many have been lost or transformed due to the impacts of global change. There have been attempts to broadly quantify salt marsh communities, especially the ubiquitous grasses which serve as foundation species such as Spartina alterniflora and Spartina patens, the latter of which is being lost due to sea-level rise. However, few researchers have used high-resolution geospatial imagery to quantify fine-scale changes in the distribution of grasses or to track losses of S. patens. To address this issue, we utilized a simple and rapid method of classifying geospatial marsh imagery with cloud-based machine learning in Google Earth Engine (>â€‰94.59% accuracy for S. patens across all models for 2006 and 2019). Our methods allowed us to characterize large landscapes (two geospatially proximal areas,â€‰>â€‰7000 ha each) of critical salt marshes on the New Jersey coast and to evaluate fine-scale (1 m) community transformations in response to global change with imagery from 2006 to 2019. Notably, one marsh experienced very little change while the other experienced an 81.17% (1087 ha) loss of S. patens, illuminating disparate patterns of change for two geographically proximal ecosystems. Further exploration revealed an association in the loss of S. patens with increases in streamflow and total nitrogen content in the rivers that run through each marsh. These results signify the importance of broad-scale ecological studies that evaluate fine-scale community transformations and for management strategies that do not generalize across landscapes of an ecosystem type.
Community transformation, Foundation species loss, Geospatial classification

Session 8: Urban Ecology

1. Ecosystem service production in lawns: Urban grassy spaces provide substantial nitrogen fixation, water infiltration, and pollinator benefits even with limited species diversity in Prince Georgeâ€™s County, MD

Lorraine Clarke, Prince George's Community College
Zaira Ahmed, Prince George's Community College

Despite being intensely cultivated, lawns offer multiple direct and indirect ecosystem services to city residents, including erosion control, water infiltration, and aesthetic value. Homogenization of functional forms can limit these benefits. Depending on the functional biodiversity makeup of lawns, other important ecosystem services like pollination and nitrogen fixation may be supported by lawns, though these services are understudied in managed ecosystems. Undergraduate student data is used for a broad look at cultivated and uncultivated grassy spaces across Prince Georgeâ€™s County, MD. The ethnic and socioeconomic diversity of community college students means a large diversity of randomized locations were sampled in varied neighborhoods, creating a snapshot of MD lawn biodiversity. Students in an introductory biology course individually collected plant richness and abundance information from cultivated and uncultivated grassy quadrats, using the iNaturalist app â€œSeekâ€• and standardized abundance categories. Across four years, 120 separate locations and 480 separate plots were organized into a large biodiversity and abundance matrix. We examined the functional properties of species found 3 or more times in both cultivated and uncultivated spaces. Using iNaturalist and USDA Plants Database plant species were categorized by native status, nitrogen fixation, duration, growth habits, and root type. These were compared between cultivated and uncultivated locations to get a broad overview on functional biodiversity and ecosystem services.
While over 260 species were found across all 480 plots, only 81 species were found in 3 or more plots (many species found were unique). Most of these species were perennial forbs (61%). The cover and number of pollinator and native plants was significantly higher in uncultivated spaces vs. cultivated spaces (p<0.01). There is some evidence of homogenization in abundance across locations, as 10 of these species, mostly grasses, made up 50% of all plant cover regardless of management. Broadly, our study did not show difference in functional biodiversity with reduced cultivation, but we did find evidence of high functioning within all locations sampled. Nitrogen fixing species, though limited to 8 species in diversity, accounted for half the coverage of grassy spaces, cultivated or not. Additionally, 75% of plant cover was perennial with fibrous or rhizome forming roots, which is associated with high water infiltration and reduced erosion. Our results illustrate the homogenizing effect of urbanization on cultivated and uncultivated spaces in terms of species abundance, but also show how lawns can be pollinator refuges that offer multiple ecosystem services.
Urban homogenization, Lawns, Functional biodiversity

2. Links Between Campus Protected Landscape Awareness and Support for Conservation in a Student Sample

Hogyeum Evan Joo, Rutgers University
Jeffrey A.G. Clark, Nature Areas Conservancy
Myla F.J. Aronson, Rutgers University

Natural areas are key providers of ecosystem services in urban environments. On college campuses, these landscapes play a crucial role in serving as preserved open spaces and living laboratories for place-based education. Despite their ecological and educational benefits, campus natural areas are often the subject of competing interests among stakeholdersâ€”including students, faculty, administration, and local community groupsâ€”leading to tensions over their use and management. Furthermore, depending on stakeholders' levels of knowledge and awareness, these spaces may be at risk of development or underutilization. Considering the importance of local support in the long-term protection of natural areas, a thorough understanding of the communityâ€™s involvement, awareness, and levels of support is central to the conservation of these spaces. On college campuses, studentsâ€™ awareness and engagement may have a strong influence on institutional policies and decisions regarding these landscapes as a key community stakeholder of universities.

In this study, we examined the perspectives of students through a questionnaire survey, investigating the relationship between their awareness of protected natural landscapes on campus and their support for environmental conservation. The online survey targeted undergraduate students in the US in 2024 and 2025, yielding 822 responses from 25 institutions. While 77.13% of respondents reported being aware of their campusâ€™s natural areas, only 60.08% understood their purpose, and 72.38% visited these areas fewer than three times a year. Despite this, 94.88% supported their protection when informed of their ecological value. Notably, 25.49% of students who had visited protected areas did so for class-related activities.
Our findings underscore the role of higher education institutions (HEIs) in educating students on conserved natural areas and fostering their interactions with nature. While a significant majority of students supported on-campus natural area preservation, their direct engagement remained low. Increasing hands-on exposure and structured engagement within these areas can bridge this gap. The administrations of HEIs can promote the use of these areas in coursework and other academic activities in collaboration with faculty members. Furthermore, universities can enhance engagement through outdoor learning experiences and campus-wide initiatives that encourage interaction with nature. By strengthening student involvement, HEIs can cultivate a campus culture that prioritizes environmental stewardship and conservation, ensuring that these natural areas are both preserved and actively contribute to studentsâ€™ academic experiences, well-being, and environmental awareness.
Environmental Awareness, Campus Natural Areas, Institution-led Conservation

3. Native Trees May Struggle to Regenerate in Canopy Gaps of Invaded Urban Forest Patches

Jack Levy-Diedrich, University of Delaware
Max Piana, Harvard University
Vince D'Amico, US Forest Service
Tara Trammell, University of Delaware

The death of an overstory tree within a forest creates a formation called a canopy gap. These canopy gaps introduce new light into the forest floor and create the opportunity for new trees to grow into the forest canopy. However, many urban forests in the Mid-Atlantic Region of the United States are subject to several biotic stressors, including high browse pressure from white-tailed deer and propagule pressure from nonnative invasive plants. In forests with these stressors, understory seedlings may face an enormous barrier in filling in the open canopy and sustaining the structure of the forests. Consequently, these factors may have a profound impact on the future of urban forests, including altering their biodiversity and the ecosystem services they provide to cities. In this study, we sought to characterize canopy gaps across urban forests within the Mid-Atlantic, as well as determine which environmental factors associate with gap abundance, gap tree regeneration, and gap nonnative plant abundance.

To address this knowledge gap, we located and surveyed canopy gaps along gridded transects within nine urban forests between Baltimore, MD, Newark, DE, and Philadelphia, PA. Overall, we encountered 133 canopy gaps, and measured a suite of characteristics in 68 of these gaps, including gap size, understory nonnative plant abundance, and tree regeneration classified into three diameter classes. Our results suggest that there is a weak relationship between gap abundance and forests containing oak species (Quercus spp.). The abundance of growing saplings in gaps also appeared to decline when we saw more invasion in gaps, suggesting that nonnative plants may be suppressing the growth of new trees. Overall, our results add to the evidence that the future of oak forests may be threatened. However, we believe these results present a blueprint for concentrated, gap-based restoration efforts within urban forest ecosystems.
Urban Ecology, Disturbance Ecology, Forest Ecosystems

4. Modelling tree growth and climate response across Mid-Atlantic urban forests

Kendall McCoach, University of Delaware
Vince D'Amico, U.S. Forest Service
Tara Trammell, University of Delaware

As global population increases, cities expand and subject more forests to urban conditions, such as the urban heat island (UHI). Urban forests provide critical ecosystem services including habitat, recreation space, and carbon (C) storage. As part of the UHI phenomenon, forests experience altered climate, such as increased temperatures, impacting tree growth. Tree growth response determines a forestâ€™s aboveground biomass (AGB), a proxy for C storage. Humans increasingly rely on the C storage potential of forests as a nature-based solution for climate change, therefore, it is important to understand patterns of tree growth response to climate across variable urban conditions. How tree growth has responded to climate patterns throughout the past century informs how to accurately estimate forest potential for C storage. To understand the response of tree growth to climate, we performed a climate response analysis of tree growth in 15 mid-Atlantic forests in Newark DE, Baltimore MD, and Philadelphia PA. Tree cores were obtained from four dominant species; Liriodendron tulipifera, Fagus grandifolia, Acer rubrum, and Quercus spp. The cores were measured and chronologies were constructed which reveal the growth rate throughout time for each species in each city. These chronologies were compared to patterns in temperature and precipitation throughout the past century to determine the relationship between tree growth and climate. Across all cities, growth of L. tulipifera showed a strong relationship with precipitation, while F. grandifolia growth showed almost no relationship with precipitation or temperature. Relationships between growth of Quercus spp. and temperature varied over time and by city. To determine the importance of each climate variable, temperature and precipitation will be incorporated into separate models as predictors of tree growth and will be compared to a null model without climate predictors. This model comparison will fuse tree ring data with tree inventory data (DBH), collected from repeated surveys of the 15 study forests to estimate tree growth and DBH. The resulting model estimates will reveal the impact of climate on the growth of each species throughout the past century. This information improves our understanding of forest response to current and future climate change.
Urban forests, Tree growth, Climate

5. Beating the heat: Investigating the impact of urban heat islands on thermoregulatory traits in the common butterfly Pieris rapae

Catherine McManus, Temple University

Urban land cover is predicted to increase by over 1 million km2 by 2100 and is increasingly housing more of the worldâ€™s biodiversity. Urbanization and habitat loss subdivide populations and impose intense selective pressures, potentially driving differentiation from nonurban populations through neutral and/or (mal) adaptive processes. Among the many environmental impacts of urban development, the urban heat island effect is particularly significant for ectothermic species and may drive urban ectotherms to diverge from nonurban conspecifics in their thermal biology. In this study, we investigate patterns of phenotypic divergence in thermoregulatory traits in Pieris rapae (the cabbage white butterfly). We collected 582 adult P. rapae individuals in urban and non-urban sites across three metropolitan regions in the Eastern United States. We measured key morphological traits related to thermal biology, including wing surface area, melanized wing area, melanization intensity, and ultraviolet (UV) and near-infrared (NIR) reflectance. We tested whether these traits differed between urban and non-urban areas and whether they varied along a gradient of urbanization, defined quantitatively based on impervious surface cover and surface temperature data. Based on adaptive hypotheses to reduce heat load in warm urban microclimates, we predict that urban populations will exhibit reduced melanization (area and intensity) and increased UV and NIR reflectance in basal wing regions that transmit heat directly to the butterfly body. In contrast, we predict that distal wing regions involved in reflectance basking will show increased melanization and decreased UV and NIR reflectance. We discuss the potential biological consequences of these changes for urban populations of P. rapae, particularly for thermoregulation and intraspecific communication. This study provides valuable insights into the phenotypic response of P. rapae to urbanization and paves the way for future research into the mechanisms driving population divergence following urbanization.
Urbanization, Morphology, Lepidopterans

6. Evaluating and Understanding Biodiversity of Urban Cemeteries in Philadelphia, PA, USA

Heather Kostick, University of Pennsylvania

Cemeteries and burial grounds are an often-overlooked part of green space in an urban environment. However, in recent years, they've been found to be local hotspots of biodiversity. Studies in Europe suggest that cemeteries can provide habitat for hundreds of species and rare species in an urban environment; and that species richness and composition varied across urban cemeteries depending upon management intensity and available vegetation structures. Measuring biodiversity of cemeteries provides useful information to land and cemetery managers, but also allows for the documentation of species that may not have been otherwise and give a fuller picture of biodiversity in urban spaces. This information will also provide insight to stakeholders on how to better manage the green spaces for increased biodiversity in these urban spaces. This study evaluated biodiversity of three urban cemeteries (Laurel Hill, The Woodlands, and Mount Moriah) in Philadelphia, PA. Data was collected in Fall 2021, Spring 2022, and Summer 2022. Taxonomic data for birds, plants, and arthropods were collected using methods appropriate for each taxon. Biomass was weighed for each of the arthropod samples to provide a measurement of abundance and ecological function. Analysis suggests that there are seasonal and site differences but that depending on season, one site is more diverse than others which may be due to the differences in land management styles and site history. Future work would examine differences between cemeteries and urban parks to elucidate whether management styles between types of urban green space truly differ or if they are the same as they are currently discussed in literature.

Session 9: Plant Traits

1. An Analysis of Neutral Outcomes in Niche Models

Henry Chao, Stony Brook University

Niche theory postulates that species coexist by partitioning resource space, thus reducing interspecific competition. In contrast, neutral theory assumes that species are ecologically equivalent, meaning competitive outcomes are driven by stochastic processes rather than trait differences. Although niche and neutral theories are generally modeled separately, neutral dynamics can emerge within niche models. One such case is trait clustering, where an invader with traits similar to a resident species may persist for an extended period before being excluded. However, this represents just a subset of possible neutral invaders. By expressing an invaderâ€™s growth rate as a function of its traits and identifying when it equals zero, we can determine the set of traits that allow the invader to persist neutrallyâ€”which we term the "neutral manifold." This talk will explore the ecological significance of this neutral manifold and introduce a model in which resources are composed of smaller subunits. When trade-offs are imposed on these subunits, we frequently observe neutral outcomes, highlighting conditions under which neutrality naturally arises within niche frameworks.
Neutral, Theoretical, Invasion

2. Environmental variability in sap flow-based canopy stomatal conductance in eleven dominant hardwood species of Eastern Temperate Forests of New Jersey

Kapil Khanal, Rutgers University
Dirk Vanderklein, Montclair State University

Richard G. Lathrop, Rutgers University
Chi Chen, Rutgers University
Karina VR Schafer, Rutgers University

Estimation of sap flow in plants is pivotal in understanding the physiological process like transpiration, canopy stomatal conductance, water use efficiency, and net carbon assimilation. Sap flow is a basic function of water transport from roots to shoots and canopy conductance is a measure of the volume and ease with which water is transported and exited through the leaves. Sap flow-scaled canopy stomatal conductance captures the response of the entire tree, and its influences of bio-physical conditions. Assessing sap flow-based canopy stomatal conductance suggest how tree responds to environmental perturbations like drought, fire, defoliation, and overall global environmental change.
However, there are a limited studies on sap flow-based canopy stomatal conductance covering a wide range of species and those studies also provide mixed results showing speciesâ€™ varying responses to bio-physical conditions. It is therefore imperative to study the diverse species in a similar environment and assess their responses to environmental variables. To do so, eleven dominant species of the Eastern Hardwood Forest in New Jersey are investigated such as American beech, black walnut, white oak, and sugar maple present at multiple sites to investigate site specific versus environmental responses. We used Granierâ€™s method to estimate sap flow and derive canopy stomatal conductance and used Pearson Correlation Coefficient for statistical analysis and Random Forest regression technique was used for identifying the strongest environmental variable that influences the conductance.
It was observed that canopy stomatal conductances of all species positively correlated with photosynthetic active radiation (PAR), yet PAR was not always the strongest environmental variables for all species. Canopy stomatal conductance for hickories and oaks positively correlated with soil moisture and negatively with air temperature; and soil moisture was found to be the strongest variable suggesting that they are more sensitive to heat and drought. Red maple and black walnut have negative correlation with soil moisture and positive correlation with temperature indicating that they can endure heat and drought. Vapor pressure deficit (VPD) remained as the least important environmental variables for all species except shagbark hickory and red oak. Diverse responses were observed for some species such as American beech, white oak, and sugar maple that are present in multiple sites, exhibiting larger plasticity in their responses to environmental perturbation. It is concluded that species try to acclimate to the environment depending upon the site and environmental conditions.
sap flow, canopy conductance, global environmental change

3. Investigating Plant Morphological Trait Change in Four Cities in the Eastern United States

Megan R. King, Rutgers University
Ryan J. Schmidt, Harvard University
Myla F.J. Aronson, Rutgers University
Lena Struwe, Rutgers University

As urbanization continues to rapidly increase, floras are changing around the world, with many non-native species filling niches no longer favorable to the native flora. However, how urbanization drives plant phenotypic variation and adaptation is less known. Understanding morphological trait change in response to urban environmental conditions allows us to study plant adaptation, and how those adaptations will shape the future biodiversity of cities due to lack of genetic variation. Recent studies have shown that some non-native species become taller, increase in specific leaf area (SLA), and heavier seeds in highly urbanized landscapes. Here, we investigated morphological change (plant height, leaf size, seed mass, peduncle/pedicel length, SLA) across urban and latitudinal gradients in four cities. We hypothesized that: 1) morphological traits will shift in response to higher impervious surface cover across all cities, and 2) trait change will be more variable in cities at higher latitudes, due to higher relative increase in average temperature. In this study, we collected three common urban plant species (Lepidium virginicum, Plantago lanceolata, Trifolium repens) in four cities (New Haven CT, Baltimore MD, Raleigh NC, Jacksonville FL) along a latitudinal gradient in North America from Florida to Connecticut, USA. In each city, specimens were collected within areas of high (80-100%), medium (50-79%), and low

(20-49%) impervious surface cover for a total of 377 specimens. Trait change is also highly variable and non-consistent across impervious surface cover, however we have determined that seeds are heavier and plants are typically are shorter in areas of high urbanization, and that leaf thickness does not correlate with latitude. The age, size and overall amount of impervious surface within each city may also play an important role in stress induced trait change. Our data suggests that plant trait variation is higher in the most urbanized parts of cities, indicating that trait change may be occurring in some urban populations and not others, and that traits may not be influenced by urbanization in landscapes of less than 80% impervious surface. While controlled environments for plant trait shifts have been favored by researchers, understanding how morphological traits respond in natural populations allows us to understand how the multiple facets of environmental change caused by urbanization influences selective pressure for certain traits. This research provides the stepping stones to understanding trait selection and adaptation by species in urban environments.
Plant trait change, Urbanization, Impervious surface

4. Morphological and phenological trait change in herbaceous wetland plants in relation to temperature and precipitation patterns over the last century

Alyssa Latargia, Rutgers University
Myla F.J. Aronson, Rutgers University

Plant morphological and phenological traits represent adaptations to their environment, particularly temperature and soil moisture. Because wetland plants are sensitive to fluctuations in climate, they can serve as an early indicator of climate change impacts. In this study, we examined how leaf area and flowering phenology has changed in the past century, driven by temperature and precipitation, in three herbaceous wetland plants: Asclepias incarnata, Mimulus ringens, and Lobelia cardinalis. We hypothesized that leaf area would decrease and flowering would occur earlier in the growing season with increasing temperatures. We also hypothesized that leaf area would decrease if spring and summer precipitation decreased, but changes in flowering time would not respond to precipitation changes. Using digitized herbarium specimens accessed via the Mid-Atlantic Herbaria Consortium, we examined specimens collected between 1930-2024. In order to account for local variation, we measured pairs of specimens collected within 3 kilometers of each other at least 20 years apart. We measured leaf area using ImageJ and accounted for flower presence for 30 specimens per species. For each specimen, we also collected average annual temperature and precipitation from the NWS National Forecast Offices historical data. When all species were analyzed together, we found a weak positive trend for leaf area in relation to increasing average annual temperature and precipitation. We found that flowering time occurred later in the season over time despite mean annual temperature increasing. We also found greater variability in flowering time for specimens collected more recently for two species, L. cardinalis and A. incarnata. These data indicate that flowering season increased in length due to climatic changes, likely driven by increased temperatures. For leaf area, more specimens may be needed to observe a significant trend. The increase in leaf area in relation to average temperature may be due to other external factors, such as an increase in precipitation. Because wetland plants are highly sensitive to climatic changes, this research provides insight into how wetland communities may adapt to climate change, helping to inform future conservation and management strategies.
Plant traits, Herbarium, Climate change

5. Rhizobia strain diversity promotes stable plant functional traits and resilience under simultaneous drought and herbivore stress

Brendan Randall, University of Maryland
Kimberly Komatsu, University of North Carolina at Greensboro
John Parker, Smithsonian Institution
Kelsey McGurrin, University of Maryland

Nicole Rieger-Erwin, University of Maryland
Karin Burghardt, University of Maryland

In agroecosystems, stress from drought and insect pests threaten crop production and pose a significant challenge to crop management strategies. Soybeans rely on symbiotic rhizobia bacteria, which are facultative legume mutualists that infect and colonize soybean roots and conduct symbiotic biological nitrogen (N) fixation. This relationship is crucial for ecosystem functioning, as plants need N for growth, reproduction, and synthesis of defensive compounds. Within soils, rhizobia populations are exceptionally genetically diverse, with different strains possessing unique traits in different environments. We completed a greenhouse experiment in which we inoculated a single, commercial soybean variety with one of twenty-four unique rhizobia strains collected and isolated from a Maryland soybean field. We found that the effect of drought on caterpillar growth rates and plant functional traits was strain-dependent. Additionally, biodiversity-ecosystem function theory (BEF) provides a framework for understanding the (often) positive relationship between biodiversity and ecosystem functioning. Legumes can simultaneously associate with multiple strains, and diversity in rhizobial partners may be one potential method for introducing diversity in traits, plant resistance, and resilience to simultaneous stressors into monoculture crop plantings. However, an important question remains: Do diverse rhizobial partners increase or stabilize plant functional traits under simultaneous drought and herbivory? We inoculated the same soybean variety with eight unique rhizobia strains selected from the previous experiment in single-strain monocultures, two-strain bicultures, and four-strain polyculture combinations under drought and ambient conditions in a greenhouse. We also performed greenhouse feeding assays in which we reared the generalist legume pest, Chrysodeixis includens. We quantified herbivory on soybean foliage, herbivore growth rates, root nodulation, and plant functional and fitness traits. We predicted that plants inoculated with diverse rhizobia polycultures would be characterized by lower levels of herbivory and variability in plant functional traits across watering environments. We found that as rhizobia diversity increased, the difference in caterpillar growth rates between ambient and droughted treatments decreased. We also found that rhizobia diversity shifted multivariate functional plant trait expression, with polycultures showing less variation in their multivariate traits than bicultures and monocultures. Understanding how BEF relationships influence plant-insect interactions in combined abiotic and biotic stress environments advances fundamental ecological knowledge. This work offers novel insight into management strategies that promote the stability of soybean performance in increasingly variable climates. Future work will address the â€œwinnersâ€• and losersâ€• of rhizobial competition within biculture and polyculture mixtures and assess whether diversity effects were driven by selection or complementarity benefits.
Functional Traits, Multitrophic Interactions, Symbiosis

6. Photosynthetic induction and sunfleck responses of three understory tree species in Mid-Atlantic broadleaf forests

Jessica Schedlbauer, West Chester University
Sarah Paynter, West Chester University

The dynamic light environment of broadleaf forest understories creates conditions in which tree species must respond rapidly to short duration sunflecks to maintain positive carbon balance. In this context, leaf physiological responses are often assessed via measurements of photosynthetic induction under saturating light exposure. During induction, a leaf must overcome both stomatal and biochemical limitations to achieve light-saturated rates of photosynthesis (A), and induction responses of many tree species have been characterized. Less well understood is how leaves respond to conditions that more closely resemble an understory light environment, in which light is only briefly available during ephemeral and often temporally clustered sunflecks. The present study sought to characterize both induction and sunfleck responses of tree species frequently found growing together in Mid-Atlantic forest understories: Acer rubrum, Acer platanoides, and Fagus grandifolia. Three individuals per species were measured at three study sites between late June and late July to compare leaf physiological responses to (1) constant saturating light (i.e., induction responses) and (2) variable light, delivered via either 30 or 60 s clustered sunflecks. Induction responses varied little among species, with all

rapidly gaining induction, as has been observed for other shade tolerant tree species. However, A. rubrum exhibited a different physiological strategy, relative to the other species, with significantly lower stomatal limitation ($p < 0.001$) during induction and a significantly higher A to stomatal conductance (gs) ratio once induced ($p < 0.05$). Despite similarities in induction responses, the two Acer species were more responsive to applied sunflecks, relative to F. grandifolia. Cumulative carbon assimilation (CCA) in the 30 s sunfleck experiment was significantly greater for both Acer species and for A. rubrum in the 60 s experiment ($p < 0.01$), when compared to CCA during induction. Rates of CCA were 50-121% higher during sunfleck exposure, a response supported by high stomatal responsiveness and consistently elevated gs in the Acer species. Findings demonstrating elevated CCA under dynamic light exposure have not, to our knowledge, been previously reported and are in need of further investigation so we might better characterize carbon uptake in forest understory environments. In terms of local significance, both Acer species are well poised to persist in the forest understory, while growth of F. grandifolia will likely be more limited, particularly in light of Beech Leaf Diseaseâ€™s recent introduction to North America.

Plant ecophysiology, Broadleaf forest, Understory trees

Poster Session Abstracts

1. Assessing Seed Bank Viability Within Legacy Sediment
Session 1

Cydney Delaney, Towson University
Dr. Vanessa Beauchamp from Towson University

The combined effects of historic legacy sediments and present-day urbanization have significantly altered stream ecosystems, particularly in Baltimore County. From the late 1600s to the early 1900s, milldams trapped sediment from upstream agriculture and deforestation, accumulating layers of sediment. After dam removal, streams cut through meters of accumulated sediment, disconnecting streams from their floodplains, which reduces overbank flooding, limits nutrient retention, and degrades water quality. Urbanization has further exacerbated stream degradation by increasing impervious surfaces, leading to accelerated runoff, stream channel erosion, and disrupted riparian vegetation. Removing legacy sediment has been proposed as a restoration strategy to reconnect streams to their floodplains, with the potential for the sedimentâ€™s seed bank to contribute to natural revegetation. This study aims to assess seed viability within legacy sediment by germinating samples from various depths. The findings will help determine whether viable seeds, particularly native species, could support natural vegetation recovery or if invasive species management is needed post-restoration. By examining the seed bankâ€™s role in stream restoration, this research could offer valuable insights into enhancing ecological restoration strategies and improving water quality in impacted watersheds.
Stream restoration, Ecosystem recovery, Seed bank

2. Nine Years Later: Investigating the Impact of Arctic Wildfires on Methane and Carbon Dioxide Fluxes in a Tundra Site in Northern Alaska
Session 2

Jennifer Chandler, West Chester University of Pennsylvania
Brenda Del Cid, Wilkes University
Michael Moody, University of Texas El Paso
Marcel Vaz, Wilkes University
Bjorn Larson, Marine Biological Laboratory
Ned Fetcher, Wilkes University

Arctic warming is progressing at over two times the rate of the global mean leading researchers to explore how carbon dynamics are being altered as high-latitude temperatures soar. Much work has focused on CO2 dynamics with somewhat less focus on how tundra CH4 flux varies with climate change, even though CH4 has more global warming potential. Almost no studies have investigated how tundra fire influences CH4 emissions, even as the number of wildfires in the arctic tundra as well as the duration of wildfire seasonality have increased over the last several decades, and are predicted to continue increasing in the future.
An experiment was designed to determine if differences in CH4 and CO2 fluxes exist between burned and unburned plots 9 years after a fire event. The site is located on moist tussock tundra near Toolik Lake in northern Alaska. Ten 4 m2 plots were laid out in 2015, dried, and burned with a weed burner. One m2 plots were established in the center of the burned plots. In 2024, a series of 1m2 controls were established approximately 15m from the burn plots. In July 2024, one soil collar (approx. 3626 cm3) per plot was placed surrounding a single Eriophorum vaginatum tussock as well as moss, forbs, graminoids, and an occasional woody shrub. After a stabilization period of four days, data were collected for each burn

and control plot, and included: depth of thaw, NDVI, volumetric moisture content, soil temperature (10cm and 20cm), CH4 and CO2 flux.
Drone imagery indicated that the burned plots have experienced subsidence of approximately 20cm since the 2015 burn. Mean soil temperatures in burned plots are substantially warmer at 10cm and 20cm depths (4.09 C, 1.97 C) than in unburned plots (2.13C, 0.45C). Although data collection is currently underway, preliminary results suggest that CH4 flux does not differ between the previously burned plots and unburned controls ($t = -0.37$, $p = 0.358$), but that CH4 flux is highly variable among individual plots, regardless of fire history. Mean CO2 flux is less variable than methane flux, and is higher in burned plots ($t = -2.77$, $p = 0.007$). The 9-year elapsed time since treatment and the low intensity and duration of the burn in 2015 may help explain the lack of difference in CH4 between treatments.
arctic tundra, wildfire, methane

3. The role of extended leaf phenology in the success of invasive Amur Honeysuckle (L. maackii) across a latitudinal gradient in the central U.S.
Session 1

Megan Jefferis, Purdue University
Jessica Gurevitch

Temperate forests across North America have been extensively invaded by nonnative woody plant species. Amur honeysuckle (Lonicera maackii, AH and its hybrids) has become established as a dominant forest understory shrub, especially in the midwestern U.S. where a native shrub layer is often absent. The invasiveness of this species can be attributed to several advantages that have contributed to its occupancy and dominance of an otherwise empty niche in forest understories. One important hypothesized trait is the extended leaf phenology (ELP) of AH, which provides photosynthetic benefits from an enhanced growing season, and impacts native tree regeneration and herbaceous understory species composition by altering forest understory light conditions. This study focused on investigating the role of ELP in the success of AH at three sites over a latitudinal range from approximately 41oN to 39 oN in northern to southern Indiana, U.S. to understand the impact of differences in temperature regimes on its success. I examined the leaf phenology and light environment of AH and native overstory trees from spring 2024 to spring 2025. Leaf phenology was recorded on an intensity scale from bud swelling to leaf maturity in the spring and to leaf abscission in the fall. I also measured light interception of both the overstory and AH canopy using a LP-80 ceptometer and measured photosynthetic gas exchange of AH over the course of the growing season. Data was analyzed using repeated measures multivariate analysis of variance. Results showed that light interception by AH increased during the spring and fall when the overstory canopy was open, with greater light interception occurring in the spring. AH leafed out by late March 2024, whereas the overstory canopy did not leaf out until late April to early May across all sites. In the fall, AH phenophases occurred earlier in the north and central sites, but the difference in timing of AH phenophases relative to the overstory were less pronounced. These findings highlight how ELP contributes to invasiveness of AH and suggests that long term temperature changes may influence these dynamics. Consideration of phenology and the influence of these changes on biological invasions will be critical for making future informed decisions regarding invasive species management.
Leaf phenology, Invasive woody species, climate influence

4. Hyphosphere Influence on Mineral-Associated Organic Matter Under Nitrogen-Limiting Conditions
Session 2

Raydaliz Cancel, University of Massachusetts Amherst
Robert Wick, University of Massachusetts Amherst
Rachel Hestrin University of Massachusetts Amherst
Ashley Keiser, University of Massachusetts Amherst

Rhizosphere soil is a key area of mineral-associated organic matter (MAOM) formation, the longer-lived pool of soil organic matter (SOM), due to high microbial activity fueled by plant inputs. The fungal hyphosphere â€“ the area that includes the reach of mycorrhizal fungi â€“ can extend the zone of high microbial activity beyond the rhizosphere, and potentially, the zone of high MAOM formation. This includes the area where senesced litter can enter the decomposition pathway. While it has been proposed that decomposing litter is more likely to end up in particulate organic matter (POM) pools because it is generally mineralized outside of the rhizosphere , it is unknown whether the hyphosphere can promote the formation of MAOM derived from decomposing litter. We conducted a greenhouse mesocosm experiment using basil plants (Ocimum basilicum, L.) to test whether the presence of an arbuscular mycorrhizal fungi (AMF) hyphosphere promotes the formation of MAOM. Using isotopically enriched cover crop residues, we quantified new MAOM and POM across treatments which isolated the effects of the rhizosphere, the hyphosphere, and bulk soil on decomposition and SOM formation.

The treatment with the AMF hyphosphere had greater MAOM formation than the plant-only treatment. Due to the limited nutrient environment, plant growth and plant nitrogen (N) uptake decreased when AMF was present. Interestingly, the greatest amount of new MAOM was found in soils without a basil plant or AMF. In contrast to expectations of microbial activity in the bulk soil versus the rhizosphere, our results show that high MAOM formation derived from decomposing litter can occur in the bulk soil. Using isotopically enriched litter, our results show that the hyphosphere promotes greater new MAOM formation derived from litter residues compared to the rhizosphere. And, without plant and mycorrhizal competition for N, bulk soil has the potential for greater new MAOM derived from decomposing litters. While litter decomposition is a critical pathway for C and nutrient return, our results demonstrate that litter decomposition also contributes to new MAOM formation across the heterogenous soil environment, improving our ability to estimate litter-derived MAOM formation in AMF-dominated ecosystems.
fungal hyphosphere, plant-soil interactions, soil organic matter

5. Ecological genetics for several populations of the high salt marsh foundation plant Spartina patens across the mid-Atlantic, USA
Session 1

Annika Peterson, , Georgetown University
Sean Cole, Georgetown University;
Charli Minsavage-Davis, Georgetown University;
Rachel Kang, Georgetown University
Jack Simon, Georgetown University
Clare Reif, Georgetown University
Valerie Ng, Georgetown University
Matthew B. Hamilton, Georgetown University

Intertidal salt marsh habitats support diverse communities that act as a buffer and filtration system for estuaries and also provide valuable ecosystem services such as coastal protection, water treatment, fisheries recruitment, carbon sequestration, and recreation. Spartina patens is a foundation plant found at higher tidal elevations in mid-Atlantic salt marshes that reproduces sexually and via clonal growth with distinct genotypes (genets) producing vegetative tillers (ramets). In plant populations, especially grasses, rates of clonal versus sexual reproduction may change over time or in response to environmental variation, and different genotypes may vary in rates of sexual and clonal reproduction. We seek to address several questions: 1) was clonal reproduction evident through frequencies of ramets and genets within marshes? 2) how were ramets and genets spatially distributed within marshes? 3) among populations, what were the levels of genetic differentiation, and were ramet and genet spatial distributions heterogeneous? Based on prior studies, we expected unique genets to represent about 60% of the samples, for ramets per genet to match random sampling distributions, and for populations to exhibit genetic differentiation and isolation by distance yet share spatial patterns of ramets and genets.

Between 2015-2024, seven mid-Atlantic salt marsh populations (Cape Cod, MA; Long Island, NY; Tuckerton, NJ; Tuckahoe, NJ) were sampled for S. patens (ca. n=1000 stems). Within each population, patches were sampled on one-meter grid transects. Using DNA isolated with a rapid chelex-based method, samples were genotyped for 12 novel microsatellite loci using multiplex PCR and fragment analysis. Multilocus genotypes were used to assign each sample within patches as distinct genets and ramets of the same genet. Multilocus genotypes showed high levels of heterozygosity with clearly identifiable clonal ramets. We mapped ramets and genets within each population and quantified spatial distribution using landscape aggregation metrics. Distributions of ramets per genet were compared to Poisson expected frequencies to test for the possibility that genets varied in fitness. We used metrics of genetic differentiation among populations and tested for isolation by distance. Our findings will inform salt marsh conservation and restoration efforts by quantifying the current spatial genetic diversity produced by the combination of sexual and vegetative reproduction. Additionally, these data illustrate this high marsh foundation species has a pronounced clonal architecture that is likely to shape salt marsh migration in response to rising sea levels.
Ecological genetics, Salt marsh, Clonal plants

6. Drought Response of an Appalachian Green Roof with a Distinct Native Prairie Community
Session 2

Gavin Wallace, Ohio University
David Rosenthal, Ohio University

The construction and use of green roofs has gained popularity in recent decades because of the many beneficial services they can provide to urban ecosystems. Current research has identified many plant communities that perform well under the low water availability and extreme temperatures of a green roof. However, as climate change is projected to decrease water availability in many parts of the world, it is important to understand how these communities may respond to even harsher green roof conditions caused by drought. This study aimed to identify how a native prairie green roof community adapts to drought throughout the growing season. Out of the entire community, three dominant species, with distinct growth forms and photosynthetic pathways, were analyzed under drought conditions by measuring gas exchange and other important parameters throughout the season. Predictably, the C4 grass, P. Virgatum, performed better during the peak of the drought than the two C3 species, C. lanceolata and M. fistulosa. The grassesâ€™ success is attributed to much greater water use efficiency driven by lower rates of stomatal conductance. All three species showed significant variation throughout the growing season but the strategies they used to respond to drought varied greatly. This project will help to clarify the mechanisms that many common green roof plants use to adapt to the harsh environment on a green roof.
Green roofs, Drought, CO2 Assimilation

7. Identifying patterns and drivers of avian species co-occurrence along a seasonal migration route in the eastern United States
Session 1

Wren Logan, Rutgers University-Newark

Â It is understood that many migratory bird species tend to migrate and use stopover sites as a multi-species flockâ€”a phenomenon known as co-migration. However, some unanswered questions in avian migratory ecology about co-migration remain, including 1) Are there patterns of species assembly and cooccurrence which persist along migration routes during the pre-breeding and post-breeding migratory seasons? and 2) If so, what ecological mechanisms drive these patterns? This study attempted to provide insight into these questions by testing the hypotheses that such patterns exist and that the driver behind these patterns is niche partitioning to minimize competition. These hypotheses were tested by using large-scale publicly available citizen science data (at 27km resolution) from the year 2022 on the average weekly

abundances of 46 species of migratory birds that migrate through the eastern United States. Distance matrices representing cooccurrence patterns during the pre-breeding and post-breeding migratory seasons were compared with distance matrices generated from databases containing morphological trait, diet, and foraging strategies for all species using Mantel Tests. Additionally, matrices were generated using chi-square goodness of fit tests to show the frequency of cooccurrence between each pair of species during each migration season. Â Results were insignificant for each Mantel test, implying that in the eastern United States, patterns of migratory co-occurrence were not explained by niche overlap, suggesting possible niche partitioning. Finally, chi-square goodness of fit tests showed a high degree of random correlation among all pairs of species, implying there may not be persisting patterns of cooccurrence along this flyway. Â This implies that stopover assembly patterns at small urban forest patches, the object of our current studies, are not explained by patterns of co-migration alone. Â These findings illustrate the need for more studies to assess patterns of cooccurrence along other flyways. Similar studies along other flyways could provide a baseline pattern to compare with local patterns of stopover site assembly and to identify drivers of community assembly at this localized level.
Bird Migration, Community Ecology, Urban

8. Investigating Ant Diversity in Urban Ecosystems with High Heat Vulnerability
Session 2

Caitlin Tanoue, Rutgers University
Chiara Garcia, Rutgers University Camden
Amy Savage, Rutgers University Camden

Climate change leads to an uptick in extreme weather events, such as heatwaves, which are unpredictable periods of abnormally high temperatures. Urban ecosystems are more vulnerable to the consequences of heat waves due to the presence of urban heat islands and substantial impervious surfaces. Organisms of urban ecosystems, such as humans and arthropods, are prone to heat-induced injuries, including death. Arthropods, notably ants, are much more sensitive to climate change because of their lower thermal tolerance, thus posing a threat to their biodiversity and ecosystem function. Because of their abundance and widespread distribution, ants have been utilized as bioindicators for ecosystem health.

Our poster will discuss a preliminary, ongoing assessment of ant diversity across sites with high heat vulnerability before, during, and after heat waves. Our first year of data revealed that three prominent ant genera collected across Camden, NJ, displayed similar patterns of variance across heatwave periods, suggesting decreased ant activity. Furthermore, Tetramorium and Pheidole exhibited abundance declines during heatwaves. With our data, we will compare ant diversity across sites with varied heat vulnerability to determine if ants can be used as bioindicators for human health during heat waves. Furthermore, we will employ our findings in conjunction with public health and climate data to develop ways to mitigate the impacts of climate change in the world of increasing urbanization.
Heatwaves, Urban Ecology, OneHealth

9. Exploring Factors Influencing Agrobacterium-Mediated Genetic Transformation in the Unicellular Green Algae Chlorella sp.
Session 1

Ali Parsaeimehr, Delaware State University
Gulnihal Ozbay Delaware State University

This study establishes an Agrobacterium-mediated transformation platform for Chlorella sp. (UTEX B 3198). Cultivation was examined in BG11 and Modified Bold 3N Media, analyzing biomass and growth rate. Agrobacterium tumefaciens

strain LBA4404, with pCAMBIA1305.1 expressing GFP and GUS genes driven by a 35S promoter, was used. Key transformation factors such as IPTG concentration, selection antibiotics, and alga-to-Agrobacterium ratios were optimized. Successful transformation was confirmed by PCR amplification of reporter genes, ensuring reliable gene expression in Chlorella sp., demonstrating the precision and efficacy of the developed transformation approach.
Genetic Transformation, Green Algae, Chlorella sp.

10. Plastic mulching effects on microbiomes in Colocasia esculenta cultivars
Session 2

Abigail Croft, William and Mary
Emmanuel Opoku, William and Mary
Joshua Puzey, William and Mary
Harmony Dalgleish, William and Mary
Jennifer Kahn, William and Mary

The plant microbiome is formed by deterministic (e.g., host genotype, microbe interactions) and stochastic (e.g., death, pathogen invasion) processes. Human agricultural practices also influence the assemblage of microbial communities in agricultural systems. Plastic sheet mulching, a contributor to plastic pollution, alters agroecosystems by affecting soil microbiomes, nutrient cycling, and plant growth. Despite the widespread use of plastic mulch, there is limited knowledge of how mulching type influences plant-associated microbiome in irrigated agroecosystems. Using taro (Colocasia esculenta) as a model system we propose to begin to fill this knowledge gap. Specifically, this study investigates how mulching methods (traditional organic materials versus plastic sheets) and taro subspecies' genetic diversity influence soil and leaf microbiomes. To investigate these questions, taro varieties from Rurutu, French Polynesia, â€“where subsistence farming has thrived for over eight centuries â€“ were collected for genomic resequencing to assess genetic diversity and its effects on plant phenotype and microbial community structure. Additionally, soil and leaf samples will undergo metagenomic sequencing, nutrient profiling, and microplastic quantification to evaluate the impacts of mulching practices on microbial abundance and diversity. By studying the ecological interactions between mulching methods, host genotype, and microbiome composition, this research aims to inform sustainable agricultural practices that enhance plant-microbiome interactions, improve crop yield, and breeding for desirable traits.
microbiome, genetic variation, agriculture

11. Fifty years of Phragmites australis landscape change on Long Islandâ€™s South Shore Estuaries
Session 1

Saloni Singh, Stony Brook University
Elizabeth Watson
Sixto Taveras Lopez

Phragmites australis is an invasive plant species that densely populates a broad range of wetland and dry upland habitats due to its wider tolerance for flooding and salinity, and often forms a monoculture in the salt marsh-coastal forest ecotone in Northeastern tidal wetlands. Here we assessed shifts in P. australis distribution across the South Shore of Long Island using historic P. australis distribution data from 1974, 2008, and 2024. The historic data was obtained from New York DEC and was based on maximum likelihood classification of four-band imagery with 1-m resolution across four coastal wetland classes (intertidal marsh, high marsh, fresh marsh, and Phragmites) in Long Island estuaries to evaluate observed wetland loss and Phragmites colonization. The 2024 data was generated using a random forest model used with 2022 National Agricultural Imagery Program (NAIP) data, and classification was conducted using google earth engine, revealing notable changes in the abundance of Phragmites. We utilized a Digital Elevation Model (DEM) to investigate

potential elevational changes. Furthermore, an analysis of P. australis landscape metrics explores changes in patch size and isolation, as well as spatial trends indicating if there is movement further from coastal shores. The historical changes in Phragmites distribution and its landscape ecology reveal impacts of sea level rise and disturbances. This new information also contributes to informing management of invasive species and marsh migration.
Phragmites australis, Invasive species, Machine Learning

12. The effects of floodplain restoration on reptiles and amphibians
Session 2

Angelymarie Pacheco, Elizabethtown College
Makenzi Reed, Elizabethtown College

Floodplain wetland restoration is a relatively new method to improve water quality in valley-bottoms affected by legacy sediment. While the primary driver for these restorations is the reduction of sediment and inorganic nutrient pollution, the restoration of wetlands should also be beneficial for biodiversity. For example, the restored wetland is the preferred habitat for the spotted turtle, a Pennsylvania species of concern and IUCN Red List endangered species, but the use of restored floodplain wetlands by spotted turtles is unknown. We evaluated the Conewago Creek restoration in southcentral Pennsylvania for its effect on reptiles and amphibian diversity in May 2024, one year after the restoration was completed. Specifically, we used minnow traps and dip nets to capture the animals. We documented the presence of six fish species, including the American eel, one amphibian species, and two turtles. We did not detect the spotted turtle. As the floodplain wetland restorations increase in number and size, they should generate co-benefits for biodiversity. Evaluating how these restored wetlands benefit biodiversity is an important part of measuring restoration success.
restoration, wetland, biodiversity

13. Negative Effects of Acid Mine Drainage on Stream pH Levels and Ecological Health
Session 1

Nicholas Sessums, West Liberty University
James Wood, West Liberty University

Water chemistry is a key component of stream ecological research, influencing species composition, nutrient cycling, and other factors. Furthermore, understanding and remediating stream water quality issues, such as the impacts of agriculture, urban development, and industrial pollution require long term monitoring and an understanding of reference conditions. Industrial pollution, such as Acid Mine Drainage (AMD), and urban development can profoundly influence water chemistry parameters such as pH levels. To better understand the effects that industrial pollution and urban development have on water chemistry, we studied four streams from the Northern panhandle of West Virginia using a dataset spanned seven years (2019-2025). We compared two streams heavily affected by AMD, one highly urbanized stream, and one primarily forested stream to serve as a control. We wanted to answer the following questions 1) Are there any differences in the variation of pH levels between AMD, urbanized, and healthy streams?, and 2) Are there any differences in seasonality change? Our results showed that the sites impacted by AMD demonstrated larger fluctuation in pH than that of the reference and urbanized streams. pH in the AMD impacted streams ranged between 4.4 and 9.96, while the urbanized stream ranged from 6.29 to 9.07. The reference stream ranged from 7.55 to 9.25. We did not observe any notable season correlations in pH in these streams. The results of this study are important for understanding the effect that industry has on local streams and provides insight into mitigation efforts. This study can help other studies as a launch pad for finding correlation, or background information for action to be taken against industrial pollution.
Water Chemistry, pH, Industrial Pollution

14. Freshwater Snail Inventory of the Upper Delaware River
Session 2

Tanya Dapkey, Academy of Natural Sciences
Emma Guelzow, Academy of Natural Sciences
Andrew Weber, National Park Service

The Upper Delaware Scenic and Recreational River (UPDE) unit of the National Park Service partnered with the Academy of Natural Sciences of Drexel University (ANS) to perform a freshwater snail inventory within the park. Fifty-four sites were chosen along the ~70 miles of the Delaware River within UPDE and included cold-water and warm water fisheries zones. Snails were identified using traditional morphological taxonomy and DNA barcoding of the CO1 (Cytochrome c oxidase I) gene. This study identified 27 species of snails, one of which is a non-native species, the Japanese Mystery Snail (Cipangopaludina japonica). Water temperature appeared to be correlated with snail abundance as there were more snails below the Cannonsville Reservoir influence in the warm water zone. A better understanding of the snail community and the ecosystem has been gained with the results of this inventory which will inform effective and responsible river management plans.
Japanese Mystery Snails, Aquatic Snails, Temperature

15. Assessing different management actions for the conservation of the grand skink (Oligosoma grande)
Session 1

Noah Dean, Stony Brook University
Zhangpeng Zheng, Stony Brook University
Rafael D'Andrea, Stony Brook University

The ongoing biodiversity crisis necessitates conservation actions around the globe. With multiple factors contributing to species declines, different conservation strategies may be viable for different species. Population dynamics models can be used to forecast conservation outcomes and help in determining the optimal strategies in specific cases. This study introduces a population model integrating habitat expansion, translocation, captive breeding, and predator control with the goal of finding the most effective combination of actions for a particular species. We use as a case study the grand skink (Oligosoma grande), an endemic New Zealand lizard currently classified as Endangered on the IUCN Red List. Using the IUCN Green Status score, we assess the impact of historical and future management actions on the viability of the population. We find that captive breeding and predator control best reduce the risk of the grand skink becoming Critically Endangered, potentially elevating its conservation status to Vulnerable within 36 years. Our approach can be applied to other taxa and complement the toolkit of conservationists and wildlife managers.
Population modeling, IUCN Red List, Conservation and management

16. Ecotypic Differentiation in Photosynthesis and Respiration of Eriophorum vaginatum Across a Latitudinal Gradient in a Common Garden Setting
Session 2

Caleb Edwards, Wilkes University
Ned Fetcher, Institute for Environmental Science and Sustainability
Marcel Carita Vas, Institute for Environmental Science and Sustainability
Bjorn Larson, Ecosystem Center, Marine Biological Laboratory

The tussock forming species Eriophorum vaginatum grows along a wide latitudinal gradient, and is therefore subjected to large environmental variation. A previous study found evidence of ecotypic differentiation in maximum photosynthetic rate of E. vaginatum when assessed in common gardens. While this variation is seen in the field, it remains unclear as to if the ecotypes will maintain these differences when placed in a more controlled setting. In this study, 5 tussocks from 12 populations across a latitudinal gradient from Eagle Creek, Alaska, to Prudhoe Bay were maintained in a greenhouse at Toolik Field Station. We tested for ecotypic differences in photosynthesis and respiration. Although no significant differences were found between the populations overall, the Gobblerâ€™s Knob population exhibited lower values in light compensation point and dark respiration. This suggests that ecotypic differentiation may be influenced by the environmental conditions found at the garden sites, with subtle differentiation occurring at Gobblerâ€™s Knob. These findings indicate that E. vaginatum may have some capacity to adapt to amelioration in environmental conditions.
Tussock Tundra, Photosynthesis, Adaptation

17. The Effect of Elevation and Soil Moisture on Water Use Efficiency of Understory Plants
Session 1

Ishita Khambete, Union College

Are plants moving into higher elevations fast enough to cope with rising temperatures, or are they changing physiologically to adapt instead? With climate change and other human impacts threatening forest ecosystems it is important to investigate the physiological mechanisms that lead to population change. The Russian Wilderness in California is a botanical biodiversity hotspot with long term plots established in 1969. The area is facing two main threats: climate change and fire suppression. At high elevations, warming temperatures and decreased precipitation are likely to dry out soils, creating physiologically stressful conditions. Furthermore fire suppression leads to a buildup of biomass at lower elevations where fires have historically occurred more frequently also creating stressful conditions for understory plants. This study focuses on how elevation and soil moisture affects stress in six common understory plants in the Ericaceae family using stable isotopes as a proxy for plant stress. In summer 2024 we travelled to the Russian Wilderness in northern California and hiked in the wilderness backcountry to thirteen long term plots along an elevation and moisture gradient. We collected 114 leaf samples and additional microhabitat data including soil moisture, litter and duff depth, and canopy cover. Leaf samples were dried, pulverized, and analyzed using a mass spectrometer for two carbon isotopes, carbon-13 and carbon-12, which were used to estimate water use efficiency (WUE), a proxy for plant stress. We found that plant species that inhabit drier habitats had higher WUE than species that prefer wetter conditions, indicating that species that live in drier conditions are more stressed. We also found that soil moisture significantly decreased WUE for all species, indicating that with more available water, plants are less stressed. Finally, we found that the impact of elevation on WUE depended on the species. As elevation increased, Pyrola picta experienced a significant decline in WUE while other species had a weakly positive or no relationship between WUE and elevation. Overall our data suggest that all species are stressed by decreased soil moisture and that soil moisture is a stronger driver of plant stress than elevation in the Russian Wilderness. Physiological changes precede population shifts, and can inform why plants may or may not be shifting in elevation in response to climate change and other human impacts.
Water Use Efficiency, Soil Moisture, Stress

18. Impacts of Tornado Disturbance on Soil Carbon Fluxes in a Temperate Deciduous Forest
Session 2

Keri Kern, Temple University
Joshua S. Caplan, Temple University
Lori A. Sutter, University of North Carolina Wilmington
Mariana Bonfim, Temple University

Trinity Flores, Villanova University
Christopher LeClair, Temple University
Ian Stonefield, Temple University
Brent J. Sewall, Temple University
Amy L. Freestone, Smithsonian Environmental Research Center
Sasha Eisenman, Temple University

Tornado disturbance is rare in the northeastern United States, but tornados may be increasing in frequency in the region due to climate change. For the many forests and forest stands in the Northeast, tornado disturbance can be expected to alter carbon dynamics dramatically, with some of the least understood effects pertaining to fluxes into and out of the soil.â€¯In particular, canopy loss would reduceâ€¯soil carbon inputs substantially, whileâ€¯soil warming may raise carbon losses by accelerating respiration. However, numerous mitigating factors, synergisms, and spatial variability could alter the magnitude, and possibly direction, of such effects across tornado-disturbed forests, ultimately making it difficult to predict the net effect of disturbance on soil carbon loss and recovery though time.

The Temple Forest Observatory (TFO) is a deciduous forest stand within the Temple Ambler Field Station in southeastern Pennsylvania. The TFO was a mature forest with tree ages exceeding 150 yr until it experienced a tornado strike in September 2021. The event provided an opportunity to investigate changes in the forestâ€™s carbon dynamics, which we did by comparing litterfall, soil respiration rates, and soil carbon storage to those in a nearby reference site at Robbins Park. For one year, we measured leaf litter accumulation every two weeks and soil respiration approximately monthly in 18 plots in the TFO and 6 plots in the reference forest. We also quantified soil carbon storage and ran a single-pool soil carbon model to project future trajectories.â€¯

Given the structural similarities between the TFO and Robbins Park prior to the tornado strike, our data suggest thatâ€¯large-scale canopy loss at the TFO reduced leaf litter contributions to the soil carbon pool by 66%, except in the minority of plots with low canopy loss. Concomitantly, the annual mean rate of soil respiration was 26% greater in the TFO (4.1 vs. 3.2 Î¼mol/m2/s), which was associated with soil being 3.3Â° C warmer. Although there was notable spatial variation in these rates, the net outcome isâ€¯likely to be a depletion of the soil carbon pool. However, as vegetation regrows, rising leaf litter inputs will eventually raise carbon inputs enough to outpace losses through respiration, which itself could decline due to the increased shade. These findings highlight how severe windthrow disturbances can fundamentally alter carbon fluxes in forest stands, with long-term implications for ecosystem resilience and carbon storage.
Carbon, Soil, Disturbance

19. Methods for managing the invasive grass Microstegium vimineum differ in effectiveness, effort required, and regeneration of native plants over three years of treatment.
Session 1

Tabitha Petri, Longwood Gardens
Ellen C. Oordt, Longwood Garden
Evan R. Horne, Longwood Gardens / University of Vermont
Joseph Thomas, Longwood Gardens
Lea R. Johnson, Longwood Gardens / University of Maryland

Restoration of native biodiversity often requires management of invasive species. Methods for controlling invasive plants vary in cost and effectiveness, making evaluation of management techniques that integrates labor and cost, effectiveness, and benefits to biodiversity important. The annual grass Microstegium vimineum invades forests of the U.S. with negative

impacts on native species richness, cover, and regeneration. Few studies have examined long-term effects of methods used to control this species on plant communities, and none have examined inputs of management effort over time.

We compared the efficacy of chemical, mechanical, and manual methods commonly used to control Microstegium and examined their effects over time on Microstegium cover, plant community composition, and effort required. Cutting, hand pulling, and pre-emergent and post-emergent herbicides were applied annually using a randomized block design in forest patches in southeast Pennsylvania.

After three years of treatment, early results indicate that different management strategies are successful by different metrics and that effectiveness varies over time. One treatment with pre-emergent herbicide decreased Microstegium cover and it has remained suppressed with successive treatments (p<0.001). Each pre-emergent treatment increased native diversity (p<0.01) and richness (p<0.01), though non-native diversity also increased (p<0.001). One treatment with post-emergent herbicide decreased Microstegium cover and repeated treatments led to a greater decrease each year (p<0.001). After one post-emergent treatment non-native diversity increased (p<0.01), and after two treatments native diversity (p<0.001) and richness (p<0.001) increased and sustained. Two cutting treatments decreased Microstegium cover and the third treatment has kept cover suppressed (<0.05). After one cutting treatment, non-native richness (p<0.01) and diversity (p<0.01) increased and remained steady. After two cutting treatments, native diversity (p<0.001) and richness (p<0.001) increased, though these values decreased following the third treatment. After two treatments by pulling, Microstegium cover decreased and remained steady following a third treatment (p<0.001). One pulling treatment also increased diversity of both native (p<0.001) and non-native (p<0.05) species and richness of native (p<0.001) species; these levels remained consistent. In untreated control plots, after three years the Microstegium cover decreased (p<0.001), but richness did not significantly change at any point for native or non-native species. However, after four years, non-native diversity increased in the untreated plots (p<0.01), potentially due to encroachment of woody non-native species. Chemical and mechanical methods were approximately four to eight times faster to implement than manual. As this long-term study progresses, we will continue to evaluate how effects change over time.
Invasive Species, Experimental Ecology, Integrated Pest Management

20. An exploration of traumatic resin duct (TRD) formation tree rings from three Himalayan conifer species
Session 2

Allison Stewart, Rider University
Dr. Daniel Druckenbrod, Rider University
Nicole Filipowicz, Rider University
Alexis Burns, Rider University

Dendrochronology can serve as a method to uncover past climate and ecological events by using tree rings as a climate proxy. Long-term tree-ring records are especially useful for areas sensitive to climate change particularly on the Tibetan Plateau where glaciers feed major rivers. Through ongoing collaboration with Columbia University, we have been re-analyzing tree cores collected previously by Paul Krusic throughout the Tibetan Plateau to study climate variability using a new method called blue intensity (BI). As part of this larger collaboration, our research explored an unusual feature frequently found in these tree rings, traumatic resin ducts (TRDs). Resin ducts do form normally; however, when formed in tangential rows they show signs of trauma related to a growth stressor for the tree, such as climate, insect outbreaks, or other events. The Himalayan hemlock (Tsuga dumosa) and Sikkim Spruce (Picea spinulosa) are native conifer trees to this region in which we noticed the prevalence of TRDs. This study is an initial exploration into the factors causing TRD production in three conifer species. We examine whether production is synchronized spatially by site or temporally through time with records of historical climate data. Results showed a prevalence of TRDs in the hemlock and spruce species compared to the Silver Fir (Abies spectabilus), notable visual differences in formation type of the TRDs between

species, and an overall spike in the number of TRDs seen in 1900-2000. Further research will determine whether the presence of TRDs affect BI values and whether any correlation exists between the peak years of TRD production and climate data.
Traumatic Resin Duct, Himalayas, Dendrochronology

21. Plant Native: Comparing biodiversity benefits, ecosystem services provisioning, and physiological performance of native and non-native plants in urban horticulture
Session 1

Elena Tartaglia, Rutgers University
Myla F.J. Aronson, Rutgers University

Non-native plants are frequently used in urban horticulture despite evidence that urban areas are regular points of introduction, often leading to invasions in urban and surrounding areas, negatively impacting biodiversity. Many horticulturalists assert that non-native plants are more successful at survival in stressful urban conditions and that they provide equal or greater habitat and ecosystem services than native plants. However, little research has directly compared biodiversity support, ecosystem services and physiological performance of native and non-native plants in urban systems. We present here a systematic literature review using the PRISMA methodology, to assess the following three questions: (1) Is there a difference between native and non-native plants in their ability to support faunal biodiversity in urban green spaces? (2) Is there a difference between native and non-native plants in their provisioning of urban ecosystem services? and (3) Do non-native species outperform natives in urban environments in terms of survival, growth, fitness or other physiological parameters? We extracted data from 165 total papers, divided into categories of biodiversity support, ecosystem service provisioning and physiological performance. Across all categories, 120 studies found that native plants outperform non-native plants on the response metric evaluated in the study, 57 demonstrated mixed impacts, 56 demonstrated no differences among plant origin, and 26 found non-native plants outperformed native plants. We found overwhelming evidence that native plants support higher faunal abundance and diversity than non-native plants in urban landscapes. Relatively few studies examined ecosystem services and plant physiological performance but we found that native plants support higher levels and diversity of ecosystem services and that many native plants can be used for horticulture â€“ that is, native plants are able to survive and thrive in urban conditions. Native plants provide multiple ecosystem functions in urban greenspaces, supporting urban biodiversity and provisioning ecosystem services and their use should be prioritized in urban horticulture.
Urban Greenspaces, Native Plants, Invasive Species

22. Effects of warming and precipitation on emergence and survival of red maple and green ash seedlings
Session 2

Therese Apuzzo, Rider University
Dr. Kerrie Sendall, Rider University

Most plant species are sensitive to rainfall regimes, particularly as rainfall interacts with temperature, and plant responses to climate will vary based on species-specific physiological constraints and the metric being examined (e.g., emergence, growth, or survival). Climate change may have more severe impacts on seedling establishment than on older plants, given that young seedlings have limited access to water reserves due to their shallow roots. We tested the effects of warming and precipitation on seed germination and seedling survival in a laboratory experiment. Our study tested two temperate, deciduous tree species native to the northeastern U.S. (green ash and red maple). We manipulated the day/night

temperature in the growth chambers at three levels: 28/18.5Â°C (ambient day/night), 30/20.5Â°C (+2Â°C), and 32/22.5Â°C (+4Â°C), all with a day/night light regime of 16/8h. Ambient temperature was based on average summertime temperatures in the region. Within each warming treatment, seeds were further split into wet, moderate, and dry watering treatments, which were achieved by watering seedlings every 3, 7, and 10 days, respectively. We measured seedling emergence, leaf out timing, growth, and survival over 90 days. At the 90-day mark, all watering was stopped to simulate a drought and seedlings were monitored for survival until mortality reached 100%. The warming and drought treatments had no impact on the proportion of seeds that germinated or the number of days after planting it took species to produce at least one fully-expanded leaf. However, leaf production was complete by 44 days after planting on average for green ash seedlings in the +4Â°C treatment, but leaves were produced until 53 days after planting for seedlings in ambient or +2Â°C conditions. Height growth of seedlings was not impacted by the warming treatment for either species, but green ash seedlings grown in wet soil conditions were 10.5 cm tall on average, compared to the 7.2 cm tall seedlings in dry and moderate soil. Survival of seedlings both within the 90-day experiment and subsequent drought conditions was impacted by both warming and soil water availability. In general, seedlings that germinated in warm, dry treatments experienced more rapid mortality compared to seedlings in ambient temperature and wetter soil conditions. These results suggest that while initial emergence of these species might not be affected by altered temperature or precipitation, growth and survival during warm, dry years may be of concern.
deciduous trees, seed germination, altered climate

23. Examining Patterns of Urban Weed Adaptation to Elevated Salt Levels
Session 1

Max Carroll, Johns Hopkins University
Dr. Meghan Avolio, Johns Hopkins University

Stressors from the urban environment cause adverse effects on city-dwelling organisms. Adaptation to tolerate certain stresses, such as the urban heat island and impervious surfaces, has been well-documented. Road salt is another widespread stressor with strong adverse effects on plants, but adaptations to it are not as well-studied. To investigate whether plants are adapting to elevated salt content, we collected the seeds of two widespread urban species, corn speedwell (Veronica arvensis) and red dead-nettle (Lamium purpureum), from five parks in Baltimore. Half the seeds were collected from the roadside, where they would be exposed to higher degrees of road salt, and the other half from the inner park, where they would not be exposed to as much salt. We then germinated the seeds, and planted seedlings in a common garden experiment with two treatments, clean water or salt water. All F1 plants were exposed to both treatments, and we hypothesized that F1 plants whose parents were roadside would perform better in the salt treatment compared with F1 plants whose parents were collected from parks. After 8 weeks of salt treatments, corn speedwell collected from the roadside were better able to tolerate salt than seeds collected from the park. By this point, 56% of inner park speedwell had died, but only 41% of roadside speedwell had died. Corn speedwell from the roadside were also generally healthier at this point in the experiment. However, after an additional 5 weeks of salt treatments, speedwell survival and health were similarly low between the two groups. This may be due to a fungal infestation that occurred in the final weeks of the study. Red dead-nettle did not display any differences in salt tolerance. Our findings show mixed evidence for roadside plants being better able to tolerate salt compared with park plants. Future experimentation is needed to further investigate the impacts of road salt on plants in urban environments, including work on F2 generations.
Urban Ecology, Adaptation, Salt Tolerance

24. Identifying transport hubs for invasive species jump dispersal using stakeholder derived spatiotemporal occurrences: Forecasting the spotted lanternfly (Lycorma delicatula) invasion
Session 2

Joseph Keller, Temple University
Matthew Helmus, Temple University

Invasive species spread through a combination of natural movement and human-mediated jump dispersal. Jump dispersal is the transport of propagules across large distances by human activities that results in outlying populations. Forecasting where transport is most likely to occur is crucial to control spread. Often, these events begin and end at invasive species transport hubs, which are properties, such as distribution centers and rail terminals, where the flow of goods and people transports propagules long distances. The spotted lanternfly (Lycorma delicatula) exemplifies this challenge in the United States. This grape pestâ€™s spread has been marked by repeated establishment of far-flung outlying populations. The pathways by which L. delicatula has spread remain difficult to discern, in part because sampling efforts may be biased. Here, we measure which potential transport hub properties across the U.S. were most associated with L. delicatula jump dispersal events. Using a database of >900,000 samples and >1,048,000 hubs we first used a spatial clustering algorithm to identify 118 jump dispersal sites. At each of these locations, we measured the distance between L. delicatula presence records and 18 types of potential transport hubs. We additionally measured the length of rail and primary roads within 100m. We compared these values against those measured at two types of points: regional background points, which were spaced evenly across the study region in the northeastern United States, and proactive search points, where government surveyors searched for L. delicatula at least 20 km away from any previous occurrence. For each of these datasets, we generated a distribution of average values by randomly subsampling and calculating the mean over 5000 iterations. For nearly every hub type, proactively surveyed points were closer to hubs on average than regional background points were, revealing unequal sampling effort across the region. Jump dispersal sites were significantly closer than the average proactive survey site for the following hub categories (ordered by effect size): â€œshipping and distributionâ€• , â€œtruck rentalsâ€• , â€œstadiumsâ€• , â€œflea marketsâ€• , â€œlandscaping businessesâ€• , â€œtruck stopsâ€• , â€œamusement parksâ€• , and â€œrailroad stationsâ€• . Jump dispersal points had significantly greater lengths of railroad within 100 m (mean = 77.5 m) than the average proactively surveyed site (95% CI: 14.2 â€“ 45.6 m), but the same was not true for primary roads. These findings can be used to generate risk maps. Further, they suggest potential mechanisms underlying spread, agreeing with previous work suggesting transport by rail may be important for this pest.
invasive species spread, human mediated dispersal, invasion pathway

25. Evaluating the BirdWeather PUC for research-grade bioacoustic monitoring and potential applications
Session 1

Hannah Slesinski, Temple University
Jocelyn Behm, Temple University

Passive bioacoustic monitoring has become a widely used tool in avian ecology, with autonomous recording units (ARUs) serving as the primary means of collecting vocalization data. A newer ARU model, the BirdWeather Portable Universe Codec (PUC), features automatic audio analysis through BirdNET, an artificial neural network (AI) designed for bird vocalization detection and classification, and uploads species detections to an online database. This study evaluates the PUC's suitability for scientific research and establishes protocols for generating research-grade data with PUC detections. We first assessed the device's detection and identification capabilities across varying distances and field conditions in southeastern Pennsylvania and southwestern New Jersey. Our findings show that the PUC's detection capability diminishes with distance as expected, but higher-frequency vocalizations were detectable at greater distances compared to lower-frequency calls. Additionally, the device's detection range degraded in the presence of competing background noise, such as wind and overlapping bird vocalizations. We also found that bird vocalizations played from behind the PUC had a shorter detection range than bird vocalizations played in front of the PUC, meaning the device does not have an equal detection radius from all directions, which could be a limitation compared to other ARU models and for some population estimates. Secondly, we conducted manual validation of BirdNET's identification accuracy on PUC-collected audio data for bird species in our study area. This validation process enabled us to establish confidence thresholds for detection data

that varied greatly by species. We found that BirdNET was more successful with some species compared to others: some species were always deemed correct by human validators (e.g., Northern Cardinal), some always incorrect (e.g., Eastern Wood-Pewee), and some a mix of correct and incorrect AI identifications (e.g., Fish Crow). In the near future, we plan to repeat our manual validation procedure for PUCs in different locations and time periods to see how confidence thresholds may change. As this research progresses, we hope our methods and protocols can be applied to the greater BirdWeather library of bird vocalizations, which has hundreds of millions of vocalization contributions from PUCs all around the world.
bioacoustics, birds, autonomous recording unit (ARU)

26. Understory Complexity, Soil Conditions, and Landscape Characteristics as Potential Drivers of Eastern Red-backed Salamander Presence in Varied Forest Habitats
Session 2

Maggie Sehnert, Stevenson University
Lauren Sober, Stevenson University (Co-presenter)

Eastern red-backed salamanders (Plethodon cinereus) are often utilized as an indicator species to determine forest health due to their sensitivity to environmental conditions, relative ease of sampling, and vital role in ecosystem functioning. Though their range spans much of the Northeast United States, including all of Maryland, the species is notably absent within most of the forested areas at Stevenson University and Irvine Nature Center, two neighboring properties in Owings Mills, Maryland. Just two of 16 sampled coverboard transects represented over 97% of captured salamanders. Three overarching forest characteristics were studied to further understand the drivers of eastern red-backed salamander presence: understory complexity (sapling abundance, species composition, and percent cover), soil conditions (pH, moisture, texture, and temperature), and surrounding landscape characteristics (elevation, distance to forest edge or urban development, and forest area). Though there was considerable variability in all tested characteristics across all transects, only sapling abundance and forest area had a positive correlation with salamander presence. These results can help target future research into our local salamander populations, and in turn, allow us to make more informed decisions about the health of our forest.
Forest ecology, Salamanders, forest structure

27. Vertebrate and invertebrate herbivory vary with vegetation type and experimental warming conditions in high-Arctic Svalbard
Session 1

Claire Bandet, University of Pennsylvania

The Arctic is a critical ecosystem for understanding the ecological impacts of climate change. This project investigated the influence of vegetation type and experimental vegetation warming on both vertebrate and invertebrate herbivory at the International Tundra Experiment (ITEX) sites in Endalen, high-arctic Svalbard. Following a standardized protocol to assess levels of invertebrate herbivory, a modified point framing methodology was applied at control and artificially warmed plots (n=30) across three different vegetation types (Cassiope heath, Dryas heath, and Bistorta snowbed). Compared to control plots, experimental warming significantly reduced invertebrate herbivory in Cassiope tetragona-dominated plots but significantly increased it in Bistorta vivipara-dominated plots. For Dryas octopetala-dominated plots, no significant difference between control and warmed plots was found. A survey of vertebrate feces along transects in each site (n=11) revealed twice as many feces in the south-facing Dryas heath than in Bistorta snowbed. There was no difference in herbivory at the two north-facing sites, except that ptarmigan feces were observed twice as often at the drier site compared to the wetter site. When compared to herbivore data from these same sites collected in 2014 and 2015, we

find invertebrate and vertebrate herbivory has increased at all sites. The results of this study contribute to the ecological insights afforded by the longitudinal data collected by ITEX collaborators across alpine and arctic environments, highlighting the reciprocal effects of warming-induced changes in vegetation on herbivory and, in turn, the effects of changes in herbivory rates on vegetation responses.
Arctic, Herbivory, Climate change

28. Maternal Investment Strategies in Mammals: A Phylogenetic Comparative Approach
Session 2

Jack Forgione, West Chester University of Pennsylvania
Jennifer L. Maresh, West Chester University of Pennsylvania

Maternal body size is widely recognized as a key determinant of maternal investment in placental mammals, influencing both absolute and relative energy allocation to offspring. However, ecological and biogeographical factors may be equally important in shaping reproductive strategies by imposing external pressures that select for specific investment patterns. For instance, trade-offs between current and future offspring may be influenced by movement patterns and geographic distribution. To assess the relative importance of these factors, we synthesized data from approximately 900 placental mammal species, incorporating multiple indicators of maternal investment, including: gestation length, litter size, birth mass, fetal and offspring growth rates, lactation duration, and weaning mass. Species were categorized into four movement typesâ€”territorial, central place foragers, nomadic, or migratoryâ€—based on home range size and residency behavior. Additionally, home range data were used to classify species by biome and biogeographic realm for further comparisons. Phylogenetic comparative methods were applied to control for shared evolutionary history and highlight absolute differences across species. Our analysis aims to disentangle the relative influences of four key environmental pressuresâ€—body size, movement patterns, phylogeny, and biogeographyâ€—on maternal investment strategies. While viviparity and endothermy impose inherent constraints on reproductive energetics, we expect that at least one of these factors will emerge as a primary driver of trait variation across species.
Investment, Biogeography, Phylogenetics

29. Cropping systems variations impact on organic and inorganic nitrogen losses.
Session 1

Mololuwa Abe, University of Delaware

Nitrogen is an important nutrient in agricultural systems, necessary for crop growth and productivity. However, the management of nitrogen in agroecosystems presents noticeable challenges due to its susceptibility to loss through leaching, volatilization, and denitrification. There have been many measurements of nitrate leaching losses from agroecosystems, but few of dissolved organic nitrogen (DON) losses. DON losses were generally considered to be insignificant and have been overlooked. In this study, we aim to characterize the losses of dissolved inorganic and organic nitrogen across a gradient of ecological intensification. This study investigates the effects of winter cover crops and tillage regimes on soil nitrogen dynamics in a corn–soybean rotation and intermediate wheatgrass (Thinopyrum intermedium, a perennial grain) system. The research was conducted at the University of Delaware Newark Farm, the experiment followed a randomized block design with three treatments: conventional corn–soybean rotation with tillage and winter fallow, no-till corn–soybean rotation with cereal rye cover crop and intermediate wheatgrass with tillage. Prenart suction lysimeters were installed to a depth of 80 cm at 60° angle from the soil surface to monitor soil water leachate, with samples collected weekly. Also, nitrogen mineralization and nitrification rates were assessed using the buried bag method, comparing initial and six-week incubated soil cores across all treatments. Leachates were analyzed for nitrate (NO3?), Ammonium-N (NO3–N), and total bound nitrogen (TNb). Preliminary findings indicate that soil leachate NO3? and

NO3–N concentrations were higher in conventional corn–soybean rotation with tillage treatment compared to intermediate wheatgrass treatment. Ongoing research seeks to quantify the impact of perennial cropping and cover crops on nitrogen retention and cycling, with implications for nitrogen management in agroecosystems.
Nitrogen losses, Agroecology, cover crops

30. Impact of Grazing and Fire treatments on Sagebrush and Associated Gall-Inducing Insects
Session 2

Jianna Smith, Virginia State University
Matthew Whalen, Virginia State University
Hailey Wilmer, U.S. Department of Agriculture
Nicole Strong, U.S. Department of Agriculture
Sarah Melissa Witiak, Virginia State University

Fire and grazing are common selective pressures in terrestrial ecosystems. Following fire or grazing events, plants often rapidly regrow. Herbivorous insects, including gall-formers, tend to favor new vegetation, enabling higher colonization rates, increasing feeding sites by larvae, and improving survival. This idea of herbivores favoring rapidly growing plants is called the plant vigor hypothesis.
In western North America, insect galls induced by the genus Rhopalomyia are found on Artemisia spp. (sagebrush) leaves, stems, and buds. Sagebrush provides habitat for a variety of insect and bird species, such as sage grouse. However, sagebrush populations in the western U.S. are declining due to threats from increasing fire severity/frequency and spread of invasive grass species. As a result, Rhopalomyia midges, along with many other insect and vertebrate species that rely on sagebrush, may also be negatively affected.
We surveyed long-term fire and grazing plots at the U.S. Sheep Experiment Station in southeastern Idaho to examine the impact of these treatments on sagebrush and insect gall populations. Per the plant vigor hypothesis, we expected more gallers in grazed pastures than in pastures not exposed to grazing; we also anticipated a higher plant volume in burned pastures and a lower in pastures not exposed to fire
From early June to mid-August of 2023 and early to mid-May of 2024, we measured gall diversity and the vegetation characteristics of sagebrush within six pastures, each subjected to different selective pressures. Pastures were subjected to either fire, grazing, a combination of fire and grazing, or no treatment.
We measured sagebrush plant size and distribution within three transects in each pasture to calculate the average plant volume across pastures. In parallel, we counted the gall species found on each plant to assess gall diversity. After collecting the data, we performed an analysis using R studio and Excel. Our results suggest that pastures exposed to fire have a higher average plant volume than those not exposed to fire. We also observed a significantly lower number of galls in unburned pasturesâ€”noting a substantially higher number of galls in ungrazed, burned pastures compared to ungrazed, unburned pastures, where little to no galls were found.
Fire and Grazing ecology, Plant-gall Interactions, Sagebrush Convservation

31. Antibiotic resistant gene presence within stream sediment in two mid-order Appalachian streams
Session 1

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Dr. James Wood, West Liberty University
Dr. Nicole Garrison, West Liberty University
Dr. Stuart Cantley, West Liberty University

Anthropogenic pollution of freshwater systems has become a major concern as the effects of climate change are becoming more severe. One of the growing concerns is the presence of antibiotic-resistant genes (ARG). To better understand the presence of ARG in local freshwater systems and the effect of anthropogenic climate change on ARG, we studied sediment samples from one forested, one agricultural, and one urban sites in two mid-order (5-6th) streams, Wheeling and Little Wheeling Creek. The forested site and urban site was located on Wheeling Creek and the agricultural site was located on Little Wheeling Creek. Nine sediment samples from each site were taken and the genomic DNA was processed using the DNeasy PowerSoil pro kit. The six highest yield samples of each stream were pooled together for Nanopore sequencing. DNA quality was quantified using a Qubit fluorometer and gel electrophoresis. Sequenced data was then analyzed for ARG using the Antimicrobial Resistance Mapping Application pipeline in EPI2ME from Oxford Nanopore Technologies. We hypothesize that ARG would be more present in urban and agricultural stream sediment as compared to forested stream sediment. The presence of ARG in stream sediment is has major effects on human development. Antibiotic resistant bacteria pose a serious threat to public health as around three million deaths occur each year from antibiotic resistant bacteria. Stream sediment acts as a refugee for biofilms where bacteria can exchange ARG and leads to further antibiotic resistance.
Stream Ecology, Antibiotic-resistant genes, Genetics

32. Termite Mound Water Management
Session 2

Meron Dibia, Rutgers University
Hunter King, PhD

Macroterminitae, a subfamily of termites, live in arid regions with limited water resources. They also cultivate fungi species as a food source and desiccate easily at low relative humidities. Therefore, the procurement and conservation of water is very important for their survival. There is no clear understanding of the mechanisms by which they collect and conserve water. The objective of this research is to identify if the water and thermal dynamics in vapor and liquid form between the mound and its immediate environment. Our premise is that the abiotic structure(mound) not only regulates their climate needs but also facilitates vapor capture and conservation of water for the colony. In order to observe this, sensors positioned within and around a termite mound were used to collect temperature, relative humidityÂ and soil moisture data. The preliminary results show correlation between daily fluctuations in external conditions and the corresponding thermal and moisture profiles within different sections of the termite mound.
Termite Mound, Water, Conservation

33. Impact of Environmental and Sociodemographic Factors on the Spatial Spread of Lyme Disease in the United States
Session 1

Leah Williams, University of Kansas
Folashade Agusto, University of Kansas

As the United States undergoes many geographic and climatic changes, Lyme Disease, a tick-borne pathogen, has spread throughout the US. This study aimed to look at different environmental and sociodemographic factors in a spatial regression framework to indicate patterns in Lyme Disease incidence. The data in this study came from Johns Hopkins Bloomberg School of Public Health and ranged from 2001 to 2022. In order to perform the spatial regression, a temporal regression was performed on the values that spanned multiple years using response feature analysis. It was found that temperature, forest land cover, histolsol majority soil, and change in housing had a positive impact on Lyme Disease spread across the country. Micropolitan classification, noncore classification, vertisol majority soil, median household

income, percent of high school graduates, and forest edge density all had a negative impact on the spread of Lyme Disease across the country.
Lyme Disease, Spatial Regression, Sociodemographic factors

34. Meta-analytical synthesis of the impacts of garlic mustard on the diversity and productivity of understory plants, invertebrates, and fungi in North American forests
Session 2

Aidan Brown, Kutztown University
Christopher Habeck, Kutztown University

Garlic mustard (Alliaria petiolata) is a biennial flowering plant that is native to Europe, Asia, and parts of Africa. This plant grows well in the understories of North American forests where it is considered invasive. Considerable effort has been extended to describe the consequences of garlic mustard densities on plants and other species that are native to North American forests. However, a quantitative synthesis of this work has not been done. We conducted a meta-analysis of published studies describing the impacts of garlic mustard on plant species richness, diversity, and evenness; invertebrate abundance, and mycorrhizal fungal richness in North American forests. We included all studies in the meta-analysis that 1) provided site-specific information on the location and duration of the study and 2) reported statistics (mean, variance, and replication) necessary to compute standardized mean differences between control and garlic mustard removal plots or along a garlic mustard density gradient. We report effects of garlic mustard on our response variables using Hedgesâ€™ g effect size parameter. We found only nine studies that reported one or all of the ecological parameters described above, plus all of the site-specific information. Average effect sizes computed from this synthesis indicate no negative impacts of garlic mustard on any of the response variables we explored (plant richness = 0.02; 95% CI = -0.13, 0.18, plant diversity = 0.10; 95% CI = -0.26, 0.62, plant evenness = 0.12; 95% CI = -0.28, 0.46, invertebrate abundance = -0.10; 95% CI = -0.26, 0.67 fungi richness = 0.07; 95% CI = -0.15, 0.30) in North American forests. Similarly, none of the effect sizes showed any linear relationship to percent garlic mustard in the control plots versus removal plots. This synthesis suggests that current published accounts do not support the general idea that garlic mustard is an invasive species in North American forests, at least for the understory forest variables analyzed here. Our experiment is limited by the number of peer-reviewed papers that report the necessary data for a quantitative synthesis. We are continuing to request data from authors and find additional sources to verify our current results. Until then, we suggest researchers collaborate to standardize the further exploration of garlic mustard impacts on native species throughout its â€œinvasiveâ€• range.
Garlic mustard, Invasive species, Meta-analysis

35. Darwin's Naturalization Conundrum revisited: The limited role of phylogenetic and trait distances as predictors of non-native plant success
Session 1

Sienna Dunham, Union College

Darwinâ€™s Naturalization Conundrum is a long-standing debate over whether a non-native species is more likely to successfully invade a community if it is closely or distantly related to the native residents. On the one hand, closely-related species may succeed because they share traits with native species that enable them to survive local environmental conditions (Preadaptation Hypothesis). On the other hand, distantly-related species may succeed because there are open niches and an absence of direct competition (Darwinâ€™s Naturalization Hypothesis). Previous research has found evidence for both hypotheses, based on surveys of native and non-native species at a single point in time. However, these

â€œsnapshotsâ€• do not reveal dynamics during an invasion, as a species spreads. We tested each hypothesis using repeated surveys of plant speciesâ€™ abundance in 1,370 forested plots in eastern North America to test whether changes in non-native abundance was related to their phylogenetic and/or trait distances to the resident community. Plots were surveyed at least twice, with a mean of five years in between observations. We calculated the change in absolute and relative abundance of each non-native species in each plot over time, and tested their relationships to the phylogenetic and trait distances to the rest of the plant community using mixed-model regression. The Preadaptation Hypothesis would predict positive relationships, while Darwinâ€™s Naturalization Hypothesis would predict negative relationships. We compared both minimum and abundance-weighted mean phylogenetic distances, and tested such functional traits as leaf nitrogen and specific leaf area. There was a significant, negative relationship between phylogenetic distance and abundance and a positive relationship between trait distances and abundance. However, these relationships were extremely weakly correlated, with RÂ² values below 1%. The weakness of our models suggest that both phylogenetic relatedness and trait differences are poor predictors of whether a speciesâ€™ abundance changes over time. While it still remains to be seen whether these measures of relatedness have a greater biological significance for the initial invasion, it appears that for non-native species that are already established, other factors seem to be more important.
ecology, invasive species, naturalization

36. Sex Specific Feeding Choices of Adult Lycorma delicatula
Session 2

Sophia Knightly, Temple University
Christopher LeClair , Temple University
Clayton R Traylor, Temple University
Mariana Bonfim, Temple University
Joshua Caplan, Temple University
Matthew A. Banks, Temple University
Mark T. Swartz, Pennsylvania Department of Military and Veterans Affairs
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The spotted lanternfly (SLF, Lycorma delicatula) is a fulgorid native to eastern China that was introduced into the United States in 2014. Since its introduction into Berks County, Pennsylvania, this insect has become highly invasive with active infestations across the east coast. While SLF feed primarily on an invasive tree, the tree of heaven (Ailanthus altissima), they also exhibit a high degree of polyphagy, expanding their threat to a wide suite of plant species. Despite an abundance of research on the potential hosts of SLF and their effects upon agricultural systems, there is little that explores the potential for intraspecific feeding choices and their effects upon forested systems. This study aims to understand whether there are differences between male and female SLF feeding choices across a season and if SLF density plays a role in those choices. We anticipate a strong overall choice for A. rubrum and V. riparia, with females showing a greater choice for A. rubrum than males, especially at higher densities. To investigate this question, adult SLF were released into 12 semi-natural mesocosms containing a variety of tree and understory species at two different SLF densities. High density treatments were maintained at 48 SLF while low density treatments were maintained at 12 SLF. From August through October of 2024, we conducted twice-weekly counts of adult SLF host choice within the mesocosms. We found that a strong preference was exhibited for both A. rubrum, and V. riparia over all other plants. They also exhibited a seasonal shift toward A. rubrum and away from V. riparia beginning in October. Adult SLF exhibited similar feeding choices by sex until late August, where feeding choices diverged. At this point, females showed a greater choice for A. rubrum than males, especially at low densities. This divergence is temporally correlated with SLF mating and could indicate sex-specific nutritional needs while females are gravid. However, of the females present in the mesocosm, over half still chose to feed on V. riparia at low densities until the host switch to A. rubrum exhibited by both sexes in October. This indicates

that feeding density is also a factor in host choice with greater proportions of females choosing to feed on A. rubrum while gravid at high densities. The identification of these feeding patterns may offer an opportunity to develop management strategies that specifically target gravid females, which could reduce the reproductive success of this invasive species.
Invasion ecology, Insect behavior, Feeding behavior

37. Green burial promotes important pollinator habitat: Arthropod Biodiversity in Green vs. Traditional Burial Sites
Session 1

Lilah Shtino, Temple University
Hannah Joseph, Temple University
Matthew Helmus, Temple University

Green burial site practices aim to minimize environmental impact by using biodegradable materials and promoting native plant growth. West Laurel Hillâ€™s Nature Sanctuary in Philadelphia, PA is the first cemetery to earn SITES Gold certification. The vegetation planted at the green burial site located at the cemetery is designed to grow through multiple stages of ecological succession ultimately reaching a mature forest. Here, we report on the arthropod biodiversity and abundance of this site during the first phase of the plant installation that included a native meadow of wildflowers, grasses and a few shrubs and saplings. We sampled multiple plots within this site for arthropod diversity using sweep nets. As a comparison, we also sampled a traditional burial site that was adjacent to the green site. Arthropod samples were identified to order and then morphospecies. Our results show that, in the green burial site, order richness and total arthropod abundance were 56.9% and 108.4% higher, respectively, compared to the traditional site. Although Hemiptera was the most abundant order at both sites, it accounted for 83% of individuals at the traditional site and only 53% at the green site. Smaller proportions of Hymenoptera, Diptera, and Araneae were found at both sites, while Psocoptera, Sarcoptiformes, Lepidoptera, and Orthoptera were only present at the green burial site. The higher diversity in green plots likely provides a broader range of ecosystem services, including pollination. Our findings suggest that the use of native plants and ecological burial practices in green burials create a more suitable habitat for arthropod populations.
Arthropod biodiversity, Green burial, Native plants

38. Gene Expression and Dispersal: Investigating the for Gene in the Enchenopa binotata Species Complex
Session 2

Michael Merola, Stevenson University
Andrea Hawkins, Stevenson University
Dr. Frank Stearns, Stevenson University

The Enchenopa binotata species complex of treehoppers are small hemipteran insects found on over 13 woody host plants, including redbud. They have limited dispersal, which is believed to have played a role in reproductive isolation and speciation. This study examines the expression of the foraging (for) gene, which is known to influence movement and feeding behaviors in a wide taxonomic range of insects. We used RNA extraction to initiate qPCR methods and measure gene expression levels in treehoppers as compared to levels in Drosophila melanogaster. Gene expression analysis provides insight into potential genetic pathways that regulate dispersal strategies in insects. While results are still being explored, this research contributes to a broader understanding of how genetic variation shapes ecological interactions. Future studies may further investigate the evolutionary and ecological significance of the for gene across different members of the Enchenopa genus.
Dispersal, Enchenopa, Foraging

39. Evaluating Applied Nucleation for Urban Reforestation in Harford County, Maryland
Session 1

Chloe Romm, Towson University
Dr. Vanessa Beauchamp, Towson University

Best management practices for urban reforestation typically involve planting trees in widely spaced rows, however tree mortality rates can be high. When planted in spaced rows trees are subjected to heat stress, competition from invasive plants in the understory, and accidental mowing during maintenance. Applied nucleation is a reforestation strategy implemented in tropical climates which involves planting trees in tightly spaced clumps to increase the rate of tree growth, encourage shading out of invasive understory species, and increase seed deposition and tree recruitment. Applied nucleation can also decrease maintenance costs with mowing the understory. The purpose of this project is to compare the success of traditional spaced forest plantings to nucleation plantings in an urban forest environment. We worked with the Division of Environment & Sustainability in Harford County, Maryland to compare four different planting treatments: traditionally spaced trees with individual deer protection, traditionally spaced trees fenced as a group, clumped trees fenced as a group, and clumped trees fenced as a group with an outer ring of Robina pseudoacacia as additional deer protection. The tree growth and survival, canopy cover, herbaceous vegetation cover and richness, tree seedling germination and establishment will be measured to assess the success of each planting treatment. We predict that trees will have increased growth rate, lower understory cover, and higher natural tree seedling recruitment in clumped and clumped defended treatments compared to the traditionally spaced treatments. Preliminary data thus far indicates clumped planting can result in lower understory cover. We also found that plantings in turf had higher understory cover overall compared to plantings in former agricultural fields, possibly because of a larger seed bank at turf sites.
Spacing, Trees, Best management

40. Growth and survival of red oak seedlings from several northeast provenances in a New Jersey common garden experiment
Session 2

Nicole Filipowicz, Rider University
Dr. Kerrie Sendall, Rider University

As global temperatures continue to rise as a result of climate change, many tree species will find that growth temperatures in their native locales are no longer compatible with their survival. How successful a species will be in future climate conditions depends in part on the provenance of the individual organisms, or what specific climate they are accustomed to. These differences have implications for assisted migration, one promising solution to help species adapt to our warming world. The prevailing hypothesis in assisted migration research is that southern populations from more xeric and warmer environments will be better adapted to the expected future warmer and drier conditions in northern latitudes. In this experiment, we analyzed the effect of ecodistance (i.e., the number of degrees latitude a provenance was moved) on tree growth and survival at a common garden experiment at Rider University in Lawrenceville, NJ (40Â°28â€™N). Red oak seedlings with ecodistances of 2.3Â° (sourced from Virginia), 0.0Â° (sourced from Pennsylvania), and -2.8Â° (sourced from New York) were planted in the common garden in both open and understory canopy conditions in spring 2023 and 2024. Throughout the 2024 growing season, we collected phenological, physiological, and growth measurements of seedlings. We observed that the seedlings moved northward (2.3Â° ecodistance) had the highest rates of survival, growth, and photosynthesis of all three groups (p<0.05). For example, in the open canopy plots, 2.3Â° seedlings grew 9.3 cm on average, while the 0.0Â° and -2.8Â° seedlings grew an average of 3.1 and 1.4 cm, respectively.

These data indicate that it was beneficial for red oak individuals to be moved from more southern regions with warmer temperatures, indicating that there may already be existing climate mismatches for long-lived forest species.
Deciduous trees, Common garden experiment, Assisted migration

41. Characterization of Sarracenia purpurea purpurea Communities in the New Jersey Pine Barrens
Session 1

Paul Santasiero, Monmouth University
Sage M. Phelps, Monmouth University
Kevin P. Dillon, Monmouth University
Pedram P. Daneshgar, Monmouth University

The northern purple pitcher plant (Sarracenia purpurea purpurea) is a carnivorous plant species found in the New Jersey Pine Barrens. To survive and reproduce in soil that is nutrient poor and acidic, the purple pitcher plant employs carnivory to capture insects, thus supplementing its nutrient supply. The insects are captured in specific water-filled phytotelma: large cone shaped leaves, or â€œpitchersâ€• . Insects attracted to the pitcher plant for its water source, fragrance, rewards, or its associated biotic community could eventually fall in, drown, and then become a source of nutrients for the plants. Purple pitcher plants are classified as inactive carnivores as they do not directly digest the insects but instead rely on a diverse community of microbes to break down the insects. This project aims to better understand the microbial community composition and dynamics of pitchers across the Pine Barrens. Seasonality, local environment, plant health, and external sources were examined as predictors of community composition. In June and July 2024, seven field sites throughout the NJ Pine Barrens were established for periodic monitoring and sampling. In June/July and October 2024, pitchers and pitcher fluid were sampled to characterize the microbial populations through cultivation-dependent and cultivation independent characterization. Bacteria including Chromobacterium vaccinii, Rahnella aquatilis, and others were cultivated and isolated from pitchers plants. Marker-gene surveys characterizing the bacterial (16S rRNA gene) and fungal (ITS region) communities were conducted as well. This preliminary work will shed light on factors affecting community assembly, succession and dynamics.
Carnivorous Plants, Microbial Ecology, Pine Barrens

42. Biochar in Wetland Restoration: Soil Biogeochemistry and Plant Recruitment Impacts
Session 2

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Elizabeth Watson, Stony Brook University
Rupert Ikeh, Stony Brook University
Monique Fountain, Elkhorn Slough National Estuarine Research Reserve

Climate change has been identified as a major threat to coastal wetlands, which serve as buffer zones between salt and freshwater systems, long-term carbon sinks, and hubs for biodiversity. Accelerated sea level rise is causing coastal wetland fragmentation and drowning; one mechanism for extending their lifespan is sediment placement of dredged sediment. One proposed restoration strategy for increasing wetland elevation is thin layer sediment placement. Biochar has been proposed as a soil amendment to sediment addition projects to promote plant recruitment, address soil chemistry, and increase carbon sequestration.

Biochar is a carbon rich material produced as a waste product from the agricultural and forestry industries, and is being promoted as a method of mitigating greenhouse gas emissions. Within agricultural settings, biochar has been shown to improve the fertility of soil and crop-yields as well as increasing carbon sequestration. This study examines the impact of

biochar application on plant recruitment and cover, as well as its influence on soil chemistry parameters including: pH, redox potential, bulk density, water content, salinity, and greenhouse gas emission â€“ in coastal wetland restoration initiatives involving sediment placement. Two field experiments were devised to observe thin layer sediment placement involving biocharâ€™s effects on plant recruitment, sequestered carbon, and altered soil conditions. In the first experiment, 13 m^2 field plots were constructed within a large-scale (50 ha) sediment addition project, where the effect of 10% (volume/volume) eucalyptus biochar soil amendments on plant growth and soil conditions were examined for two different sediment types and admixtures. In the second experiment, smaller 0.7 m^2 replicated plots at three tidal marshes were constructed to differentiate between two biochar types and observe commonalities in biochar incorporation in thin layer placement activities in salt marsh conditioning and function. While biochar did not significantly affect plant cover between plots, within the large field plots, biochar did have an effect on the biogeochemistry of the soil, specifically there was a significant (pâ‰¤0.001) increase of loss on ignition (LOI) and water content compared to non-biochar amended soils. Biochar, as a byproduct of agricultural and forestry industries, presents a sustainable option for carbon sequestration in wetland environments although it does not seem to significantly enhance plant regrowth in a restoration context. Understanding its impact on soil health and vegetation recovery can inform future coastal resilience strategies.
Restoration, Biochar, Wetland

43. Invasive spotted lanternfly planthopper (Lycorma delicatula) honeydew and its effects on U.S. forest ant assemblages
Session 1

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Lee Zimmerman, Temple University
James R. Hepler, Agricultural Research Service, United States Department of Agriculture
Tracy C. Leskey, Agricultural Research Service, United States Department of Agriculture
Matthew R. Helmus, Temple University

The Lycorma delicatula (Hemiptera, spotted lanternfly) is an invasive, Asian planthopper that has been spreading across the eastern US since 2014. When it feeds, it produces honeydew, a liquid excretion of excess sugar. Generally, Hemipteran honeydew is a food source often used by ants (Formicidae) that influences ant community composition and colony success. However, it is unknown how L. delicatula honeydew is influencing resident US ant species. To investigate this, we established 12 forested study plots, each 7 by 7 meters, within a 45 km2 extent of the L. delicatula invaded range in northern parts of Virginia and West Virginia. Plots were separated by a minimum of 0.9 km. Ants were collected at each plot biweekly (seven times during the 2022 growing season) using timed sweep netting, a pitfall trap, and a blue-vane trap. Spotted lanternfly abundance was also recorded, with four plots having little to no lanternflies (0â€“10 individuals), four with moderate abundance (10â€“100s), and four with high abundance (100â€“1000s). All ants were identified to genus to assess whether variation in lanternfly abundance influenced ant community composition. Plots that differed in lanternfly abundance also differed in ant community composition. Our initial results indicated that as lanternfly abundance increased across sites, total ant abundance rose and changed with Camponotus spp. becoming more common and Nylanderia spp. less common. This turnover in composition may affect ant community function in US forests because Camponotus are typically much larger-bodied than Nylanderia species. Because ants are keystone taxon with extensive ecological interactions and influence, these findings suggest that spotted lanternfly honeydew deposits may be reshaping local ant communities with possible cascading ecosystem effects.
Formicidae, Spotted lanternfly, Community composition

44. Exploring the Complex Relationship Between Race, Gender, and Perspectives on Existing Terminology in Myrmecology
Session 2

Ethan Scolastico, West Chester University
Dr. Manuela Ramalho, West Chester University

This study examines problematic terminology in Myrmecology and its impact on scientific communication and inclusivity. Terms like "queen," "soldier," "worker," and "slave-making ants" have been criticized for their anthropomorphic and colonial connotations, potentially misrepresenting ant behavior and reinforcing outdated frameworks. These terms impose human social structures onto insect societies, leading to misconceptions and reflecting historical biases in scientific discourse. Using a global survey, this research explores Myrmecologists' perceptions of these terms and potential alternatives that align with contemporary science. The survey gathered responses from researchers across disciplines and cultural backgrounds, revealing diverse perspectives. Findings indicate that "slave-making ant" received an average discomfort rating of 1.98/5, with 39.4% supporting its replacement. "Caste" was rated 1.51/5, with 21.2% advocating for change. While some respondents consider these terms scientifically functional, others emphasize their ethical and historical implications, arguing that revising terminology could improve public understanding and foster inclusivity. Perspectives on terminology shift based on cultural and academic exposure, with those aware of colonial legacies in science more inclined toward change. Respondents from historically underrepresented groups were more likely to support revisions, recognizing that language shapes perception and access to scientific knowledge. While these terms provide classification consistency, they can also obscure the complexity of ant behavior, limiting a nuanced understanding of insect social structures. Survey participants proposed alternative terms to better align with modern scientific perspectives. Suggestions included replacing "slave-making ant" with "raiders", "caste" with "morphotype" or "functional group", and "queen" with "reproductive" to remove hierarchical implications. Respondents also recommended shifting from "soldier" to "defender" and replacing "worker" with "forager" or "task specialist" to better reflect behavioral roles. More neutral and descriptive terms, such as "invader species" instead of regionally named invasive species, were also suggested. This study highlights the significance of inclusive and precise scientific language. The findings contribute to discussions on language reform in Myrmecology, advocating for intentional and contemporary terminology to enhance accuracy and inclusivity. Addressing problematic terms is a step toward a more equitable and accessible scientific community. By critically assessing taxonomic and behavioral descriptions, scientists can work toward a field that is both rigorous and socially responsible, ensuring that language better reflects the complexities of ant behavior and ecology.
Inclusivity, Ethics, Association

45. Tree community structure and patterns of bird activity within a permanent forest plot in the Ramapo Mountains
Session 1

Zofia Myszko, Ramapo College of New Jersey
Eric Wiener, Ramapo College of New Jersey

The purpose of this study was to determine if the abundance and spatial distribution of different tree species impacts foraging activity of four common bird species within a permanent forest survey plot in the Ramapo Mountains, New Jersey Highlands. Twenty-six point count surveys of morning bird activity were conducted across 15 plots (0.2 hectares per plot) during the fall of 2024. Correlations were identified among the four most common bird species and variables that characterize the abundance of tree species commonly found in the midstory and overstory layers of the forest. Activity in different plots was statistically positively correlated ($p < 0.05$) between red-bellied woodpeckers (Melanerpes carolinus) and white-breasted nuthatches (Sitta carolinensis), between white-breasted nuthatches and tufted titmice (Baeolophus bicolor), and between white-breasted nuthatches and blue jays (Cyanocitta cristata). Meanwhile, preliminary analyses suggest that the activity of red-bellied woodpeckers, white-breasted nuthatches and tufted titmice was positively correlated with the abundance of midstory trees. In contrast, none of the tree data are predictive of where blue jays tend to be most active within the survey area. Overall, patterns in the data suggest that surveys of bird activity within permanent

forest plots such as in this study could be useful for understanding relationships between forest structure and spatial gradients in bird activity. Additional analyses will focus on predicting how forest birds may be impacted by changes in forest tree communities that are currently occurring due to invasive insects, diseases and a changing climate.
avian ecology, habitat preferences, point count survey

46. Biodiversity Illuminated: A Two-Year Urban Moth Portfolio
Session 2

Robert Harris, Widener University
Bruce W. Grant, Widener University

Biodiversity is a fundamental component of ecosystem function and is increasingly impacted by urbanization -- mostly due to habitat destruction and fragmentation, biological invasion, and native species loss. Nocturnal Lepidoptera (most of the moths) play critical roles in urban ecosystems as pollinators, herbivores, and prey, and are sensitive indicators of environmental change, especially in rapidly urbanizing landscapes. Understanding moth community structure and dynamics is essential for informing urban design, urban native biological conservation, and land-use decisions impacting urban sustainability. This study investigated nocturnal moth biodiversity in suburban Delaware County, PA, over two consecutive summers (2023 and 2024), utilizing UV LED light traps. Moths were attracted to a cloth sheet, photographed (some specimens captured), and identified to family and, when possible, species levels, employing iNaturalist and other online taxonomic resources. Data were organized into Google Slides, documenting moth abundance and family frequency. In 2023, 44 sampling nights yielded 1,699 individual moths from 35 families, while 52 sampling nights in 2024 produced 1,651 individuals from 28 families. Both years revealed Crambidae, or grass moths, as the dominant family, representing 22% and 30% of all observations, with Microcrambus elegans (Elegant Grass-veneer Moth) being the most common species. This high abundance of Crambidae likely reflects the prevalence of managed lawns, which serve as a significant habitat for these grass-feeding moths in the suburban landscape. Other prevalent families included Erebidae, Tortricidae, and Geometridae. Each year, numerous unique morphotypes, exceeding 300 in 2024 and 400 in 2023, were recorded, suggesting a rich diversity beyond initial identifications. This ongoing research highlights the diverse moth community persisting in an urbanized environment and establishes a baseline for monitoring potential shifts in moth biodiversity over time. Future work will focus on detailed species identification, analyzing temporal trends within families, and exploring the functional roles of these moths in urban ecosystems. All specimens collected will be deposited and accessioned at the Academy of Natural Sciences of Philadelphia (ANSP) for future study.
Lepidoptera, insect biodiversity, urban ecology

47. Assessing the Effects of Historical Land Use and Environmental Variables on Rare Plant Distribution at Antietam National Battlefield
Session 1

Jonathan Obermaier, Towson University
Vanessa Beauchamp, Towson University

Local scale patterns of plant distribution are affected by a combination of abiotic, biotic, and historical factors. Identifying key environmental factors aids in protecting rare and endangered plant species by informing land stewards about effective management strategies for plant habitats. Antietam National Battlefield contains several state-rare or uncommon species due to its location on Cambrian Limestone deposits in the Ridge and Valley Province of Maryland. Antietam National Battlefield is entering an era of implementing new management strategies to best protect its natural resources, especially some of the parkâ€™s rarest plant species. Therefore, rare, threatened, and endangered species found in restricted areas of the park need to be reassessed to determine the best approach to protect and preserve these species in a changing

environment. The purpose of this project is to investigate how land-use history and other environmental factorsâ€”such as underlying geology, slope, aspect, overstory forest type, and proximity to disturbances like trailsâ€”influence the distribution of Symphyotrichum shortii, Ruellia strepens, Cubelium concolor, Carex sparganioides, and Delphinium tricorne, all of which are all state-rare or uncommon but locally abundant at Antietam. Utilizing geographical information systems, we analyzed aerial photographs and historical maps acquired from the National Archives dating back to 1936 to cross-reference data collected from a recent rare plant survey of five wooded lots of various ages at Antietam. Preliminary data suggests that land that has been consistently forested since at least 1936 better supports populations of these five target species versus land that has historically been utilized for agricultural purposes. As we continue examining the relationship between biodiversity and historical land-use, we will also account for the broader environmental context, including the biotic and abiotic factors that shape the distribution of these five state-rare or uncommon species at Antietam National Battlefield.
Plant distribution, biodiversity, rare plants

48. Does Forest Management have Unintended Consequences for Habitat Restoration?
Session 2

Andrew Mitchell, Union College
Jeffrey Corbin

Habitat management often includes the use of large equipment such as trucks, mowers, and brush hogs to clear vegetation, create fire breaks, or control unwanted species. Such activities are intended to benefit the ecosystem, but the vehicles may be so heavy that they can compact the soil. Such soil compaction can have negative consequences that counterbalance the positive effects of the management. Therefore, we need to know if the machines are compacting the soil, and if so, to what degree the compaction is occuring. We tested whether soil compaction occurs at the Albany (NY) Pine Bush Preserve. Managers at this inland pine barren use brush hogs to clear woody vegetation in preparation for prescribed fire. We hypothesized that the vehicles compact the soil, resulting in denser soil in treated sites compared to untreated sites. We also hypothesized that compaction would intensify with the number of times that treatment occurred and decrease as time passed from its most recent treatment. We sampled soil at 36 sites throughout the Albany Pine bush that had experienced a range of brush clearing treatments. Each soil core was sampled in 5 cm increments to a depth of 20 cm. We compared the bulk density of soil cores that had and had not been treated with brush hogs using a t-test. We also used linear regression to test how bulk density changed as the time since treatment varied as well as how bulk density changed as the number of times a site had been treated increased. We found no signs of soil compaction stemming from management activities. Bulk density in treated sites was not significantly different from sites that had never been treated. We also did not find a significant effect of treatment frequency, nor the time since last treatment, on bulk density. Given that bulk density remained mostly consistent across all brush hog treatments, we conclude that the Albany Pine Bushâ€™s management practices do not cause soil compaction. This is a favorable result, as the use of such heavy equipment can be used for its intended purposes, without concern for secondary, negative effects.
Habitat Conservation, Soil Compaction, Bulk Density

49. Impact of Climate Change on the Phenology of Native and Invasive Plants
Session 1

Adam Abdur-Rahman, Stevenson University
Samuel G. Obae, Stevenson University

The effect of abiotic factors (temperature and precipitation) on phenological shifts of two native (Ilex verticillate and Sambucus nigra) and two invasive (Rosa multiflora and Lonicera maackii) plant species in United States Forestry Service (USFS) Region 9 was investigated using data from USA National Phenological Network from 2010 to 2019.

The phenophase classes observed were onset day of fruits or seed cones, initial shoot or leaf growth, and open flowers or pollen cones. The data revealed a distinct pattern of responses between native and invasive plants to precipitation. In general, native species showed a positive correlation with precipitation and invasive species showed a negative correlation. In contrast, temperature had a less consistent effect on phenology, with both native and invasive plants exhibiting a negative correlation with temperature in most phenophase classes.

These preliminary findings suggest that invasive plants may have a higher tolerance for wetter conditions, which could grant a competitive advantage in changing climate patterns. Overall, this research emphasizes the importance of understanding how climate factors influence plant phenology and highlights the need for further studies to assess the long-term ecological impacts of climate change on plant communities.
Climate change, Invasive species, Phenology

50. Solving the "predator problem" in dietary analyses of spiders
Session 2

Sophie Rabinowicz, College of William & Mary

While DNA metabarcoding is a promising new method for accurately determining the diets of a variety of species, its use is often complicated by an overwhelming amount of predator DNA in samples. This high-quality, high-concentration DNA overwhelms prey DNA during PCR amplification and reduces the sensitivity of this dietary analysis. This issue, coined the â€œpredator problem,â€• is especially difficult to address when predators are closely related to their prey. In an attempt to solve this problem, we have done a variety of tests to optimize PCR amplification of the prey of wolf spiders (Lycosidae), including modifying the concentration of primer, type of DNA polymerase, and concentration of template DNA. These refinements provide a framework for researchers working with similar predator-prey systems, helping to enhance the accuracy of DNA-based dietary studies.
eDNA, Spider, Diet

51. Contrasting Exotic and Native Geckos to Explore Drivers of Caribbean Homogenization
Session 1

Cameron Mann, Temple University

The Anthropocene era, marked by increased human globalization, has drastically impacted global ecosystems and climate stability. The biodiversity hotspot of the Caribbean is threatened by invasive herpetofauna via unintentional maritime transportation causing competition with native species, extinctions, and overall loss of biodiversity. Invasive herpetofauna contributes significantly to the ecological homogenization of Caribbean islands, increasing species overlap across islands and thus reducing the uniqueness of local ecosystems. In our study we addressed this issue by compiling available records of invasive species. By focusing on exotic and native geckos as a representative subgroup of herpetofauna, we aim to identify variations in the homogenization of island ecosystems across the Caribbean. We find that the distribution of

exotic species is strongly influenced by anthropogenic factors, including habitat modification. Specifically, islands with higher levels of human-modified habitats tend to share more exotic gecko species. In contrast, native gecko species are more likely to be similar on islands with comparable green habitat, precipitation and in close geographic proximity. Understanding the distribution dynamics and ecological effects of non-native species will support future conservation efforts and may mitigate ecological impacts of invasive species.
species invasions, anthropogenic habitat, lizards

52. Residence Patterns and host use of female Tropical Lanternfly, Enchophora sanguinea, in Costa Rica
Session 2

Jennifer Weigand, Temple University
Kenny Lam, Temple University
Stefani Cannon, Temple University
Matthew Helmus, Temple University

Lanternflies (Fulgoridae) are an understudied group of insects, as most ecological research focuses on Lycorma delicatula and other invasive species. Within native species, the host use, spatial patterns, and residence times remain largely undocumented with most scientific literature focusing on taxonomy. This study examines host tree residence patterns amongst the females of the tropical lanternfly, Enchophora sanguinea, in lowland wet forests of Costa Rica with a brief comparison against male residence patterns. Field surveys conducted between October 2023 and May 2024 recorded individuals on 133 trees, using photographic records to document host use and residence periods. Trees were revisited during the study to document the individuals found at each tree and to assess recapture of individuals using photographs. Individual identification using the unique spot patterns on the bottom of the lanternflies wings was performed using the photographs in I3S software. Overall we found that females have longer residence periods than males with females documented on the same tree up to 80 days later compared to males documented on the same tree up to 14 days later. We found that there is a higher frequency of female recapture compared to males and found a difference in host use. This studyâ€™s findings aid in providing insight into the host specificity and residence time of female E. sanguinea, contributing to the larger neotropical lanternfly ecological understanding. These results have implications within the study of plant-insect interaction, trophobiotic interactions, comprehension of sexual dimorphism within E. sanguinea, and conservation efforts within tropical insect biodiversity. By expanding knowledge on native lanternfly behaviors, this study highlights the importance of documenting insect biodiversity within tropical ecosystems and offers a foundation for further ecological and conservation research on E. sanguinea.
Residence time, Behavioral ecology, Digital pattern analysis

53. Variability in Organic Carbon Storage of Chesapeake Bay Submerged Aquatic Vegetation (SAV) Systems
Session 1

Faith McCarthy, Johns Hopkins University

Submerged aquatic vegetation (SAV) is a foundational part of the Chesapeake Bay estuarine ecosystem. There are more than a dozen species of SAV in the Chesapeake that vary in salinity tolerance, with distinct communities in each salinity zone. These ecosystems provide critical habitat and food for fish, shellfish and waterfowl, acting as nurseries for juvenile organisms. Additionally, SAV contributes to global carbon cycling through what is known as â€œblue carbonâ€• . This term refers to carbon sequestered in coastal ecosystems such as seagrass beds (including SAV), mangroves, and tidal marshes. In seagrass beds, carbon is stored both in living biomass (via photosynthesis) and in detrital biomass and underlying sediments. This study explores the carbon sequestration potential of SAV ecosystems in Chesapeake Bay in order to determine their capacity as a carbon sink for climate change mitigation. This was measured using sediment cores

and biomass samples from each of four salinity zones. Preliminary results show that the moderately salty areas adjacent to tidal marshes show the highest carbon content at ~68 GtC per hectare of SAV, comparable to published values for marshes. These findings are significant in understanding the role that SAV systems play in the global carbon budget.
SAV, Carbon, Chesapeake

54. Microclimate and thermal tolerances structure ground beetle assemblages across a tree diversity gradient in a planted forest
Session 2

Hannah Obenaus, Smithsonian Environmental Research Center
Shelley Bennett, Smithsonian Environmental Research Center
John Parker, Smithsonian Environmental Research Center
Justin Nowakowski, Smithsonian Environmental Research Center

Deforestation is a leading cause of biodiversity loss globally, exposing many organisms to extreme temperatures outside of their physiological limits. Forest restoration may reverse species loss, in part, by cooling the understory over time. Currently, we lack a general framework for predicting changes in animal assemblages under restoration. Recent studies show that both microclimate and thermal physiology may be important factors shaping species distributions across fragmented forest landscapes. However, very few studies have combined information on both speciesâ€™ exposure and sensitivity to microclimates to quantify the effects of thermal trait-by-environment interactions on local species assemblages. Here, we examine the influence of thermal trait-by-environment interactions on ground beetle assemblages in a tree diversity experiment in Maryland, USA. Ground beetles (Coleoptera: Carabidae) may be especially sensitive to changes in fine-scale microclimate because they are ectotherms with limited dispersal ability. We sampled ground beetles and measured their exposure to microclimate variation at fine scales across 75 planted forest plots, varying in tree diversity and forest structure. We also measured morphological and thermal traits, including body size, critical thermal maximum (CTmax), and preferred temperature, and compiled other traits (flight ability, activity time, trophic level) from the literature to compare their relative importance in predicting beetle responses to microclimate. We found that near-ground air temperature was the environmental variable with the strongest direct effect on ground beetle assemblages and was negatively associated with beetle richness and abundance. Tree diversity indirectly influenced ground beetle assemblages by directly affecting canopy structure which in turn moderated understory microclimate. The probability of speciesâ€™ occurrence in plots decreased with increasing microclimate temperature, on average, but the magnitude of effect varied across species. Among the traits examined, CTmax was the best predictor of speciesâ€™ occurrence responses to microclimate. Our results show that microclimate and thermal traits interact to influence ground beetle distributions at fine scales.
Trait-environment, Thermal, Microclimate

55. Rapid eastern hemlock decline alters litter decomposition following hemlock woolly adelgid infestation
Session 1

Corey Palmer, University of Massachusetts Amherst
Audrey Barker-Plotkin, Harvard Forest
Ashley Keiser, University of Massachusetts Amherst

Forest ecosystems are increasingly shaped by invasive species, necessitating a better understanding of how disturbance events influence decomposition and nutrient cycling. In eastern North America, the non-native Adelges tsugae (hemlock woolly adelgid or HWA) threatens eastern hemlock (Tsuga canadensis) forests. While early HWA spread across southeastern states resulted in a rapid hemlock decline following infection, HWA infection in the northeastern U.S. has

caused a more gradual rate of hemlock mortality. To assess how the speed of hemlock decline and forest transition impacts litter decomposition dynamics over time, we used the Harvard Forest Hemlock Removal Experiment to compare litter decomposition and soil nutrient cycling across three forest treatments: an unmanipulated hemlock control infected by HWA expansion in 2005, a girdled site (17 years post-treatment) that simulates abrupt hemlock loss, and an adjacent hardwood site representing a late-stage forest transition.

We deployed litter bags containing four litter species which are currently in the overstory or expected within transitioning hemlock stands. We measured litter mass loss and soil nutrient cycling across the three forest treatments. Litter mass loss was significantly influenced by litter type with black birch, hemlock, and tulip poplar decomposing faster than maple overall. Within-site differences also emerged, with hemlock mass loss highest in the control site compared to the girdled and hardwood sites, and tulip poplar mass loss greatest in the hardwood site. FTIR absorbance in lignin regions was also distinct among sites, with most litter in the control site retaining more lignin than in other sites by the end of the study. These findings suggest that the speed and trajectory of hemlock decline influence litter decomposition patterns. When hemlocks are lost rapidly, either through HWA-driven mortality or management interventions like girdling, decomposition patterns shift more quickly toward those found in hardwood forests, reflecting the transition in overstory composition. In contrast, gradual hemlock decline allows soil microbial communities to retain functional characteristics of hemlock-dominated stands, buffering decomposition dynamics from immediate change. Additionally, as climate change facilitates the northward expansion of mid-Atlantic species like tulip poplar, its high-quality litter may decompose more rapidly than that of black birch and maple, the dominant species currently replacing hemlock. By using girdling as a proxy for rapid hemlock loss, this study provides insight into how climate change-driven hemlock decline may alter nutrient cycling and carbon storage, with long-term consequences for northeastern forest composition and function.
decomposition, nutrient cycling, forest disturbance

56. Nitrogen and Salt Pollution in Connecticut Streams: A Preliminary Study
Session 2

Nora Kliczewski, Union College
Anouk Verheyden, Union College

Healthy streams are of major importance to provide habitat for aquatic animals, provide safe swimming areas and reduce cost of water treatment when stream water is used for drinking water. However, a 2018 report by the Council of Environmental Quality, Connecticut, found that about 80 miles of rivers are polluted by overflows of raw sewage (CEQ, 2018). Monitoring of surface water can help identify contaminated streams, and evaluate the progress of cleanup efforts. This study focuses on sewage pollution as well as salt pollution, two major concerns in Connecticut streams. A total of 24 different stream locations were sampled over the course of 10 weeks in the summer of 2024 from the south-west region of Connecticut. Water samples were collected at all 24 sites and analyzed using ion chromatography. Macrophyte samples were obtained from 22 streams and analyzed for stable nitrogen isotopic composition. Chloride concentrations ranged between 1.1 to 155 ppm, and as such, none of the streams had values above the threshold level for chronic effects for aquatic life determined by the EPA (230 ppm). However, throughout all of the sites, there was a strong correlation between sodium and chloride ions which indicates that road salt is the main source of these ions in these streams and that salt concentrations could be much higher during winter and spring when road salt is expected to enter the streams. Additionally, 12 streams showed macrophyte Î´15N values above 6â€°, a threshold often used to indicate contamination by sewage or animal waste, with one stream exhibiting values higher than 10â€°. This study indicates that there is a need for larger scale monitoring of Connecticut streams in order to identify and clean up polluted streams. When comparing rural and urban environments, the lowest chloride concentrations were only observed in the most rural locations. In addition, none of the most rural locations showed Î´15N values above the threshold of 6â€° indicative of sewage presence. Urban locations showed both high and low levels of chloride and sewage pollution. This study shows that the method of water and macrophyte analysis can help identify streams for water quality remediation.

Stream Health, Nitrogen Pollution, Chloride Pollution

57. Phytoplankton community dynamics in a small reservoir after the elimination of Ceratophyllum demersum
Session 1

Sydney Kubalak, Susquehanna University
Michael Rose, Susquehanna University
Alyssa Packer, Susquehanna University
Dr. Jack Holt, Susquehanna University

Faylor Lake is a reservoir in the upper Middle Creek watershed of western Snyder County, Pennsylvania. The reservoir is relatively small with a mean depth of 1.24 meters and a volume of 0.7 x 106 m3. Land use upstream of the lake is mainly agriculture and gameland-forest. For more than a decade until 2023, Ceratophyllum demersum, a free-floating aquatic plant, was commonly found throughout the water column of the lake. By the summer of 2024, it disappeared from the lake. The phytoplankton communities of the lake during the Fall transition typically followed the change in dominance from cyanobacteria to diatoms from September through November. The loss of Ceratophyllum did not alter that community transition, but the similarities between those communities were less than 7%. The mean Shannon Diversity Index (SDI) between Fall 2023 and 2024 are comparable, being 1.88 and 1.72. The biovolume values of the phytoplankton communities and the dominant groups by biovolume tended to be similar. The only exception was the October sample, in which dinoflagellates dominated in 2024, and diatoms dominated in 2023. This study focuses on the phytoplankton community dynamics between Fall 2023 and Fall 2024 and the impact of Ceratophyllum loss on these communities.
Phytoplankton, Ceratophyllum demersum, Reservoir ecology

58. Changes in Insect Biomass During the Tree Swallow Breeding Season
Session 2

Christopher Smith, West Chester University

Insect populations are changing across North America. As part of a continent-wide study led by Peter Dunn, we monitored aerial insect populations throughout the bird breeding season in West Chester, PA, to begin tracking the biomass of these vital food sources. We focused on the availability of aerial insects because they are important for tree swallows, which are part of a group of birds called aerial insectivores that are declining rapidly. We were especially interested in the availability of Nematocera, a suborder of flies. This suborder is rich in specific omega 3 fatty acids that are critical for tree swallowsâ€™ developing young and may be influencing the time in which tree swallows begin breeding. To measure aerial insect biomass, I set up a malaise trap for three 3-day periods throughout key times in a tree swallowâ€™s breeding cycle to determine the biomass of insects available for these birds. After collecting all three samples, I weighed each sample separately and sorted them by order to determine how abundant each one is throughout the season. We found that, while overall aerial insect biomass increased or plateaued throughout the season, Nematocera biomass was highest during the recorded peak laying times and then declined. Our local patterns reflect similar findings across the country, illustrating the short window in which these birds have access to this critical food source.
Insects, Aerial Insectivores, Nematocera

59. Vouchering Specimens at the Delaware Museum of Nature and Science
Session 1

Alex Kittle, Delaware Museum of Nature and Science
Ashley Kempken, Delaware Museum of Nature and Science
Matthew Halley, Delaware Museum of Nature and Science
Liz Shea, Delaware Museum of Nature and Science

The Delaware Museum of Nature and Science (DelMNS), formerly known as the Delaware Museum of Natural History, was established in 1957 and opened to the public in 1972. The museum boasts engaging exhibits, programs, and large natural history collections. With over 2.3 million individual shells in the mollusk collection, over 113,000 birds from around the world, and other invertebrate, vertebrate, and paleontological specimens, the scientific collections preserve an incredible biodiversity record. The collections are publicly accessible online via several data aggregators including iDigBio.org, GBIF.org, VertNet.org, and InvertEBase.org.
DelMNS is an active, growing, mid-Atlantic repository for specimens collected around the world. Ongoing, ethical scientific collecting is critical to documenting and understanding the Earthâ€™s biodiversity. Morphological and genetic data derived from collections provide a baseline to examine changes in species distributions over time, and to study the effects of invasive species, habitat loss, trophic structure, and climate change. Specimens are also critical resources for basic research on disease vectors and host-parasite relationships.
Collecting, fixing, and vouchering specimens into a permanently managed scientific collection is essential for ensuring repeatability of research, achieving open science goals, and leveraging current scientific efforts for potential future research and education. The DelMNS digital and physical holdings are regularly used in research and education. Vouchering new specimens from todayâ€™s research will contribute essential data to understanding our changing world.
museum, vouchering, specimens

60. Functional Diversity and Trait Shifts in Sapling Communities of Post-Disturbance Old-Growth Forests
Session 2

Ian Stonefield, Temple University

As climate change increases the frequency and intensity of novel disturbances, understanding how ecosystems recover is critical for predicting future forest dynamics. The early stages of recolonization, particularly sapling establishment, represent a key window for understanding how post-disturbance recovery trajectories may unfold. These early responses can offer insights into whether forests are likely to follow historical recovery patterns or shift toward alternative states. To test whether disturbances can drive shifts in ecological function during the early reorganization window, we examined the functional diversity of sapling communities in nearby old-growth forest stands, one of which was heavily impacted by a novel tornado disturbance and the other that remained largely unaffected.
Sapling communities were sampled from May to August over two years post-disturbance, with species-level functional traits derived from plant trait databases. To quantify functional diversity across sites and years, we calculated Rao's Quadratic Entropy (RaoQ) and its components of richness, divergence, and evenness. We further examined trait dissimilarity between tornado-affected and undisturbed forests using non-metric multidimensional scaling (NMDS) and permutational multivariate analysis of variance (PERMANOVA). Post-hoc similarity percentage analysis (SIMPER) was used to identify which reproductive and resilience-related traits contributed most to observed differences in community-weighted mean trait composition across sites.
Our results indicate that functional diversity indices were not significantly different between the tornado-disturbed and undisturbed sites over both sampling years. Shifts in functional trait composition, however, particularly in reproductive and dispersal traits like seed abundance, seeds per pound, and dispersal syndrome, drove differences between sites. These changes suggest that the disturbance may select for species with different reproductive and dispersal strategies, with species turnover contributing to stability and functional diversity rather than functional group loss.
The stability of overall functional diversity, despite shifts in trait composition, suggests that species with similar ecological roles (functionally redundant species) may help buffer communities against disturbance. These findings imply

that post-disturbance changes in reproductive and dispersal strategies can reshape community composition without diminishing the range of ecological functions present.
Forest Dynamics, Functional Diversity, Disturbance Ecology

61. A comparison in the changes of the zooplankton communities in the fall of 2022 and 2024 Faylor lake.
Session 1

Alyssa Packer, Susquehanna University
Dr. Jack Holt, Susquehanna University
Sydney Kubalak, Susquehanna University

Faylor lake, located in Snyder County, PA, has a volume of 0.7x106m3 and has a mean depth of 1.2m. For more than a decade the open water of the reservoir was filled. The similarities between the species of zooplankton from 2022 to 2024 went from 4% to 15% and the diversity of the zooplankton community decreased from September through November in 2024 to the fall of 2022, there are much less Cladocera with the exception of the Daphnia and Daphniasoma. In the late summer of 2024, while Copepods and Daphnia were prominent, there was an more taxa present, but as it became early winter, the taxa present were almost completely Copepods or Daphnia. Another noticeable difference was the presence of 19 taxa in 2022 compared to the 4 taxa present in 2024. Those 4 taxa being Daphnia mendotae, Daphniasoma birgei, Cyclopoid nauplius, and Microcyclops rubellus. One reason suspected for this decrease is the occurrence of turnover in the fall, however this was not the case considering the lack of species diversity at the end of the summer. Another reason is the decrease of Ceratophyllum dermersum in the lakes to provide cover for the zooplankton. The Ceratophyllum that was previously in the lakes was now only found along the shores. Ceratophyllum is important for the survival if zooplankton species because zooplankton, ranging in size from 2ï• -m to 200mm, are large enough to be visible to larger predators when in the water, and the lack of cover from the Ceratophyllum make them more visible than in previous years and caused a simplification of the zooplankton community.
Zooplankton, Ceratophyllum dermersum, Aquatic Ecology

62. Bryophytes and Lichens of Liberty: Baseline survey of the cryptogam community in the brownfields of Liberty State Park before park redevelopment.
Session 2

Natalie Howe, George Mason University
Elizabeth De Cicco
Christiane Fashek
Frank Gallagher, Rutgers University
Jason Hafstad
Claus Holzapfel, Rutgers University
Patricia Kaishian, The New York State Museum
James C. Lendemer, The New York State Museum
Scarlett Simpson, Rutgers University
Dorothy Smullen, New Jersey Audubon’s Scherman Hoffman Wildlife Sanctuary
Dennis Waters, Rutgers University
Blair Young, Rutgers University

We surveyed the lichens and bryophytes of the brownfields of Liberty State Park on the Hudson River in Jersey City, NJ, in 2023 to support land management decision-making during a large-scale site restoration. The 1200-acre park was a former tidal marsh that had been filled in the mid 1800s with dredge, construction and demolition materials and converted

into a large-scale industrial complex and railyard. After 1967 when the railyard was demolished, large parts of the area were capped and remediated as public parkland. However, within the park, a 235-acre brownfield with areas of metal-contaminated soil was fenced off and has been mostly undisturbed for almost 50 years. During that period, a biodiverse novel community of early-to-mid-successional plants and fungi, many of them pollution-tolerant, established spontaneously. We conducted two days of surveys there, collecting voucher specimens of lichens, lichen allies, and bryophytes, later identifying the species using chemistry and microscopy. We found 61 species: 12 mosses, a liverwort, 46 lichens, a lichen parasite, and a fungus. Many of the species we found were common to urban areas of the Mid-Atlantic, but two of the lichens (Canoparmelia texana and Micarea synotheoides) were the first records of their species from NJ, and the fungus (Synnemasporella aculeans) was last reported from New Jersey 126 years ago. As these observations add to our understanding of the local biodiversity, they also inform decisions about the siteâ€™s redevelopment, and effective conservation strategies for the area. In addition, we hope the findings inspire others to conduct more surveys of urban cryptogams.
lichens, bryophytes, brownfield

63. Selective insecticide treatment reduces mortality of white ash (Fraxinus americana) on the Allegheny National Forest
Session 1

Kathryn Kovalchick, Washington & Jefferson College
Jason S. Kilgore, Washington & Jefferson College
Ramaniah D. Karamcheti, Washington & Jefferson College
Kathleen S. Knight, Northern Research Station, USDA Forest Service
Charles E. Flower, Northern Research Station, USDA Forest Service
Alejandro A. Royo, Northern Research Station, USDA Forest Service

The non-native and invasive emerald ash borer (EAB, Agrilus planipennis) has decimated ash (Fraxinus spp.) across eastern hardwood forests of North America in two decades, and ash are rapidly approaching functional extirpation throughout the range of EAB invasion. Loss of ash changes the composition and structure of some forests and may lead to a trophic cascade, therefore preservation of ash and its genetic diversity throughout forests is essential to maintaining the long-term ecological benefits associated with species assemblages.

The Allegheny National Forest (ANF) encompasses 207,674 ha of noncontiguous hardwood and mixed forest types in northwestern Pennsylvania. EAB was first documented on the ANF in June 2013 but was likely attacking ash trees as early as 2008. In this experiment, all ash trees within 30 randomly selected 3.14-ha plots were located and tagged in 2010. Starting in 2015, 20 white ash (F. americana) trees in each of these plots were randomly selected for triennial treatment with an insecticide (emamectin benzoate, TREE-Ã¤ge); systemic pesticides have been shown to save individual trees in urban/suburban areas. Ash canopy condition (AC1 healthy through AC5 dead) and diameter at breast height (dbh) were measured for all treated and untreated ash trees in 2015 and in six subsequent years. For this analysis, we limited the use of data from the five-year peak window of EAB-induced ash mortality of 2019 and 2024. Mortality rates were 41% (95% CI 32% â€“ 50%) higher on average in untreated trees (mean = 54%, 95% CI 45% â€“ 64%) than in treated trees (mean = 13%, 95% CI 9% â€“ 18%); mortality rates for untreated trees in untreated plots (controls) was 100%. Relative diameter growth of treated ash trees was marginally greater than in untreated trees. Furthermore, trees with healthier canopies experienced more growth regardless of treatment. Therefore, selective treatment of a portion of ash trees in a forested landscape increases survivorship not only of treated but also nearby untreated trees, which supports the associational protection hypothesis. Integrated and synergistic approaches, including selective treatment, are necessary to prevent the extinction of white ash and conserve the food webs and ecosystem functions that depend on white ash trees.
emerald ash borer (EAB), associational protection, conservation

64. Method Development and Comparison of Methods for Quantifying Total Phosphorus in Goose Creek
Session 2

Evangelique Myers, West Chester University
Dr. Megan Fork, West Chester University

Elevated concentrations of total phosphorus (TP) in surface waters, typically from wastewater treatment effluent and untreated stormwater runoff entering streams, can cause eutrophication that damages aquatic ecosystems. Urban streams, like Goose Creek in West Chester, PA, frequently have increased TP levels compared to rural streams. Due to the negative impact of inflated P in urban streams, it is of regulatory and environmental importance that we can measure it accurately. Phosphorus exists in many forms; therefore, it is necessary to convert organic phosphorus compounds into orthophosphate using digestion, the result of which can then be analyzed using colorimetry or ion chromatography to determine TP. Typical methods of digestion use chemicals such as sulfuric or nitric acid and boil at high temperatures, requiring constant monitoring and posing safety risks while also costing more for reagents. This research follows a known neutral digestion method that uses a safer chemical, sodium persulfate, at lower temperatures with similar results. This method is being developed through replication of protocols with statistical analysis for most effective conditions. The result will be a lab-specific protocol that represents the optimization of known methods regarding safety inclusions, correcting reaction and reagent holding times, repeatability in TP analysis and waste & cost reduction in protocols. Having an efficient method to quantify TP in the Aquatic Ecosystems Lab is essential to studies on the impact of elevated P in Goose Creek and other streams in southeastern PA.
Method Development, Total Phosphorus, Aquatic Ecosystems

65. Advances in Understanding the Microbiota of Ants in Brazil: Review and Future Perspectives
Session 1

Alexandra Gianaris, West Chester University
Felipe Pereira Rocha, The University of Hong Kong
Ygor Victor F. Pinheiro, Universidade Estadual do Maranhão
Odair C. Bueno, Universidade Estadual Paulista Julio de Mesquita Filho
Manuela O. Ramalho, West Chester University
Cintia Martins, Universidade Federal do Delta do Parnaíba

Since the advent of DNA sequencing and the introduction of new sequencing technologies such as Next Generation Sequencing (NGS), we have advanced our understanding of ants, including the host-microbe interactions maintained within their bacterial communities, sometimes spanning 50 million years. This significant advancement has attributed to exploration of non-cultivable bacteria, yielding unprecedented data. Considering that Brazil harbors one of the world's largest ant diversities, exclusively unique biomes, it is expected that bacterial diversity is equally extraordinary. Thus, this study systematically reviews and shows meta-analysis aiming to provide a comprehensive view of ant microbiota in Brazil, identifying the studied ant species and genera, mapping the explored biomes, and delineating the functional attributes of studied ants, ultimately outlining future perspectives. This includes identifying hotspots for subsequent studies, and identifying biomes that have not yet been investigated. This study for the first time, gaps in ant subfamilies/genera, and locations still underexplored in the context of host-microbe interactions in Brazil. Results of this study reveal that bacterial community composition is significantly affected by biome, subfamily, and diet type, being the first study of its kind to do so on such a large scale. Additionally, it can serve as a guide for the myrmecology community to direct future microbiota studies, aiming to expand both the number of ant species and investigated locations. Furthermore, this study has the potential to unravel more about Neotropical microbiological diversity, contributing significantly to understanding the ecological and evolutionary mechanisms underlying ant-bacteria associations.

Meta-analysis, Bacterial Communities, Symbionts

66. Does Greening Philadelphiaâ€™s Vacant Lots Result in Lower Arthropod Diversity?
Session 2

Jore Bagdonas, Temple University
Dr. Jocelyn Behm, Temple University
Dr. Timothy Swartz, Temple University

In urban areas, greenspaces can be incredibly important refuges for biodiversity, therefore, it is necessary to understand how management of urban greenspaces impacts biodiversity. Vacant lots are often an overlooked type of urban greenspace that may hold value for biodiversity, especially arthropods. In Philadelphia, which has over 40,000 vacant lots, approximately 12,000 of these vacant lots have been â€œgreenedâ€• through a partnership between the city of Philadelphia and the Pennsylvania Horticultural Society (PHS). Lot greening provides neighborhoods with small outdoor spaces in an otherwise crowded city. However, this â€œgreeningâ€• involves removing and mowing all overgrown shrubs, trees, and plants and replacing them with grass lawns and a few trees. There has not been research performed on this greening process and what effect it has on arthropod biodiversity. The goal of this study is to understand how arthropod biodiversity of Philadelphiaâ€™s vacant lots varies across greened versus ungreened lots. In 2019 and 2022, we sampled arthropods from 25 vacant lots in Philadelphia. The arthropods were identified to order and the Hemipteran order was further identified to family. We explored the effects of lot greening, sampling year and surrounding impervious surface on the abundance, richness and composition of arthropod orders and Hemipteran families. Overall, we found a stronger effect of sampling year on arthropod abundance and diversity than the effect of lot greening. In particular, at the order level, there was lower abundance but higher order richness in 2022 than 2019, leading to a homogenization of the composition of arthropods across sampling sites in 2022. Comparatively, at the Hemipteran level, abundance and family richness were higher in 2022 than 2019 which led to a differentiation in the composition of hemipterans across lots in the two years. Lot greening did result in lower order richness and the absence of arthropod orders across lots relative to ungreened lots. In conclusion, we found that lot greening did lead to a reduction in arthropod diversity, however, inter-annual fluctuations in arthropod communities confounded these patterns. Future work should focus on understanding the habitat features in vacant lots that support arthropod diversity and contribute to their conservation.
urban ecology, Hemiptera, urban greenspace management

68. The ecological significance of Asclepias syriaca and Cirsium vulgere for insect pollinators
Session 1

Cameron Morris, William & Mary

Asclepias syriaca, or common milkweed, is an ecologically relevant species as multiple insect species are specialists to the plant, such as the monarch butterfly and longhorn milkweed beetle. Bombus griseocollis, or the brown-belted bumblebee, is also an ecologically relevant species, being a common native pollinator for the majority of the United States. Characterizing the resource use of native pollinators is especially important for conservationists, as habitat loss is a driving factor of insect population declines in recent years. The original hypothesis of this project was the potential specialization of Bombus griseocollis to Asclepias syriaca. Unfortunately, not enough B. griseocollis visitations were recorded in order to collect sufficient evidence. However, we have been able to characterize the insect pollinator visitors for both A. syriaca and Cirsium vulgere, or bull thistle, and provide evidence that both plants are both ecologically significant species since they are both utilized by a diverse range of native insect pollinators. A. syrica had the most diverse visitors of 15 unique taxa and Halictidae bees as the most frequent visitor. C. vulgere had 12 unique taxa represented with Bombus (species griseocollis, impatiens, bimaculatus) as the most frequent visitor.

native plants, pollinator, milkweed

69. Behavioral Insights into Residence Time and Site Fidelity of Male Enchophora sanguinea, the Tropical Lanternfly
Session 2

Kenny Lam, Temple University
Matthew Helmus, Temple University
Stefani Cannon, Temple University
Jen Weigand, Temple University

The tropical lanternfly (Fulgoridae: Enchophora sanguinea) is a species native to Central America and unlike their invasive relative spotted lanternfly (Fulgoridae: Lycorma delicatula), they are a neglected species in scientific research. Within behavioral ecology, there is little in-depth knowledge about E. sanguinea. This gap in information includes the sexual differences in coloring between males and females, their residency times on the trees they feed on, and their likelihood of returning to a certain site. This study utilizes images of the species taken at Camaquiri Conservation Initiative in northeastern Costa Rica to analyze male residence time with a brief comparison against female residence patterns. Photographs were taken between October 2023 and May 2024 recording individual lanternfly on 133 study trees. Trees were revisited throughout the period and when possible, individuals were photographed. Using an imaging software called I3S for its pattern recognition of the spots on the lower portion of the speciesâ€™ wings, individual lanternflies can be tracked to determine how long they remain on hosts and whether they are returning to a given site. In this study, we found that males have shorter residence periods and a lower recapture frequency than females. We expected that males will display a lower residence time than females due to a sexual priority to reproduce. While females would likely prioritize locations in order to be successful in laying eggs, males would likely be exploratory in behavior. This behavior may be driven by the need to maximize their mating opportunities. This proposes a distinction in sexual priority to reproduce and contributes to a wide-ranging grasp around the understudied species. As there are few studies focusing on this species, these findings will play a significant role as the first steps in understanding E. sanguinea and its ecological behaviors.
Residence patterns, Behavioral ecology, Digital pattern analysis

70. The importance of small herbaria for revealing tropical biodiversity patterns
Session 1

Deniz Ertem, Trinity College Dublin and University of Maryland
Dr. Peter Moonlight, Trinity College Dublin

Herbaria, collections of dried and preserved plants, are present in many academic and independent research institutions around the world. Herbarium specimens often include collection location, species name, and date of collection. However, not all herbaria are created equal. The largest, and best-known, are exclusively in institutions of Western nations, such as Kew Gardens (UK) and the botanic gardens in New York and Chicago (US).

This â€œsize and prestigeâ€• disparity also comes with a disparity in the number of specimens from specific geographic regions, which can have very real influences on research. One of the many uses of herbarium specimens is the creation of species distribution models (SDMs); specimens usually contain coordinates, which enable researchers to map where a particular species is, or was, found. Large herbaria, such as that of the New York Botanical Garden, may have the funding to do more collecting trips around to a particular country, such as Brazil. However, they are also likely to have samples from all over the world. Conversely, Brazilian herbaria (much smaller than the NYBG) are likely to have many more

Brazilian samples due to limited ability to travel further afield. Therefore, while researchers may feel inclined to rely on samples from well-known herbaria such as the NYBG in making SDMs, using smaller herbaria such as Brazilian ones is also essential if one is to get accurate models.

This project aimed to test two hypotheses: 1) there will be notable differences between Begonia SDMs constructed using only data from Brazilian herbaria, using only data from non-Brazilian herbaria, and using all data, and 2) there will be notable differences between Begonia SDMs if herbaria are excluded from the models in order from smallest to largest. Râ€™s Maxent package was used to construct all of the herbaria; the statistics used to compare the SDMs were the Continuous Boyce Index (CBI) and the I statistic. The results indicated that, for 1), there is a difference between the models; however, the answer to 2) was more complex. Based on these findings, we can conclude that, in order to get more accurate models, smaller herbaria must be used in SDM creation.
herbaria, species distribution models (SDMs), Begonia

71. Soil Greenhouse Gas Fluxes in Perennial & Annual Forage Systems Under Livestock Grazing Management
Session 2

Dylan Brown, University of Delaware

Cover crops are often utilized in agronomic systems to increase soil health by adding diversity to cropping systems and provide ecosystem services in an attempt to create an overall more resilient agroecosystem. However, cover crops can also be utilized as annual grazing forage for livestock producers. In particular, summer annual forage species provide producers in the Mid-Atlantic region with extended grazing opportunities when cool-season dominated perennial pastures lose productivity during the hot, humid summer months. Soil Greenhouse Gas (GHG) fluxes have historically been under-studied in pasture-based grazing systems. With limited to no focus being made in quantifying soil GHG fluxes from Mid-Atlantic grazing ecosystems, an opportunity to further identify ecosystem response processes exists. The focus of this study was to identify response from these primary factors: Does the difference in perennial & annual forage type, along with its vegetation stage influence GHG flux? Additionally, what is the GHG flux response to an ecosystem disturbance (i.e., grazing event)? It was hypothesized the regrowth & termination/dormancy vegetation stages would yield the greatest GHG flux in both forage types. Secondly, grazing disturbances would contribute both positive and negative influences on soil GHG fluctuations. To test these hypotheses, a static chamber sampling methodology was deployed to collect soil GHG fluxes from both perennial and annual forage systems throughout the grazing season during four key vegetation stages: growth, post-graze, re-growth, & termination/dormancy. Preliminary results indicate the annual forage system experienced higher nitrous oxide (N2O) fluxes, compared to the perennial forage system. Further research should be conducted to better quantify soil GHG fluxes from these dynamic grazing ecosystems, particularly in the wake of unprecedented climatic disturbances in these ecosystems.
Greenhouse gases, Livestock grazing, Cover crop

72. Exploring the Impact of Land Use and Fragmentation on Wetlands and Ecosystem Services in Delaware
Session 1

Samantha Cotten, Delaware State Univeristy
Helen E. Tripp and Sigrid D.P. Smith

Habitat fragmentation, driven by urbanization and agricultural expansion, can shape landscape dynamics influencing ecosystem services. Wetlands, which are vital for services such as water purification, flood mitigation, and biodiversity support, are vulnerable to land use changes. This study examined the relationship between land use transitions, habitat

fragmentation, and wetland ecosystem services in Delaware by analyzing land cover data from 2013 to 2018 using the Chesapeake Bay Project and Guidos Toolbox. The land cover analysis revealed that wetland areas remained relatively stable during the 2013â€“2018 period, with few transitions to other land use types. However, minor transitions (e.g., from tidal wetlands to turf grass, and from riverine wetlands to open water) suggest that localized changes do occur, possibly due to factors like water level changes, human encroachment, or shifts in wetland boundaries. This study highlights the ongoing challenges posed by land use change and fragmentation in Delaware, particularly for wetlands, and underscores the importance of targeted conservation efforts to preserve ecosystem services and mitigate fragmentation impacts.
Habitat Fragmentation, Land Use, Wetlands

73. Impact of stand age on forest structure and carbon storage in a Pennsylvania forest
Session 2

Meredith Fitzgerald, West Chester University
Jessica L. Schedlbauer, West Chester University

Temperate broadleaf forests are important carbon sinks in the Mid-Atlantic region of the United States. By sequestering carbon dioxide (CO2) from the atmosphere, these forests can aid in climate change mitigation, though the future composition of these forests remains uncertain. This study aimed to understand the effects of forest age and time on forest carbon storage and composition. Plots of 0.2 ha were established, three in a 100-year-old stand and three others in a 200-year-old stand. Plots were censused in 2013, 2018, and 2023 for trees â‰¥ 10 cm in diameter at breast height (DBH) and in 2024 for < 10 cm DBH trees. Down and standing dead wood were measured and assigned a decay class in each census year. Basal area (BA) and stem density (SD) were calculated for each sample year in each stand. Allometric equations were used to determine carbon stored in living aboveground biomass (AGBM-C), while dead wood measurements were used to determine the carbon stored in down and standing dead wood. Trees from 2023 and 2024 were divided into DBH classes, with small trees designated as â‰¤ 15 cm and large trees â‰¥ 30.1 cm. These data were used to determine a regeneration index (RI) for each species, as the percentage of small minus large trees.

The BA and SD of the â‰¥ 10 cm trees was significantly higher ($p = 0.0001$ and $p < 0.0001$, respectively) in the 100-year-old stand. The AGBM-C was also significantly greater ($p = 0.0043$) in the 100-year-old stand. The RI of Carya sp. and Quercus rubra varied significantly ($p = 0.0403$ and $p < 0.0001$, respectively) due to forest age, though no significant difference was detected in the RI of any other species. The RI of Carya sp. was positive in the 100-year-old stand, but was negative in the 200-year-old stand, which indicated the species was regenerating only in the 100-year-old stand. Quercus rubra showed the opposite pattern, with a negative RI in the 100-year-old stand and a positive RI in the 200-year-old stand. In general, RI data indicated higher regeneration potential in the 100-year-old stand. Overall, age had an impact on the forest, as the 100-year-old stand had a higher BA, SD, and AGBM-C. Tree regeneration also differed with forest age and will affect future tree species composition, particularly given the limited number and diversity of young trees in the 200-year-old stand.
Forest structure, Carbon storage, Temperate broadleaf forest

74. Detection Rates of Predators and Prey in Fragmented vs Intact Forests
Session 1

Thomas Mathiesen, Susquehanna University

Forest fragmentation influences predator-prey dynamics by altering prey species' detectability in fragmented forests compared to continuous forests. Our goal is to determine if prey adopt different detectability strategies such as an active response or predation refuge to avoid predators within fragmented forests compared to intact forests in central PA. We quantified detection rates using camera traps at 22 continuous and fragmented forest sites. Landscape variables such as

each camera's distance to water, forest edge, and percentage of forest were quantified using ArcGIS. Our results suggest that more prey and predators were detected in the fragmented compared to the intact forest sites. Data also suggests prey stay detectable in areas with less percentage of forest. This suggests that prey species are adopting an active strategy to avoid predators due to a lack of spatial partitioning availability. Our results will aid in making management decisions about how land is spatially configured to best protect wildlife in northeastern forests.
Prey, Fragmented, Camera

75. Soil nitrogen in canopy gaps: Patterns of nitrogen distribution in northeastern urban forests
Session 2

Katherina Kang, University of Delaware
Tara Trammell, University of Delaware
Vincent D'Amico, USDA United States Forest Service

Urban forests play a key role in the mitigation of urban heat island effects and climatic shifts. Canopy gaps, openings within forests due to tree mortality, are a common disturbance that regulate forest dynamics and enhance tree regeneration through increased sunlight and temperature. However, the structure of urban forest patches expose forest edges and gaps to potentially extreme environmental conditions. Higher temperatures in urban centers can enhance microbial N mineralization and increased atmospheric deposition has been associated with higher soil N. As a result, urban canopy gaps are potential hotspots for soil N which can influence biomass growth and future forest stand composition. The patterns of soil N and potential mechanisms that control the distribution of soil N across urban gaps remain unknown. Therefore, the aim of this study is to understand how soil N and C:N ratio vary across urban forest gaps in relation to gap size, gap distribution (i.e. distance to edge), and forest characteristics. Soil samples were collected from 85 gaps of varying sizes distributed across nine urban forests in three northeastern cities: Baltimore, MD, Newark, DE, and Philadelphia, PA. Forest characteristics included surrounding % impervious cover within a 1km buffer and forest edge: interior ratio. Preliminary results revealed that gap size had no relationship with soil %N or C:N ratio, but %N was negatively related to gap distance from forest edge. Average soil %N across each forest was positively correlated with % impervious cover and edge: interior ratio. These results indicate that gaps closer to forest edges and surrounded by higher urbanization have greater soil N availability. This may be due to higher particulate matter associated with increased impervious cover, especially in forests with more exposed edges. By understanding which forest characteristics influence soil N in gaps, we can identify potential mechanisms that drive N distribution across urban forests.
Urban Forest, Soil, N Distribution

76. Impact of coarse fragments for estimating soil carbon pools in Paramo soils
Session 1

Viv Srinath, Swarthmore College

The paramo ecosystem is a high-altitude alpine grassland ecosystem found in the northern Andes that is recognized as a biodiversity hotspot for its unique species composition. PÃ¡ramo soils are mainly andisols of volcanic origin with a great potential for carbon storage by stabilizing soil organic matter via the formation of complex minerals that protect the organic matter from decomposition. This characteristic allows andisols to accumulate twice as much soil organic carbon (SOC) as other soils. However, accurate estimates of SOC remained highly uncertain since most studies do not account for the lack of SOC in coarse fragments (particles larger than 2 mm in diameter), which are included in the determination of bulk density (mass of soil particles per unit volume). In two zones of paramo that have different content of SOC, we evaluate three different methods that vary in their treatment of coarse fragments. Calculated pools of SOC varied by up to

58% when bulk density methods included coarse fragments. Our results suggest that estimates of the contribution of paramo soils to the global carbon cycle have been vastly overestimated.
Soil organic carbon, Global carbon estimates, Bulk density

77. I-Assisted Tree Species Identification for Fine-Scale Biodiversity Mapping
Session 2

Eugene Potapov, Bryn Athyn College
Declan Williams, Bryn Athyn College
Grace McMackin, Bryn Athyn College

Recently, several studies have focused on identifying tree species using UAV-derived RGB, multispectral, hyperspectral, and LiDAR data. However, UAV-based methods are rarely applied beyond photogrammetry tasks.
We developed a framework for mapping fine-scale biodiversity gradients in forested and suburban ecosystems using AI-assisted tree species identification. High-resolution imagery of multiple forest patches was obtained by UAV surveys in fall and summer. The training dataset was created by integrating ground survey data with UAV-acquired imagery.
Using off-the-shelf AI tools, we delineated individual tree canopies from stitched forest imagery. A convolutional neural network (CNN) was trained on images of isolated canopies extracted from these images, and its accuracy was evaluated through cross-validation.
We then used the processed images to compute the Shannon- Wiener diversity index for individual trees based on the species composition of their nearest neighbors. This approach enabled us to generate a biodiversity map at the individual tree scale.
This framework introduces a novel approach for estimating biodiversity patterns on individual spatial scale, thus offering a fine-scale perspective on forest community structure. The results underscore the potential of AI and UAV-based remote sensing technologies to advance ecological research and conservation. Potential applications of the framework are also discussed.
Biodiversity, Spatial ecology, Community structure

78. Stream Water Quality Monitoring in the Raritan River Headwaters Region in Central New Jersey
Session 1

Maria Scarpantonio, Raritan Valley Community College
Isabella Scricco, Raritan Valley Community College
Dr. Emilie Stander, Raritan Valley Community College

Water quality in the mixed-use, headwaters region of the Raritan River Basin in Central New Jersey is affected by a transition from agricultural land use/land cover to sub/urban land use/land cover. Bi-weekly monitoring of 13 stream locations in the headwaters region of the Raritan River Basin has been conducted since May 2018. Water quality parameters measured include nitrate and E. coli concentrations. Water samples were collected in pre-rinsed sterile Nalgene bottles. E. coli concentrations were determined by filtering the sample through membrane filters and incubating with m-ColiBlue24 media at 35Â°C for 24 hours. Colonies were counted manually using the EPA-approved method 10029. The water samples were filtered using Whatman 42 filter papers to remove sediment and analyzed for nitrate concentrations by colorimetric analysis with a flow-injection analyzer using EPA-approved methods.

Over the course of the study, nitrate concentrations ranged from 0.0187 to 6.7 ppm, with a mean value of 1.17 ppm. Nitrate concentrations tended to increase during winter and spring seasons and decreased in the summer and fall throughout the seven-year sampling record. The observed E. coli concentrations ranged from 0 to 46,600 colonies/100mL,

with a mean value of 633 colonies/100mL. The nitrate concentrations followed trends that increased in the winter and decreased in the summer, while E. coli concentrations tended to spike between July and October and decrease during the rest of the year. Two sites in watersheds with relatively high agricultural land use, CB03 and NR10 (47% and 37% respectively), consistently had higher E. coli concentrations, while SB04, which is in a watershed with less agriculture (18%), consistently had lower E. coli concentrations. However, there were other sites with low E. coli concentrations in watersheds with high agricultural land cover (ex. SB07 with 47%), suggesting that agricultural land use is not a good predictor of E. coli concentrations. Several sites showed higher concentrations of nitrate in watersheds with higher agricultural land use and lower forest cover. Sites in watersheds with less agricultural land use generally had lower and less variable nitrate concentrations.

Water Quality, E. coli, Nitrate

79. Examining urban tree health as a method of predicting species-specific climate adaptation

Session 2

Margaret Schaefer, University of Maryland College Park
Kelsey McGurrin, University of Maryland College Park
Sophie McCloskey, University of Maryland College Park
Anne-Lucie Pierre, Amherst College
Karin Burghardt, University of Maryland College Park

As climate change increases stress for trees through changes in temperature, water availability, and air quality, cities may serve as an early indicator of climate effects and their future impact on trees. While urban trees can provide ecosystem services and mitigate effects like urban heat islands and air pollution, their ability to thrive is also impacted by these same stressors. It is unlikely that all tree species will be affected by climate change similarly. Recent modelling efforts, such as those produced by the USFS Climate Change Tree Atlas, predict that some tree species will do well with a shifting climate in urban areas, while others will be unable to adapt. Studying a cohort of recently planted urban street trees across the gradient of temperatures within a single city provides an avenue to examine how changing climate could impact various species. Through this we can answer: 1. Are climate resilience predictions reflected accurately across the different species, and 2. Are species predictions reflected along an urban temperature gradient? To examine these questions, we revisited young street tree cohorts of several native species originally measured in the 2018 Baltimore Tree Inventory. These species were selected based on climate adaptation predictions as released by the USFS Climate Change Tree Atlas, where some were predicted to do well in the Greater Baltimore region, and others poorly. The individual trees selected were growing in neighborhoods experiencing a gradient of air temperatures, which had been recorded over the summer of 2018. We quantified growth over the past six years and assessed different tree health, damage, and insect population metrics. Overall, tree health decreased with increasing temperature. However, this effect was not consistent across species, and generally but not exclusively matched climate predictions. This knowledge can help influence urban planting decisions in anticipation of increased climate stress to ensure ecosystem services are maintained and predict the future outcomes for these species across the region.

Urban Ecosystems, Climate Change, Plants

80. Investigation into elemental composition and physical characteristics of Podostemum ceratophyllum (Podostemaceae)

Session 1

Saraswati Braun, West Liberty University
James Wood, West Liberty University

Podostemum ceratophyllum is an ecologically significant aquatic plant that plays a key role in freshwater rivers in Eastern North America by stabilizing sediments, providing habitat for aquatic insects and fish, and serving as a food source for

herbivores. Previous research has linked land use to variation in elemental composition in P. ceratophyllum, but little is known about how these patterns relate to different growth forms or specific plant structures, such as stems and leaves. In particular, it remains unclear whether the characteristic of blackened stems observed in some populations of the plant directly correlate to higher concentrations of metals or if elemental composition varies systematically between stem and leaf tissue. To investigate these questions, we conducted metal analysis on dried samples of P. ceratophyllum using Optical Emission Spectroscopy (ICP-OES). ICP-MS was used to measure trace elements such as Li, V, Co, Ni, Cu, Ga, As, Se, Rb, Sr, Mo, Cd, Cs, Tl, Pb, and U at parts-per-billion (ppb) resolution, while ICP-OES quantified elements including Al, B, Ba, Be, Ca, Cr, Fe, K, Mg, Mn, Na, P, S, Sr, and Zn at parts-per-million (ppm) resolution. We hypothesize that (1) blackened stems contain higher concentrations of metals compared to non-blackened tissue, (2) elemental composition differs between stems and leaves due to physiological and structural differences, and (3) growth form influences elemental uptake. By investigating the relationship between this aquatic plant and its morphological varieties, we aim to provide insight into how elemental composition may influence P. ceratophyllumâ€™s ecological functions and interactions with aquatic herbivores. This research enhances our understanding of freshwater plant physiology and contributes to the overall understanding of elemental cycling and plant-herbivore dynamics in aquatic systems.
Podostemum ceratophyllum, Aquatic plants, Aquatic habitat

81. Comparison of Pollinator Visitation to Native and Tropical Milkweed (Asclepias) species in Pennsylvania
Session 2

Caitlyn Polter, Kutztown University
Christopher F. Sacchi, Kutztown University

Prior studies have documented the predominant insect visitors and rates of visitation to milkweedâ€™s native to northeastern U.S. and to those native to tropical areas in their native habitats. Studies of North American common milkweed (Asclepias syriaca) and swamp milkweed (Asclepias incarnata) have reported reproductive attributes of the plants including number of flowers per inflorescence and pollinia removal by insect visitors and fruit production per plant. Similar studies of tropical milkweed (Asclepias curassavica) and Caribbean milkweed (Asclepias nivea) have documented these same plant attributes. Based on differences in plant reproductive attributes and rates of visitation by pollinators to these four milkweeds in temperate versus tropical environments, we studied the same plant attributes and rates of insect visitation when all four species were grown in southeastern Pennsylvania. Temperate and tropical milkweeds differed significantly in the number of open flowers and number of insect visits per inflorescence per observation period. The dominant insect visitor differed significantly between temperate and tropical milkweeds with bumble bees and wasps the most common insect visitors to temperate and tropical species, respectively. The proportion of pollinia removed differed significantly between temperate and tropical species. One temperate species, A. incarnata, had a much higher proportion of pollinia removed than the other three species. Capsule number per plant differed among the four milkweeds. When studied in the same temperate localities, tropical and temperate milkweed species differed in their pollination biology and plant reproduction.
Pollination Biology, Plant Reproduction, Milkweed Pollination

82. Mapping the risk of Lycorma delicatula (spotted lanternfly) invasion hubs across the U.S.A. with interactive web applications
Session 1

Hannah Joseph, Temple University
Dr. Matthew R. Helmus, Temple University

Plant pests spread rapidly when transported among invasion hubs, which are locations that are at risk of facilitating the movement of invasive species across regions. Such locations include areas where there is a predictive high density of vehicle traffic and transportation infrastructure. Here, we designed interactive mapping web applications for the management and control of the spotted lanternfly (Lycorma delicatula), an invasive forest and grape planthopper that hitchhikes on a variety of goods and transportation infrastructures. To build these apps, we first determined a set of regions of interest such as states and counties with agencies who need support tools for spotted lanternfly surveys. We obtained spatial data that we cleaned and harmonized using R. We then built SQL databases to store hub and other spatial data. We built a user interface using Leaflet (JavaScript) and PHP code. We deployed the apps and gathered user feedback we used for further tailoring apps to stakeholder needs. We have developed 43 apps for spotted lanternfly thus far, and we hope to apply this framework for the management and control of other invasive species who spread via invasion hubs.
Lycorma delicatula, Invasion hubs, Interactive mapping applications

83. "Bug roads": Modeling the potential dispersal routes of hymenopteran pollinators in New York City
Session 2

Brianna Fay, Marymount Manhattan College
Matthew J. Lundquist, Marymount Manhattan College

Hymenopteran pollinators play a crucial role in natural ecosystems, and the presence of green spaces in cities is vital for supporting the diversity of these pollinators. However, in New York City, green spaces are not uniformly spread out, and obstacles such as buildings can hinder the dispersal of pollinators. It may be a challenge for pollinators in New York City to locate suitable habitats or food resources. The goal of this study was to model insect pollinator's possible travel routes (â€œbug roadsâ€•) in Manhattan. To do this we used QGIS to model the shortest distance that insects would need to travel between green spaces (N = 373) while also having to navigate around buildings and other barriers. We also measured the connectivity of parks based on the reported maximum foraging distance for different species of hymenopteran pollinators using community cluster analysis. Furthermore, we estimated potential pollinator habitat in each green space using LiDAR land cover data.
In general, hymenopteran pollinators have a maximum foraging distance of between 250 m and 14000 m. After excluding paths that were longer than 14000 m, the average â€œbug roadsâ€• between green spaces in Manhattan was 6362.5 Â± 4.5 m. We also found that the number of community clusters decreased with increased foraging distance. Short foraging distances typical of solitary bees (2000 m) yielded a few large clusters. Furthermore, we found that ~98% of the green spaces in Manhattan do not have enough high or medium vegetation cover to support the full foraging ranges of solitary bees. These results suggest that green spaces in New York City may better support pollinators with large foraging distances, but local habitat quantity and quality may be more important for solitary bees, which do not travel as far from their nests.
pollinators, urban, foraging

84. Drivers of Arthropod Diversity Across a Tornado Disturbance Gradient
Session 1

Isabella Miller, Temple University

Climate change has altered weather patterns due to anthropogenic activities, increasing the frequency and severity of novel disturbances ultimately impacting community composition and biodiversity. Arthropods, including insects, arachnids, and crustaceans, are important for ecosystem recovery as they contribute to nutrient cycling and ecosystem health, serving as indicators of environmental changeâ€”particularly in the face of increasing climate-driven disturbances. It is hypothesized that due to a high percentage of canopy cover preventing large fluctuations in temperature, humidity,

and soil moisture, the existence of pre-established ecological communities, and stabilized carbon-nitrogen levels there will be higher diversity in the low disturbance plots. Temple Forest Observatory (TFO), which has an open canopy due to a tornado-induced windthrow event, allows for fluctuations in such factors. To assess the effects of novel disturbances like tornadoes on ecological communities, we examined arthropod diversity and abundance across a tornado disturbance gradient over 18 months using pitfall traps to capture specimen in different seasons. Plant percentage cover was measured seasonally. We further examined the influence of seasonality, temperature, soil moisture, ground vegetation cover (ground and canopy), and carbon-nitrogen levels on arthropod community patterns. Our results suggest that the highest abundance and richness, and thus diversity, were found at low disturbance plots. A total of 963 specimens were accounted for through the duration of this study, 463 from the spring and fall collection and 500 from the summer collection. Diversity was the highest at intermediate disturbance levels but remained relatively consistent across the gradient. Understanding the role arthropods play in an ecosystemâ€™s response to novel disturbance events will foster an in-depth understanding of the resilience species exhibit and their aid in the recovery of such environments, emphasizing the importance of canopy structure and microclimate stability.
Disturbance, Arthropods, Biodiversity

85. Forest development in the seven years following experimental reforestation treatment establishment
Session 2

Christian Stoltz, West Chester University of Pennsylvania
Dr. Jessica L. Schedlbauer, West Chester University of Pennsylvania

Reforestation efforts can address ecological concerns stemming from historical and modern forest loss. As forests regenerate, aboveground structural changes including leaf area index (LAI) and stem density can influence the development of the soilâ€™s organic horizon (O horizon). However, no study within the Mid-Atlantic region has addressed quantitative differences among reforestation methods and their effects on forest development. This study sought to characterize LAI, stem density, and O horizon development among six seven-year-old reforestation treatments. These treatments were established in 2015 on old hayfields at the Mt. Cuba Center in Hockessin, DE. Treatments varied based on structural complexity (trees only vs. trees and shrubs) and planting density (~1.5 m vs. ~3 m spacing), with one treatment subject only to natural succession (NS). Planted reforestation treatments included the following: low density, trees, mowed (LTM), low density, trees (LT), low density, trees, shrubs (LTS), high density, trees (HT), and high density, trees, shrubs (HTS). Seven years after establishment, average LAI was highest in the HT (6.94 m2/m2) and HTS (5.74 m2/m2) treatments, followed by LT (4. 71 m2/m2), LTM (3.26 m2/m2), and LTS (3.01 m2/m2), then NS (0.1 m2/m2). Stem density was lowest in the LTM treatment (858 stems/ha) and highest in the HTS treatment (2902 stems/ha), increasing as planting density and composition increased; NS contained no trees. The HT treatment had the highest O horizon biomass (76.28 g/m2), however the other high-density treatment (HTS, 25.09 g/m2) had biomass lower than that of the low-density treatments (46.15 & 43.61 g/m2). These findings show that reforestation treatments can rapidly increase tree cover on old agricultural fields, with substantial gains in LAI and stem density. Planted treatments somewhat mimic early successional forests but have yet to experience self-thinning. However, accumulation of organic material in the soilâ€™s O horizon does not follow this pattern of rapid change and will clearly require more time to develop.
temperate reforestation, organic horizon development, forest structure

86. Exploring Ant Diversity and Diapause Patterns in West Chester, PA in response to Environmental Contexts
Session 1

Kay McFadden, Dr. Manuela Ramalho, West Chester University of Pennsylvania
Dr. Monica Ulyssea
Jonathan Morgan

Dr. Manuela Ramalho

Diversity is evident in all aspects of life. It is the cornerstone of evolution and a major difference between species. Diversity is important genetically and morphologically. Without diversity, scientists would not be able to discern between organisms. In ants, diversity is widened even more. There are many species of ants worldwide that have different habitats, diets, morphologies, colony structures, and more. The emphasis of this study is to observe the diversity of ants on the West Chester University campus, and their patterns of diapause or, dormancy. The specific species of ants that live in West Chester and on campus is not widely known. By setting up in-ground samples at least once a month for several months, we could determine the patterns of ants on campus and what species live here. Collections were set up on the Francis Harvey Green Green Roof, the Gordon Natural Area, the outdoor classroom outside of Science Complex North, and two off-campus locations still located within West Chester. Our findings will expand the knowledge of ants on campus and show the abundance of diversity of ants as a whole.
diversity, ants, diapause

87. Temperature Influences Patterns of Staggered Egg Hatching in the Eastern Treehole Mosquito (Aedes triseriatus)
Session 2

Kelly Zimmerman, Montclair State University

Aedes triseriatus is the primary vector for La Cross virus and a carrier of other arboviruses of concern to public health. Aedes eggs are stimulated to hatch when inundated with water once dissolved oxygen levels in the water decrease due to microbial growth on the eggs. Ae. triseriatus engages in staggered egg hatching, which is a bet-hedging strategy to minimize immediate reproductive failure in ephemeral environments. Warmer temperatures have been shown to increase mosquito development and hatch rates, tapering off as temperatures become lethal. In this study, we tested the effects of temperature variation on Ae. triseriatus staggered hatch rates. We compared hatching patterns at two temperatures, 20oC and 28oC. These temperatures are ~4oC lower and higher respectively than the average daily summer temperature from the collection location (23.6oC for June, July & August; 2003-2023). The first three rounds of flooding showed a higher rate of eggs hatching than the later rounds in both treatments, with greater rates occurring in the 28oC treatment. Eggs hatched at 20oC had a more even distribution of hatch rates per round. This may preserve eggs when at a less-than-optimal temperature for larval survival. Our findings suggest that warmer spring and summer temperatures may result in larger numbers of concurrently emerging adults.
Aedes, staggered hatching, temprature

88. The Lingering Effects of the Asian Longhorned Beetle: Impact on the Changing Composition of a New England Campus Arboretum
Session 1

Elizabeth Silver, College of the Holy Cross
Russell Cleary, College of the Holy Cross
Kelly Wolfe-Bellin, College of the Holy Cross

With myriad outbreaks of insect and pathogenic pests affecting New England forests, we conducted a study to investigate how the tree community of the College of the Holy Cross arboretum has changed since 2009. In Fall 2024, we began an

effort to map and identify every tree on the 70-ha campus in Worcester, MA. The campus trees have been surveyed three times, most recently in 2009. Our 2024 survey was the first to be conducted by students.

Between 2009 and 2024, the campus arboretum grew from 708 to 919 trees, and diversity of the community increased as well. In 2009, the arboretum housed 73 species with an Hâ€™ (Shannon-Wiener Index) of 3.23, and the ten most abundant genera accounted for 85% of the community. In 2024, the tree community included 94 species, with an Hâ€™ of 3.67, and the ten most abundant genera comprised 75% of the community. The composition of the tree community changed, too, but not entirely as expected.

We predicted a decrease in the number of maple (Acer), ash (Fraxinus), Eastern hemlock (Tsuga canadensis), elm (Ulmus), and beech (Fagus) trees, since these genera are all threatened by forest pests, such as the Asian longhorned beetle, emerald ash borer, hemlock woolly adelgid, Dutch elm disease, and beech bark disease, respectively. We found that ash, hemlock, and elm did not change over the 15-year period, while beech increased significantly. Only maples showed the predicted significant decrease. The other trees that decreased significantly were birches (Betula) and horse chestnut (Aesculus hippocastanum), while many trees increased significantly, including oaks (Quercus), spruce (Picea), ginkgo (Ginkgo biloba), dawn redwood (Metasequoia glyptostroboides), black gum (Nyssa sylvatica), arborvitae (Thuja occidentalis), zelkova (Zelkova serrata), and serviceberry (Amelanchier canadensis).

We found that the strongest predictor of changing abundance in the campus tree community is status of the tree as a potential host for the Asian longhorned beetle (ALB). Following a 2008 ALB outbreak in Worcester, tree planting in the city has been tightly regulated: only non-host species are allowed. On our campus, genera that have notably decreased are all known ALB hosts, while those that have increased are all non-hosts. We found that the ALB eradication efforts have had a strong and lasting impact on the campus tree community. This project, although conducted on the highly managed system of an arboretum, provides insights into the role of pest outbreaks in shaping managed and natural ecosystems.
arboretum, Asian longhorned beetle, invasive insects

89. Validating the Metabolic Scaling Exponent Estimated from Maximum Entropy Theory and Individual Size Data
Session 2

Meng Xu, Pace University

Metabolic scaling depicts the relationship between the metabolic rate and the body size of organisms. Empirical estimation of the metabolic scaling parameters relies on metabolic rate and body size measurements. Metabolic rate can be obtained under laboratory settings or from the field, resulting in different types of metabolic rate (standard, routine, active, and field). To understand the ecological effects on the metabolic scaling of free-living organisms requires field metabolic rate. Although doubly labelled water method has been the standard for estimating field metabolic rate, it cannot be applied to aquatic organism and has other practical limitations. Other proxies and techniques, such as heart rate, otolith carbonate, body acceleration, and time-budget, have been developed to estimate field metabolic rates. While these methods are based on the respiratory, chemical, or activity function of organisms at the individual level, an empirical method that can predict the metabolic scaling from the community- or population-level data is lacking. Such method would allow the inference of energy use at higher-level biological organizations and guide management practices.

Recently, parameterized maximum entropy models have been developed to estimate the metabolic scaling exponent of free-living organisms, without relying on metabolic rate data. The parameterized models use Shannon entropy to quantify the uncertainty involved in the joint distribution of species abundance and individual metabolic rate, and estimate the metabolic scaling exponent through empirical fitting of the individual size distribution. Calibration of the estimated exponent is much needed to evaluate the validity and limitations of the parameterized models. Here, we apply the

parameterized models to the natural populations of four aquatic species living in the freshwater streams in Oregon. We seek from the literature metabolic scaling patterns of related taxa, and assess whether the exponent estimated from the model follows the documented patterns. Our preliminary result shows that the estimated exponent varies consistently with nine of the 13 established metabolic scaling patterns, which reflect the biotic and abiotic influences of body shape, predation, temperature, and activity level. This finding suggests that the parameterized model produces ecological meaningful estimates of the metabolic scaling exponent, and gives us confidence to use the model to infer the energy expenditure of free-ranging animals in the wild.
statistical modeling, metabolic scaling, information theory

90. Digitization and Collection Trends of the Frostburg State University Herbarium (FSUH)
Session 1

Clara Thiel, Frostburg State University
Lily Ridgell

The Frostburg State University Herbarium (FSUH) houses over 15,000 dried plant specimens that feature many regional taxa and significant collectors. Despite its establishment in the 1950s, the FSUH has yet to be cataloged, and its complete inventory is currently unknown. To better understand the contents of the FSUH collection, collaborative efforts in partnership with the Mid-Atlantic Herbarium Consortium (MAHC) have created a digitized database to assist in its accessibility and organization. Analysis of specimen information thus far has identified trends in taxonomy, location, and distribution. Identification of taxonomic or regional location gaps in the FSUH inventory can inform future plant collection initiatives while involving undergraduate students in experiential learning opportunities. Digitization of FSUH and other small herbaria will continue to improve the accessibility of small plant collections for future research and data sharing throughout the state and greater mid-Atlantic region.
Herbaria, Mid-Atlantic Herbarium Consortium, Western Maryland

91. Disturbed and Diverse - Soil Microbial Communities of Green-Wood Cemetery
Session 2

Shelby Luster, UPROSE

Urban soils are a vital aspect of the overall health of our cities. Microbial communities present in soils are essential to ecosystem services, such as, decomposition, bioremediation, managing stormwater runoff, nutrient cycling, and the health of urban greenery and agriculture. Green-Wood Cemetery, in Brooklyn NYC, is an ideal location to study as it contains soils that have been exposed to varying levels of human influence and management practices.
We hypothesized that Green-Wood Cemetery soils under less managed conditions would maintain higher levels of microbial diversity relative to those with greater management intensity. We used a combination of 16S amplicon sequencing to examining soil bacterial communities and community-level physiological profiling to assess the soil microbial diversity at nine sites in Green-Wood Cemetery. These nine sites were under three different levels of management intensity.
Contrary to our expectation, our preliminary data suggest that, using these techniques, were were unable to detect a significant decrease on soil microbial community diversity in the most highly human influenced soils. We did find that soil depth had an influence on soil microbial diversity, with deeper soils having lower levels of microbial diversity.
urban, soil, microorganisms

92. Amplifying Fungal Knowledge: Ribosomal DNA Barcoding and the Future of Biodiversity Identification and Assessment
Session 1

Cameron Simmons, Widener University
Anthony DiLucido III, Widener University
Dr. Hemlata L. Mistry, Widener University
Dr. Bruce W. Grant, Widener University

Fungi play critical roles in ecosystems as decomposers, nutrient recyclers, and symbionts. Fungal biodiversity is vital for the health of our planet because fungi break down dead organic matter, releasing nutrients back into the environment allowing other organisms to thrive. Unlike animals and plants, for which clearly described morphological and DNA-based taxonomies have proven highly successful in estimating biodiversity, fungi "species" tend to exhibit tremendous morphological variation and DNA-based techniques to build comprehensive reference databases for fungal species remain works in progress; consequently, accurate estimates of fungal biodiversity at all scales remain elusive. Recent work has revealed that regions in the genomic ribosomal RNA (rRNA) might prove to be promising targets for DNA-Barcoding for fungi. Parts of this genomic region are highly conserved across taxa since the ribosomes are necessary for basic survival; however, other parts show random variation that creates opportunities for barcode identification. For my project, field samples of common fungi were collected from the Taylor Arboretum and Hickory Run State Park, PA. Frozen tissue was homogenized and cellular material was degraded using a lyticase solution. A DNeasy PowerSoil Pro Kit was used to harvest genomic DNA from the fungal cells, and to remove proteins, lipids, RNA, and other contaminants from the samples. After PCR-amplifying and sequencing the rDNA region, the fungal specimens were identified using Blastn. The molecular results were compared to the identifications given on internet repository identifications, such as iNaturalist. This showed that the data from Blastn was able to accurately identify the fungi down to the species level, which ultimately shows that rDNA-based barcoding can be used in conjunction with these online ID sources to further improve the validity of the databases. Moreover, my project shows that barcoding has promise for fungal biodiversity estimation.
fungal biodiversity, DNA barcoding, Ribosomal rDNA

93. Relationships between Wind Direction and Concentrations of Four Raptor Species During Autumn Migration in the Ramapo Mountains
Session 2

Daniel Kasauskas, Ramapo College of New Jersey
Thomas Thatcher, Ramapo College
Eric Wiener, Ramapo College

Although wind direction has been correlated with high concentrations of migrant raptors at some hawk watch sites, little attention has been given to the relationship between wind direction and low concentrations of migrant raptors. The purpose of this study was to examine whether wind direction is predictive of both low and high concentrations of four common raptor species during autumn migration in the Ramapo Mountains (New Jersey Highlands). Raptor counts were conducted daily during the autumns of 2014-2024. For each species, weighted wind directions were compared between days on which low counts or high counts occurred. Given that some low daily counts can simply reflect a low abundance of migrant raptors in the larger region, days with low counts were only evaluated if substantial numbers of migrant raptors were seen at one or more nearby hawk watch sites. Although there was considerable overlap in wind directions between low and high daily counts for each of the four raptor species, some segregation between low and high counts was observed. For both broad-winged hawks (Buteo platypterus) and American kestrels (Falco sparverius), multiple low counts were recorded when winds occurred from the southwest, south, and southeast, while no high counts occurred under these wind directions. For turkey vultures (Cathartes aura), zero low counts occurred on winds from the north/northeast

through the east/southeast directions, while multiple high counts occurred under these wind directions. Meanwhile, in contrast to the other three species, there was nearly complete overlap between weighted wind directions for both high and low counts of sharp-shinned hawks (Accipiter striatus). Overall, studies that include both low and high daily raptor counts can help us better understand relationships between wind direction and pathway selection by raptors as they migrate. The substantial overlap in patterns found in this study suggests that other factors such as wind speed and thermal air currents may also play an important role.
raptor migration, pathway selection, avian ecology

94. Hybrid Group-Based Concept Mapping
Session 1

Nathan Ruhl, Rowan University

Helping students to understand complex processes is one of the core challenges in teaching biology courses. Concept mapping is a flexible pedagogical method that enables students to learn the complexities of a given subject while at the same time being versatile enough that instructors can easily pivot between instructional modalities and/or update learning goals. In concept mapping the instructor chooses key terms (topics, subjects, words, ideas) from the course and the students draw labeled connections between these terms. The labels on these connections describe the relationship between the two terms. Here I describe my approach to concept mapping in teaching â€˜Climate Change Biologyâ€™ at Rowan University: hybrid group-based concept mapping. This approach is suitable for virtually any course, can be employed as a stand-alone assignment or as the basis for the entire course, and is appropriate for virtual (synchronous), in-person, or mixed in-person and virtual (HyFlex) instructional modalities.
Climate Change, Teaching, Biology

95. Microbial Partners: Decoding Host-Microbe Interactions in the Spotted Lanternfly (Lycorma delicatula)
Session 2

Amanda Munshower, West Chester University

The Spotted Lanternfly (Lycorma delicatula), an invasive species originally from southeast China, has spread rapidly across the United States since its introduction in 2014. Its expansion is largely due to the widespread presence of its preferred host, the Tree of Heaven (Ailanthus altissima), along with other plant species it can feed on. The SLF is an aggressive feeder, harming plants not only by feeding directly but also by promoting mold growth on its excrement, which can disrupt photosynthesis. Moreover, the insectâ€™s ability to spread via human transport presents significant economic risks across various industries. Current control efforts primarily rely on insecticides, which can be harmful to both humans and beneficial insect populations, as well as the physical removal of host plants. However, few studies have investigated the role of host-microbe interactions in managing this pest, leaving an area rich for exploration. This study seeks to explore the bacterial communities associated with the SLF throughout its lifecycle, potentially offering more eco-friendly approaches for controlling its spread. Our findings represent an important first step in understanding any potential symbiotic relationship between the SLF and its bacteria. A better understanding of these interactions could help inform future research on pest management through symbiosis.
Spotted Lanternfly, Bacteria, Host-Microbe Interactions

96. Effects of heavy metal pollution and phytoremediation on belowground ecology in a grassland mountainside
Session 1

Emma Noonan, Haverford College
Ariadne Kelm, Haverford College
Abigail Litchfield, Haverford College
Lee Dietterich, Haverford College
Eric Miller, Haverford College

In the wake of widespread industrialization, soil heavy metal pollution remains a significant environmental challenge, highlighting the need to study the interactions of root traits, arbuscular mycorrhizal fungi (AMF), and soil bacteria, as a way to optimize phytoremediation strategies. The highly polluted soils in the Palmerton Zinc Superfund Site provide a well-suited location to study pollutants, specifically zinc, lead, and cadmium, as well as phytoremediation in the rhizosphere. This study seeks to investigate how roots, AMF, soil microbes, and soil metal and nutrient concentrations throughout succession and ecosystem recovery. We collected roots and soil from four plant species at nine sites within the portion of the site owned and managed by the Lehigh Gap Nature center. Study species represent a successional gradient: the grasses Agrostis perennans and Andropogon gerardii and the trees Betula populifolia and Sassafras albidum. For each of the samples, we assessed root morphological traits, mycorrhizal fungal colonization, soil metal and nutrient availability, and soil microbial community composition. Samples were collected in Fall 2023, Spring 2024, and Summer 2024 to observe seasonal effects. Agrostis perennans consistently had a much higher specific root length than the other species in both the fall and spring, while A. gerardii and B. populifolia had higher root tissue density in the fall compared to the spring. AMF colonization was consistently higher in the grasses compared to the trees in both seasons, though AMF colonization was higher overall in the spring, perhaps due to increased plant nutrient demands to support growth. The greater presence of AMF in the grasses was counter to expectations that later-successional species would show higher levels of colonization due to their increased root diameter. Soil pH was a strong predictor of fall microbial community composition, consistent with other microbial community literature. Soil metal and nutrient availability have shown surprisingly few significant relationships with our biological response variables. These results suggest that AMF can be beneficial to even early stages of phytoremediation, showcasing their potential role in ecosystem recovery, and that many belowground processes in this site are robust to substantial variation in soil nutrient and metal availability.
Arbuscular mycorrhizal fungi, phytoremediation, rhizosphere

97. Integrating ecological science and stewardship practices to manage invasive species: A case study of an emerging invasive shrub, Symplocos paniculata
Session 2

Ellen Oordt, Longwood Gardens
Kristie L. Anderson, Longwood Gardens
Lea R. Johnson, Longwood Gardens

In order to protect and restore native plant communities in natural areas, it is necessary to relieve the pressures that non-native, invasive plant species impose on these communities. When managing for invasive plants across a landscape, land managers must consider various factors in order to prioritize where to focus their efforts and resources, especially where invasive plants are abundant, such as the Mid-Atlantic region of the United States. These considerations may include resource availability, financial and labor investments, goals, and species of concern. A science-driven land stewardship approach can help managers track invasive species management and develop stronger management plans to ensure success in achieving land management goals.

We present an approach for integrating ecological observations and management tracking to synthesize invasive species management plans and priorities within a data-driven framework. This approach integrates spatially explicit data describing invasive species management actions, comprehensive plant community data, and community science projects producing invasive plant maps and a database of invasive plant management methods. We use these to determine and

adjust management priorities and inform goal setting. As management is conducted, the data sets grow, which further shapes plans, guides follow-up actions, and improves upon practices in an iterative process.

We present a case study using this planning approach to address an emerging invasive shrub, Symplocos paniculata. Since 2021, 62 person-hours and 18 management actions have been employed across 37 acres utilizing 4 methods. Frequent, repeated integration of data into decision-making has enabled a strategic approach to this species and adjustments to management strategies as needed to optimize effectiveness. This approach rapidly advances adaptive invasive species management and supports long-term evaluation of outcomes.
Applied Ecology, Invasive Species Management, Community Science

98. Nectar microbes identified as detrimental to pollinia germination in Asclepias syriaca
Session 1

Geneva Waynick, William & Mary

The nectar microbiome, namely the bacteria and fungi that inhabit floral nectar, is the nexus of plant-pollinator-microbe interactions. It is currently understood that nectar microbes indirectly impact plant reproduction by altering pollinator attraction and health, but little is known about the direct impacts of nectar microbes on plant reproduction and fitness. This research aims to characterize the link between nectar microbes and plant reproduction in common milkweed (Asclepias syriaca).
Sequence- and culture-based methods were used to characterize the nectar microbiome of A. syriaca. Bacterial and fungal nectar community DNA was sequenced from insect-visited and insect-excluded flowers to gain an overview of nectar microbiome composition. A culture library of 32 bacteria and 31 fungi was created by isolating microbes from field-collected nectar and insect visitors. Pollinia germination assays were conducted to assess the effects of individual isolates on pollinia germination vigor.
In A. syriaca, pollen grains are housed in structures called pollinia that must be inserted into the nectar-filled stigmatic chamber for the pollen tubes to germinate and fertilize the ovule. The likelihood that a pollinium would successfully fertilize the ovule was approximated by conducting pollinia germination assays. Fresh-harvested pollinia were placed in drops of nectar containing microbial isolates and left to germinate for 6 hours, then the number and length of the resulting pollen tubes were recorded to calculate the germination vigor.
Results showed that 26 of the 63 tested isolates significantly decreased pollinia germination vigor compared to controls, while no isolate substantially increased vigor. Bacterial isolates were more likely to inhibit pollinia germination than fungal isolates. Bacteria and fungi isolated from insects were more likely to inhibit pollinia germination than those isolated from nectar. Interestingly, closely related microbial strains exhibited distinct effects on vigor and insect-derived isolates were generally more detrimental than nectar-derived isolates of the same genus.

Analysis of community DNA showed that insect-visited and insect-excluded nectar had similar microbial richness, but insect-visited nectar had lower pollinia germination vigor than insect-excluded nectar. This, in conjunction with the distinct effects of individual microbes on pollinia germination, suggests that the presence of certain microbes in nectar may be driving pollinia germination vigor.

These results provide evidence for a direct link between the nectar microbiome and plant reproduction; potential mechanisms for microbial pollinia germination inhibition warrant further study.
nectar microbiome, plant reproduction, plant pollinator mutualism

100. Species Diversity and Distribution within Edge-Interior and Canopy-Understory Quercus rubras in a Temperate Deciduous Forest
Session 1

Emily Connell, Stevenson University

The tree canopy is a host to many species and is an extremely important habitat in a forest. Research of the species in these habitats is limited, especially in temperate deciduous forests. Examination of two dominant Northern red oak (Quercus rubra) trees in Owings Mills, MD was done from the fall of 2023 to the spring of 2024. The two trees are positioned differently in the forest area, one being on the forest edge and the other in the interior. Using the stationary rope system, we installed trail cameras to analyze the species across the upper, middle, and lower canopy as well as the understory and ground. Over seventy thousand photos were taken by the ten trail cameras, and these captures generated a number of discoveries. Flying squirrels were the most abundant in the middle and lower canopy and made up 43% of the captures in the fall/winter, 95% of which were in the middle and lower canopy. Deer were the most abundant ground species, making up 73% of the captures there. There was variability between the bird species captured on each tree with Pileated woodpeckers, Eastern bluebirds, Northern flickers, Blue jays, and Carolina chickadees only occurring on the forest edge. Carolina wrens, Downy woodpeckers, Black and white warblers, and Brown creepers were only captured in the forest interior. From our data, we can conclude that flying squirrels are mainly active in the middle and lower areas of the tree canopy. The species found only in the forest interior or edge could be specialist species, only being active in these parts of the forest. White-breasted nuthatches were found to be the most abundant bird species, commonly found in the middle part of the canopy on the edge of the forest and the understory in the interior. The differences in location of activity could be due to numerous factors including microclimates, those of which will need to be studied further to draw conclusions. With the information we found, we can conclude that there are clear differences between the habitats of the edge and interior of the forest, but future research will aim to determine the specifics.
Forest canopy, Biodiversity, resource partitioning

101. Population Trends and Influence of Wind Direction on Autumn Migration of Monarch Butterflies and Canada Geese in the Atlantic Flyway
Session 2

Aleah Germinario, Ramapo College of New Jersey
Kyle Sheldon, Ramapo College of New Jersey
Eric Wiener, Ramapo College of New Jersey

The purpose of this study was to investigate the use of data collected at hawk watch sites for better understanding migrating populations of monarch butterflies (Danaus plexippus) and Canada geese (Branta canadensis). Migrant counts were conducted daily in the Ramapo Mountains for both species, and monarch butterfly data from other sites in the region were accessed via the Hawk Migration Association of North Americanâ€™s online database. Trends in daily and annual counts of monarch butterflies were compared among hawk watch sites, as well as with overwintering data from Mexico published by the World Wildlife Fund - MÃ©xico. Trends in annual counts of migrating Canada geese were compared with breeding survey data published by the US Fish and Wildlife Service. In addition, wind direction that was recorded while collecting migrant data in the Ramapo Mountains was evaluated for relationships with migrant counts.

Yearly trends in monarch butterfly counts were remarkably consistent across hawk watch sites and recent overwintering data. Additionally, trends in differences between daily counts at different hawk watch sites were largely consistent, suggesting that migrating monarch butterflies do not alter their pathway selection as much as migrating diurnal raptors. Yearly trends in counts of migrating Canada geese as seen from the Ramapo Mountains show similar fluctuations to breeding population counts, suggesting that migration counts can be another useful data source for monitoring the migratory populations of the specie. Interestingly, the highest daily counts of migrating monarch butterflies in the Ramapo Mountains tended to occur on days with WSW-NNE and SE winds, and high counts of Canada geese only occurred on

days with tailwinds or winds perpendicular to the mountain ridges and flight paths. Given the variety of interesting trends in the data, further research seems warranted to more fully realize the value of using data from hawk watches to monitor these two species.
migration, population monitoring, monarch butterfly

102. Soil Respiration Drivers and Challenges in a Changing Environment
Session 1

Olivia Haas, Montclair State University

This study aims to understand forested soils (sandy loam & silt loam, post-agricultural and native) and the influences that drive carbon sequestration and soil respiration flux. Duke farms Hillsborough NJ has historically been utilized as an agricultural zone for farming a variety of crops. Currently the area is protected with a focus on environmental conservation and restoration of the land. This includes getting a better understanding of the forested portions of the property. Understanding the quality of forested areas is vital as they have the potential to act as a carbon sink which can mitigate the effects of climate change. This ongoing study aims to investigate soil respiration (Rs) and how it is affected by soil temperature (Ts) and soil water content (SWC). Measurements were gathered using an infrared gas analyzer (IRGA) (Li- 6400XT; LiCor, Lincoln, NE) at four sites across forested areas in Duke Farms. Data were gathered for 5 soil collars per site at least once a month from 2020-2025. Additionally, parameters measured using the IRGA were air temperature (Ta_C) and relative humidity (Rh%). Soil temperature (Ts) was also collected using soil temperature sensors (T107 probe) at a depth of 10cm, every 30 seconds and averaged every 30 minutes at each site. Soil moisture (SWC) was gathered using a soil moisture probe (CS616 probe) every 30 seconds and averaged every 30 minutes. Both sets of data were collected using a CR6 datalogger (Campbell Scientific Inc.). Preliminary findings suggest a potential trend where, as Ts increases, the rate of Rs increases but is modulated by prior management.
Soil Respiration, Climate Change, Infrared Gas Analyzer

103. Seasonality of Harmful Algal Bloom Occurrences and Correlations to Nitrate Concentrations in the Spruce Run Recreational Area, Clinton, NJ
Session 2

Kiara Bonzano, Raritan Valley Community College
Emilie Stander, Raritan Valley Community College

Bodies of water in New Jersey have become affected by harmful algal blooms (HABs) during the past few years. HABs produce toxins including neurotoxins, hepatotoxins, and nephrotoxins, posing a threat to the public who use these affected water bodies for recreation. Spruce Run reservoir, a recreational area in western NJ, has been afflicted by this issue since the summer of 2019, leading to the closure of the swimming area. In this study we documented HAB occurrences and algal toxin concentrations in relation to nitrate concentrations within the Spruce Run Recreation Area Reservoir using low-cost, semi-quantitative screening methods. Samples were collected on a biweekly basis from August 2020 through August 2023 at two locations within Spruce Run reservoir. Samples were collected in pre-rinsed, sterile Nalgene bottles, and filtered the same day through 42mm filter papers prior to nitrate concentration analysis. Nitrate concentrations were determined by colorimetric analysis using a flow-injection analyzer. Microcystin and phycocyanin levels were measured using semi-quantitative test strips and a fluorometer, respectively, and matched to state health advisory levels. Abraxis test strips were used to measure concentrations of microcystin between 0 and 5ppb. Abraxis testing was initially conducted without filtering or other sample processing; starting in June 2022 samples were first filtered and subjected to three cycles of freezing and thawing prior to using the Abraxis test kits in order to more effectively lyse the bacterial cells. A FluoroSense handheld fluorometer was used for on-site measurements of phycocyanin levels up to 199 rfu. Results from

the Abraxis strips and fluorometer readings were regressed with nitrate concentration measurements taken on the same dates and showed weak correlations. Fluorometer readings regressed with nitrate concentrations throughout the sampling period in both sampling locations resulted in R^2values of < 0.1. Comparisons of state government-provided microcystin concentrations, measured quantitatively using ELISA (enzyme-linked immunosorbent assay) methods, to same-day nitrate concentrations also showed weak relationships. Although HABs are generally thought to be active during the summer months and dormant during the fall and winter, we found HAB occurrences during all times of the year. Our findings indicate that same-day nitrate concentrations are a weak predictor of HAB occurrence and that HABs at Spruce Run are perennial throughout the year.
harmful algal bloom, nitrate concentration, Abraxis test strip

104. The Effects of Road Salt on EPT within Western New York
Session 1

Daniel Dziezewski, Daemen University
Dr. Jeffrey Law, Daemen University

Each year, the New York Department of Transportation spreads 20 million tons of salt onto the roadways. This salt leeches into surrounding waterways, raising the salinity levels within freshwater ecosystems year round. While there are multiple studies examining the changes in salinity concentrations in these freshwater streams, there is a gap in the literature in regard to the effects of road salt runoff on Ephemeroptera, Plecoptera, and Trichoptera (EPT). In order to further examine these effects, we carried out a six month long investigation on the impacts road salt runoff had on stream salinity and EPT in Western New York. Streams residing in both Niagara and Erie county were sampled beginning in May 2024 and ending in October 2024. HOBO loggers were utilized to capture salinity concentrations, along with Surber nets that were used to collect macroinvertebrate samples monthly. Here, we present the trends observed between EPT abundance as it relates to stream location, salinity concentrations, and seasonal changes. The spring and summer months were characterized as having drought like conditions, which affected the water levels and flow rate. However, the winter months brought about severe winter storms, displaying subfreezing temperatures and little precipitation. The findings here will be supported by future analysis carried out by the sister project spanning the remaining six months of the year.
Salt, EPT, Biodiversity

105. Picky eaters or anything goes: Seasonal timing and specialization among greater fritillary butterflies
Session 2

Gabriela Cano, Temple University
Mark T. Swartz, Virginia P. Tilden, Erika N. McKinney, Kayli L. Thomas, Konstantina Zografou, Matthew A. Banks, and Brent J. Sewall

Diet specialization can shape species survival. Species with generalized diets can better adapt to fluctuations in resource availability, while specialists may efficiently exploit resources but remain vulnerable to the loss of a few key resources. For pollinators like butterflies, specialists need to further respond to the ephemeral nature of their resources; nectar plants may only be in bloom for a portion of the pollinators' life cycle. Butterflies serve as key indicators of ecosystem health, but for most species, temporal variation in their resource use remains poorly understood, hindering conservation and restoration efforts. In this study, we analyzed nectar plant use among closely related butterfly species, comparing the common Great Spangled Fritillary (Argynnis cybele) and Aphrodite Fritillary (Argynnis aphrodite) with the rare Eastern Regal Fritillary (Argynnis idalia idalia). We examined how seasonality and specialization of nectar plant use varied among butterfly species between sexes of the Eastern Regal Fritillary, and among years. We hypothesized that the Great Spangled and Aphrodite Fritillaries would exhibit a broader use of nectar resources over the course of a season, following

nectar availability, while we expected the Eastern Regal Fritillary would display a consistent seasonal and inter-year pattern of specialization, using fewer nectar plants over time. We also expected sex-specific differences in nectar plant use in Eastern Regal Fritillaries due to their differing emergence times. During transect walks conducted weekly throughout the summer flight season of these butterflies over 27 years (1998-2024), we recorded nectaring behavior and flowering plant species. We then examined seasonal shifts in nectar plant use by season, year, species, and sex. Our results indicate clear differences in specialization: while Great Spangled and Aphrodite Fritillaries used diverse nectar resources simultaneously, Eastern Regal Fritillaries demonstrated sequential specialization, using only a few plants before switching. Over the years, Eastern Regal Fritillaries relied on just seven nectar resources, and females of this species exclusively selected field thistles (Cirsium discolor) during oviposition. These results indicate that Eastern Regal Fritillaries are consistently more specialized than the Great Spangled and Aphrodite Fritillaries and indicate that Eastern Regal Fritillaries exhibit a repeated annual pattern of sequential specialization. This study further revealed the central importance of field thistle during oviposition by female Eastern Regal Fritillaries, suggesting a key target for habitat improvement to support this rare species. These findings highlight the need to consider nectar resource availability and seasonality, particularly for rare butterfly species, in habitat restoration and reintroduction efforts.
habitat restoration, pollinator conservation, diet specialization

106. Management of Microstegium vimineum: A meta analysis
Session 1

Marty Farchione, Chatham University

Effectiveness of invasive species management varies based on treatment type, timing, and duration. Microstegium vimineum (Japanese stiltgrass) is an invasive annual grass affecting vast regions along the eastern United States. This meta-analysis aims to determine the effectiveness of various management strategies for Japanese stiltgrass. We are conducting a comprehensive literature review to gather data on treatment types (mechanical, chemical, and biological), application timing, and duration (ranging from one to multiple seasons). Our quantitative analysis will statistically verify the effectiveness of treatment types, with a focus on studies with durations of >2 years to assess potential stiltgrass resurgence. Preliminary results indicate that mechanical and chemical treatments are more effective than biological methods, and treatments lasting more than one season show higher success rates. We will use these findings to provide best management practices that will benefit conservation initiatives, agricultural spaces, and public and private landholders. Understanding effective management practices is essential for maintaining healthy ecosystems. By determining best practices for Japanese stiltgrass management, this study will improve land stewardship across various settings and affected regions. Our meta-analysis will enhance the accessibility of best practices for diverse audiences, contributing to more effective invasive species control strategies.
Microstegium vimineum, invasive, management

107. Investigating the Possible Effect of cGMP-Dependent Protein Kinase on Dispersal Behavior in Chinese Praying Mantis (Tenodera sinensis) Nymphs
Session 2

Andrea Hawkins, Stevenson University
Mike Merola, Stevenson University
Dr. Stearns, Stevenson University

The Chinese Praying Mantis, Tenodera Sinensis, are ambush predators that remains solitary for the majority of their life. In many insect species, a foraging gene (for) mediates dispersal at a specific stage in their life cycle. Given the gene's widespread presence in insects, it is likely involved in mantid dispersal as well. This gene may facilitate the mantisâ€™

movement away from the hatching site, minimizing the risks of inbreeding, cannibalism, and resource depletion. Exploring a candidate gene approach, this study explored if there are receptors for the gene by observing whether the nymphs exhibited increased movement once exposed to a concentration of the protein, cGMP-dependent protein kinase (PKG). A 1.25 mM solution of PKG was administered at 100%, 50%, 20%, and 10% concentrations, with water used as the control. 10 nymphs were used in total, and each were given a different level of concentration. Two tests were conducted for each concentration. The nymphs were recorded both before and after receiving the protein to measure (mm) the distance traveled. There was no clear indication if the protein had an effect on the nymphs. This pilot study provides further insights into the foraging gene and future research will be conducted to investigate its possible impact on the behavior of praying mantis.
Tenodera Sinensis, Foraging Gene, Behavior

108. Trophic ecology of blacknose dace (Rhinichthys atratulus) in the Bronx River, NY, USA
Session 1

Juliet Hernandez, Marymount Manhattan College
Matthew J. Lundquist, Marymount Manhattan College

Urbanization, the transformation of natural landscapes into cities, is rapidly increasing and rivers and streams face challenges, including increased salinity, higher temperatures, runoff, nutrient pollution, and habitat loss. The Bronx River, the largest freshwater river in New York City, has low aquatic insect diversity and abundance is significantly reduced compared to nearby, non-urban rivers. Three taxa dominate: caddisflies (Hydropsychidae), midges (Chironomidae), and amphipods (Amphipoda). These invertebrates are likely crucial food sources for fish in the river, and their biomass and abundances vary within the river and may impact stream food webs differently. To investigate this, we collected blacknose dace (Rhinichthys atratulus) from June through July 2023, the lengths of the fish (cm) were recorded, and then dissected, and their gut content was recovered. Invertebrate bodies both partial and whole were identified under a microscope and separated by taxa and location. Representative samples of each aquatic invertebrate taxa were also collected with dip nets. Despite having the smallest biomass, midges were the most abundant taxa within R. atratulus guts of all body sizes, but caddisflies and amphipods were also present in some guts. Interestingly, total biomass consumed was similar among R. atratulus of similar size classes, regardless of gut content diversity. This suggests that R. atratulus preferentially consumes many small prey items (midges), but will opportunistically consume larger prey items (caddisflies and amphipods). Additionally, these three aquatic invertebrate taxa were the only identifiable organic material found within all R. atratulus guts. While R. atratulus did show some preference for midges, the lack of overall diversity of prey items may have important consequences for the resilience of aquatic food webs against further urbanization impacts within the Bronx River.
urbanization, food webs, fish

109. Water quality testing across Wheeling Creek shows recent SPC spikes across all sites
Session 2

Dedrick Martin, West Liberty University
James Wood, West Liberty University

In urbanized watersheds, wastewater inputs and impervious surface runoff can contribute to increases in ions such as Potassium, Sodium, Chlorine, Sulfate, Calcium, Magnesium, Carbonate, and Bicarbonate. These â€œchemical cocktailsâ€• can lead to environmental degradation and are collectively measured as conductivity. Routine monitoring of streams can help provide insightful changes in water quality over time, and changes in water chemistry in low order streams can subsequently influence the chemistry in higher-order receiving streams. Using a routine monitoring dataset

that extends back to 2019, we analyzed data from seven sites in the Wheeling Creek watershed near Wheeling, WV. Four sites were located on the main stream and three sites were from tributaries to Wheeling Creek. We identified fluctuations in all variables that have been observed since testing began, given expected seasonal influences. Interestingly, all four sites in Wheeling Creek (WeCr11, 09, 03, 02) as well as two of the three lower order streams (PrCr, LrCr) showed a recent record high peak in specific conductance since testing began 5.5 years ago. In addition to these spikes, we observed a trend of increasing SPC beginning in late 2024. High levels of SPC may be toxic to fish and aquatic invertebrates, and determining the cause of increases in SPC could help maintain water quality and recreational opportunities in Wheeling. High concentrations of salts in surface waters may be due to point or non-point sources, but can also be due to an increased reliance on ground water during droughts, if that ground water has been contaminated with pollutants, for example, brine water, excess road salt applications, or failing sewage infrastructure.
Water quality, Urbanization, Conductivity

110. Tritrophic interactions between Eastern Redbud (Cercis canadensis) cultivars, a seed predator (Gibbobruchus mimus) and parasitoid wasps
Session 1

Michaela Rolecki, Susquehanna University

Eastern Redbud (Cercis canadensis) is a horticulturally important pod-bearing tree in the legume family (Fabaceae). It is host to a bruchid beetle (Gibbobruccus mimus), which is considered a seed predator, and multiple species of wasps that are parasitoids of the beetle larvae. Along with native C. canadensis species, many cultivars are commercially available. Previous research on legume species has found that seed beetle predation varies among cultivars. Here we test whether seed predation by G. mimus is higher in cultivars than the native redbud and whether predation and parasitoidism varies among cultivars given their phenotypic diversity. To investigate this, Eastern Redbud pods were collected from native redbud trees and from 5 cultivars (including Heart of Gold, Texas Oak, Royal White, Cascading Hearts, and Pink Heartbreaker), all located at the National Arboretum in Washington, DC. Sixty pods were collected per tree and 3 to 4 trees per cultivar were sampled. Seed condition was classified as either intact, aborted, irregular, or having an exit hole created by a wasp or beetle (distinguished based on hole size). We found seed condition varied among cultivars, with Heart of Gold seeds having fewer beetle exit holes than other varieties. The Royal White cultivar had the greatest proportion of intact seeds. We were also interested in whether seed predation by the beetle always leads to death of the plant embryo, as the term â€œpredationâ€• implies. Our initial findings suggest cellular respiration (as indicated by tetrazolium staining) is present in embryo tissue that remains following the emergence of the beetle, suggesting the designation â€œseed predatorâ€• may not be accurate. If embryos can germinate despite bruchid beetle damage, it is possible that the damage could act to scarify the seed coat and improve germination, leading to a reclassification of this tritrophic interaction.
Seed predation, Parasitoid wasp, Tritrophic interactio