2017 ONHC -- Oral Talks

Author:

Collins, Merri. (Merri Kathleen Collins)

[Poster Title: Habitat of the Mudpuppy Salamander (*Necturus maculosus)* in SE Ohio using environmental DNA. 2016]

Oral Talk Title:

The common mudpuppy salamander; not so common anymore? Habitat and Conservation of the Mudpuppy Salamander (*Necturus maculosus)* in SE Ohio using environmental DNA.

Affiliations:

Crane Hollow Nature Preserve (Grant recipient)

Ohio University (Graduate Student)

Abstract:

The mudpuppy salamander, with a wide-reaching range in the Midwest, has suffered severe population declines due to habitat degradation and anthropogenic drivers. Little is known about the current population of mudpuppies in Ohio, especially the Southeast. Environmental DNA is a new and innovative biological monitoring tool that can establish presence or absence of aquatic organisms in lentic and lotic ecosystems using only water samples and PCR (polymerase chain reactions). Coupled with traditional surveys, eDNA monitoring can be a useful tool for conservation of cryptic species like the mudpuppy.

Biography:

Merri is a current graduate student at Ohio University (projected graduation date of July 2017) in the Environmental Studies program with a concentration in wildlife conservation biology. She is a member of Kuchta labs at Ohio University studying the habitat of mudpuppy salamanders using both traditional field surveys and environmental DNA.

Marion Andrews Holmes and Glenn R. Matlack

Composition of forest herb communities differs with agricultural land-use history

Department of Environmental and Plant Biology, Ohio University

Abstract

Herb communities in post-agricultural deciduous forests are distinct from minimally-disturbed forests in composition and structure. General effects of land use are well-documented, but potentially

contrasting impacts of specific agricultural practices are less understood. We examine recolonization of herbaceous plant communities on post-agricultural land. We tested the hypothesis that community composition would initially differ between stands with histories of pasturing and cultivation, and that community types would converge through successional time as physical contrasts diminished and species accumulate. As an alternative hypothesis, community composition potentially diverges as populations are filtered by contrasting environments.

Forest stands in southeastern Ohio were selected on abandoned pastures and cultivated fields to form a replicated chronosequence spanning 0-80 years after canopy closure. Five minimally-disturbed mature stands >120 years were included as a control. Stand age and land-use history were determined using historical aerial photographs, surface microtopography, and soil profiles. Herbaceous vegetation, environmental variables and soil characteristics were recorded.

Forest herb community composition changed through successional time and differed significantly between pastured and cultivated sites. Shade-tolerant native species accumulate through the chronosequence, suggesting successional convergence, but composition is still distinguishable from the control at 80 years. Community composition within age classes was influenced by environmental variables at each site, demonstrating an interaction between site characteristics, forest age, and land-use history. Thus, legacy effects of agriculture persist for at least 80 years suggesting environmental and demographic filtering. Full re-assembly of the forest herb community occurs on longer time scales than measured in this project.

Marion Holmes is a doctoral candidate in plant biology at Ohio University who specializes in forest herbs. Her research interests include vegetation dynamics, land-use history, and spatial ecology.

Glenn Matlack is an associate professor of plant biology at Ohio University. He specializes in plant population biology, and is interested in interactions of demographic processes such as seed dispersal with spatial and temporal pattern in the landscape.

Author(s) & Affiliation(s):
Hopkins, C. B. Ohio University (ch183014@ohio.edu -or- 248-941-2839), Kuchta, S. R. Ohio University, and Roosenburg, W. M. Ohio University

Title of Talk: Assessing Roadway Mortality and Ecopassage Utilization along a Two-lane Highway

Abstract:
As roadways reduce amphibian population sizes, disrupt connectivity, and degrade habitat mitigation measures are increasingly being implemented. Barriers and ecopassages are a common strategy used to mitigate roadway impacts. Barriers limit access to roadways and may direct animals toward ecopassages, which are corridors designed to conduct animals safely over or under the roadway. The effectiveness of these mitigation measures for small animals remains poorly studied. We quantified levels of roadway mortality, ecopassage use, and amphibian populations, to assess the effectiveness of a barrier-ecopassage system along a two-lane highway. We will be presenting our findings from 2015-2016 and directions for future research.

Biographies:
Charlene B. Hopkins is a graduate student at Ohio University advised by Dr. Shawn R. Kuchta and Dr. Willem M. Roosenburg. She is studying the impacts of roadways and roadway mitigation measures on amphibians. Charlene has worked on field ecology projects in 12 states, served in Peace Corps Senegal, and earned her BS from Michigan State University.

Dr. Shawn R. Kuchta is an Associate Professor in the Department of Biological Sciences at Ohio University. He earned his BS in Zoology from the University of Washington under Ray Huey and his PhD in Integrative Biology under David Wake in the Museum of Vertebrate Zoology, University of California-Berkeley. He completed postdoctoral work at University of California-Santa Cruz, Lund University, and Dartmouth College. He is broadly interested in patterns of diversity and the processes that generate, maintain, or limit these patterns.

Dr. Willem M. Roosenburg is a Professor in the Department of Biological Sciences at Ohio University. He earned his BS in Zoology at the University of Rhode Island, his MA in Biology at the State University College at Buffalo under Edward Standora, and his PhD in Biology at the University of Pennsylvania under Arthur Dunham. Roosenburg's research specialties are population and conservation biology. He has conducted several successful long-term demographic studies on turtles, snakes, and lizards.

The importance of forest management for birds in Ohio

Matthew B. Shumar
Ohio Bird Conservation Initiative

Ohio's forests have seen remarkable change over the last two centuries. Following widespread clearing during the 1800s, forest cover plummeted to less than 15% of the state. From the 1940s through the 1990s, Ohio experienced a regrowth of forest lands totaling approximately 1.6 million hectares, and even recently our state's forests have continued to expand and mature. Today, approximately one-third of Ohio is classified as forested. While speaking generally about trends in forest cover is moderately easy, generalizing population trends and conservation threats across bird species is decidedly more difficult. Both Breeding Bird Survey and Ohio Breeding Bird Atlas results show that woodland-breeding species have fared reasonably well, with a higher proportion of species experiencing significantly positive population trends. However, the inverse is true for grassland birds and species breeding in shrubland and early-successional habitats. Further, many songbird species that nest in mature forests rely on dense successional habitat during post-breeding and migration periods. Thus, ensuring a diverse assemblage of forest at various successional stages across the landscape is important. Given that 85% of Ohio's forests are privately owned, landscape planning can be challenging. In recent years, biologists have made important discoveries regarding the habitat requirements of breeding songbirds in forested landscapes, including the importance of stand age, structure, size, species composition, and configuration on the landscape. The Ohio Bird Conservation Initiative has been developing a variety of materials including workshops and videos to inform private and public land managers on the importance of forest management for Ohio's avifauna.

Author bio:

Matthew Shumar is the Program Coordinator for the Ohio Bird Conservation Initiative. In addition to serving as OBCI Coordinator, he is the webmaster for the Association of Field Ornithologists and was the Project Coordinator and editor for *The Second Atlas of Breeding Birds in Ohio*.

2017 ONHC Poster Abstracts

Donald P. Althoff and Karen M. Roberts

Activity Patterns of Tri-Colored Bats (*Perimyotis subflavus*) in Southeastern Ohio

Wildlife Conservation Program, University of Rio Grande, Rio Grande, Ohio.
Email: dalthoff@.rio.edu

The tri-colored bat (*Perimyotis subflavus*), the smallest of Ohio's 9 breeding species, prefers open forest areas with a water source nearby during the breeding season. We used acoustic monitoring (AM) equipment to passively sample 24 sites in southeastern Ohio from late April to September 2015 and 2016 to detect the presence of bats. Deploying 4 AM units per week (i.e., 7 consecutive nights per site, rotated 3 times through each site), we recorded 264 calls in 2015 and 255 in 2016 that were of sufficient quality to confidently identify them as being made by tri-colored bats. Based on these detections, activity patterns in late spring/early summer were different than late summer/early fall within a year for both years. The overall trend for late spring/early summer indicated the peak of activity from 11pm to 4am in 2015 but from 9pm to midnight in 2016. For late summer/early fall in 2015 activity peaked shortly after sunset and again around 4am; for 2016 the greatest number of detections were from midnight to 2pm. The seasonal shifts and annual differences may be explained, in part, by changes in prey abundance. Or the shifts may have reflected presence of newly volant young—especially in 2015 where at several sites we had greatly increased detections both for an hour shortly after sunset and again about 4am for an hour. Understanding such activity shifts is important to consider when deciding the optimum time to deploy mists nets to capture this species or conduct additional AM surveys.

Don Althoff is currently professor of Wildlife Conservation at the University of Rio Grande. He has a B.S. from the Ohio State University (1976), an M.S. from the University of Nebraska (1978), and a Ph.D. from Penn State University (1983).

Karen Roberts is a volunteer with the Rio EcoMonitoring Project. She has a B.S. from Southern New Hampshire (1997).

John A. Blazer and Donald P. Althoff

Does Big Brown and Eastern Red Bat Presence Correlate With Estimates of Canopy Coverage?

University of Rio Grande, Rio Grande, Ohio.
Email: dalthoff@.rio.edu

Big brown bats (*Eptesicus fuscus*) and eastern red bats (*Lasiurus borealis*) represent two common Ohio species yet little has been reported about their ecology in southeastern Ohio. We conducted passive acoustic monitoring (AM) in Gallia, Jackson, and Vinton counties from April-September 2016, in part, to evaluate whether these two species used sites more or less relative to estimates of canopy cover. AM was conducted for 7-consecutive nights three times at each site (n=24) to determine presence and frequency of use. Calls were recorded in full spectrum. After filtering out noise files and making initial identification using autoID software, 6,553 bat calls were manually vetted. Of that total, 1,438 were identified as big brown bats and 1,165 as eastern red bats. We estimated mean canopy cover based on 9 digital photos per site with the photos systematically obtained within a 50m radius of the AM equipment. Each 9-photo set was converted to black-and-white to determine pixel counts using ImageJ software. Bat use of a site and estimates of mean canopy cover were not correlated ($r = -024$, $p = 0.25$ for big brown bats; $r = 0.02$, $p = 0.93$ for eastern red bats). This lack of association may be attributed to several factors, including our measure of canopy coverage not being a good representation of clutter—a habitat feature known to strongly influence bat foraging behavior. We did observe a high degree of correlation ($r=0.75$, $p<0.0001$) between the two bat species relative to site usage indicating at a minimum a high degree of spatial overlap.

John Blazer is currently a senior at the University of Rio Grande majoring in Wildlife Conservation. He spent the summer of 2016 as the seasonal technician on the Rio EcoMonitoring Project.

Don Althoff is currently professor of wildlife conservation at the University of Rio Grande. He has a B.S. from the Ohio State University (1976), an M.S. from the University of Nebraska (1978), and a Ph.D. from Penn State University (1983).

Seasonal Toxic Effects of Amur Honeysuckle Leaf Leachate on an Aquatic Invertebrate

Eric B. Borth, Kevin W.Custer and Ryan W. McEwan

University of Dayton

Abstract

The invasive plant *Lonicera maackii* (Amur honeysuckle) has caused many negative effects for native vegetation as it spreads through the eastern United States including the loss of biodiversity and alterations in ecosystem function in forests. Many studies focus on effects of Amur honeysuckle invasion on terrestrial habitats, while effects on aquatic habitats have received much less attention. In this set of experiments we aim to improve our understanding how terrestrial invasion of Amur honeysuckle affects aquatic organisms. This will be investigated using the macroinvertebrate *Hyalella azteca*, a standard "model" aquatic organism

used to assess toxicity in flowing waters (streams and rivers), to reveal effects that Amur honeysuckle may have on aquatic macroinvertebrates. Based on preliminary data, it was hypothesized that Amur honeysuckle leachate would have negative effects on the survival of *H. azteca.* In the lab, *H. azteca* were exposed to riparian honeysuckle leaf leachate (made by soaking 10 g leaves in 100 mL dechlorinated water for 24 h) in 48 h acute, static toxicity tests. This was repeated throughout the growing season. When exposed to an Amur honeysuckle leachate dilution series (6.25%, 12.5%, 25%, 50%, 100%), *H. azteca* survival was significantly decreased in all dilutions in the spring and fall trials. However, the summer trials showed no significant decrease in survival in nearly all the dilutions. These results suggest (a) strong toxic effects of Amur honeysuckle foliage on a model aquatic organism that (b) varies throughout the year, potentially in relationship to biochemical changes associated with phenology. Future experiments regarding the chemical composition and toxicity of these leaves should be mindful of the season in which the leaves are gathered. This study supports the importance of management of Amur honeysuckle in headwater stream riparian zones which are particularly vulnerable to perturbations and are increasingly a focus of conservation.

Biographies:

Eric Borth is a senior undergraduate at the University of Dayton. Since his freshman year he has been involved in the McEwan lab projects investigating terrestrial-aquatic linkages of the invasive shrub Amur honeysuckle (*Lonicera maackii*).

Kevin was a Postdoctoral Associate in the lab working on the NSF grant. He has a PhD from Wright State University where his research focused on ecotoxicology in stream systems focusing on metal pollution of stream benthos. His interest in the lab was applying this ecotox framework to the invasion biology of Amur honeysuckle. He wrapped up work in the lab in March of 2017 and left to take a leadership position at Pace Analytical Laboratory.

Dr. Ryan McEwan is Associate Professor and Environmental Biology Program Chair in the Department of Biology at the University of Dayton. His research group focuses on diversity, function and dynamics in temperate, tropical and boreal forests including disturbance ecology, invasion biology, terrestrial-aquatic linkages and sustainable resource management.

Authors: Brooke Dunigan and Sarah Minter

Title: Morphometric Analysis of Metapopulation Parameters using Museum Specimens

Affiliation: Shawnee State University, Portsmouth, Ohio

Abstract: Members of the same species may exhibit significant variation among populations, especially when populations have become isolated in unique environmental parameters. Accordingly,

metapopulations may be comprised of populations that exhibit markedly different measurable characters. We hypothesize that mammal species having populations in multiple physiographic regions of Ohio exhibit measurable distinctions among populations. We will test this hypothesis by comparing a standard set of cranial measurements among mammal skulls collected across the five physiographic regions of the state for all species of native Ohio mammals. Cranial measurements will be obtained from university and museum collections across the state. We are presenting the data from our first series of measurements collected from the teaching collection at Shawnee State University in Portsmouth, Ohio. University teaching collections, while not often of museum quality, offer valuable scientific information about local populations. The collection at our university houses 282 study skins representing 16 families and 250 skulls representing 15 families in 10 orders. For the purposes of our study, we are focusing entirely on cranial measurements. All measurements are made to the one hundredth millimeter using a digital caliper. Diversity of represented species and summary statistics for species represented by 5 or more skulls are presented. It is our intention to expand data collection to encompass skulls housed in collections across the state with current and future collaborations. We seek not only to test our hypothesis, but to utilize collected data in the construction of a dichotomous key to the skulls of Ohio mammals.

Brief Biography of Authors: Brooke Dunigan is a senior undergraduate biology student at Shawnee State University. She plans to attend graduate school and obtain a MS degree in a Systematics, Evolution & Ecology program following graduation in May of 2018. She is also interested in museum studies.

Sarah Minter is an Associate Professor of Biology at Shawnee State University where she teaches courses focused on organismal biology and advises undergraduate research students. She received her PhD in Entomology from the University of Kentucky in 2011.

Authors: Alex Haddad and Rob Hopkins

Title of Poster: Description and Geography of a Unique Population of the Stonecat (*Noturus flavus*)

Affiliation: University of Rio Grande

Abstract: The Stonecat, *Noturus flavus,* has one of the largest distributions among madtom catfishes, ranging latitudinally from northern Alabama to southern parts of Canada and longitudinally from Montana to Vermont. Corresponding to this widespread distribution are unique patterns of morphological variation. Several reference works suggest the existence of three distinct morphs of Stonecat which may warrant independent, species-level designations. In this project we evaluated morphological (shape and pigmentation) variation of the Stonecat across its entire range (n=453). Particular emphasis was placed on the morph found throughout the upper Cumberland River and Tennessee River drainages, herein referred to as the “Highlands Stonecat”. Sheared Principal Component Analyses indicated only moderate divergence in morphometric characteristics of the Highlands Stonecat versus typical Stonecat. However, pigmentation patterns were markedly different between the two putative lineages and specimens were 100% distinguishable when two or more pigmentation patterns were compared concurrently. Distinctive light-colored crescents were present on

the nape of 99% of Highland Stonecat specimens, 91% showed dense pigmentation on the lips, and 73% displayed moderate pigmentation on the pelvic fins and abdomen. In contrast, only 3% of typical Stonecat specimens had crescents present on the nape, 6% showed pigmentation on the lips, and 21% had pelvic find and/or abdomen pigmentation. Our morphological results corroborate those of recent karyologic and phylogenetic studies suggesting the Highlands Stonecat is a distinct lineage of Stonecat in the formal taxonomic sense. Thus, we suggest future efforts be directed toward formally describing the Highlands Stonecat as a unique species of madtom catfish.

Biography: Alex Haddad is an undergraduate student in the School of Mathematics and Natural Sciences at URG studying Biology-Biomedical Science. Rob Hopkins is an Associate Professor of Wildlife Conservation with research interests in aquatic zoology and ecological modeling.

Author: Kal Ivanov
Title: *Myrmica* (Hymenoptera: Formicidae) of Ohio
Affiliation(s): Virginia Museum of Natural History, Department of Recent Invertebrates

Abstract: *Myrmica* is a diverse genus of cold-adapted ants found in boreal and temperate habitats of the Northern Hemisphere and in the high mountains of Southeast Asia where these ubiquitous myrmicines are conspicuous and ecologically important members of local faunas. Ohio's Myrmica were last reviewed by Coovert (2005) who reported five species from the state including *M. punctiventris*, *M. pinetorum*, *M. americana*, *M. fracticornis*, and *M. emeryana* (as *M. latifrons*). Since Coovert's publication two species have been added to the state's myrmecofauna (*M. semiparasitica* – Francoeur and Ivanov 2008; and M. AF-*smi* – Ivanov and Keiper 2009). Here I contribute to our knowledge of Ohio's *Myrmica* by providing new records, distributional information, identification and natural history notes.

Biography: I am an entomologist and community ecologist who specializes in aculeate Hymenoptera, primarily ants. I joined the Virginia Museum of Natural History in 2014 where I currently hold the position of Assistant Curator in the Department of Recent Invertebrates. I received my Master's degree in entomology from Sofia University (Bulgaria) and my Ph.D. in ecology from Cleveland State University. I have previously worked as a research biologist (Institute of Zoology, Bulgarian Academy of Sciences), collections assistant (Cleveland Museum of Natural History), and a lecturer (John Carrol University, Cleveland State University). My research focuses primarily on ant taxonomy and natural history, community ecology and biodiversity.

Understanding the terrestrial carnivore community composition and distribution in Southeastern Ohio

Mackenzie E. Rich [1], Cassandra M. Thompson [1], Viorel D. Popescu [1], & Suzanne Prange [2]
[1] Ohio University, Biological Sciences, Athens OH; [2] Ohio DNR, Division of Wildlife, Athens OH

Understanding community composition and distribution of species is vital for implementing sound management and conservation techniques. In particular, carnivores play vital roles in maintaining ecosystem integrity as top-down trophic pyramid regulators. Many regions in the US are witnessing a comeback of terrestrial carnivores after >100 years of absence, yet the trophic relations in these ecosystems and the carnivore community makeup have not been quantified. To address this problem, we used baited camera traps to investigate the carnivore community composition in southeast Ohio, a forested area where species such as black bears, bobcats, fishers are currently expanding their ranges. We monitored 50 cameras for approximately 3,000 trap nights between May and July 2016 in an area ~300 sqkm. Using an occupancy modeling framework, we investigated local and landscape predictors of occurrence for red and gray foxes (*Vulpes vulpes*, *Urocyon cinereoargenteus*), bobcats (*Lynx rufus*), and coyotes (*Canis latrans)*. Our results shed light on the carnivore community composition in SE Ohio and provide critical information state and federal wildlife management agencies.

- **Mackenzie E. Rich:** Senior, Ohio University Honors Tutorial College. Research interests include carnivore ecology, spatial ecology, and conservation biology.
- **Cassandra M. Thompson:** First year masters student, Ohio University, Department of Biological Sciences. Research interests include amphibian ecology and responses to climate change.
- **Viorel D. Popescu**: Assistant Professor, Ohio University, Department of Biological Sciences. Research interests include conservation biology, wildlife ecology and management (focused on carnivores, amphibians and reptiles), and systematic conservation planning.
- **Suzanne Prange:** Furbearer biologist, Ohio Department of Natural Resources, Division of Wildlife.

Authors: Michael B. Mahon, Thomas O. Crist

Title: Exotic earthworm response to removal of white-tailed deer and Amur honeysuckle

Abstract:

The overabundance of white-tailed deer (*Odocoileus virginianus*) and the presence of invasive plants, such as Amur honeysuckle (*Lonicera maackii*), have strong effects on temperate deciduous forest ecosystems of eastern North America. Deer and Amur honeysuckle reduce abundance and richness of seedlings, saplings, and herbaceous plants in the forest understory. Additionally, deer and invasive plant presence has been linked to an increased abundance of exotic earthworms. Invasive European earthworms have detrimental effects on ecosystems processes through decreasing soil nutrient availability, total soil carbon, and leaf litter layer, as well as increasing soil horizon mixing in forest soils. We hypothesized that the removal of deer and invasive honeysuckle would reduce the abundance of

invasive earthworms and increase standing litter biomass. We sampled and analyzed earthworm abundance and standing litter biomass from five sites in southwestern Ohio from 2011 to 2016. Sites consisted of paired 20x20-m deer exclosure and control plots, each with a split-plot treatment of honeysuckle removal and control. Earthworm abundance was negatively related to deer removal. Standing litter biomass was positively related to deer removal, but negatively related to earthworm abundance. We found no effect of any treatment on earthworm community composition. Our results show little effect of honeysuckle treatment on the earthworm community, but provide evidence that deer presence has a large effect on the abundance of these invasive detritivores. These changes to the earthworm community may have cascading effects on forest ecosystem processes and indicate that managing areas with high deer populations may also reduce invasive earthworm abundance.

Author Biographies:

Michael B. Mahon received his B.A. from Drake University and is currently pursuing his PhD in

Ecology, Evolution, and Environmental Biology at Miami University. His research interests include community ecology and ecosystem ecology.

Thomas O. Crist received his B.A. from McPherson College, M.F.S. from Yale University, and PhD from Utah State University. Currently, he is the Chair of the Department of Biology at Miami University. His research interests include landscape ecology, biodiversity, and conservation biology.

Authors: Margaret E. Maloney, Kevin W. Custer, and Ryan W. McEwan

Title: The impact of the non-native invasive shrub *Lonicera maackii* on sensitive salamander populations in headwater streams

Affiliation: University of Dayton

Email: maloneym11@udayon.edu

Poster Abstract:

Lonicera maackii has dramatically shifted ecosystems across much of the Midwestern USA and has been linked to alterations in riparian zones along headwater streams. The foliage from *L.maackii* releases water-soluble photochemicals into the ecosystem that have adverse effects on insects, herbivores, and plants. Previous research has demonstrated that *L.maackii* has negative impact on the growth of several amphibian species; however, little is known about the impact on stream salamanders, which are most common in headwater streams. While qualitative assessments of stream salamanders are a common practice, estimation of population density remains a methodological challenge. Our research goals were to (1) invent a prototype device for quantification of salamander abundance in streams, (2) validate this prototype through field trials across seasons and habitat types, and (3) implement the developed technology to further understanding of salamander presence and abundance along an invasion gradient of *L. maackii*. We developed a new artificial habitat for sampling salamanders that allows for density

calculations. Field trials revealed that this method was superior for estimating salamanders than other methods including the standard Visual Encounter Survey (VES) and allows for estimation of population density This invention is currently being employed to assess stream salamander abundance and richness along a gradient of *L.maackii* invasion.

Biographies:

Margaret E Maloney: Meg Maloney is a junior environmental biology major at the University of Dayton. She is passionate about herpetology and restoration ecology. In the future, Meg hopes to get her Master's degree in restoration ecology or herpetology and become an environmental educator for children.

Kevin W Custer: Kevin was a Postdoctoral Associate at the University of Dayton working on an NSF grant to understand the impacts of *Lonicera maackii* on aquatic habitats. He has a PhD from Wright State University where his research focused on ecotoxicology in stream systems focusing on metal pollution of stream benthos. His interest in the lab was applying this ecotox framework to the invasion biology of Amur honeysuckle. He wrapped up work in the lab in March of 2017 and left to take a leadership position at Pace Analytical Laboratory.

Ryan W McEwan: Dr. Ryan McEwan is Associate Professor and Environmental Biology Program Chair at the University of Dayton. His work focuses on long-term temperate forest dynamics, impacts of invasive plants on forests and streams, and biodiversity-ecosystem function relationships in temperate and tropical forests.

Authors: Michael Cunningham-Minnick, Thomas O. Crist

Title: An invasive flowering shrub shifts native bee distributions among canopy layers along forest edges

Abstract:

Invasive plants can alter bee communities by displacing native food sources and offering their own floral resources. *Lonicera maackii* (Amur honeysuckle) is a flowering invasive shrub that dominates forest edges throughout Ohio. Ohio's sparse native shrub canopy layer emphasizes potential consequences for foraging native bees following *L. maackii* invasion. Therefore, we determined if *L. maackii* shifts the vertical distribution of foraging native bee communities by sampling bees throughout the canopy along a *L. maackii* density gradient before, during, and after the *L. maackii* blooming period. We established 10 study sites in southwestern Ohio with forest habitats directly adjacent to soybean and corn fields. A 100 m edge of each habitat collectively represent a gradient of honeysuckle densities (0%-100% cover). We sampled the bee community with blue vane traps located vertically every 3 m with the highest trap 16 m from the ground. We sampled 1719 bees before, and >300 bees during, the *L. maackii* bloom across sites. Bees showed bimodal distributions with peaks 1-4 m and 13 m above the forest floor prior to the *L. maackii* bloom. These patterns are consistent with spring ephemeral and tree floral resource availability. Bee distributions shift towards a unimodal peak at the shrub layer (4-10 m) during *L. maackii* bloom in sites with moderate to high densities of *L. maackii*. Preliminary findings illustrate that Ohio's native bees forage up to 16 m above the forest floor, and suggest that *L. maackii* may outcompete a broad range of native flowering species for pollinators.

Author Biographies:

M Cunningham-Minnick received his BS from The Ohio State University. He is currently pursuing a PhD in Ecology, Evolution, and Environmental Biology at Miami University. His research interests include community ecology, biodiversity, and plant-pollinator interactions.

Thomas O. Crist received his BA from McPherson College, M.F.S. from Yale University, and PhD from Utah State University. He is the Biology Department Chair at Miami University. His research interests include landscape ecology, biodiversity, and conservation biology.

First poster

Justin Grubb, Kent Bekker

Distribution of the common mudpuppy, Necturus maculosus maculosus, in Lucas County, Ohio.

Toledo Zoo, Ohio Biological Survey

Abstract: The mudpuppy, *Necturus maculosus maculosus,* is a widely distributed amphibian among the Great Lakes and inhabits streams, rivers, ditches and ponds. It is a cryptic amphibian that prefers the seclusion of rocks, logs, plants and sunken debris. The peak season for mudpuppy activity is late fall, winter and early spring when these bodies of water are partially covered by ice. Since these animals are amphibians, they are particularly sensitive to fluctuating water quality and are extremely vulnerable within habitats associated with areas of high urban development (Lannoo 2005). Very little is known about the current distribution of mudpuppies in the rivers and streams of Lucas County and the last known record of a mudpuppy being caught in the Maumee river was before 1952 (Pfingsten *et al.* 2013). Funding for this project was provided by the Ohio Biological Survey which helped purchase research supplies.

Biographies:

Justin Grubb, B.Sc. – Wild Toledo biologist at the Toledo Zoo. Justin earned his B.Sc. in biology with a specialization in marine and aquatic science from Bowling Green State University. For the Zoo, Justin's work includes everything from assisting with hellbender releases to the wild, setting and collecting trail camera data, reptile surveys, and turtle trapping and processing. Justin also serves as a communicator and develops citizen science initiatives and creates educational videos.

Kent Bekker, M.Sc. – Director of Conservation at the Toledo Zoo. Kent earned his masters of science degree from Bowling Green State University in 2007. Kent worked at the Toledo Zoo Department of Herpetology prior to his relocation to coordinator of Wild Toledo. His local conservation work began with native reptiles and amphibians, initiatives which have continued over the past several years.

Second Poster

Eastern Hellbender, *Cryptobranchus alleganiensis*, rearing at the Toledo Zoo

Kent Bekker, John Chastain, R. Andrew Odum and Justin Grubb

The Toledo Zoo, Ohio Hellbender Partnership

Abstract: The Toledo Zoo has been rearing the Eastern hellbender, *Cryptobranachus alleganiensis*, for rearing in Ohio since 2012. The eastern hellbender is a state-endangered species, with pollution and loss of habitat eliminating wild populations throughout much of their historic range. Hellbenders need clean and siltation free streams for survival because they hide under rocks, which can become buried with heavy erosion and sedimentation. Today, some of Ohio's streams have recovered and can again support hellbender populations.
Kent Bekker, M.Sc. – Director of Conservation at the Toledo Zoo. Kent earned his masters of science degree from Bowling Green State University in 2007. Kent worked at the Toledo Zoo Department of Herpetology prior to his relocation to Director of Conservation. His local conservation work began with native reptiles and amphibians, initiatives which have continued over the past several years.
Justin Grubb, B.Sc. – Wild Toledo biologist at the Toledo Zoo. Justin earned his B.Sc. in biology with a specialization in marine and aquatic science from Bowling Green State University. For the Zoo, Justin's work includes everything from assisting with hellbender releases to the wild, setting and collecting trail camera data, reptile surveys, and turtle trapping and processing. Justin also serves as a communicator and develops citizen science initiatives and creates educational videos.

Penny Niday: Metroparks of the Toledo Area
Karen Menard: Metroparks of the Toledo Area
Harvey Ballard: Ohio University

Poster Title: Monitoring Orthoptera in the Oak Openings Region

Summary: The wet prairies and ancient dunes of the Oak Openings region are rich in Orthoptera, harboring several of Ohio's rarest species. A common misconception is that these insects are mostly economic pests of weedy or disturbed sites, but monitoring has shown that the vast majority are characteristic of natural systems and are habitat-restricted. Most Orthopteran species are restricted to one plant community, however, many species occupy a particular microhabitat within a distinct community. In most states (including Ohio) a significant percentage are only known from very few sites, occupy unusual or regionally rare natural communities, and consist of small populations. These species can be excellent "bio indicators" of successful habitat management.

In 2014 and 2016, dunes, prairies, and similar open habitats in the Oak Openings region were surveyed for adult stage crickets, grasshoppers, and katydids, with a focus on species that are

potentially rare in Ohio. Through this survey, a total of nine species considered "potentially rare" were found within microhabitats throughout the Oak Openings Region. These species include the following: Sprinkled Grasshopper (*Chloealtis conspersa*), Graceful Grasshopper (*Melanoplus gracilis*), Green-legged Grasshopper (*Melanoplus similis*), Short-winged Green Grasshopper (*Dicromorpha viridis*), Marsh Meadow Grasshopper (*Pseudochorthippus curtipennis*), Gray Ground Cricket (*Allonemobius griseus*), Longhorn band-winged Grasshopper (*Psinidia fenestralis*), Mottled Sand Grasshopper (*Spharagemon collare*), and Boll's Grasshopper (*Spharagemon bolli*). To date, 38 total Orthopteran species have been found in the Oak Openings Region, with another 76 species yet to be found. Future survey goals include continuation of monitoring at sites with already established baseline data in regard to species presence.

Penny Niday works for the Metroparks of the Toledo Area as the Seed Nursery Coordinator, focusing on collecting and processing large quantities of diverse native plant material. She assists with species monitoring efforts throughout the Metroparks and is also an Ohio Certified Nursery Technician.

Karen Menard works for the Metroparks of the Toledo Area as the Research and Monitoring Supervisor and is involved with planning much of the species monitoring in Oak Openings Preserve and other Metroparks. Karen is also a Certified Interpretive Guide with the National Association of Interpretation.

Harvey Ballard is the Associate Professor of Plant Systematics and Evolution and the Director of the Floyd Bartley Herbarium and Curator of Vascular Plants at Ohio University in Athens, Ohio. He has spent time in the field researching Orthoptera in the Oak Openings and has assisted Metroparks Toledo in starting a monitoring program.

Karen Menard: Metroparks of the Toledo Area

Poster Title: The Restoration of Blue Creek's Limestone Glade: A closer look at a rare community

Summary: Occurring directly on the edge of the Oak Openings sand, Blue Creek Metropark's limestone glade in Northwest Ohio is considered globally significant. At nearly 25 acres, this biodiverse site consists of prairie, sparsely vegetated rock barrens, and thin-soiled Chinquapin Oak savanna habitat. Oak Openings sand from glacial times sits along the edges of the ancient limestone in the glade, revealing a unique ecotone. An ecotone is an edge zone where ecological systems meet, sometimes forming a different community of species. Seven state-listed plant species, as well as other unique species, such as lichens and mosses have been located here.

During the winter of 2014-2015, Metroparks Natural Resource Management Staff hydro-axed approximately 10 acres of honeysuckle, buckthorn and privet in an overgrown area at this site. Several, old piles of trash were also removed. As the now cleared areas of invasive plants were exposed to sunlight, native plants began to thrive. 38 Chinquapin Oaks (one dated to 1865),

were also uncovered in the savanna. Currently, there is additional acreage that still needs invasive removal, as well as species monitoring; however, much of this important work is continuing through staff and volunteer involvement.

Karen Menard works for the Metroparks of the Toledo Area as the Research and Monitoring Supervisor and is involved with planning much of the species monitoring in Oak Openings Preserve and other Metroparks. Karen is also a Certified Interpretive Guide with the National Association of Interpretation.

Authors: Abe Perez, Sarah Diamond

Affiliation: Case Western Reserve University

Title: Linking community composition with morphological and physiological traits across urbanization gradients.

Abstract:
Shifts in community composition in response to urbanization are well documented but how these shifts relate to differences in organismal traits remains largely unknown. Urban areas are typically warmer than the surrounding rural areas, a pattern known as the “urban heat island”. Despite our understanding of how morphological and physiological traits respond to temperature changes, these relationships are under studied in urban environments. Here, we used ants (Hymenoptera, Formicidae) to link differences in community composition with morphological and physiological traits across multiple urbanization gradients. Specifically, we were interested in whether there were predictable shifts in community composition, body size and thermal tolerance along individual urbanization gradients, and whether these patterns were repeatable among different urbanization gradients. We sampled ant communities monthly from May through November 2015 along three major urbanization gradients in the Midwestern United States. We found that ant communities differed along our urbanization gradients, with an overrepresentation of thermophilic species including the aptly named “pavement ant” *Tetramorium caespitum* and *Formica subsericea*. To some extent these patterns were repeatable among cities, although shifts in community composition for less common species were more variable among the three urbanization gradients. Understanding how shifts in community composition relate to differences in organismal traits is critical for developing trait-based ecological forecasts of responses to environmental change, and is becoming increasingly important with accelerating rates of urban development.

Abe Perez, PhD Candidate, Biology, Dr. Sarah Diamond Lab. B.S. Ecology and Environmental Biology, California State University of Dominguez Hills (2013)

Abe is interested in understanding shifts in community structure and biodiversity in response to urbanization

Sarah Diamond, Assistant Professor, Biology. (2010-2013) Post-doctoral Research Associate, North Carolina State University, (2010) PhD, University of North Carolina at Chapel Hill , (2005) BS, Bucknell University

Research in the Diamond lab is focused on understanding and predicting biological responses to changing and novel environments.

Title of Poster: Ecological divergence or conservatism? Geographical patterns and evolution of the ecological niches in the spadefoot toads (Anura: Pelobatoidea)

Author(s): Iulian Gherghel, Ryan A. Martin

Affiliation(s): Department of Biology, Case Western Reserve University, Cleveland, OHIO, United States.

Abstract: Two mechanisms are generally recognized for speciation by natural selection: mutation-order speciation, and ecological speciation. Ecological speciation occurs when reproductive isolation between populations results as a byproduct of adaptation to divergent environments. In contrast, mutation-order speciation occurs when different adaptive mutations are fixed between populations adapting to similar environments. In this context, progress towards speciation is dependent on the ability of populations to diverge and adapt to new environments (niche divergence), or to occupy the same ecological niche (niche conservatism) accompanied by reproductive isolation. These two mechanisms of speciation affect the functional diversification of evolutionary lineages and the interaction of closely related species. However, the relative importance and prevalence of the two mechanisms in speciation remain largely unknown. Spadefoot toads (Anura: Pelobatoidea) offers a great system to test this question, this relatively diverse family is distributed across the Northern Hemisphere, inhabiting a wide array of climates, from tropical regions of the South-Eastern Asia (Megophryidae) to the steppes and plains of Europe and Central Asia (Pelobatidae, Pelodytidae) and the dry deserts of North America (Scaphiopodidae). Combining ecological niche models (Maxent models) with phylogenetics (Pelobatoidea dated phylogeny) we were able to reconstruct the ecological niche evolution of the group to visualize niche evolution, evaluate the relative influence of the climatic factors in niche evolution and to test for rates of divergence within the spadefoots. Generally, we found a mixed signal of niche conservatism (consistent with mutation-order speciation or neutral processes) and niche divergence (consistent with ecological speciation) within lineages and across Pelobatoidea.

Biographies:
Iulian Gherghel: Currently he is a PhD student working on understanding evolutionary consequences and eco-evo feedbacks of resource polymorphism on lower trophic level

communities and the biogeography of spadefoot toads. He is also working on understanding the drivers of species distributions across different spatial scales. Iulian is broadly interested in aspects of life history, evolution, ecology, and conservation with special focus on reptiles and amphibians.

Ryan A. Martin: Is interested on understanding the role of ecological interactions in phenotypic evolution. He uses a combination of measurements and observations from natural populations, manipulative experiments in both the field and lab, and meta-analytical techniques to understand how and why organisms adapt and diversify in response to ecological variation.

Tony Miller

Title: Studying Local Adaptation for use in a Restoration Setting

Research conducted at University of Akron. Current program: Kent State University

Abstract: A tamarack bog at the Bath Nature Preserve is quickly transitioning into a terrestrial forest. Restoration efforts will soon be underway to stabilize the habitat. For such a peatland restoration, *Sphagnum* is an important genus. The tamarack bog restoration project is divided into three types of habitat: core bog, wetland edge, and upland transition. Long-term monitoring plots were placed in the tamarack bog for the purpose of tracking *Sphagnum* growth. There are 16 monitoring plots in each of the wetland edge and upland transition habitats, and there are 12 monitoring plots in the core bog habitat. Along with these 44 plots, 8 more plots are setup at the wetland end of transects stretching from the upland to the wetland. The findings for the first year of monitoring show *Sphagnum* only present in the core bog region and in one of the eight transects. *Thuidium delicatulum* was also monitored due to its high presence in the wetland, and it was found in all types of habitats. These results show the initial extent of *Sphagnum* within the bog before restoration efforts have taken place, and this lays the groundwork for monitoring to see if the restoration efforts help *Sphagnum* establishment. If introduction of *Sphagnum* is needed, I also ran greenhouse experiments to test if *Sphagnum palustre* specimens grow best in water collected from their local water source.

Biography: I am currently a student in the PhD program at Kent State University. I am in the Biological Sciences-Ecology and Evolutionary Biology program. My research interests are in population biology and evolutionary ecology. When I find some spare time, I enjoy visiting the numerous parks and nature preserves that Ohio offers. I am particularly fond of bogs and fens, an interest leftover from my M.S. degree at the University of Akron.

Student Poster 1 of 5

Title: The Use of Trail Cameras to Determine Mammal Presence and Potential Coyote (*Canis latrans*) Threats at the Richfield Heritage Preserve (Summit Co., OH)

Authors: Erica Morgan and Chris Stanton

Affiliation: Baldwin Wallace University

Abstract: Coyotes (*Canis latrans*) have been an elusive subject in northeast Ohio however sightings have increased in recent years, especially in Summit County. The Richfield Heritage Preserve (formerly known as the Crowell-Hilaka Girl Scout camp) is a newly established park that is open to the public but concerns regarding coyotes as a threat to area residents and their pets have been expressed. In order to assist the Richfield Joint Recreational District with coyote management decisions, a study was begun during the summer of 2016. The objectives of this project were to 1.) document mammal activity on the property, 2.) determine coyote density and activity on the property and 3.) identify parasites that these coyotes are carrying. Browning Black Ops trail cameras were placed at various spots throughout the preserve from mid June to late August. Scat samples were collected and fecal floats were performed to determine parasite load. We documented a total of 13 mammals on the property, including numerous rodents, deer, mink, red and grey foxes. We concluded that approximately five coyotes are active on the property but are not breeding there. We also concluded that the coyotes are carrying three common nematode parasites that are very common in wild canine species. Overall, it was determined that coyotes do not currently pose an immediate threat to users of the park or the residents living nearby.

Biographies:

Erica Morgan is a senior biology major with a chemistry minor at Baldwin Wallace University. After earning her Bachelor of Science degree from Baldwin Wallace University, she plans on working as a Forensic Scientist within various crime fields. Eventually, she would like to pursue a Master's degree in forensic biology.

Chris Stanton is a professor of biology at Baldwin Wallace University. He earned a Bachelor of Arts degree from Wittenberg University, a Master of Science degree from the University of Tennessee, and a Doctor of Philosophy degree in entomology from The Ohio State University. He has been teaching at Baldwin Wallace for the past 16 years.

Student Poster 2 of 5

Title: **Vane Trapping to Document Bumble Bee Richness and Other Invertebrates in a Late Summer Field at the Carlisle Reservation (Lorain Co., OH)**

Authors: Lauren LeDuc and Chris Stanton

Affiliation: Baldwin Wallace University

Abstract: Bumble bee decline is a growing problem in the United States that has been associated with habitat loss, neonicotinoid usage, pathogens and parasites, and climate change. In order to determine if bumble bee species are missing from northeast Ohio, an open field with a high diversity of flowering plants was selected for study in Lorain County at the Carlisle Reservation. The field was sampled during the summer by hand-netting along six transects in 2014 and 2015 to determine the bumble bee species present. In 2016, blue and yellow vane traps were set every 7 to 10 days on each transect from late July through September. The objectives of the study were to 1.) determine if vane trapping increased the number of bumble bee species collected and 2.) identify any other bee species present in the field. The results of the trapping added one new species of bumble bee to the previous two years and captured only three bumble bees total (out of 151 specimens). We determined that the vane traps were not successful at trapping bumble bees and that the yellow traps were especially ineffective. In addition to Hymenoptera, six other invertebrate taxa were collected in the traps, however the most common species was the long horned bee (*Melissodes* spp). Closely resembling a bumble bee, the long horned bee may be filling the niche of the missing bumble bees in this field, and possibly elsewhere, but more research is needed.

Biographies:

Lauren LeDuc is from Lakewood, Ohio and is currently a senior at Baldwin Wallace University in Berea, Ohio. After graduation, she plans to attend graduate school for entomology and work as a naturalist. Her favorite bumble bee is the tri-colored bumble bee.

Chris Stanton is a professor of biology at Baldwin Wallace University. He earned a Bachelor of Arts degree from Wittenberg University, a Master of Science degree from the University of Tennessee, and a Doctor of Philosophy degree in entomology from The Ohio State University. He has been teaching at Baldwin Wallace for the past 16 years.

Student Poster 3 of 5

Title: Summer 2016 Water Quality Measurements of the Two Lakes at the Richfield Heritage Preserve (Summit Co., OH) and Comparisons with Other Local Lakes

Authors: Claire Watts and Chris Stanton

Affiliation: Baldwin Wallace University

Abstract:

The Richfield Heritage Preserve (formerly known as Camp Crowell-Hilaka) is a newly-established public park in Richfield, Ohio. The property includes two man-made lakes which were lowered

in late May 2016 in order to assess the condition of their dams. Lowering the water level led to an increase in water temperature and a decrease in dissolved oxygen in both lakes, causing stress for the resident fish. In response, we monitored water conditions for the rest of the summer, and compared them to other local lakes, to better understand the state of the lakes and determine if any water quality management needed to be done. Three sampling sites on each lake at the Richfield Heritage Preserve were visited every 7 to 10 days and a YSI multi-parameter probe was used to record water temperature, pH, dissolved oxygen, and other variables. By August 6th, both of the Richfield lakes were similar to other lakes in terms of water temperature and pH and were within EPA's recommended guidelines. However, both lakes remained low in dissolved oxygen and did not reach the EPA guideline of 5 mg/L. We suggest that the water quality of both lakes be monitored year-round and aerators installed when oxygen levels drop below recommended levels. These lakes are a vital resource and habitat to many of the preserve's animal residents and should be carefully maintained.

Biographies:

Claire Watts is from Medina, Ohio and is a senior biology and sustainability double major at Baldwin Wallace University. After graduation this spring she hopes to find a career in field biology.

Chris Stanton is a professor of biology at Baldwin Wallace University. He earned a Bachelor of Arts degree from Wittenberg University, a Master of Science degree from the University of Tennessee, and a Doctor of Philosophy degree in entomology from The Ohio State University. He has been teaching at Baldwin Wallace for the past 16 years.

Student Poster 4 of 5

Title: 2016 – 2017 Water Conditions and Frog Occurrence in Two Vernal Pools at the Carlisle Reservation (Lorain Co., OH)

Authors: Alysa M. Hellisz and R. Chris Stanton

Affiliation: Baldwin Wallace University

Abstract: The current global decline of frogs and other amphibians is an important conservation issue. Vernal pools are critical to the survival and reproduction of many of these species but little work has been done on these temporary habitats in Ohio. The Carlisle Reservation in Lorain County, Ohio has two vernal pools (the upper and the lower) but no data have been collected pertaining to them. The objectives of this study were to 1.) record water quality in both vernal pools for a full year, 2.) document the frog and toad species using the pools, and 3.) identify any important physical parameters that are associated with the resident frog species. Three sampling sites were chosen for each pool. These sites were visited every 7-

14 days to observe any frog activity and collect data on pool conditions. A YSI multi-parameter probe was used to measure water temperature, salinity, pH, dissolved oxygen, and other variables. A total of seven frog and toad species were observed in the pools during the spring of 2016. The pools differed in temperature and pH, with the upper pool having an average temperature of 9.31° C and a pH of 7.14, while the lower pool averaged 11.50° C and a pH of 7.26. These differences were probably due to thicker canopy cover over the upper pool, especially button bushes. By the end of June, both pools were dried and the frog species were no longer present.

Biographies:

Alysa Hellisz is from Parma, Ohio and is currently a senior at Baldwin Wallace University. She is a biology major with a chemistry minor. After graduation, she plans on attending an accelerated nursing program and eventually become a Nurse Anesthetist.

Chris Stanton is a professor of biology at Baldwin Wallace University. He earned a Bachelor of Arts degree from Wittenberg University, a Master of Science degree from the University of Tennessee, and a Doctor of Philosophy degree in entomology from The Ohio State University. He has been teaching at Baldwin Wallace for the past 16 years.

Student Poster 5 of 5

Title: **Phenology of the 2016 Periodical Cicada Emergence (Brood V) and Activity at the Richfield Heritage Preserve (Summit Co., OH)**

Authors: Katie Swanson and Chris Stanton

Affiliation: Baldwin Wallace University

Abstract: The 17-year periodical cicadas (Brood V) emerged in northeast Ohio during the spring and summer of 2016 and occupied many areas, including the Richfield Heritage Preserve (RHP) in Summit County, Ohio. To gain a better understanding of the occurrence and behavior of these cicadas, cicada species were observed on this property to 1.) document when they emerge, 2.) identify which of the three species were present, and 3.) determine if they have the *Massospora cicadina* fungus (a parasitic fungus that sterilizes and kills its cicada host). Soil temperatures and soil emergence traps were used at seven sites on the property. Hand collection of the cicadas and listening for calling males were also performed. Within the RHP, all three species of periodical cicadas were found (*Magicicada septendecim*, *M. cassini,* and *M. septendecula*), emerging between May 27 and June 28, 2016. Calling by the males began on May 31 and continued until early August. The *Massospora cicadina* fungus was also found on the property from July to August but only in the *M. septendecim* species. The results of the

study support the determination that the RHP is a healthy ecosystem that should be studied further and makes predictions for where these species are likely to emerge in 2033.

Biographies:

Katie Swanson is from Elgin, Illinois and is currently a junior pursuing a biology degree at Baldwin Wallace University in Berea, Ohio. After graduation from BW, she plans to attend veterinary school and pursue a career as a veterinarian.

Chris Stanton is a professor of biology at Baldwin Wallace University. He earned a Bachelor of Arts degree from Wittenberg University, a Master of Science degree from the University of Tennessee, and a Doctor of Philosophy degree in entomology from The Ohio State University. He has been teaching at Baldwin Wallace for the past 16 years.

Authors: Mitchell J. Kukla, Meg E. Maloney, Julia I. Chapman, Erin C. Rowekamp, and Ryan W. McEwan

Affiliation: Department of Biology, University of Dayton, Dayton OH

Poster Presentation

Poster Title: Herbaceous layer species richness along forested headwater streams is negatively impacted by Amur honeysuckle (*Lonicera maackii*) Invasion

Abstract:
A major threat to forest ecosystems are invasive species such as *Lonicera maackii* (Amur honeysuckle), a shrub that has been shown to greatly increase understory shading in forests. Our aim was to understand how herbaceous layer species richness and abundance are impacted by invasion of *L. maackii* along forested headwater streams in southwestern Ohio. The herbaceous layer was sampled in 60 1-m^2 plots along 5 headwater streams representing a gradient of honeysuckle invasion intensity: reference, moderate, and heavy. Within 12 plots at each site, percent cover was estimated for each species present in April, June, and August. For all three sampling dates, there were no significant differences in herbaceous cover among sites. Significant differences in species richness were found in April and June (ANOVA; $P < 0.001$). The Englewood Reference site had significantly higher richness than the Aullwood Reference site in April and June ($P < 0.005$), which we believe was due to differences in environmental and soil properties between the sites. The Englewood Reference site also had significantly higher richness than the Englewood Moderate site in April ($P = 0.024$) and the heavily invaded Buckeye Trail site in June ($P = 0.00083$). In summary, these results suggest that Amur honeysuckle had an overall negative influence on herb layer diversity, but herb layer cover was unaffected. Further analyses will examine how the composition of these herb communities differ among sites in terms of growth form, native status, and Floristic Quality Assessment Index values.

Author Biographies

Mitchell Kukla is a third-year undergraduate student in the lab of Dr. Ryan McEwan.

Meg Maloney is a third-year undergraduate student in the lab of Dr. Ryan McEwan.

Julia Chapman is a Ph.D. student in the lab of Dr. Ryan McEwan.

Erin Rowekamp is a Master's student in the lab of Dr. Ryan McEwan.

Ryan McEwan is an associate professor of Biology at the University of Dayton. His lab investigates the invasion ecology of Amur honeysuckle (*Lonicera maackii*) and long-term dynamics of eastern North American deciduous forests.

Biofilm responses along a gradient of Amur honeysuckle in headwater streams

Kevin W. Custer, Eric B. Borth, Taylor Buskey, Sean D. Mahoney, Margaret Maloney, Joseph Murphy, Mitchell Kukla, Corey Kuminecz, Ryan W. McEwan

University of Dayton, Department of Biology, Dayton, Ohio, 45469, USA

The invasive shrub Amur honeysuckle (*Lonicera maackii*) can be a dominant species in headwater stream riparian areas, and forms dense canopies that can extend across headwater streambanks. This invasion has the potential to change the quantity and quality of terrestrial subsidies entering streams. Benthic biofilm production is highly important to headwater stream processes, and its trophic position provides a basal food source for selected aquatic invertebrates. We tested benthic biofilm biomass responses seasonally (spring, summer, fall 2016) in five 1st and 2nd order Southwest Ohio headwater streams. These streams ranged in *L. maackii* invasion: low (Englewood Reference, Aullwood Reference), moderate (Englewood Moderate, Charleston Falls Moderate), and heavy (Buckeye Trail Heavy). We hypothesized that benthic biofilm biomass (chlorophyll-*a* and (ash-free dry mass (AFDM)) would respond negatively along a gradient of *L. maackii* invasion in headwater streams. Benthic biofilm chlorophyll-*a* concentrations and AFDM showed significant responses seasonally, and along a gradient of *L. maackii* invasion ($p < 0.05$). Chlorophyll-*a* concentrations were often highest at Aullwood Reference, and lowest at Buckeye Trail Heavy. Seasonal differences were observed at all sites; however, Buckeye Trail chlorophyll-*a* and AFDM were highest in late spring and early summer 2016 and declined significantly through late summer and fall. Our data is suggesting that *L. maackii* presence is having a negative effect on benthic biofilm biomass measures like chlorophyll-*a* and AFDM. Future research should focus on long-term studies, and exploring biofilm responses to novel subsidies such as *L. maackii* leaves, flowers, and fruits in headwater streams.

Author: Ray Stewart
Poster Title: Evolutionary Adaptations of the Family Ardeidae, Wading Birds that include Herons, egrets and Bitterns

Affiliation: Ohio Wetlands Association

Abstract:

Evolutionary adaptations are special physical features and behaviors of individuals that are beneficial for their survival. Without these adaptations, organisms would not be able to fill the ecological niche they occupy. Most members of the Ardeidae live in wetlands where they stalk their prey in shallow waters. The fate of members of the Ardeidae is intimately connected to the fate of wetlands. This paper describes the physical adaptations that link the Ardeidae with the exclusive habitats that support them.

The family Ardeidae includes the long-legged waterbirds, Herons, Bitterns and Egrets. Although members of this family are distinct from one another, they have a set of traits that make them a unique and coherent group. Ardeidae mostly live in or near inland freshwaters shallow waters as well as marshy coastal wetlands (Sibley, Elphick, Dunning, & National Audubon Society, 2001). Cattle egrets are an exception since they are more likely to occur in grasslands. To accommodate their use of shallow waters Ardeidae have long legs and long toes that lack webbing. Their long, curved necks support a narrow head with a spear-like beak. These traits can also be found in other families of birds but the unique feature of all members of Ardeidae is the powder down that they produce. The powder down of the Ardeidae grows continuously with tips that disintegrate into a powdery substance (Wetmore, 1920). These special adaptations are described on the infographic to illustrate the intimate relationship between this family of birds and their precious wetlands.

Biography

Ray is a retired public school science teacher living in Amherst, Ohio. He is the past president and now functions as the chief outreach officer and Director of Communications. The OWA office is currently at his home. Ray has a BA in Botany from Kent State University and MA from Ohio University in Latin American Studies. He completed a Master of Arts in Teaching through the Global Field Program at Miami University in 2014. All of the field work has, coincidentally, been in Latin America.

Sarah J Rose and P. Charles Goebel.

Poster Title: Shifts in the spider community in response to an urbanization gradient in riparian forests in Central Ohio.

School of Environment and Natural Resources, The Ohio State University, Wooster, Ohio.

Abstract. The world is urbanizing, with this increase in urbanization there is sharply contrasting fragmentation and loss of natural habitat. Yet, the impacts of urbanization on biodiversity are highly variable and the underlying mechanisms causing these changes are not well understood. From an ecological restoration standpoint a clearer understanding of the impacts of urbanization is necessary for two reasons. First, we need to be able to conserve existing natural habitat within urban systems in order to maintain biodiversity and the ecosystem function. Second, we need a clear understanding of the structure and function of these ecosystems to assist in the challenges of restoring, rehabilitating, or reestablishing green spaces within the context of an urban setting. For this study, spiders were sampled along an urbanization gradient in riparian forests in central Ohio. We also collected habitat structure data and meteorological data at the time of spider sampling. These sites were categorized as urban, suburban, and rural. We found a significantly higher abundance of spiders in suburban sites compared to both the rural and urban sites (p-values 0.002 and 0.003, respectively). Although we did not find any significant difference in the Shannon Diversity Index by site type (all p-values >0.43), we did find statistically significant differences in the community composition among urban, suburban, and rural sites (MRPP=0.001). Multivariate analyses suggest that understory exotic vegetation density was an important driver of these changes in the spider community. These data provide us with valuable insights into the impact of urbanization on riparian forest systems.

Sarah J Rose is a PhD candidate with the School of Environment and Natural Resources with The Ohio State University. She received her B.S. from Ohio State in 2008, and has worked on several ecological research projects, and is currently focused on understanding the dynamics of spider communities after disturbance.

Dr. P. Charles Goebel is a Professor and Assistant Director of the School of Environment and Natural Resources, The Ohio State University, Wooster, OH. His research interests include forest restoration ecology, riparian ecology and management, forest community and ecosystem ecology, and watershed management and restoration.

Authors: Erin C. Rowekamp and Ryan W. McEwan

Title: Seeing the forest and the *stream*: riparian invasion by the exotic shrub Amur honeysuckle (*Lonicera maackii*) impacts terrestrial-to-aquatic subsides.

Affiliation: University of Dayton; Biology Department

Abstract:

Seeing the forest and the *stream*: riparian invasion by the exotic shrub Amur honeysuckle (*Lonicera maackii*) impacts terrestrial-to-aquatic subsides.

Amur honeysuckle (*Lonicera maackii*) is an invasive species that has been shown to have detrimental effects on many terrestrial systems. However, little research has been done on how cross boundary subsidies such as leaves and woody debris are impacted by honeysuckle invasion. These cross boundary subsidizes are vital to aquatic systems in the form of nutrients and habitat. Therefore, our research aims to examine the influence of a gradient of honeysuckle, located in the stream riparian zone, on the contribution of organic subsidies to stream systems. In August of 2015 four leaf litter collection baskets were established along five headwater streams. The sites varied in the amount of honeysuckle present thus creating a gradient of invasion. Collected leaf litter was sorted, dried, and weighed resulting in leaf litter input biomass per site. As a whole, the analysis of the non-honeysuckle leaf species litter biomass along the gradient proved to have no apparent differences from the reference sites to the heavily invaded site. However, the data did show that there were differences in the biomass of honeysuckle contributed to the stream at each site. This data surprisingly, revealed that the heavily invaded site had a lower honeysuckle leaf biomass than one of the moderately invaded sites. We hypothesize that this is largely due to the large number of dead honeysuckle branches at the heavily invaded site, which are no longer producing leaves. Lastly, we saw support for late autumnal leaf litter influx of honeysuckle as compared to native species earlier senescence.

Author Biographies

Dr. Ryan McEwan is Associate Professor and Environmental Biology Program Chair in the Department of Biology at the University of Dayton. His research group focuses on diversity, function and dynamics in temperate, tropical and boreal forests including disturbance ecology, invasion biology, terrestrial-aquatic linkages and sustainable resource management.

Erin Rowekamp is a Master's student at the University of Dayton in Dr. Ryan McEwan's ecology lab. Erin has a strong interest in conservation and her masters project focuses on **how the invasion of** *Lonicera maackii* **in headwater stream riparian zones influences the linkage between the terrestrial environment and biology of the stream system.**

Authors: Andrew D. Runyon, Meredith S. Fitschen-Brown, Neil B. Zook and Jennifer M. Clark

Title: Eagle Creek Restoration Site Monitoring at the James H. Barrow Field Station

Affiliation: Hiram College, James. H. Barrow Field Station

Abstract:
In order to improve stream health, restoration efforts are common across the U.S. with more than one billion spent annually. Long-term monitoring to assess the success of stream restoration, however, is limited with the National River Restoration Science Synthesis assessment reporting that only 10% of streams are monitored post-restoration. During the summer of 2013, a section of Eagle Creek (J.H. Barrow Field Station) was restored and long-term monitoring efforts are in place to survey changes in water and habitat quality and macroinvertebrate and fish communities. Surveys were completed during the summer of 2016 (three years post-restoration) to compare to those completed pre-restoration and one year post-restoration. In the restored section of the stream, canopy cover was significantly lower while algae cover and dissolved oxygen were significantly higher. Further, downstream effects of decreased dissolved oxygen and temperature may be a consequence of restoration. Macroinvertebrate community scores for quality (%EPT and Invertebrate Community Index) increased post-restoration at most sampling sites while species richness remained the same. Although macroinvertebrates appeared to recover quickly, Index of Biological Integrity scores for fishes were lower in two of three sites within the restored section and all downstream sites indicating a decrease the quality and health of stream fishes post-restoration. Further, stream fishes were significantly smaller in the restored section than all other sites within Eagle Creek indicating that larger fish cannot effectively use this new habitat. With time, partial to full recovery of this system is expected and these surveys will be completed every other year.

Biographies:
Andrew Runyon is a sophomore at Hiram College pursuing a double-major in biology and environmental studies. He is broadly interested in field biology, with specific interest in aquatic ecology. He plans to eventually attend graduate school and pursue a career as a researcher.

Jennifer Clark is an assistant professor of biology at Hiram College. She received her PhD in Ecology from Kent State University in 2009 and focused her research on factors structuring stream crayfish distribution patterns. Her current research focuses on the consequences of natural channel design restoration on stream communities and the impacts of light pollution on macroinvertebrates and fishes.

Authors: Sabrina Callaway, Andrea Wyatt, and Sarah Minter

Title: Comparison of Resident and Non-Resident *Peromyscus spp.* using Radio Telemetry

Affiliation: Shawnee State University, Portsmouth, Ohio

Abstract: A study comparing the behavior of residential and translocated *Peromyscus* spp. was completed using radio telemetry. All comparisons were completed in an urban setting, specifically the campus of Shawnee State University in Portsmouth, Ohio. We hypothesized that total meters traveled over an observational period would be greater for residential mice compared to translocated mice. Residential mice were trapped within the campus grounds, while translocated mice were collected within 10 miles of campus from rural locations within Scioto County, Ohio. Trapping involved the simultaneously saturation of the rural and urban location with Sherman traps and occurred weekly prior to each monitoring period. Pairs of captured *Peromyscus* spp. (one from each respective location) were collared and observed for one hour before release. Mice were released simultaneously from a central location on campus one hour after sunset on Friday and observed continually until one hour after sunrise on Saturday. Tracking resumed one hour after sunset on Saturday and continued until one hour after sunrise on Sunday. The last known location was saturated with Sherman traps; mice were recollected and euthanized via cervical dislocation. Skulls were extracted and specimens were identified to species. While our study successfully established a procedure for comparing residential and non-residential *Peromyscus*, we were unable to conclusively accept or reject our hypothesis. Non-residential mice traveled a greater distance overall, however mice in both treatments remained stationary on the second night of tracking. More experimental replication and longer monitoring periods are needed to better understand the unexpected behaviors observed.

Brief Biographies of Authors:

Sabrina Callaway is a senior undergraduate biology student at Shawnee State University. She has been accepted to the Virginia-Maryland College of Veterinary Medicine following her upcoming graduation in May of 2017.

Andrea Wyatt is a senior undergraduate biology student at Shawnee State University. She intends to seek employment in a wildlife technician position following graduation.

Sarah Minter is an Associate Professor of Biology at Shawnee State University where she teaches courses focused on organismal biology and advises undergraduate research students. She received her PhD in Entomology from the University of Kentucky in 2011.

Authors: Troy Meyer, Michael Cunningham-Minnick, Thomas O. Crist

Poster Title: Effects of Water Body Type on Dragonfly Community Composition

Abstract: Dragonfly species prefer different biotic and abiotic characteristics of aquatic environments, and thus are good indicators of habitat type and quality. Mature and immature dragonflies use still and running waters differently, but species compositions at the intersections of these water bodies are not well understood. Therefore, we quantified dragonfly abundance, species richness, and community composition along a gradient of habitats, including streams, stream mouths (intersections), and open water habitats. Specifically, we asked is dragonfly community composition at the intersection different from the adjacent lake and stream, and how does riparian forest cover affect dragonfly communities across the three types of water bodies?

The study was conducted in summer 2016 at four stream-lake systems in SW Ohio. At each site, adult dragonflies were netted along transects adjacent to lake, intersection, and stream habitats. In all 12 sampling locations, riparian canopy cover was quantified, and qualitative information was gathered on the type of riparian vegetation (tree, shrub, herbaceous), water channel width, and the presence of floating algae.

A total of 157 individuals of 12 dragonfly species were identified. There was significant difference in community composition among stream, intersection, and open water habitats. Intersection communities had highest abundance and open water communities supported the highest species richness. Canopy cover and habitat type were the best predictors across sites explaining 54.6% of the variation in abundance and 74.5% in observed richness. We concluded that intersections between stream and open water habitats are important for dragonfly diversity and abundance in SW Ohio.

Author Bio:

Troy Meyer is currently pursuing his BS degree from Miami University. His research interests include community ecology, biodiversity, and conservation biology.

Michael Cunningham-Minnick received his BS from The Ohio State University. He is currently pursuing a PhD in Ecology, Evolution, and Environmental Biology at Miami University. His research interests include community ecology, landscape ecology, biodiversity, and plant-pollinator interactions.

Thomas O. Crist received his BA from McPherson College, M.F.S. from Yale University, and PhD from Utah State University. He is the Biology Department Chair at Miami University. His research interests include landscape ecology, biodiversity, and conservation biology.

Authors: Taylor Yamamoto and James Kercher

Poster Title: White-Winged Wood Duck Water Quality Monitoring and Management at Hiram College's James H. Barrow Field Station

Affiliations: Hiram College, James H. Barrow Field Station

Abstract: White winged wood ducks are native to Southeast Asia. The population has undergone a rapid decline, and only 1000 individuals are currently estimated to be living in the wild. Hiram College's James H. Barrow Field Station is home to 12 white winged wood ducks. The ducks are bred in captivity. Decline in duck populations could be due to avian tuberculosis (*Mycobacterium avium*) and the occurrence of free-living pathogenic amoeba. Chemical conditions also contribute to the quality of the water; mycobacterium avium favors lower pH levels. The existing biological filters were remodeled to better the living conditions of the ducks and to help filter bacteria out of the water. A variety of native and nonnative plants were added to the filters to compare their ability to purify the water, thus applying the idea of hydroponics. It was found that the filter for Pool 9 was the best at removing mycobacteria and regulating chemical conditions in comparison to other pools.

Biographies: Taylor Yamamoto is a sophomore Biomedical Humanities and Chemistry double major at Hiram College. She enjoys horse-back riding and swimming. This past summer, she monitored water quality on endangered white-winged wood ducks and gained valuable laboratory experience. She hopes to attend medical school after graduation.

James Kercher was born and raised in New York and teaches introductory chemistry and physical chemistry in addition to his research in unimolecular dissociation dynamics of energy-selected gas phase ions as well as research in the activation of halides from the condensed phase to the gas phase through heterogeneous chemistry. Outside of academia, he enjoys hiking and biking with his wife and their son and daughter.

Authors: Jacob Brower*, Chase Altier*, Bethany Gwinn*, Ariel Wears**, J. Andrew Roberts***, and Shauna L. Weyrauch***

Poster Title: Project Wild Coshocton: A Camera-Trapping Program to Monitor Bobcats (*Lynx rufus*) in Coshocton County, Ohio

Affiliations: * College of Education and Human Ecology, The Ohio State University (Columbus, Ohio); ** Department of Biology, The Ohio State University (Columbus, Ohio); ***Department of Evolution, Ecology & Organismal Biology, The Ohio State University at Newark (Newark, Ohio)

Abstract: The bobcat (*Lynx rufus*) is an important apex predator native to Ohio. Once found throughout the state, they were extirpated by the mid-1800s due to habitat loss and over-hunting. The bobcat was one of the first species listed as endangered in Ohio in 1974. Populations slowly recovered, and in 2014 they were removed from Ohio's threatened and endangered species list. These decisions by Ohio Division of Wildlife (ODW) were based on reported sightings, which have seen a steep increase since 2006. Much of the reported increase has been due to submitted photographs from trail cameras by hunters and land owners, which may bias the index of abundance. In consultation with ODW, we are beginning a long-term program of camera trapping, the primary goal of which is to better document the distribution and population trends of bobcats in central Ohio. In 2015-2016, we conducted preliminary 2-week camera trapping surveys of 49 sites throughout Coshocton and southern Holmes counties. We found bobcats at seven of those sites, including the first verified sighting in Holmes county since the species was extirpated. Data from our preliminary survey has been used to select permanent field sites which will be monitored yearly beginning in 2017. ODW expects to open a trapping season on bobcats within the next four years, so this study offers an opportunity to assess changes in bobcat populations before and after hunting begins. This study will also explore relationships between bobcats and other species, particularly the non-native coyote, which competes with the bobcat.

Biographies: Jacob Brower is a senior at The Ohio State University majoring in Human Nutrition/Nutrition Science. Jacob plans to apply to medical school upon graduation and would like to become a pediatrician.

Chase Altier is a junior at The Ohio State University who plans to major in Exercise Science. He would like to become a physical therapist.

Bethany Gwinn is a junior at The Ohio State University who plans to major in Exercise Science. She would like to become a physical therapist.

Ariel Wears is a senior at The Ohio State University majoring in Biology. Ariel plans to apply to pharmacy school upon graduation.

J. Andrew Roberts: BS (1995) in Neurobiology at Purdue University; MS (2001) in Chemical Ecology at the University of Cincinnati; PhD (2003) in Behavioral Ecology at the University of Cincinnati. Dr. Roberts is a behavioral ecologist whose main research interests are in the evolution of animal communication and social behavior. He applies an integrative approach to his research program, incorporating techniques from several disciplines to address interesting questions about the evolution of animal signals, sexual selection and mate choice, and group formation and social behavior. At present, much of his research concerns environmental constraints on the evolution of animal signals and signaling behavior.

Shauna L. Weyrauch: B.S. (1995) and M.S. (1997), Biology, Wright State University, Dayton, Ohio; Ph.D. (2004), Evolution, Ecology & Organismal Biology, The Ohio State University, Columbus, Ohio; Dr. Weyrauch is primarily a field-oriented ecologist and studies questions of conservation interest, including effects of habitat fragmentation on community structure and genetic diversity in amphibians, amphibian population declines, and the status of the recovering bobcat population in central/eastern Ohio.