

2017

# Cranberry Lake Biological Station Research Symposium, Session A

SUNY College of Environmental Science and Forestry

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## Recommended Citation

SUNY College of Environmental Science and Forestry, "Cranberry Lake Biological Station Research Symposium, Session A" (2017).  
*Cranberry Lake Biological Station*. 19.  
<http://digitalcommons.esf.edu/clbs/19>

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**SUNY – ESF Dept. of Environmental and Forest Biology  
Cranberry Lake Biological Station  
Ecological Monitoring and Biodiversity Assessment  
Research Symposium, June 9, 2017**

**Amphibians**

**Dugan, Alyssa J., Mary I. Schwartzmyer, and Alivia A. Sheffield.** Effects of Anthropogenic Noise Disturbances on Anuran Mating Calls. Acoustic signaling is an integral part of anuran behavior for mating and territorial defense amongst conspecifics. Anthropogenic noise interferes with the detection and discrimination of crucial signals, having consequences on individual fitness and overall population levels. We hypothesize intensity of frog calls will decrease in response to an increase in anthropogenic noise and that the time it takes for anurans to return to their control intensity will increase as we increase the decibel of noise stimulus. Whoosh Pond, Beaver Pond, Beaver Meadow, and Pigs Ear Flow were tested twice over a period of four nights. Each night, we played two cycles of three decibel levels of noise treatments in random order (50 dB, 70 dB, and 90 dB), using a recording of a motorcycle. We then recorded the change in calling intensity using the Decibel 10 App, and recorded the time that it took for the frogs to return to their initial decibel level. We had eight experimental units and sixteen sampling units per treatment. We used a regression analysis to measure the relationship amongst the stimulus intensity and the dependent variable (mating call intensity change and length of time before returning to control intensity). The findings will be presented and discussed during the CLBS symposium. We anticipate that our hypotheses will be supported, providing evidence that noise pollution is a significant factor contributing to the world decline of amphibians.

**Babbitt, Zachary PM., Amelia L. Dragone, and Elaina J. Sherman.** Effects of Diameter and Decay Stage of Coarse Woody Debris on the Habitat Preference of Juvenile vs. Adult Red-backed Salamanders (*Plethodon cinereus*). Red-backed salamanders are highly abundant in New York. Based on their territorial behavior, it is hypothesized that juvenile and adult red-backs will not be found under the same coarse woody debris (CWD) despite a similar habitat preference. The adults will occupy preferred habitat which consists of logs with small to medium diameters (cm) and a decay class between 2-3 (CWD chart). At each of the three experimental units; North Shore/Tower/N-5 Trail, South Sucker Brook Trail, and South Lake/Chair Rock Trail, five 100m<sup>2</sup> plots were randomly chosen by marking a map with a total of fifteen sampling units. A stake was placed at the edge of the trail, side chosen by coin flip, and 10m from the stake marked the bottom left corner of the 100m<sup>2</sup> plot. CWD (diameter  $\geq$  10cm was measured, decay class was designated with a classification chart, and RBS size was measured from head to vent (cm). A regression was used to analyze diameter of CWD and juvenile vs. adults and a T-test was used to analyze decay level of CWD and juvenile vs. adults. This study is significant since it further examines the preferred habitat and behavior of red-backed salamanders and how they interact with each other.

**VanderStouw, Benjamin T., Clare E. Foley, Renee M. Perrotte and Scott R. Kostka.** Effect of both Presence of White Stripe and Size of Organism on Cryptic Color Change in American Toads. One major defensive mechanism of American Toads (*Anaxyrus americanus*) against predation is cryptic coloration; they undergo a color change to match their substrates. The observation of a distinct white stripe on some Adirondack toads led us to question how the stripe impacts the toad's ability to match substrate color. We hypothesized that American Toads with a distinct white stripe will have a faster rate of color change (measured in change of MCV's per minute) than American Toads without white stripes. Due to the difference in sizes of the toads, we also hypothesized that smaller toads would undergo a faster color change (change in MCV's per minute) due to their smaller surface area. Thirty-one toads were collected after sunset on the trails immediately surrounding the campus. These toads served as both the experimental and sampling units. They were brought back to the lab and color change was tested from a light to dark tank over a total of 3 hours. One two sample T-test and one regression analysis were used to statistically analyze the data for hypothesis one and two, respectively. The mean findings for the presence or absence of a white stripe on rate of color change will be presented and discussed, as well as the hypothesis on color change rate based on size. The findings from this experiment could potentially explain how the diverse coloration of Adirondack toad populations persist with distinct markings.

**Invertebrates**

**Ryan, Alyssa J., Madison L. Cullen, Julia C. Fairbanks, and Liesl A. Barkman.** The Assessment of Leaf Damage on *Acer pensylvanicum*, *Fagus grandifolia*, and *Viburnum lantanoides* by Unknown A. At the beginning of our study, we observed previously unnoticed damage to all three of these plant species while searching for the Viburnum Leaf Beetle. Instead, we found a previously ignored weevil feeding on these shade trees. Of *Acer pensylvanicum*, *Fagus grandifolia*, and *Viburnum lantanoides*, it was hypothesized that *Viburnum lantanoides* would suffer the highest percent leaf damage and *Fagus grandifolia* would suffer the lowest percent leaf damage. It was also hypothesized that the insect consumes more of the *Viburnum lantanoides* plant (mm<sup>2</sup>) than the other two species. For our experimental units, we used the Northshore trail, Northside Sucker Brook trail, and Southside Sucker Brook trail. There were 4 transects with a point at 10m and 30m on each trail, where 10 leaves were taken haphazardly from each of the closest of the three species being studied. We will use the ANOVA and Tukey tests to analyze our data and test our hypothesis. Our results will be presented and discussed on June

9th, 2017. We anticipate that our findings will give us insight into how Unknown A will affect the Adirondack ecosystem in the near future.

**Bethany Elliott, Cameron “Hanz” Hauberg, Kimberly Badger, and Hannah McKelvey.** The Relationship Between Black Fly Attraction and Individual Body Odor. Black flies (*Diptera: Simuliidae*), are small, biting insects that are known pests at CLBS. We observed that some individuals attract a greater number of black flies than others. We hypothesized that people who received more bites daily would attract more black flies with their natural body odor than those who received fewer bites. Fifty-one individuals at CLBS were surveyed for the number of black fly bites they received daily and dietary preferences, which affect body odor. Twenty-four of the individuals surveyed were tested for black fly attraction. Live black flies were held in a mason jar with a mesh lid fixed with sticky tape on the bottom. Subjects were instructed to not use deodorants, perfumes, or bug sprays for at least 12 hours prior to testing. Each subject held the jar up to his or her under arm for exactly one minute, and the flies that had flown towards that individual’s scent and had become stuck to the paper were counted. The flies remaining in the jar were euthanized and counted, and the percentage of flies attracted to that individual’s scent was calculated. Four control jars were used to measure the average number of flies that would attempt to escape the jar without any influence of body odor. T-tests and an ANOVA test with Tukey’s analysis were used to analyze the data. We found no significant relationship between black fly attraction to body odor and the number of bites received by the individuals at CLBS.

**Yusuf Romaine-Elkhadri, Nicole Hoch, Gina Coluccio, and Elizabeth Breault.** Differences in Carapace Length of *Cambarus robustus* in Riffle and Pool Habitats within Streams. Crayfish are members of the order Decapoda, and many of the 640 known species are found in North America. Typically, crayfish inhabit flowing waters such as rivers and stream and the primary species of crayfish found within the Cranberry Lake Wild Forest in Clifton, New York is *Cambarus robustus*, Big Water Crayfish. Through the course of studies conducted in Ontario, Canada, *C. robustus* was determined to prefer riffle habitats over pool habitats within streams (Guiasu 1996). We hypothesized that adult crayfish caught in riffle habitats would have longer carapaces (mm) than adult crayfish caught in pool habitats. For this experiment the sampling units were the different stream habitats, riffles and pools, with subsampling units of three replicates of each habitat type in each stream. Specimens were collected at locations in Sucker Brook, an unnamed stream near Chair Rock Creek, and East Creek using D-nets and a bucket, and the carapace and total length of each crayfish was measured using a ruler. A paired t-test was used to analyze the data and indicated that there is no significant difference in carapace length of *C. robustus* specimens between riffle and pool habitats. It is important to understand where crayfish will be most successful as they can be used as an indicator for the health of stream ecosystems that also support sport fish.

**Barkley, Matthew, Christian Chevalier, Eva Hanan.** Abundance of Tardigrades in Foliose Lichen Samples Found on Tree and Rock Substrates. Tardigrades are cosmopolitan micro invertebrates that can live in limno-terrestrial habitats such as that of lichen and mosses. Due to this, an assessment of abundance of tardigrades on foliose lichen between different tree and rock substrates was made. It was hypothesized that there would be a larger abundance of tardigrades (number of individuals/ 1g of lichen) on foliose lichen found on tree substrates when compared to rock substrates due to higher moisture content in the tree bark. It was also hypothesized that there would be a larger abundance of tardigrades (number of individuals/ 1g of lichen) on foliose lichen found on Sugar Maple and Black Cherry Trees when compared to Red Maple Trees due to higher moisture content in the bark. Four trails were used as experimental units. At each of these sites, lichen samples were taken from between tree species (n=6) and between rocks and trees (n=12), which served as the sample units. Each lichen sample was examined for the abundance of tardigrades. To analyze the data collected, an ANOVA general linear model was used to compare the rock and tree data. An ANOVA and Tukey’s test was used to analyze the data among tree species. For both of the studies, there was no significant difference between substrate or tree types. These results are significant because tardigrades have not been widely studied in the Adirondack region.

**Simpson, Taylor, Lindsay DiLego, Maya Gaasche and Christopher Gemelli.** Effects of Anthropogenic Disturbances on Freshwater Zooplankton. Negative human impacts on the environment such as global warming and acid rain are having a major effect on natural ecosystems. An assessment was made of the consequences of increased acidity and temperature on freshwater zooplankton populations. An affinity for light was also observed and studied among *Polyphemus* (lake shore) and *Daphnia*, *Holopedium*, *Calanoid*, and *Bosmina* (lake middle). It was hypothesized that as acidity increased and as temperature increased independently of each other, the number of live zooplankton would decrease. It was also hypothesized that the number of *Polyphemus* zooplankton reacting to light would be higher than the number of deep water zooplankton reacting to the light. Samples of both the shore and deep water zooplankton were haphazardly collected from the lake. The mason jars in which the zooplankton were tested were the experimental units and the zooplankton themselves were the sampling units. The pH was tested by slowly changing the pH of three mason jars with a buffer down solution and the temperature was tested by slowly increasing the temperature of three mason jars. Six hours after each consecutive change the zooplankton were sampled and the amount of live and dead zooplankton were recorded along with genera. To test light reactivity 50 shore plankton and 50 deep water plankton were placed in separate tanks and a flashlight was held to the side of each for a minute and the number of plankton that gravitated toward the light by the end of the minute was recorded. An ANOVA and Tukey’s Test will be used to analyze the data collected. The results will be presented and discussed. These

findings are important because zooplankton are critical to the health of freshwater lakes and a significant loss of them could have detrimental effects on aquatic and terrestrial ecosystems.

### Plants

**Butler, Ryan M., Mathew Miele, Adam Lamancuso, and John DeTomaso.** Ecological Conditions Relating to Presence or Absence of *Cypripedium acaule* in Forested Areas around Cranberry Lake. *Cypripedium acaule* is a rare member of the orchid family, and grows best in soils between pH values of 4.0 and 5.0, in medium light levels, and requires moist, well-drained soil conditions, represented by higher levels of clay. The typical growing conditions of the flower would also be reflected by a low species richness in the surrounding understory. Due to the increase in the *C. acaule* population noticed in the Cranberry Lake region, it would be of interest to research if *C. acaule* could indicate certain ecological conditions and affect local plant growth. Presence of *C. acaule* in a mixed hardwood forest community will predict lower soil pH, higher percentage of clay, lower species richness in number of species present, close proximity to water in meters, and higher exposure to sunlight on a scale from 1 to 5 than areas without them. We chose five locations with at least three known populations of *C. acaule* and compared them to three control plots without populations within 10 meters. At each plot we measured a 5.64-meter radius (100 m<sup>2</sup>) where we measured the distance to the nearest water source, determined the number of species that occurred, and rated the amount of incoming sunlight. We also collected soil samples with which we later measured soil pH and percentage of clay. We used paired t-tests with the statistics program MiniTab to determine correlation between *C. acaule* presence and previously stated ecological conditions. Results will be presented and discussed in our presentation.

### Birds

**Lilly Gritsavage, Brooke Smith, and Sydney Hamracek.** Mobbing Responses of Passeriformes to a Barred Owl, *Strix varia*, Call at Various Times of Day. Mobbing is an antipredator response of many songbirds in which the smaller birds use alarm calls and approaches to drive larger, predatory birds out of an area to prevent them from attacking nests. Typically mobbing behavior is started by one or two birds calling which attracts others from the surrounding area to join in. Songbirds' singing and feeding activity peaks during the morning hours, when they have the advantage of strong daylight. We hypothesized that mobbing responses will score higher on a mobbing physical response scale and have the highest decibels (dB) between the times of 9am and 11am. A visual scale was used to measure the flight reaction of songbirds in the area. The experimental units were the four locations, and the sampling units were the time of day. An audio scale was used to measure the vocalization of the songbirds (dB) in response to a Barred owl call. For each of the twenty four time slot, a control call, the Red-Eyed Vireo, and the experimental Barred owl call was broadcast through a speaker and the songbird response was quantified using audio and visual scales. The basal area density of each location was measured in order to determine the consistency between the four locations. For statistical analysis we used an ANOVA and Tukey statistical test to show the variance in mobbing between different times of day. Results will be presented and discussed. From these results it will be able to be determined whether or not mobbing activity is greater at one time of day.

**Calamita, Adrianna, E., Eleanor A. Nunn, Juliana T. Ofalt, and Liam C. W. Reed.** Differences in Gastrointestinal Parasites in Fecal Matter between Ground Dwelling and Canopy Dwelling Birds at Cranberry Lake Biological Station, Adirondacks, New York. Determining if one type of bird is more victim to parasites than another will give us insight into the health of birds at Cranberry Lake. Infected birds have the capacity to spread parasites to other humans and animals through their droppings. We hypothesize that ground bird species will have a higher number of parasites in their droppings per milligram of fecal matter than canopy bird species. Samples were collected from the droppings around six bird feeders set on campus and the surrounding trails. Samples were also collected on the leaf litter and grass trails on and around campus. We sampled feces from 27 birds. The 27 birds represent the experimental units and the 27 fecal samples represent the sampling units. A portion of each sample was analyzed with a fecal smear and fecal float, and the number and type of parasite per milligram of sample was determined. A T-test was used to compare the mean number of parasites in each gram of the canopy and ground bird groups. An ordination analysis was completed to compare all of the fecal samples. Results will be presented and discussed. The anticipated findings are of importance, because the ground birds that were used in our study are common in areas of high human activity, enabling an increased chance of parasite transfer.

### Fungi

**Siwik, Emily P., Lydia R. Pleasants, Declan J. Daly, Jenny T. Russo.** Relationship between the presence of conk fungus and the health and diameter of *Acer saccharum*. Invading parasites are more easily able to access injured trees due to the lack of protection of lignin. The greater the age of the *A. saccharum*, the more susceptible it is to heart rot fungus (*Fomes fomentarius*, *Ganoderma applanatum* *Fomitopsis pinicola*). As the DBH (meters dbh) of *A. saccharum* increases, the number of visible fruiting bodies of conk fungi will also increase. As the health of *A. saccharum* decreases, the number of visible fruiting bodies of conk fungi will also increase. Five different trails, which served as our experimental units, (Sucker Brook trail, Southside trail, Chair Rock trail, North Shore trail, Tower trail) were sampled for various size classes, number of conks, and general health of the *A. saccharum*. One 50 cm + *A. saccharum* was used as a center point tree where four of the closest

sugar maples of each size class were sampled around each center point tree, totaling 4 additional samples. Size classes were 10-19 cm, 20-29 cm, 30-39 cm, and 40-49 cm. 175 *A. saccharum* were sampled over two days, 35 trees for each size class. The collected data was analyzed using a regression model, one plotting the DBH (independent variable) and the number of fruiting conk fungi (dependent variable) and the other plotting the tree health scale (independent variable) and the number of fruiting conk fungi (dependent variable). A positive relationship between both variables and the number of conks will be presented. Understanding conk fungi patterns is a useful tool when studying forest ecology around the world.

**Giovati, Amy S., Clara L. Garvey, Tucker W. Schnaars, and Gabriela B. Wemple.** Abundance and Diversity of Aquatic Hyphomycetes Along a Gradient in Sucker Brook. Aquatic hyphomycetes play a crucial role within water systems as detritivores in their later lives. They decompose the organic material, which produces an abundance of nutrients that other organisms utilize. By knowing where the spores are most abundant and diverse and assuming these spores become fungi, we can infer that those areas will be nutrient rich. We hypothesize that the lower section of Sucker Brook will have a higher abundance and diversity of aquatic hyphomycetes in comparison to the higher reaches of the stream. We collected four water samples from each of the seven different areas along Sucker Brook. Our experimental unit is Sucker Brook and its lower order streams. The sample units are the 28 water samples. Aquatic hyphomycetes were counted, identified, and recorded. Species richness and species diversity will be calculated to assess differences. A Tukey test will be used as a multiple comparison test between the different sites sampled. We will then use PC-ORD to look at environmental factors such as stream velocity, dissolved oxygen, canopy cover, and pH to see if the differences or similarities can be attributed to these factors. Findings will be reported and discussed. The data collected in this study opens up an opportunity to better understand the abundance and diversity of aquatic fungi, which will allow us to find more nutrient rich areas in bodies of water.

### Fish

**Danforth, Christopher, Larsen Tormey, and Edward Rolle.** Analysis of the Environmental Conditions Affecting Black Bass Beds. The primary focus of this study is to analyze two species of black Bass, *M. dolomieu* and *M. salmoides*. During the spring, black bass move into shallow areas to spawn. This study sought to understand the different environmental factors that affect where black bass choose to bed, in order to quantify and categorize what an ideal nesting habitat is. We hypothesized that there would be a higher frequency of black bass beds in locations that exhibit ideal nesting habitat (mineral substrate, shallow depth, access to cover) than random locations. Each black bass bed is a sampling unit and each random and nonrandom testing site is an experimental unit. This data was gathered in four different bays employing a surveying method that analyzed six "random" evenly distributed locations, and six chosen sites that seemed to exhibit an ideal habitat. After this data was gathered it was statistically analyzed and presented using t-tests for sample sites and distance to cover, and a chi-squared test for substrate. These results could be important in the conservation and management of black bass species in Cranberry Lake during this vital stage of their life cycle.

**Shaw, Devon C., Shane M. Currey, Andrew J. Koch, and Joe V. Rubenstein.** Changes in Activity Levels of Rock Bass, Golden Shiner, and Brown Bullhead in Response to Alarm Pheromones Released by Banded Killifish and Eastern Blacknose Dace. Alarm pheromones are vital to the survival of many fish, and are detected by both conspecifics and heterospecifics. We aim to show how different species of fish respond to the pheromones of minnows they live with, versus pheromones from minnows of unfamiliar origin. We hypothesize fish activity will be greater in the presence of pheromone released by prey found in their habitat than in the presence of pheromone released by prey from another habitat. Individual fish collected from Cranberry Lake were placed in separate tanks and baseline activity levels were recorded. After 30 minutes, water with alarm pheromones from killifish or dace was dumped into each tank and activity levels were observed. Thirteen rock bass, nine brown bullhead, and nine golden shiner were tested. ANOVA and Tukey tests were used to compare the percent change in activity of fish when presented with pheromone. Results will be discussed during our presentation. Our anticipated findings are significant in that they will show how some species increase activity when presented with alarm pheromones, while others decrease their activity in order to avoid potential predators.