

THIRTY-SECOND ANNUAL FIELD PARASITOLOGY SYMPOSIUM



**Downstairs Lab
Goodall Lodge
August 10, 2007**

9:00 1. ASSEMBLAGE OF ECTOCOMMENSAL COMMUNITIES: CILIATES OF *HYALELLA AZTECA*.

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Ecological communities are not typically groups of organisms assembled at random. Many factors influence which, where, and how many species or individuals live together. Determining which biotic or abiotic factors influence the assemblage of communities can be difficult, in part, because it is necessary to have replicated communities. Host-parasite/commensal systems offer a unique opportunity to study the rules of community assembly because each host individual is a community of organisms. We studied assemblages of ectocommensal ciliates living on the exterior surface of the freshwater amphipod *Hyaella azteca*. We sampled *H. azteca* from four discrete bodies of water in western Nebraska. Nearly all of the *H. azteca* in our system had ectocommensal ciliates, and the ciliate communities varied in several ways. The number of ciliates per host was strongly correlated with host size. Ciliate communities also varied between geographic locations. *H. azteca* populations from nearby locations shared more ciliate species than host populations from distant areas. However, geographic proximity did not influence the abundance of ciliates on hosts in the community. Interestingly, ciliate abundance was least in a population that was recently dredged. This data suggests that the age of the host population may be an important factor determining ciliate population diversity and abundance.

9:15 2. INVESTIGATING AN ECTOCOMMENSALISTIC RELATIONSHIP: *VORTICELLA SP.* AND *EPISTYLIS SP.* ON THE MOSQUITO LARVAE, *CULEX TARSALIS* AND *CULEX PIPIENS*.

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This study was conducted to address issues of intensity, prevalence, resource use, and body region specificity of the ciliated ectocommensals (*Vorticella sp.* and *Epistylis sp.*) found on two species of mosquitoes (*Culex tarsalis* and *C. pipiens*) from Humphrey Pond in western Nebraska. Additionally, correlations between host length and intensity of the particular ciliates were examined. Following the data collection, statistical tests (chi-squared, linear regression, niche breadth, niche overlap, and Student's t-test) were employed. Chi-squared and Student's t-test revealed no significant difference in the prevalence or intensity of the ectocommensals on the two different species of mosquitoes. Linear regression suggested a relationship between the length of the mosquito and the intensity of ciliates. Finally, niche overlap and niche breadth explained resource use of the ectocommensals and their relationship with the host, as well as with one another.

9:30 3. A SURVEY OF MOSQUITOES OF KEITH COUNTY, NEBRASKA DURING LATE JULY AND AUGUST, 2007.

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After surveying the genera and species of mosquitoes in the vicinity of Cedar Point Biological Station, there proved to be a great amount of diversity amongst the specimens collected. Both adult female mosquitoes and fourth generation larvae were used in the survey. Various species of both the genus *Aedes* and the genus *Culex* proved to be more abundant than others at the collection sites. Diverse specimens were collected within specific areas and also between different sites. At different times during the day, collections took place at Dunwoody Ranch (including the pond and surrounding area) and the white gate at the border of the Cedar Point Biological Station. The analysis of data was necessary to determine existing patterns and relationships between the presence and absence of various species. Also, correlations between thriving species within each of the collecting sites were studied. To study these patterns, collection of both adult females in a given area along with larvae from the same location was of vital importance for the accuracy of the study. After a five day collection period surveying six different sites, ten species within two genera of mosquitoes were found. From this total, inferences about the prevalence of dominant species were made. It became understood that mosquito species do not compete with each other for resources in the areas from which collections occurred. However, to verify the interrelations of species a larger sample size would be necessary.

9:45 4. ANIMAL CARE OF DAMSELFLY NAIADS: IS IT POSSIBLE TO INFECT NAIADS WITH GREGARINE OOCYSTS?

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The objectives of this study were to determine if exposure of damselfly naiads to a solution containing gregarine oocysts affected the infection rate of the naiads and to keep the test subjects alive. The first objective was accomplished by collecting gregarine gametocysts from infected adult damselflies and exposing naiads to the oocysts that dehisced from the gametocysts. The second objective was accomplished by reviewing published literature that used the same test subjects and applying previously used methods to this study. After exposure, we analyzed the data and found that the exposed group had gregarines with epimerites, a characteristic of younger gregarines. There was also more species diversity in the exposed group, which was to be expected because a mixture of species of gametocysts was used in the exposure. We found that it is difficult to simulate a natural gregarine-host interaction in the lab with very limited time. This study was important because it addressed several different issues with animal care, the timeline of a life cycle of a gregarine, and unexpected factors that could be influencing results.

10:00 BREAK

10:15 5. OSMOREGULATION IN GREGARINES: THE EFFECTS OF VARYING TONICITIES ON THE OSMOTIC PRESSURE IN ASSORTED GREGARINE SPECIES

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This study was designed to determine the effects of varying tonicities on the osmotic pressure in an assortment of gregarine species. Different gregarine species were obtained from five hosts, *Ischnura verticalis*, *Enallagma civile*, (both adults and naiads), *Tenebrio molitor*, *Eleodes tricostata*, and the *Embaphion* sp. Hosts were dissected daily and the gregarine species, *Trapezorophalus silliseni*, *Nubenocephalus nebrokensis*, *Actinocephalus carrilynuae*, *Hoplorhynchus acanthatholius*, *Steganorhynchus dunwoodyi*, *Gregarina niphandrodes* and *Stylocephalus* sp., were maintained in a isotonic solution. Single gregarines were placed in depression slides, each containing an isotonic, hypertonic or hypotonic solution. The width and length of the protomerite and the deutomerite were taken at specific time intervals, and any significant change in the size and shape of the gregarines was recorded. A dye exclusion test was also used to determine the time of death for the gregarines. The results of the trials demonstrated that all species of gregarines tested showed a significant response to the hypotonic solution, resulting in increased body size or rupture. Responses to the environment were marginal during the first eight hours of exposure. Overall, the most significant response was observed after eight hours of being immersed in the solutions. The dye exclusion test revealed that in general, gregarine species were able to survive for a minimum of four hours in the given solutions. These findings suggest that, unlike other common parasites thought to be unable to osmoregulate, gregarines may in fact have the ability to do so. The data is supported by the dye exclusion test which reveals that gregarines have the ability to survive in different solutions for a considerable amount of time.

10:30 6. SURVEY OF FIVE FAMILIES OF SNAIL CERCARIAE AND THEIR RELATED FAUNA

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This survey involved the snail species *Physa* at five separate locations near Cedar Point Biological Station. The survey was primarily used to speculate the surrounding fauna at each of the five separate locations and formulate possible life cycles of each family of cercariae. The prevalence of each family of cercariae was also plotted against the length of the host snail. The snails were collected primarily by using dip nets around the edge of the bodies of water. The snails were then dissected and were observed for the presence of cercariae. The family of cercariae that were found in each snail could then be studied by what type of host species they are known to come in contact with. The five families of cercariae that were found in *Physa* were Macroderoididae, Echinostomadae, Notacotylidae, Pronocephalidae, and Clinostomatidae. Some of the families of cercariae were found in several of the locations while some were specific to only certain locations. The classification of each family of cercariae allowed for the construction of life cycles for each of the separate families of cercariae. The importance of

seeing how the different fauna interact in an environment, and how they can be associated with each other can be valuable in wide range of environmental studies.

10:45 7. CHAETOGASTER IN THE SNAILS OF DUNWOODY POND: VARIATION IN THE CHAETOGASTER LIMNAEI POPULATION IN PHYSA GYRINA, HELISOMA TRIVOLVIS, AND GYRAULUS PARVUS

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The population of three genera of snails in Dunwoody Pond, *Physa gyrina*, *Helisoma trivolvis*, and *Gyraulus parvus*, were analyzed for the presence or absence of *Chaetogaster limnaei* in this study. All three genera were dissected following collection, and the lengths of the *Chaetogaster* found were recorded. The number of tufts of setae and the number of setae per tuft were also counted and recorded. This initial survey of the *Chaetogaster* population in the snails revealed that *Chaetogaster* were not present in *Physa*. It also revealed that there was a relationship between the length of the host snail and the length of the *Chaetogaster* found in the snail. There also was a relationship between the length of the *Chaetogaster* and the total number of tufts. The distribution of *Chaetogaster* between the three snail species lead to the development of two additional experiments. Individual *Physa* were placed into a small jar of water along with free *Chaetogaster* to test for the ability of *Physa* to serve as a host for the *Chaetogaster* population. In an identical set up, a single *Physa* and a single *Helisoma* were placed in order to see if the added *Chaetogaster* would preferentially infect the *Helisoma* or the *Physa*. This experiment showed that *Physa* could be successfully infected with *Chaetogaster*, however, in the closed system of the jars, *Chaetogaster* preferred to infect *Helisoma*. This preference was reflected in the natural closed system of Dunwoody Pond. Another experiment was performed in which *Physa* and *Helisoma* were restricted at separate sides of a Petri dish. A single *Chaetogaster* was then placed equidistant from the two snails. The *Chaetogaster's* movement was then watched under a dissecting microscope and the time taken to choose a host was also recorded. This was done to test a possible chemical attraction between *Helisoma* and *Chaetogaster*. The results of this showed that while *Chaetogaster* did choose *Helisoma* more frequently as its host, this decision was not quick nor did it provide definitive results. This study shows that there is an obvious relationship between the host parasite relationship of *Helisoma trivolvis* and *Chaetogaster limnaei*. While *Chaetogaster* prefer *Helisoma* as their host, it is possible for the *Chaetogaster* to inhabit *Physa gyrina*. It is also improbable that this relationship is a direct result of chemical signaling between the two species.

11:00 8. DISTRIBUTION OF DACTYLOGYRUS ON THE GILLS OF CYPRINUS CARPIO.

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The objective of this study was to establish preferences of *Dactylogyrus extensus* in terms of location on the gills of the host species *Cyprinus carpio*. Size, gill arch, and dextral and sinistral preference were all examined. *C. carpio* from the South Platte River near Roscoe, Nebraska were used in the study. Conclusions of this study were that *D. extensus* have no predilection for

specific gill arches, size or side of *C. carpio*. These findings could have implications for further studies concerning *D. extensus* and commercial endeavors involving *C. carpio*.

11:15 9. EFFECT OF STANDARD LENGTH OF *LEPOMIS MACROCHIRUS* ON NUMBERS AND SPECIES OF PARASITES.

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This study investigated the relationship between host size and the number of species of parasites to determine the size at which the host is first parasitized. Thirty-two bluegills of the species *Lepomis macrochirus* were collected from Humphrey Pond, western Nebraska. The bluegills were measured for standard length and then dissected to determine the types of species of parasites found in them and the abundance of each species. Although most of the fish had parasites, no significant correlation was found between standard length and the number of species of parasites. Parasites are not necessarily host length specific, but rather opportunistic.

11:30 10. HAMULI VARIATION IN *HAPLOCLEIDUS DISPAR* (MONOGENOIDEA: ANCYROCEPHALIDAE) OF LARGE MOUTH BASS FROM KEITH COUNTY NEBRASKA

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This study was designed to measure the difference in hamuli sizes between the gill monogene *Haplocladius dispar* (Monogenoidea: Ancyrocephalidae) found on large mouth bass, *Micropterus salmoides* (Centrarchidae), in two geographically isolated ponds in western Nebraska. Digital photographs were taken of the haptor and copulatory complex of a specified number of worms from each fish. Although five species of monogenes were recovered, the comparison focused on the species *Haplocladius dispar*. The photographs were analyzed using ScionImage™, and a series of twenty-two measurements of the dorsal and ventral hamuli were recorded. Results indicate that there are significant differences in certain haptor measurements between the ponds, with a greater probability of difference between the ventral hamuli than the dorsal hamuli.

11:45 11. RELATIONSHIPS AMONG SPECIES OF ANCYROCEPHALINAE (MONOGENOIDEA) IN *MICROPTERUS SALMOIDES*

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This project was designed to examine the relationship between species of Ancyrocephalinae (Monogenoidea) infecting *Micropterus salmoides*. Six host individuals were collected, from which a total of 437 worms were removed and identified. Six distinct monogene species were found on the gills, with the number and type of parasites varying between hosts. Statistical analysis was used to determine relationships among monogene species and reveal significant correlations. Intensity values and host sizes were also examined. Results suggest a fairly strong negative correlation between the presence of *Clavunculus bursatus* and other species. A

significant positive correlation also seems to exist between *Haplocladius furcatus* and species of *Onchocleidus* and *Synclerithrum*. Such findings may suggest that infection of *M. salmoides* by a monogenetic parasite may be dependent upon the species of parasites already occupying the host's gills. These results could also imply a mechanism of interaction between parasites that influences their attachment to a host individual.

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