

# **THIRTY-THIRD ANNUAL FIELD PARASITOLOGY SYMPOSIUM**



**Downstairs Lab  
Goodall Lodge  
August 8, 2008**

**Session A – Ecology and Life Cycles  
Downstairs lab**

**Chair: Alaine Knipes**

**9:00 1. SPECIES DIVERSITY AND GEOGRAPHIC DISTRIBUTION OF  
MOSQUITOES IN KEITH COUNTY, NEBRASKA**

**Joshua Dean and Angela Schick**

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A survey was conducted to identify mosquito species and their distribution in Keith County, Nebraska. Mosquitoes were collected over a two week period at six locations throughout the county using aspirators for the adults and traditional aquatic dipping techniques for the larvae. Various aquatic locations were examined for the presence of mosquito larvae and the sampling sites chosen represented diverse habitats in both rural and urban areas. The mosquitoes collected were examined and identified to species using microscopy. Seven species representing four genera were found. Many of the locations showed limited species diversity with only one species being predominant. This demonstrated that different species of mosquitoes show variation in their preferred habitats. Understanding the environments needed for each specific species is important in explaining and predicting variations in the mosquito population from year to year. Monitoring the population is also a crucial step in controlling the spread of West Nile Virus and other diseases commonly associated with mosquitoes.

**9:15 2. DEMOGRAPHIC SURVEY OF GREGARINES IN *ENALLAGMA CIVILE***

**Brianna Ward and Kirstin Sholes**

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The study objective was to conduct a demographic survey of the gregarines found in a damselfly population of *Enallagma civile*. The data obtained from this survey were used to determine if the damselflies had been infected multiple times. Also prevalence of infection was compared by the dates of specimen collection. Male damselflies were collected from Nevens Ranch in Keith County, Nebraska. They were dissected and measurements of protomerite and deutomerite length and width were recorded. Gregarines species was also determined. The results of this survey showed that there was a significant difference in the variance of gregarine total length within the infected damselflies. This indicates that there was a wide range of sizes observed and multiple infections occurred among the total population as well as within some individuals. Also, there was no significant difference in prevalence based on collection date. These findings are maybe significant in understanding how multiple infections affect disease transmission.

**9:30 3. MULTIPLE INFECTIONS OF GREGARINE SPECIES IN *ISCHNURA  
VERTICALIS***

**Mohammed S. Vhora and Phillip Jarrett**

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This study examined the likelihood of multiple infections of gregarines in *Ischnura verticalis*. *Ischnura verticalis* were collected at Dunwoody pond, Keith County, Nebraska over a six day period using insect nets. The gut was then extracted to see if gregarines were present. Gregarines

were identified and protomerite and deutomerite lengths and widths were measured. Two gregarine species were found, *Hoplorynchus acanthatholius* and *Actinocephalus carrilynnae*. The measurements were taken to determine whether *I. verticalis* is a host for multiple gregarine infections. The mean, variance and range were calculated for each damselfly; also an ANOVA was performed on the total lengths of each gregarine species. Measurements of both species of gregarines varied in individual hosts. These results show that *I. verticalis* is being infected multiple times by *H. acanthatholius* and *A. carrilynnae*. Evidence of multiple infections of individual hosts translates to other areas of study, such as the medical and veterinary sciences, helping better diagnose and treat other parasitic infections.

#### **9:45 4. FECUNDITY AND PARASITE BURDENS IN DAMSELFLIES (*ENALLAGMA CIVILE*)**

**Krista M. Major and B. Shockley**

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This study was created to investigate a possible correlation between any element of *Enallagma civile* fecundity and of parasitic infection. A sample of fifty-two female, *Enallagma civile* damselflies were collected from a pond on Neven's Ranch in Keith County, Nebraska. After collection, eggs were counted and a sample was measured. Ectoparasites as well as endoparasites in the damselflies were counted, measured, and identified. A linear regression test was conducted through FieldStat to determine the correlation coefficients comparing the following elements: number of eggs, total biomass of eggs, total biomass of gregarines, total biomass of parasites, total number of mites, biomass of mites, total number of parasites per host, and the total number of trematodes. Completion of the statistical analysis revealed correlations among a sample of the tested groups; however, many of the correlations had relatively small significances biologically. Overall, this study will provide insight into the role that parasites have in the reproduction and essentially the survival of *Enallagma civile*.

#### **10:00 BREAK**

#### **10:15 5. EFFECTS OF HOST *ELEODES TRICOSTATA* (ARTHROPODA: COLEOPTERA) STARVATION ON ITS PARASITE *STYLOCEPHALUS GIGANTEUS* (APICOMPLEXA: EUGREGARINIDA)**

**Karla Rinschen and Brent Schmoker**

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This study was conducted to explore the nutritional association of the host *Eleodes tricostata* (Arthropoda: Coleoptera) and its parasite *Stylocephalus giganteus* (Apicomplexa: Eugregarinida). This was accomplished by comparing the mean number, length/width ratio, and the deutomerite cytoplasmic density of the trophonts found inside the gut of four categorized groups of beetles: experimental-starved, experimental-refed, control-fed, and control-wild. The starved group was given no food for three days, while the fed group was provided a fresh Raisin Bran® flake daily for three days. On the third day, all of the beetles in the fed group were dissected while only half of the beetles from the starved group were dissected. The other half of the starved group was given Raisin Bran® flakes for two days and dissected on day five. The wild group was dissected almost immediately after collection to control for the effects of laboratory conditions. Although there was no significant difference between the mean number of

trophonts found in each of the four beetle conditions, the parasites from the starved beetles had significantly less cytoplasmic density than both the fed and refed groups. Additionally, the starved group had a significantly higher length/width ratio than the fed group, meaning that they were significantly longer and skinnier. Conclusively, this study demonstrated that there was a relationship between the nutritional status of *Eleodes tricostata* and the morphology of its parasite, *Stylocephalus giganteus*.

## **10:30 6. THE LARVAL TREMATODES OF SNAILS IN KEITH COUNTY, NEBRASKA: A SURVEY OF CERCARIA WITH A CONCENTRATION ON HOST-SPECIFICITY**

**Patrick Olson and Keenan Price**

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A survey of cercarial types found in three species of snails in Keith County, Nebraska is presented here based on the study of 919 snails. *Helisoma trivolvis*, *Physella gyrina*, and *Stagnicola elodes* were collected from four different collection sites by standard water dipping techniques. Each snail was dissected to inspect for infection. Cercariae were then identified down to cercarial type and family. A total of ten different cercarial families were found in 78 (8.596%) snails. Amphistome, strigea, and virgulate cercaria were the most common and were found in all three species of snail. Data analysis revealed that the prevalence of strigea and virgulate cercaria was not significantly different between the three species of snail. However, the prevalence of amphistome cercaria was significantly different. These findings suggest that strigea and virgulate cercaria lack first intermediate host-specificity, while amphistome and other cercaria types not found in all three species may remain host specific. Furthermore, the three different species of snail were found to have significantly different susceptibilities to infection. Collectively, this study gives a comprehensive review of the cercaria types present in Keith County, Nebraska and the observed host-specificity.

## **10:45 7. COMPARING THE HOST SPECIFICITY OF STRIGEIDAE AND SCHISTOSOMATIDAE CERCARIA AMONG VARIOUS HOSTS**

**Kristen Jackson and Cody Pick**

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In this study we attempted to penetrate four hosts with two families of cercaria: Strigeidae and Schistosomatidae. *Physa* snails shedding Strigeidae cercariae were collected from the South Platte River; Lymnaeidae snails shedding Schistosomatidae cercariae were obtained from a stagnant irrigation ditch near Dunwoody Pond. The four experimental second intermediate hosts utilized in the trials were damselfly larvae, planaria, killifish, and *Physa* snails. In order to determine the level of host specificity within each of the cercaria families, an individual host was placed into a container with ten fork-tailed cercariae of the same family. Following a thirty-minute trial, the host specimen was removed and the remaining cercariae were counted. These values allowed us to determine the percentage of penetration of the cercariae per each host in the allotted time interval. Four different t-tests were performed on the data to determine differences between the mean penetration values of the two families of cercaria. Despite the fact that the

two families of cercariae tested shared physical features there was a significant statistical difference in the percentage of penetration into all four of the tested hosts. Plus, these values indicated that a single type of cercaria has the ability to penetrate multiple intermediate hosts.

**11:00 8. A COMPARATIVE ANALYSIS OF THE PARASITES IN *FUNDULUS ZEBRINUS* IN ISOLATED AND NON-ISOLATED POPULATIONS OF THE SOUTH PLATTE RIVER NEAR ROSCOE, NEBRASKA, IN KEITH COUNTY.**

**Kelsey J. Kumm and Kelsey C. Koch**

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*Fundulus zebrinus* populations from the South Platte River were collected for an analysis that compared the similarities and the differences of parasite mean, prevalence, variance, and mean intensity between an isolated population and a non-isolated population. The South Platte River near Roscoe, Nebraska, in Keith County, is highly variable in depth, stream flow, and discharge. This variability has caused some populations of *F. zebrinus* to be isolated from the flowing river. *F. zebrinus* were trapped in stagnant water within close proximity to numerous shedding aquatic snails. This interaction between possibly infected snails and *F. zebrinus* could potentially be detrimental to the health of the isolated population of *F. zebrinus*. Fifty-two *F. zebrinus* from each population were collected, dissected, and analyzed for data during the last week of June of 2008. *F. zebrinus* is host to a variety of parasites, including: *Posthodiplostomum minimum*, *Gyrodactylus bulbacanthus*, *Gyrodactylus stableri*, *Trichodina* sp., *Scyphidia* sp., and *P. Nematoda*. The data was analyzed to discover correlations between standard lengths, parasite species, and total number of parasites. The isolated population had a different assemblage of parasites compared to the population that was not isolated. These results suggest that variability in one's surroundings can affect fitness, available resources, and life expectancy.

**11:15 9. PATHOLOGY OF PARASITIC INFECTIONS IN *FUNDULUS ZEBRINUS* AS REVEALED BY DIFFERENTIAL BLOOD CELL COUNTS**

**Amber Bartelt and Zachary Baumfalk**

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The goal of this study was to determine whether pathological effects of parasites on their host species could be shown by a study of blood smears, with a focus on differential white blood cell counts. From July 25-August 4 2008, parasites were found in the gills, gut, body cavity and eyes of *Fundulus zebrinus*, a freshwater fish from the South Platte River in Nebraska. There were *Posthodiplostomum minimum* metacercaria, both encysted and unencysted, in the eyes and body cavity. The number of *Posthodiplostomum minimum* in the body cavity exceeded the number of *Posthodiplostomum minimum* found in the eyes. In the gills *Salsuginus thalkeni* was present, but no other parasites were found. In addition there were nematodes found in the body cavity near the eyes by the heart. A species of the family Bothriocephalidae tapeworm was found in one of the *F. zebrinus* specimens. It is the first known Bothriocephalidae found in the gut of this species of killifish. During the same dissection a member of phylum Nematoda was also found in the body cavity. There is evidence to suggest that more parasites are found in the *Fundulus Zebrinus* that were over a year old in comparison to the *F. zebrinus* that were under a year old. The age, however, appears to not have an affect on the number of trematode metacercaria or nematodes found. More nematodes were found in the *Fundulus zebrinus* that were under a year old. There

were no significant differences found in the numbers of monogenes or metacercariae found in the right or left gills and eyes respectively. Results of the blood smear examinations will be reported.

#### **11:30 10. HOST SPECIFICITY OF LARVAL TREMATODES IN CO-OCCURRING FISHES**

**Tyler Moore and Joseph Smith**

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*Posthodiplostomum minimum* is a trematode that inhabits fish as intermediate hosts, and usually infects its hosts' eyes and/or body cavities. During the end of July, 2008, sixty-three fish, with specimens from five different species, were collected from the South Platte River near Roscoe, Nebraska, for a study on host and infection site specificity of *Posthodiplostomum minimum* metacercaria. The eyes and body cavities of the host fishes were examined for *P. minimum* metacercaria, and the numbers of metacercaria found in the eyes and body cavities were recorded. Results show that *P. minimum* does indeed display strong host specificity among the five hosts examined, as well as infection site specificity in hosts of different species. Certain species, such as *Notropis ludibundus* display very high prevalence and infection intensity, while in other species, such as *Campostoma anomelum*, infection is nearly completely absent. Evidence was also found demonstrating infection-site specificity; body cavity to eye metacercaria ratios varied significantly among the five host species. In addition, correlations were found between host standard length and infection intensity in some host species. The overall results of the study show that *P. minimum* populations vary greatly among separate host species of the same geographical area.

#### **11:45 11. HOST SPECIFICITY AMONG SPECIES OF ANCYROCEPHALIDAE (MONOGENOIDEA) IN MICROPTERUS SALMOIDES**

**Rachel Paseka and Emily Signor**

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The goal of this study was to determine host specificity among the family Ancyrocephalidae in the order Monogenoidea which are found on the gills of bass and sunfish. Eleven fish of the family Centrarchidae were collected from two different ponds in Keith County, Nebraska. Host species used were green sunfish (*Lepomis cyanellus*), bluegill (*L. macrochirus*), and largemouth bass (*Micropterus salmoides*). Every fish examined was found to be infected with monogenes. Each monogene was isolated, identified, and measured in micrometers. Using original descriptions of monogene species, a key was derived for the monogenes on centrarchids in Keith County. Four hundred monogenes were found, representing nine species in six genera. After statistical analysis using ANOVA and contingency tables, results showed that *Actinocleidus fergusonii*, *Onchocleidus ferox*, *Onchocleidus heliciis*, and *Onchocleidus principalis* displayed host specificity. Raw data indicated that *Onchocleidus cyanellus* and *Haploleidus dispar* may also demonstrate host specificity; however, not enough data was collected to reject the null hypothesis that no host specificity exists.

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