2000-03

General Schedule


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Taxis that are reproductively variable have provided biologists with the ability to test mechanisms of evolutionary change. North American freshwater mussels, a primarily dioecious clade, are an exceptionally useful group for investigating mating system transitions (e.g., from dioecy to simultaneous hermaphroditism [SH]). Studies of unionid genera consisting of both dioecious and hermaphroditic species offer significant opportunities for increased comprehension of the ecological, genetic, historical, and morphological factors involved in the origin and maintenance of SH. The freshwater mussel genus Toxolasma currently contains eight recognized species, T. courneculus, T. cylindrus, T. invexus, T. meansi, T. parvus, T. papulosa, T. pulchra, and T. toxofleas (T. parvus is the only hermaphroditic species). Species delineation and interspecific relationships within Toxolasma, currently based on morphological data sets, are questionable and have hindered the examination of mating system transitions in this genus. The goal of this project is to use phylogenetic analyses of DNA sequences (from the cytochrome c oxidase subunit I [COI] gene) to (1) estimate the evolutionary relationships among multiple populations representing the species within Toxolasma and (2) use this estimate to infer the minimum number of matrix system transitions that occurred within Toxolasma. The estimation of the phylogenetic relationships among the species within Toxolasma is a necessary first step toward gaining an understanding of the events that led to the origin of SH in this genus. To date we have extracted total DNA. PCR amplified a portion of the COI gene, gel purified the PCR products, and ran sequencing reactions for both strands of the PCR products. We have sequence from 42 individuals, representing 42 populations.

3:20 THE EVOLUTION OF SIMULTANEOUS HERMAPHRODITISM IN THE FRESHWATER MUSSLE GENUS TOXOLASMA (BIVALVIA: UNIONIDAE): Angela M. Fettig (Walter R. Hoeh), Kent State University, Dept of Biological Sciences, Kent OH 44242. Afettig7013@aoe.com

Zebra mussels (Dreissena polymorpha), which are commonly excluded from studies of feeding preference, may be important food sources of larval fish. Previous studies have suggested that rotifers, Brachionus angularis, Asplanchna sp., Synchaeta sp., and cyclopoids, nauplii {DOROSOMA CEPEDIANUM) are important food sources for larval fish. However, these studies have focused on only one or two species, and the diversity of zooplankton present in Lake Erie is not well known. This study compared the size distribution (1996 and 1997). Zooplankton abundance was higher in 1996 than 1997. Allele sizes were not changed. Microsatellite analysis appears to be a reliable and

3:30 SELECTIVITY OF FISH SIZE AND SPECIES COMPOSITION FOR THREE TRAP NET DESIGNS. Daniel E. Shoup, Robert E. Carlson and Robert T. Heath, Kent State University, Dept. of Biological Sciences, Kent OH 44242. dshoup@kent.edu

The objective of this study was to compare prey selectivity of larval gizzard shad in a hypereutrophic reservoir (Acton Lake, Ohio) between years with different zooplankton composition (1996 and 1997). Zooplankton abundance was higher in 1996 than 1997. Rotifers dominated the zooplankton community (48.23% in 1996 and 92.31% in 1997) when larval gizzard shad were present in the lake. The proportion of cladocerans and small copepods was higher in 1996 (31.6%) than in 1997 (6.7%). Mean density of larval gizzard shad was lower in 1996 (2.2 ind/m3) than in 1997 (7.4 ind/m3) in Acton Lake. We calculated Chesson's Prey Selectivity Index on three larval fish sizes (< 10.5 mm TL, 10-15.0 mm TL and > 15.1 mm TL). In 1996, larval gizzard shad < 10.5 mm TL positively selected for nauplii, Asplanchna sp., Polyarthra sp. and Synchaeta sp. The medium size class-10.6-15.0 mm TL positively selected for cycloids, nauplii and Asplanchna sp. Larvae greater than 15.1 mm TL positively selected for Daphnia parva, cycloids, nauplii and Asplanchna sp. Larvae less than 10.5 mm TL positively selected for nauplii, Asplanchna sp., Polyarthra sp. and Synchaeta sp. The medium size class selected for Asplanchna sp., Polyarthra sp. and Synchaeta sp. Large larvae selected for Brachionus angularus and Asplanchna sp. Our results suggest that rotifers, which are commonly excluded from studies of feeding preference, may be important food sources of gizzard shad throughout larval life stages, in particular, when the availability of cladocerans and copepods is low.

3:45 MICROSATTELITE ANALYSIS OF FORMALIN TREATED LAKE ERIE STURGEON TO DETERMINE THE GENETIC VARIABILITY FOLLOWING A POPULATION CRASH. Julie L. Maybruck, and Paul Fuert, Ohio State University, Dept of Molecular Genetics, Columbus OH 43210. Maybruck2@osu.edu

3:30 GENETIC STUDIES OF POPULATION STRUCTURE IN THE LAKE STURGEON OF THE GREAT LAKES. Tara Rose, Todd M. Cavender, Brian Mark and Paul A. Fuert, Ohio State University, Dept. of Evolution, Ecology and Organismal Biology, Columbus OH 43210. Rose.256@osu.edu

Information about the genetic population structure of the lake sturgeon, Acipenser fulvescens, in the Great Lakes is critical for the management of this locally endangered species. Questions concerning the degree of population differentiation and the similarity of populations are relevant in making decisions concerning possible restocking or supplemental stocking of populations. Genetic differences between localities within the lake sturgeon population have been examined using RAPD (Randomly Amplified Polymorphic DNA) analysis and microsatellite locus comparison. A set of fish representing several localities throughout the Great Lakes has been analyzed. These localities include the Wolf River (preliminary findings) and the St. Clair River and Lake Erie. Population distances based on allelic sharing and allelic frequency were determined and population relationships analyzed using UPGMA cladograms. The RAPD studies show substantial differences between localities, and an East-West component of overall differentiation. The analysis of these data by coistic methods shows that genotypes are shared among populations. An analysis of the same localities using microsatellite DNA shows a similar clustering of populations. The data should be expanded with additional populations and more loci to confirm the preliminary findings. The results suggest that transplantation of stock must be undertaken with care. (We thank the Wisconsin, Michigan and Ohio DNRFs for assistance in collecting material and the USFWS, Ohio Sea Grant and the National Science Foundation for partial support of the work reported here.).

4:00 EFFECTS OF PREY AVAILABILITY ON LARVAL GIZZARD SHAD (DOROSOMA CEPEDIANUM) PREDATION. David W. Paul, Maria J. Gonzalez and Amina J. Pollard. Wright State University, Dept. of Biological Sciences, 3640 Colonel Glenn Hwy, Dayton OH 45435-0061. dpaul@wstein.com

The objective of this study was to compare prey selectivity of larval gizzard shad in a hypereutrophic reservoir (Acton Lake, Ohio) between years with different zooplankton composition (1996 and 1997). Zooplankton abundance was higher in 1996 than 1997. Rotifers dominated the zooplankton community (48.23% in 1996 and 92.31% in 1997) when larval gizzard shad were present in the lake. The proportion of cladocerans and small copepods was higher in 1996 (31.6%) than in 1997 (6.7%). Mean density of larval gizzard shad was lower in 1996 (2.2 ind/m3) than in 1997 (7.4 ind/m3) in Acton Lake. We calculated Chesson's Prey Selectivity Index on three larval fish sizes (< 10.5 mm TL, 10-15.0 mm TL and > 15.1 mm TL). In 1996, larval gizzard shad < 10.5 mm TL positively selected for nauplii, Asplanchna sp., Polyarthra sp. and Synchaeta sp. The medium size class-10.6-15.0 mm TL positively selected for cycloids, nauplii and Asplanchna sp. Larvae greater than 15.1 mm TL positively selected for Daphnia parva, cycloids, nauplii and Asplanchna sp. Larvae less than 10.5 mm TL positively selected for nauplii, Asplanchna sp., Polyarthra sp. and Synchaeta sp. The medium size class selected for Asplanchna sp., Polyarthra sp. and Synchaeta sp. Large larvae selected for Brachionus angularus and Asplanchna sp. Our results suggest that rotifers, which are commonly excluded from studies of feeding preference, may be important food sources of gizzard shad throughout larval life stages, in particular, when the availability of cladocerans and copepods is low.