

The turtle community of the Little Pigeon River (Sevier County, TN)

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ABSTRACT: Three primary sites along the Little Pigeon R. are being surveyed for this project. Turtles are typically hand-captured at night between 2000 and 2300 h while wading the river with spotlights (or flashlights), although several daytime captures have been made. As of 14 September 2003, a total of 122 turtles representing six species (*Apalone spinifera*, *Chelydra serpentina*, *Graptemys geographica*, *Pseudemys concinna*, *Sternotherus minor*, and *S. odoratus*) have been captured. Data is collected for each capture and turtles are marked for potential recapture. Seven recaptures (representing three species- *C. serpentina*, *S. minor*, and *S. odoratus*) have been made as of 14 September 2003, but population size estimates have not been made at this time. Investigating competition among *G. geographica*, *S. minor*, and *S. odoratus* is currently the focus of the project. Long-term goals include documenting the life history of *S. m. peltifer* and population monitoring for all turtle species. This project relies heavily on volunteer participation- particularly from youth (high school) volunteers that work in the Department of Herpetology at Knoxville Zoo. Volunteer participation will be discussed in detail.

Early Movement Behavior in a Litter of Neonate Timber Rattlesnakes. Vincent A. Cobb, Timothy Worrall, J. Jeffrey Green, Brad Glorioso, Jake Pruett. Department of Biology Middle Tennessee State University, Murfreesboro, Tennessee 37132.

Snakes, in general, are known to lack parental care. However, several species of live-bearing pitvipers have been observed to exhibit a brief maternal attendance behavior with the mothers staying near the neonates until their first ecdysis event. Both mother and neonates then disperse. Although it is thought that neonates may follow maternal pheromone trails, few data are documented to test this event. In September 2003, we radiotracked a postpartum timber rattlesnake along with her four neonates. Initial movement behavior of two neonates appeared to be associated with the movement of the mother, but, within one week those two neonates were making movements clearly independent of the mother. Movement by the third neonate was independent from the mother from the start. The fourth neonate stayed close to the birth site. Total movement distance by all five snakes during their first 10 days varied considerably (mother: 22 m; neonates: 3, 21, 49, and 154 m). It appears there may be some initial association between movements of some neonates and their mother but they are likely short-lived. Once neonates made a move to a new location they generally stayed there for an extended period (typical of many pitviper movements). Habitat associations of the neonates is varied but many relocations have been close to a wood/clearing ecotone. During most relocations neonates are coiled on the ground, however, one neonate has repeatedly been arboreal for over 50% of its relocations.

THS Title and Abstract

Daily Body Temperature Patterns of Black Racers (*Coluber constrictor*) in Middle Tennessee

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Between July and September 2003, we radiotracked and monitored the daily body temperature patterns of five free-ranging black racers (*Coluber constrictor*) in Middle Tennessee. Snakes were followed for a minimum of seven days and a maximum duration of 21 days. Snake body temperatures were recorded every 15 minutes using miniature temperature loggers surgically implanted into the coelomic cavity. Thermal physical models constructed of appropriately painted copper pipes were placed in a variety of different environmental locations and were used to describe potential snake body temperature. Our results indicated that *C. constrictor* had a mean emergence time of 8:46 a.m., a mean daily high and low temperature of 35.5°C and 20.5°C, respectively, and a mean daily temperature range of 14.5°C. The degree of daytime light intensity and climate strongly influenced the shape of their 24-hour body temperature patterns. This study provides the first detailed description of daily body temperature patterns for free-ranging *C. constrictor* and provides several insights into snake thermoregulatory behavior.

Multiple mating and offspring viability in the Leopard Gecko (*Eublepharis macularius*)

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It is widely accepted that males should attempt to copulate with numerous females to increase their reproductive success. Females who multiply mate before the production of offspring have also been documented. However, the benefits of multiple mating for females are currently in debate. Broadly, two hypotheses could explain the benefits of multiple mating for females. Females may gain maternal benefits such as fertilization assurance, nutrients from seminal fluid and/or parental care. Alternatively, females may gain genetic benefits such as increasing offspring diversity, preventing genetic incompatibility, inbreeding avoidance, allowing for sperm competition and/or allowing for cryptic female choice.

This study proposes to discern between the hypotheses of maternal and genetic benefits of multiply mating females through the examination of offspring viability over three mating treatments. Forty-five virgin female Leopard geckos (*Eublepharis macularius*) will be matched for size and distributed across the treatment groups. Treatment group one will consist of females mated to one male once, group two will be composed of females mated to one male twice and group three will be comprised of females mated to two different males. Females will be maintained separately in identical conditions and eggs will be collected and incubated at 30EC until hatching. Fertilization success and hatching success will be used to assess offspring viability.

> Seasonal Changes in Environmental Abundance of Chiggers (Acari:
> Trombiculidae) and Infestations on Fence Lizards, *Sceloporus undulatus*
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> ABSTRACT.-Fence lizards (*Sceloporus undulatus*) in middle Tennessee are
> commonly parasitized by chiggers (Acari: Trombiculidae) but little is known about the
ecological significance of this host-parasite system. Thus, fence lizards were sampled
monthly to determine the seasonal pattern in chigger infestation intensity, and habitats
known to harbor fence lizards were sampled for chigger abundance. Chigger abundance was
quite low in the spring (April-May), dramatically higher throughout the summer, and
declined in the fall (Sept.-Oct.). In general, infestation intensities on fence lizards
(males, females, and juveniles) followed the same pattern except that mean infestation
intensity of males declined during the summer in spite of persistently high chigger
abundance. The results of this study suggest that seasonal changes in chigger abundance
are a major factor influencing infestation intensities on fence lizards. Other factors
(behavioral and physiological) that likely influence infestation intensities are discussed.
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Anuran Monitoring in the Tennessee River Gorge - Some significant records

Part of the long term goal of the Tennessee River Gorge Trust is to promote public use of its properties for limited recreation and hunting. In order to achieve this it became necessary to determine potential high impact areas, and identify sensitive and threatened habitats. Therefore a number of biological inventories were initiated, including an Anuran inventory. To gather baseline data on Anurans in the gorge a pilot project was conducted for one calendar year, and ongoing long-term monitoring continues. In the six years that this project has been underway, a total of fifteen species of Anuran have been recorded in the gorge. A number of these records are significant in that they are range extensions and county records. *Hyla cinerea* has been noted in two different localities during this reconnaissance, and these sites are believed to be the most upstream locations of this species on the Tennessee River.

An overview of the TRGT anuran inventory will be presented, with emphasis on species not previously reported from the gorge. Local threats to gorge Anurans will be outlined and potential solutions discussed.

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Demography of hellbenders in middle Tennessee: Cause for Concern? Brian T. Miller and Joyce L. Miller. Middle Tennessee State University. Tributaries of the Cumberland and Tennessee Rivers were surveyed for populations of the eastern hellbender during the early 1990s. All streams sampled possessed habitat believed suitable for hellbenders, but populations were found only in the Duck, Calfkiller, Little Sequatchie, Collins and Buffalo Rivers. Only two sites surveyed appeared to have populations conducive for long-term mark-recapture studies. From June of 1990 to July of 1992, 17 visits to the Collins River site resulted in 82 captures of 44 individuals. From July 1992 to September 1993, 7 visits to the Buffalo River resulted in 39 captures of 29 individuals. The Collins River site was dominated by large, sexually mature hellbenders with total length (TL) ranging from 408 mm to 545 mm. At the Buffalo River, the TL of captured hellbenders ranged from 111 mm to 608 mm; three hellbenders were captured that were less than 200 mm and four between 201 and 300 mm. Although young hellbenders were not found at the Collins River site, annual estimates suggested that this population was relatively stable during the three years of study. However, this site appears to no longer sustain the population found a decade ago. Only one individual has been found during the three most recent visits (July of 2002, April 2003, and May of 2003). Population estimates at the smaller Buffalo River site ranged from a high of 39 during August 1992 to fewer than 20 during September of 1993. However, the capture of young suggests successful reproduction at the site during the course of the study. Unfortunately, the site appears to have degraded considerably during the last decade. Too few sites have been studied in middle Tennessee to make definitive statements, but preliminary evidence suggests that the streams in this region harbor small, potentially declining, populations of hellbenders.

"The Herpetofauna of the Duck River Watershed in Coffee County, Tennessee"

The Duck River in middle Tennessee is one of the most biologically diverse river systems in the United States with over 500 documented species of aquatic plants, vertebrates and invertebrates including several endemic mussels and fish species. While several inventories have been conducted on the mussel and fish fauna of the watershed, little attention has been given to herpetofauna. From May 2002 to September 2003, a herpetological inventory using visual encounter surveys, road cruising, and drift-fence/pitfall traps documented 44 species, 23 amphibian and 21 reptile, within the watershed. Of the 23 species of amphibians, 12 frog species and 11 salamander species were observed. Of the 21 reptile species, 3 turtle, 4 lizard, and 14 snake species were observed. The first distribution record for *Gyrinophilus porphyriticus* and the second distribution record for *Desmognathus ochrophaeus* within Coffee County were also documented.

139 words

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Inventory of the Herpetofauna of Stones River National Battlefield, Tennessee

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Abstract:

Stones River National Battlefield (SRNB) is a small historical park, located near Murfreesboro, in the central basin of Tennessee and is operated by the National Park Service. SRNB comprises approximately 700 acres of mixed hardwood forest, cedar thickets, and limestone cedar glades. Because SRNB is surrounded by a rapidly growing community, it potentially serves as a refuge for reptile and amphibian species.

The primary objective of this study is to accurately determine the species richness of the herpetofauna occurring within the park. A variety of techniques are being employed to achieve this goal. These include the use of coverboards, funnel traps with drift fencing, as well as ground and road searches.

To date, 13 species of reptiles and 9 species of amphibians have been documented. No rare, threatened, or endangered species have been observed. Future plans include the use of turtle traps in various aquatic habitats, undergraduate field assistants, and the construction and emplacement of more funnel traps. This is an ongoing project that will last approximately 27 months. At the conclusion of the study, photo vouchers and recording will be submitted to the SRNB to be placed in their archives and the data will be used to aid the NPS in managing for their herpetofaunal communities.

Effect of hydroperiod on developmental polymorphisms of the eastern newt

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Recent studies show that evolutionary divergence can occur in sympatry along environmental gradients. Some species of salamanders express facultative polymorphisms, in which plastic developmental pathways reflect adaptations to variable aquatic environments. The eastern newt (*Notophthalmus viridescens*) has a complex life cycle: larvae potentially can become terrestrial efts (metamorph), aquatic lunged adults (metamorph), or aquatic gilled adults (paedomorph) according to aquatic conditions. Pond hydroperiod is an important environmental parameter for aquatic amphibians, and it varies regionally. There are four subspecies of *N. viridescens* and natural history studies have provided evidence that frequency of developmental polymorphisms vary among subspecies: red-spotted newt seems to be adapted to shorter hydroperiod than other subspecies. Our research tested the hypothesis that there are genetically based differences among subspecies in developmental polymorphisms in relation to pond hydroperiods. If the frequency of developmental polymorphisms varies geographically according to different aquatic environments and has a genetic component, adaptation to local hydroperiods accompanied by assortative mating could lead to evolutionary divergence.

We tested for genetic and ecological components of larval development among subspecies of *N. viridescens*. We collected twenty female and twenty male adults of three subspecies (*N. v. viridescens*, *N. v. dorsalis*, and *N. v. louisianensis*) from the center of their respective ranges (West Virginia, North Carolina, Arkansas). Animals collected were returned to University of Memphis and paired until oviposition occurred. Hatched larvae were distributed into 36 of replicated artificial ponds (1000L each) with different hydroperiods: a constant water level to simulate a permanent pond, a short hydroperiod (4 week-drying) to simulate one of the shortest larval period observed, and a long hydroperiod (8 week-drying) to simulate typical larval period in lowland. We measured four responses: (1) survival, (2) growth, (3) larval period length, and (4) proportion of survivors that became efts.

We have collected data from the short hydroperiod treatment to date. *N. v. viridescens* and *N. v. louisianensis* produced significantly higher proportion of eft than *N. v. dorsalis*, which suggests that the former two subspecies are more adapted to shorter hydroperiods. Accordingly, strong selection imposed by different hydroperiods potentially could lead to speciation if gene flow between subspecies is reduced, possibly facilitated by their strong fidelity to breeding ponds.

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