

ZOOLOGY

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ABSTRACTS

Arthropods of the Guano Communities of the Big Brown Bat (*Eptesicus fuscus*) Colonies of Indiana. JUDE BOYLL BINGHAM, Science Department, Otter Creek Junior High School, Terre Haute, Indiana 47805.—There have been several studies on the arthropod community of bat guano from caves. From buildings, guano from the little brown bat, *Myotis lucifugus*, has been studied (Bernath and Kunz, 1981). However, no information exists concerning the arthropod community from guano of the big brown bat, *Eptesicus fuscus*. Therefore, the objectives of this study were 1) to describe the arthropod community from guano of the big brown bat from buildings during summer in Indiana and 2) to compare this community to that of the little brown bat.

Standardized procedures were used to collect guano of the big brown bat from three nursery colonies in buildings (unused wooden barns) in Vigo and Warrick counties during June and July, 1985. Visible arthropods were removed, preserved, and identified. Next, arthropods were collected via Berlese funnels, counted, and identified; the identifications were confirmed as necessary.

Only two arthropods were found in appreciable numbers. *Tenebrio obscurus* (Coleoptera), a frequent inhabitant of stored grain, was collected from a surface guano deposit mixed with hay and grain. *Trichouropoda orbicularis* (Acarina) was abundant in a moist, subsurface deposit. Few other arthropods were present. Unlike little brown bat guano, essentially no parasites were found in big brown bat guano.

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Physiological Aspects of Temperature Dependent Sex. PATRICIA J. CLARK, MICHAEL A. EWERT AND CRAIG E. NELSON, Department of Biology, Indiana University, Bloomington, Indiana 47405.—The presence of temperature determined sex in turtles is evident, but the reason for its presence is as yet unknown. The musk turtle, *Sternotherus odoratus*, was used for comparative studies in calorimetry and respirometry. Comparisons between males and females were made for oxygen consumption during incubation and the caloric content of the hatchlings. Eggs were incubated at two female producing temperatures and at a male producing temperature. Additional eggs were incubated at two intermediate temperatures which produced both males and females. A Gilson differential respirometer was used to measure the rate of oxygen consumption at intervals throughout incubation. A Parr adiabatic calorimeter was used to determine the caloric content of unincubated eggs and of male and female hatchlings from each of the temperature treatments. The resulting data were used to determine the affect of temperature and sex on oxygen consumption during incubation and the conversion of egg material to hatchling tissue.

Ectoparasites, Including Mites of Cryptic Biotopes, of *Eptesicus fuscus*, the Big Brown Bat. SHERRY L. GUMMER, Department of Life Sciences, Indiana State University, Terre Haute, Indiana 47809.—Information is presented on ectoparasites, including mites of "cryptic" biotopes, from 40 individuals of *Eptesicus fuscus* the big brown bat from Vigo County, Indiana. Mites recovered from the fur in decreasing order of abundance were *Steatonyssus occidentalis*, *Acanthophthirius caudatus*, and *Spinturnix bakeri*. The batbug *Cimex adjunctus* was also recovered. The ectoparasites of the fur were recovered in percentages similar to those found in other studies. Little information is available on mites of cryptic biotopes, which are hidden areas such as ear canals, eye sockets, nasal cavities, hair follicles, skin pustules, muzzle glands, and Meibomian glands. Mites collected from cryptic biotopes were from the genera *Demodex* thought to be 4 new species each occurring in separate cryptic biotopes, the muzzle glands, Meibomian glands, muzzle hair follicles, and skin pustules. These are currently being further studied and will be described at a later date.

This study was funded by an Indiana Academy of Science Development Fellowship for Secondary School Science Teachers.

Preliminary Results of the Indiana Breeding Bird Atlas Project. EDWARD M. HOPKINS, Atlas Project Coordinator, West Lafayette, Indiana 47906.—Evidence indicative of the breeding status of the birds utilizing many of 650 equally sized and evenly spaced areas has been collected and compiled for the first year of a five year breeding bird atlas study. Atlas methodology and some preliminary results will be discussed.

Effects of Temperature, Body Size and Other Factors upon Oxygen Consumption of Tropical Anuran Tadpoles. DUVAL A. JONES, Department of Biology, Saint Joseph's College, Rensselaer, Indiana 47978.—Rates of oxygen uptake were measured in ten species of Neotropical anuran larvae from the families Hylidae, Leptodactylidae, and Pseudidae. Warburg respirometry was used to take measurements during laboratory studies in Florida. Data collected during field studies in the West Indies and Surinam were based upon polarigraphic measurements with an oxygen electrode. Rates of oxygen consumption were studied in relation to ambient water temperature, salinity, carbon dioxide concentration, and body size of larvae; they were also considered in relation to the natural habitat, breathing organs, breathing behavior, and presence or absence of chlorosis in the species. Positive correlations between ambient water temperature and rate of oxygen uptake were observed for several species of larvae within their optimal temperature ranges. A composite group of several species of larvae showed an obvious inverse correlation between body size and oxygen consumption. These studies demonstrated no clear relationship between rate of oxygen uptake and salinity, carbon dioxide concentration, or chlorosis.

The Range of the Hellbender, *Cryptobranchus alleganiensis alleganiensis*, in Indiana. WILLIAM H. KERN, JR., Department of Zoology, University of Florida, Gainesville, Florida.—The historical range of the Hellbender in Indiana included most major streams that flow directly into the Ohio River. Hellbenders were reported in the literature from the following streams: the Wabash River north to Vincennes, the Ohio River at Evansville, Madison, and Vevay, the Blue River north to Milltown, Silver Creek at New Albany, Fourteen Mile Creek in Clark County, and the Whitewater River at Brookville. There were also reports from fishermen that Hellbenders were once found in the Little Blue River in Crawford County and Indiana Creek in Harrison County. I examined the streams listed above, except the Wabash and Ohio Rivers, for the presence of Hellbenders. Hellbenders were found only in the Blue River from the Harrison-

Crawford State Forest upstream to Becks Mill in Washington County, and the lower portions of the South Fork of the Blue River. The decrease in the range of the Hellbender in Indiana was probably due to channelization, dam construction, increased silt load, and pollution.

Reproduction of the Hellbender, *Cryptobranchus alleganiensis*, in Indiana. WILLIAM H. KERN, JR., Department of Zoology, University of Gainesville, Gainesville, Florida.—Prior to this study, little was known of the reproductive habits of the Hellbender in Indiana. The release of milt by captured males and the presence/absence of gravid females were evidence that the Blue River population apparently bred between September 7 and October 11 during the fall seasons of 1982 and 1983. Peak breeding activity occurred between September 15 and October 4.

On September 27, 1983, a Hellbender nest containing 153 eggs was found in the Blue River, in Washington County. The nest was found under a large limestone slab that measured 90 × 76 cm and varied from 6 to 10 cm thick. The edges of the slab were buried on three sides, with the entrance located on the downstream side. The attending adult escaped, but on October 4 a very aggressive male Hellbender was taken under the same rock. No larval hellbenders have been found in Indiana. I collected two immatures, measuring 262 mm and 282 mm in total length, in September 1983. These subadults were probably three years old, based on size class information by Smith (1907) and Bishop (1941). It is apparent that the Hellbender was still able to reproduce successfully in the Blue River as late as 1983 and with proper protection of that river the Hellbender should continue to exist there.

Size Class Distribution of the Hellbender, *Cryptobranchus alleganiensis*, in Indiana and Its Implications for their Life History. WILLIAM H. KERN, JR., Department of Zoology, University of Gainesville, Gainesville, Florida.—The mean total length of 113 Hellbenders captured in the Blue River in southern Indiana was 481.8 mm, with a range of 610 mm to 260 mm. The mean body length of 112 Hellbenders was 320 mm, with a range of 410 mm to 175 mm. The mean weight of 126 Hellbenders was 685.9 g, with a range of 1840 g to 79.6 g. The size class distribution shows that few Hellbenders less than 425 mm in total length or less than 400 g in weight were collected by physical search or baited hoopnets. The infrequent capture of small Hellbenders may indicate either a lack of small animals in the population or a sampling bias. Hellbenders are long lived animals that have few enemies as adults. Hellbender eggs and larvae suffer from heavy predation, but stable populations can be maintained even with this low recruitment of young, due to the long reproductive life of the adults.

Aspects of Ova Variability in *Ambystoma tigrinum*. DAVID M. SEVER, SUSAN DUFF AND ANGELA GONZALEZ, Department of Biology, Saint Mary's College, Notre Dame, Indiana 46556.—Previous studies have shown that larger eggs produce larger larvae at hatching, and that larger hatchlings grow faster than smaller hatchlings. Thus, the wide variation in size noted among tiger salamander larvae from an ephemeral pond may be due to differences in ovum size. This variation may have important ecological consequences. Larger larvae may be better able to avoid predation, and may be more likely to metamorphose in those years in which the pond dries. In contrast, slow-growing larvae may metamorphose at a larger size and be more likely to survive terrestrial life. The size of eggs that a female *A. tigrinum* produces, therefore, has implications for her reproductive fitness. Also, the adaptive strategy may differ between populations breeding in permanent ponds and those utilizing ephemeral ponds. Our study involves laboratory and field observations to determine the amount of

variability in larval growth and mortality of tiger salamanders: (1) within the clutches of individual females from an ephemeral and permanent pond; (2) among clutches of individual females from the same pond type; and (3) among clutches of females from different pond types.

Should the "Egg-destruction" Hypothesis of Dinosaur Extinction Be Discarded? HENRY TAMAR, Department of Life Sciences, Indiana State University, Terre Haute, Indiana 47809.—It recently has been reported that mass extinctions of animal life have occurred with a periodicity of 26-28 million years. Even if this periodicity is not a statistical fluke, should the hypothesis that small early mammals caused the dinosaurs' demise by destroying their eggs simply be discarded? If the hypothesis is obsolete (dinosaurs coexisted with mammals for over 100 million years), it nevertheless gives rise to interesting concepts.

There is a good chance some early mammals, and also some reptiles, ate the eggs of dinosaurs, since this was an available ecological niche. It is likely also that certain early insectivores and marsupials, as well as reptiles, preyed on the small hatchlings and young of the large, and other, reptiles. Their endothermic condition would have enabled some of the predominantly nocturnal early mammals to better capture ectothermic reptiles at lower temperatures (as at night, etc.). Conversely, reptiles probably devoured at least immature and young early mammals. Further, the Triassic reptiles, which first became endothermic (and developed some body hair), should have been advantaged by their endothermic condition in preying on contemporary ectotherms when these were sluggish at lower temperatures.