

## ZOOLOGY

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### ABSTRACTS

**Genetic Suppression and Enhancement of the *Lozenge*-eye Mutant of *Drosophila melanogaster*.** VIRGINIA S. BEESON and HARVEY A. BENDER, University of Notre Dame, Notre Dame, Indiana 46556.—The *lozenge* complex of mutants are sex-linked and were initially identified on the basis of their effect on the compound eye. However, additional (pleiotropic) effects include modification of the antennae, legs and female reproductive structures. A series of studies has been undertaken to ascertain the effects of third chromosome suppressor and fourth chromosome enhancer genes on the various mutant characters of the *lozenge-34k* mutant. These investigations included light and scanning electron microscope examination of external morphology, study of female reproductive capacity, behavioral analyses of phototactic responses and mating success, and electroretinogram analysis of the mass corneal response to a light stimulus. It was found that essentially only the eye morphology and not the additional structures (antennae, legs and internal female reproductive structures) was altered by the genetic modifiers. Female reproductive capacity was essentially the same in the *lozenge* and *lozenge-modified* females and was lower than that of the wild type female. Wild flies exhibited a positive phototactic response, *lozenge* were less responsive, and both the modified types were even less phototactic. The mating experiments indicated that under normal light conditions *lozenge-enhanced* males were less successful than the other males, while under dark conditions there was no difference among the groups tested. Only the *lozenge-enhanced* fly gave an abnormal electroretinogram; those of all others appeared normal.

**The Use of Sound to Disrupt a Winter Roost of Starlings (*Sturnis vulgaris*) in Livestock Barns.** JACK L. ALBRIGHT, JAY R. ELKINS and MERLE D. CUNNINGHAM, Department of Animal Sciences, Purdue University, West Lafayette, Indiana 47906.—Amplified starling alarm calls have been used effectively over a 3-day test period in residential areas prior to their winter migration. Such techniques were tried under farm conditions during winter months with a permanent roost of starlings. The two 40-foot x 72-foot buildings involved in this study had been infested over a number of years with approximately 900-1,700 pest birds seasonally. Two battery operated cassette recorders with two 20-watt speakers were used to amplify starling distress calls for 3 days within 45 minutes of sunset in two adjoining barns at Purdue University during January 10-12, 1972. During this 3-day test period, the buildings were kept free of pest birds (starlings and sparrows) and they roosted in nearby trees and silos. On days 4 to 7, human vocalizations and gun

shots were used in lieu of the amplified distress calls near sunset to frighten the birds attempting to roost in the barns. The following day (January 17) at roosting time, 1 starling and 6 sparrows used the barns. Weekly observations found no starlings and 4-15 sparrows roosting in both barns. It was observed one month later (February 14) that a large flock of starlings attempted to roost overnight in the barns. Whether these birds were the same flock that had originally been driven away or was a new migrating flock was undetermined.

**Long Term Rhythmicity in the Turtle Heart and the Effects of Changes in Light-Dark Cycles.** WILLIAM J. BRETT, Department of Life Sciences, Indiana State University, Terre Haute, Indiana 47809.—Turtles, *Pseudemys scripta*, had "permanent" electrodes implanted which permitted monitoring of the electrocardiograms. Twenty 4-hour records were obtained by using a standard electrocardiogram electrode lead-in and a physiograph. The animals were exposed to 12:12 light-dark cycles, constant darkness and constant illumination. There was an increase in heart rate from shortly before onset of the light period until shortly before onset of the dark period. In constant darkness the animals showed anticipatory action in relation to the times when the light conditions had changed in the previous light-dark cycle.

**Seasonal Weight Changes of *Tamias striatus* in Captivity.** RICHARD E. SCHAFFER, Department of Natural Science, Eastern Kentucky University, Richmond, Kentucky 40475.—Weight changes of wild-captured *Tamias striatus* housed under three laboratory conditions were investigated. One group (control) was maintained on a 12-hour artificial photo-period at a room temperature of  $22 \pm 2^\circ$  Centigrade. This group began to gain weight in October, reached a mean relative maximum increase of 11 per cent in January and retained this gain through March. A second group was housed in a windowed room which permitted a natural photoperiod with a temperature of 19-23° Centigrade. These animals also began to gain weight at the same time as the control group, achieved a mean relative maximum increase of 16 per cent in December, retained this gain through January, then subsequently lost this gain through March. A third group was housed outside, subject to environmental vicissitudes. These animals experienced the most pronounced changes in body weights. From October through December this group rapidly gained weight to a mean relative maximum increase of 24 per cent, then progressively lost this gain through March. These results are interpreted to indicate an intrinsic circannian pattern of weight changes in *Tamias striatus* reinforced by environmental stimuli.

**The Effect of Taurine on Ouabain-induced Hypoglycemia.** PAUL S. RAY, Biology Department, Manchester College, North Manchester, Indiana 46962.—After a 30-minute control period, ouabain, in concentrations of 0.5, 0.75 and 1.0 milligrams per kilogram per minute, was infused at a constant rate for 30 minutes into the right femoral vein of adult mongrel dogs of either sex. The left femoral vein was exposed for blood sampling which was done every 15 minutes until 1 hour after the infusion stopped. Increasing concentrations of ouabain resulted in a

progressive hypoglycemia. At the lowest concentration, no arrhythmias occurred. At the intermediate and highest concentrations, arrhythmias were consistent and predictable in their occurrence and concomitant with low levels of blood sugar. Taurine injected at a rate of 1.9 millimolar per minute during the ouabain infusion (at 0.75 milligram per kilogram per minute) consistently prevented the decrease in blood glucose induced by ouabain and abolished the arrhythmias which so predictably occurred with this dose.

**Notes on the Reproductive Habits of the Slimy Salamander, *Plethodon glutinosus*, in West-Central Indiana.** DAVID C. RUBIN, Department of Biology, Central State University, Wilberforce, Ohio 45384.—Information on the reproductive habits of the slimy salamander in west-central Indiana points to fall mating, late spring deposition of eggs, late summer-early fall hatching, and a 2-year female cycle. This agrees with the pattern described by Highton for this salamander in other northern states. Egg complement in Indiana is as high as 34 but probably averages about 20. The recently-hatched young were described.

***Psittacidae*—A Monograph of the Parrot Family.** DAVID S. GUINN and GEORGE W. WELKER, Department of Biology, Ball State University, Muncie, Indiana 47306.—Museum specimens of 592 different species and subspecies of the family *Psittacidae* were examined over a 3-year period at the American Museum of Natural History, New York, the Field Museum of Natural History, Chicago, and the Smithsonian Institution, Washington, D.C. Comparative data of culmen length and width, total length, length of tail, primary length and color variation was collected and statistical means of the measurable data computed. In addition, field observations were made in Mexico and live specimens in many zoological collections were also examined. From data collected it became apparent that several subspecies divisions have not been made with verifiable data, and the validity of several subspecies classifications is questioned. This work was based entirely on the personal observations of the author and no supposition of data that could not be personally verified is included.

#### NOTES

**Heated Effluents and the Occurrence of *Lernaea cyprinacea*.** ROBERT S. BENDA, Natural Science Division, Aquinas College, Grand Rapids, Michigan 49506.—The incidence of infestation of fish by the copepod parasite, *Lernaea cyprinacea*, was studied as part of a 2-year project concerning the effects of thermal effluents from the Indianapolis Power and Light Company electric generating plant on the White River near Petersburg, Indiana (1, 4, 5)

*Lernaea* was observed on bluegill, *Lepomis macrochirus*, spotted bass, *Micropterus punctulatus*, white crappie, *Pomoxis annularis*, black crappie, *Pomoxis nigromaculatus*, longear sunfish, *Lepomis megalotis*, and green sunfish, *Lepomis cyanellus*.

Chi-square tests showed significant differences in rates of infestation for many of the species in each of three sections of the river;

one unheated (Section A), and two heated (Sections B and C). Temperatures in the heated sections average 2°C to 6°C above ambient river temperature.

The per cent of infected fish in the study area was higher than those found in Vigo County, Indiana (2) and Smith Pond, Maryland (3). The species of fish infected varied considerably. Demaree (2) found *Lernaea* on Cyprinidae, but he collected few Centrarchidae. Haley and Winn (3) collected both Cyprinidae and Centrarchidae, but Cyprinidae were the most heavily infested.

Combining the 1969 and 1970 data for all species showed a total of 175 fish out of 955 infected in Section A for an 18% infestation rate, 97 out of 658 infected in Section B for a 14% infestation rate, and 88 out of 635 infected in Section C for a 13% infestation rate. None of these rates are statistically significant. The bluegill, longear sunfish, and spotted bass were the most heavily infested of all the species and on a year to year basis showed significant statistical differences from section to section, but because variability of infestation rates showed the unheated section to sometimes have higher rates of infestation than the heated sections no definite conclusions could be reached relating higher or lower indices of *Lernaea* infestation to the thermal effluents.

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Observations on the Gross Morphology of the Oocyst Walls in Some Coccidia<sup>1</sup>. THOMAS JOSEPH, Department of Biology, Indiana University at South Bend, South Bend, Indiana 46615.—Coccidian oocysts may generally be classified as either thick or thin-walled depending on the gross appearance of their walls. In most species studied, the oocyst wall consists of 2 layers which closely adhere to each other. The structure of the oocyst wall in 2 thin-walled eimerians, *Eimeria tamiasciuri* from the red squirrel, (*Tamiasciurus hudsonicus*), and an *Eimeria* sp. from the fox squirrel, (*Sciurus niger rufiventer*), was studied with the light microscope.

Oocysts, concentrated from fresh feces were transferred to 2% (w/v) potassium dichromate solution in Petri dishes and left undis-

turbed at room temperature. Some of the oocysts always remained floating on the surface of the medium while the rest sank in it. After 3-4 days, some of those oocysts floating on the surface were removed to a glass slide using a bacteriological loop and crushed under a coverslip by applying light pressure. Under pressure, the oocysts generally broke open and the two layers of their walls separated in varying degrees. Fracture and separation of the outer layer alone in some oocysts was accomplished by repeated attempts of carefully applied pressure.

The oocyst walls of *Eimeria tamiasciuri* and *Eimeria* sp. were thin and appeared to be single-layered. Levine *et al.* (1) described *Eimeria tamiasciuri* as possessing a single-layered wall. But my results showed that the oocyst walls in this species as well as that in *Eimeria* sp. from the fox squirrel were composed of 2 separable layers.

The oocysts that I crushed under the coverslip were the ones that floated in the potassium dichromate solution and thus were exposed to air drying on one side. It appeared that this partial drying of the oocysts caused the outer layers to be brittle and break loose from the inner when gently pressed under a coverslip. Although the technique of crushing oocysts in potassium dichromate solution is not new, the modification (crushing oocysts that floated on the surface) that I introduced gave good results. The findings also suggested that some coccidian oocyst walls described and appearing as single-layered may actually be composed of 2 layers.

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<sup>1</sup> Supported by grants from the Office of Research and Advanced Studies, Indiana University, and the Society of the Sigma Xi.

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#### OTHER PAPER READ

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