ZOOLOGY

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ABSTRACTS

The Rediscovery of an Unusual Hydroid, *Keratosum complexum.* SEARS CROWELL, Department of Zoology, Indiana University, Bloomington, Indiana 47401.——In 1909 Hargitt described a hydroid from preserved specimens collected at Crab Ledge a few miles east from Chatham, Mass. Subsequently it has not been reported until we obtained a specimen in August, 1975 from the same location. The "thing" (Hargitt's expression) looks and feels like a sponge. Our specimen, completely covering the upper surface of a rock about 10 cm in diameter, consists of a basal mat of entwined stolons about 1 mm thick from which arise more than 100 slightly branching stems, 2-3 mm thick and up to 15 cm tall. The stems have a core of many parallell hydrocauli and a cortex of hydrothecae and nematothecae. Neither Hargitt's specimens, nor ours at the time of collection, had hydranths or gonangia. After a few weeks, some of the stems, kept at 5°C in the laboratory, developed good hydranths, which, however, failed to emerge from the hydrothecae. Also many thin stolons grew out from both the basal mat and the tips of the stems. Along the sides of the stems similar outgrowths appeared which had nematocysts in their tips and which can be regarded as simple nematophores. Hydrothecae are 0.18-0.24 mm wide, extend as much as 0.7 mm beyond the surface of the stem, and have an operculum of 12 triangular plates. Hydranths have 12 filiform tentacles. No gonosomal components have been found. The structure of the base, the stem, and the hydranths corresponds with these structures in *Clathrozoon wilsoni* of the thecate family Clathrozonidae. Although *Clathrozoon* and a second species *Pseudoclathrozoon cryptolarioides* are more branching than *Keratosum,* it seems to belong with them in the Clathrozonidae.

An Analysis of Some Techniques for Collecting Ectoparasites from Small Birds. GARY L. TIEBEN, Department of Biological Sciences, Indiana State University, Terre Haute, Indiana 47809.——Visual inspection, soap and water washing, and a potassium hydroxide dissolving technique were compared on each of twenty five House Sparrows (*Passer domesticus*). Numbers and types of parasites were noted for each technique. Washing produced significantly more mallophagans, primarily *Brueelia subtilis*; and feather mites, primarily *Protophylodes truncatus.* Dissolving produced significantly more shaft mites, primarily *Syringophilodus minor.*

Mammals in the Indiana State University Vertebrate Collections. D. DAVID PASCAL, JR., GWILYM S. JONES, JOHN O. WHITAKER, JR., Indiana State University.——The research collection of mammals in the Indiana State University Vertebrate Collections presently contains nearly 6100 specimens representing 122 genera and 240 species. The collection is primarily from the United States and Canada, but representative species are present from 14 other countries.

Chromotropism in *Mermis nigrescens* Duj. MELVIN W. DENNER, Department of Life Sciences, Indiana State University Evansville in Evansville, Indiana 47712.——Cobb described a type of chromotropism associated with the egg laying of *M. subnigrescens* Cobb. According to his studies, release of eggs is due to the accumulation of the pigment haemoglobin in the anterior end and, to a lesser degree, throughout the body of the female. The presence of this pigment, in sunlight, is thought to provide the stimulus for egg laying as shown by Cobb and later confirmed by Christie. However, Ellenby and Smith, working on the haemoglobin pigmentation in *M. subnigrescens*, suggests that the distribution of pigment is more closely associated with respiratory functions and is particularly related to oxygen supply. They concluded that the concentration of pigment is not delimited enough to function in chromotropism.

In the present study, female *M. nigrescens* were collected during the early morning hours following an evening rain. The vegetation with the worms were taken back to the laboratory and examined for eggs, which were found in abundance on the vegetation. Several of these gravid females were placed on individual pieces of vertically placed moist filter paper in separately covered containers overnight in a dark room at room temperature. In another experiment, several lab-reared gravid females were removed from the soil in the absence of light and placed in similar containers overnight under the same conditions. When these pieces of filter paper were examined the next day, from 500-1500 eggs per female were present on the filter paper from each of the two groups. This seems to indicate that oviposition may occur in the absence of sunlight and that the presence of haemoglobin may not act as a chromatropic stimulus for egg laying.

The present study tends to indicate that although sunlight is not necessary for egg laying, it may influence it to some extent. This was evidenced by the somewhat greater number of eggs laid in the presence of sunlight than in darkness.

Host sex preferences of the nematode *Mermis nigrescens* Duj. MELVIN W. DENNER, Department of Life Sciences, Indiana State University, Evansville in Evansville, Indiana 47712.——Published reports on host sex preferences of mermithids, parasites of members of the order Orthoptera, shows considerable variability. Glaser and Wilcox found mermithid parasites in about 45% of female grasshoppers but only about 9% of the males. Christie found that 10.7% of male acrididae and 10.2% of the females were infected with *Agamermis decaudata* Christie. In the family Tettigoniidae, he found 14.6% of the females and 19.6% of the males parasitized with *A. decaudata*.

In the present study, 3,454 male and 3,418 female orthopterans were collected. Three subfamilies, Cyrthacanthacridinae, Oedipodinae, and Conocephalinae were the principal hosts collected in this study.

Field collections of grasshoppers were sacrificed, dissected with microdissection equipment and each was examined under a binocular stereomicroscope.

Results showed that 547 or 15.8% of the male grasshoppers harbored one or more mermithids and 602 or 17.6% of the females were parasitized. These results tend to support the work of Christie and seems to indicate that mermithids do not exhibit a strong host sex preference.

A Directional Photocell Technique to Monitor Activity of Volant Vertebrates. JEFFREY L. FISHER, Life Science Department, Indiana State University, Terre Haute, Indiana 47809.——A photoelectric cell system was devised to detect directional nocturnal movement of flying bats at the roost site in the fall of 1974. A light beam reflected across parallel mirrors focused upon a pair of photoelectric cells forming a detection grid across the plane of the roost exit. Bats *Eptesicus fuscus*, and birds, *Passer domesticus* interrupted the light beam and this event and the direction of movement was recorded. The light used had no detectable effect on either species. Direct observation of movements agreed well with apparatus counts.

Bovine Laterality: Resting Behavior. JACK L. ALBRIGHT, DOUGLAS H. YUNGBLUT, CLIVE W. ARAVE and JAMES C. WILSON, Department of Animal Sciences, Purdue University, West Lafayette, Indiana 47907.——Laterality of function in animals unlike right or left handedness in humans is of comparatively recent origin. Bovine laterality can be expressed in several ways: hooking tendencies in the bull ring; movements to the right or left in an open field maze; movement onto rotary milking parlors which rotate right or left; and resting behavior—lying on either their left or right side.

Dairy cows were observed during three 8.5 hour watches between 6:00 P.M.-2:30 A.M. during winter-spring confinement conditions. Cows were confined to loose housing with free stalls (individual 4 feet x 7 feet rectangles). Significance values were tested (chi square) against an expected mean of 50% lying on their left side. With level stall surfaces cows laid on their left side 53% (1854 observations $P < .10$) of the time. This is an agreement with recent work that cows tend to lie more on their left sides (52-56% of the time).

Jackson conducted two studies in Great Britain on the lying position of cattle. The first involved 340 observations of cattle of which 58.5% were lying on their left side while the second involved 493 animals of which 61% were lying on their left side. Wagnon and Rollins calculated the statistical significance of laterality in Jackson's studies to be $P < .001$.

A total of 3179 observations were made on six stall surfaces which sloped 1.5-2%. Cows laid with their dorsal side (backbone) uphill 55% ($P < .20$), 58,65,68,86 and 88% (all $P < .01$) for an average of 71%.

The first four values were for a clay base and the last two (86 and 88%) were for concrete-filled stalls. This finding could have immediate practical implications in the design of free stall barns. A slight slope of uniform direction would encourage cows to lie with their backs in the same direction. Therefore they would fit the stalls better and the incidence of teat injury caused by a cow stepping on another cow's udder might be reduced. In the long-run, encouraging cows to lie in a particular direction should be checked to assess the incidence of mastitis and digestive disturbances such as displaced abomasums.

Furthermore, ruminants sleep very little and one probable reason is that they eructate almost continuously. Also, for the rumen to remain comfortable and functioning normally the cow must remain in a fairly upright position. Hence resting on the left side on a surface slightly uphill is probably the most advantageous position.

Aminoglutethimide Kinetics in Fetal and Neonatal Rats *(Rattus norvegicus).* WILLIAM J. BRETT and VICKY M. WELLS, Department of Life Sciences, Indiana State University, Terre Haute, Indiana 47809. ——Tritiated ($3_{H}H$) aminoglutethimide (AG) was injected intraperitoneally into pregnant and post partum female rats in doses of 100 mg AG with a specific activity of 25 uCi/kg body weight. Cesarean deliveries were performed at 1, 3, and 5 days from injection. Pups were removed at 1, 3, and 5 days after injection from females which received one injection and at 1, 2, and 3 days from females which received three injections. Samples of placenta and amnionic fluid (fetus), milk and urine (pup), and blood, brain, liver and muscle (fetus and pup) were digested, dissolved in scintillation fluid and analyzed in a scintillation counter. All fetal tissues showed a significant uptake of AG with a relatively long depletion time. AG appears to be selectively absorbed by mammary tissue and secreted in the milk.

Coelomic Brood Protection of the Sea Cucumber, *Synaptula hydriformis.* SUSAN B. YANOS, DePauw University, Greencastle, Indiana, JOHN M. LAWRENCE, University of South Florida, Tampa, Florida.——*Synaptula hydriformis* broods the developing young within the coelomic cavity. Adult *S. hydriformis* were found to be hyperosmotic. Using tentacular movements as a measure of well-being, embryos removed from adults and directly exposed to reduced salinities had fewer tentacular movements than embryos from adults exposed to the same salinities. The adult coelomic fluid retards and reduces the effect of reduced salinities upon the embryos.

Preliminary Observations of the Nocturnal Activity of Insectivorous Bats and Their Prey in Wayne County, Indiana. ANDREAS R. RICHTER, GERTRUDE L. WARD, and JAMES B. COPE, Earlham College, Department of Biology, Richmond, Indiana 47374.——Food preferences and nocturnal activity patterns of insectivorous bats are in early stages of investigation. Little is known about nocturnal insect activity patterns, and few comparative studies exist. This study reports the activity of both bats and insects on the night of 30-31 June 1973, over Nolands Fork River, near Webster, Wayne County, Indiana. Bat activity was highest

during the first hour after sunset, lowest between midnight and 0400 hr., and then had a secondary peak just before sunrise. Insect activity was highest after sunset, and from 2100 hr. until sunrise decreased in a regular fashion without a secondary peak.

Bat Species Diversity Patterns in East Central Indiana. RICHARD S. MILLS, Aullwood Audubon Center, Dayton, Ohio 45414; GARY W. BARRETT, Department of Zoology, Miami University, Oxford, Ohio 45056; and JAMES B. COPE, Department of Biology, Earlham College, Richmond, Indiana 47374.——Bats were mist-netted weekly from 6 July through 5 October 1972 over Nolands Ford River in Wayne County Indiana. Seven species comprising 87 individuals (24 male, 63 female) were captured and banded during this period. Information ($H' = -\sum_{i=1}^{S} p_i \log_e p_i$), richness ($D = S - 1/\log_e N$), eveness ($e = H'/\log_e S$), and equitably ($e = S/S'$) species diversity values were found to be 1.42, 0.89, 0.73, and 0.86, respectively. These data indicate that this taxon lacks community richness. Species were found to be apportioned according to MacArthur's broken-stick model for contiguous, non-overlapping niches. The high equitability value suggests resource limitation; food is postulated to be the resource in short supply.

The Effects of Prostaglandin E_2 on Adrenal Regeneration Hypertension. PAULSON, D. J. and W. J. EVERSOLE, Indiana State University, Terre Haute, Indiana.——The effect of prostaglandin E_2 (PGE_2) on Adrenal Regeneration Hypertension was investigated in Charles River female rats. Four groups of 23±1 day-old rats underwent right adrenonephrectomy and left adrenal enucleation. The rats were maintained on tap water for 18 hours and then given 1% saline drinking solution. Each group received daily subcutaneous injections of 0.9% saline or PGE_2 (20, 40, or 80 ug per day). Blood pressures were determined by a tail and cuff method at 3, 5, and 7 weeks following surgery. The rats were sacrificed at 7 weeks and the kidney, heart, thymus, and adrenal were removed and weighed. Injections of 20 and 40 ug PGE_2 per day produced a progressive reduction in blood pressures, mean kidney and heart weight, but the differences from control values were not statistically significant. Administration of 80 ug PGE_2 per day caused a significant fall in blood pressure at 5($P<.01$) and 7($P<.05$) weeks. The mean heart weight of this group was also significantly less than the control ($P<.05$) and the mean kidney weight was reduced but not significantly so. Thymus and adrenal weights showed no significant change. This study suggested that a deficiency of renal PGE_2 may be involved in the etiology of Adrenal Regeneration Hypertension. (Aided by a grant from the Eagles' Max Baer Heart Fund).

Catalysis of an Allosterically Inhibiting Nucleotide with a Synthetic Estrogen and a Subsequent Alteration in Ovarian Metabolism. GREG CAPLINGER.* Dept. of Zoology, Anderson College, Anderson, Indiana. (Intr. by Marie Mayo).——The ovarian synthesis of proteins may be subject to amino acid alterations as a result of the treatment with synthetic estrogens. Wistar white adult female rats were given intramuscular

injections of a synthetic estrogen compound known as Mestranol (17-ethynylestradiol 3-methyl ether) which was followed by the isolation of two distinct cell free ovarian proteins in both the experimental and the control groups. When looking at the biosynthesis of estrogen one sees that NAD is needed in the conversion of cholesterol to $\triangle^5$-pregnenolone. Also it has been noted that NAD will allosterically inhibit LDH and thus decrease the LDH content. In the ovarian synthesis of estrogen we found a very unique interrelationship in the metabolic scheme. First of all it was recognized that Mestranol injected in small quantities acted to catalyze the reaction involving NAD and thus an allosteric inhibition and a lower level of LDH was measured. Also the elevated level and catalysis of NAD resulted in the addition of amino acid residues to the two isolated ovarian proteins. With a subsequent use of a high quantity of Mestranol the NAD level was decreased, thus alleviating the allosteric inhibition of LDH. This decreased level of NAD resulted in the deletion of amino acid residues from the two isolated ovarian proteins. From this unique metabolic scheme there has developed the uncovering of a two way recognition mechanism. Cholesterol levels are not altered by the Mestranol alone but cholesterol recognizes the physiological estrogen in the normal negative feedback pattern and the levels of Mestranol are recognized by NAD. In conclusion one can see how the injections of a synthetic estrogen have induced changes in the amino acid content without a subsequent change in the estrogen level. With a prolonged alteration in the amino acid content there will no doubt be an induced nucleotide alteration which will change the ovarian biosynthetic pattern.