A. costata—North Texas and Hays County.
A. rectangula—Brazos and Hays Counties.
A. quadrangularis—Brazos County.
A. monacantha—Brazos County.
Pleuroxus denticulatus—North Texas; Brazos and Hays Counties.
P. hamulatus—North Texas; Brazos and Hays Counties.
P. aduncus—North Texas.
Dunhevedia crassa—Hays County.
D. serrata—Hays County; exact locality not given by Birge (1910, *op. cit.*).
Oxyurella tenuicaudis—Brazos County.
Chydorus sphaericus—North Texas; Brazos and Hays Counties.
C. hybridus—Exact locality not given by Birge (1910, *op. cit.*).
C. globosus—North Texas.
C. poppei—Hays County.
Alonella diaphana—North Texas: exact locality not given by Birge (1910).
A. dadayi—Exact locality not given by Birge (1910, *op. cit.*).
A. dentifera—Exact locality not given by Birge (1910, *op. cit.*).

Of the 130 species of freshwater Cladocera reported from North America, 58 have been reported from Texas. Of these 58 species *Daphnia laevis, Ceriodaphnia regaudi, Dadaya macrops, Eurycercus lamellatus, Alona kauai, Alona monacantha, Dunhevedia serrata, Chydorus hybridus, Chydorus poppei, Alonella diaphana, Alonella dadayi,* and *Alonella dentifera* represent the southern warm water species.

As other investigations are made in the Cladoceran fauna of Texas additional species will undoubtedly be added to this list. *Paul R. Becker and Stanley L. Sissom, Department of Biology, Southwest Texas State University, San Marcos.*

PARASITES OF THE EVENING BAT, *NYCTICEIUS HUMERALIS*, IN IOWA —The evening bat, *Nycticeius humeralis humeralis* (Rafinesque), occurs throughout the southeastern United States and is a resident in southern Iowa at least from May through August (Kunz and Schlitter, 1968, *Trans. Kan. Acad. Sci.*, 71: 166–175). This paper reports the parasites taken from 9 adult female and 6 juvenile evening bats. The latter were distinguished from adults by their unfused phalangeal ephiphyses and darker, plumbeous pelage. Three species of nematodes, and one species each of a cestode, a trematode, a mite, and a bat bug were recovered from bats collected in Polk, Dallas, Warren, and Marion counties in central Iowa.

All bats taken in this study were shot and placed immediately in separate plastic bags until examined. Ectoparasites were immobilized with chloroform and preserved in 70% ethanol. Nematodes were killed in hot glycerin-alcohol and stored therein until examined. Cestodes and trematodes were relaxed, flattened, and killed in warm water, fixed in corrosive-sublimate or A.F.A. and stored in 70% ethanol until stained in Harris' hematoxylin.

Arthropoda

Steatonyssus ceratognathus (Ewing).—Numerous adults and nymphs of this mite (Macronyssidae) were taken from the membranes and pelage of each of the 15 bats. *S. ceratognathus* was described from *N. humeralis* from South Carolina (Ewing, 1922, *Proc. U.S. Nat. Mus.*, 62: 1–26) and subsequently recorded from Alabama, Oklahoma, and Texas from the following hosts: *Myotis lucifugus, Lasiurus borealis,* and *Tadarida brasiliensis cynocephala.*

Cimex adjunctus Barber.—Three specimens of this bat bug (Cimicidae) were taken from the forearms of juvenile evening bats collected in Polk and Warren counties. Although *C. adjunctus* has been previously reported from Iowa (Muscatine Co.), the host was not recorded (Usinger, 1966, *Entomol. Soc. Amer.*, 7: 1–585).

Cestoda

Vampirolepis roudabushi (Macy and Rausch).—Six of 9 adults and one of 6 juveniles harbored this cestode in the small intestine. The incidence of occurrence in adults ranged from one to 8, whereas a single juvenile contained 3. *V. roudabushi* was originally described from *Eptesicus fuscus*, *Lasionycteris noctivagans*, and *N. humeralis*, from Iowa and Ohio (Macy and Rausch, 1946, *Trans. Amer. Micros. Soc.* 65: 173–175) Nickel and Hansen (1967, *Amer. Midl. Nat.*, 78: 481–486) have reported it from *Myotis keenii* taken in Kansas, and Blankespoor (1968, M.S. thesis, Iowa St. Univ., Ames) recorded it from *M. lucifugus* and *E. fuscus* from Iowa.

Nematoda

Allintoshius nycticeius Chitwood.—This nematode was found in the intestine in 7 of 9 adults and one of 6 juveniles examined. The incidence of infection ranged from one to 3 individuals. This species was described from *N. humeralis* taken at Washington, D.C. (Chitwood, 1937, *Proc. Helminth. Soc. Wash.*, 4: 19–20) and recently has been reported by Nickel and Hansen (1967, *op. cit.*) from *Myotis velifer* in Kansas.

Allintoshius travossosi Chandler.—This nematode was found in the intestine of 4 juvenile bats, but infected only one of 9 adults. It was the only nematode encountered in the intestine of one juvenile. The incidence of infection ranged from one to 5 individuals. This species was described from *N. humeralis* and *Myotis velifer* from Texas (Chandler, 1938, *In* Livro Jubilas do Professor Lauro Travassos, Instituto Oswaldo Cruz, Rio de Janeiro, pp. 107–114), and also is known from *M. grisescens*, *M. velifer*, and *E. fuscus* from Kansas (Ubelaker, 1966, *Amer. Midl. Nat.*, 75: 109–204; Nickel and Hansen, 1967, *op cit.*) and *E. fuscus* from Iowa (Blankespoor, 1968, *op cit.*)

Capillari palmata Chandler.—This nematode occurred in the stomach of three adults and one juvenile. The incidence of infection ranged from 2 to 3 individuals. The species was first described from *N. humeralis* from Texas (Chandler, 1938, *op cit.*) and has been reported parasitizing *Eptesicus fuscus* from the same state (Jameson, 1959, *Sw. Nat.*, 4: 61–65). Nickel and Hansen (1967, *op cit.*) reported *C. palmata* from Kansas *Myotis grisescens* and Blankespoor (1968, *op cit.*) reported it from *M. lucifugus*, *E. fuscus*, and *Lasionycteris noctivagans* from Iowa.

Trematoda

Prostrodendrium diminutum Chandler.—A single individual was recovered from the intestine of one adult bat. This species was described from *N. humeralis* from Texas (Chandler, 1938, *op. cit.*).

It is of interest to note that cestodes occurred in both juvenile and adult bats. In one of the few other papers in which both juvenile and adult bats were considered, Cain (1966, *J. Parasit.*, 52: 351–357) reported that juvenile *Tadarida brasiliensis mexicana* harbored only a nematode, whereas adult bats harbored 4 kinds of trematodes and one cestode. Cestodes and trematodes are known to have indirect life cycles,

whereas nematodes probably have direct cycles. The occurrence of cestodes in juvenile bats suggests that the entire life cycle of *V. roudabushi* occurs in *N. humeralis* in Iowa.

Also of interest is the occurrence of the 2 species of nematodes of the genus *Allintoshius* in a single bat. However, from our data, it seems that *A. travassosi* occurs primarily in juveniles and *A. nycticeius* is generally restricted to adults. Although both species have been reported previously from *N. humeralis*, the ages of the hosts were not mentioned. It would be of interest to examine juvenile and adult *N. humeralis* from throughout the geographic range with reference to the distribution of *A. nycticeius* and *A. travassosi*.

Thanks are extended to Dr. Nixon Wilson, Northern Iowa University, Cedar Falls, Iowa, for identifying some of the ectoparasites reported in this study, to Robert M. Wessleman, Drake University, Des Moines, Iowa, for assistance in collecting the bats, and to Dr. J. Knox Jones, Jr. for reading the manuscript. *John E. Ubelaker, Department of Biology, Southern Methodist University, Dallas 75222 and Thomas H. Kunz, Museum of Natural History, The University of Kansas, Lawrence 66044.*

FIGHT BETWEEN ROCK SQUIRREL AND BULLSNAKE. Each evening during the summer months the Carlsbad Caverns National Park presents a naturalist program at the Cavern entrance, during which visitors may watch the exit flight of the thousands of Mexican freetail bats which are summer Cavern residents. During the program on August 5, 1969 we were on duty as Park Guides and our attention was drawn by a visitor to a battle ensuing between an adult rock squirrel (*Spermophilus variegatus grammurus*) and a 28 inch bullsnake (*Pituophis melanoleucus sayi*).

When we first saw them the animals were 7 feet from the entrance to the squirrel's burrow. The 2 were rolling over and over with the snake striking at the squirrel's hindquarters. Most of the strikes seemed to be missing but there was some blood on the squirrel's fur. The squirrel was rapidly biting the snake, having been at the middle when we first saw them, and then working back toward the tail. Their thrashing about brought them to the edge of the embankment above one of the Cavern trail switchbacks, and they fell 5 feet to the trail below. At this time the snake stopped striking and straightened out. The squirrel immediately jumped to the snake's head and continued biting, again working toward the tail. The snake then coiled around the squirrel for the first time, getting at least 3 loops around his abdomen. The squirrel made 2 vertical leaps and shook off the coils while still retaining its hold about 4 inches behind the snake's head. The latter then went limp and apparently died. The squirrel dropped the snake, climbed the wall, and entered its burrow.

Throughout the battle we gained a distinct impression of great aggressiveness on the part of the squirrel, while the snake seemed merely to be protecting itself and trying to get free. Since we had previously seen young squirrels of this summer's litter using this burrow entrance, we think there is a possibility that the snake had been after the young and was driven from the burrow by the adult squirrel. *Charles A. Haywood and Rodney W. Harris, Carlsbad Caverns National Park, Carlsbad, New Mexico* 88220.

RATES OF HEMOGLOBIN DENATURATION IN TWO FISHES.—During a series of experiments designed to determine the rates of hemoglobin denaturation in vertebrates as an index of molecular stability, 2 fishes, the goldfish (*Carrassius*

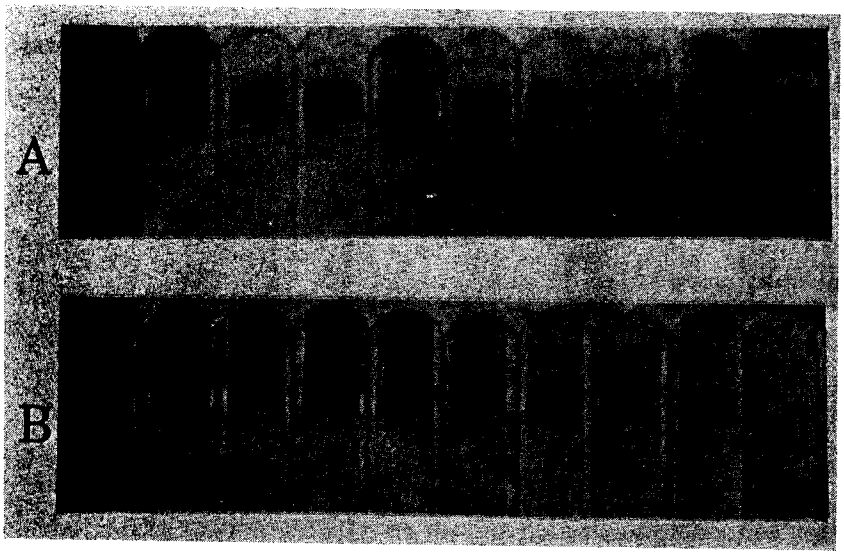

Fig. 1. Acrylamide gel electrophoresis patterns of hemoglobins of A, *Carassius auratus*, and B, *Plecostamus* sp. Gels 1–5 were run at 12-hour intervals, and 6–10 at 24-hour intervlas.

auratus), and the South American armored catfish (*Plecostomus* sp.), were examined.

Blood was extracted into a culture tube containing a tablet of potassium oxalate dissolved in 2 ml. of a one per cent saline solution. The red cells were precipitated by centrifugation, washed 3 times with saline solution, and lysed by adding distilled water. One drop of the approximately 5% hemoglobin solution was submitted to acrylamide gel electrophoresis similar to that described by Davis (1964, *Ann. N.Y. Acad. Sci.*, 121: 407–427) and Ornstein (1964, *Ann. N.Y. Acad. Sci.*, 121: 321–329). A Tris-glycine buffer at pH 8.5 with Brom-phenol blue added as a marker was used. The tubes, each conducting 5 ma., were run simultaneously in a cold chamber and the current was terminated when the Brom-phenol blue front had migrated 32 mm. Hemoglobin bands were resolved by staining the gels with an amido black solution, and then destaining the gels in 8% acetic acid. The gels were then stored in a solution of the same composition. The samples were kept at room temperature throughout the experiment, and run electrophoretically every 12 hours for 5 runs and then every 24 horus until no bands were resolved. The results are shown in Fig. 1. In *Carassius* (Fig. 1, part A) one band of hemoglobin was resolved; in *Plecostomus* (Fig. 1, part B) 2 bands were resolved. It is of great interest that hemoglobin of both *Carassius* and *Plecostomus* begins to show signs of denaturation at the 4th to 5th gel, indicating a somewhat similar stability. From the standpoint of investigations of electrophoretic patterns of fish hemoglobins, it would seem advisable to run the electrophoresis within a day, or have the material stored in the frozen state within a day in order to assure accurate results.

I wish to thank P. L. Berry and K. L. Smith for their assistance in this project.

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