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Growth and Year Class Composition of the White Bass (Morone chrysops) in DeGray Lake, Arkansas

Thomas E. Moen
U. S. Fish and Wildlife Service

Michael R. Dewey
Ouachita Baptist University

OBSERVATIONS ON THE INCIDENCE OF CHIGGERS, *EUTROMBICULA ALFREDDUGESI* (OUDEMANS) ON *CROTAPHYTUS* (SAURIA:IGUANIDAE) IN IZARD COUNTY, ARKANSAS

During an ecological investigation of the eastern collared lizard, *Crotaphytus collaris collaris*, data were obtained on the incidence of ectoparasites infesting this lizard at an abandoned rock quarry in Izard County, near Myron, Arkansas (T.18N, R.7W, Sec. 26).

Collared lizards emerging from hibernation in early April, 1979, were free of ectoparasites, and remained so until June. Infestation by chiggers (larval trombiculid mites) extended from June through October, with the greatest density in July (Fig. 1). Sixty-seven chiggers were identified and found to be *Eutrombicula alfreddugesi*. Eleven (27%) of 41 lizards were infested with *E. alfreddugesi*. The majority of chiggers were attached under scales on the nuchal folds, on folds around the axilla, and near the post-femoral pockets and ear openings, with 13 found near the cloaca. Other lizards collected near the study site which were infested with *E. alfreddugesi* included: *Eumeces fasciatus*, *Eumeces laticeps*, and *Sceloporus undulatus*.

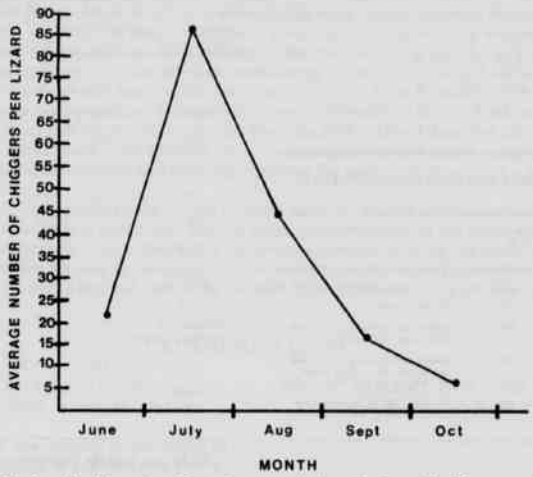

Figure 1. The occurrence of *Eutrombicula alfreddugesi* on *Crotaphytus collaris collaris* at the Myron study site, from June through October 1979.

Distribution of trombiculid mites is known to be localized and sporadic and may not be constant throughout a particular study area (Baker, et al., Natl. Pest Control Assoc. Tech. Pub., New York, 170 pp, 1956; Allred and Beck, Herpetologica 18:47-50, 1962; Spoecker, Amer. Midl. Nat. 77:539-542, 1967). At the Myron site, chigger infestation was locally variable, being more closely associated with some plant communities (eg., mixed grasses) than with others.

Wolfenbarger (Ann. Ent. Soc. Amer., 45:645-677, 1952) reported *E. alfreddugesi* from *S. undulatus* in Crawford and Newton counties, Arkansas. To my knowledge, this report represents only the second published record on the ectoparasites of Arkansas lizards.

This investigation is based on a portion of a thesis prepared in partial fulfillment of the requirements for a Master's degree in Biology at Arkansas State University. I thank Dr. V. R. McDaniel for reading the manuscript. Dr. J. O. Whitaker, Jr., Indiana State University, and Dr. R. B. Loomis, California State University-Long Beach, aided in the identification of the chigger mites. I also thank Mr. L. Ferguson for allowing me to carry out the study on his property.

CHRIS T. McALLISTER, Department of Biological Sciences, Arkansas State University, State University, Arkansas 72476. (Present address: Department of Biology, North Texas State University, Denton, Texas 76203.)

GROWTH AND YEAR CLASS COMPOSITION OF WHITE BASS *(MORONE CHRYSOPS)* IN DEGRAY LAKE, ARKANSAS

DeGray Lake was impounded in 1969 on the Caddo River, 11.3 km north of Arkadelphia in west-central Arkansas. At normal pool elevation (124.4 m above mean sea level), the lake has an area of 5,427 ha, a maximum depth of 57 m and a mean depth of 15 m.

White bass *(Morone chrysops)* have been important predators and sport fish since 1971, following the stocking of 460 adults in the fall of 1969. We conducted electrofishing surveys on the spawning grounds each spring, 1975-79, to obtain basic information on the population dynamics of this species. Spawning concentrations occurred in the upper end of the lake and extended a short distance upstream in the Caddo River. Spawning usually took place during the last two weeks in March at water temperatures of 12 to 17°C. A total of 550 fish were collected by electrofishing, representing nine year classes (1970-1978). Fish of the 1970 year class were also collected as young-of-the-year in September by biologists of the Arkansas Game and Fish Commission *(unpublished data)*. Length, weight, sex, and maturity were recorded for all fish, and scale samples were taken from most of the fish.

There have been no reproductive failures since 1970. Our collections indicated that strong year classes were established in 1971, 1974 and 1977 (Table 1). However, moderately strong year classes tend to mask the true strength of strong year classes. Year class strength was not correlated with Caddo River inflows during the spawning period.

Mean lengths (sexes combined) for all ages I through VI were 250, 350, 385, 407, 424, and 419 mm, respectively (Table 2). The oldest white bass (419 mm) collected were age VI, and only 15% of all fish collected were older than age IV. Growth of white bass in DeGray Lake was similar to that of other Arkansas reservoirs (Table 3). First-year growth was faster in DeGray Lake; however, age I fish were represented only by sexually mature males that had migrated to the spawning areas. As noted by most investigators, females grew faster than males. Mean length of females at each age was at least 21 mm greater than that of males.

Table 1. Year class composition (percent) of white bass collected in DeGray Lake each spring, 1975-79.

YEAR OF COLLECTION	NUMBER OF FISH	YEAR CLASS								
		1970	1971	1972	1973	1974	1975	1976	1977	1978
1975	95	2.1	68.5	14.7	8.4	5.3				
1976	55		12.7	25.5	20.0	38.2	3.6			
1977	92			29.3	12.0	35.9	9.8	13.0		
1978	181			0.5	15.0	27.1	7.7	18.2	31.5	
1979	127				5.5	10.2	22.8	15.7	44.1	1.6

Table 2. Average total length (mm, empirical data) of white bass from DeGray Lake, 1975-79.

	AGE AND SEX											
	I[1]	II		III		IV		V		VI		
YEAR CLASS	M	M	F	M	F	M	F	M	F	M		
1978	246											
1977	251	334	357									
1976	243	330	350	357	365							
1975	259	345	366	369	393	390	400					
1974	251	339	351	374	399	384	416	401	435			
1973		343	380	375	408	396	415	417	428	419		
1972				392	415	405	427	420	438			
1971						403	427	415	433			
1970									438			
Unweighted Average Length												
By Sex	250	338	361	373	396	396	417	413	434	419		
Sexes Combined	250	350		385		407		424		419		

Table 3. Average total length of white bass from selected lakes in Arkansas.

WATER	TOTAL LENGTH (MM) AT END OF YEAR OF LIFE				REFERENCE
	I	II	III	IV	
DeGray Lake	250[1]	350	385	407	Present Study
Lake Catherine	224	305	333	368	Hulsey and Stevens, Proc. Ark. Acad. Sci. 12:17-30, 1958.
Bull Shoals Reservoir	190	332	382	420	Houser and Bryant, U. S. Fish and Wildl. Serv. Tech Paper No. 40, 11 pp., 1970.
Beaver Reservoir	216	295	355	385	Velleyi, Ph. D. Dissertation Univ. of Ark., 193 pp., 1972.

1] Males only

1] Only one female yearling was collected during the study.

THOMAS E. MOEN and MICHAEL R. DEWEY, U. S. Fish and Wildlife Service, Multi-Outlet Reservoir Studies, Post Office Box 705, Ouachita Baptist University, Arkadelphia, Arkansas 71923.

USE OF AN OUTDOOR LAB IN TEACHING BOTANY

Those of us who teach botany with an ecological emphasis often have difficulty in locating areas for field experiences for our classes. At the University of Central Arkansas, however, the Outdoor Lab is an ideal setting for such exercises. This Outdoor Lab is situated on the southwestern part of the campus and consists of these habitats: a wooded area, an old field or pasture (perhaps a "prairie remnant"), shrubby successional stages, and a stream. This Outdoor Lab is considered part of the UCA Campus Arboretum (Moore, 1974).

At the present time four laboratory-field exercises have been developed and are being regularly used with my General Botany classes.

The first field experience is for consciousness-raising and is primarily set up to develop an awareness of the natural plant community. The class assembles at a circle of benches set up in the midst of the wooded area. A brief introduction to the area is given—the history of its development and its function on campus. Members of the class are then given suggestions for "experiencing an ecosystem." No communication with peers or instructor is permitted. Each student is instructed to wander in the area at will or sit to listen to sounds, to see what can be seen, to smell, to feel textures of rock or bark or leaf—letting thoughts come and go at will, recording in sketches or words, or not recording, as it pleases the student. At a signal from the instructor, the group gathers back at the benches to share reactions from this experience (if they wish to do so). Discussion follows and leads into consideration of the types of organisms seen in the area; some concepts of the ecological relationships are introduced to the group. These relationships deal with the basic ecological classification of organisms into decomposer, producer, and consumer categories. Listing of those seen by members of the class (perhaps pointing out some of these, if unnoticed by the group) tends to focus thoughts on some of the ecological concepts which will later be discussed in their text.

A second lab experience deals with the decomposers—a group of organisms which tends to be under-studied in most field experiences dealing with plant communities. Near the wooded area is a place where the maintenance crew dumps leaves and other biodegradable materials from campus clean-ups. Examination of what is happening in this large "compost pile" leads naturally into discussions of cycling of materials and energy in ecosystems. Discussions dealing with organisms involved, processes of metabolism, end-results, availability of materials and energy, and related questions can become quite lively and productive. Questions dealing with decomposition of organic materials, or composting, include: Does the decomposition of certain kinds of leaves (oak, pine, maple, elm) change the pH of the soil? How long does decomposition take? Is the process speeded by use of commercially available preparations? Can chemical fertilizers be used? Are aerobic or anaerobic conditions "better"? Students can usually add many questions, and they contribute to designing experiments by which some of these questions can be tentatively