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FISHES OF THE ANTOINE RIVER, LITTLE MISSOURI RIVER SYSTEM, SOUTHWESTERN ARKANSAS

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ABSTRACT

The fishes of the Antoine River (Little Missouri River system) in southwestern Arkansas were surveyed from September, 1980 - June, 1982. Thirty-four field collections plus literature and museum records, revealed a total of 60 species in 29 genera representing 16 families to presently inhabit the river system. Comments are presented on life history aspects, systematics and occurrence of fishes in the study area.

INTRODUCTION

The Antoine River is a major tributary of the Little Missouri River system (Ouachita River drainage) in southwestern Arkansas. Surprisingly, few collections of fishes have been made from this beautiful upland stream previously. Although Myers (1977) surveyed the fishes of the Little Missouri River system, he made only four collections from the Antoine River. Earlier, Buchanan (1973) reported only one pre-1960 collection and only two post-1960 collections from the river, one of which was made by the senior author. Prior to this survey, a total of 29 species was known from the Antoine River based primarily on work by Northeast Louisiana University graduate students and one collection by Dr. George A. Moore, Oklahoma State University.

This paper seeks to document as accurately as possible the ichthyofauna of the Antoine River using literature records, museum records and personal collections.

DESCRIPTION OF THE AREA

The Antoine River is a clear, spring-fed tributary of the Little Missouri River approximately 40 miles long and drains an area of 399 square kilometers. Major tributaries include Wolf, Suck, Buffalo, Caney, Woodall, Matthews, Little Antoine, and Bigsby Creeks. The river arises in the Athens Plateau physiographic region in northeastern Pike County just south of Salem, Arkansas and flows southeasterly through a sparsely populated, heavily forested area of east-west trending valleys and ridges populated by loblolly-shortleaf pine, oak-hickory, and gum trees to form the border of Pike and Clark counties before joining the Little Missouri River south of Antoine, Arkansas within the Gulf Coastal Plain physiographic region.

The Antoine River has a typical dendritic drainage pattern arising in Mississippian (Stanley Shale) and Pennsylvanian rocks (Jackfork Sandstone, Johns Valley Shale, lower Atoka Formation) and flows south over Cretaceous rocks before finally reaching Quaternary Alluvium near its confluence with the Little Missouri River. Elevations in the headwaters reach 213 m while near the confluence the elevation is 76 m. Mean annual rainfall is 11.76 cm and 12.38 cm in Pike and Clark counties, respectively. Air temperature ranges from 11.2° to 46.5°C (Hickmon, 1941).

Antoine River has been classified as a warm-water fishery and Class A stream (AR. Dept. Poll. Cont. and Ec., 1976). Average discharge of the Antoine River is 7.53 m^3/s (25 year average). Selected physicochemical data range as follows: pH 6.6 - 7.2; water temperature 5° - 26°C; dissolved oxygen 8.1 - 12.3 mg/1; hardness 15 - 49 mg/1; alkalinity 13 - 24 mg/1.

METHODS AND MATERIAL

Fishes were collected from September, 1980 to June, 1982. All collections were made with 3.1X1.8 m and 6.1X1.8 m seines with 3.175 mm meshes, except one gill net sample. Specimens were fixed in 10% formalin, before being preserved in 40% isopropyl alcohol for permanent storage in the Southern Arkansas Vertebrate Collection. Museum records from Northeast Louisiana University were verified when possible.

Scientific and common names of fishes follow those of Robins et al. (1980) unless otherwise noted.

Stations were established throughout the stream system. The following is a brief description of each station.

Antoine River Stations

Pike-Clark County Line
1. Antoine River at Antoine at St. Hwy. 26. (Sec. 23, 24, T8S, R23W)

Pike County
2. Wolf Creek at St. Hwy. 29, 1 mi. SW of Antoine (Sec. 27, T8S, R23W).
3. Wolf Creek at Co. Rd. bridge, 9 mi. S of Antoine (Sec. 25, 26, T8S, R23W).
4. Buffalo Creek at St. Hwy. 19 (Sec. 9, T9S, R23W).
5. Wolf Creek at St. Hwy. 26 at Delight (Sec. 19, T8S, R23W).

Pike-Clark Co. Line
6. Antoine River at end of TAR (Sec. 14, T8S, R23W).
7. Antoine River (Sec. 11, T8S, R23W).
8. Antoine River at Graysonia (Sec. 21, T7S, R23W).
9. Antoine River (Sec. 22, T7S, R23W).

Clark Co.
10. Unnamed tributary to Antoine River (Sec. 6, T8S, R22W).

Pike-Clark Co. Line
11. Antoine River (Sec. 25, T7S, R23W).
12. Antoine River (Sec. 21, T6S, R23W).

Clark Co.
13. Little Antoine River (Sec. 21, T6S, R23W).

Pike Co.
14. Bigsby Creek at St. Hwy. 84 (Sec. 36, T5S, R24W).
15. Unnamed trib. to Bigsby Creek at St. Hwy. 84 (Sec. 31, T5S, R23W).
16. Antoine River at St. Hwy. 84 (Sec. 4, 5, T6S, R24W).
17. Unnamed trib. to Antoine River at St. Hwy. 84 (Sec. 4, T6S, R24W).
18. Antoine River (Sec. 29, T5S, R24W).
19. Antoine River (Sec. 30, T5S, R24W).
20. Woodall Creek (Sec. 21, T6S, R24W).
21. Matthews Creek (Sec. 19, T6S, R22W).

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ANNOTATED LIST OF SPECIES

The following discussion of species is supplemented by verified museum records and literature records. Species are presented in phylogenetic order following Robins et al. (1980).

Petromyzontidae (Lampreys)

Ichthyomyzon castaneus Girard. Chestnut lamprey. Three specimens (one male, two females) were collected spawning in a swift riffle, 12-16 inches deep, over a gravel bottom at Station 1 on 19 May 1982. Females were full of eggs. Water temperature was 19 °C.

Amiidae (Bowfins)

Amia calva Linnaeus. Bowfin. Rare; only one small specimen found in the lower, sluggish reaches of the main Antoine River.

Lepisosteidae (Gars)

Lepisosteus oculatus (Winchell). Spotted gar. *L. oculatus* was uncommon in the system, found only occasionally in the larger pool sections of the lower reaches.

Lepisosteus osseus (Linnaeus). Longnose gar. More common inhabitant of the lower, more sluggish stream sections.

Esocidae (Pikes)

Esox americanus vermiculatus Lesueur. Grass Pickerel. The grass pickerel occurred throughout the system in appropriate backwater, vegetated pool habitats. Probably the major predator species in the system.

Clupeidae (Herrings)

Dorosoma cepedianum (Lesueur). Gizzard shad. Only two specimens of this schooling species were collected in a gill net sample at Station 1. As the gizzard shad prefers more lacustrine type habitats generally unavailable in the Antoine River, it is typically uncommon in the system.

Catostomidae (Suckers)

Erimyzon oblongus (Mitchell). Creek chubsucker. Most common sucker in the higher gradient upper stream sections generally avoiding the sluggish lower regions.

Hypentelium nigricans (Lesueur). Northern hog sucker. Typically a headwater clear stream resident occurring rather infrequently in the system.

Minytrema melanops (Rafinesque). Spotted sucker. *M. melanops* was uncommon in the system as only three specimens were collected.

Moxostoma erythrurum (Rafinesque). Golden redhorse. Common mainstream resident preferring clean substrates.

Cyprinidae (Minnows and Carps)

Campostoma anomalum pullum Agassiz. Central stoneroller. Abundant headwater stream resident occupying swift riffles.

Notemigonus crysoleucas (Mitchell). Golden shiner. Rare within the system. Only four specimens were collected, and these may be bait introductions.

Notropis atherinoides Rafinesque. Emerald shiner. The emerald shiner is uncommon in the Antoine River being largely confined to the lower stream sections where this population has free access to the larger main channel of the Little Missouri River.

Notropis boops Gilbert. Bigeye shiner. Abundant schooling cyprinid in the system. *N. boops* was collected at 16 of 21 stations from pool regions having some flow and gravel bottoms.

Notropis cornutus isolepis Hubbs and Brown. Southern common shiner. We follow Miller (1968) in considering *N. cornutus isolepis* a subspecies of *N. cornutus* rather than of *N. chrysocephalus*. Although widely distributed in the system, the southern common shiner was never taken in large numbers. Confined to upper areas over gravel substrates above and below riffles and in shallow pools with moderate current.

Notropis emilae (Hay). Pugnose minnow. Rare. Two specimens of the pugnose minnow were collected in the lower stream regions in a backwater, vegetated pool area over organic detritus-sand mixture away from the main current.

Notropis fumeus Everman. Ribbon shiner. Rare. Taken occasionally syntopically with *N. umbratilis*, the ribbon shiner was collected in sluggish pools over mud and sand substrates in the lower reaches.

Notropis perpallidus Hubbs and Black. Peppered shiner. Previous to this study only eight specimens, six of which were collected by Myers (1977), had been taken from the Antoine River. Subsequent seining of Station 1 at Antoine yielded 21 individuals. Specimens were taken in about three to four feet deep pool regions over sand and sand-gravel substrates with *Justicia americana* beds at the margins. Documentation of the continued existence of *N. perpallidus* is noteworthy as this species is considered rare in Arkansas (Robison, 1974).

Notropis umbratilis cyanocephalus (Girard). Redfin shiner. The redfin shiner was the most abundant and widespread species in the Antoine River system having been taken at 19 of 21 stations sampled. The extremely variable habitat requirements of this species facilitates its use of the entire stream length of the Antoine River and tributaries.

Notropis venustus (Girard). Blacktail shiner. Rare in the system. Collected only three times, all in the lower, larger stream portions in the pools.

Notropis whipplei (Girard). Steelcolor shiner. Uncommon. Taken in four downstream localities in pools and regions directly downstream of riffles areas over gravel sand bottoms.

Pimephales notatus (Rafinesque). Bluntnose minnow. Collected only sparingly in gravel-bottomed pools of the upper and middle stream sections.

Pimephales tenellus (Girard). Slim minnow. Rare in the system. Myers (1977) collected just three specimens of this minnow from the main Antoine River; however, we were unable to collect it.

Semotilus atromaculatus (Mitchill). Creek chub. The creek chub was only collected from the uppermost small, headwater tributaries over sand, gravel and rock bottoms and then in small numbers.

Ictaluridae (Freshwater catfishes)

Ictalurus melas (Rafinesque). Black bullhead. Common ictalurid in the lower more sluggish stream sections over mud and sand bottoms.

Ictalurus natalis (Lesueur). Yellow bullhead. The yellow bullhead was common in the system preferring areas of little or no current and vegetation *(Justicia americana)* in the upper stream reaches and avoiding the lower stream sections.

Ictalurus punctatus (Rafinesque). Channel catfish. Common in the main river.

Noturus miurus Jordan. Brindled madtom. This secretive species was collected in the lower stream sections and was in association with brush pile debris in pools with noticeable current ranging in depths of six inches to two feet over shifting sand substrates. Females taken in mid-June were full of eggs.

Noturus gyrinus (Mitchill). Tadpole madtom. Rare. Myers (1977) reported two specimens and we collected another four individuals from Wolf and Buffalo Creeks. *N. gyrinus* typically was taken in sluggish, backwater areas with submerged aquatic vegetation or over accumulated detritus.

Noturus nocturnus Jordan and Gilbert. Freckled madtom. The freckled madtom was a common ictalurid taken during the survey from riffles with gravel bottoms, accumulations of twigs, leaves and sticks,

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and occasionally vegetated stream margins.

Pylodictis olivaris (Rafinesque). Flathead catfish. This solitary species is occasionally taken on hook and line by anglers (R. Reed, pers. comm.).

Anguillidae (Freshwater Eels)

Anguilla rostrata (Lesueur). American eel. The eel is still taken occasionally on hook and line by fishermen knowledgeable with the river (R. Reed, pers. comm.).

Cyprinodontidae (Killifishes)

Fundulus notatus (Rafinesque). Blackstripe topminnow. The same ecological separation noted by Braasch and Smith (1965) was documented in this study as *F. notatus* was collected only from pools in the extreme lower portions of the Antoine River while *F. olivaceus* was more abundant in the upper and middle three-fourths of the system. The two species were never collected syntopically.

Fundulus olivaceus (Storer). Blackspotted topminnow. The blackspotted topminnow was more common than *F. notatus* and was found throughout the upper and middle regions at stream margins and in pools away from the main current.

Poeciliidae (Mosquitofish)

Gambusia affinis (Baird and Girard). Mosquitofish. Uncommon. Confined primarily to the lower tributaries, frequenting vegetated backwaters.

Atherinidae (Silversides)

Labidesthes sicculus (Cope). Brook silverside. A common and abundant pool species occurring throughout the Antoine River system.

Aphredoderidae (Pirate Perches)

Aphredoderus sayanus (Gilliams). Pirate perch. Rare. Usually associated with vegetated stream edges *(Justicia)* and accumulations of twigs and leaves over bottoms consisting of mud and decaying organic matter in the lower reaches of the main river and Wolf Creek.

Centrarchidae (Sunfishes)

Ambloplites rupestris (Rafinesque). Rock bass. A single small specimen was taken from Station 13 from a vegetated stream margin. Local fishermen attest to its more common presence in the system.

Chaenobryttus gulosus Cuvier. Warmouth. We follow Miller and Robison (1973) in retaining the name *C. gulosus* for the warmouth. The warmouth exhibited a decided preference for pools with mud bottoms covered with organic debris with rooted aquatic vegetation in the lower sections.

Lepomis cyanellus Rafinesque. Green sunfish. The green sunfish is quite widespread and abundant in the Antoine River system due to its more plastic habitat requirements. Found at 12 of the 21 stations.

Lepomis macrochirus Rafinesque. Bluegill. Widespread and abundant in the system, especially near the confluence with the Little Missouri River where abundant cover was available.

Lepomis megalotis Rafinesque. Longear sunfish. Most common centrarchid in the system. Taken at 17 of the 21 stations in a variety of stream habitats.

Lepomis microlophus (Gunther). Redear sunfish. Rare. Only two specimens were collected during our survey from the lower stream sections.

Micropterus dolomieui Lacepede. Smallmouth bass. Primarily taken in the upper, clear stream sections in pools.

Micropterus punctulatus (Rafinesque). Spotted bass. Most common bass, found to prefer swifter stream sections than did the largemouth bass. Spawning males guarding nests were seen 19 May 1982 in Wolf Creek.

Micropterus salmoides (Lacepede). Largemouth bass. Found in the lower, more sluggish pool regions of the system.

Pomoxis annularis Rafinesque. White crappie. No crappie were collected during this survey, although this species was reported by Buchanan (1973).

Percidae (True Perches)

Etheostoma blennioides newmanii (Agassiz). Greenside darter. Miller (1968) did not examine specimens from the Antoine River; however, specimens from the upper Ouachita and Saline river systems were designated *E. b. newmanii* as were all Arkansas populations. Preferred fast stream sections in algae covered gravel riffles and over bedrock runs in the upper sections.

Etheostoma chlorosomum (Hay). Bluntnose darter. Rather uncommon darter owing to its preference for sand, clay, mud or detritus substrates in shallow pool areas. This habitat is not commonly found in the Antoine River system.

Etheostoma collettei Birdsong and Knapp. Creole darter. Common darter in swift gravel riffles. Avoids the sluggish lower stream sections.

Etheostoma histrio Jordan and Gilbert. Harlequin darter. Although relatively rare in our samples, *E. histrio* conformed to observations of Hubbs and Pigg (1972) by preferring detritus sand substrates to gravel areas. This limited the distribution of this species to only the lower station.

Etheostoma nigrum Rafinesque. Johnny darter. Rare. One specimen was collected previously by Dr. G. A. Moore (pers. comm.). Not collected in our survey.

Etheostoma radiosum (Hubbs and Black). Orangebelly darter. Hubbs and Black (1941) reviewed the darters of the *whipplei* complex, this fish being considered a subspecies of *whipplei* at the time and reported specimens from the Little Missouri River system as *Poecilichthys whipplii radiosum (-E. radiosum)* . A thorough study of this species is in need in Arkansas. Taken in shallow gravel riffles in lower stream sections.

Etheostoma stigmaeum stigmaeum (Jordan). Speckled darter. All Arkansas populations of the speckled darter belong to the nominate form, *E. s. stigmaeum* (Howell, 1968). This fish was never abundant at any locality and preferred downstream areas below moderately swift riffles in about one foot of water over a gravel-sand mixed bottom.

Etheostoma whipplei (Girard). Redfin darter. Small numbers of this percid were taken in small to large-sized tributaries over sand and gravel bottoms and occasionally in brush piles.

Etheostoma zonale (Cope). Banded darter. The banded darter was another of the rather uncommon percids confined to the lower, larger stream segments. Tsai and Raney (1974) reported banded darters in the Upper Ouachita River to average 50.3 lateral line scales. Breast squamation was roughly ¼ partially scaled. Antoine River specimens were similar. Tsai and Raney (1974) designated the Ouachita River populations to conform to the Arkansas race of *E. z. zonale.* Antoine River populations are also placed in this race.

Percina caprodes (Rafinesque). Logperch. Uncommon with only five specimens collected, all from moderate to swift deep riffles in the middle and lower stream areas.

Percina copelandi (Jordan). Channel darter. Only four specimens of the channel darter were collected, all at Antoine (Station 1) in the main river from moderately swift deep riffle areas with algae covered gravel substrates.

Percina maculata (Girard). Blackside darter. A single specimen of *P. maculata* has been collected from the system by Dr. G. A. Moore (pers. comm.). This species is rare due to the paucity of its preferred lowland habitat in the Antoine River system.

Percina sciera (Swain). Dusky darter. Common. Frequently encountered near over-hanging banks and submerged brush piles and leaf litter in the lower stream sections.

Sciaenidae (Drums)

Aplodinotus grunniens Rafinesque. Freshwater drum. Rather common in the lower pool regions and frequently taken by fishermen (R. Reed, pers. comm.).

SUMMARY

A total of 60 species in 29 genera representing 16 families was documented from the Antoine River, a tributary of the Little River system, by 34 field collections, previously published literature records and museum records.

In comparing the Antoine River ichthyofauna with other Ouachita Mountain streams of southern Arkansas, it is apparent that the Antoine is a moderately rich stream system. For example, the entire Little Missouri River, of which the Antoine River is a tributary, has a total of 91 fish species known from the system (Myers, 1977) while the Caddo River system, immediately to the north of the Antoine has 86 recorded species (Fruge, 1971; Dewey and Moen, 1978).

The occurrence of good populations of the rare cyprinid *Notropis perpallidus* was seen as evidence of relatively good water quality as was the presence of 12 darter species.

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