ANNOTATED LIST OF FISHES COLLECTED IN VICINITY OF AUGUSTA, GA., WITH DESCRIPTION OF A NEW DARTER.

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The specimens upon which the following list of species is based were collected in the vicinity of Augusta, Ga., during the spring and summer of 1918 and the summers of 1921 and 1922, while the author, in cooperation with the United States Public Health Service, was engaged in investigations relative to the use of fishes for the purpose of mosquito control. The specimens were obtained incidentally, and from time to time, during the course of the investigations. The list is far from exhaustive, as the collections, with a few exceptions, were made in waters that were potential mosquito-breeding areas; that is, in ponds, swamps, ditches, or sluggish creeks. No collecting was done in the Savannah River nor in any of its larger branches, and only one small lot was collected in a fairly rapidly flowing creek (Sweetwater Creek, Mealing plantation, Edgefield County, S. C.).

It is hoped that the list, although not complete for the locality, will be of value to future workers interested in the distribution of fishes. Furthermore, the fishes of Georgia appear to have been neglected, as very little has been written on them, notwithstanding that we find extended accounts of the fishes of North and South Carolina and Florida. A list of species and notes concerning the fishes of any part of Georgia, therefore, seems to be of interest and value. An effort was made to secure the local common names of the fishes, and these names are indicated by quotation marks wherever used in this paper.

Only a very few persons in the vicinity of Augusta regularly engage in fishing, and their principal catch consists of catfishes and carp. Sport fishing is a common diversion, and several artificial lakes are owned and maintained by fishing and hunting clubs for the purpose of providing sport fishing for the members. The important game fish sought by nearly all anglers is the large-mouthed black bass.

1. **Amiatus calva** (Linnæus). "JACK GRINDLE," "JACK FISH," "MUDFISH," BOWFIN.

This species is common in muddy ponds. It is used for food only by the negroes. The name "jack grindle" is also applied to the garfish (*Lepisosteus osseus*) by the negroes.

2. **Ictalurus punctatus** (Rafinesque). CHANNEL CAT, "SHINE-EYE," "WILLOW CAT," "SPOTTED CATFISH."

This important food fish is caught principally in the Savannah River above Augusta. The young have been taken occasionally in the brickyard ponds connected with Beaver Dam Ditch, a drainage canal.

"Shine-eye" is applied to the young fish because of the bright eyes when first taken from the water. "Willow cat" is applied to larger fish, the name originating from the fact that the fish is often taken from among roots of willow trees growing along the shore edges of streams.

3. **Ameiurus natalis** (LeSueur). YELLOW CAT, "MUD CAT."

This fish was taken only in a mill pond, located on the Mealing plantation on Sweetwater Creek, Edgefield County, S. C. The color of the specimens taken was plain bluish-black. This species is probably rather rare in the vicinity, and it is not distinguished from the "mud cat" (*Ameiurus nebulosus*).

4. **Ameiurus nebulosus** (LeSueur). "MUD CAT," BULLHEAD, "CAMEL-BACK," "ROUNDHEAD," "SPECKLED CAT."

This fish, next to the "bream" (*Lepomis incisor*) is the most common and the most important food fish occurring in the brickyard ponds. It is regarded as an inferior food fish by most of the white population but is much sought and well liked by the negroes. Earthworms are the principal bait used in catching this catfish. The dark mottled variety is the common one in the ponds, but the plain colored ones predominate in the streams. The names "roundhead" and "camel-back" are applied to the plain colored variety and "speckled cat" to the mottled forms. "Mud cat" appears to be applied indiscriminately to the varieties of this species as well as to one or two other species of catfishes.

5. **Ameiurus platycephalus** (Girard). "MUD CAT," BROWN CAT.

This species was taken only once. All the individuals seen were small, the largest being only 6¼ inches in length. They were taken in a borrow pit along the levee, about 6 miles below Augusta. The color in life was bright golden-yellow. The anal fin in 3 specimens preserved contains 22 to 23 rays, including rudiments, which appears to be a somewhat larger number than are ascribed to the species (16 to 20) in published accounts.

6. **Hypentelium nigricans** (LeSueur). STONE ROLLER, BLACK SUCKER, "SPOTTED SUCKER."

The stone roller was taken only once, and that time in Sweetwater Creek, Edgefield County, S. C. It apparently is rather rare and unknown to most fishermen.

7. **Erimyzon sucetta** (Lacépède). CHUB SUCKER, "POND SUCKER."

This chub sucker is occasionally taken in brickyard ponds. It is rather rare and of no commercial importance, except that individuals of suitable size are sometimes used for "trout" bait.

8. **Minytrema melanops** (Rafinesque). STRIPED SUCKER.

A single specimen was taken in Sweetwater Creek, Edgefield County, S. C. The fish was unknown to some of the most intelligent local anglers. It is probably rare in the vicinity.

9. **Hybognathus nuchalis** Agassiz.

This species does not appear to be very common. Three specimens were taken in borrow pits along the levee and one was taken in a small creek. It was not seen elsewhere. A female, taken on June 5, 1918, contained well-developed roe.

10. **Semotilus atromaculatus** (Mitchill). "HORNYHEAD," DACE.

Taken only in Sweetwater Creek, Edgefield County, S. C., where it appears to be common. This fish is said to be good "trout" bait.

11. **Notemigonus crysoleucas** (Mitchill). "ROACH," SHINER, GOLDEN SHINER.

The "roach" is common in ponds and borrow pits. It is the most commonly used and one of the best-liked minnows for "trout" bait. Bait collectors especially seek this minnow, for which they find ready sale.

12. **Opsopœodus bollmani** Gilbert. "MINNER."

This little fish is probably not common in the vicinity of Augusta. Two specimens, 2½ and 2¾ inches in length, were taken in a brickyard pond on the Carolina side of the Savannah River. The size of the specimens at hand is somewhat larger than that ascribed to the species in current works, in which the greatest length given is 2 inches.

13. **Notropis hudsonius** (Clinton). SHINER, SPAWNEATER, "MINNER."

This minnow is common in brickyard ponds. The specimens collected appear to belong to the variety *saludanus*.

14. **Notropis rubricroceus** (Cope). SAFFRON-COLORED MINNOW, "MINNER."

This pretty little fish was taken in Sweetwater Creek, Edgefield County, S. C., and in a small creek on the Milledgeville Road. It is apparently confused with the "hornyheads" (*Semotilus atromaculatus* and *Hybopsis kentuckiensis*) by local anglers.

15. **Hybopsis kentuckiensis** (Rafinesque). "HORNYHEAD."

The "hornyhead" was taken only in Sweetwater Creek, Edgefield County, S. C., where it is not rare. It is not distinguished from *Semotilus atromaculatus* by local people.

16. **Cyprinus carpio** Linnæus. "CARP," "COB."

This fish is rather common in some of the brickyard ponds. It is much sought by the negroes and is used to a limited extent by white people. It is the opinion of some of the local fishermen that this fish is now less abundant than formerly. No very large individuals and only "scale carp" were seen.

17. **Anguilla rostrata** LeSueur. "EEL," "COMMON EEL."

The eel is not common in the brickyard ponds, and only small ones were taken. It apparently is of no commercial importance in the vicinity.

18. **Umbra limi** (Kirtland). MUD MINNOW.

This fish is common in the very muddy ponds, in which it may be found in company with the "jack grindle." The specimens in the present collection appear to resemble the northern form, *Umbra limi*, more closely than the more southern form, *U. pigmæ*. The southernmost range of the genus, as recorded by Jordan and Evermann (Bulletin U. S. National Museum, XLVII, 1896, p. 623), is Neuse River, N. C., and of *U. limi* is New Jersey and the Ohio River. The range of the genus and species was extended a considerable distance southward by the record of Palmer and Wright (Iowa Academy of Science, XXVII, 1920, p. 362), who first recorded the genus and the species, *limi*, from Georgia. This minnow was mistaken for the young of the "jack grindle," or bowfin, by several anglers who saw the fish when it was caught.

19. **Dorosoma cepedianum** (LeSueur). "GIZZARD SHAD," "MUD SHAD."

The "mud shad" is plentiful in some of the brickyard ponds and borrow pits in the vicinity, where it undoubtedly is an important source of food for other species.

20. **Esox americanus** Gmelin. "RED-FINNED PIKE," "JACK."

The "jack" is a rather common species in brickyard ponds, and it is spoken of in the vicinity as a richly flavored fish. Specimens vary greatly in color, even those taken from the same small pond may have very definite dark wavy bars, indistinct bars, or no bars at all. The anal and the paired fins appear to be reddest in the otherwise plainly colored individuals.

21. **Esox reticulatus** LeSueur. "JACK," PICKEREL.

This species was taken only in Sweetwater Creek, Edgefield County, S. C., and in a pond on the same creek.

22. **Fundulus notti** (Agassiz). STAR-HEADED MINNOW, "TOP MINNOW."

This fish is common in certain heavily overgrown swamps and ponds in the vicinity. It practically replaces Gambusia in the Carmichael and Richmond factory ponds, where it appears to be able to protect itself from game fish better than Gambusia. This fish is undoubtedly of some value as an eradicator of mosquito larvæ.

23. **Gambusia affinis** (Baird and Girard). "TOP MINNOW," "TOP-WATER MINNOW."

This minnow is by far the most abundant of all the fishes occurring in the locality. In 1918 it was introduced into all the ponds in the vicinity that it had not reached through natural channels, and it has increased greatly in numbers

since that time. This minnow is an immensely important factor in the control of malaria in the vicinity. It is used rather extensively for bait for other fish by the negroes.

24. **Labidesthes sicculus** (Cope). BROOK SILVERSIDE, "MINNER."

This silverside is not common in the vicinity of Augusta. It was seen in the ponds only a few times.

25. **Aphredoderus sayanus** (Gilliams). PIRATE PERCH.

This minnow is not uncommon in the muddy brickyard ponds connected with Beaver Dam Ditch, a drainage canal. It was also taken in borrow pits and once in a clean, clear creek. The species was entirely unknown to local fishermen who, upon seeing the fish, said: "We didn't know there was such a fish here."

26. **Elassoma zonatum** Jordan. PIGMY SUNFISH.

This little fish was found to be common in woodland swamps and in a swamp densely overgrown with aquatic grass, Chara, etc., near Hamburg, S. C. It was unknown to the local people to whom the fish was shown. Its habitat suggested that it might be of considerable value as an agent for mosquito control, but this has not been confirmed by observations made.

27. **Elassoma evergladei** Jordan. PIGMY SUNFISH.

A single specimen about 1 inch in length occurs among the specimens at hand. This species was not recognized as distinct from *Elassoma zonatum* in the field, and, as only a few of the numerous specimens taken were preserved, the species may be much more numerous than is indicated by the collection. The specimen at hand differs somewhat in color from the pattern described in that it has very narrow pale crossbars.

28. **Pomoxis annularis** Rafinesque. WHITE CRAPPIE, "SUN PERCH," "SPECKLED PERCH," "SPECKLES."

The specimens at hand appear to be representatives of the western species rather than the eastern one (*Pomoxis sparoides*). In 7 specimens examined, 4 have 6 dorsal spines, 2 have 5, and 1 has 7, and they all have the slender body and the S-shaped profile of *P. annularis*. The depth in length in 7 specimens ranging from 60 to 135 mm. long varies from 2.4 to 2.7. The fish that were taken in muddy ponds and borrow pits are nearly plain silvery with only faint markings on the body and fins. The "speckled perch" is locally considered a fine food fish, and it is much sought by anglers.

29. **Centrarchus macropterus** (Lacépède). "PERCH," "SAND PERCH."

This beautiful sunfish is not rare in borrow pits on the levee below Augusta, but it was taken only once in a brickyard pond.

30. **Chænobryttus gulosus** (Cuvier and Valenciennes). "WARMOUTH."

This is a common and rather important food fish, occurring in nearly all ponds in the vicinity, where it is taken by negroes, who use worms for bait. Allowances for wide variations within the species appear to have been made by authors. The specimens at hand, with a single exception, are quite uniform. One specimen differs from all the others taken in the somewhat deeper body, in having black on the interradial membranes of the anal, and in the absence of the usual dark bars on the side of the head.

31. **Lepomis auritus** (Linnæus). "REDBELLY," "RED-BELLIED PERCH."

This fish is common in some of the larger ponds in the vicinity of Augusta, but it is rare in the brickyard ponds. It commonly inhabits the streams just below the dams of impounded waters and is taken with angleworm bait.

32. **Lepomis megalotis** (Rafinesque). "REDEYE," "GOGGLE-EYE," LARGE-EARED SUNFISH.

This species is common in the old and densely overgrown brickyard ponds, and it was also taken in borrow pits on the levee. It is a beautiful fish, the specimens taken from among vegetation being especially brilliantly colored. The iris is at least in part red, a character from which it derives the common name, "redeye." The fish is of very little importance as a food fish, because of its small size; the largest individuals seen did not exceed a length of 4 inches. The adults guard their eggs and wage a very game fight against other fish coming near, even though they are twice or more their own size.

33. **Lepomis incisor** (Cuvier and Valenciennes). "BREAM," "BLUE PERCH," BLUEGILL.

The "bream" is the most common and most important food fish occurring in the ponds of the vicinity. It is caught daily throughout the summer, principally by negroes. Worms and top minnows are used for bait. The young of this species may readily be distinguished from the young "redeye" (*Lepomis megalotis*), the other common species in the old brickyard ponds, by the lighter coloration, the presence of dark vertical bars on the side, the colorless fins (except a trace of a dark spot on the last rays of the dorsal, occasionally present in specimens less than 2 inches in length), and the absence of a dark bar through and under the eye. The eggs of this species were found in "beds," in 1918, as late as July 22.

34. **Enneacanthus gloriosus** (Holbrook). BLUE-SPOTTED SUNFISH.

This pretty little sunfish is common only in those brickyard ponds that have become largely overgrown with vegetation. No individuals exceeding 2½ inches in length were seen. It was not recognized as a distinct species but mistaken for the young of other species of "perch" by all anglers consulted. This fish is doubtless of considerable value in checking mosquito production in those ponds in which it is common.

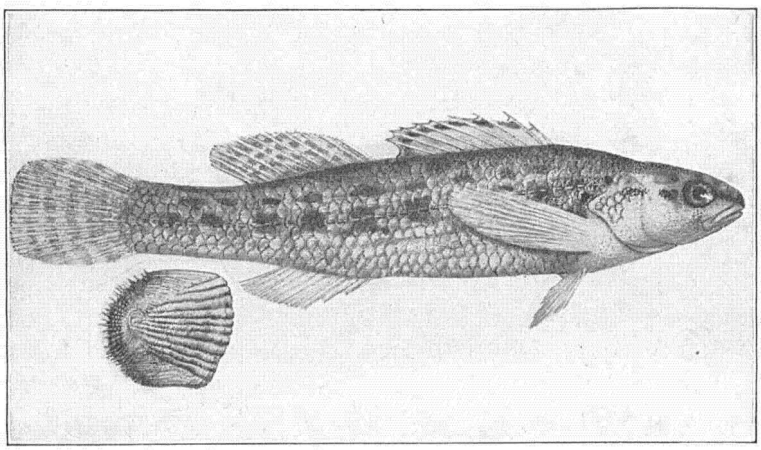

FIG. 1.—*Etheostoma fricksia*, sp. nov. From the type, 51 mm. long.

35. **Micropterus salmoides** (Lacépède). "Trout," "Fresh-water Trout," Large-mouthed Black Bass.

The "trout" is the most highly prized fish of the angler in the vicinity. It is common in many ponds but appears to prefer the deeper and clearer ponds to the shallow and more weedy ones. The large-mouthed black bass reaches a large size in the vicinity. Individuals weighing from 6 to 10 pounds are not uncommon, and the maximum weight attained is said to be 13 pounds.

36. **Etheostoma fricksia** sp. nov. Figure 1. Fricks Darter.

Head, 3.6 to 4.2; depth, 4.2 to 5.8; D. IX, 11 or 12; A. II, 8; scales, 4–39 or 40–5.

Body elongate, compressed, deep (for a darter); the back elevated in advance of first dorsal; caudal peduncle rather strongly compressed, its depth 2 to 2.55 in head; head moderate, compressed; snout conical, a little shorter than eye, 5 to 6.4 in head; eye 3.8 to 4.25; mouth oblique; the maxillary reaching to or a little beyond front of pupil, 3.2 to 4 in head, premaxillaries not protractile, connected with the skin of the forehead at tip of snout, free laterally; teeth in jaws in villiform bands; vomer and palatines with similar teeth; gill membranes very narrowly connected across the isthmus; gill rakers short and blunt, 7 on the lower limb of the first arch; lateral line complete, slightly arched anteriorly, scales large, strongly ctenoid, upper surface of head, cheeks, and thorax naked, opercles scaly, with a strong spine posteriorly; abdomen fully scaled; dorsal fins well separated, two rows of scales crossing back between the fins; first dorsal scarcely as high as the second, its origin a little nearer the origin of the second dorsal than tip of snout; origin of the second dorsal over origin of the anal; caudal about as long as head without snout, its posterior margin convex; anal fin similar to second dorsal, only shorter, the spines rather strong, much shorter than the soft rays; ventral fins are inserted slightly behind bases of pectorals, reaching a little more than halfway to origin of anal; pectoral fins inserted low, the entire base below median line of trunk, rather large, somewhat longer than the head, 3.8 to 4 in head.

Color in alcohol, brownish above, pale yellowish underneath. Sides with irregular dark brown markings; the back with six faint dark blotches, the first one under anterior dorsal spines, the second under posterior dorsal spines, the third crossing the back between the first and second dorsals, the fourth under anterior rays of soft dorsal, the fifth under posterior rays of soft dorsal, and the sixth on caudal peduncle. The rows of scales on sides, in the largest specimens, with pale lateral streaks. A dark streak on opercle, passing through eye and around tip of snout; a pale line just above the black streak, passing from eye to upper angle of opercle. The dorsal and caudal fins with dark crossbars; the pectorals plain or with faint indications of dark markings; the other fins plain translucent.

This darter is related to *Etheostoma thalassinum*, recorded from the Santee River basin in North and South Carolina, and *E. inscriptum*, reported from the Oconee River, Ga. It differs from these species, however, in several respects. The lateral line is slightly arched anteriorly, but complete. Thus, it forms a "connecting link" between the genera Etheostoma, with a straight and complete lateral line,

and Boleichthys, with an arched and incomplete lateral line. The scales are larger than in related species and present on the opercles, and the dorsal fins are well separated, two rows of scales crossing the back between the fins.

The above description is based upon four specimens, 37, 39, 51, and 56 mm. in length, respectively, taken in March, 1918, in a small, sluggish creek on the Sanitary Dairy Farm near Augusta. The largest one, a female, contained well-developed ova. These specimens appear to represent an undescribed form, which is probably not common. The specimen 51 mm. in length, United States National Museum No. 82633, is designated as the type. This darter is named for Surg. L. D. Fricks, of the United States Public Health Service, in charge of field investigations relative to malaria control, under whose directions the investigations in 1921 and 1922 were conducted.

37. **Boleichthys fusiformis** (Girard). FUSIFORM DARTER.

This is the only darter inhabiting the ponds and swamps in the vicinity, and it is found both on muddy bottom and among vegetation. It was unknown to the local fishermen who saw the specimens. A female taken on September 26 contained large roe.