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CHARACTERS, RELATIONSHIPS, DISTRIBUTION, AND BIOLOGY OF *NOTROPIS MELANOSTOMUS*, A RECENTLY NAMED CYPRINID FISH FROM SOUTHEASTERN UNITED STATES

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ABSTRACT.—*Suttkus, R. D. and R. M. Bailey. 1990. Characters, relationships, distribution, and biology of* Notropis melanostomus, *a recently named cyprinid fish from southeastern United States. Occ. Pap. Mus. Zool. Univ. Michigan, 722:1–15, figs. 1–3.* A character analysis, postulated relationships, and biology of a recently named cyprinid (*Notropis melanostomus*) are presented. Material for this study of the blackmouth shiner was obtained from three disjunct lowland localities in western Florida and southern Mississippi. This diminutive species attains maturity at about 21 mm, has a maximum SL of 38 mm, and is short lived. It inhabits sluggish or stagnant waters which are usually well vegetated. On occasion it is locally numerous but overall it is a rare, highly vulnerable species whose populations merit close observation.

Structurally *N. melanostomus* is highly distinctive, with many apomorphies. In addition to small size these include numerous elongate gill rakers, serrate pharyngeal teeth (4–4), large steeply upturned mouth that bows forward, very large eye, reduced lateralis system, the lateral line with only 0 to 6 pored scales, and the floor of the mouth heavily pigmented. *N. melanostomus* is believed to be most closely related to the Ouachita Mountains *N. ortenburgeri*, but the relationship of these two in the genus is unclear.

Key words: *Cyprinidae*, melanostomus, Notropis, *Florida, Mississippi, gill rakers.*

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INTRODUCTION

An unnamed, diminutive species of *Notropis* was discovered by Marian and Reeve Bailey in Santa Rosa County, western Florida, in August 1939. Repeated attempts by various workers over the years failed to yield additional specimens, but in 1976 one of us (RDS) collected a large series from an overflow pool of Pond Creek at U.S. Hwy. 90, site of the original capture. Subsequently, additional collections were obtained from the same locality as well as from two adjacent sites downstream. A small series was obtained from a flood pool along the upper part of Shoal River in Walton County, Florida, in 1977. A population was discovered in the lower part of Black Creek, tributary to Pascagoula River in Perry County, Mississippi in 1986.

After submission of our manuscript, this new fish was named by S. A. Bortone (1989). We have therefore modified our paper using his name, *Notropis melanostomus*. Despite some duplication, this paper largely supplements or amplifies Bortone's account.

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We are indebted to Jeanne E. Suttkus (Fig. 2) and William L. Brudon (Fig. 3) for photographs of this shiner.

MATERIALS AND METHODS

In addition to standard compass directions, with the following "of" deleted, these abbreviations are used: Co. = County, Cr. = Creek, km = kilometer(s), R. = River, SL = standard length, trib. = tributary (to), CU = Cornell University, UAIC = University of Alabama, Ichthyology Collections, UF = University of Florida, Florida State Museum, TU = Tulane University, Museum of Natural History, UMMZ = University of Michigan, Museum of Zoology, USNM = National Museum of Natural History, and UT = University of Tennessee.

Notropis melanostomus Bortone
Blackmouth Shiner
Figs. 1–3

Notropis sp. Jenkins, 1976:643 (undescribed, possibly extinct). Gilbert, 1978:14–15 (brief description, distribution, illustration, on Florida's list of threatened wildlife). Robison, 1980:290 (undescribed sp. in western Florida; likely related to *N. ortenburgeri*).

Notropis melanostomus. Bortone, 1989:737–741, figs. 1–3 (original description, Pond Cr., 2 km S of Milton, Santa Rosa Co., Florida).

MATERIAL.—Material examined includes 563 specimens 12–35 mm in SL taken from an overflow pool of Pond Cr., trib. Blackwater R. at the southwestern edge of Milton, Santa Rosa Co., FL, U.S. Hwy. 90 (TIN, R28W, Sec. 9); 163 specimens 12–33 mm from two nearby sites along Pond Creek; 22 (27–38 mm) from Shoal R., Walton Co., FL; and 38 (22–37 mm) from Black Cr., Perry Co., MS (Fig. 1). For each lot in the detailed list below, the number of specimens and the SL range in mm appear in parentheses.

Blackwater R. drainage, FL: Pond Cr. at overflow pool, 27 July 1976 (see above), (60, 23–33), distributed as follows: TU 98579 (39), TU 150946 (1), UMMZ 214858 (10), and USNM 301165 (10); UMMZ 157843 (24, 19–31), 21 Aug. 1939; TU 99329 (176, 12-33), 21 Aug. 1976, distributed as follows: TU 99329 (166), UAIC 9101.01 (10); TU 100746 (17, 18–23), 5 Jan. 1977; TU 101606 (7, 18–24), 2 Apr.

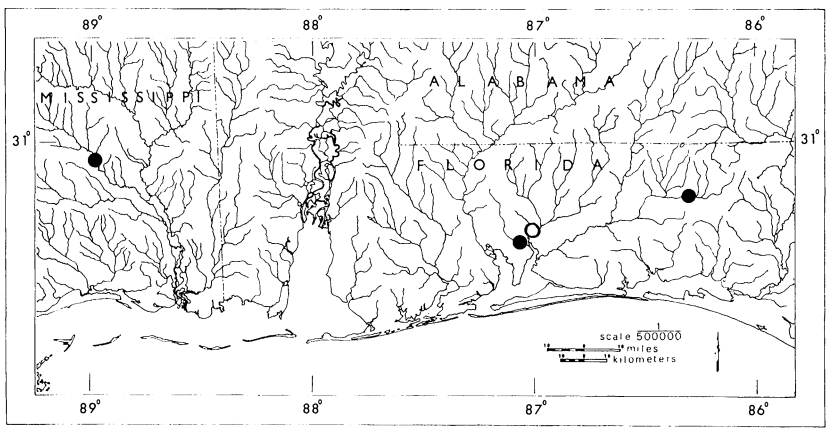

FIG. 1. Distribution by record stations of *Notropis melanostomus*. The open circle is from Bortone (1989:738).

1977; TU 101868 (110, 18–28), 29 Apr. 1977; TU 122232 (60, 13–35), 14 July 1981, distributed as follows: TU 122232 (30), CU 71711 (10), UF 78363 (10), UT 44.4503 (10); TU 129435 (53, 18–29), 24 June 1983, distributed as follows: TU 129435 (43), UMMZ 214859 (10); TU 108649 (11, 25–30), 26 July 1978; TU 111398 (24, 19–29), 4 Jan. 1979; TU 113890 (3, 23–26), 24 July 1979; TU 116030 (2, 22 and 27), 11 Jan. 1980; TU 120145 (11, 20–29), 7 Jan. 1981; TU 124299 (5, 15–28), 6 Jan. 1982.

Pond Cr. near Louisville and Nashville Railroad crossing (TIN, R28W, Sec. 9): TU 99391 (28, 13–21), 21 Aug. 1976; TU 101883 (29, 23–33), 29 Apr. 1977; TU 102266 (21, 24–31), 9 June 1977; TU 102915 (49, 12–31), 17 July 1977; TU 122252 (35, 13-30), 14 July 1981. An additional specimen is from Pond Cr. at Hwy. S-191 (TIN, R28W, Sec. 10): TU 99354 (1, 18), 21 Aug. 1976.

Yellow River drainage, FL: Shoal R. flood pool, 5.8 km N. Mossy Head, Hwy, C-285 (T4N, R21W, Sec. 36), Walton Co. (14, 27-38), 30 Apr. 1977, TU 101945 (12), UMMZ 214860 (2); TU 102339 (7, 30–37), 9 June 1977; TU 102356 (1, 29), 9 June 1977.

Pascagoula River drainage, MS: Black Cr. (Doctor Lake, oxbow lake), trib. Pascagoula R., 2.4 km upstream of Hwy. 318 (T1S, R10W, Sec. 27), Perry Co., TU 144885 (1, 34), 21 May 1986; (20, 22–37), 10 Oct. 1986, TU 146816 (18), UMMZ 214861 (2); TU 150125 (6, 23–35), 9 Oct. 1987; TU 150604 (11, 25–36), 7 Nov. 1987.

Diagnosis.—A diminutive species of *Notropis,* maximum SL 38 mm, with 4–4 pharyngeal teeth, the posterior three serrate, and typically 10 or 11 anal fin rays. Lateral line canal short, pored scales ranging from 0 to 6, typically 2–5. Mouth large, steeply inclined, and bowed forward. Orbit large, horizontal diameter exceeds snout length and upper jaw length. Gill rakers slender, 15–18. Dark lateral stripe present; some specimens with posterior end of stripe developed into basicaudal spot; dorsolateral area immediately above lateral dark stripe devoid of pigment or with only a few scattered melanophores. Inner lining of lower jaw heavily pigmented from near angle of mouth forward.

Description.—Besides the diagnostic characters given above, counts and measurements are given in Tables 1–3 and include comparisons from the three seemingly disjunct populations (Tables 2–3). Measurements are detailed in Table 1. Fin ray counts not included in Tables 2 and 3 are as follows: Dorsal fin rays, 8 (394) or 9 (12), pelvic fin rays, 7–7 (1), 7–8 (1), 8–8 (77), 8–9 (1), 9–8 (2), and 9–9 (2), n = 84; caudal fin rays, 17 (2), 18 (5), and 19 (88). The breast and prepectoral area are fully scaled. Pharyngeal teeth were counted

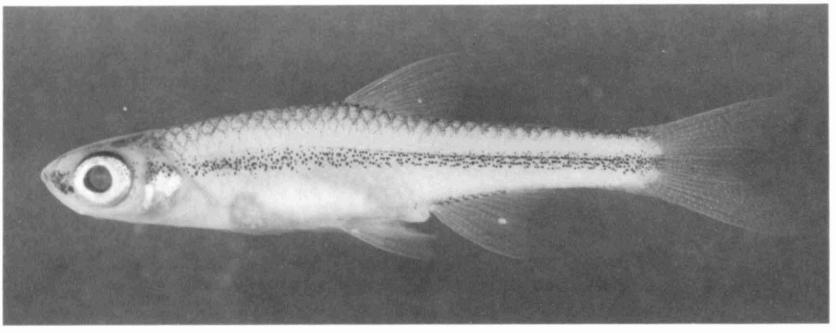

FIG. 2. *Notropis melanostomus*. Lateral view of TU 98579, 32 mm SL. Photo by J. Suttkus.

from 10 Pond Cr., 6 Shoal R., and 4 Black Cr. specimens; all 20 had 4–4 teeth. The anterior (lowermost) tooth is smallest and roughly conical or with a weak hook; the others are longer, strongly hooked at their tips, and have an elongate, flattened grinding surface. The posterior margins of the grinding surfaces form essentially entire cutting edges. The anterior margins bear an elevated crest of several serrae or crenulations; those of the two median teeth are best developed. The base of the uppermost tooth is considerably elevated, as in *Notropis maculatus* (Gilbert and Bailey, 1972, fig. 2B), a species that lacks serrations. Gill rakers (total, including rudimentary ones) were counted on the first left arch of 5 Pond Cr. and 7 Shoal R. specimens. The count ranged from 15 to 18, with an average of 17.2 for Pond Cr. and 15.9 for Shoal R. specimens. The rakers are slender and well developed, not only more numerous but longer than in most species of *Notropis;* the longest when depressed extends to or slightly beyond base of the second raker below. Vertebral counts from radiographs for 72 Pond Cr. specimens are: 35 (5), 36 (61), and 37 (6), mean 36.01, including 4 Weberian and the urostylar vertebra.

Mouth terminal, large, oblique, gently curved forward and almost scooplike (Fig. 3); mandibles narrow and closely approximated behind, extending almost to below front of pupil. The drawing in Bortone (1989, Fig. 2) accurately portrays the angle and position of the mouth, but his Fig. 1 is deceptive, perhaps as a result of careless cropping of the photograph.

Cephalic lateralis canals imperfectly developed. Infraorbital canal usually continuous, occasionally with an interruption posteroventral to eye, well separated from supraorbital canal and from lateral canal

TABLE 1.—Proportional Measurements* of *Notropis melanostomus*

Measurements	10 Males† Range	$\bar{X}$	SD	11 Females† Range	$\bar{X}$	SD
Standard length (mm)	23.6–36.8	30.4	5.66	24.4–38.0	30.8	4.95
Dorsal origin to snout tip	491–515	503	7.5	484–514	499	8.4
Dorsal origin to caudal base	493–517	507	6.8	490–516	502	7.8
Dorsal origin to occiput	287–326	306	13.1	283–328	305	12.3
Pelvic insertion to snout tip	460–475	469	5.6	458–489	470	8.7
Anal origin to caudal base	359–377	369	4.9	347–373	359	8.4
Body, greatest depth	191–209	199	5.4	180–210	192	9.7
Body, greatest width	100–122	110	8.5	95–124	108	11.0
Caudal peduncle, length	207–233	221	7.7	209–237	221	8.1
Caudal peduncle, least depth	89–98	94	3.1	77–93	86	5.5
Head, length	243–259	249	4.6	237–255	244	5.3
Head, depth	144–155	148	3.4	142–153	146	3.1
Head, width	118–133	126	4.5	115–129	122	4.6
Interorbital, least fleshy width	72–80	75	2.7	68–76	71	3.2
Snout, length	56–64	60	2.4	52–62	57	4.0
Orbit, length	85–93	89	3.2	84–93	88	3.2
Upper jaw, length	55–61	58	2.0	53–62	57	3.2
Lower jaw, length	84–90	88	2.3	82–90	86	2.3
Dorsal fin, depressed length	254–297	276	11.9	225–258	245	11.0
Anal fin, depressed length	205–230	216	8.4	172–216	200	12.3
Caudal fin, length from base to tip of longest ray	290–307	298	5.7	264–304	283	14.3
Pectoral fin, length	183–201	191	5.2	176–198	185	7.9
Pelvic fin, length	182–215	199	11.9	156–185	172	7.5

*Proportions are expressed in thousandths of SL.
†TU129435, 150946 (Pond Cr., 5 males, 6 females), TU101945 (Shoal R., 5 males, 1 female), 102339 (Shoal R., 4 females).

TABLE 2.—Frequency Distribution of Number of Fin Rays in Three Disjunct Population Samples* of *Notropis melanostomus*

Population	Anal Rays				N	$\bar{X}$	SD
	9	10	11	12			
Black Creek	1	32	5		38	10.1	0.39
Pond Creek		229	205	3	437	10.5	0.51
Shoal River		13	8	1	22	10.5	0.60
	Left Pectoral Rays						
	11	12	13				
Black Creek	5	22			27	11.8	0.40
Pond Creek		18	11		29	12.4	0.49
Shoal River		14	8		22	12.4	0.49

*Samples are arranged from west to east.

TABLE 3. Frequency Distribution of Number of Scales or Scale Rows in Three Disjunct Populations of *Notropis melanostomus*

Population	Lateral Scales			N	$\bar{X}$	SD
	34	35	36			
Black Creek	8	18	2	28	34.8	0.57
Pond Creek	13	13	2	28	34.6	0.63
Shoal River	14	5	3	22	34.5	0.74

	Pored Lateral Scales									
	0	1	2	3	4	5	6			
Black Creek			2	4	9	4	2	21	4.0	1.10
Pond Creek	3	3	21	41	45	32	6	151	3.6	1.24
Shoal River	1	1	0	2	8	7	2	21	4.1	1.45

	Body Circumferential Scales								
	19	20	21	22	23	24			
Black Creek	1	15	8	4			28	20.5	0.79
Pond Creek		13	7	4	3	2	29	21.1	1.29
Shoal River		9	11	2			22	20.7	0.65

	Predorsal Scale Rows						
	12	13	14	15			
Black Creek			15	13	28	14.5	0.51
Pond Creek	2	10	12	5	29	13.7	0.85
Shoal River		5	12	5	22	14.0	0.69

*Samples are arranged from west to east.

of body. Preopercular canal not continuous with the 4-pored mandibular canal, and well separated dorsally from the infraorbital canal (no opercular canal). No supratemporal canal.

Notropis melanostomus has a compressed body with moderately elevated dorsal and anal fins (Fig. 2). The dorsal fin origin is slightly

posterior to a vertical at the insertion of the pelvic fin and is about midway between the tip of the snout and the base of the caudal fin. The body depth is greatest just in front of dorsal and pelvic fin insertions. The dorsal fin has a nearly straight distal margin; the anterior rays are longest and extend well beyond the tips of the posterior rays in the depressed fin. The anal fin is falcate; the anterior rays reach nearly to the distal tips of the posterior rays in the depressed fin. The caudal fin is deeply forked. The posterior tips of the pelvics of males reach past the origin of the anal fin, usually to the base of the second to the fourth anal fin ray; whereas those of females are considerably shorter, reaching from nearly to the posterior tip of the urogenital elevation to a little beyond or just to the origin of the anal fin.

COLORATION.—The interradial membranes of all the fins are devoid of pigment. There is a little dark pigment along the rays of the dorsal, anal, and pelvic fins and the dorsal and ventral rays of the caudal fin; without magnification these fins appear to be clear. The pigment that forms the chevron-shaped basicaudal spot, if present, extends distally along the central rays of the caudal fin. The anterior rays of the pectoral fin are moderately well margined with black pigment, particularly the anterior ray for most of its length. The succeeding rays are pigmented more heavily on the proximal parts.

The lateral stripe is widest on the body, narrows in the region above the anal fin, and continues as a narrow stripe on the peduncle (Fig. 2). There is a slight widening ventrally just anterior to the base of caudal fin (not unlike the pattern of *Notropis volucellus*) and then a restriction that is immediately followed in most specimens by a darker chevron-shaped spot. The central caudal rays that extend posteriorly from the chevron spot are darkened, as mentioned above. Anteriorly the stripe extends on the upper part of the opercle to the orbit. A very dark stripe extends anterior to the orbit, on the lateral aspect of the snout and lower jaw and gular region; thus the band is continuous around the snout and jaw. The floor of the mouth is heavily pigmented anteriorly. Most of the iris is silvery but there are some melanophores along the dorsal outer margin and dorsally the eyeball is jet black. The cheek and lower part of the opercle are silvery as is the lower side of the body ventral to the lateral stripe. There is a concentration of pigment along the base of the anal fin, and this continues posteriorly as a mid-ventral line on the caudal peduncle.

A pale area devoid of pigment, one to one and one-half scale rows in width, occurs above the lateral stripe. Some specimens may have a little pigment extending into this pale stripe, usually just behind the

FIG. 3. *Notropis melanostomus*. Anterolateral view of UMMZ 157843, 29 mm SL. Photo by W. L. Brudon.

head. The upper part of the side and the dorsum is rather uniformly pigmented. Most scales are outlined by marginal melanophores; the enclosed spaces are also pigmented, particularly on the dorsum. Scales on the side just above the pale stripe have the least amount of pigmentation within the enclosed areas. Most specimens have a middorsal row of melanophores that extends from the dorsal-fin origin to the occiput. The top of the head over the brain and the interorbital area is heavily pigmented. Pigment continues anteriorly on the internarial area and in some specimens to the upper lip. The areas surrounding the nares and temporal region are pale and contrast markedly with the jet black of the eyeball. The peritoneum is dusky.

No bright breeding colors were observed on any tuberculate males or gravid females.

SIZE.—*Notropis melanostomus* is one of the smallest of American cyprinids at maturity and in maximum size. The largest of 726 specimens taken from Pond Cr. is 34.6 mm SL. The largest of 22 from Shoal R. is 38.0 mm and the largest of 38 from Black Cr. is 36.6 mm SL. Collections are from the months of January, April, May, June, July, August, October, and November. Gilbert (1978) gave size of this species as about 45 mm SL, but he informs us (pers. comm.) that this figure was an estimate. Females with large, developed ova ranged down to 21 mm SL and males at this same small size were tuberculate (tubercles on first six pectoral fin rays). Females of 19 mm SL have

ova of moderate size and males of 19 mm SL have weakly developed tubercles on the first three to five pectoral rays; thus 21 mm SL seems to be near the minimum adult size. A perusal of the adult size range of the various species of *Notropis* in the Atlas of North American Freshwater Fishes (Lee *et al.,* 1980) reveals that none was known to be of adult size below 24 mm SL. The species that were listed with a minimum adult size of 24–29 mm SL had maximum adult sizes ranging from 45 to 75 mm SL. Adults of the northeastern Mexican species *Notropis saladonis* were reported by Hubbs and Hubbs (1958:297–298) to range from 21 to 38 mm SL, equal to our measurements for *N. melanostomus.* The largest of the 13 known specimens of the Mexican *Notropis aulidion* is also 38.0 mm SL (Chernoff and Miller, 1986); size at maturity was not discussed, but the holotype is an adult female 35.1 mm SL. Thus, *saladonis, melanostomus,* and perhaps *aulidion* seem to be the smallest species of *Notropis.*

Reproduction.—Spawning of the blackmouth shiner has not been observed. Tuberculate males and gravid females were collected from the end of April to the end of July during several different years and we conclude from these nuptial conditions that this time span is representative of the spawning period. Young-of-the-year comprised the greater part of the 21 August 1976 sample. Based on visual inspection of size frequencies in the samples we believe that the major part of the standing crop (as sampled with 3/16 inch mesh seine) in early summer is composed of one-year olds with a few two-year olds. Thus we view the blackmouth shiner as a fragile species because of its relatively short life span.

Comparisons.—*Notropis melanostomus* is characterized by some features that are distinctive and others that are shared by few other species of the genus. Small size (see p. 9) is one of these. Highly diagnostic are the slender and relatively long and numerous gill rakers (15–18) of the anterior arch. We know of no other species of *Notropis* with so many. Smith (1986) tabulated counts for the 19 species in New York that ranged from 4 to 11 rakers. Becker (1983) found that for the 21 species found in Wisconsin (many the same as in New York), rakers were short and more or less knobby or conical and ranged from about 5 to 11. From 11 to 13 rakers were reported in *N. oxyrhynchus* by Chernoff *et al.* (1982). In selective examination of many other species of *Notropis* we find that most have the rakers more or less rudimentary to short and stubby, often well separated. We have encountered gill-raker morphology approaching that of *N. melanostomus* only in *N. ortenburgeri.* In that species also the rakers are slender and long, the longest extending about to the base of the

second raker below on the first arch, and number 12 to 15, mean of ten counts = 13.4. Among species presently included in *Notropis* the similarity is presumably a synapomorphy for *ortenburgeri* and *melanostomus*. Among eastern North American cyprinids, high gill-raker counts are found otherwise only in the species of *Campostoma* (11–33), in *Notemigonus crysoleucas* (16-27), and in *Pimephales promelas* (12–16); the relationship of these to the two species of *Notropis* is ostensibly remote.

Notropis melanostomus adults have from 0 to 6 pores anteriorly in the lateral line (Table 3). We cannot confirm Bortone's observation (1989:739) that the lateral line is complete. Comparably poor development of the lateral canal is characteristic of several other species of *Notropis* that are inhabitants of quiet, usually heavily vegetated waters (e.g., *aulidion, bifrenatus, calientis, hubbsi, maculatus, welaka*) (Jenkins and Zorach, 1970; Bailey and Robison, 1978; Chernoff and Miller, 1986). In a few species the lateral line is variably complete, almost complete, incomplete, or interrupted, but if incomplete it is usually so only posteriorly and with relatively few unpored scales (e.g., *amecae, chalybaeus, heterolepis, heterodon, texanus*). In *N. ortenburgeri* the lateral line is complete or incomplete. Of 10 specimens counted, 5 have the line complete, and unpored scales are 1 (in 1), 2 (2), 3 (1), and 4 (1); total scales in lateral series number 34 (1), 35 (4), 36 (4), and 37 (1). In contrast, a large majority of the species of *Notropis* have the lateral line complete, clearly the plesiomorphic condition. *Notropis melanostomus* differs trenchantly from the above mentioned species with an incomplete lateral line; we believe that this specialization is commonly homoplasious, having evolved repeatedly in the genus.

Mouth size, shape, and position vary widely in *Notropis*, and *N. melanostomus* is distinctive in having the mouth large, steeply inclined, and the mandible somewhat bowed (convex) forward (Fig. 3). *Notropis anogenus* and *N. emiliae* also have the mouth upturned, but in these species the mouth is among the smallest in the genus (Bailey, 1959; Gilbert and Bailey, 1972:4). *Notropis ortenburgeri*, like *melanostomus*, has a large, terminal, oblique mouth; the upper jaw reaches nearly to the front of the eye, and the lower jaw extends almost to below the front of the pupil. In *ortenburgeri* the mouth is straight edged, less strongly oblique, and the upper lip is slightly above the level of the center of the pupil rather than at its upper level as in *melanostomus*, which has the border of the mouth curved convexly outward. Most other species of *Notropis* have the mouth smaller, varying from moderately oblique to subterminal and almost horizontal.

The presence of serrations on the pharyngeal teeth of some American cyprinids was discussed briefly by Gilbert and Bailey (1972:4). If present, serrae are most often developed on the anterior cutting edges of the grinding surface or trough on the distal parts of teeth of the main row. In *Notropis emiliae,* however, weak serrae are present also on the posterior cutting edges. Serrations typically lie between strong terminal hooks and prominent elbows near midshaft on the teeth, the three structures in combination forming an impressive semicircular grasping structure. Serrae may be present on all major row teeth, or may be lacking on the anterior one or two teeth. There is a strong association of serrations with species with steeply upturned mouths (e.g., *Notemigonus crysoleucas, Notropis anogenus, N. emiliae, N. melanostomus*), and we interpret both as trophic specializations, presumably adaptations for predation on microcrustaceans. Serrae may be developed both in species with a single tooth row, as listed above, or with two rows (e.g., *Notropis boops, N. heterodon,* some species of subgenus *Cyprinella* of *Notropis*), usually with a dental formula of 1,4–4,1. In *N. heterodon* a hook and a few serrae may be present on the tooth of the lesser row. In some species, including some of *Cyprinella* (e.g., *xanthicara, spilopterus*), serrae may be weakly developed or absent. Since serrae are well developed only in a few species that have little else in common except upturned mouths, we assume that the specialization is homoplasious.

Anal fin ray and pharyngeal tooth counts have traditionally been relied upon heavily in the classification of *Notropis* and these counts are often correlated. A majority of species with pharyngeal teeth 2,4–4,2 have 9 or more principal anal fin rays, although many have 7 or 8; those with a single row, 4–4, usually have 7 or 8 anal rays, but there are 9 in *lepidus* and *lutrensis* and 10 in *garmani* (all in *Cyprinella*). For species with teeth 1,4–4,1 (including many species of *Cyprinella*) 7, 8, and 9 are prevalent anal counts, whereas *N. cummingsae* and two species of *Cyprinella* have modal counts of 10 and 11. *Notropis melanostomus,* with 4–4 teeth and usually 10 or 11 anal rays, therefore displays an atypical combination for the genus. *Notropis hubbsi* and *N. ortenburgeri* also have 4–4 teeth and usually 9 or 10, occasionally 11, anal rays.

In at least two species of *Notropis* (*chalybaeus* and *melanostomus*) there is notable development of black pigment in the buccal cavity, whereas most species are unpigmented or have few scattered melanophores. The pigment pattern differs between these two species. In *melanostomus* the inside of the lower jaw is broadly darkened from near the level of the angles of the mouth forward to the symphysis, but the

roof of the mouth is unpigmented. In *chalybaeus* the anterior parts of both jaws, including the oral valves, are blackened, but pigment on the floor of the mouth is concentrated laterally and does not extend as far posteriorly. We judge that buccal pigmentation has evolved independently and is not a synapomorphy for these two species, which differ in many respects.

RELATIONSHIPS.—*Notropis melanostomus* and the Kiamichi shiner, *N. ortenburgeri,* are apparently sister species. The distinctive gill-raker shape and elevated raker counts are probable synapomorphies as is the large, steeply upturned mouth. The common pharyngeal tooth formula 4–4, believed to be advanced in *Notropis,* is widespread in the genus, but is infrequently present in combination with high anal fin-ray count (modally 10 or 11 in *melanostomus,* 9 or 10 in *ortenburgeri*). Both are small, *melanostomus* attaining a SL of 38 mm and *ortenburgeri* of 50 mm. Despite these similarities the species differ notably: *N. ortenburgeri* has the lateral line complete or nearly so, fewer gill rakers, the border of the mouth straight and the mouth itself not quite as steep; it lacks serrations on the teeth, and has no pigmentation on the inside of the lower jaw. The species differ also in habitat and distribution: *N. ortenburgeri* is an upland stream inhabitant of the Ouachita Mountains whereas *N. melanostomus* lives in lowland backwaters near the Gulf of Mexico coast (Fig. 1). *Notropis melanostomus* appears to be the more specialized since its structural differences are interpreted as apomorphies in *Notropis.* If the two species are next of kin, as here believed, the separation is certainly of long standing.

The placement of this small group of two species among the numerous species and species groups in the genus is uncertain. Among other species *N. heterodon, N. boops,* and *N. cummingsae* might bear close scrutiny as possible relatives.

HABITAT AND HABITS.—*Notropis melanostomus* is an inhabitant of backwater areas or slow moving lateral areas that are partially to completely cut off (oxbow lakes) from the main channel of moderate-sized streams. No specimens were obtained from the main channel of Pond Creek, Shoal River or Black Creek although the channel areas nearby were sampled each time the backwater areas were collected. Both Shoal River and Pond Creek backwater areas were well vegetated with rooted aquatic plants. However, the Black Creek area is a small oxbow lake which is canopied by bald cypress, *Taxodium distichum,* and black gum, *Nyssa sylvatica;* there are a few clumps of button bush, *Cephalanthus occidentalis,* but no submerged aquatic vascular plants or any emergents along the shoreline.

The blackmouth shiner is gregarious; at the Pond Creek and Shoal

River sites it occurred in schools in mid-water of the open areas near aquatic vegetation. All specimens taken in the Black Creek area, however, were obtained from shallow marginal areas or around submerged dead branches or brush.

Collections from the backwater and main channel at Pond Creek were combined during processing and contained a combined total of 48 species in 13 collections; *N. melanostomus* composed 4.4% of the 12,240 total specimens. The backwater areas and channel samples also were combined at the Shoal River site which contained 32 species of which *melanostomus* made up 0.9% of the 2368 total specimens. The samples from Doctor Lake (Black Creek site) were kept separate from nearby stream samples. There was a total of 24 species of which *melanostomus* made up 1.0% of the 2490 total specimens.

RANGE.—*Notropis melanostomus* as presently known has a disjunct distribution from the western Florida panhandle to southeastern Mississippi (Fig. 1).

ETYMOLOGY.—As indicated by Bortone, the name *melanostomus* is from Greek and refers to the black mouth. However, it is not a noun in apposition, and if transferred to a genus of different gender the suffix will require correction.

STATUS AND CONSERVATION.—The blackmouth shiner, *Notropis melanostomus,* with a short life span, is highly vulnerable to human activities which impact the fish's environment. During recent years the type locality area has been modified. The northeast shore of the backwater area was cleared and graded for a home site. Also the peninsula between the backwater area and the main channel of Pond Creek was partially cleared. The most recent development was the erection of a high chain-link fence between the park area and the backwater pool. Our visits to the area have been too infrequent to evaluate the impact, if any, of these activities.

Several recent trips to the Shoal River site did not reveal any blackmouth shiners and a recent trip to Doctor Lake in the Black Creek area was also unsuccessful. Although we believe there are other undiscovered disjunct populations, the Pond Creek population deserves continuous close watch.

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