

NOTROPIS HYPHILEPIS, A NEW CYPRINID FISH FROM THE
APALACHICOLA RIVER SYSTEM OF GEORGIA
AND ALABAMA

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The small species of *Notropis* described below appears to be endemic to the Apalachicola River system. It has been overlooked, or confused with *Notropis xanocephalus* (Jordan), which is native in the upper Alabama River system of Alabama and Georgia. Little is known of its life history or habitat and judging from the few times it has been taken it seems to be scarce, or, possibly, it prefers a habitat not normally investigated.

The material is deposited in the Cornell University fish collection and was collected by the authors with the aid of R. H. Backus, J. Willard Colston, R. W. Crawford, J. S. Dendy, J. N. Layne, C. R. Robins, and R. L. Wigley. Counts and a description of the lateral line head pores were kindly made available by Helen J. Illick. Counts and measurements were taken using the methods described by Hubbs and Lagler (1947: 8-15).

NOTROPIS HYPHILEPIS, sp. nov.

Figs. 1 and 2, Map 1

The 50 available specimens, all designated as types, range from 19 to 51 mm in standard length and are from eight localities. In the enumeration of the material below the number of specimens and range of standard length of the series measured in millimeters are given in parentheses, *e. g.* (6, 41-51). In addition to standard abbreviations for compass directions, with the following "of" deleted, the following are used: Co. = County, Cr. = Creek, Hwy. = Highway, mi. = mile or miles, junct. = junction, R. = River, trib. = tributary (of), CU = Cornell University fish collection, UMMZ = University of Michigan, Museum of Zoology.

Material.—Holotype, CU 17442, an adult male, 51 mm from trib. Soque R., 0.4 mi. W. Soque R. and 1.5 mi. W. Clarksville on Ga. Hwy. 115, Chattahoochee R. system, Habersham Co., Georgia, on April 1, 1950, by Edward C. Raney, Royal D. Suttkus, Richard H. Backus and C. Richard Robins. Designated as paratypes are CU 28237 (6, 41-51) which were taken with the holotype.

Other paratypes from the Apalachicola River system are listed

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below. Chattahoochee River system of Georgia: CU 18102 (8, 34-50), Grant Cr., trib. Soque R. near junct. with Chattahoochee R., near Cornelia, Habersham Co., June, 1949; CU 19625 (9, 45-51), Chestatee R. at mouth of Yahoola Cr., 2.1 mi. S.E. Dahlonge, Lumpkin Co., March 26, 1951; CU 17138 (19, 34-51), Vickery Cr. at junct. with Chattahoochee R. at Roswell, Fulton Co., March 30, 1950; CU 17279 (3, 19-27), Hodchodkee Cr., 1.4 mi. S. Lumpkin, Stewart Co., March 28, 1950; UMMZ 157957 (1, 48), Cane Cr., 1¼ mi. W.S.W. Dahlonge, Lumpkin Co., August 25, 1939. Chattahoochee River system of Alabama: UMMZ 142910 (2, 41-43), Halawakee Cr., 10 mi. N.E. Opelika, Lee Co., October 17, 1938. Flint River system: CU 21138 (1, 40), trib. Lazier Cr., 2.9 mi. W. Talbotton, Talbot Co., March 26, 1952. Also examined was a single adult specimen, not designated as a paratype, taken from Little Uchee Cr., trib. Chattahoochee R., at US Hwy. 80, Russel Co., Alabama, October 10, 1953, by Jack S. Dendy. This specimen is now in the collection of the Alabama Polytechnic Institute.

Diagnosis.—A small, pale-colored species of *Notropis* with 2, 4—4, 2 teeth and 7 anal rays. Other fin rays: dorsal 8, rarely 7; caudal 19; pectoral 13-16, usually 14; pelvic 8, or occasionally 9. Anterior lateral line scales elevated; exposed portion of third scale 4 times as high as wide. Scales: predorsal rows usually 15, rarely 16 or 17; above lateral line to dorsal origin 5, rarely 6; below lateral line to anal origin 3 or 4; in lateral line 35 or 36; around body before dorsal fin 21 to 26, usually 22 or 23; around caudal peduncle 12. Snout blunt, mouth inferior. Body subterete. Lateral line on body complete. Middorsal dark stripe little developed before and scarcely if at all behind the dorsal fin. Lateral band on body weak. Diagnostic dark patches on body at base of the first 4 or 5 dorsal and anal rays. Area about the anus light. Small wedge-shaped basicaudal spot separated from the lateral band on body by a light area. Oblique dark scapular bar lacking. Size small, to 51 mm.

Description.—Proportional measurements for the holotype and 11 paratypes are given in Table 1. In the following enumeration of fin, teeth, and scale counts, the count for the holotype is in bold face. The frequency is shown in parentheses. Dorsal rays, 8 (44), 7 (3); anal rays **7** (47); caudal rays, **19** (20); pectoral rays, 13 (3), **14** (12), 15 (6), 16 (1); pelvic rays, 8 (71), 9 (15), holotype **9—8**. In upstream samples the pelvic count averages high: the two samples (CU 17442, 18102) from tributaries of the Soque R. have 8 (18), 9 (12). Teeth **2, 4—4, 2** (9), 1, 4—4, 2 (1). Predorsal scale rows, 15 (8), **16** (2), 17 (1); scales from dorsal origin to lateral line, 5 (10), **6** (1); scales from anal origin to lateral line, 3 (5), 4 (6); lateral line scales, 35 (10), **36** (9); scales around body before dorsal fin, 21 (1), 22 (7), 23 (5), 24 (3), **25** (2), 26 (1), with 10 to **12**, usually 11, above the lateral line and 9 to 12, usually 9 or 10, **11** in holotype below the lateral line; caudal peduncle scale rows, **12** (11), the formula being **5—2—5**.

TABLE 1.

PROPORTIONAL MEASUREMENTS OF ELEVEN ADULT *Notropis hypsilepis* IN THOUSANDTHS OF THE STANDARD LENGTH. SEVEN MALES AND FOUR FEMALES WERE MEASURED.

Measurement	Holotype	Paratypes			
	CU 17442	CU 28237 and 18102			
	Male	Males		Females	
		Range	Avg.*	Range	Avg.
Standard length, mm	51.2	41.2-51.2	47.0	37.1-48.2	43.9
Dorsal origin to snout tip	502	491-510	501	495-525	505
Dorsal origin to caudal base	529	514-546	530	527-545	538
Dorsal origin to occiput	307	287-316	301	269-321	296
Pelvic insertion to snout tip	488	488-499	494	480-484	482
Anal origin to caudal base	344	336-365	348	338-347	341
Body, greatest depth	193	177-210	198	184-244	212
greatest width	127	119-137	126	116-135	129
Dorsal origin to lateral line	127	112-134	126	121-139	133
Pelvic insertion to lateral line	092	082-102	092	084-112	100
Caudal peduncle, length	226	226-248	240	226-252	239
least depth	094	090-105	097	085-097	091
Head, length	244	239-259	247	242-258	250
depth	161	152-161	157	154-156	155
width	131	123-136	129	119-130	124
Interorbital, least fleshy width	088	085-095	090	085-090	087
Snout length	080	080-087	084	079-084	082
Eye length	065	065-075	070	069-074	071
Upper jaw length	073	072-078	075	067-075	071
Suborbital, least width	041	032-041	036	031-136	034
Dorsal fin, depressed length	227	226-246	235	225-231	228
Anal fin, depressed length	184	174-193	185	169-179	174
Caudal fin, length	270	270-304	285	271-288	276
Pectoral fin length	191	191-213	202	188-194	190
Pelvic fin length	164	162-181	171	155-174	166

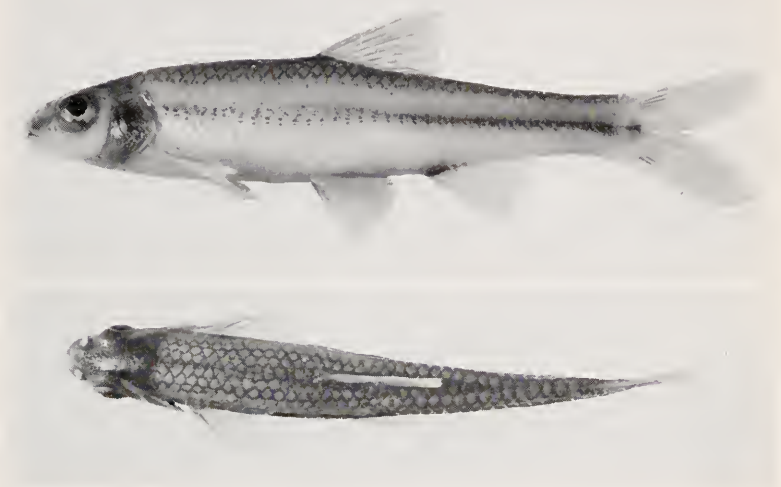
* Holotype included.

The body shape and other characters are illustrated in Figures 1 and 2. The body is subterete. The subtriangular head terminates in a blunt snout, which extends slightly beyond the upper lip and far in front of the lower lip. The contour of the dorsum posterior to the occiput is straight and rises gradually to the dorsal origin; it dips at the dorsal fin base and then extends in an almost straight line posteriorly to the procurent caudal rays. Ventrally the body curves gently downward to a point two-thirds the distance between the pectoral fin base and the pelvic fin insertion; posteriorly the contour is almost a straight line to the anal origin and then curves in a gentle arc to the procurent caudal rays. The least depth of the caudal

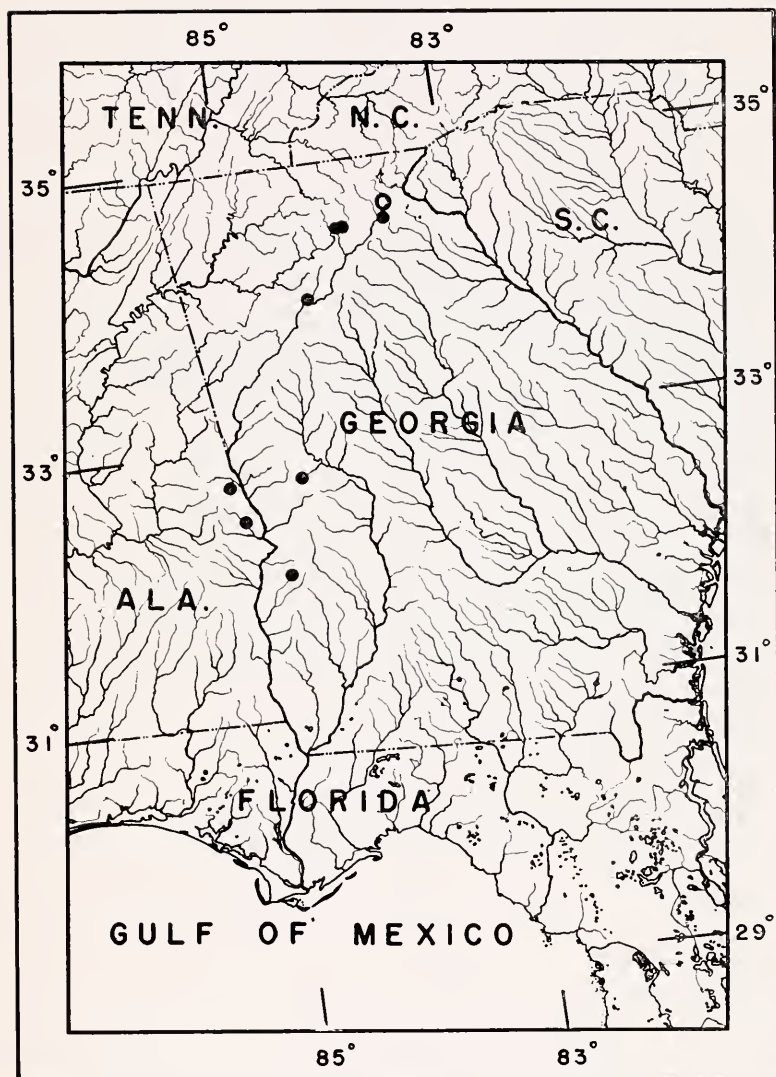
peduncle is just anterior to the procurrent caudal rays. The upper jaw does not reach to below the anterior margin of the eye. The gape of the mouth is little inclined. The upper lip is curved about midway, its anterior half is almost horizontal and at its anterior tip it barely reaches the lower level of the eye. Viewed from below the gape is U-shaped. The eye is shorter than the snout and is rather high. The interorbital region is moderately convex. The center of the eye is slightly closer to the tip of snout than to the margin of opercle.

The lateral line is complete. Anteriorly its path is marked by small aggregations of melanophores above and below each pore. Posteriorly it curves gently downward to a point opposite the pelvic fin insertion and then curves upward to a point opposite the posterior end of the dorsal fin base. The remaining part is straight and lies within the upper part of the relatively narrow dark lateral band. In the following description of the cephalic lateral line pores, the number of specimens is given in parentheses. In making the pore counts on a canal the anteriormost is designated number one. Five specimens (CU 17138) were studied. The supratemporal canal is incomplete and may be broken irregularly. In three specimens, the count is 2 on the left and 1 on the right; in two, there are 2 on the left, 2 isolated in or near the center and 1 on the right. The supraorbital canal is complete in four of the five specimens studied, with pore counts of 8 (2), 9 (1), 10 (1); in one specimen it is incomplete, with a break between pores four and five. The supraorbital may end opposite a vertical line projected from the posterior margin of the eye but usually this line falls on the penultimate pore. The infraorbital canal is complete in three out of the five studied, with pore counts of 14 (1), 15 (1), 17 (1). In two specimens, with counts of 17 and 16 respectively, the canal is incomplete and irregularly broken; in one the break comes between pores four and five; in the other, in the temporal region, between pores fourteen and fifteen. A vertical from the anterior margin of the eye falls between pores four and five in four specimens and on pore seven in one. The preoperculo-mandibular canal is incomplete in four, with a count of 13, and complete in one, with a count of 12. When this canal is incomplete, it is broken between pores five and six. In respect to the high count of this canal, *bypsilepis* stands extreme among species with 2, 4—4, 2 teeth and 7 or 8 anal rays.

The extended dorsal and anal fins are almost straight on the distal border; when depressed the tip of the anterior rays of the dorsal exceed the tip of the posterior ray while the reverse is true of the anal fin. The dorsal fin is relatively high. The distance from the midcaudal base to the midfork is less than half the distance from the caudal base to the tip of the longest lobe. The posterior margin of the pectoral and pelvic fins is gently rounded. The origin of the dorsal fin is directly over or slightly posterior to the insertion of the pelvic fin.



Figures 1-2. *Notropis hypsilepis*, sp. nov. 1. (top) Side view of holotype, an adult male, 51 mm in standard length, from trib. Soque River, 0.4 mi. W. Soque River and 1.5 mi. W. Clarksville, Chattahoochee River system, Habersham Co., Georgia. 2. (bottom) Top view of a paratype, an adult male, 51 mm in standard length, from the same series as the holotype. (Photographs by Douglass M. Payne.)



Map 1. Distribution of *Notropis hypsilepis*. (Circle designates the type locality)

The pharyngeal arch which bears the teeth is shaped like a fish hook and the extreme tip of the short arm is curved abruptly outward. The upper two-fifths of the arch is widened prominently. The teeth in the main row are three to four times higher than wide and the hooked tips partly overhang the well developed grinding surface, which has serrulate edges. The small teeth of the lesser row are similarly shaped and have a well developed grinding surface, but the hook is not as pronounced. There are only three developed, bluntish gill rakers on the first arch. One lies near the angle and the other two on the upper half of the lower arch. The nape and breast are scaled.

In separating the light-colored *hypsilepis* from the other species of *Notropis* in the southeastern United States, many details of pigmentation are diagnostic. The other forms with 2, 4—4, 2 teeth and 7 anal rays, are usually darkish, with a prominent dark lateral band running the length of the body. In *hypsilepis* the lateral band is weakly developed throughout. Anteriorly it consists of a scattering of melanophores which lie above the lateral line and in addition there is a small group of melanophores immediately above and below each lateral line pore. Posteriorly the lateral band is darker, narrower, and more continuous close to the lateral line. On the rear half of the caudal peduncle the melanophores are arranged in oblique lines, some of which form chevrons. The dark lateral band is paralleled above by a prominent clear band which is wider. The lower side is white. On the snout and opercle the lateral band is weak. The adjacent areas behind the eye and the fleshy margin of the opercle lack or have very few chromatophores. The dark appearance of the opercle of the holotype (fig. 1) is due to the darkness of the underlying gills which changed upon preservation.

The white area from the eye to and including the nostrils contrasts with the internarial region which bears scattered melanophores. On the top of the head between the eyes are two subquadrate blotches, separated by a clear area. The heart-shaped mark on the rear of the head is divided into three parts, each with a lighter center. The temporal region has scattered melanophores. There is no oblique dark bar posterior to the opercular slit. The anterior quarter of the upper lip and the groove above bear scattered melanophores; the lower lip is white, as is the lower half of the head and the inside of the mouth.

Each of the dorsal scales, except those on the midline, has a light center and the posterior third bears small scattered chromatophores. The middorsal streak anterior to the dorsal fin origin consists of a thin line of one to three rows of melanophores and it lacks an expanded concentration immediately before the dorsal fin. Diagnostic are the dark marks on the body that extend along the base of the first 4 to 5 developed rays of the dorsal and anal fins. Posterior to the dorsal fin base the middorsal streak is absent or consists of a weak line just behind the dorsal base. The basicaudal dark spot is a wedge with its apex pointing forward; about half is on the caudal

rays. It is separated from the dark lateral band on the caudal peduncle, which is also expanded posteriorly, by a clear space which sometimes has a few scattered melanophores. Just above the diffuse dark area on the posterior caudal peduncle is a faint band of melanophores, which extends to the base of the caudal rays. The area immediately before and behind the anus is white. On the lower edge of the caudal peduncle two or three rows of melanophores form a weak band that normally reaches to the procurrent caudal rays. The peritoneum is silvery, with large scattered melanophores which become more common dorsolaterally. The fins are white and transparent; the dorsal and caudal have the ray margins faintly outlined by a row of melanophores and the first two pectoral rays are similarly marked. No bright colors were noted in the field.

Nuptial tubercles are well developed on the male. Small scattered tubercles are present on the opercle and elsewhere on the head. Anteriorly they are coarse and irregularly arranged on the snout, below the eye, and on the dentary. Fine tubercles cover the lips, isthmus, and branchiostegals. The scales from the occiput to the dorsal fin have small tubercles, mostly in an irregular row on the posterior border. A vertical row of tubercles is present on the front third of each lateral line scale on the anterior half of the body. These are absent on the scales in the row above the lateral line and none were noted on the scales below the lateral line row, except for a few scattered, coarse tubercles on two or three transverse scale rows immediately behind the opercle. The small tubercles on scales and head were red in specimens taken on March 26 (CU 19625). Tubercles are absent on fins, except on the upper side of the first 8 pectoral rays, where they are arranged in several rows; the maximum development is on rays 3 to 6. The female has small tubercles and many developed "sensory" pits on the head but no tubercles on body or fins. Other than in the degree of development of nuptial tubercles, sexual dimorphism is not marked but the pelvic fins are slightly longer and the pectoral fins somewhat broader in the male. Judged from the large ovarian eggs and the high development of tubercles, spawning occurs sometime in June rather than in March or April.

Relationships.—Among the species of *Notropis* with 2, 4—4, 2 teeth *hypsolepis* seems to be most closely related to *roseus*, *xaenocephalus* and an undescribed species from the Mobile Bay drainage. It differs from *chalybaeus*, *chrosomus* and *lutipinnis*, which have 8 anal rays, in numerous characters but especially in body shape, the type of mouth, the shape of caudal spot, the development of the middorsal stripe, the nature of the dark lateral band on body and head, and the elevated anterior lateral line scales. A description of many of these characters was given for the above-mentioned species by Suttkus and Raney (1955: 73-84).

Besides the elevated anterior lateral line scales, the poorly developed dark lateral band, the light colored body, inferior mouth and blunt snout *hypsolepis* differs from *baileyi*, *petersoni*, *xaenocephalus* and

roseus, which have a black lateral stripe, 2, 4—4, 2 teeth and 7 anal rays, in numerous details of pigmentation. The following characters are helpful in separating *hypsolepis* from the forms listed immediately above.

(1) Body light-colored, with contrasting dark patch on body at the anterior base of the first 4 or 5 dorsal and anal fin rays, rather than being darker, with the dark blotch extending along entire base.

(2) Melanophores lacking rather than present immediately behind or beside anus.

(3) Dark lateral band on body very weak and mostly developed posteriorly, rather than being well developed for its entire length.

(4) Basicaudal dark spot separated from the posterior extension of the lateral band and forming a small wedge no wider than 3 caudal rays at its posterior end, rather than being well developed and continuous with the dark lateral band, or only slightly separated (*N. petersoni*), and quadrate, or, if wedge-shaped, as wide as 5 or 6 caudal rays.

(5) Lacks oblique scapular bar, rather than being strong to weak.

(6) Upper lip white on its posterior two-thirds and lower lips white, rather than each being dusky to black in whole or in part.

(7) Heart-shaped mark on top of head divided into three sections, rather than two.

(8) Peritoneum silvery with, no or few scattered melanophores midventrally, rather than being somewhat dusky and blotched ventrally.

Superficially and in the elevation of the anterior lateral line scales *hypsolepis* resembles *volucellus* but the similarity is attributable to convergence. These species differ trenchantly in tooth and anal ray counts (4—4 and 8 in *volucellus*), as well as many details of proportions and coloration.

Distribution and ecology.—*Notropis hypsolepis* is apparently endemic to the Apalachicola River drainage. Eight stations are known from the Chattahoochee River system and one collection is available from the upper Flint River system. It apparently prefers "Piedmont" type streams with sand bottom. Although it has been collected three times in small creeks from 10 to 20 feet wide, it has been taken in greatest abundance in or near the mouths of streams at a point where they enter large rivers. In color and body shape it seems to be adapted for life on or near the bottom.

The name *hypsolepis*, derived from *hypsi*, high, and *lepis*, scale, refers to the elevated anterior lateral line scales.

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ages of Mississippi and Alabama. *Tulane Stud. Zool.*, 2(5): 69-86, 4 figs., 1 map.

CORRIGENDUM

Material housed in the University of Michigan, Museum of Zoology should be acknowledged in the second paragraph of paper.

ADDENDUM

A very fine series of 42 specimens of *Notropis bysilepis* was examined by the senior author while the paper was in press. These specimens are hereby designated as paratypes.

Pigmentation, counts and measurements of these additional specimens agree favorably (with one exception) with those given in the diagnosis, description and elsewhere in the paper. The one exception noticed was an anal-ray count of 8 rather than 7.

This additional series bears the following data: UMMZ 136086 (42, 34-48), trib. Chattahoochee R., just below Hwy. 43, just E. Dahlonega, Georgia, collected by C. L. and L. C. Hubbs, May 15, 1937.