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PERCINA JENKINSI, A NEW SPECIES OF LOGPERCH (PISCES, PERCIDAE) FROM THE CONASAUGA RIVER, TENNESSEE AND GEORGIA

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The subgenus *Percina*, commonly called logperches, is probably the most widespread group of darters, ranging from the Hudson Bay basin of Canada to the Gulf Coast of Louisiana (Thompson, 1980). For much of its taxonomic history, two species were recognized, the widely ranging and polymorphic, *Percina caprodes*, and *P. rex*, an Atlantic-drainage Virginia endemic.

Recent revisions have resulted in the elevation of several subspecies to full species (*P. burtoni* and *P. carbonaria*; Jenkins, 1976) and in description of new species (*P. macrolepida*; Stevenson, 1971) and subspecies (*P. caprodes fulvitaenia*; Morris and Page, 1981). Moenkhaus (1894) examined color pattern and meristic variation in logperches, attempted to relate these to drainage pattern, latitude, and ontogenetic growth, and found numerous unresolved complications. Modern workers have also recognized that the group is systematically complex (Morris and Page, 1981) and many problems remain unresolved (Jenkins, 1976; Jenkins, Thompson, and Zorach 1977; Thompson, 1978 and 1980).

Thompson (1978) presented evidence that the logperches east of the Mississippi River and south of the Tennessee drainage represent four undescribed species. Distributions presented for these four species were:

1. *Percina* "A". Conasauga Logperch: confined to the Conasauga River in southeastern Tennessee and probably northern Georgia, sympatric with *Percina* "B".

2. *Percina* "B". Mobile Logperch: found in the Mobile drainage above the

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Fall Line in the Alabama and Tombigbee systems; sympatric with *Percina* "A" and "C".

3. *Percina* "C". Gulf Logperch: found from Lake Pontchartrain to the Mobile drainage below the Fall Line; sympatric with *Percina* "B".

4. *Percina* "D". Florida Logperch: confined to the Escambia and Choctawhatchee drainages; allopatric from other logperches.

Kuehne and Barbour (1983), however, dismissed the notion that the systematics of *caprodes* reflected an unresolved complex of undescribed forms. The purpose of this paper is to describe the form referred to as *Percina* "A", the Conasauga Logperch, in Thompson (1978).

Materials and Methods

In addition to the type series, the following comparative material was examined. Numbers in parentheses represent numbers of specimens of each species examined. Complete locality data may be obtained from the author on request.

Percina c. caprodes (44): Arkansas, TU 44872 (19); Tennessee, TU 95734 (25).

Percina "B" (57): Alabama, TU 78217 (8), TU 68225 (8), TU 76443 (4), TU 78438 (2). Georgia, UT 91.1645 (3), UT 91.2109(4), UT 91.1641 (5), UT 91.1906 (4), Bruce H. Bauer-752 (3), Bruce H. Bauer-765 (3). Tennessee, UT 91.475 (2), UT 91.1175 (3), UF 22794 (3), TU 78370 (3), UT 91.303 (2) (this species referred to as *Percina* "B", Mobile logperch, by Thompson (1978).

Counts and measurements in this study were made according to Hubbs and Lagler (1964) with the following exceptions:

1) Transverse scale counts — from anal-fin origin to spinous dorsal, and from second dorsal origin to anal fin (following Raney and Suttkus, 1964).

2) Diagonal sum — the sum of the above two transverse counts plus the number of scales above the lateral line (Hubbs and Lagler, 1964).

3) Body width — widest dimension of the body.

4) Second dorsal and anal-ray counts — Radiographs showed that the last two rays of these species should not be counted as one (Thompson, 1977). Each ray of both the second dorsal and anal fin articulates on a separate fin support bone, thus each is counted separately. Occasionally the last ray is branched nearly to the base, in which case the two branches are counted as one ray. The last ray counted separately is separated from the next ray by a space about equal to that between other rays in the fin. This method, based

on the anatomical structure of the fin, results in a ray count one higher than would be obtained following the method of Hubbs and Lagler (1964).

5). Vertebral counts — made using the technique of Bailey and Gosline (1955).

Numerous studies have attempted to describe the complex pattern of body markings in logperches with many undefined terms such as primary, secondary, and whole. Often a total count of all bars is given (Stevenson, 1971; Morris and Page, 1981), but with variations in patterns producing broken, fused, or split barring, duplication of these total counts for comparative studies is difficult. A system is proposed here that describes different bars (whole, half, and quarter bars) and relates their relative length, connection to blotches, and position relative to each other. *Percina caprodes*, since it is so widespread, is described as the "basic" pattern without any implication to phylogenetic position.

1) There are nine whole bars that expand into lateral botches below the lateral line. Numbered from the tail, forward: No. 1, middle of caudal peduncle; No. 2, posterior insertion of soft dorsal fin; No. 3, middle of soft dorsal fin; No. 4, approximately one-third of the distance posteriorly from origin of soft dorsal fin; No. 5, just anterior to posterior insertion of spinous dorsal fin; Nos. 6, 7, and 8, under spinous dorsal fin; No. 9, just anterior to spinous dorsal fin. These bars are usually the widest ones on the body and are often the only ones pronounced on young-of-the-year and small juveniles.

2) Located just anterior and posterior to each whole bar are half bars that are usually shorter and generally not laterally expanded below the lateral line to form complete blotches. In specimens where these bars become elongated, the number of whole bars appears exaggerated. These bars usually first appear in subadults.

3) Numerous short markings located between the half bars are called quarter bars. These quarter bars are not found in many specimens; sometimes they are only small streaks of pigment. Seldom are they elongated to reach the lateral line. Similar to the half bars, the quarter bars are usually more pronounced in larger specimens.

4) In some specimens, often those collected at night, four rectangular saddles ("night saddles") appear. These are located at whole bar numbers 1, 2, 5, and 9.

5) The last body marking is a single, large, round dot located just posterior to the hypural plate.

The relative development, number of whole bars, and width of bars are useful characters in identifying many of the forms of logperches.

Description of New Species

I take great pleasure in naming this form after Dr. Robert E. Jenkins, Roanoke College, in recognition of his work with freshwater fishes in eastern North America, and particularly for his efforts in the subgenus *Percina*, commonly called logperches. The common name, Conasauga logperch, refers to the river in Tennessee and Georgia where this species is an endemic.

Percina jenkinsi new species
Conasauga Logperch
Figures 1-3

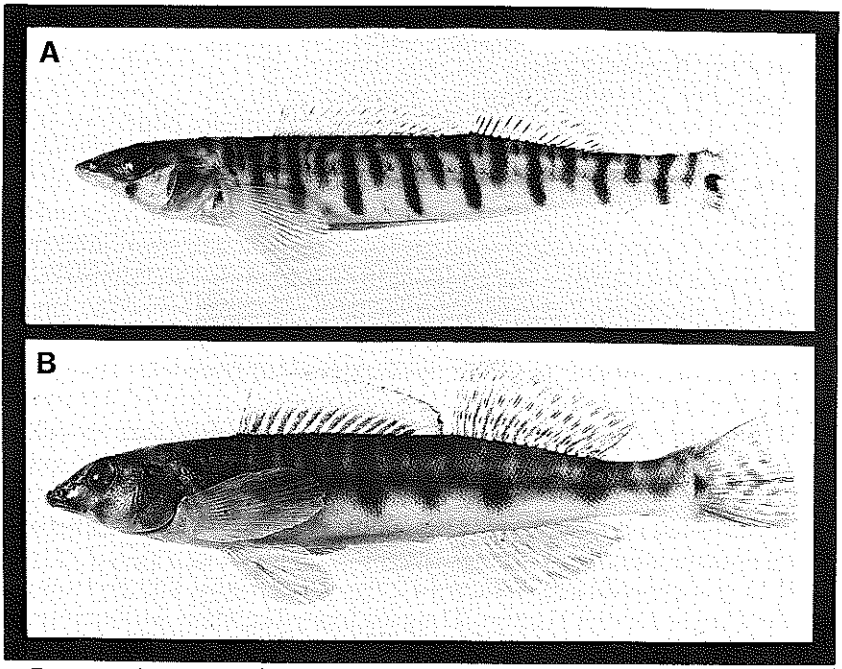

FIGURE 1. A. *Percina jenkinsi* n. sp., TU 78369, 115.7 mm SL, paratype female from Conasauga River, Tennessee. B. *Percina* "B", TU 78438, 113.0 mm SL, male from Coosa River System, Alabama.

Percina caprodes — (in part) Stiles and Etnier, 1971.
Percina reticulate form — Jenkins, Thompson and Zorach, 1977.
Percina "A" — Thompson, 1978.
Percina sp. cf *caprodes* — Starnes and Etnier, 1980.
Percina (Percina) sp. — Jenkins, 1976.
Percina (Percina) sp. cf. *caprodes* — Bryant et al., 1979.
Percina sp. — Page 1981; Biggins, 1984.
Percina jenkinsi (nomen nudem) — Page, 1981.

Holotype.—TU 106075, an adult male, 113.3 mm SL, Conasauga River (Mobile Bay Drainage), Tennessee Hwy 74, 20 km SE Cleveland, Bradley Co., Tennessee, 1 July 1972, BAT-72-451, B. A. Thompson, D. A. Etnier and University of Tennessee students.

Paratopotypes.—TU 80507 (6:55.8-101.4 mm SL), 17 October 1969; TU 80508 (8:49.6-87.8 mm SL), 19 Oct. 1969; TU 80506 (1:116.0 mm SL), 29 June 1970; TU 69140 (6:71.2-111.6 mm SL), 15 April 1971; TU 78369 (2:73.0-115.7 mm SL), 1 July 1972 [incorrectly listed in Page (1981) as TU 18369)] CU 69366 (2:93.9-99.7 mm SL), 19 June 1983; INHS 74582 (1:93.3 mm SL), 13 October 1971; UT 91.380 (1:108.1 mm SL), 22-3 October 1969; UT 91.688 (1:109.8 mm SL), 9-10 April 1970; UT 91.1176 (2:110.3-111.3 mm SL), 25 April 1976; UT 91.1545 (1:108.1 mm SL), 9 April 1978; UT 91.2621 (2:69.9-104.9 mm SL), 19 June 1983; UAIC 3901 (2:76.5-86.0 mm SL), 29 November 1969.

Other Paratypes.—UT 91.691 (1:51.8 mm SL), Conasauga River, ford above U.S. Hwy 411, Polk Co., Tennessee, 11 October 1969; UT 91.2702 (2:81.2-110.3 mm SL), Conasauga River, Easley Ford Rd., Boanerges Church bridge, Polk Co., Tennessee, 14 October 1969; UT 91.1646 (1:103.1 mm SL), Conasauga River, 4 km above Georgia Hwy 2, Murray/Whitfield Co., Georgia, 29 August 1978; UMMZ 213400 (2:79.7-99.6 mm SL), formerly part of UT 91.1646; USNM 268480 (2:79.0-81.3 mm SL), formerly part of UT 91.1646; UG 1394 F (1:100.4 mm SL), Conasauga River at Gregory's Mill, Cord 173, 2.4 km W Georgia 225, Murray/Whitfield Co., Georgia, 11 April 1981.

Diagnosis.—*Percina jenkinsi* (Fig. 1a) is distinguished from all other members of the subgenus *Percina* Haldeman by the following combination of characteristics: 1) no red, orange or yellow marginal or submarginal band in first dorsal fin; 2) nape always entirely scaled; 3) no scales on top of head or on anterior portion of breast; 4) well-developed prepectoral blotch present in adults; 5) lateral pattern dominated by thin vertical bars, with only eight whole bars developed (whole bar No. 4 appears as a halfbar, see Fig. 1a); 6)

no black or dark gray breeding colors on anterior portion of body.

Percina jenkinsi is separable from all the other logperches in the Gulf of Mexico drainages by its lack of a red, orange, or yellow band in the first dorsal fin. This character also distinguishes it from *P. burtoni, carbonaria, caprodes fulvitaenia,* and *rex. Percina macrolepida* has larger scales and is scaled on the top of the head and on much of the breast. *Percina jenkinsi* is most similar to *P. caprodes*; it is separated from *caprodes semifasciata* by having a completely scaled nape, a well-developed prepectoral blotch, and eight whole lateral bars developed into side blotches, and from the subspecies *caprodes* by the latter two characters. In addition, the lateral pattern on the dorsolateral portion of the body of *P. jenkinsi* is often very irregular, with breaks or anastomosed portions in the whole and half bars. This irregular lateral pattern, the lack of the colored band in the first dorsal fin, and only eight well-developed whole bars distinguishes *jenkinsi* from its sympatric congener, the Mobile logperch (*Percina* "B"), an undescribed *carbonaria-fulvitaenia* morph (Fig. 1b), and two other undescribed red-banded Gulf Coast logperches (species "C" and "D").

Percina jenkinsi is also distinguishable from all other logperches by the position of the first whole bar below the second dorsal fin (6th whole bar from the head) relative to the fin rays aligned with the bar. In all *P. jenkinsi* examined to date, this bar (whole bar No. 3) is between ray 7 and 8. In *P. caprodes* this bar (whole bar No. 4) is between ray 5 and 6 (60%) or band 7 (40%). In the Mobile logperch the bars are wider and often span three rays; still this whole bar (No. 4) positioned between rays 5, 6 and 7 (25%) or 6, 7 and 8 (75%). Also, in the Mobile logperch, the edge of the bar often does not start directly under a particular ray. In the narrow-barred Gulf logperch (species "C") the bar is usually between rays 6 and 7.

Description.—Percina jenkinsi is a medium-sized logperch (maximum size 116 mm SL), somewhat more terete than many of the larger members of the subgenus such as *P. burtoni, P. carbonaria,* and *Percina* "B". Frequency distributions of fin-ray and scale counts are given in Table 1 through 5. *Percina jenkinsi* has high meristic counts overall, that include some of the maximum values known for the genus *Percina (e.g.,* vertebral count = 47, see Bailey and Gosline, 1955; Thompson, 1977; Page, 1983). Proportional measurements for adult male and female *P. jenkinsi* are presented in Table 6. Branchiostegal membranes are separate. The broad frenum as part of the conical characteristic "logperch snout" is present. The cephalic sensory canal system is typical for the genus *Percina* (Page, 1977 and 1983; Thompson, 1977): a single coronal pore, supratemporal canal with three

pores, supraorbital canal with four pores, infraorbital canal with eight pores, and preoperculomandibular canal with ten pores. All canals are uninterrupted.

Dorsal spines usually number 16 or 17, dorsal rays 15 or 16 (modally 15). The dorsal fin usually has more spines than rays, in contrast to *P. caprodes* (Fig. 3a) which usually has more rays than spines. Although the overlap in counts is greater (Fig. 3b), the pattern is the same between *P. jenkinsi* and the Mobile logperch (*P.* "B"). The anal fin has two spines and usually 10 or 11 rays. The pectoral fin has either 14 or 15 rays, and a total ray count of 28-30 rays. Total vertebrae ($N = 23$) number 45-47 (modally 45, $\bar{X} = 45.4$).

Breeding tubercles are well developed in males, absent in females. The following description of tubercle pattern is based on four adult males (UT 91.1176, 91.1545; UG 1394) collected in April. The tubercles appear as elevated whitish crescents covering much of the exposed portion of the scales. Along the lower side and belly region there are tubercles on about 4-14 scale rows on each side of the midventral row of modified scutes; along each side of the anal fin there are 4-6 scale rows covered with tubercles; at maximum development in the caudal peduncle region, there are about 6 rows up from the ventral midline of the peduncle that are covered with tubercles. The tubercles in this region extend posteriorly to the caudal base.

Heavy ridges of epidermal thickening on fins, similar to tubercles (Wiley and Collette, 1970; Denoncourt, 1976; Thompson, 1977) are well developed in breeding male *P. jenkinsi*. These ridges form on both spines and on all branches of the rays of the anal fin. They form on several of the lowermost caudal rays. The epidermal thickenings form prominent ridges on all branches on the lower side of the pelvic rays. On the pectoral fin they are present on the proximal portion of the four ventral rays, but do not extend onto the distal branched sections.

The nape, cheek, and opercle are completely scaled. The scales on the opercle and cheek are usually embedded, while those on the nape are exposed. The breast is naked except for the enlarged modified interpelvic scutes. The "interpelvic bridge" discussed by Page (1974, 1976) as characteristic of the subgenus *Percina* is not developed in *P. jenkinsi*. The modified midventral row(s) of scutes is very well developed in male *P. jenkinsi*; males at maximum reproductive development possess 36-43 scutes. Often this row becomes 2 or 3 scutes wide posteriorly. The greatly enlarged ctenii on these scutes are angled away from the body (see Fig. 3 in Page, 1977) and are darkly pigmented.

Percina jenkinsi is a small-scaled species. The lateral line is straight and

complete, with usually 90 or more scales. There are normally no pored scales extending onto the caudal fin. Transverse counts are also high: anal fin to spinous dorsal 33-38, second dorsal to anal fin usually 25-30, and above the lateral line usually 12-14. The diagonal sum (see Materials and Methods) is usually 74-82. The total caudal peduncle count is normally 33-37.

Color.—The body pattern of *P. jenkinsi* consists of numerous narrow vertical bars. These are dark brown set against the yellow-tan of the upper half of the body. The lower portion of most of the body is a light cream-white color, devoid of melanophores. There are eight whole body bars that are slightly expanded into blotches just below the lateral line. The last three blotches are circular, but the more anterior ones are vertically elongated and appear as dark, wider sections of the whole bars. Between the whole bars are shorter half and quarter bars. The half bars are very thin with little evidence of being widened into lateral blotches. The quarter bars are also very narrow. There is a tendency for the half and quarter bars to become broken into dashes and irregular markings. In several specimens adjacent whole, half, and quarter bars anastomose to form "V" and "Y" shaped bars. In these specimens only the whole bars remain intact. Anterior to the spinous dorsal fin there are usually five narrow bars crossing the midline, one being whole bar number eight. On most adults there is a well-developed prepectoral blotch near the upper edge of the pectoral fin; this blotch is also developed in some juveniles. The head pigment is dominated by a well-developed subocular bar and a series of irregular markings on the cheeks and opercles. The latter is a distinctive feature of *P. jenkinsi*. The upper portion of the head is dark tan with the remainder of the head light cream colored. *Percina jenkinsi* does not develop secondary blackening on the head and anterior body like that found in breeding *P. carbonaria* and certain other logperches.

The spinous dorsal fin in *P. jenkinsi* lacks a red or orange band. There is a narrow, light grey marginal band that is slightly wider at the posterior section of the fin. Proximal to this band is a clear band running the entire fin (this band should not be confused with a clear or milky band that results from the fading of the red or orange in certain species of logperch). The basal half of the fin has a light charcoal wash on the interspinous membranes. On each dorsal spine is a series of 3 or 4 black dashes spaced apart on the spine. The same pattern of a series of dashes is the main pattern on the rays of the second dorsal fin. Similar to that found along the edge of the first dorsal, there is a narrow light grey border on the second dorsal fin. The anal fin is generally white or translucent, but on some larger specimens there is a slight melanophore development on some rays. The pelvic fin has a very

light grey wash on some of the larger specimens, but most often it is nearly clear. The pectoral fin also has some development of dashes on the rays that form arcs of pigment across the fin. This type of pigment pattern forms three prominent bands across the caudal fin. The base of this fin has a large spot in line with the rounded lateral blotches.

Overall, except for occasional light yellow flecks and a slightly yellowish background fin pigment, there are no chromatic colors on *P. jenkinsi*.

Distribution.—At present, *Percina jenkinsi* is known from an 18.5 km - long section of the Conasauga River in northern Georgia and extreme southeastern Tennessee (Fig. 2). Based on sight records (Freeman, 1983), the range may extend upstream an additional 2.2 km. Examination of hundreds of specimens of logperches from other areas of the Coosa River system has failed to reveal any specimens identifiable as this species. Also, being confined to the main channel, *P. jenkinsi* has not been found in any of the tributary collections from this area.

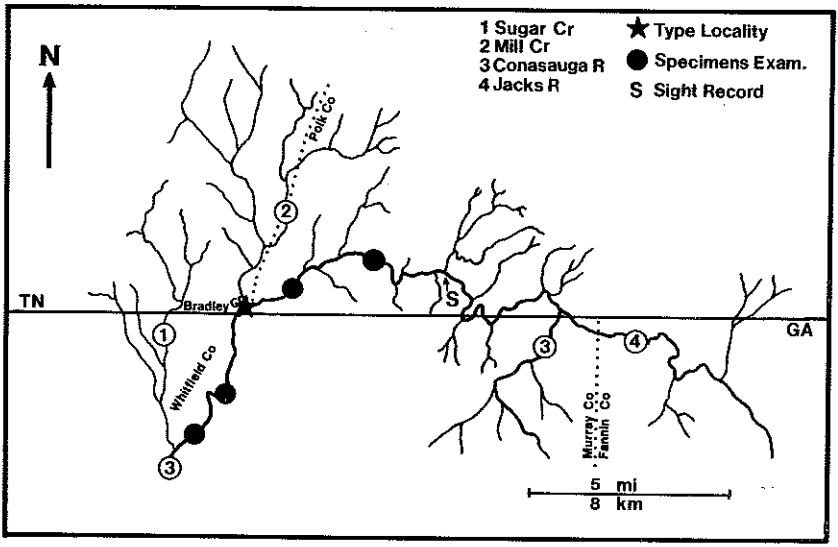

FIGURE 2. Distribution of *Percina jenkinsi* in northern Georgia and southeastern Tennessee.

Present records of *P. jenkinsi* range from 215 to 230 m above sea level. Average stream gradient for this area is 0.82 m/km. The Conasauga River above the known distribution area cuts through several ridges of higher elevation (to over 455 m above sea level) and has a steeper gradient. The

lower reaches of the Conasauga River downstream from the present known distribution become more meandering with a lower (0.2 m/km) gradient.

Examination of ichthyological collections was done to find evidence of a wider historical distribution of *P. jenkinsi*, similar to that of *Percina antesella* (Williams and Etnier, 1977) or *Etheostoma trisella* (Freeman, 1983), once thought to have parochial distributions. This search indicated that *P. jenkinsi* was first collected around 1969 with no evidence of a wider range. Apparently no collections were made before 1969 in this small section of the Conasauga River; thus this species remained uncollected. All other logperches in the Coosa system above the Fall Line are referable to the undescribed species currently called the Mobile logperch (*Percina* "B").

Ecology and Habitat.—Most adult *Percina jenkinsi* have been taken in deep chutes and flowing pool areas over clean, mixed gravel-and-rubble bottom. Snorkle observations at the type locality showed that *P. jenkinsi* concentrated in the deeper, faster portions of chutes and runs, while the second species of logperch present in this section of the Conasauga, *Percina* "B", tended to be more common in the shallower, slightly slower flowing habitats. There have been several observations, however, noting the two species adjacent to each other, so there is some overlap in the two logperches' habitat requirements. As noted by Starnes and Etnier (1980), *P. jenkinsi*, like most logperches studied, flip rocks over with their peculiar snout and consume the aquatic invertebrates found. The habitat and feeding behavior of this species could be severely impaired by any activity that would decrease water flow and/or increase siltation, which would bury the preferred type of habitat, smother their prey, and disrupt their feeding.

Additional study is needed to determine if there is a seasonal change in habitats similar to that found in a number of *Percina*, where the species moves from the faster portions of the chutes and runs occupied in spring and summer to deeper, slower pools during fall and winter.

Spawning most likely occurs during April, since highly tuberculate males have been taken during this time period in 1976, 1978, and 1981. No other reproductive information is presently known.

Origin.—This species appears to have been derived from *Percina c. caprodes*, theoretically from ancestral stock captured from the Tennessee River system. The two species share features that are not present in other syntopic logperches, namely a lack of a red or orange band in the first dorsal fin and thin lateral barring on the side of the body. Numerous reports have discussed the geology and stream capture patterns that could transfer logperch stock from the Tennessee system (Hayes, 1899; Hayes and Camp-

bell, 1894 and others). Ross (1971) summarized the historical studies providing biological support for such a theory and concluded "that the geological and biological evidences in favor of major drainage exchanges between the Tennessee and Gulf rivers in northern Georgia and Alabama are much stronger than arguments against such interchanges." Starnes and Etnier (MS) argue strongly against any recent major connections between the Tennessee and Mobile drainages. Nevertheless, in a small localized area, a logical choice in this instance would be a transfer of a population of *P. c. caprodes* from the Hiwassee to the section of upper Coosa system now known as the Conasauga River. The presence of the Mobile logperch, already occupying the entire upper Coosa system, would have prevented this form from expanding its range and thus confined the surviving species to a very small section of the Conasauga River.

An alternative hypothesis for the origin of this form is hybridization between the more common form of logperch in the Conasauga River, the Mobile logperch, and some other species of darter, presumably a *Percina*. It is well documented (Schwartz, 1972 and 1981) that *Percina caprodes* has naturally hybridized with members of both *Percina* and *Etheostoma*. Moenkhaus (1903) described a new logperch, *Hadropterus evermanni*, now considered a hybrid between *P. caprodes* and *P. maculata* (Collette and Knapp, 1966). Information from previous studies (Stiles and Etnier, 1971; Dahlberg and Scott, 1971; Bryant et al., 1979) shows that eight species of the genus *Percina* are present in the Conasauga River, but examination of pigment patterns, meristics, and morphometrics of these species leads to the rejection of the hypothesis of any being the second parent for a hybrid cross with the Mobile logperch.

Population Levels and Status.—There is too little information at the present time to make a population estimate, but field observations by the author and others (Starnes and Etnier, 1980) suggest rather low densities. Based on these observations and the relative number of museum specimens, *P. jenkinsi* appears to be roughly half as abundant as the Mobile logperch, the other logperch species syntopic in this section of the Conasauga River.

Percina jenkinsi has been classified as threatened by the Tennessee Wildlife Resources Agency and Tennessee Heritage Program, but until recently it has had no federal status (Starnes and Etnier, 1980). Georgia has not listed the species at the present time. It has been recently proposed that *Percina jenkinsi* be classified as an endangered species by the U.S. Fish and Wildlife Service's Office of Endangered Species (Biggins, 1984). The main factor influencing this classification is its restricted distribution in the Conasauga

River. As noted previously, *P. jenkinsi* is known from only an 18-km stretch of river. Biologically, this distributional area probably encompasses a single population and thus is vulnerable to environmental perturbations. As noted in the section on ecology, this species, perhaps on a seasonal basis, prefers deeper, faster chutes and runs. There is no evidence at present that this species can tolerate reservoir or lake conditions like certain other members of the subgenus (Trautman, 1957). Thus, management of *P. jenkinsi* should include measures to protect the fast-flowing chutes and runs that are critical habitat for this species. The section of the Conasauga River occupied by *P. jenkinsi* has clean rubble-and-gravel substrates with little silt. Management of the species should incorporate preventative measures to avoid excess siltation.

There is a growing awareness of many unsolved systematic and ecological problems concerning logperches. Recognition of all forms will not be complete in the near future so a provisional key to the forms presently recognized by the author is given to assist workers in specimen identification.

Provisional Key to the Logperches, subgenus *Percina*

1a. No distinct red or orange band in first dorsal 2
b. Red or orange band[2] (in life) in first dorsal 5
2a. Nape fully scaled 3
b. Nape generally 25% to 100% naked. Upper Mississippi, Great Lakes, Hudson Bay, and Central Atlantic drainages.

P. caprodes semifasciata, Northern Logperch

3a. No scales on head or breast 4
b. Breast and head with scales: breast from 50% to 100% scaled; top of occipital section of head with 6 to 30 scales, with often a row of scales on top of head between eyes. Calcasieu River to Rio Grande along western Gulf of Mexico, Red River in Oklahoma and Texas, introduced into California.

P. macrolepida, Bigscale Logperch

4a. Nine whole body bars with expanded lateral blotches on or below lateral line, four whole bars posterior to origin of second dorsal fin;

[2]This character can be confusing from preserved specimens and should be verified from fresh material. Small juveniles may have a light orange or yellow band that can easily be overlooked

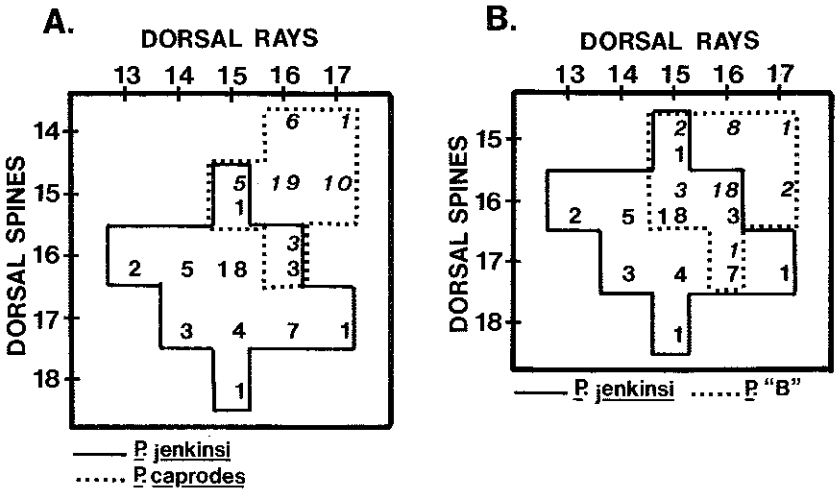

FIGURE 3. Distribution polygons of dorsal fin elements: A. Comparison of *Percina caprodes* (upper numbers) and *P. jenkinsi* (lower numbers); B. Comparison of *P.* "B" (upper numbers) and *P. jenkinsi* (lower numbers).

scales intermediate in size: lateral line usually with less than 90 scales, diagonal sum 69 or less, caudal peduncle with 32 or fewer scales; dorsal fin usually with more rays than spines (see Fig. 3a), often XV-16 or XV-17. Ohio River basin, White River drainage in Arkansas and Missouri, Red River drainage in Oklahoma, Arkansas and Louisiana, Atchafalaya River in Louisiana.

P. caprodes caprodes, Logperch

b. Eight whole body bars with expanded lateral blotches on or below lateral line, three whole bars posterior to origin of second dorsal fin; scales small: lateral line with more than 90 scales, diagonal sum 70 or more, caudal peduncle with 32 or more scales; dorsal fin usually with more spines than rays (see Fig. 3), often XVI-14 or 15 and XVII-15 or 16. Conasauga River in Tennessee and Georgia.

P. jenkinsi, Conasauga Logperch

5a. Lateral pattern dominated by oval or rectangular blotches; whole and half bars seldom developed in adults; little vertical barring 6

b. Lateral pattern dominated by vertical bars, with whole, half, and sometimes quarter bars present 7

6a. Color band in spinous dorsal fin mainly at margin of fin; nape usually 10-50% scaled; scales small, diagonal sum 72 or more; no spots or blotch at base of pectoral fin. Confined to Tennessee and Cumberland River drainages.

P. burtoni, Blotchside Logperch

b. Color band in spinous dorsal fin distinctly submarginal, proximal to a complete black margin; nape 80-100% scaled; scales larger, diagonal sum 68 or less; spots or blotch present at base of pectoral fin. Confined to Roanoke River system in Virginia.

P. rex, Roanoke Logperch

7a. Bars on body generally wide, predominantly whole and half bars; wide red/orange band on first dorsal fin 8

b. Bars on body generally narrow, half and quarter bars often very well developed; narrow red/orange band on first dorsal fin 10

8a. Scales large, diagonal sum usually 50-65; lateral line scales usually less than 90. Found in Mississippi and Gulf Coast drainages west of the Mississippi River 9

b. Scales small, diagonal sum 69-85, usually over 70; lateral line scales 87-102, usually over 90. Confined to Mobile Bay system in Alabama, Georgia, Mississippi, and Tennessee.

P. "B", Mobile Logperch

9a. Breeding males with breast, pelvic fins, and anal fin dark black, secondary darkening on head and soft dorsal fin. Confined to Texas Gulf Coast drainages on Edwards Plateau.

P. carbonaria, Texas Logperch

b. Breeding males with breast, pelvic fins, and anal fin not dark black; little secondary darkening on head and soft dorsal fin. Arkansas and Missouri River drainages in Arkansas, Kansas, Missouri, and Oklahoma, also in portions of Red River in Oklahoma.

P. caprodes fulvitaenia, Ozark Logperch

10a. Scales large, diagonal sum 47 to 57 ($\bar{X} = 51$); lateral line scales 88 or less ($\bar{X} = 84$); total pectoral rays usually 28 or less; total dorsal

elements 31 or less. Below Fall Line along Gulf Coast from Lake Pontchartrain to Mobile Bay drainage.

P. "C", Gulf Logperch

b. Scales smaller, diagonal sum 59 to 72 ($\bar{X}$ = 64); lateral line scales 88 or more ($\bar{X}$ = 91), total pectoral rays usually 29 or more; total dorsal elements 31 or more. Confined to Escambia and Choctawhatchee River drainages in Alabama and Florida.

P. "D", Florida Logperch

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Table 1. FREQUENCY DISTRIBUTIONS OF FIN COUNTS for *Percina jenkinsi*, *P. c. caprodes* and *P.* "B" (Mobile logperch).

DORSAL SPINES									
Species and Drainage	**14**	**15**	**16**	**17**	**18**	**N**	**$\bar{X}$**	**SD**	**CV**
P. jenkinsi		1	28	15	1	45	16.36	0.57	3.5
P. c. caprodes									
Tennessee R.	5	19	1			25	14.84	0.47	3.2
White R.	2	15	2			19	15.00	0.47	3.1
P. "B"		26	30	1		57	15.56	0.54	3.4

DORSAL RAYS									
Species and Drainage	**13**	**14**	**15**	**16**	**17**	**N**	**$\bar{X}$**	**SD**	**CV**
P. jenkinsi	2	8	24	10	1	45	15.00	0.84	5.6
P. c. caprodes									
Tennessee R.			4	17	4	25	16.00	0.58	3.6
White R.			1	11	7	19	16.32	0.58	3.6
P. "B"			14	39	4	57	15.82	0.54	3.4

TOTAL DORSAL ELEMENTS										
Species and Drainage	**29**	**30**	**31**	**32**	**33**	**34**	**N**	**$\bar{X}$**	**SD**	**CV**
P. jenkinsi	2	6	21	7	8	1	45	31.36	1.13	3.6
P. c. caprodes										
Tennessee R.		9	11	5			25	30.84	0.75	2.4
White R.		2	9	8			19	30.95	0.40	1.3
P. "B"		8	22	24	3		57	31.39	0.80	2.5

TOTAL ANAL RAYS									
Species and Drainage	**9**	**10**	**11**	**12**	**13**	**N**	**$\bar{X}$**	**SD**	**CV**
P. jenkinsi	1	12	28	4		45	10.78	0.64	5.9
P. c. caprodes									
Tennessee R.		12	13			25	10.52	0.51	4.8
White R.		7	12			19	10.63	0.50	4.7
P. "B"		5	40	10	1	56	11.13	0.57	5.2

(Table 1. - Continued)

Species and Drainage	TOTAL PECTORAL RAYS 27	28	29	30	31	N	$\bar{X}$	SD	CV
P. jenkinsi		20	6	19		45	28.97	0.94	3.2
P. c. caprodes									
Tennessee R.		6	6	13		25	29.28	0.84	2.9
White R.			5	12	2	19	29.84	0.60	2.0
P. "B"	1	16	11	28		56	29.18	0.92	3.1

Table 2. FREQUENCY DISTRIBUTIONS OF PORED LATERAL LINE SCALES for *Percina jenkinsi, P. c. caprodes* and *P.* "B" (Mobile logperch).

Species and Drainage	NUMBER OF SCALES 82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	100	N	$\bar{X}$	SD	CV
P. jenkinsi						1	1	5	4	7	7	8	4	3	2	3		45	92.20	9.61	10.4
P. c. caprodes																					
Tennessee R.	1	—	4	5	5	4	3	1	2									25	86.16	1.97	2.3
White R.					2	3	3	5	3	1	1	1						19	88.84	1.91	2.1
P. "B"						1	2	—	14	14	9	5	3	2	1	1	2	57	91.61	2.54	2.7

Table 3. FREQUENCY DISTRIBUTIONS OF DIAGONAL (TRANSVERSE) SCALE COUNTS for *Percina jenkinsi*, *P. c. caprodes* and *P.* "B" (Mobile logperch).

ANAL FIN TO SPINOUS DORSAL																			
Species and Drainage	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**N**	**$\bar{X}$**	**SD**	**CV**
P. jenkinsi								1	2	4	14	9	11	4		45	35.71	1.40	3.9
P. c. caprodes																			
Tennessee R.	3	3	7	7	5											25	27.32	1.33	4.7
White R.			2	2	6	2	4	2	—	1						19	29.79	1.81	6.1
P. "B"							2	5	8	10	17	5	5	1	1	54	34.50	1.71	5.0

SECOND DORSAL TO ANAL FIN																			
Species and Drainage	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**				**N**	**$\bar{X}$**	**SD**	**CV**
P. jenkinsi					1	4	9	14	10	5	1	1				45	28.16	1.41	5.0
P. c. caprodes																			
Tennessee R.	4	18	3													25	21.96	0.54	2.4
White R.		2	2	7	6	2										19	24.21	1.12	4.7
P. "B"				1	4	5	13	17	9	2	1	1				54	27.57	1.64	5.8

ABOVE LATERAL LINE																			
Species and Drainage	**9**	**10**	**11**	**12**	**13**	**14**	**15**									**N**	**$\bar{X}$**	**SD**	**CV**
P. jenkinsi			3	10	22	9	1									45	12.89	0.88	6.8
P. c. caprodes																			
Tennessee R.	11	14														25	9.56	0.51	5.3
White R.		4	9	6												19	11.11	0.73	6.6
P. "B"				16	22	10	6									54	13.11	0.96	7.3

Table 4. FREQUENCY DISTRIBUTIONS OF "DIAGONAL SUM" for *Percina jenkinsi*, *P. c. caprodes* and *P.* "B" (Mobile logperch).

	NUMBER OF SCALES																				
Species and Drainage				**69**	**70**	**71**	**72**	**73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**	**81**	**82**	**N**	**$\bar{X}$**	**SD**	**CV**
P. jenkinsi				1	1	1	—	—	4	4	11	5	5	5	6	2		45	76.76	2.77	3.5
P. "B"				3	3	2	4	4	7	4	4	9	6	2	4	—	2	54	75.25	3.36	4.4

	NUMBER OF SCALES																				
Species and Drainage	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**N**	**$\bar{X}$**	**SD**	**CV**
P. c. caprodes																					
Tennessee R.	1	—	4	7	4	4	4	1										25	56.76	10.91	1.9
White R.						1	1	2	3	—	3	3	2	2	1	—	1	19	65.11	2.90	4.5

Table 5. FREQUENCY DISTRIBUTIONS OF CAUDAL PEDUNCLE CIRCUMFERENTIAL SCALE COUNTS for *Percina jenkinsi*, *P. c. caprodes* and *P.* "B" (Mobile logperch).

ABOVE LATERAL LINE												
Species and Drainage	**13**	**14**	**15**	**16**	**17**				**N**	**$\bar{X}$**	**SD**	**CV**
P. jenkinsi		2	13	26	4				45	15.71	0.69	4.4
P. c. caprodes												
Tennessee R.	2	22	1						25	13.96	0.53	2.5
White R.	4	10	4						18	14.00	0.69	4.9
P. "B"			23	27	3				53	15.62	0.60	3.8
BELOW LATERAL LINE												
Species and Drainage	**14**	**15**	**16**	**17**	**18**				**N**	**$\bar{X}$**	**SD**	**CV**
P. jenkinsi			7	19	19				45	17.27	0.72	4.2
P. c. caprodes												
Tennessee R.	1	14	10						25	15.36	0.57	3.7
White R.		5	11	2					18	15.83	0.62	3.9
P. "B"		2	14	33	4				53	16.74	0.65	3.9
TOTAL SCALES												
Species and Drainage	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**N**	**$\bar{X}$**	**SD**	**CV**
P. jenkinsi			2	4	8	14	13	4	45	34.98	1.31	3.7
P. c. caprodes												
Tennessee R.	2	13	9	1					25	31.36	0.70	2.2
White R.	2	5	6	4	1				18	31.83	1.10	3.4
P. "B"			3	10	13	22	3	2	53	34.34	1.14	3.3

Table 6. PROPORTIONAL MEASUREMENTS of *Percina jenkinsi*.

Measurements	Holotype	Males (5)		Females (5)	
		$\bar{X}$	Range	$\bar{X}$	Range
Standard length (mm)	113.3		111.6-108.1		116.0-99.7
1. Thousandths of SL					
head length (HL)	271	259	243-278	256	251-265
snout length	104	93	89-96	93	89-99
eye diameter	42	46	45-46	45	41-48
upper jaw length	84	73	67-79	75	68-80
post-orbit HL	129	126	110-139	119	114-124
snout-D_1 origin	329	318	304-329	315	304-323
body depth	156	157	144-165	149	140-161
body width	131	124	118-128	133	128-139
caudal peduncle depth	77	78	75-83	76	75-78
caudal peduncle length	215	211	202-217	207	200-213
D_1 base	310	310	289-322	307	293-320
D_2 base	204	206	198-216	205	197-220
P_1 length	203	203	200-210	184	179-195
P_2 length	176	182	165-189	169	160-181
2. Thousandths of HL					
snout length	384	359	343-367	362	346-375
eye diameter	156	178	167-187	175	153-188
upper jaw length	309	283	275-294	293	265-307
post-orbit HL	476	485	453-500	465	447-481

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