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SYSTEMATIC REVISION AND DESCRIPTION OF NEW
SPECIES OF SUCKERMOUTH CATFISHES
(*CHILOGLANIS*, MOCHOKIDAE)
FROM CAMEROUN

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ABSTRACT: Ten species of *Chiloglanis* occur in Cameroun: *C. batesii* Boulenger, 1904 (all or almost all river basins); *C. benuensis* Daget and Stauch, 1963 (Niger); *C. cameronensis* Boulenger, 1904 (Lokunje, Kribi, Kienke, Ntem); *C. disneyi* Trewavas, 1974 (Mungo and Cross); *C. harbinger* new species (Lokunje); *C. niger* new species (Niger); *C. polypogon* new species (Cross); *C. reticulatus* new species (Congo); *C. sanagaensis* new species (Sanaga); and *C. voltae* Daget and Stauch, 1963 (Niger).

Chiloglanis disneyi, *C. harbinger*, *C. niger*, *C. polypogon*, and *C. sanagaensis* are known only from Cameroun; *C. benuensis* occurs in the River Benue in Cameroun and Nigeria. *Chiloglanis reticulatus* also occurs in the Congo basin in northwestern Zaire. *Chiloglanis batesii* (including its synonym *C. micropogon* Poll, 1952) occurs in suitable habitats throughout the Niger and Congo basins, and is the only species of *Chiloglanis* known from the Chad basin. *Chiloglanis cameronensis* is the only species known in the Ogooué basin (Gabon). *Chiloglanis voltae* is also known from the Benue in Nigeria and the Volta basin (Ghana and Burkina Faso).

In all of the major river systems of Cameroun two or even three species of *Chiloglanis* occur sympatrically. Sympatric species usually differ strongly in sucker morphology, number and length of barbels, dentition, coloration, adult size, and other characteristics. Secondary sexual dimorphism is marked in some species, apparently absent in others.

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INTRODUCTION

Chiloglanis belongs to the endemic African catfish family Mochokidae. Adults range in size from about 18 to 100 mm standard length. The sucker or oral disc is formed by the enlarged upper and lower lips. The maxillary barbels lie free at the sides of the upper lip but the mandibular or mental (chin) barbels are largely incorporated into the lower lip.

A total of 34 species of *Chiloglanis* has been recognized, of which six have been reported from Cameroun: *C. batesii* Boulenger, 1904; *C. ben-*

uensis Daget and Stauch, 1963; *C. cameronensis* Boulenger, 1904; *C. disneyi* Trewavas, 1974; *C. micropogon* Poll, 1952; and *C. voltae* Daget and Stauch, 1963. For a review of the literature on species of *Chiloglanis* and their distribution see Daget et al. (1986). Two recent papers have dealt with *Chiloglanis* from parts of Cameroun: the Camerounian portion of the Benue (Niger basin) by Daget and Stauch (1963), and the Mungo and Meme, small coastal streams in western Cameroun, by Trewavas (1974). The results of these studies and my interpretations of them are incorporated in the present paper.

Most species of *Chiloglanis* are represented in museum collections by only a few specimens, often in poor condition. In 1980 I travelled extensively in Cameroun, collecting in the Niger, Ndian, Cross, Sanaga, and Congo basins. Additional collections were made in Cameroun in 1987–88. Specimens of *Chiloglanis* were collected readily with a nylon flyscreen pushnet in rocky substrate, gravel bars, and sand riffles. This resulted in discovery of four undescribed species. An additional new species, from the Lokunje basin, was discovered in the fish collection of the California Academy of Sciences. I visited the Lokunje in December 1987 but was unable to collect additional specimens. Five of the six species previously reported from Cameroun are recognized as valid. After study of over 40 lots and nearly 2,000 specimens referable to *C. batesii* and *C. micropogon*, including type specimens, I regard *C. micropogon* as a junior synonym of *C. batesii*. *Chiloglanis batesii* is perhaps the most widely distributed species of *Chiloglanis*. It occurs in suitable habitat in all or almost all river basins of Cameroun, throughout the Niger and Zaire basins, and is the only species of the genus in the Chad basin; it is absent west of the Niger basin. *Chiloglanis disneyi*, hitherto known only from the Mungo, is reported from the Cross basin. The new species described from Cameroun are: *C. niger* (Niger basin); *C. poly-pogon* (Cross); *C. sanagaensis* (Sanaga); *C. harbinger* (Lokunje); and *C. reticulatus* (Congo). The first four are known only from Cameroun. The fifth is also present in the Congo basin in Zaire.

Little is known about the biology of *Chiloglanis* or of any other mochokids. At least some species of *Chiloglanis* have surprisingly large eggs. Ovarian eggs of 1.7 and 1.9 mm were reported in *C. batesii* of 28 and 35.5 mm, respectively, by Trewavas (1974:363). A 37.2 mm specimen from Kivu has ovarian eggs of 2.0 mm. The total number of eggs in this specimen is at least a dozen, but no more than 20 (all but one or two have been left in situ). The holotype of *C. reticulatus* is a gravid female with about 40 eggs to 1.8 mm. In *C. batesii* and in *C. reticulatus*, ripe ovaries contain several size classes of eggs. Sexually mature males of all species have lobate testes, which in very ripe individuals may cause abdominal expansion comparable to that caused by enlarged ovaries of gravid females. In several species males have an elongate genital papilla, the functional

significance of which is unknown. Males of a few species have the humeral process of the pectoral girdle greatly enlarged, but the significance of this is also unknown. *Chiloglanis* feed mainly on insects and attached algae. The species differ strikingly in dentition and other morphological features related to feeding, but these differences have not been correlated with particular foods.

STUDY MATERIAL

Material examined is deposited in the following institutions (standard symbolic codes from Leviton et al. 1985): BMNH, British Museum of Natural History; CAS and CAS-SU, California Academy of Sciences; FMNH, Field Museum of Natural History (Chicago); MCZ, Museum of Comparative Zoology; MHNG, Muséum d'Histoire Naturelle, Genève; MNHN, Muséum National d'Histoire Naturelle; MRAC, Musée Royal de l'Afrique Centrale (Tervuren); UMMZ, Museum of Zoology, University of Michigan; and USNM, Smithsonian Institution.

Camerounian and non-Camerounian material of species of *Chiloglanis* found in Cameroun is listed in the systematic account of each species.

The abbreviation "R.", always placed in front of the proper name, stands for River, rivière, Río (Spanish), and rio (Portuguese). I have adopted this practice when writing on African freshwater fishes because the same river is often shared by two or more English-, French-, Spanish-, or Portuguese-speaking countries; authors in French usually refer to any river, regardless of what country it is in, as "rivière," while authors in English use "River"; and although in English the word "River" may precede or succeed the proper name, in the other languages the word for river always precedes the proper name.

The following comparative material of non-Camerounian species of *Chiloglanis* and of the suckermouthed mochokid genera *Atopochilus* and *Euchilichthys* has been examined:

- Chiloglanis brevibarbis* Boulenger, 1902: MHNG 2000.68-82, 15: 29.3–57.7 mm, Kenya, R. Athi at Kabaa.
Chiloglanis congicus Boulenger, 1920: CAS(SU) 66706, 51.6 mm, Congo basin, probably Stanley Pool; CAS 44887, 2: 58.0–59.5 mm, aquarium specimens; CAS 60812, 60.7 mm, Congo basin, R. Inkisi below Chute de Sanga.
Chiloglanis deckenii Peters, 1868: MHNG 1443.79-83, 5: 25.8–33.4 mm, Kenya, R. Kerio near Tambach.
Chiloglanis neumanni Boulenger, 1911: UMMZ 199975, 199988, and 200183, 19: 19.5–40.8 mm, Zambia, Luapula-Congo basin.

- Chiloglanis niloticus* Boulenger, 1900: MNHN 1907-230, 39.4 mm, R. Nile at Arko, Sudan (syntype).
- Chiloglanis occidentalis* Pellegrin, 1933: UMMZ 182016, 24.0 mm, tributary of R. Senegal; CAS(SU) 62926, 56: 19.9–40.5 mm, Ghana, R. Ankwa; CAS(SU) 62927, 4: 30.7–46.4 mm, Ghana, Opon Valley; CAS(SU) 62928, 56.7 mm, Ghana, R. Ahiri near Wasa Akropong; MCZ 48063, 25.6 mm, Ghana, Pra basin, Twifu Prasu; V. G. F. Smith collection, uncat., 26.4 mm, Nigeria, Niger basin, R. Lere, Jos Plateau; BMNH 1935.5.29:52, 18.8 mm, Nigeria, Niger basin, R. Kaduna.
- Chiloglanis polyodon* Norman, 1932: BMNH 1901.12.26, Sierra Leone, headwaters of R. Bagbwe (holotype).
- Chiloglanis sardinhai* Ladiges and Voelker, 1961: USNM 265443, 5: 28.1–37.1 mm, Angola, Benguela, Caibambo.
- Atopochilus savorgnani* Sauvage, 1878: CAS(SU) 15715, Cameroun, R. Ntem, Nyabessan.
- Atopochilus* sp. undet. a: CAS(SU) 64793, 98.2 mm, Congo basin, Stanley Pool.
- Atopochilus* sp. undet. b: CAS 60815, 31.5 mm, Congo basin, R. Lufu.
- Euchilichthys dybowskii* (Vaillant, 1892): MNHN 1892-81, 34.0 mm, Congo basin, Oubanghi (syntype); MCZ 48356, 5: 40.8–63.2 mm, Congo basin, R. Mbomou at Gozobangui.
- Euchilichthys royauxi* Boulenger, 1902: CAS(SU) 64612, 2: 89.6–175 mm, Congo basin, rapids of lower Congo at Kin-suka.

Characters Useful in Distinguishing Species of *Chiloglanis*

Apart from Trewavas (1974), almost no authors have given adequate discussion or definitions of the characters used to define species of *Chiloglanis*. Some easily observed features of the sucker and dentition have not been utilized, and discussion of variation with age or sex is generally lacking. Observation of previously unobserved or unreported features, such as tubercles and taste buds, is facilitated by scanning electron microscopy. Some useful characters, none previously utilized, can be observed in radiographs.

SUCKER AND BARBELS.—All species of *Chiloglanis* have a well-developed sucker or oral disc (Fig. 1), made of the greatly expanded and united upper and lower lips. The lower lip incorporates much or almost all of the mental (mandibular or chin) barbels. The most obvious differences in the sucker of various species involves the mental barbels. In some species they project considerably from the posterior border of the lower lip, in others they project moderately, and in still others slightly or not at all. Some species have only two prominent mental barbels on each side of the lower lip. These correspond to the primary or primitive pair of mental barbels found in almost all groups of catfishes. In other species there are up to five auxiliary mental barbels on each

side of the lower lip. In most species with auxiliary mental barbels, these occur inside the outer primary mental barbel, but one species (*C. polyogon*) usually has an auxiliary mental barbel external to the outer primary mental barbel. Camerounian species of *Chiloglanis* with mental barbels projecting considerably from the lower lip (i.e., with “large” mental barbels) are *C. benuensis*, *C. polyogon*, *C. reticulatus*, and *C. voltae*. *Chiloglanis reticulatus* and *C. voltae* have only primary mental barbels, while *C. benuensis* and *C. polyogon* have well-developed auxiliary mental barbels. *Chiloglanis voltae* is unique in having very elongate outer mental barbels and very short inner ones. Species with mental barbels projecting very little (“minute” mental barbels) are *C. batesii*, *C. disneyi*, *C. harbinger*, and *C. niger*. *Chiloglanis camerounensis* and *C. sanagaensis* have moderately projecting mental barbels.

Other obvious differences between species involve size and shape of the sucker. In some species it is transversely oval (i.e., broader than long) and relatively (proportionately) small compared to the size of the fish, e.g., in *C. benuensis*, *C. polyogon*, and *C. reticulatus*. In others it is relatively round, e.g., *C. disneyi*, *C. harbinger*, and *C. niger*. The last two species have perhaps the largest suckers of any species of *Chiloglanis*. The papillae on the sucker also differ among species. In *C. benuensis*, *C. polyogon*, and *C. reticulatus* they are especially large, particularly on the median part of the lower lip. In *C. voltae* the papillae are greatly reduced or absent. In *C. sanagaensis* they are extremely numerous, evenly distributed and of nearly the same size over virtually the entire sucker. In all species the two halves of the lower lip are separated distally by a median cleft. In most species the cleft is very deep, so that most of the median papillate area of the lower lip is also cleft, but in *C. niger* the cleft is shallower and the median papillate area undivided. The boundary between upper and lower lips is relatively well defined in some species, e.g., *C. benuensis*, *C. polyogon*, and *C. reticulatus*, but is indistinguishable in others, e.g., *C. niger*. The upper lip of *C. disneyi* extends posteriorly under the lower and is broadly fused to it, but retains a free posterior margin where it has joined the lower lip.

Each half of the lower lip has two medullary cartilages. Difficult to see in some species or spec-

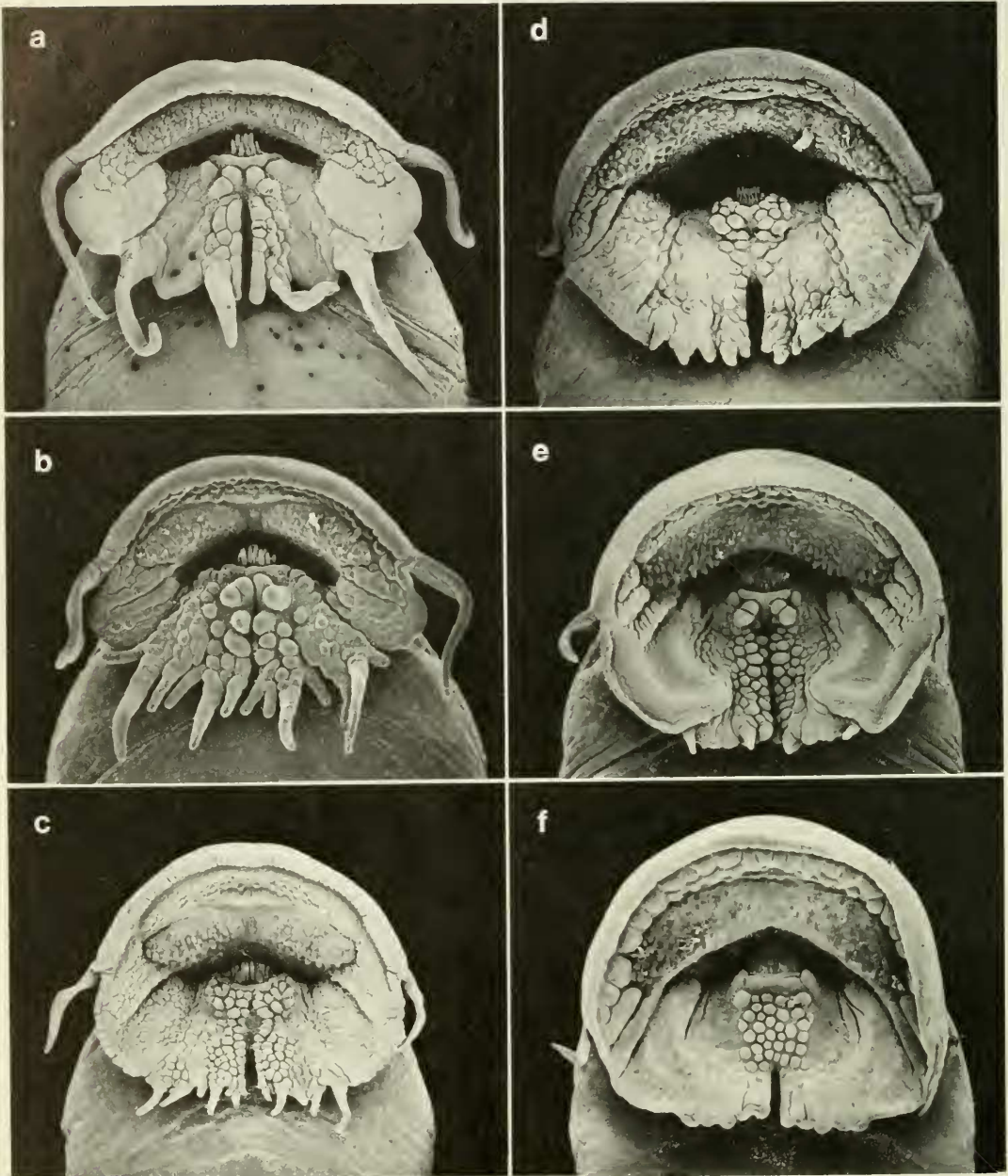


FIGURE 1. Suckers of Camerounian species of *Chiloglanis*. a, *C. reticulatus*, 31.3 mm paratype (Congo basin); b, *C. polypogon*, 25.0 mm paratype (Cross basin); c, *C. sanagaensis*, 28.6 mm paratype (Sanaga basin); d, *C. batesii*, 21.7 mm (Sanaga basin); e, *C. disneyi*, 23.0 mm (Cross basin); f, *C. niger*, 27.8 mm paratype (Niger basin).

imens, in others they are large, naturally reddish or purplish, and readily observed with transmitted light. The distal portion of each medullary cartilage typically is trifurcate; occasionally a cartilage may have four branches (see Trewavas

1974:360-361, fig. 5a). The branches of the medullary cartilages are longest in species with large barbels. In *C. reticulatus* and *C. voltae*, which have no auxiliary mental barbels, the medullary cartilages are nevertheless tri- or quadrifurcate.

The large central branch of each medullary cartilage lies in the middle of a primary mental barbel and extends almost to its tip. The lateral branches, much shorter than the central one, extend along the lateral margins of the portions of the disc projecting posteriorly between the bases of the barbels. In *C. polygona*, in which the portions of the disc between the primary mental barbels are greatly prolonged as auxiliary mental barbels, a lateral branch of the medullary cartilage lies in the center of each auxiliary barbel.

DENTITION.—The dentition of *Chiloglanis*, like that of most mochokids, is highly specialized, and its description has given rise to much confusion. As in *Synodontis*, the mochokid genus with the largest number of species, the teeth are S-shaped. An exception is provided by *C. voltae*, in which the teeth are almost straight. The morphology of the teeth has been described and illustrated for many species of *Synodontis* (Poll 1971), but this has not been done for *Chiloglanis*. The premaxillary (upper jaw) teeth are of two sizes, large and small. The large teeth are arranged in two oval patches, one on each premaxillary, separated by a toothless median gap. The teeth in these patches form somewhat irregular rows that nevertheless can be counted; the number varies from two to eight. Most species have three to five rows, *C. batesii* and *C. disneyi* three or four, *C. harbinger* to seven, *C. niger* to seven or eight; *C. voltae* only two. In addition to the oval patches of large teeth, the upper jaw bears numerous small teeth forming a shallowly V-shaped series across the angle of the upper jaw where the flat external surface bearing the oval patches curves sharply upwards toward the roof of the mouth. Some of these teeth are firmly implanted on the premaxillary bones, while others lie more or less loose in the membrane between the premaxillary bones. The innermost or most posterior row of teeth in this series may be somewhat longer and more slender, forming a row of ciliiform teeth (*sensu* Trewavas 1974:359 et seq.). This tooth row, while it varies in prominence and degree of differentiation from the rest of the small premaxillary teeth, is present in most species of *Chiloglanis*. According to Trewavas (1974:358–359) the disposition of small premaxillary teeth differs in *C. batesii* and *C. micropogon*: “in *C. batesii* the attached and free teeth compose a uniform group, but in *C. micropogon* the median teeth are still smaller and

sections show that the membrane in which they lie forms a minute pouch opening backwards, the teeth at the edge of the pouch forming a transverse series across the midline. Examined with a dissecting microscope, these latter appear as a row of minute ciliiform teeth on a small membranous curtain.” This lengthy quote provides the best account of a peculiar feature of the dentition of *Chiloglanis*, and purportedly as a basis for distinguishing *C. batesii* and *C. micropogon*. My observations suggest that a complete row of ciliiform teeth is characteristic of most species of *Chiloglanis* except *C. voltae*. In many freshly preserved specimens identified by me as *C. batesii*, the ciliiform teeth are highly visible, and the membranous pouch described by Trewavas is fully evident. In other specimens, including some collected by Bates at Efulen (type locality of *C. batesii*), they appear at first glance to be absent. However, in at least some of these specimens the delicate membrane bearing the ciliiform teeth is shrunken and collapsed against the roof of the mouth, so that the teeth no longer project normally downwards. In this connection it may be noted that a small specimen from the R. Lobi in Cameroun, originally identified as *C. batesii* by Boulenger, was re-identified as *C. micropogon* by Trewavas (1974:361), and that part of the type series of *C. batesii* was collected in tributaries of the Lobi. It may also be noted that in another species, *C. breviparbis*, Trewavas (1974:364) reported ciliiform teeth present in only one specimen among several she examined.

The mandibular or lower jaw teeth, arrayed in a relatively small area near the symphysis of the lower jaw in all species of *Chiloglanis* except *C. voltae*, usually comprise an internal row of functional teeth and an external row (rarely two or three external rows) of replacement teeth (Fig. 2). In most species the teeth in the replacement row erupt nearly simultaneously, so that depending upon the stage in the replacement cycle, teeth of the lower jaw are either in only a single row (the functional row) or in two rows (functional and replacement). This simple situation may be complicated when the row of functional teeth has been shed or only partially shed, and only part of the replacement tooth row has moved into functional position. In some species, especially those with numerous teeth such as *C. disneyi*, *C. harbinger*, and *C. niger*, the replacement process tends to be very regular, and it seems

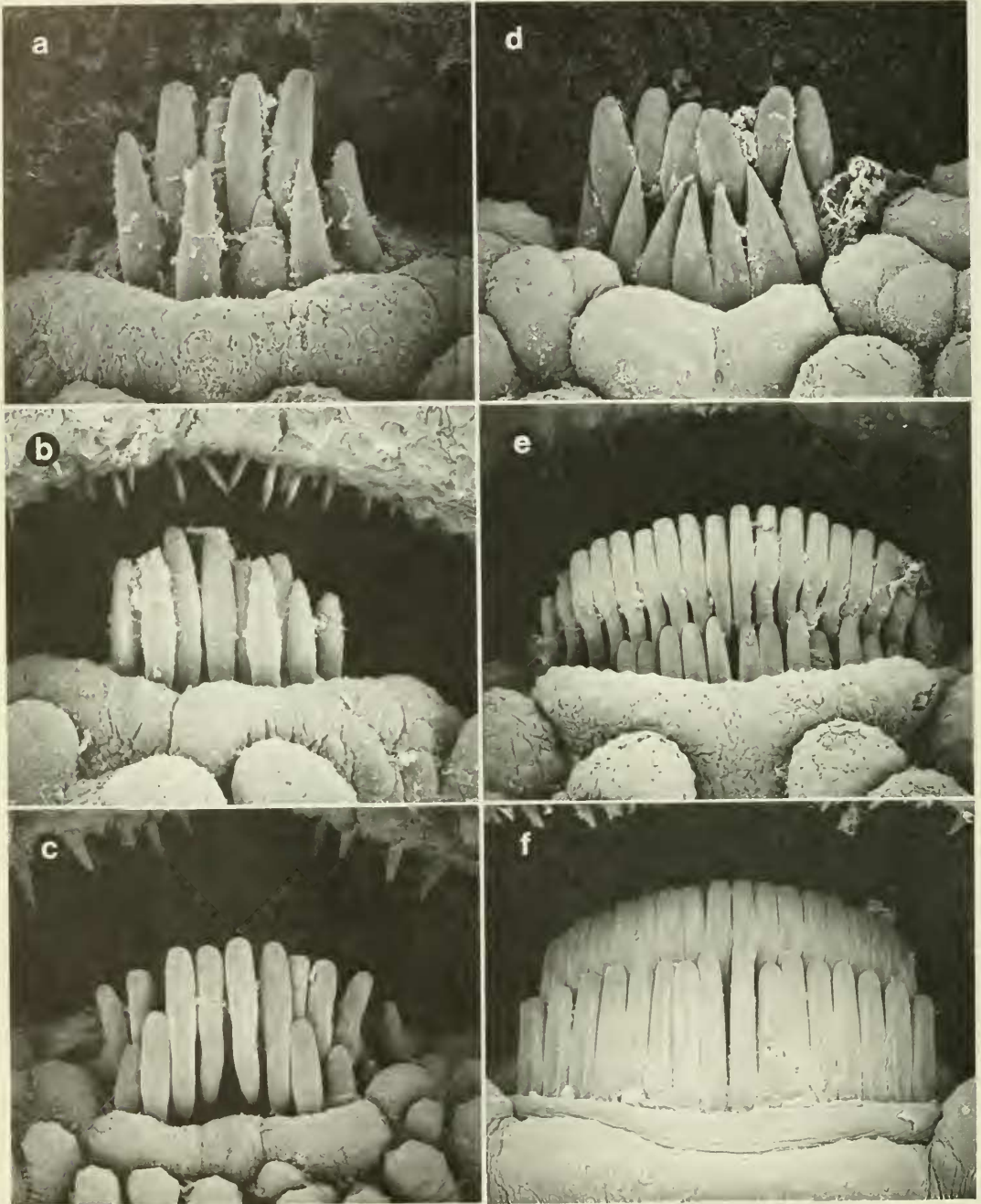


FIGURE 2. Mandibular teeth of Camerounian species of *Chiloglanis*. a, *C. reticulatus*, 31.3 mm paratype; b, *C. polygona*, 25.0 mm paratype; c, *C. sanagaensis*, 28.6 mm paratype; d, *C. batesii*, 21.7 mm; e, *C. disneyi*, 23.0 mm; f, *C. niger*, 27.8 mm paratype.

that an old row of functional teeth is shed nearly simultaneously or as a unit, to be replaced at once by a complete row of replacement teeth. In others, e.g., *C. polygona* and *C. congicus*, it seems that those near the symphysis fall out first, to be

replaced by corresponding teeth from the replacement row before the more lateral functional teeth are shed. The sequence of tooth replacement has not been investigated in detail.

In *Chiloglanis* generally, allowing for individ-

ual variation due to loss or injury of teeth and irregularities in replacement, there are basically two rows of mandibular teeth, an internal functional row and an external replacement row; the number of teeth of the left and right side of the lower jaw is usually equal. The number of teeth in the replacement row usually corresponds to that in the functional row. There is some increase in number of teeth with growth, but throughout the size range of specimens examined for this report, the ontogenetic increase does not amount to more than four to six functional mandibular teeth even in species with the highest tooth counts. In numerous specimens of *C. batesii*, the functional tooth row has 6 teeth on the left side and 6 on the right, and the replacement tooth row has the same count. Thus, the basic number of mandibular teeth in this species usually is 6+6. Although some specimens of *C. batesii* have fewer than 6+6 (usually 5+5 or 4+4) I have not observed any with more than 6+6.

Species of *Chiloglanis* previously reported to have numerous mandibular teeth are *C. congicus*, *C. disneyi*, *C. lamottei* Daget, 1948, *C. marlieri* Poll, 1952, and *C. polyodon*. These were discussed in connection with the description of *C. disneyi* by Trewavas (1974:365-367). *Chiloglanis congicus* has mandibular teeth tightly bunched together ("en bouquet"). The teeth near the symphysis (middle of the bouquet) have their crowns projecting more than those at the sides. Trewavas gave the mandibular tooth count as 18 but did not explain how the count was made. In four specimens of *C. congicus* I find the total number of mandibular teeth is 12, 16, 16, and 19. In the first three specimens there are basically two rows of teeth (one functional, one replacement) with 4+4 or 5+5 teeth in each row. The fourth specimen has two or three rows of teeth, one functional and one or two replacement, with the rows deranged and some teeth missing. On each side of any of the rows the maximum number of teeth is 4. *Chiloglanis lamottei*, known only from the holotype from the R. Cavally, has a single row of 14 mandibular teeth (Daget 1948), presumably 7+7. *Chiloglanis polyodon*, known only from the holotype from the R. Bagbwe, was originally described as having mandibular teeth "arranged in two parallel rows, each consisting of 15 or 16 teeth, those of the inner row larger and more curved than those of the outer (Norman 1932:184). Some 40 years later the holotype was re-examined and found to have 15 inner and 14 outer mandibular teeth bunched together"

TABLE 1. Mandibular tooth counts in species of *Chiloglanis*.

<i>C. polyogon</i>	3+3 or 4+4
<i>C. reticulatus</i>	3+3 to 5+5?
<i>C. congicus</i>	4+4 (occasionally 5+5?)
<i>C. sanagaensis</i>	4+4 or 5+5 (rarely 6+6)
<i>C. beniuiensis</i>	3+3 to 6+6
<i>C. cameronensis</i>	4+4 to 8+8
<i>C. batesii</i>	4+4 to 6+6
<i>C. lamottei</i>	7+7
<i>C. polyodon</i>	7+7 to 8+8
<i>C. disneyi</i>	8+8 to 10+10
<i>C. niger</i>	8+8 to 10+10
<i>C. marlieri</i>	13+13 (or 14+14?)
<i>C. harbinger</i>	13+13 to 15+15

(Trewavas 1974:367). Both accounts are cited here because of the possibility that in the intervening period a tooth was removed from each row, possibly by Norman himself. The basic mandibular tooth count for *C. polyodon* presumably is 7+7 or 8+8. *Chiloglanis marlieri* is known only from the holotype collected in the R. Ndakirwa, a tributary of the R. Lowa, west of Lake Kivu. As originally illustrated this specimen has one complete mandibular tooth row of 15+15 teeth, plus an incomplete internal row with 7 teeth on the extreme left side, 8 on the extreme right, and none in the large intervening space (Poll 1952:227, fig. 2). Trewavas (1974) re-examined this specimen and reported the mandibular teeth as "one row of 26, a widely interrupted row of 6+7 and 2 incompletely erupted teeth at the midline." Thus the basic tooth count presumably is 13+13 or 14+14. Mandibular tooth counts for various species of *Chiloglanis* are presented in Table 1.

TASTE BUDS.—Taste buds (Figs. 3, 4) were reported (not figured) on the papillae or "bosses of thickened epithelium" on the oral disc of *C. batesii* and *C. micropogon* (regarded here as a synonym of *C. batesii*) by Trewavas (1974). I have observed taste buds with scanning electron microscopy in one or two specimens of five species from Cameroun, and failed to find them in specimens of a sixth (Figs. 3, 4). The following remarks are presented as generalizations on the taste buds of these six species, but the limited number of specimens on which they are based should be kept in mind. The buds are largest and most abundant in *C. polyogon* and *C. reticulatus*. In these species they are distributed fairly uniformly on the papillae and barbels of the lower lip. In *C. reticulatus* the buds are about 50 μm diameter, and the sensory field (with numerous

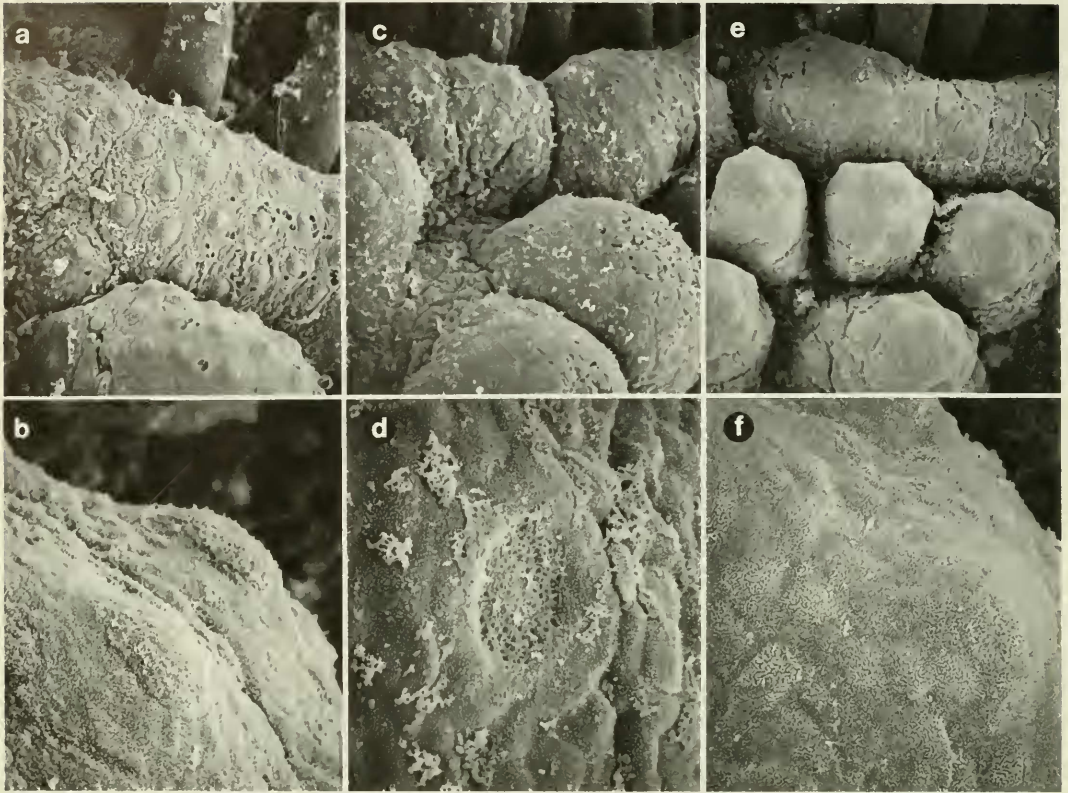


FIGURE 3. Taste buds in Camerounian species of *Chiloglanis*. a, b, *C. reticulatus*, 31.3 mm; c, d, *C. polypogon*, 25.0 mm; e, f, *C. sanagaensis*, 28.6 mm. Horizontal field widths: a, c, e (top row) = 450 μm ; b, d, f (bottom row) = 45 μm .

minute pores for the sensillae) of each bud is about 18 μm diameter. The sensory field projects from the summit or apex of the taste bud (Fig. 3b). The density of the taste buds, calculated from Figure 3b, is about 240 per square mm; this is about the same as that reported for taste buds in the mouth and pharynx of the common Eurasian loach *Cobitis taenia* Linnaeus, 1758 by Jakubowski (1983:850). The taste buds and sensory fields of *C. polypogon* are of about the same size, but the sensory field tends to be sunken into the middle of the bud rather than elevated (Fig. 3d). A similar condition is reported for the external taste buds of *Cobitis taenia* by Jakubowski (1983:851, fig. 1D) but has not been observed in other *Chiloglanis*. *Chiloglanis disneyi* has relatively large, numerous buds on the lower lip. The buds are up to 22 μm diameter and the sensory fields to 7 or 8 μm diameter (Fig. 4d). Slightly larger buds occur in *C. batesii* (Fig. 4b). Extensive viewing of the sucker of *C. niger* with SEM re-

vealed no large or well formed taste buds. Only a few small structures tentatively identified as taste buds were observed on papillae on the lower lip (Fig. 4f). The largest bud is 12 μm diameter with a sensory field of about 8 μm diameter. The sensory field has fewer pores than observed in other species of *Chiloglanis*. Taste buds apparently are absent in *C. sanagaensis*. I could not find any on the sucker of a 28.6 mm specimen. Although the oral papillae of this specimen have raised areas similar to those where taste buds occur in other species, their summit is occupied only by densely convoluted microvillar ridges, without any sensillar pores. The structures superficially most similar to taste buds observed in *C. sanagaensis* are illustrated in Figure 3e, f).

The species of *Chiloglanis* with the largest and most numerous taste buds, *C. polypogon* and *C. reticulatus*, have suckers with large barbels and large papillae. Taste buds of intermediate size and abundance occur in *C. batesii* and *C. disneyi*,

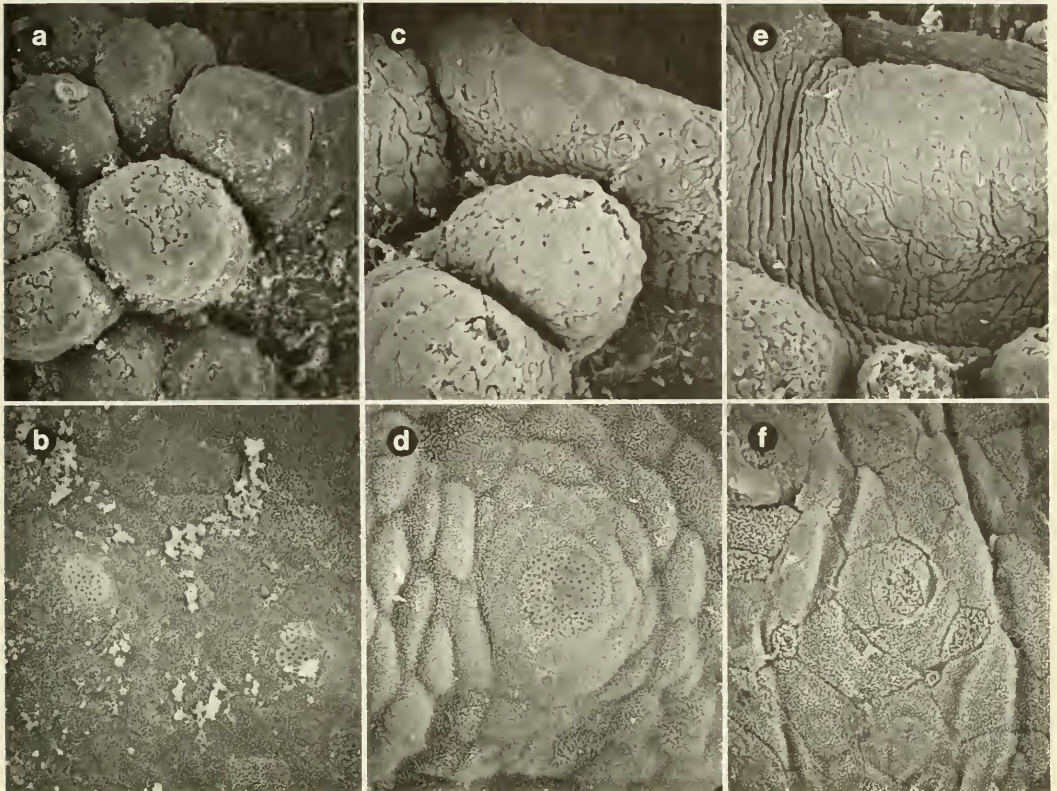


FIGURE 4. Taste buds in Camerounian species of *Chiloglanis* (cont.). a, b, *C. batesii*, 21.7 mm; c, d, *C. disneyi*, 23.0 mm; e, f, *C. niger*, 27.8 mm. Horizontal field widths: a, c, e (top row) = 450 μ m; b, d, f (bottom row) = 45 μ m.

species with greatly reduced barbels and relatively small papillae. *Chiloglanis niger*, with a very large sucker, minute barbels, and moderately large papillae, has taste buds few in number and poorly developed. *Chiloglanis sanagaensis*, with moderately elongate barbels and numerous well-developed papillae, apparently lacks taste buds. Finally, it should be noted that taste buds are not limited to the sucker in *Chiloglanis*. Relatively large buds occur on the dorsal surface of the head in *C. reticulatus* (Fig. 5e, f).

TUBERCLES.—Tubercles, composed of keratinized and sometimes also greatly enlarged superficial epidermal cells, occur on the head and body of all or almost all species of *Chiloglanis*. In contrast to the situation in most cyprinoid fishes, the tuberculation apparently is not sexually dimorphic. Among Camerounian species it is particularly well developed in *C. reticulatus*, *C. polypogon*, and *C. batesii*. Although less evident because they are fewer and further apart, well-

developed tubercles are present also in *C. disneyi*, *C. niger*, and *C. sanagaensis*. The Camerounian (and Zairean) species with the most striking tuberculation is *C. reticulatus*, in which large specimens of both sexes have long tuberculated ridges forming a network or reticulum covering the dorsal and lateral surfaces of the head and much of the body. The ridges are especially evident on the head. They are up to 10 cells wide; the crest of a ridge is regularly tuberculate, each tubercle consisting of about a dozen enlarged epidermal cells (Fig. 5d). The surface of the non-tuberculate polygonal cells forming the ridge is not smooth, the center of each cell being occupied by a low-lying roughened protuberance evidently equivalent to an unculus (for review of unculti see Roberts 1982). The epidermal surfaces between the ridges, in contrast, consist of slightly smaller, non-unculiferous (and therefore relatively smooth-surfaced) polygonal cells, widely scattered taste buds, and even more widely scattered pores. The

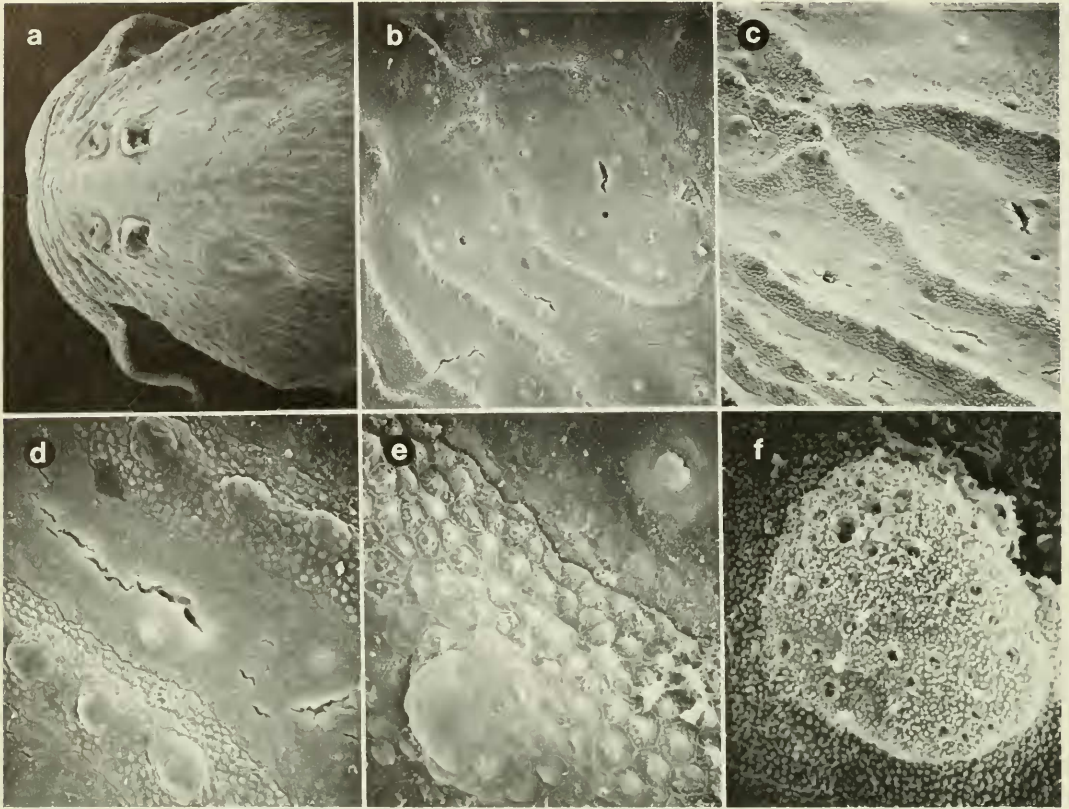


FIGURE 5. Epidermal features on head of *Chiloglanis reticulatus*. *a*, dorsal view of head of 31.3 mm paratype, with elongate tuberculate ridges well developed (but not connecting up to form a network as in larger specimens); *b-e*, dorsal surface of head posterior to eye of 41.6 mm holotype, with well-developed network of tuberculated ridges and isolated taste buds; *f*, enlarged view of taste bud in *e*. Horizontal field widths: *a*, 7.5 mm; *b*, 1 mm; *c*, 750 μm ; *d*, 360 μm ; *e*, 110 μm ; and *f*, 11 μm .

pores, two of which are seen in Figure 5*b, c*, lie in shallow depressions about 50 μm diameter and are themselves about 20 μm diameter. The taste buds, elevated above the general epidermal surface, are also about 20 μm diameter (Fig. 5*f*). The gross aspects of all of these features (but not their cellular nature) can be observed under the dissecting microscope. Although no other species of *Chiloglanis* observed by me has tuberculated ridges forming such an extensive and well-defined network as *C. reticulatus*, more or less elongate tuberculated ridges are present on some larger specimens of *C. batesii*, *C. occidentalis*, and *C. polypogon*.

Numerous round or oval tubercles, comprising some 60 to 80 cells and about 40 μm diameter, occur on the dorsal surface of the head of *C. polypogon* (Fig. 6*a, b*). Similar tubercles were observed in *C. batesii* from Ngudi (Fig. 6*e*). Some

larger *C. batesii* have tuberculated ridges, but these were not observed with SEM. In *C. polypogon* the cells comprising a tubercle are unicellular, whereas in the specimens of *C. batesii* observed they are not. In a 28.6 mm *C. sanagaensis*, prominent tubercles were observed on the dorsal surface of the snout. These have a round base 30 to 35 μm diameter, and a rounded or pointed apex to 20 to 30 μm high. They appear to have a perimetal dehision ring (Fig. 6*d*). The head of this specimen exhibits many shallow crater-like depressions, tentatively identified as scars from tubercles that had been shed. Of the species of *Chiloglanis* examined with SEM, the weakest tuberculation is in *C. niger*. Tubercles on its head are widely separated, up to 40 μm diameter, but not elevated, consisting of only a single layer of thin, apparently individually dehiscient polygonal epidermal cells, with irregular projections

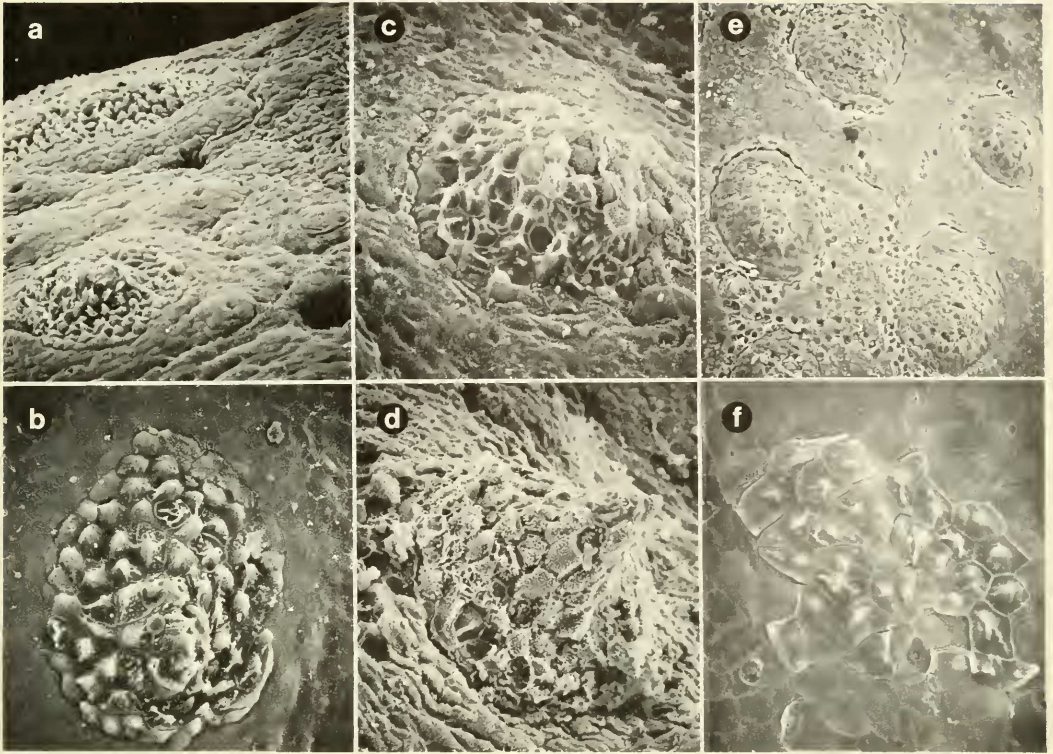


FIGURE 6. Tubercles on head of Camerounian species of *Chiloglanis*. a, b, *C. polypogon*, 25.0 mm; c, d, *C. sanagaensis*, 28.6 mm; e, *C. batesii*, 25.7 mm (R. Ngudi); f, *C. niger*, 27.8 mm. Horizontal field widths: a, 250 μm ; b, c, 115 μm ; d, 105 μm ; e, 450 μm ; and f, 105 μm .

(unculi?) arising from their centers or cell margins (Fig. 6f).

FIN RAYS.—Counts of fin rays are of limited usefulness in distinguishing species of *Chiloglanis*. Most useful are dorsal and pectoral fin ray counts. Most Camerounian species usually have 5 soft dorsal fin rays, but *C. batesii*, *C. niger*, and *C. voltae* usually have 6. However, occasional specimens of the former species have only 5 and occasional specimens of the latter species have 6. *Chiloglanis harbinger* has 4 or 5. Many species have 7 or 8 soft pectoral fin rays; no species has been observed with fewer than 7. *Chiloglanis disneyi* has 8 or 9, *C. harbinger* and *C. niger* 9 or 10.

In many specimens the number of anal fin rays is difficult to determine. I have not obtained adequate data to evaluate anal fin ray counts for distinguishing species. Camerounian species have a total of 7 to 12 anal fin rays, but much of the variation is in the number of anterior simple

rays, which range from 2 to 5. Especially in specimens with more simple rays, the anteriormost ones tend to be very small, sometimes impossible to count accurately in whole specimens or even in radiographs. The number of branched anal fin rays is usually 7 (range 5 to 8). All species of *Chiloglanis* examined have 7 pelvic fin rays and 8/9 principal caudal fin rays.

COLORATION.—The basic elements of color pattern—lightly and darkly pigmented areas—are remarkably constant in many species of *Chiloglanis*. This can be appreciated readily by comparing the photographs of various Camerounian species in this paper. The main feature of the color pattern is three broad dark vertical bands on the dorsolateral body surface. Although the outline of the bands is irregular, closer examination reveals the same or similar irregularities in the bands of quite different species. This is especially true for the very irregularly shaped second band, lying between the adipose and anal

fins. This band has an anteroventral projection where its ventral portion is more or less extensively broken or invaded by a depigmented area arising between the base of the pelvic and anal fins and extending dorsoposteriorly. The position and shape of this pale area, and the resulting configuration of the dark vertical band between the adipose and anal fins, is very evident in the photos of *C. reticulata*, *C. polyogon*, *C. sanagaensis*, and *C. disneyi*. It is also visible in the photos of *C. niger* and *C. batesii*, although in these specimens the basic pattern is obscured by their overall duskiness. The barred color pattern on the caudal peduncle and caudal fin is similar in many species. Some species, including *C. polyogon* and *C. reticulatus*, have small, round, pale spots scattered on the dark vertical bands of the body. At first glance these spots appear irregular, but their number and position is similar in various species. The peculiar conservatism of the irregularly banded or barred color pattern of *Chiloglanis* is paralleled by a number of other groups of catfishes, notably the Southeast Asian bagrid genus *Leiocassis*.

Most species of *Chiloglanis* are dull and cryptically or disruptively colored in life. Live *Chiloglanis niger* are uniformly dark, almost black. This is perhaps also true in *C. harbinger* for which coloration has been observed only in preserved specimens. The most brilliantly colored species probably is *C. disneyi*, which has well defined bright yellow and black bands. Sexual dichromatism is unknown.

A few species have distinctive color features. Nearly all species have dark vertical bars on the dorsolateral part of the body that end more or less abruptly at about the level of the paired fins. In *C. harbinger* the large anterior bar extends partially onto the abdomen, the melanophores becoming fewer and wider apart towards the ventral midline. In *C. cameronensis* this bar often continues without diminished intensity right across the abdomen, which is therefore black. This is especially so in samples of this species from the Ntem and Ogooue basins. In most specimens of *C. niloticus* and its close relative (or conspecific) *C. occidentalis*, the upper and lower caudal fin lobes each bear a dark horizontal stripe. Although *C. occidentalis* is widely distributed in western Africa, including the Niger basin, it has not been found in Cameroun. None of the species of *Chiloglanis* known from Cameroun have cau-

dal fin lobes with horizontal stripes. The dorsal surface of the snout of *C. batesii* has a triradiate pattern. This consists of a dark or dusky median mark at the snout tip separated by pale interspaces from an anterolateral dark or dusky mark on each side of the snout. This pattern, observed in specimens from throughout the extensive range of *C. batesii*, is absent or poorly developed in other species of *Chiloglanis*. *Chiloglanis reticulatus*, occurring sympatrically with *C. batesii* in the Congo basin, often has a biradiate pattern on the snout. This is due to a dark or dusky anterolateral mark on each side of the snout as in *C. batesii*, but the large intervening area including the snout tip is pale.

SEXUAL DIMORPHISM.—Testes of maturing *Chiloglanis* have numerous lobes. In extremely ripe males the lobes may be so enlarged as to cause abdominal expansion comparable to that of gravid females. In many species males have an elongate genital papilla. Secondary sexual dimorphism occurs in several species. Often this involves enlargement of the anal fin, and sometimes also enlargement and modification of the shape of the caudal fin. In males of *C. macropeterus* Poll and Stewart, 1975, from the R. Luongo in Zambia (Congo basin), the anal and caudal fins are both enlarged; the caudal fin, moderately forked in females, is triangular in large males, with the distal part of the triangle formed by elongation of the middle caudal fin rays. Very similar sexual dimorphism of the anal and caudal fins occurs in a West African species, *C. normani* from the R. Cavally, Cote d'Ivoire. The only Camerounian species in which sexual dimorphism of the caudal fin has been observed is *C. batesii*. In this species the caudal fin is very deeply forked, with the upper lobe considerably enlarged and pointed or even filamentous in mature males. Such modification of the upper caudal fin lobe of male *Chiloglanis* has been reported previously only in *C. micropogon*, here considered conspecific with *C. batesii*. In addition to the enlarged and pointed upper caudal fin lobe, mature males of *C. batesii* have lobate testes, an elongate genital papillae, enlarged anal fin, and one other remarkable feature.

Radiographs of *Chiloglanis* from Cameroun and other countries reveals several species with a striking sexual dimorphism hitherto unreported. In these species males have the humeral process of the pectoral fin girdle more or less

TABLE 2. Vertebral counts in species of the suckermouth mochokid genera *Chiloglanis*, *Atopochilus*, and *Euchilichthys*.

	Abdom- inal	Caudal	Total
<i>C. batesii</i>			
Mungo	15	16-17	31(2), 32(2)
Cross	15	16-17	31(1), 32(1)
Ja	14	17-18	31(3), 32(1)
Luala	14-15	16-17	30(2), 31(7)
Lufu	14-15	15-17	30(4), 31(5), 32(1)
Inkisi	14-15	16-17	31(5), 32(5)
Kwango	15-16	16	31(1), 32(5)
Mbomou	14-15	16-17	31(2)
Kivu	15	17-18	32(1), 33(1)
<i>C. brevivarbis</i>			
Athi	15-17	18-20	34(3), 35(10)
<i>C. cameronensis</i>			
Lokunje	15	15-16	30(1), 31(1)
Mvila	14-15	16-17	31(4)
Ntem	15	16	31(2)
Diala	15	16-17	31(2), 32(1)
Ivindo	14-15	16	30(2), 31(2)
<i>C. congicus</i>			
Congo	16-17	15-16	32(3), 33(1)
<i>C. deckenii</i>			
Kerio	16-18	15-17	33(4), 34(2)
<i>C. disneyi</i>			
Mungo	15	15-16	30(1), 31(1)
Cross	15-16	15-17	31(6), 32(3)
<i>C. harbinger</i>			
Lokunje	15-16	15-16	30(1), 31(9)
<i>C. niger</i>			
Menchum	15	16	31(1)
<i>C. occidentalis</i>			
Ankwao	14-15	16-18	31(1), 32(3)
Pra	14-15	16-18	31(4), 32(2)
<i>C. polyodon</i>			
Bagbwe	15	16	31(1)
<i>C. polypogon</i>			
Cross	14-15	16-18	30(1), 32(10), 32(8)
<i>C. reticulatus</i>			
Congo	14-15	16-19	31(5), 32(4), 33(5)
<i>C. sanagaensis</i>			
Sanaga	14-16	16-17	31(1), 32(4), 33(1)
<i>C. sardinhai</i>			
Caimbambo	14-15	15-17	30(1), 31(4)
<i>C. voltae</i>			
Oti	13-14	16-17	29(2), 30(5), 31(2)
Lakdo	13-14	16-18	30(3), 31(1)
<i>A. savorgnani</i>			
Ntem	17-18	14-15	32(5), 33(3)

TABLE 2. Continued.

	Abdom- inal	Caudal	Total
<i>A. sp. undet. a</i>			
Stanley Pool	19	16	35(1)
<i>A. sp. undet. b</i>			
Lufu	21	16	37(1)
<i>E. dybowskii</i>			
Oubanghi	19	13	32(1)
Mbomou	18-20	12-14	31(2), 32(2)
<i>E. royauxi</i>			
Kinsuka	23-24	17-18	40(1), 42(1)

greatly enlarged. The enlargement is manifested externally as a large, skin-covered convex boss just above the pectoral fin. It is most pronounced in *C. batesii*, but also occurs in *C. occidentalis* and *C. polypogon*. It apparently does not occur in *C. brevivarbis*, *C. cameronensis*, *C. congicus*, *C. disneyi*, *C. niger*, *C. reticulatus*, *C. sanagaensis*, or *C. voltae*, for all of which radiographs as well as specimens have been examined.

VERTEBRAL COUNTS.—Vertebral counts, until recently seldom employed in systematic studies of catfishes, can be very useful in distinguishing species. Smaller or less elongate species of catfishes often have fewer vertebrae than their larger or more elongate close relatives. Thus, the sisorid catfish *Bagarius bagarius* Hamilton-Buchanan, 1822, is a small species superficially similar to the very large species *Bagarius yarrelli* Sykes, 1841, but differs from it in having only 38-42 (mode 39) vertebrae instead of 40-45 (mode 43) (Roberts 1983:437). Vertebral counts are of comparable utility in distinguishing species of the bagrid genera *Leiocassis* and *Myxus* and of the pangasiid or schilbeid genus *Pangasius* (Roberts, in press). Vertebral counts are determined readily from radiographs of *Chiloglanis*. In some catfish groups, due to variation in the length and partial or total fusion of the anteriormost (Weberian) vertebral centra with each other, and occasional fusion of additional more-posterior vertebrae with them, it is difficult to obtain reliable counts of abdominal vertebrae. In *Chiloglanis*, however, the four Weberian vertebrae have centra of about the same size that remain separate; thus, they often may be counted directly from radiographs. Furthermore, the fourth vertebra is

readily identifiable by the large ossa suspensoria and the fifth vertebra by a large but slender pair of normally shaped ribs. In practice I commence a count of the vertebral column with the fifth vertebra and proceed backwards. Abdominal vertebrae are defined as all those lying anterior to the anal fin and its pterygiophores. If the anteriormost anal fin pterygiophore approximates or even contacts the hemal spine of a vertebra but fails to lie in front of it, the vertebra is counted as abdominal. The hypural complex is counted as one vertebra. This method gives repeatable counts for most catfishes and many other fish groups. Vertebral counts from a radiographic survey of *Chiloglanis* and other mochokid genera with sucker mouths are presented in Table 2.

The counts are of little use in distinguishing most species of *Chiloglanis*, all of which are more or less short bodied and none very large. Many species have around 30 or 31 to 33 vertebrae. The smallest species, *C. voltae*, has 29–31. This is close to the lowest number of vertebrae found in other groups of catfishes and in ostariophysan fishes generally. Somewhat higher counts (33–35) occur in species from East Africa including *C. deckenii* and *C. brevibarbis*. Of particular interest are the vertebral counts of the genera *Atopochilus* and *Euchilichthys*, in which the species generally are far larger (to 600 mm) than *Chiloglanis* and have up to 42 vertebrae. In addition there is a shift in the ratio of abdominal to caudal vertebrae. In *Chiloglanis* the ratio is close to unity, $n:n$ or $n:n+1$ or $n+2$, while in *Atopochilus* and *Euchilichthys* the abdominal vertebrae are more numerous than the caudal vertebrae, so the ratio is $n:n-2$ to $n-7$. This increase in abdominal vertebrae appears related to an elongate abdomen accommodating an extremely convoluted gut.

SYSTEMATIC ACCOUNT

Chiloglanis Peters, 1868

Chiloglanis Peters, 1868: 599 (type species *Chiloglanis deckenii* Peters, 1868, by monotypy).

Chiloglanis (gender masculine) differs from all other genera of the endemic African catfish family Mochokidae, except *Atopochilus* Sauvage, 1878 and *Euchilichthys* Boulenger, 1900, in having upper and lower lips greatly expanded and united to form a sucker. Some species of *Synodontis* have large lips superficially resembling

those of *Chiloglanis* but are readily distinguishable because they have mental barbels free from sucker instead of incorporated into it. In *Atopochilus* and *Euchilichthys* the mandibular teeth are very numerous and spread across the entire free margin of the lower jaw, whereas in all species of *Chiloglanis* except *C. voltae*, the mandibular teeth are relatively few and restricted to a relatively small area near the symphysis of the lower jaw. In *Chiloglanis* the pectoral fin spine is invariably smooth, never serrate, while in *Atopochilus* and *Euchilichthys* it bears few to many serrae. *Euchilichthys* and *Atopochilus* are very poorly represented in Cameroun. *Euchilichthys dybowskii* is present in the R. Ngoko (lower R. Ja, Congo basin) and *Atopochilus savorgnani* in the R. Ntem.

KEY TO *CHILOGLANIS* OF CAMEROUN

- | | |
|---|---------------------|
| 1A. Mental barbels moderately to very long (Fig. 1a-c) | 2 |
| 1B. Mental barbels short, sometimes absent (Fig. 1d-f) | 7 |
| 2A. No auxiliary mental barbels (Fig. 1a) | 3 |
| 2B. From 2 to 5 well developed auxiliary mental barbels on each side of lower lip (Fig. 1b) | 4 |
| 3A. Sucker with well developed papillae; large teeth on premaxilla in several rows; mandibular teeth well developed; adults to over 40 mm (Congo basin) - <i>C. reticulatus</i> | |
| 3B. Sucker without papillae; large teeth on premaxilla in two rows; mandibular teeth in two rows; adults to 27 mm (Niger basin) | <i>C. voltae</i> |
| 4A. Mental barbels very large; sucker transversely oval, middle of lower lip with greatly enlarged papillae (Fig. 1a, b) | 5 |
| 4B. Mental barbels moderately large; sucker round, or longer than broad, entire surface covered with papillae of similar size (Fig. 1c) | 6 |
| 5A. Accessory mental barbels no more than 3 on each side of lower lip; mandibular teeth 4+4 to 7+7 (Niger basin) | <i>C. benuensis</i> |
| 5B. Accessory mental barbels from 3 to 5 on each side of lower lip; mandibular teeth 3+3 or 4+4 (Cross basin) - <i>C. polypogon</i> | |
| 6A. Body relatively elongate; abdomen not greatly expanded, more or less extensively darkly pigmented; mandibular teeth | |

- 4 + 4 to 8 + 8 (coastal basins east of Sanaga basin) *C. cameronensis*
- 6B. Body stubby; abdomen considerably expanded, pale; mandibular teeth usually 4 + 4 or 5 + 5, rarely 6 + 6 (Sanaga basin) *C. sanagaensis*
- 7A. Mandibular teeth (except in very small specimens) 8 + 8 or more; sexual dimorphism absent or weak 8
- 7B. Mandibular teeth 3 + 3 to 6 + 6; sexual dimorphism marked, larger males with enlarged anal fin, enlarged and pointed upper lobe of caudal fin, and greatly enlarged and expanded humeral process of pectoral girdle (in all or nearly all river basins) *C. batesii*
- 8A. Sucker relatively huge; large premaxillary teeth in seven or eight rows; top and sides of body extensively covered with melanophores, so it appears almost uniformly dark; pectoral fin soft rays 9 or 10; caudal peduncle moderately to very slender 9
- 8B. Sucker relatively small; large premaxillary teeth in three or four rows; top and sides of body with very sharply contrasting dark vertical bands alternating with pale areas; pectoral fin soft rays 8 or 9; caudal peduncle relatively deep *C. disneyi*
- 9A. Mandibular teeth 8 + 8 to 10 + 10; dorsal fin soft rays 6; adipose fin short (Niger basin) *C. niger*
- 9B. Mandibular teeth 13 + 13 to 15 + 15; dorsal fin soft rays 4 or 5; adipose fin long (Lokunje basin) *C. harbinger*

Chiloglanis reticulatus new species

(Figs. 1a, 2, 3a, b, 5, 7)

HOLOTYPE.—CAS 60786, 41.6 mm gravid female. Cameroun. Congo basin, R. Mwamedjwel, a very small stream 2–3 km W of Yokadouma, Tyson R. Roberts, 15 Jan. 1980.

PARATYPES.—CAS (SU) 47471, 36.3 mm, Cameroun, Congo basin, R. Momjepom, Yokadouma, A. I. Good, 20 Mar. 1936; CAS 60787, 31.0 mm, Zaire, Congo basin, R. Lubazi, tributary of R. Luala, 3 km S of Kibunzi, Tyson R. Roberts and Donald J. Stewart, 17 Aug. 1973; CAS 60788, 10: 19.1–38.1 mm, Zaire, Congo basin, R. Lufu, 2 km NW of Lufu village, Tyson R. Roberts and Donald J. Stewart, 2 Aug. 1973 CAS 60789, 43: 9.4–37.4 mm, Zaire, Congo basin, tributary of R. Luala 26 km N of Kibunzi, Tyson R. Roberts and Donald J. Stewart, 17 and 24 Aug. 1973.

Chiloglanis reticulatus is a relatively small species, largest specimen 41.6 mm standard length; sucker relatively small, transversely oval,

with very large barbels; auxiliary mental barbels absent; large teeth of premaxillary in 2 to 4 rows; mandibular teeth in 1 or 2 rows, very irregularly arranged, basic count from about 2 + 2 to 5 + 5; eyes large; dorsal fin soft rays usually 5 (rarely 6); pectoral fin soft rays 7 or 8; adipose fin long, its origin well in advance of a vertical line through anal fin origin; caudal peduncle moderately deep; caudal fin moderately forked, lower lobe longer than upper. Larger specimens of both sexes with well-developed tuberculated epidermal ridges on head and body, characteristically forming a dense network or reticulum on dorsal surface of head. The largest male, 37.4 mm, from tributary of R. Luala, has anal fin and lower lobe of caudal fin greatly enlarged; humeral process of pectoral spine not enlarged. Its genital papilla is elongate, with a peculiarly enlarged and swollen tip, so that it resembles somewhat the proboscis of an elephant. Sexual dimorphism absent or slight in other specimens examined. Holotype in life with chocolate-brown dark bands and cream-colored interspaces.

ETYMOLOGY.—The name *reticulatus* (Latin, adjective) refers to the reticulum or network of tuberculated epidermal ridges.

DISTRIBUTION.—Known only from the northwestern portion of the Congo basin in Cameroun and Zaire.

Chiloglanis voltae Daget and Stauch, 1963

Chiloglanis voltae Daget and Stauch, 1963:99, fig. 4 (type locality Bougouri Ba au pont de Nabéré, Volta basin; also reported from R. Benoué à Lakdo, Cameroun); Roman 1966: 154 (Volta Noire près de Boromo).

MATERIAL EXAMINED.—CAMEROUN: Niger basin: MNHN 1962-1275, 53: 14.6–17.6 mm, R. Benoué à Lakdo (paratypes); NIGERIA: Niger basin: CAS 64128, 33: 16.9–27.0 mm, R. Benue 22 km E of Makurdi; GHANA: Volta basin: MNHN 1984-551, 102: 15.1–26.3 mm, R. Oti à Sabari; MNHN 1984-522, 2: 22.9–27.2 mm, R. Wawa à Yadzo. BURKINA FASO: Volta basin: MNHN 1962-1280, 24.2 mm, Bougouri Ba au pont de Nabéré (holotype); MNHN 1961-591, 24: 14.6–16.9 mm, same collection as holotype (paratypes).

Chiloglanis voltae is the smallest known species of *Chiloglanis*, largest specimen 27.2 mm standard length. Sucker moderately large, non-papillose; outer mental barbel elongate, inner short; no auxiliary mental barbels; teeth conical, not strongly S-shaped; mandibular teeth in 1 or 2 irregular rows, not concentrated near symphysis but spread across entire mouth opening; eye large; dorsal fin soft rays usually 6; pectoral fin soft rays

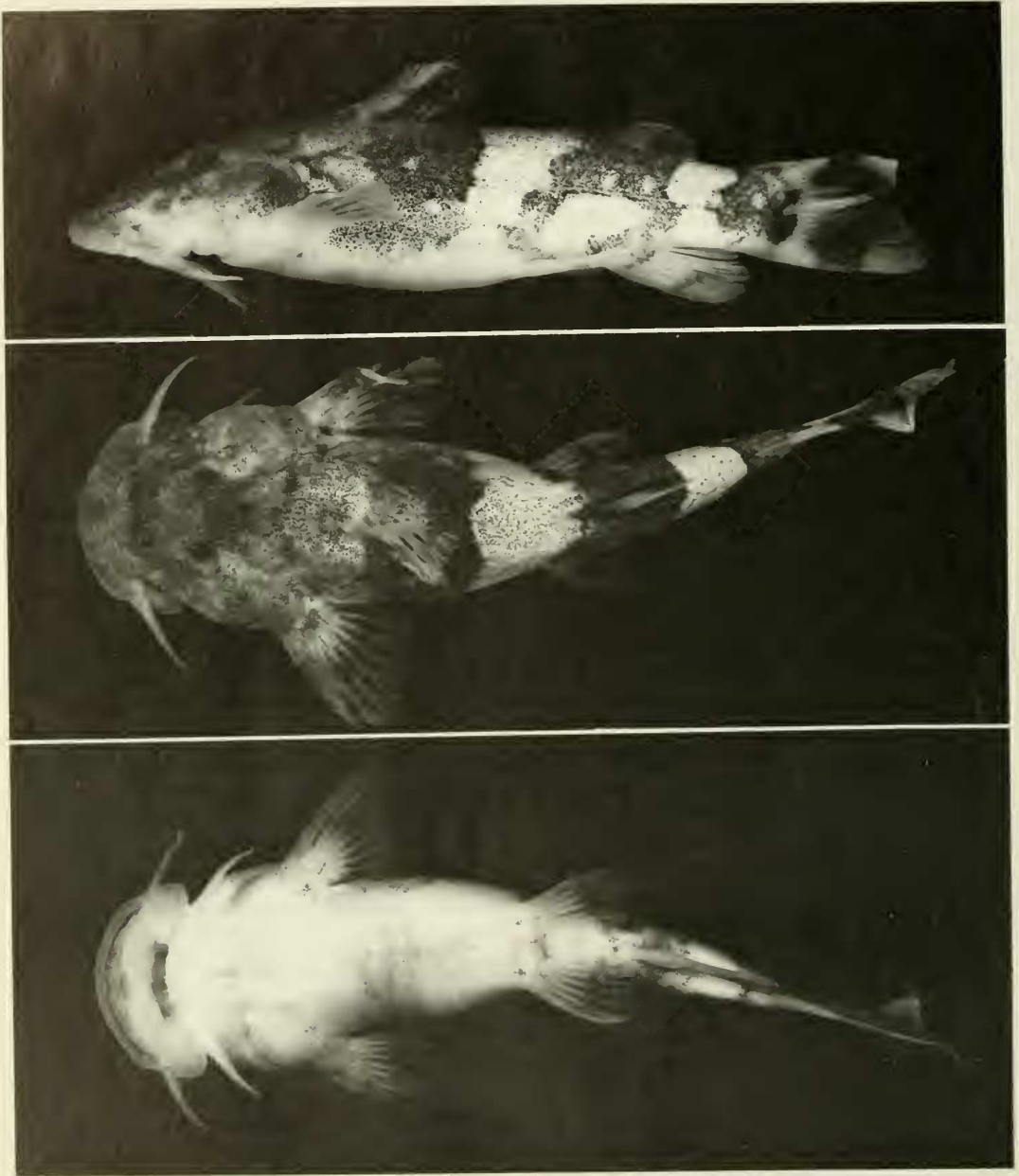


FIGURE 7. *Chiloglanis reticulatus*, holotype, gravid female 41.6 mm (Congo basin).

7 or 8; caudal peduncle moderately deep; caudal fin moderately forked; caudal fin lobes rounded, lower slightly longer than upper. Body with three dark or dusky vertical bars separated by pale areas; margin of dark bars defined by concentration of melanophores not observed in other species of *Chiloglanis*; caudal fin without well developed bars or other marks. Sexual dimor-

phism unknown. No observations available on gonads of mature individuals. Total vertebrae 29–31, fewer than in any other species of *Chiloglanis* for which data are available.

DISTRIBUTION.—Known only from the R. Benue (Niger basin) of Cameroun and Nigeria and the Volta basin. In the R. Benue near Makurdi, I collected *C. voltae* on sandy bottom, far from

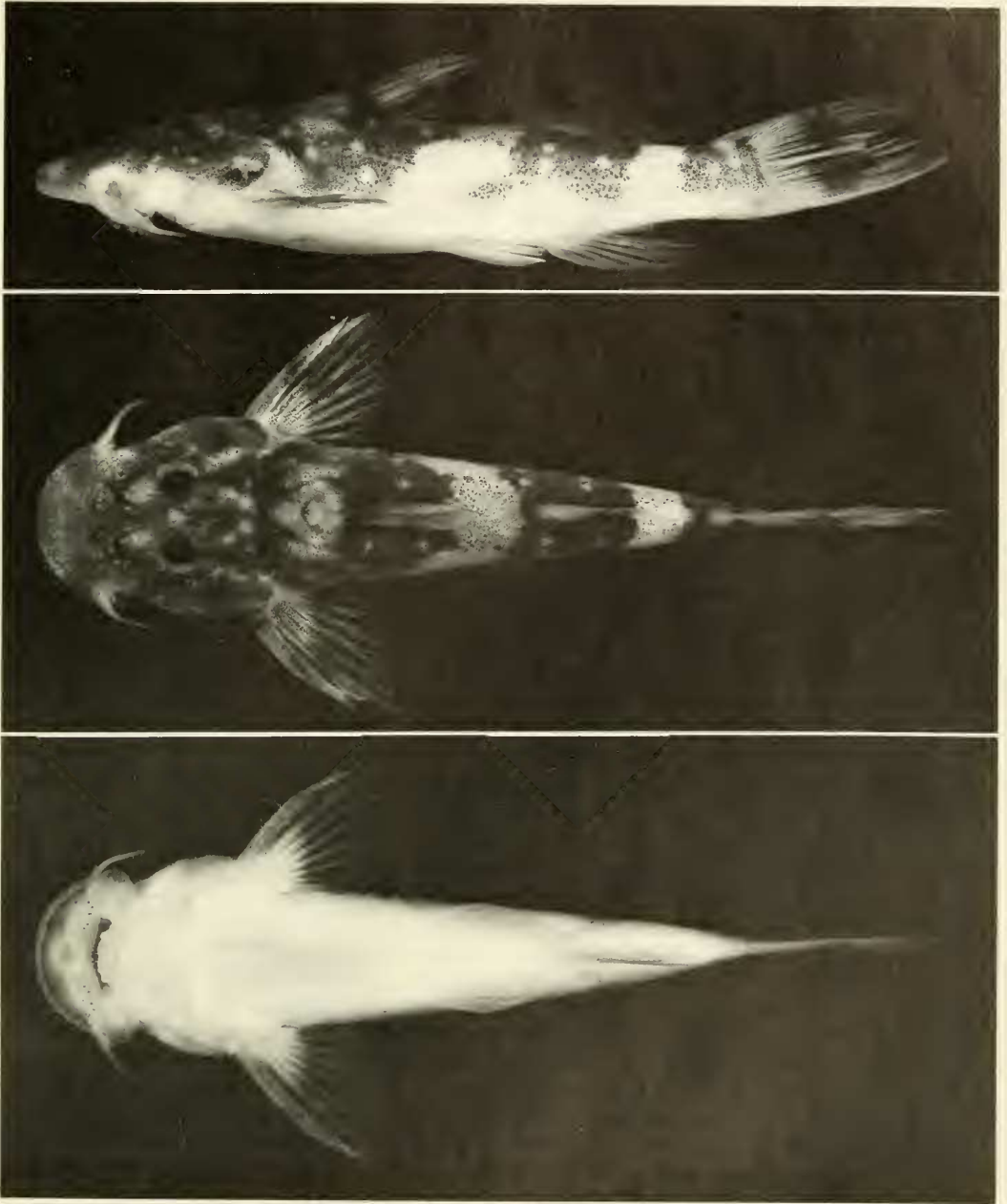


FIGURE 8. *Chiloglanis polypogon*, holotype, immature female 41.5 mm (Cross basin).

any other kind of habitat, in sympatry with *C. benuensis*.

***Chiloglanis benuensis* Daget and Stauch, 1963**

Chiloglanis benuensis Daget and Stauch, 1963:98, fig. 3 (type locality R. Benoué à Lakdo, Cameroun).

MATERIAL EXAMINED.—CAMEROUN: Niger basin: MNHN 1962-1273, 38.4 mm, R. Benoué à Lakdo (holotype); MNHN 1962-1274, 40: 18.9–34.8 mm, collected with holotype (paratypes); NIGERIA: Niger basin: CAS 64127, 20: 20.3–35.0 mm, R. Benue 22 km E of Makurdi.

Chiloglanis benuensis (largest specimen 38.4 mm) has relatively small, transversely oval suck-

er and very large barbels; up to three auxiliary mental barbels on each side of lower lip, but no auxiliary barbel lying external to outer primary mental barbel; eye large; mandibular teeth 3+3 to 5+5; soft dorsal fin rays 5 or 6; pectoral fin soft rays 8; adipose fin long, its origin far anterior to a vertical line through anal fin origin; caudal peduncle moderately slender; caudal fin moderately forked, lower lobe somewhat longer than upper; sexual dimorphism unknown.

DISTRIBUTION.—*Chiloglanis benuensis* is known only from the R. Benue in Cameroun and Nigeria. In the Benue near Makurdi it was collected sympatrically with *C. voltae* on a sandy bottom in shallow, swift-flowing water.

***Chiloglanis polyogon* new species**

(Figs. 1b, 2b, 3c, d, 6a, b, 8)

HOLOTYPE.—CAS 60790, 41.5 mm immature female, Cameroun, Cross basin, high gradient streams along road from Mamfe to Bamenda, 88–94 km SW of Bamenda, Tyson R. Roberts, 17 Mar. 1980.

PARATYPES.—CAS 60791, 11; 20.2–39.7 mm, collected with holotype; CAS 60792, 11; 23.0–26.0 mm, Cameroun, Cross basin, riffles of R. Badi where it flows into R. Cross and main-stream of R. Cross near Mamfe, Tyson R. Roberts, 1–5 Mar. 1980; CAS 60793, 7; 46.4–54.9 mm, Cameroun, Cross basin, small stream on road from Mamfe to Bamenda, 98 km from Bamenda and about 24 km from Mamfe, Tyson R. Roberts, 17 Mar. 1980; MRAC 76-32-P-2213-218, 3; 35.4–38.9 mm, Cross basin, 14 miles [23 km] W of Mamfe towards Eyomojok, H. Stenholt Clausen and Jorgen J. Scheel, 8 Mar. 1966.

Chiloglanis polyogon is a moderately large species, largest specimen 54.9 mm; sucker relatively small, transversely oval, with large papillae and very large barbels; 3–5 auxiliary mental barbels present on each side of lower lip; majority of specimens with an auxiliary mental barbel external to outer primary mental barbel on one or both sides of lower lip (not observed in any other species of *Chiloglanis*); large premaxillary teeth in 3 or 4 irregular rows; mandibular teeth large, 3+3 or 4+4; dorsal fin soft rays usually 5 (5 in 24 specimens, 6 in 5); pectoral fin soft rays 7 or 8; adipose fin long, its origin well in advance of a vertical through anal fin origin; caudal peduncle moderately slender; caudal fin moderately forked, lower lobe longer than upper; larger specimens with longitudinally oriented tuberculated epidermal ridges on dorsal surface of head; sexual dimorphism absent or slight, males without enlarged humeral process. In life pale areas between dark vertical bars and entire ventral surface pinkish or pale salmon,

unlike any other species observed by me. Bars on body intermediate in distinctness between those of *C. disneyi* (very distinct) and *C. batesii* (poorly defined), species with which it occurs sympatrically in Cross basin. Body with pale round spots observed in *C. reticulatus* and some other species but not in *C. batesii* and *C. cameronensis*.

Pupil of eye with flattened upper margin, contractile; contraction involves downward progression of a silvery membrane or “curtain” from ventral margin of exposed portion of eyeball. During maximum contraction, pupil is dorsally directed, almost out of horizontal line of vision. A contractile pupil has not been observed in other species of *Chiloglanis*.

ETYMOLOGY.—The name *polyogon* (noun in apposition, from the Greek “poly,” multiple, and “pogon,” beard) refers to the numerous mental barbels.

DISTRIBUTION.—Known only from the Camerounian portion of the Cross basin.

***Chiloglanis cameronensis* Boulenger, 1904**

Chiloglanis cameronensis Boulenger 1904:18 (type locality Efulen, S. Cameroon); Boulenger 1911:482, fig. 360; Matthes 1964:118 (R. Kululu, tributary of R. Tshuapa near Ikela, Cuvette Centrale of Congo basin, Zaire; identification doubtful, specimen unavailable for examination); Géry 1965:379 (swamps of R. Ivindo near Makokou, Ogooué basin, Gabon; Roman 1971:134, fig. 58 (Ntem basin, Río Muni).

MATERIAL EXAMINED.—CAMEROUN: BMNH 1904.7.1:90–96, 7; 32.5–41.2 mm, Efulen, Bates collection (syntypes); BMNH 1906.5.28:68–69, 45.3 mm, Efulen (Bates collection); CAS(SU) 15448, 42.0 mm, Efulen, R. Chenge, Kribi basin; CAS(SU) 47468, 25.5 mm, R. Mfiande or R. Seng, Ebolowa, Ntem or Campo basin; CAS(SU) 15450, 36.3 mm, R. Mfiande, Ebolowa, Ntem basin; CAS(SU) 15451, 4; 35.7–40.2 mm, “Ebolowa (Mejap II 12 mi W) Minya’a R. trib. of Mvila R.”; CAS(SU) 47470, 2; 25.6–34.2 mm, Bikui, Lolodorf, Lokunje basin; MHNG 757.69, 33.3 mm, Efulen; MNHN 1988-1163, 3; 34.3–42.9 mm, R. Tchengué on road from Kribi to Ebolowa, about 80 km W of Ebolowa, Kienke basin. RIO MUNI: MRAC 173147–148, 28.7 mm, R. Guoro, tributary of R. Ntem. GABON: MRAC 73-02-P-1911-921, 5; 23.5–33.7 mm, Ogooué basin, Makoukou; MHNG 2169.56–58, 4; 18.9–26.5 mm, Ogooué basin, marigots après Ybiagn, Makoukou; MRAC 80-27-P-89-95, 4; 19.6–28.2 mm, R. Diala.

Chiloglanis cameronensis is a medium-sized species, largest specimen 45.3 mm; sucker very large, longer than broad (not transversely oval), extensively covered with moderately large papillae; barbels short, but well developed, usually papillose; up to 3 auxiliary mental barbels on each side of lower lip; large premaxillary teeth

in 3 or 4 rows; mandibular teeth large, usually about 4+4 or 5+5, but some specimens with as many as 7+7 or 8+8; eyes large; dorsal fin soft rays usually 5; pectoral fin soft rays 7 or 8; adipose fin long, its origin considerably in advance of a vertical through anal fin origin; caudal peduncle moderately to very slender (most slender in specimens from Ogooué); caudal fin not deeply forked, lobes rounded or even truncate, lower slightly longer than upper. Dark bands and pale interspaces on body fairly distinct. Abdomen more or less darkly pigmented, almost black in some specimens, due to melanophores continuous with those on anterior vertical bar of body extending across abdomen. This abdominal pigmentation, absent or poorly developed in other species, highly variable: in some older and poorly preserved specimens, scarcely evident; in some specimens from Cameroun (including Efulen), on only a relatively small area between the pelvic fin bases; in specimens from Ntem and Ogooué, entire abdomen darkened.

DISTRIBUTION.—Coastal basins of SE Cameroun and Rio Muni, including Lokunje, Kribi, Kienke, and Ntem basins; Ogooué basin (Gabon). Only species of *Chiloglanis* known from Ogooué.

Chiloglanis sanagaensis new species

(Figs. 1c, 2c, 3e, f, 6c, d, 9)

HOLOTYPE.—CAS 60794, 26.8 mm male, Cameroun, Sanaga basin, gravel bars and riffles in lower 1–2 km of R. Nchit where it flows into R. Mbam (site of summer palace of Sultan of Fouban). Tyson R. Roberts, 23 Mar. 1980.

PARATYPES.—CAMEROUN: CAS 60795, 25: 18.6–28.6 mm, collected with holotype; MNHN 1988-1164, 11: 31.4–39.9 mm, Sanaga basin, R. Makénéne at bridge on road to Ndimeki (100 m from Bafia-Bafoussam route), about 110 km S of Bafoussam, Tyson R. Roberts, 1 Jan. 1988; MNHN 1988-1165, 12: 21.1–42.8 mm, Sanaga basin, R. Mana 23 km N of Bafia on route from Bafia to Bafoussam, Tyson R. Roberts, 1 Jan. 1988.

Chiloglanis sanagaensis is a medium-sized species, largest specimen 42.8 mm; sucker moderately large, round, with numerous papillae of uniform size evenly distributed over almost its entire surface; barbels short but well developed, each side of lower lip with 3 auxiliary mental barbels; large premaxillary teeth in 3 or 4 rows; mandibular teeth usually 4+4 or 5+5, rarely 6+6; eyes moderately large; dorsal fin soft rays 5 or 6; pectoral fin soft rays 7 or 8; adipose fin low and very long, its origin far in advance of a vertical through anal fin origin; caudal peduncle

slender; caudal fin almost truncate, very slightly emarginate or forked, lobes slightly rounded, lower a bit longer than upper. Secondary sexual dimorphism not observed.

This species characterized by short, stocky or stubby body and swollen abdomen. Swelling evident in virtually all specimens, seemingly due mainly to exceptionally long and highly coiled intestine. A specimen of 27.0 mm has intestine just over 30 mm long, more than double relative length of intestine observed in *C. batesii* and several other species.

ETYMOLOGY.—The name *sanagaensis*, adjective, refers to the Sanaga basin, source of all known specimens of this species.

DISTRIBUTION.—Known only from the Sanaga basin.

Chiloglanis batesii Boulenger, 1904

(Figs. 1d, 2d, 4a, b, 6e, 10)

Chiloglanis batesii Boulenger, 1904:19 (type locality "Efulen" and "streams tributary of the Lobi River, 15 or 20 miles S.W. of Efulen" [South Cameroon]); Boulenger 1911:485, fig. 363 (Efulen, R. Lobi, R. Ja); Nichols and Griscom 1917: 720 (lower Congo; Faradje; no description); Trewavas 1974 (morphology, comparison with *C. micropogon*).

Chiloglanis micropogon Poll, 1952:228, figs. 3, 4 (type locality R. Nzokwe, affluent de la R. Ulindi, Territ. Kabare; and R. Tshinganda, Bunyakiri, affluent de la R. Luhoho, West Kivu); Daget 1954:307, fig. 116 (upper Niger); Poll 1967:255, fig. 119 (R. Luachimo, Angola); Trewavas 1974:361, figs. 5, 6 (Mungo, Meme, and Lobi basins, Cameroun; R. Kaduna, Niger basin, Nigeria).

MATERIAL EXAMINED.—CAMEROUN: BMNH 1904.7.127, 28.2 mm, "15 or 20 miles S.W. of Efulen in streams trib. to R. Lobi" (syntype, a male with elongate genital papilla, elongate upper caudal fin lobe, and enormously expanded humeral process); BMNH 1904.7.1.97–100, 4: 27.8–33.2 mm, Efulen, Bates collection (syntypes); BMNH 1904.10.26:53–62, 11: 27.5–34.0 mm, R. Ja; BMNH 1909.4.29.97, 26.1 mm, R. Lobi; CAS 60796, 2: 36.7–39.3 mm, high-gradient streams along Mamfe-Bamenda road, 16–22 km N of Numba and 88–94 km SW of Bamenda. Cross basin; CAS 60797, 22.2 mm, riffles in mouth of R. Badi where it flows into R. Cross at Mamfe; CAS 60798, 6: 19.2–26.7 mm, R. Nchit where it flows into R. Mbam, Sanaga basin; BMNH 1973.5.14:362–363, 2: 19.8–20.0 mm, R. Mungo at Baduma; BMNH 1973.5.14:347–354, 3: 13.7–24.5 mm, R. Blackwater, Mungo basin; BMNH 1973.5.14: 355–359, 2: 22.0–26.3 mm, R. Dilolo at Bolo, Mungo basin; BMNH 1973.5.14:364–370, 2: 31.9–35.8 mm, R. Wowe, Mungo basin; CAS(SU) 15447, 9: 29.0–33.3 mm, Efulen, R. Chenge, Kribi basin; MNHN 1988-1155, 3: 26.2–28.7 mm, Kienke basin, R. Tchenge on road from Kribi to Ebolowa. GUINEA: Niger basin: MNHN 1986-750, 85: 18.5–34.6 mm, R. Milo. MALI: Niger basin: MNHN 1961-590, 14: 30.1–35.2 mm, Oeyanko, near Bamako. NIGERIA: Niger basin: MNHN 1988-1154, 4: 21.7–37.8 mm, R. Owena 25 km NE of Ondo on road to

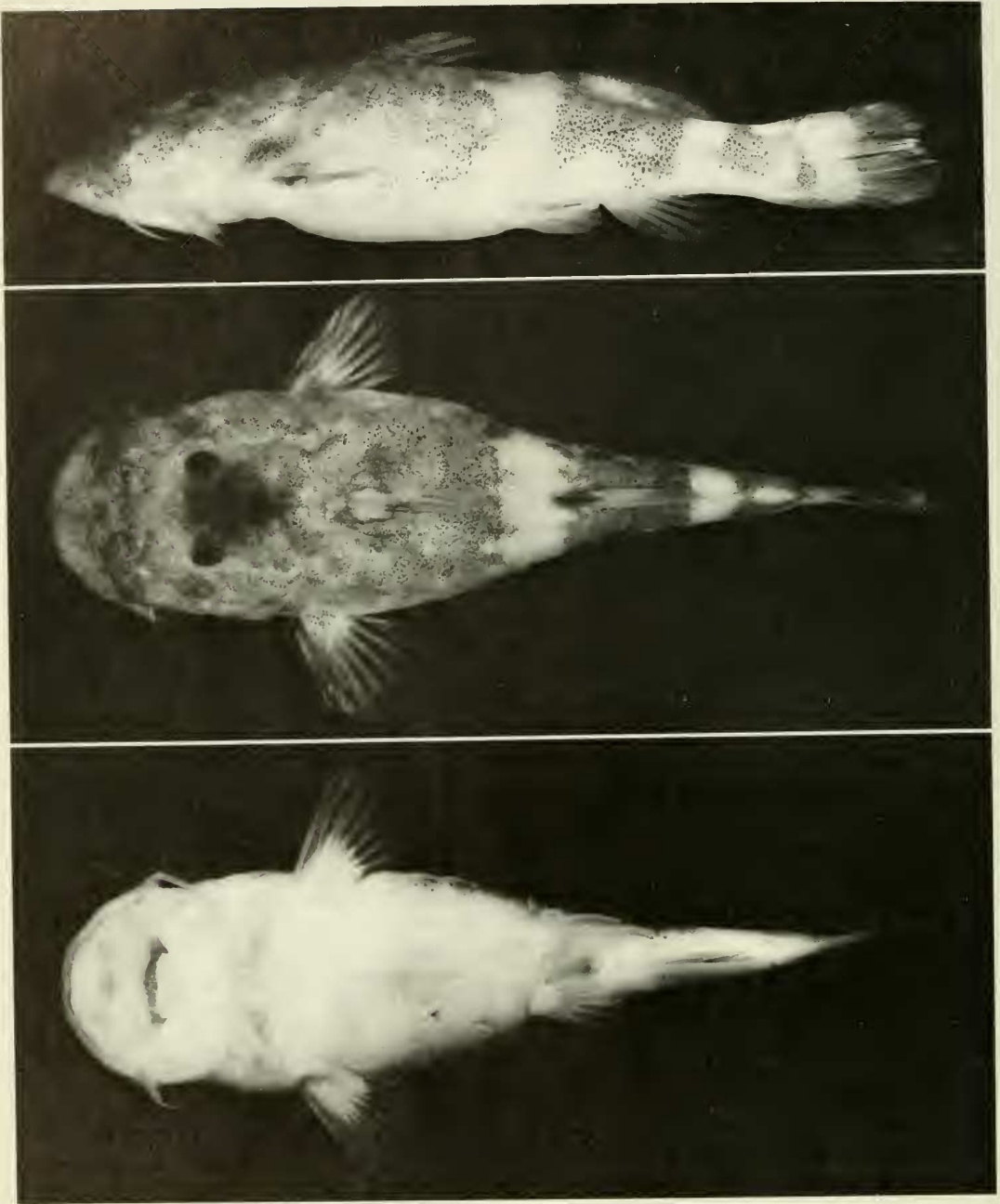


FIGURE 9. *Chiloglanis sanagaensis*, holotype, male 26.8 mm (Sanaga basin).

Akure; MNHN 1988-1153, 8: 16.3–20.0 mm, R. Osse near Uyere, on road from Benin City to Akure; BMNH 1978.12.13.7–8, 2: 26.5–27.3 mm, Gurara Falls near Abuja; MNHN 1977-14, 3: 24.1–37.6 mm, R. Lere, Gindiri, Jos Plateau; MNHN 1977-15, 3: 27.1–40.0 mm, R. Shemankar, tributary of R. Gu, Jos Plateau; Victor. G. Smith collection, uncat., 34.9 mm, R. Assob, Gengera Kibo, Jos Plateau. REPUBLIQUE CENTRAFRI-

CAINE: Chad basin: MNHN 1988-1156, 8: 21.5–27.5 mm, R. Doukouma about 65 km W of Mbres; MNHN 1988-1157, 131: 19.3–31.8 mm, R. Ouaham 20 km upriver from Batangafo; MNHN 1988-1158, 2: 31.3–36.1 mm, R. Koumbala below Chutes de Matakil; MNHN 1988-1159, 5: 22.2–25.7 mm, R. Gounda (near Chad border). Congo basin: MNHN 1988-1161, 20: 18.2–31.6 mm, R. Mbomou near Zemio; MCZ 48360,

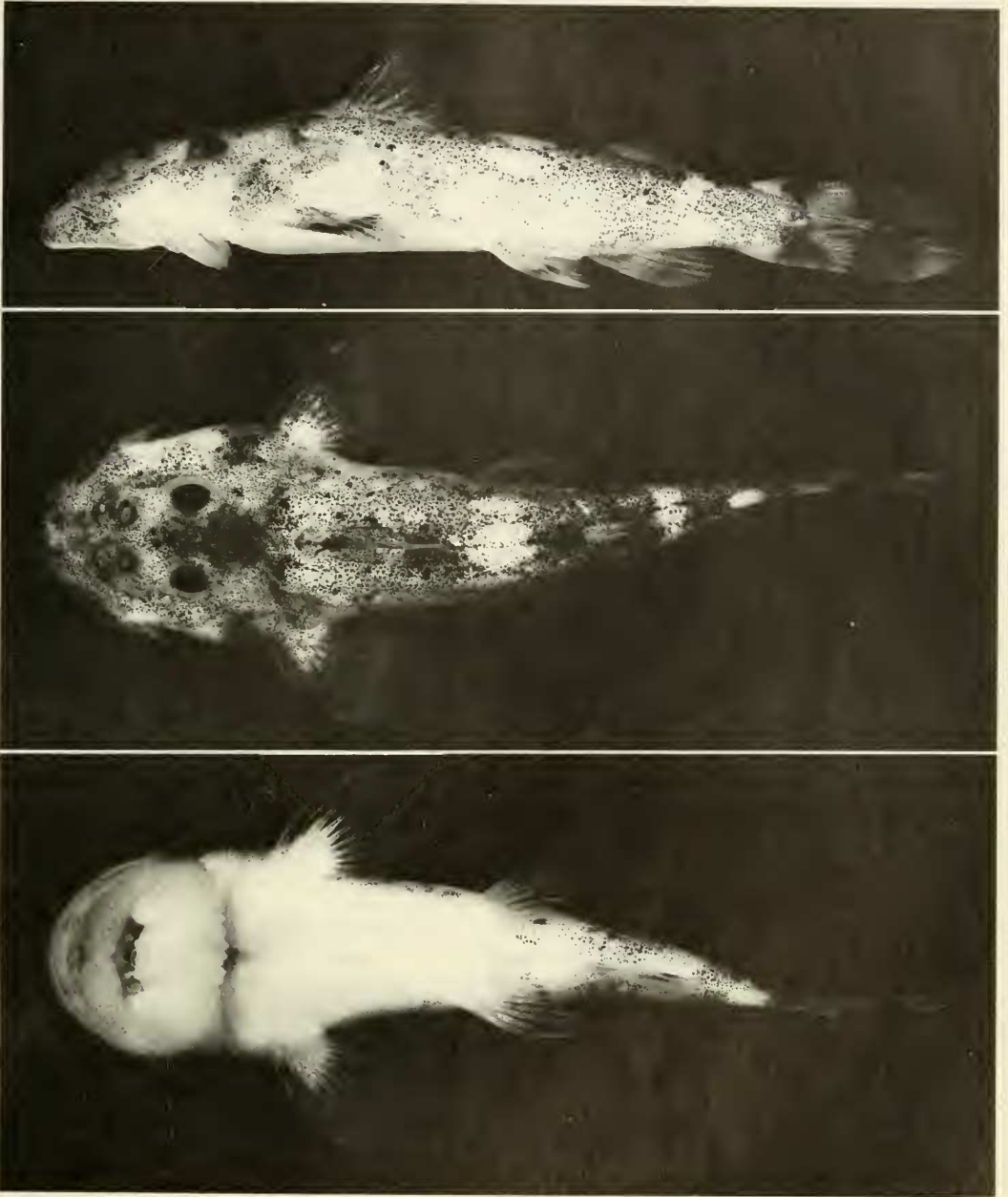


FIGURE 10. *Chiloglanis batesii*, 36.7 mm (Sanaga basin).

R. Mbomou at rapides de Gozobangui; MNHN 1988-1160, 41: 17.6–29.6 mm, R. Chinko at Rafai; MNHN 1988-1162, 4: 31.3–36.0 mm, small tributary of R. Euwou about 30 km NW of Alindao. ZAIRE: Congo basin: CAS 60799, 26.4 mm, R. Yambi below Chute de Bidi, 21 km E of Sundi-Mamba; CAS 60800, 60: 16.5–27.2 mm, R. Ngudi at Chute Mayeux, 23 km NE of Sundi-Lutete; CAS 60801, 139: 13.7–30.4 mm, R. Lufu, Songoloko district; CAS 60802, 2: 22.7–25.7 mm, R.

Lubazi, tributary to R. Lua near Kibunzi; CAS 60803, 35: 19.2–29.3 mm, tributary to R. Lua near Kibunzi; CAS 60804, 25.8 mm, R. Kwilu near Moerbeke; 60805, 29.6 mm, R. Sengezi, tributary to R. Inkisi-Lukusu 87 km W of Kinshasa; CAS 60807, 2: 23.9–26.4 mm, R. Konzi, tributary to R. Kwango, at bridge on road from Kenge to Masi-Manimba; FMNH 62918, 22.2 mm, R. Dungu. Nagero; MRAC 91480-81, 2: 33.1–37.2 mm, R. Tshinganda, tributary of R. Luhoho, Bun-

yakiri, Kivu (paratypes of *C. micropogon*); MNHN 1987-1607, 32.0 mm, R. Loya near Mafifi.

Chiloglanis batesii is a small species, largest known specimen 40 mm standard length; sucker relatively large, round or longer than broad rather than transversely oval; mental barbels greatly reduced; mandibular teeth 6+6 or fewer (often 5+5, occasionally 4+4); eyes large; dorsal fin soft rays usually 6 (sometimes 5); pectoral soft rays 7 or 8; adipose fin high and posteriorly rounded, but relatively short, its origin only slightly in advance of a vertical through anal fin origin; caudal fin deeply forked; caudal peduncle very slender; penultimate 5-7 vertebrae, in juveniles as well as adults of both sexes, with distal ends of neural and hemal spines flared (anteroposteriorly expanded). Sexual dimorphism exceptionally pronounced, subadult as well as adult males usually with enlarged anal fin, enlarged and pointed or filamentous upper caudal fin lobe, and greatly enlarged humeral spine. Most *Chiloglanis* with 6+6 or fewer mandibular teeth have relatively small suckers and long barbels. No other species has a more slender caudal peduncle, or males with such an elongate upper caudal fin and enlarged humeral spine at such small size. Neural and hemal spines in caudal peduncle slender in all or almost all other species of *Chiloglanis* examined except some larger specimens of *C. occidentalis*.

Coloration in live specimens is recorded in my fieldnotes for two Camerounian localities, high-gradient tributaries of the R. Cross and the R. Nchit, Sanaga basin. Two large Cross specimens had body with dusky, poorly defined bands, almost mottled. Pale areas on body (more distinctly outlined than dusky bands) pale yellowish or dull olivaceous yellow. Caudal fin with dusky vertical bar across base of lobes, light areas pale yellow. Dusky markings on anal fin present but less distinct than in *C. disneyi* collected at same locality. Eye with small oval black pupil, iris dull gray-green. Six specimens from the Nchit (Sanaga) had pale areas on body grayish or olivaceous or pale yellow; alternating dark and pale areas on snout forming in all six specimens a triradiate pattern not evident in specimens of *C. sanagaensis* collected at same locality.

DISTRIBUTION.—*Chiloglanis batesii* probably is the species of *Chiloglanis* with the most extensive distribution. It is found throughout the Niger and Congo basins, in the headwaters of the

Chad basin in Republique Centrafricaine, and in almost every river basin in Cameroun except the Ndian, Nyong, and Ogooué. It occurs sympatrically with six of the nine other species of *Chiloglanis* found in Cameroun.

Chiloglanis disneyi Trewavas, 1974

(Figs. 1e, 2e, 4c, d, 11)

Chiloglanis disneyi Trewavas, 1974:365, figs. 6, 8 (type locality Wowe, Mungo basin, Cameroun).

MATERIAL EXAMINED.—CAMEROUN: BMNH 1973.5.14.342, 34.6 mm, Mungo basin, R. Wowe, Disney collection (holotype); BMNH 1973.5.14:343-344, 2: 23.5-23.8 mm, R. Dilolo, Mungo basin; BMNH 1973.5.1:345, 22.5 mm, R. Blackwater, Mungo basin; CAS 60808, 20: 22.4-31.4 mm, high-gradient streams of R. Cross along road from Mamfe to Bamenda.

Chiloglanis disneyi apparently is a small species, largest specimen only 35 mm (Trewavas 1974:362); sucker moderately large, round; papillae of upper lip with distinctive frond-like margins (Trewavas 1974:365-366, fig. 8); barbels very small; no auxiliary mental barbels; large premaxillary teeth in 3 or 4 rows; mandibular teeth usually in 2 rows, each with 8+8 to 10+10 teeth; eye small; dorsal fin soft rays usually 5 (specimens from Cross basin have 5 in 18, 6 in 2); pectoral fin soft rays 8 or 9; caudal peduncle deep; caudal fin slightly forked, lobes rounded, lower distinctly larger than upper. Secondary sexual dimorphism apparently absent, but largest specimens available lack well-developed gonads.

Live specimens from Cross basin have body with three well-defined, almost black, vertical bands; dorsal surface of head to dorsal fin origin or first dark band on body yellowish orange, orangish brown, or brownish in different individuals; pale bands on body, dorsal, adipose, and caudal fins bright yellow or lemon yellow in all individuals; pectoral, pelvic, and anal fins pale yellow; abdomen off-white or cream; pectoral fin with faint transverse dusky band near its middle; adipose and anal fin base with black spots anteriorly; caudal fin with four large round yellow spots surrounded by sharply defined black marks; eye black. Alternating dark and pale areas on head and body more clearly demarcated in *C. disneyi* than in any other species of *Chiloglanis* observed by me in Cameroun.

DISTRIBUTION.—Known only from Mungo and Cross basins in Cameroun.

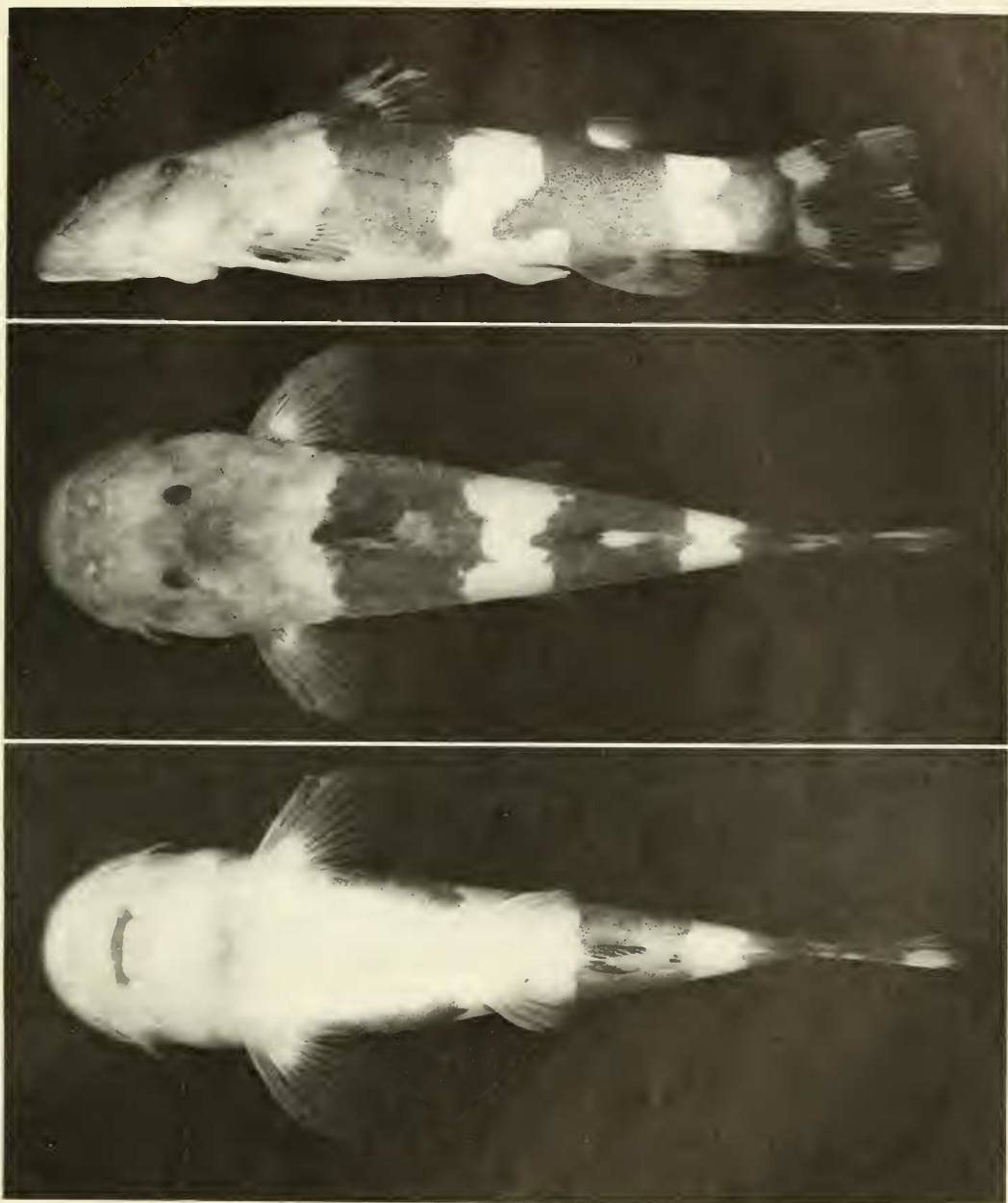


FIGURE 11. *Chiloglanis disneyi*, 31.4 mm (Cross basin).

COMMENT.—I have compared the specimens collected in the Cross with two of Trewavas's specimens collected in the Mungo, and find they agree in most respects. The sucker is relatively larger in the Cross specimens; the smaller suckers of the Mungo specimens may be due to shrinkage in preservative. The color pattern is barely dis-

cernible in the Mungo specimens, which are in poor condition.

***Chiloglanis niger* new species**

(Figs. 1*f*, 2*f*, 4*e*, *f*, 6*f*, 12)

HOLOTYPE.—CAS 60809, 34.4 mm, Cameroun, Niger basin, R. Menchum below high waterfall near Befang, Bamenda highlands, Tyson R. Roberts, 10 Mar. 1980.

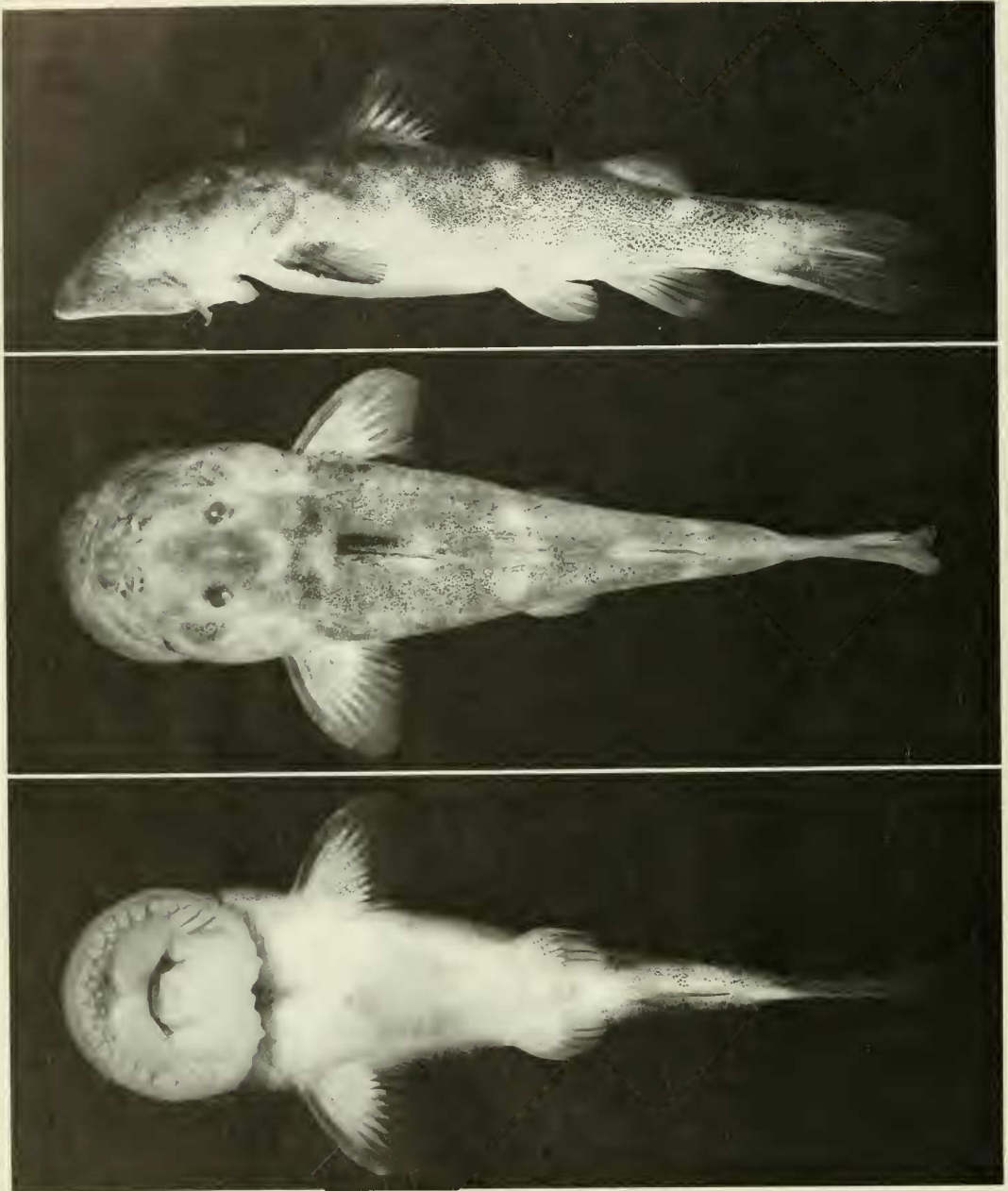


FIGURE 12. *Chiloglanis niger*, holotype, 34.4 mm (Niger basin).

PARATYPES.—CAS 60810, 7: 21.7–35.3 mm, collected with holotype.

Chiloglanis niger (largest known specimen 35.3 mm) has a huge sucker, rounded and somewhat longer than broad; barbels very small; no auxiliary mental barbels; large premaxillary teeth in 7 or 8 rows; mandibular teeth usually in 2 rows;

basic mandibular tooth count 8+8 to 10+10 in largest specimens (6+6 and 7+7 in smallest); eye very small; dorsal fin soft rays 6; pectoral fin soft rays 9 or 10; adipose fin short, its origin only slightly in advance of a vertical through anal fin origin; caudal peduncle slender; caudal fin moderately forked, lobes rounded, equal. No sexual

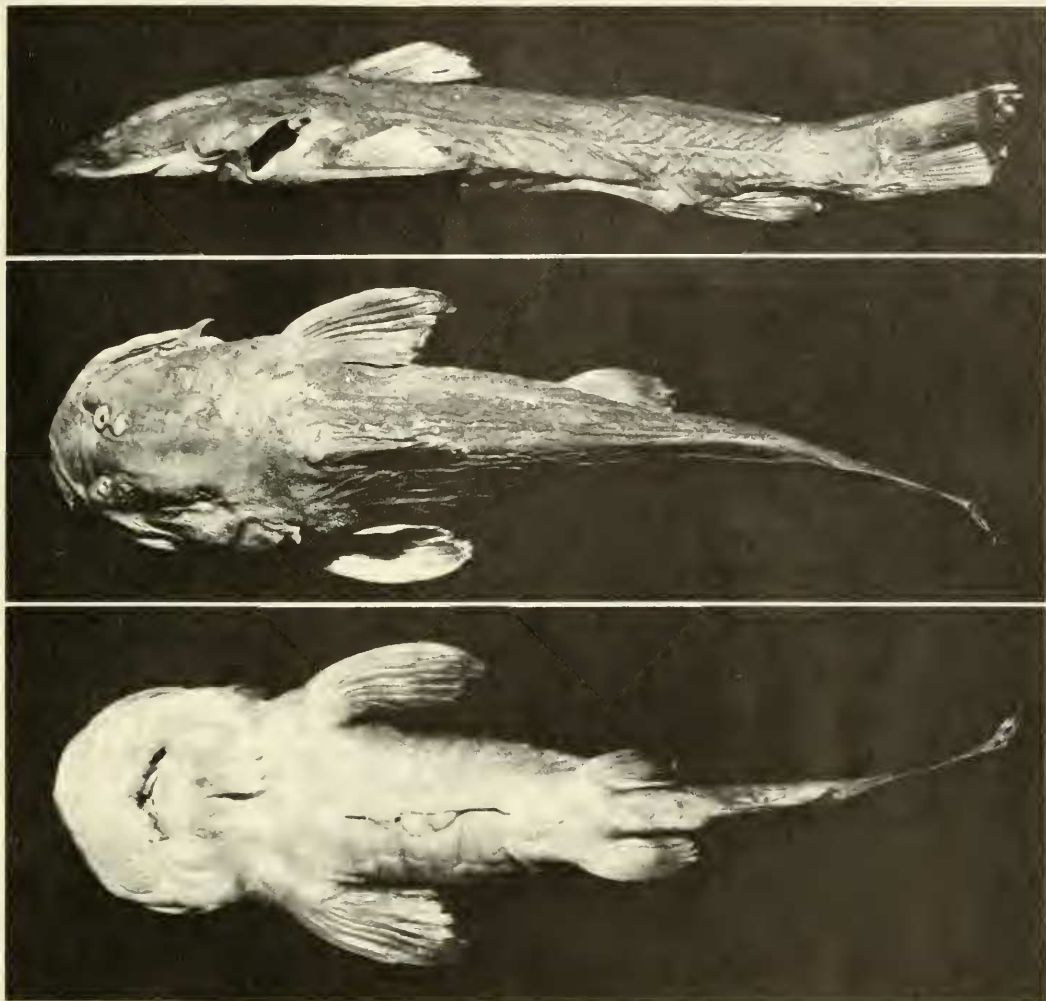


FIGURE 13. *Chiloglanis harbinger*, holotype, immature female 43.5 mm (Lokunje basin).

dimorphism observed (specimens probably immature).

Color of live specimens (collected on a black coarse sand or gravel bottom) uniformly dark, almost black, on entire dorsolateral surface of head and body; abdomen pale. Alternating dark bars and pale intervening areas on body, so typical of species of *Chiloglanis*, but not noted in live fish, faintly discernible preserved specimens.

ETYMOLOGY.—The name *niger* (Latin, black, noun in apposition) refers to the Niger basin as well as to the color in life.

DISTRIBUTION.—Known only from type locality in R. Menchum, Niger basin, Bamenda highlands of Cameroun.

Chiloglanis harbinger new species

(Fig. 13)

HOLOTYPE.—CAS 60811, 43.5 mm immature female, Cameroun, R. Lokunje near Bipindi, A. I. Good, 17 Feb. 1936.

PARATYPES.—CAS(SU) 47469, 9; 34.5–44.0 mm, collected with holotype.

Chiloglanis harbinger (largest specimen 44.0 mm) has a huge sucker, longer than broad; minute barbels; no auxiliary mental barbels; teeth very numerous; large premaxillary teeth in up to 7 rows; mandibular teeth usually in 2 rows, basic mandibular tooth count about 13+13 to 15+15 (teeth of type specimens damaged by string passed through mouth and gills); eye very small; dorsal fin soft rays usually 5 (4 in two specimens); pec-

toral fin soft rays 9 or 10; adipose fin long and low, its origin well in advance of a vertical through anal fin origin; caudal peduncle moderately deep; caudal fin moderately forked, lobes rounded, nearly equal. Males with a moderately elongate genital papilla; no sexual dimorphism observed in size of anal fin, shape of caudal fin, or humeral process of pectoral girdle.

Color in life unknown. Preserved specimens with numerous large melanophores more or less uniformly distributed over entire dorsolateral surface of body; vertical dark bars and intervening pale areas on body (present in most species of *Chiloglanis*) not evident; melanophores extending from sides of body onto sides of abdomen but rapidly becoming sparser toward middle of abdomen (hence very different from uniformly distributed melanophores on abdomen in some specimens of *C. cameronensis*); a dark vertical bar on base of caudal fin as well as one in its middle (very dark area near tip of caudal fin in lateral photograph of holotype an artifact due to shadow from tip of caudal fin, which is broken and bent toward camera).

ETYMOLOGY.—The name *harbinger* (Middle English, noun in apposition) is an allusion to the large number of teeth in the suckermouth mochokid genera *Atopochilus* and *Euchilichthys*, a condition presaged or foreshadowed in this species of *Chiloglanis*.

DISTRIBUTION.—Known only from the Lokunje basin in southeastern Cameroun.

ACKNOWLEDGMENTS

My interest in *Chiloglanis* was kindled when I visited the late botanist and ichthyologist F. R. Irvine at his home in Achimota shortly after my arrival in Ghana in 1961 and was given some specimens collected by Ing Zwilling in Nigeria. Permission for fieldwork in Cameroun was granted by the Ministry for Scientific and Technological Research of the Republic of Cameroun. Fieldwork in 1980 was supported by the Fonds Léopold III pour la Conservation et la Exploration de la Nature and in 1988 by the National Geographic Society. Fieldwork in Zaire in 1973 was sponsored by the Office National de la Recherche et du Developpement of the Republic of Zaire and supported by the National Geographic Society. Most of the photographs are by Al Coleman of the Museum of Comparative Zoology, Harvard. Scanning electron micrographs are by

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