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CHILOGLANIS PRODUCTUS, A NEW SPECIES OF SUCKERMOUTH
CATFISH (SILURIFORMES: MOCHOKIDAE) FROM ZAMBIA

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ABSTRACT.— *Chiloglanis productus*, new species, is described from the Lunzua River, which drains into the southern tip of Lake Tanganyika in Zambia. It is easily distinguished from congeners in having a color pattern consisting of a pale midlateral stripe on a purplish gray body and without any other distinct pale patches or bands, and by the nature of its sexual dimorphism in caudal fin shape: males have a produced caudal fin (vs. diamond shaped, forked or trilobate in males of other sexually dimorphic congeners).

Key words: Chiloglaninae, Lunzua River, Lake Tanganyika.

INTRODUCTION

Suckermouth catfishes of the genus *Chiloglanis* Peters, 1868 are endemic to Africa and are easily recognized by a sucker or oral disc formed by the enlarged upper and lower lips and a naked body. A total of 45 nominal species of *Chiloglanis* have been recognized (Seegers, 1996). During an ichthyological survey in Zambia, the second author obtained material from the Lunzua River, tributary to the southern tip of Lake Tanganyika that is clearly different from described species. The description of this material as *Chiloglanis productus*, new species, forms the basis of this study.

METHODS AND MATERIALS

Measurements were made point-to-point using a dial caliper to the nearest 0.1 mm following the methods of Ng (2004) with the following addition: oral disc width is the widest transverse distance between the extremities of the oral disc. Counts and measurements were made from the left side of specimens

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whenever possible. Subunits of the head are presented as proportions of head length (HL). Proportions of the head (head length, head width, and head depth) and measurements of body parts are given as proportions of standard length (SL). Terminology for the premaxillary teeth follows Skelton & White (1990). The fish were sexed via examination of external genitalia, which was verified in a few specimens by the examination of gonads.

Fin rays were counted from radiographs and under a binocular dissecting microscope using transmitted light. Vertebral counts were taken from radiographs. All counts follow Skelton & White (1990). Numbers in parentheses following a particular fin-ray or vertebral count indicate the number of specimens with that count. An asterisk after a particular count indicates the value for the holotype. The specimens included in the present study are deposited in: MRAC, Musée Royal d'Afrique Centrale, Tervuren; ROM, Royal Ontario Museum, Toronto; SAIAB, South African Institute of Aquatic Biodiversity, Grahamstown; and UMMZ, Museum of Zoology, University of Michigan, Ann Arbor.

SYSTEMATIC ACCOUNT

Chiloglanis productus new species

Figures 1–3

Chiloglanis sp. "Lunzua" – Seegers, 1996: 218; Figs. 155h, 156 (in part).

TYPE MATERIAL: Holotype: UMMZ 199816, male, 46.0 mm SL; Zambia: Lunzua stream, 11.3 km SSE of Mpulungu, about 1 km N of bridge on Mbala–Mpulungu road, 8°49'S 31°10'E; R. M. Bailey, E. K. Balon, C. Ellis, and D. J. Stewart, 2 November 1970 (Field No. B70-30).

PARATYPES: UMMZ 199817 (7 males, 41.6–48.8 mm SL; 1 male, c&s, 47.0 mm SL; 17 females, 31.0–45.7 mm SL); data as for holotype.

DIAGNOSIS: *Chiloglanis productus* is a sexually dimorphic species with enlarged anal and caudal fins, and with the central caudal-fin rays being notably produced in males (vs. diamond shaped, forked or trilobate in males of most congeners; Fig. 1). In females, the caudal fin is shallowly notched (Fig. 2). The male caudal fin most resembles that of *C. macropterus* Poll & Stewart, 1975 (diamond shaped) and *C. anoterus* Cross, 1960 (diamond shaped with extended central region), but *C. productus* can be further distinguished from *C. macropterus* in having a shorter dorsal-fin spine (9.0–15.5% SL vs. 29.4–33.1) and pectoral-fin spine (15.2–18.5% SL vs. 27.2–36.0) and dramatically different color pattern (Poll & Stewart, 1975: Fig. 1), and from *C. anoterus* in having a longer adipose-fin base (22.5–26.2% SL vs. 17.7–21.5) and smaller eye (9.0–11.5% HL vs. 12.1–14.8). *Chiloglanis productus* is also unique among congeners in lacking pale patches or bands on the trunk, instead having a distinct pale midlateral stripe with a series of small pale spots

TABLE 1. Biometric data for *Chiloglanis productus* (n=26).

	HOLOTYPE	RANGE	MEAN \pm SD
SL (mm)	46.0	31.0-48.8	
In % SL			
Predorsal length	37.2	36.0-41.1	38.1 \pm 1.55
Snout to anal	68.5	67.2-74.3	70.0 \pm 1.88
Snout to pelvic	55.0	54.4-60.3	56.5 \pm 1.53
Snout to pectoral	25.7	24.9-30.8	27.6 \pm 1.67
Dorsal-fin base length	10.7	9.8-13.6	11.6 \pm 1.12
Dorsal spine length	14.1	9.0-15.5	12.8 \pm 1.79
Anal-fin base length	15.7	12.3-16.4	14.5 \pm 1.24
Pelvic fin length	15.2	12.1-15.2	13.4 \pm 0.89
Pectoral fin length	23.9	19.1-23.9	21.2 \pm 1.47
Pectoral spine length	18.5	15.2-18.5	17.0 \pm 1.20
Caudal total length (δ)	38.3	31.8-38.3	35.0 \pm 2.89
(φ)		23.3-28.1	25.6 \pm 1.60
Adipose basal length	24.6	22.5-26.2	24.1 \pm 1.19
Dorsal to adipose distance	17.6	11.7-19.1	15.9 \pm 2.32
Adipose to caudal peduncle	17.2	11.2-17.2	13.9 \pm 1.72
Caudal peduncle length	15.2	14.9-17.6	16.3 \pm 0.86
Caudal peduncle depth	10.2	8.3-11.3	9.8 \pm 0.91
Body depth at anus	16.1	13.5-16.1	14.4 \pm 0.84
Head length	32.6	31.7-36.6	33.6 \pm 1.59
Head width	22.2	20.4-24.0	22.5 \pm 1.26
Head depth	15.0	13.9-16.1	14.7 \pm 0.58
In % HL			
Snout length	58.0	51.0-58.6	55.6 \pm 2.35
Interorbital distance	26.7	26.2-30.7	28.0 \pm 1.43
Orbit diameter	11.3	9.0-11.5	10.4 \pm 0.82
Maxillary barbel length	23.3	20.7-30.2	24.1 \pm 2.73
Primary inner mandibular barbel length	8.0	8.0-16.5	9.7 \pm 2.36
Primary outer mandibular barbel length	9.3	3.2-15.2	12.0 \pm 3.35
Oral disc width	52.7	52.7-69.3	60.8 \pm 4.58

arranged in vertical rows sometimes visible and a series of two pale patches on the dorsal midline.

DESCRIPTION: Biometric data are presented in Table 1. Body cylindrical, slightly depressed. Predorsal profile gently convex; postdorsal body sloping gently ventrally. Preanal profile horizontal. Anus and urogenital openings located at vertical through middle of pelvic fin. Skin smooth. Lateral line complete and midlateral.

Head depressed and broad, broadly rounded when viewed laterally and with rounded snout margin when viewed from above. Gill openings narrow, extending from immediately ventral to posttemporal to immediately ventral to base of pectoral spine. Gill membranes united to, and attached across, isthmus. Bony elements of dorsal surface of head covered with thin skin. Nuchal shield narrow. Supracleithral process broad and extending to proximal fifth of pectoral spine.

Eye ovoid, horizontal axis longest; located entirely in dorsal half of head. Orbit without free margin. Eyes moderately closely set, separated by distance about 2.7–3.0 times of orbit diameter from each other.

Oral sucker round and moderately large, with numerous papillae of uniform size evenly distributed over almost entire surface (Fig. 3). Barbels well developed, maxillary barbels extending beyond hind edge of oral sucker; 3–4 auxiliary mandibular barbels present on each side of lower lip. Some individuals (9 of 26 examined) with an auxiliary mandibular barbel external to outer primary mandibular barbel.

Oral teeth in rows on all tooth-bearing surfaces. Premaxillary teeth in two large ovoid patches on either side of symphysis. Primary and secondary teeth 19–35, disposed in 4–5 rows, acutely pointed and recurved; primary and secondary teeth not separated by distinct gap. Tertiary teeth 13–21, elongate, villiform and disposed in 2–3 rows. Mandibular teeth 4+4 to 5+5, closely spaced, acutely pointed, and straight.

Dorsal fin located at anterior two fifths of body, with convex margin and I,5 (26) rays. Dorsal-fin spine short, stout and laterally flattened; smooth on both anterior and posterior margins in individuals under 45 mm SL; in individuals over 45 mm SL, 2–3 very weak retrorse (proximally directed) notches present on distal portion of anterior edge of spine. Adipose fin moderate, extending for about half of postdorsal distance; margin slightly convex for entire length and posterior end deeply incised. Caudal fin sexually dimorphic, with *i*,7,7,*i* (3) or *i*,7,8,*i** (23) principal rays. Males with caudal fin broad, the central rays greatly produced and rounded distally (Fig. 1), females with caudal fin emarginate (Fig. 2). Anal-fin base located approximately below adipose fin, exhibiting sexual dimorphism in size (males with longer anal-fin rays). Anal fin with *iv*,6 (1); *iv*,6,*i* (2); *v*,6 (1); *iv*,7 (15); *iv*,7,*i*



Fig. 1. *Chiloglanis productus*, holotype male, UMMZ 199816, 46.0 mm SL.

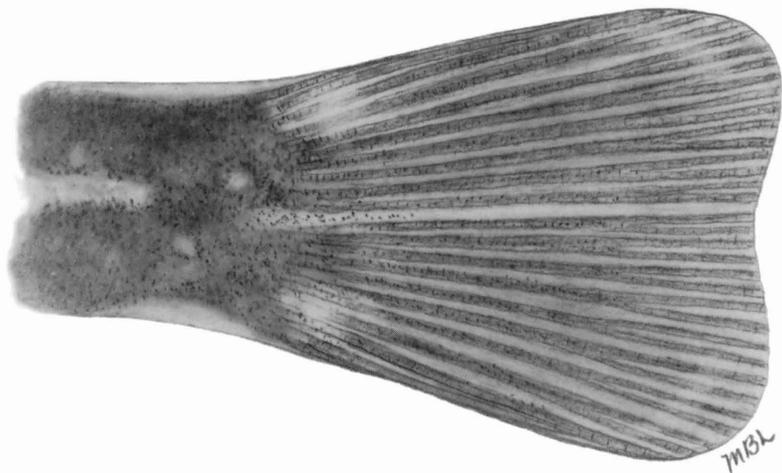


Fig. 2. Caudal fin of female *Chiloglanis productus* (UMMZ 199817, paratype, 41.5 mm SL).

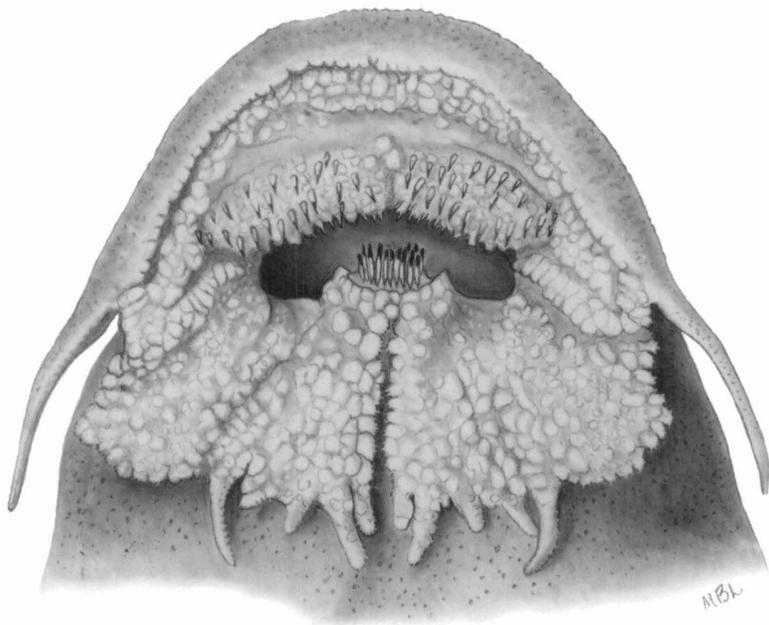


Fig. 3. Oral disc of *Chiloglanis productus* (UMMZ 199817, paratype female, 41.5 mm SL).

(5) or iv,8* (2) rays and convex margin. Pelvic-fin origin at vertical ventral to posterior end of dorsal-fin base. Pelvic fin with i,5 (26) rays and slightly convex margin; tip of appressed fin not reaching anal-fin origin. Pectoral fin with I,7* (8); I,7,i (1) or I,8 (17) rays; spine straight, short and flattened. Anterior spine margin with 2–3 indistinct retrorse (proximally directed) notches along distal portion. Posterior spine margin with 7–9 serrations along entire length; proximalmost 3–5 serrations very much more distinct, sometimes bifurcate. Pectoral-fin margin convex posteriorly. Vertebrae 14+17=31 (4); 15+16=31 (3); 14+18=32 (1); 15+17=32 (10); 16+16=32 (1); 14+19=33 (1); 15+18=33* (3); or 16+17=33 (2).

Males with numerous tubercles on top and sides of head on region extending from snout to preopercle, and short, conical and slightly recurved genital papilla situated posterior to anus. Females with marginally fewer tubercles on top and sides of head, and with genital papilla in form of small rounded protuberance.

COLORATION: Overall, *C. productus* is a rather drab species, lacking dark and light contrasting markings on body and fins that characterize many congeners. In 70% ethanol: dorsal and lateral surfaces and of head and body purplish gray, fading to lighter brown on belly, ventral surface of head, and oral disc. Light brown midlateral stripe running along sides of body. Small light brown spots arranged in 6–7 vertical series faintly visible in some individuals. Dorsal midline of body with two ovoid light brown patches: first one immediately anterior to, and second one just posterior to adipose fin. Dorsal margin of adipose fin light brown, partially coalescent with aforementioned patches, and imparting appearance of a pale middorsal stripe. Dorsal- and anal-fin rays with purplish brown regions arranged as subdistal bands. Pelvic fins hyaline. Pectoral fins with purplish brown bases and purplish brown regions in fin rays arranged as subdistal bands. Caudal-fin rays purplish brown, with two ovoid lighter brown spots arranged at upper and lower bases of caudal fin lobes.

DISTRIBUTION: *Chiloglanis productus* is known only from the Lunzua River drainage, which drains into the southern tip of Lake Tanganyika in Zambia (Fig. 4).

HABITAT AND ECOLOGY: The type locality of *C. productus* is a clear, fast-flowing stream, with boulders, gravel and sand as substrate. The water was cool (22.8°C). Other fish collected at this locality were: *Kneria wittei* Poll, 1944 (Kneriidae), *Amphilius uranoscopus* (Pfeffer, 1889) (Amphiliidae), *Clarias liocephalus* Boulenger, 1898 (Clariidae), and *Barbus kerstenii* Peters, 1868 (Cyprinidae). Part of the series of the latter species (UMMZ 199814) was examined by the late P. H. Greenwood, who identified them (pers. comm. to RMB, 24 January 1972) as *Barbus*

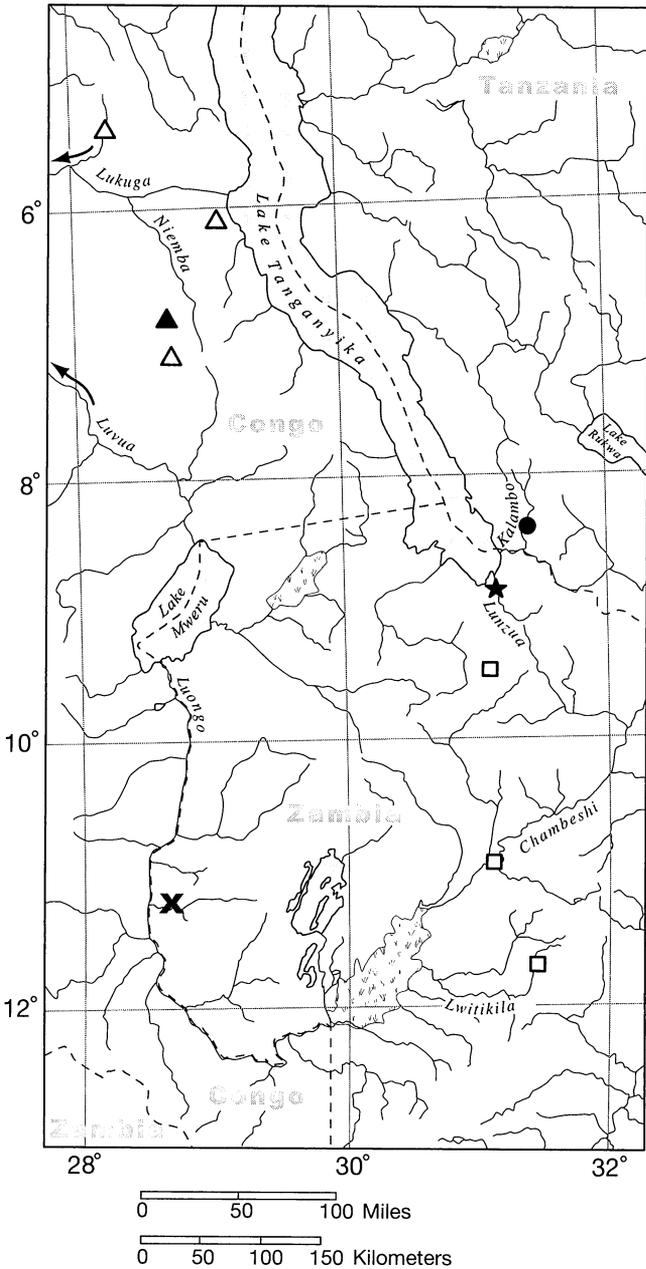


Fig. 4. Northern Zambia, southeastern Congo, and southwestern Tanzania, showing type localities of four species of *Chiloglanis* (solid symbols). Non-type localities appear as open symbols. *Chiloglanis productus* (★), *C. kalambo* (●), *C. macropterus* (✱), *C. lukugae* (Δ▲) and *C. sp.* (□).

tangandensis subspecies “seems to link *B. eutaenia* [Boulenger, 1904], *B. kerstenii*, and *B. tangandensis*” (see also Greenwood, 1962). We have compared these fish with series of “*B. tangandensis*” from the Chambeshi (Congo) and Zambezi river drainages, and believe *B. tangandensis* Jubb, 1954, is a synonym of *B. kerstenii* Peters, 1868, in apparent agreement with Skelton (2001). A notable shared character is the bright red spot on the opercle (Greenwood, 1962; Skelton, 2001).

ETYMOLOGY: From the Latin adjective *productus*, meaning lengthened or prolonged, in reference to the shape of the caudal fin in males. We also propose the common name of “Lunzua suckermouth catfish” for this species.

DISCUSSION

The characters useful for diagnosing species of *Chiloglanis* have been discussed in detail by Roberts (1989). Among the characters discussed, we have found coloration, sexual dimorphism, and barbel morphology to be useful in diagnosing *C. productus*. Both the color pattern and the male caudal fin shape of *C. productus* are unique and not shared by any other congener. The presence of numerous auxiliary mandibular barbels and the occasional presence of an auxiliary mandibular barbel external to the outer primary mandibular barbel is a condition shared only with *C. polypogon* Roberts, 1989, but *C. productus* is easily distinguished from *C. polypogon* by other characters mentioned above.

In *Chiloglanis*, the caudal fin exhibits notable variations (Seegers, 1996: 218; redrawn here as Fig. 5). In some, the sexes have similar shaped caudal fins, while others exhibit striking sexual dimorphism. In most species, the caudal fin is either shallowly or deeply forked, but in some, one lobe may be decidedly longer (e.g., in males of *C. asymetricaudalis* de Vos, 1993 and *C. batesii* Boulenger, 1904). In addition to *C. productus*, species known to us in which the males have elongate middle caudal-fin rays are *C. anoterus* Crass, 1960, from the Phongolo and Incomati river systems in southern Africa, and *C. macropterus* Poll & Stewart, 1975, from the Luongo River in Zambia. The differences between *C. productus* and these two species are outlined in the diagnosis.

The geographic ranges of species of *Chiloglanis* are typically much restricted. For example, Seegers (1996) recognized five (possibly six) allopatric species in the Lake Rukwa species flock of western Tanzania, including *C. kalambo* Seegers, 1996 in the adjacent Kalambo drainage. An exception to this generalization appears to be *C. batesii*, which with its synonym *C. micropogon* Poll, 1952, occurs “in all river basins of Cameroun, throughout the Niger and Zaire basins, and is the only species of the genus in the Chad basin...” (Roberts, 1989). *Chiloglanis*

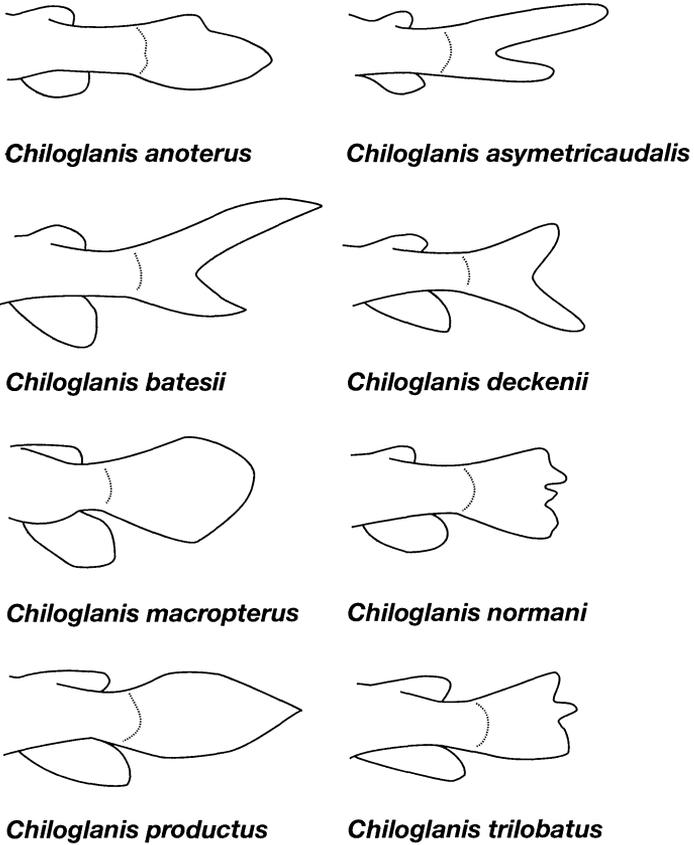


Fig. 5. Variation in the caudal fin in males of *Chiloglanis* species exhibiting sexual dimorphism (redrawn from Seegers, 1996). The posterior tip of the caudal fin in *C. productus* is pointed, as drawn by Seegers (1996), but rounded in our material (see Fig. 1).

neumannii Boulenger, 1911, has been reported by Roberts (1989) to occur in the Luapula-Congo drainage of Zambia, close to the type locality of *C. productus*. These collections in the UMMZ include 19 specimens; the caudal fin is forked in all. It is obvious that these are not *C. productus*, but it is most unlikely that they are conspecific with *C. neumannii* s. str., which was described from the upper Bubu River, Masailand (=eastern Tanzania). Seegers (1996) redescribed *C. neumannii* and suggested that the species is restricted to the Bubu drainage. As illustrated and described by Boulenger, *C. neumannii* has a deeply forked caudal fin with pointed lobes. Seegers (1996) also recorded a small specimen of *Chiloglanis* from the Chambeshi River drainage that lacked pectoral fins and which he suspected to be a distinct species. It seems more

likely for this individual fish to either have an ontogenetic defect, as he suggested as possible, or exhibit a teratological condition. *Chiloglanis* are characterized by strong pectoral fins, and their specific absence is improbable; the 19 specimens taken by RMB in the same drainage area all have normal pectoral fins. This Chambeshi species is yet to be identified.

Two species of *Chiloglanis* were described from the Lake Tanganyika area by Poll (1944). The collecting localities of one, *C. lukugae*, were amended by Poll (1953) to include two small affluents of the Luvua River at Sange (type locality, ca. 6°48'S 28°19'E) and Mambue, on the road from Albertville to Kiambi (ca. 115 and 165 km respectively SW of Albertville; see Poll, 1953: 251). Additional localities for *C. lukugae* included the Lubalaye River (tributary to the Lukuga River in the Congo drainage), Koki River (an affluent of Lake Tanganyika near Albertville), and several stations tributary to the Ruzizi River near the northern end of Lake Tanganyika. Poll's (1953) comparison of these populations led him to unite them under one determination. Nevertheless, a specimen 70 mm long from the Koki River, sympatric with *C. lukugae*, had been described as *C. pojeri* Poll, 1944. Poll's descriptions of the caudal-fin shape in both are the same ("Caudale enchancree") and his figure of *C. lukugae* from the Sanghe River (this locality is spelled "Sange" in the text, see Poll, 1953: 166, 167, and "Sanghe" on the map, see Poll: 1953: 251), tributary to the Ruzizi, shows a deeply forked caudal fin, contrasting notably with *C. productus*. Comparison of the descriptions of *C. lukugae* and *C. pojeri* reveals close agreement in most characters, with minor differences. We provisionally regard the names of these sympatric nominal species of the same date as synonyms, and as first revisers, select *C. lukugae* for the combined taxon.

Four additional species of *Chiloglanis* were reported from the Lake Tanganyika drainage by Seegers (1996): *C. asymetricaudalis* (Mukuti River), *C. sp.* (Nyamgomgo River), *C. somereni* Whitehead, 1958 (Nkululu River, in the Malagarasi River drainage) and *C. kalambo*; the first three species have well forked caudal fins and the last has a truncate caudal fin (with produced central fin rays in mature males; Seegers, 1996: Fig. 281). *Chiloglanis somereni* was originally described from the Lake Victoria drainage and its record from the Lake Tanganyika drainage by Seegers (1996) awaits verification. In addition to the caudal-fin shape, *C. kalambo* is a well marked species with contrasting colors (large light spots at midbody and on caudal peduncle, dark spots at the dorsal, pectoral, and pelvic fin bases, a pair of large dark blotches in the middle of the caudal fin, and a narrow dark submarginal band on the caudal fin), which is markedly different from the color pattern of *C. productus*. Seegers (1996) regarded *C. kalambo* as a geographically disjunct but

close relative of *C. trilobatus* Seegers, 1996 of the Lake Rukwa species group of *Chiloglanis*.

COMPARATIVE MATERIAL: *Chiloglanis asymetricaudalis*: MRAC 87-5-P-265-274 (10), 39.3-65.6 mm SL; Rwanda: Nyakabuye, Ruzizi River drainage, Rubyiyo River near its junction with Ntandwe River, 2°34'S 29°2'E.

C. anoterus: SAIAB 21677 (2 males, 48.0-54.0 mm SL, 6 females, 28.0-43.8 mm SL), South Africa: Pivanyane. SAIAB 25674 (6 males, 56.1-62.2 mm SL, 3 females, 50.8-52.1 mm SL), South Africa: Usutu River.

C. macropterus: ROM 30518 (3 male paratypes, 65.0-70.7 mm SL, 5 female paratypes, 30.5-69.8 mm SL), Zambia: Luongo River, at ferry crossing 53 km S of Kawambwa, 10°26'S 29°8'E.

C. sp.: UMMZ 199975 (8), 28.8-38.4 mm SL; Zambia: Northern Province, tributary to Lwombe River, 80 km SSW of Mbala, 9°30'S 31°13'E. UMMZ 199988 (4), 25.3-38.0 mm SL; Zambia: Northern Province, Lwitikila stream, 11 km NNE of Mpika, 11°45'S 31°28'E. (Five other specimens of this lot were sent on exchange to the California Academy of Sciences.) UMMZ 200183 (2), 18.9-23.8 mm SL; Zambia: Northern Province, Chambeshi River, Mbala-Mpika highway, 10°57'S 31°4'E.

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LITERATURE CITED

- Greenwood, P.H. 1962. A revision of certain *Barbus* (Pisces, Cyprinidae) from East, Central and South Africa. *Bulletin of the British Museum (Natural History), Zoology Series*, 8: 151-208.
- Ng, H.H. 2004. The *Microsynodontis* (Teleostei: Siluriformes: Mochokidae) of the lower Guinea region, west central Africa, with the description of eight new species. *Zootaxa*, 531: 1-52.

- Poll, M. 1944. Descriptions de poissons nouveaux recueillis dans la région d'Albertville (Congo belge) par le Dr. G. Pojer. *Bulletin du Musée royal d'histoire naturelle de Belgique*, 20: 1-12.
- Poll, M. 1953. Poissons non Cichlidae. *Résultat scientifiques. Exploration hydrobiologique du lac Tanganika (1946-1947)*, 3 (5A): 1-251, 11 pls.
- Poll, M. & D. Stewart. 1975. Un Mochocidae [sic] et un Kneriidae nouveaux de la rivière Luongo (Zambia), affluent du bassin du Congo (Pisces). *Revue de Zoologie africaine*, 89, no. 1:151-158.
- Roberts, T.R. 1989. Systematic revision and description of new species of suckermouth catfishes (*Chiloglanis*, Mochokidae) from Cameroun. *Proceedings of the California Academy of Sciences (Series 4)*, 46: 151-178.
- Seegers, L. 1996. The fishes of the Lake Rukwa drainage. *Annales. Sciences Zoologique. Musée Royal de l'Afrique Centrale Tervuren, Belgique*, 278: 1-407.
- Skelton, P.H. 2001. *A complete guide to the freshwater fishes of southern Africa*. Struik Publishers, Cape Town, 395 pp.
- Skelton, P.H. & P.N. White. 1990. Two new species of *Synodontis* (Pisces: Siluroidei: Mochokidae) from southern Africa. *Ichthyological Exploration of Freshwaters*, 1: 277-28.

