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Revision of the Congo River *Lamprologus* Schilthuis, 1891 (Teleostei: Cichlidae), with Descriptions of Two New Species

ROBERT C. SCHELLY[1] AND MELANIE L.J. STIASSNY[2]

ABSTRACT

The Congo River *Lamprologus* are revised and two new species are described. *Lamprologus teugelsi*, n.sp., from Malebo Pool and the lower Congo River rapids, and *L. tigripictilis*, n.sp., from the lower Congo River rapids, are readily distinguished from the remaining Congo River *Lamprologus* based on counts, measurements, osteology, and color pattern. Monophyly of the Congo River *Lamprologus* species is tentatively accepted and a key to the group is provided. All available collection localities for re-identified *Lamprologus* material from the Congo River are plotted for each species. Maps of collection localities reveal large distributional voids, suggesting that Congo River lamprologine diversity remains incompletely sampled.

INTRODUCTION

The African cichlid genera *Altolamprologus* Poll, 1986, *Chalinochromis* Poll, 1974, *Julidochromis* Boulenger, 1898, *Lamprologus* Schilthuis, 1891, *Lepidiolamprologus* Pellegrin, 1904, *Neolamprologus* Colombe and Allgayer, 1985, and *Telmatochromis* Boulenger, 1898, currently totaling some 90 species, comprise the Lamprologini in Poll's (1986) classification of the Lake Tanganyika cichlid assemblage. Most lamprologines are found in lacustrine habitats (Poll, 1986; Stiassny, 1997). About 90% of the species are restricted to Lake Tanganyika and associated rivers and streams, while 10% are found in the remaining Congo River drainage. Despite the predominance of lacustrine taxa in the Lamprologini, the first lamprologine to be described was fluviatile; the type

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species of the genus *Lamprologus* is *congoensis*, a species originally based on three specimens from Malebo Pool (Stanley Pool) on the lower Congo River (Schilthuis, 1891). Within just a few years, several expeditions to the rift valley lakes, including that of Moore in 1895–1896 (Moore, 1903), provided enough material to begin describing the lamprologine-rich ichthyofauna of Lake Tanganyika (Boulenger, 1898a, 1898b, 1899a, 1899b, 1901, 1906; Pellegrin, 1904). Subsequent to the descriptions of *L. tumbanus* Boulenger, 1899 and *L. mocquardi* Pellegrin, 1903, 56 years elapsed before the discovery of a fourth Congo River species, *L. werneri* Poll, 1959, among the riverine taxa. Since 1959, only two Congo River species have been described, both based on very small numbers of specimens with narrowly restricted distributions: *L. symoensi* Poll, 1976, and *L. lethops* Roberts and Stewart, 1976, which is the only known blind cichlid. This history suggests, tantalizingly, that the sampling of Congo River lamprologine diversity is far from complete, and in the course of the present study two additional riverine species have been recognized, bringing the total of known species to eight.[3]

Recently, the intrarelationships of lamprologines have been investigated, and with lamprologine monophyly well supported by both morphological (Stiassny, 1997) and molecular (Sturmbauer et al., 1994; Salzburger et al., 2002) evidence, speculation has turned to the nature and number of major evolutionary transitions within the clade. Some of the most intriguing of these questions are whether ancestral lamprologines arose in rivers or lakes, and the number of transitions between the two modalities in the history of the group. Molecular analyses that included some of the Congo River species of *Lamprologus* (e.g., Sturmbauer et al., 1994; Salzburger et al., 2002) apparently support Regan's (1920, 1922) contention that lamprologines first diversified in Lake Tanganyika and only secondarily invaded the Congo River system. Others have argued that ancient riverine lamprologines existed prior to the rift and invaded the rocky inshore habitats of Lake Tanganyika upon its formation, subsequently radiating to achieve their present diversity (De Vos et al., 2001). Roberts (1982) goes so far as to suggest that life in rocky rapids habitats preadapted cichlids such as *Haplochromis*, *Lamprologus*, and *Nanochromis* to colonize lake habitats characterized by rocks and boulders.

When existing morphological evidence is considered, the relationship of the Congo River *Lamprologus* to Lake Tanganyika endemics is far from resolved. Poll's (1986) classification of his tribe Lamprologini restricted the genus *Lamprologus* to include the Congo River species and 11 Lake Tanganyika species on the basis of their all having the second or third pelvic fin ray the longest, as opposed to the condition seen in the remaining lamprologines in which the first ray is the longest. However, this scheme is undercut by Stiassny's (1997) labial ossification character. In members of several lamprologine genera, including 8 of the 11 Lake Tanganyika *Lamprologus*, a fully ossified sesamoid bone is suspended in the labial ligament, but no such bone occurs in any of the Congo River species.

Additionally, in most lamprologines, the post-lachrymal infraorbital series is entirely absent. Exceptional among Lake Tanganyika lamprologines are *Neolamprologus toae* Poll, 1949, with a complete series of infraorbitals stretching from the lachrymal to the postorbital process, and *Variabilichromis moorii* Boulenger, 1898, which presents one or two infraorbitals adjacent to the dermosphenotic (Stiassny, 1997). The Congo River *Lamprologus* are unique among lamprologines in having, as an invariant condition, a reduced infraorbital series of one or more (typically two to three) tubular infraorbitals adjacent to the lachrymal. This character tentatively supports the monophyly of the Congo River species, a contention that is additionally supported (at least for the three included species) by the molecular analysis of Sturmbauer et al. (1994). Of course, the condition might also represent an intermediate stage of a tran-

[3] Additionally, *Neolamprologus devosi* from the Malagarasi River on the eastern shore of Lake Tanganyika has been newly described (Schelly et al., 2003), bringing the total number of exclusively fluviatile lamprologines in the greater Congo basin to nine. *Neolamprologus devosi* is not a member of the Congo River *Lamprologus* clade (Schelly et al., 2003), and is therefore excluded from this treatment.

sition series in a non-monophyletic portion of the phylogeny. While the ultimate resolution of the question of Congo River *Lamprologus* monophyly awaits a thorough phylogenetic analysis of all known lamprologines (Schelly, in prep.), the reality of the group as a circumscribed clade is tentatively accepted here.

Given the central importance of the Congo River *Lamprologus* to a full understanding of the evolutionary pathways that have given rise to present-day lamprologine diversity, a precise taxonomy of the group is a necessary prerequisite for further investigations. This revision is intended to provide such a foundation. In the course of this study we found that over 50% of Congo River *Lamprologus* material housed in museum collections was misidentified, including some of the vouchers representing specimens used in various molecular analyses. Thus, in an age of molecular phylogenetics, the importance of museum collections and morphology-based taxonomic work is clearly still of paramount importance, and the critical need to deposit and curate voucher specimens in museum collections is underscored.

METHODS

Meristic counts and morphometric measurements followed Barel et al. (1977), and were made on the left side of specimens except in cases where damage necessitated use of the right side, with digital calipers to 0.1 mm. Specimens were cleared and counterstained following Dingerkus and Uhler (1977). Where sufficient material was available, dissections were made of the abdominal cavity to measure gut length and analyze stomach contents. Whenever possible, approximately equal numbers of males and females of various size classes and collection localities were selected for measurement. With the exception of recently collected materials for which Global Positioning System (GPS) data were available, when geographic coordinates are given for collection localities, these data have been taken from the MRAC geographical database or derived from gazetteers, and the implied precision should be approached with caution.

INSTITUTIONAL ABBREVIATIONS

AMNH	American Museum of Natural History, New York
BMNH	The Natural History Museum, London
IRSNB	Institut Royal des Sciences Naturelles de Belgique, Brussels
MCZ	Museum of Comparative Zoology, Cambridge
MNHN	Muséum National d'Histoire Naturelle, Paris
MRAC	Musée Royal de l'Afrique Centrale, Tervuren
USNM	National Museum of Natural History, Washington, D.C.

ANATOMICAL ABBREVIATIONS

BD	body depth
FR	frontal ridge
HL	head length
LPJ	lower pharyngeal jaw
NLF0	neurocranial lateral line foramen 0
PSC	process for insertion of supracarinalis muscle
SL	standard length
SOC	supraoccipital crest
TL	total length

KEY TO SPECIES OF CONGO RIVER *LAMPROLOGUS*

1. 32 or more scales in lateral line; 30 or more vertebrae; head length 34.6% SL or less 2
– 29–31 scales in lateral line; 28–29 vertebrae; head length 34.6–37.0% SL; four sensory pore openings on the lachrymal; no interdigitation at LPJ suture (fig. 1a); supraneurals absent; relatively elevated supraoccipital crest continuous with frontal ridge extending to median coronal pore (fig. 2a) . . . . *Lamprologus tumbanus*
2. Flank scales irregular in size (fig. 3a), obscuring parallel rows; scaleless patch on head extending caudally well beyond dorsal fin origin (fig. 4a); supraoccipital crest low, no frontal ridge extending to median coronal pore (fig. 2c) 3
– Flank scales are of uniform size (fig. 3b), arranged in parallel rows; nape scaled to dorsal fin origin or beyond (fig. 4b,c); supraoccipital crest variable 4
3. Eyes greatly reduced and covered by thick skin; body depigmented; head dorsoventrally flattened; body depth 17.9% SL; 43–49 scales in lateral line; four sensory pore openings on the lachrymal; strongly interdigitat-

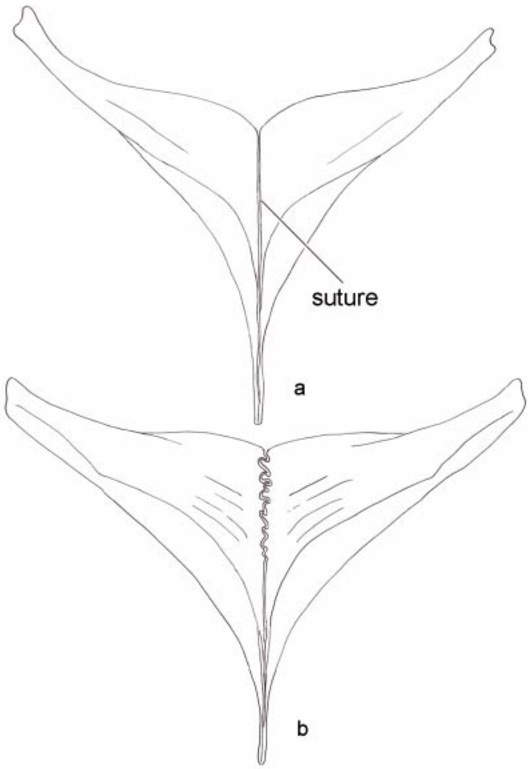


Fig. 1. Schematic of lower pharyngeal jaw ventral suture: (**a**) no interdigitation; (**b**) strongly interdigitating.

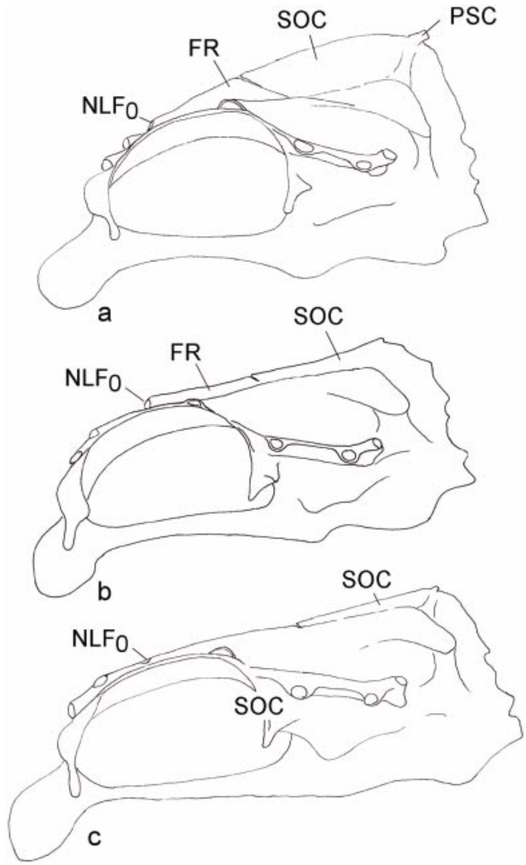


Fig. 2. Schematic of various manifestations of supraoccipital crest and frontal ridge: (**a**) Elevated supraoccipital crest continuous with frontal ridge to neurocranial lateral line foramen 0; (**b**) low supraoccipital crest continuous with frontal ridge to neurocranial lateral line foramen 0; (**c**) low supraoccipital crest, no frontal ridge extending to neurocranial lateral line foramen 0.

ing LPJ suture (fig. 1b); supraneural absent . . . . *Lamprologus lethops*

– Eyes not reduced; body pigmented; head not flattened; body depth 22.5–27.4% SL; 35–42 scales in lateral line; five sensory pore openings on the lachrymal; no interdigitation at LPJ suture (fig. 1a); supraneural polymorphic . . . . *Lamprologus symoensi*

4. Dark pigment around entire caudal edge of each scale, giving chain-link fence appearance of intersecting bands on sides of body; scales extend anteriorly onto nape, or at least to dorsal fin origin (in *L. teugelsi*, n.sp.); single supraneural present or polymorphic 5

– Dark pigment restricted to dorsal half of caudal edge of each scale, giving appearance of oblique parallel bands; nape and region just below dorsal fin origin scaleless (fig. 4b); supraoccipital crest low, no frontal ridge extending to median coronal pore (fig. 2c); supraneural absent . . . . *Lamprologus mocquardi*

5. Pelvic fin extending posteriorly beyond anus; interdigitation at LPJ suture strong; low or elevated supraoccipital crest, continuous with frontal ridge extending to median coronal pore (fig. 2a,b) 6

– Pelvic fin very seldom (only in some large *L. werneri* males) or never reaching to anus; interdigitation at LPJ suture weak or absent (fig. 1a); low supraoccipital crest, continuous with frontal ridge extending to median coronal pore (fig. 2b) 7

6. 32–35 scales in lateral line; 14 precaudal, 30–31 total vertebrae; BD 21.0–27.8% SL; elevated supraoccipital crest, (fig. 2a); 5–6 dark vertical bars on flanks; nuccal hump of fatty tissue forms in adult males . . . . *Lamprologus congoensis*

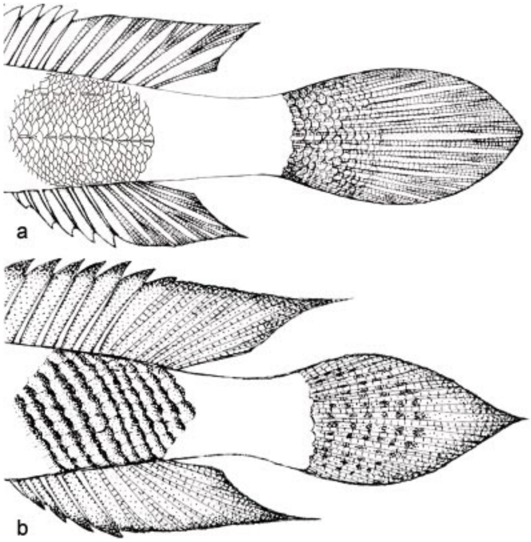


Fig. 3. Schematic of flank squamation patterns: (**a**) scales of irregular size, such that parallel oblique rows are obscured; (**b**) scales of uniform size, forming parallel oblique rows.

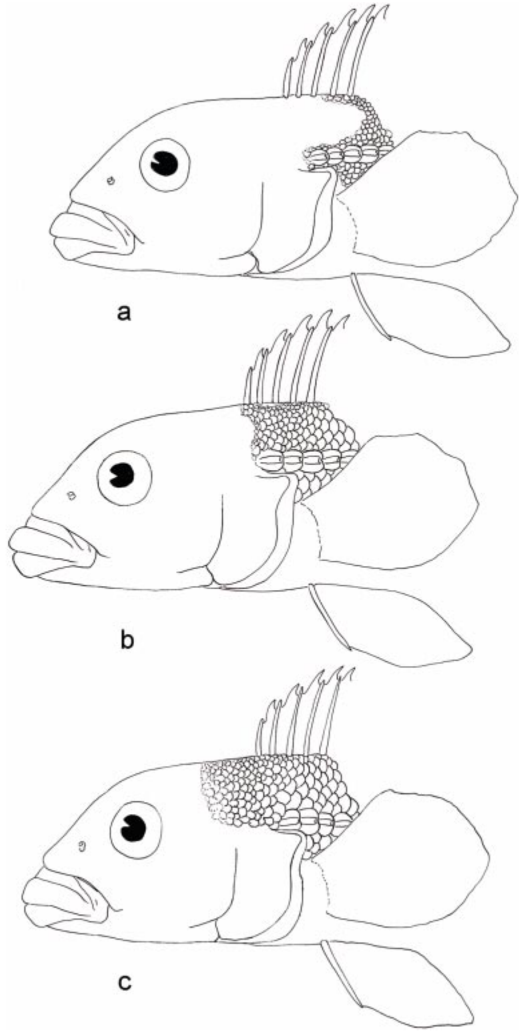


Fig. 4. Schematic of nape squamation patterns: (**a**) scaleless patch extends posteriorly well beyond dorsal fin origin; (**b**) nape scales extend anteriorly to dorsal fin origin; (**c**) nape scales extend anteriorly well beyond dorsal fin origin.

– 35–37 scales in lateral line; 14 precaudal, 31–33 total vertebrae; BD 17.1–24.4% SL; low supraoccipital crest, (fig. 2b); 9–10 dark vertical bars on flanks . . . . *Lamprologus tigripictilis*, n.sp.

7. 34–37 scales in lateral line; 15 precaudal, 31–33 total vertebrae; 12–15 total gill rakers on first gill arch; shallow bodied, BD 17.3–20.3% SL . . . . *Lamprologus werneri*

– 32–34 scales in lateral line; 14 precaudal, 30–32 total vertebrae; 8–11 total gill rakers on first gill arch; relatively deep-bodied, BD 21.9–28.6% SL . . . . *Lamprologus teugelsi*, n.sp.

TAXONOMIC SECTION

Lamprologus congoensis Schilthuis, 1891
Figures 5–8, Table 1,
Plate 1a

Acanthochromis seminudus Vaillant, 1886: 18 (*nomen nudum*) (Type locality: Nganchou).
Lamprologus congoensis Schilthuis, 1891: 85, fig. 1 (Type locality: Kinshasa, Stanley Pool).
Lamprologus congolensis: Boulenger, 1901: 402.
Lamprologus fuscus Pellegrin, 1927: 52 (Type locality: Bolobo).

LECTOTYPE: BMNH 1891.12.29.10, Kinshasa, 4°15′2″S, 15°25′0″E, A. Greshoff. (This specimen is here designated the lectotype as it is the largest of the remaining syntypes; BMNH 1899.9.6.1, the largest syntype, is lost.)

PARALECTOTYPE: BMNH 1891.12.29.11, collected with lectotype.

ADDITIONAL MATERIAL EXAMINED: 91 specimens. **Bolobo** (02°09′S, 16°14′E) MRAC 19711 (Holotype of *Lamprologus fuscus* Pel-

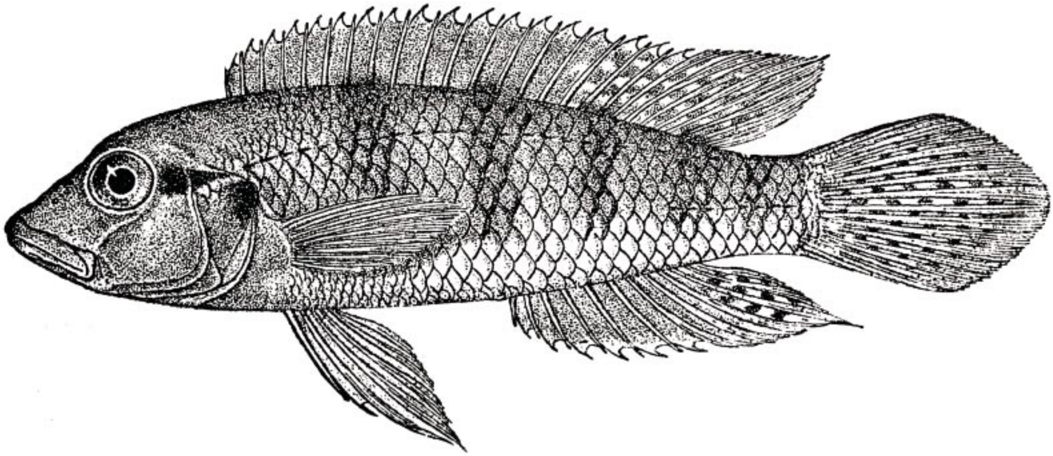


Fig. 5. *Lamprologus congoensis*, male, 100 mm TL, modified from Boulenger (1915).

legrin, 1927), H. Schouteden; MRAC 175060, 1/1/1956–12/31/1956. **N'Kele; Kasai River, Makaw** (03°28′S, 18°18′E) MRAC 153440, 1/1/1954–12/31/1954, E. Jans. **Kasai River, Bokoni** (03°9′S, 17°10′E) AMNH 233570 (*n* = 2), 9/17/2002, C. Shumway et al. **Kinshasa (Léopoldville)** (04°18′S, 15°18′E) MRAC 17483–17484 (1 specimen c&s), H. Schouteden; MRAC 39576, 1/1/1934–3/16/1934, A. Tinant; MRAC 39624, 1/1/1934–4/3/1934, A. Tinant; MRAC 40950–40951, 1/1/1934–4/24/1934, A. Tinant; MRAC 41004–41005, 1/1/1934–4/24/1934, A. Tinant; MRAC 43983, 1/1/1935–12/16/1935, A. Tinant; MRAC 55231–55232, 1/1/1937–12/31/1937, A. Tinant; MRAC 76060.0116, 10/19/1960, P. Brichard; MRAC 77346–77347, 1/1/1951–12/

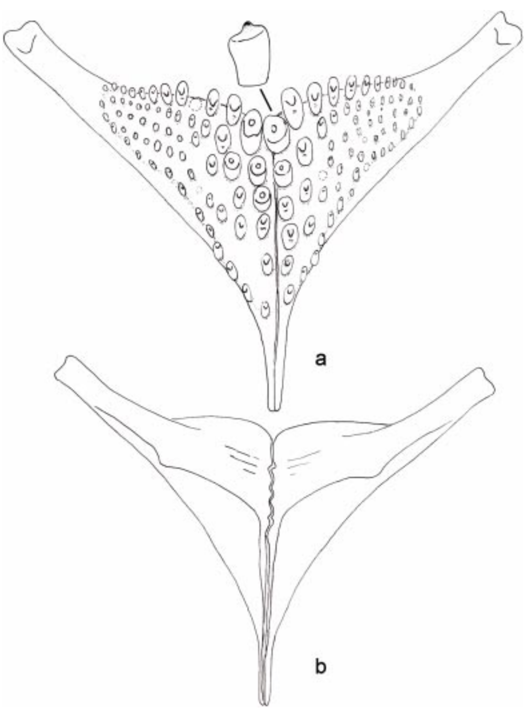


Fig. 6. Lower pharyngeal jaw of *Lamprologus congoensis* MRAC 78144: (**a**) dorsal view, showing medial molariform teeth; (**b**) ventral view, showing interdigitating suture.

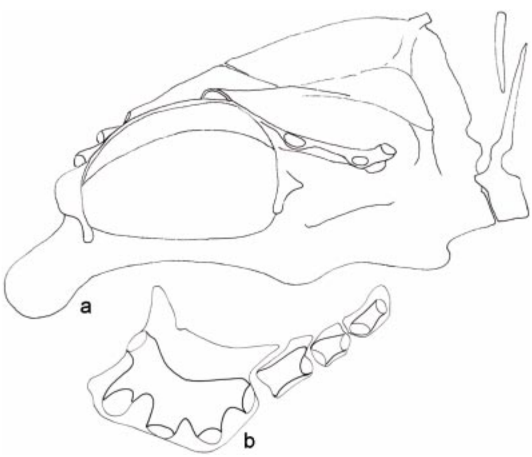


Fig. 7. *Lamprologus congoensis*, MRAC 118154: (**a**) neurocranium, first vertebra, and supraneural; (**b**) lachrymal and adjacent infraorbitals.

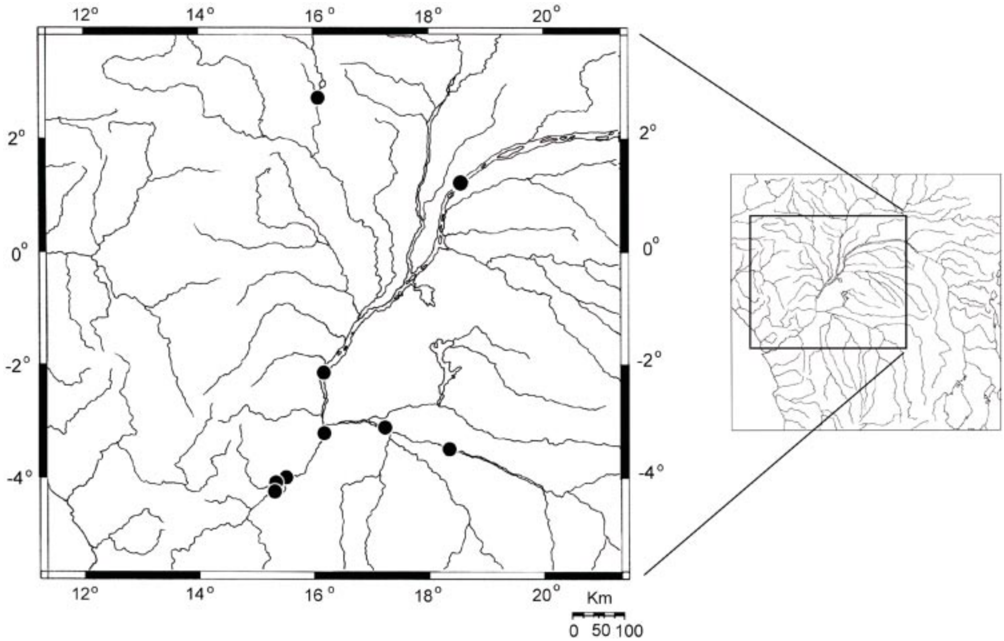


Fig. 8. Collection localities of *Lamprologus congoensis*.

31/1951, A. Dubois; MRAC 78144, 1/1/1951–12/31/1951, M.H. Pierret; MRAC 94009.0001–94009.0005, 1/1/1993–12/31/1993, W. van der Elst; MRAC 177669, 1/1/1967–12/31/1967, P. Brichard; AMNH 233613 (*n* = 13, 11 c&s), aquarium trade specimens from Kinshasa region, 10/27/2003. **Léopoldville, Kalina** (04°18′S, 15°16′E) MRAC 67426, 6/1/1945–6/30/1945, J.M. Berteaux. **Stanley Pool** (04°06′S, 15°15′E // 04°20′S, 15°23′E) MRAC 88001.2808–88001.2841, 1/1/1957–12/31/1957, Brien, Poll, & Bouillon; MRAC 94314–94317, 1/1/1954–5/31/1954, Dubois & Dubois; MRAC 88001.2807, Stanley Pool, Stat. 5, Bamu archipelago, 04°14′S, 15°22′E, 9/9/1957, Brien, Poll, & Bouillon; MRAC 118140–118154 (3 specimens c&s), Stanley Pool, Stat. 33, channel in front of Maluku, 04°04′S, 15°33′E, 10/4/1957, Brien, Poll, & Bouillon. **Monsembe, upper Congo** (01°08′N, 18°32′E) BMNH 1896.3.9.13–14 (1 specimen c&s), Rev'd. J.H. Weeks; BMNH 1898.7.9.15, Rev'd. J.H. Weeks. **Nganchou, Congo** (03°20′S, 16°12′E) MNHN 1886.442–445 (Syntypes of *Acanthochromis seminudus* Vaillant, 1886), Savorgnan de Brazza. **Sangha River, Bayonga,** Doli Lodge, by sand island in middle of channel, Central African Republic (02°55′N, 16°15′E) AMNH 227439 (*n* = 1), 6/10/1998, J. Sullivan & J. Kindimoungo. Locality unknown: MRAC 183617–183620, W. Wickler.

DIFFERENTIAL DIAGNOSIS: *Lamprologus congoensis* is distinguished from *L. lethops* and *L. symoensi* by its regularly imbricating, large, uniformly sized flank scales. It is distinguished from *L. mocquardi* by an elevated supraoccipital crest, presence of a single supraneural, and uniformly dark pigment around the exposed margin of the flank scales, giving the appearance of chain mail. *Lamprologus congoensis* and *L. tumbanus* are similarly deep bodied and share a similar flank pigmentation pattern, but *L. congoensis* differs from *L. tumbanus* in having 32–35 lateral line scales (vs. 29–31 in *L. tumbanus*), a shorter HL as a percentage of SL (31.3–34.6% vs. 34.6–37.0% in *L. tumbanus*), and five sensory pore openings on the lachrymal instead of four. While *L. congoensis* has long pelvic fins reaching beyond the anal fin origin and a strongly interdigitating LPJ ventral suture, both *L. werneri* and *L. teugelsi*, n.sp., have short pelvic fins that rarely or never reach the anus and minimal or no interdigi-

TABLE 1
Morphometric and Meristic Data for *Lamprologus congoensis*

Measurements	Lectotype	*N*	Mean	Min	Max	SD
Standard length (mm)	63.9	20	60.2	25.9	104.3	19.71
Percentage of standard length						
Body depth	24.0	20	25.2	21.0	27.8	2.01
Head length	33.2	20	32.8	31.3	34.6	0.90
Caudal peduncle depth	11.8	20	11.7	10.4	13.0	0.68
Caudal peduncle length	15.0	20	14.4	12.3	16.5	1.08
Anal fin base length	23.2	20	21.9	20.1	23.8	1.06
Dorsal fin base length	60.2	20	58.2	52.3	62.8	2.72
Pelvic fin length	22.8	19	24.8	19.7	30.4	3.03
Caudal fin length	28.6	19	29.1	24.0	32.6	2.79
Pectoral fin length	21.2	19	22.0	18.9	24.1	1.16
Predorsal fin distance	32.7	20	33.3	31.6	35.3	1.15
Preanal fin distance	66.0	20	65.0	62.2	68.3	1.69
Prepectoral fin distance	36.7	20	36.2	33.9	39.6	1.43
Prepelvic fin distance	37.4	20	38.9	34.7	43.7	2.39
Percentage of head length						
Lower jaw length	39.3	20	37.8	30.4	51.1	5.48
Eye diameter	24.2	20	26.8	22.4	32.2	2.18
Snout length	37.8	20	36.0	30.8	44.0	3.68
Interorbital width	20.8	20	22.7	17.9	27.3	2.45

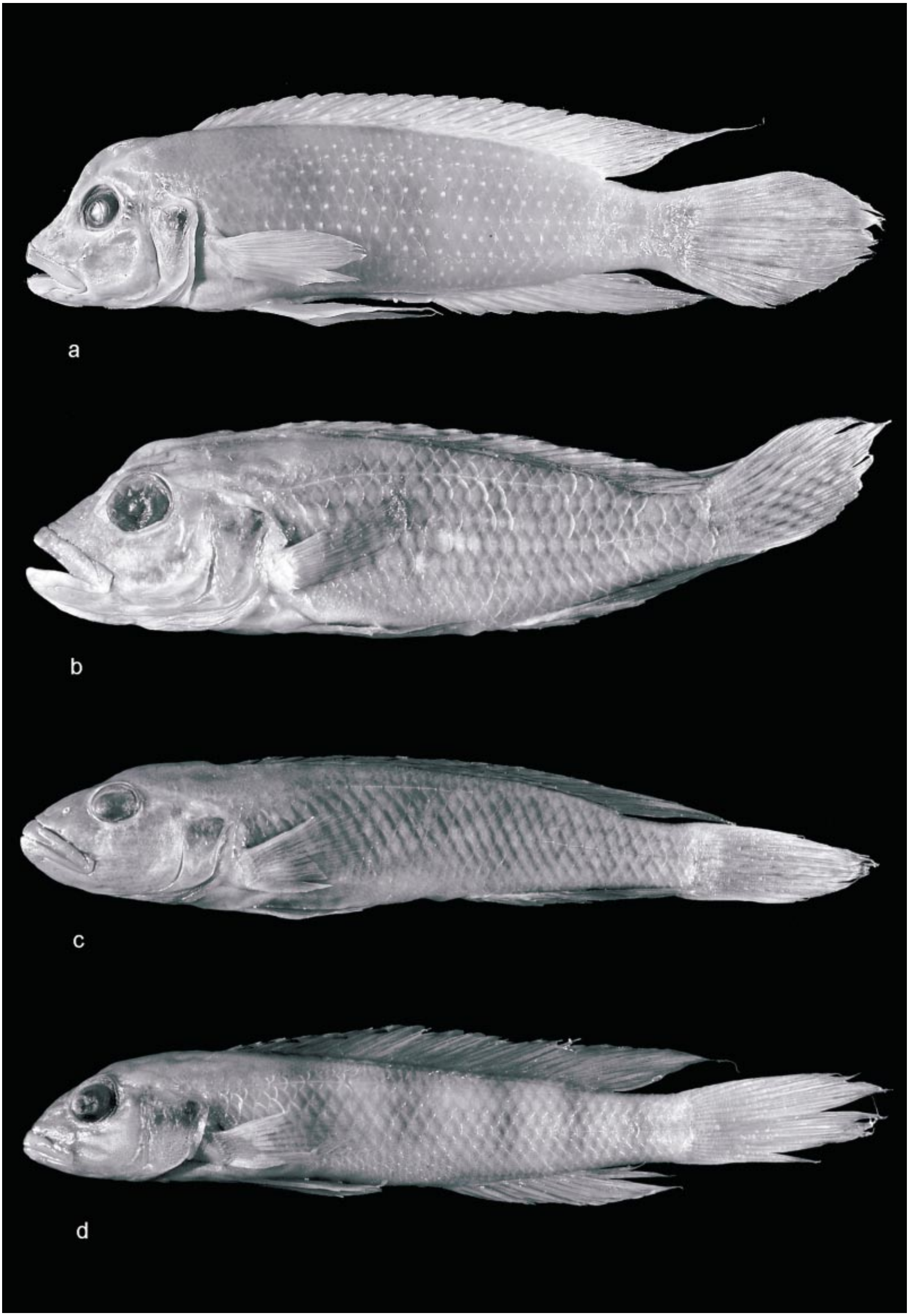
Counts	Lectotype	Variation
Lateral line scales	33	32 (1), 33 (10), 34 (6), 35 (3)
Dorsal fin spines and rays	XIX 8	XVII 8 (1), XVII 9 (1), XVIII 8 (2), XVIII 9 (6), XIX 6 (1), XIX 7 (3), XIX 8 (5), XIX 9 (1)
Anal fin spines and rays	VI 5	V 6 (1), V 7 (1), VI 5 (3), VI 6 (14), VII 5 (1)
Gill rakers	7,0,4	6,1,2 (2), 6,1,4 (1), 7,0,2 (1), 7,0,3 (1), 7,0,4 (1), 7,1,2 (1), 7,1,3 (5), 7,1,4 (1), 8,1,2 (1), 8,1,3 (4), 9,1,5 (1)
Vertebrae	14+17	14+16 (6), 14+17 (7)

tation at the LPJ ventral suture. While *L. congoensis* shares with *L. tigripictilis*, n.sp., relatively produced pelvic fins and a strongly interdigitating LPJ ventral suture, *L. congoensis* has 5–6 rather than the 9–10 dark bars on the flanks of *L. tigripictilis*, n.sp. Additionally, *L. congoensis* has an elevated supraoccipital crest while *L. tigripictilis*, n.sp., has a low crest, and almost without exception has fewer vertebrae (30–31 vs. 31–33) and lateral line scales (32–35 vs. 35–37) than *L. tigripictilis*, n.sp.

DESCRIPTION: Counts and measurements for 20 specimens, including lectotype and paralectotype, are given in table 1. Among the more deep-bodied fluviatile species of *Lamprologus* (body depth 21.0–27.8%, mean 25.2% SL), especially so as adults. Greatest body depth at about base of second or third dorsal fin spine. Head length 31.3–34.6%,

→

Plate 1. (**a**) *Lamprologus congoensis*, MRAC 118140–53, male, 104 mm SL; (**b**) *Lamprologus tumbanus*, MRAC 100851–53, male, 51 mm SL; (**c**) *Lamprologus mocquardi*, AMNH 5897, male, 78 mm SL; (**d**) *Lamprologus werneri*, MRAC 98158–92, male, 56 mm SL.


a
b
c
d

mean 32.8% SL. In smaller individuals, head profile rises at an angle of about 40°. In larger individuals, profile rises more steeply, at an angle of about 50° from tip of snout to top of orbit. Dorsal body profile convex, curving gently downward along length of dorsal fin to caudal peduncle; ventral body profile somewhat rounded posteriorly, curving gently upward anterior to caudal peduncle. Species sexually dimorphic, with adult males displaying well-developed, fat-filled nuchal hump (resulting in slight concavity of dorsal head profile anterior to the nuchal hump). Males also attain larger size (largest male 104.3 mm, largest female 75.0 mm), and have somewhat longer dorsal, anal, and pelvic fins than females.

Fins: Dorsal fin XVII–XIX (mode XIX) 6–9. Anal fin V–VII (mode VI) 5–7 (mode 6). Spines in both fins gradually increasing in length posteriorly. Dorsal and anal fins with tapering filamentous extensions reaching to about midlevel of caudal fin. Caudal fin large, rounded, and paddle-shaped, with 14 branched rays; often appears lance-shaped, subacuminate in preserved specimens or when adducted. Pectoral fins short, not reaching vertical through anus. Pelvic fins in all but smallest individuals elongate, with tapering ends reaching or extending just beyond anal fin origin (pelvic fin length 19.7–30.4%, mean 24.8% SL). Second ray of pelvic fin longest in fin in both sexes.

Teeth: Jaws isognathous, with both outer and inner row teeth unicuspid and sharply pointed. Single series of 6–8 greatly enlarged, recurved, procumbent canines situated anteriorly, with largest teeth furthest from symphysis. Inner teeth in 6–8 poorly defined rows of tightly packed, small, recurved caniniform teeth anteriorly, gradually thinning along length of jaw to 1 or 2 rows posteriorly. Lateral-most tooth row slightly enlarged and extending almost entire length of dentary and premaxilla.

Gill Rakers: Relatively slender, elongate, non-denticulate. Gill rakers number 6–9 (typically 7) along hypobranchial and ceratobranchial of first gill arch, with a single raker positioned in angle of arch in most cases. Two to 5 (typically 3) rakers along epibranchial of first gill arch.

Lower Pharyngeal Jaw (fig. 6): Wider than long, strongly interdigitating along ventral suture. Usually 25–28 teeth in most posterior tooth row. Medial teeth enlarged and more or less molariform; lateral teeth slender and either beveled or bluntly hooked.

Scales: Flank scales ctenoid, of uniform size. Lateral line scales 32–35. Upper and lower branches of lateral line not overlapping. Cheek naked; opercle and subopercle partially scaled. Gradual transition to small scales on belly and above lateral line near dorsal fin origin, with small, embedded scales extending beyond dorsal fin origin onto nape. Dorsal and anal fins scaleless. Small scales occur over most of caudal fin.

Vertebrae: 30–31; 14+16 (6), 14+17 (7).

Additional Osteology (fig. 7): Infraorbital series comprised of broad, platelike lachrymal with 5 sensory canal openings, and 2–3 tubular infraorbitals adjacent to lachrymal. Dermosphenotic absent. Single supraneural present. Supraoccipital crest elevated, and extends anteriorly as low frontal ridge to median coronal pore (NLF0). In larger specimens, elongate, paired, clublike processes on supraoccipital crest serve as attachment areas for supracarinalis anterior tendons.

Coloration: In life, base body coloration grayish lavender, with shades of yellow on belly, posterior to base of pectoral fin, along junction of preopercle and opercle, and around ventral margin of orbit. Dark, scaleless opercular spot present. Five or six somewhat dark vertical bars along flanks usually present. Individual flank scales with dark pigment distributed uniformly around exposed posterior margin, creating intersecting rows of thin, oblique bands of pigment that present appearance of chain-link fence or chain mail. Small, whitish maculae along interspinous membrane and between rays of dorsal, anal, and caudal fins. Dorsal, anal, and caudal fins with oblique black striations. Adult males with iridescent spots in posterior field of most flank scales; each spot situated adjacent to the overlapping edge of the preceding scale. Preserved coloration yellowish brown, fading to uniform dull brown in very old specimens, with scale pigmentation often completely lost.

DIET: Gut short and simple, with a length of about 50% of SL. Gut contents included fragments of insects and a spider.

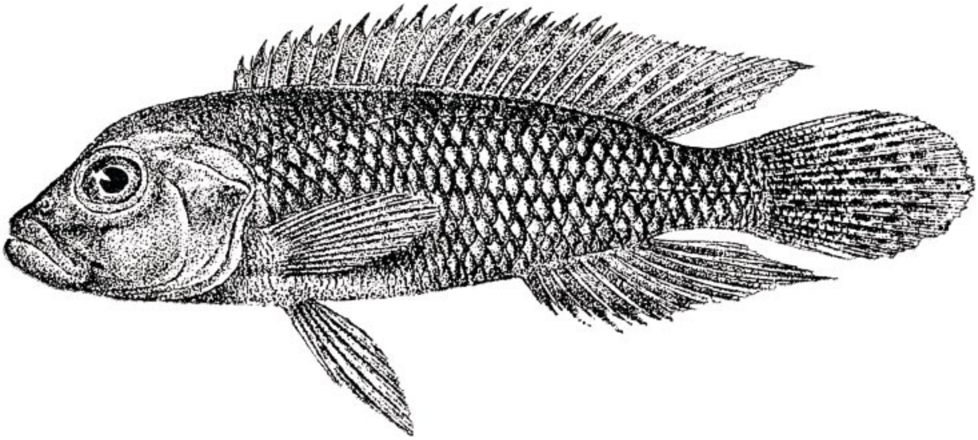


Fig. 9. *Lamprologus tumbanus*, male, 72 mm TL, modified from Boulenger (1899a).

DISTRIBUTION (fig. 8): Congo River mainstream from Malebo Pool to Monsembe (just upstream of the confluence of Congo and Lulonga Rivers); collections have also been made from the lower Kasai River and from the upper Sangha River in southwestern Central African Republic. Given the major gaps between the main channel Congo River collection localities and the occurrence of the species in the upper Sangha, it appears that *L. congoensis* remains unsampled from a large portion of its range.

REMARKS: Considering that *L. congoensis* is fairly common in the aquarium trade centered on the Kinshasa region, the number of specimens in museum collections is surprisingly small. In addition to being the largest species, and the only one in which males develop a nuccal hump, *L. congoensis* is distinctive among the Congo River *Lamprologus* in having fully molariform teeth along the symphysis of the LPJ (fig. 6a).

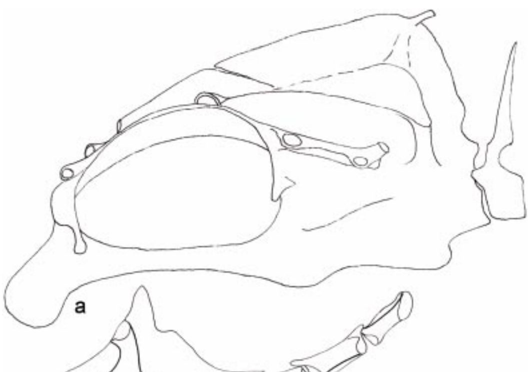


Fig. 10. *Lamprologus tumbanus*, MRAC 100851–53: (**a**) neurocranium and first vertebra; (**b**) lachrymal and adjacent infraorbitals.

Lamprologus tumbanus Boulenger, 1899
Figures 9–11, Table 2, Plate 1b

Lamprologus tumbanus Boulenger, 1899a: 116, pl. 44, fig. 3 (Type locality: Bikoro, Lake Tumba).

Lamprologus congolensis tumbanus: Poll, 1933: 143.

Lamprologus congoensis tumbanus: Colombe and Allgayer, 1985: 11.

LECTOTYPE: MRAC 1041, Bikoro, 00°40′S, 18°02′E, 1899, P. Delhez. (This specimen is here designated as the lectotype because it is the largest syntype and most closely resembles the original illustration.)

PARALECTOTYPES: MRAC 1042, Bikoro, 00°40′S, 18°02′E, 1899, P. Delhez; BMNH 1899.11.27.63, Bikoro, 00°40′S, 18°02′E, 1899, P. Delhez.

ADDITIONAL MATERIAL EXAMINED: 4 specimens. **Tondu, Lake Tumba** (00°50′S, 18°07′E) MRAC 18019, H. Schouteden. **Lake Tumba** (00°37′S, 17°49′E // 01°00′S, 18°09′E) MRAC 100851–100853 (1 specimen c&s), 9/29/1955–9/30/1955, G. Marlier.

DIFFERENTIAL DIAGNOSIS: *Lamprologus tumbanus* differs from all other Congo River *Lamprologus* species in having 29–31 in-

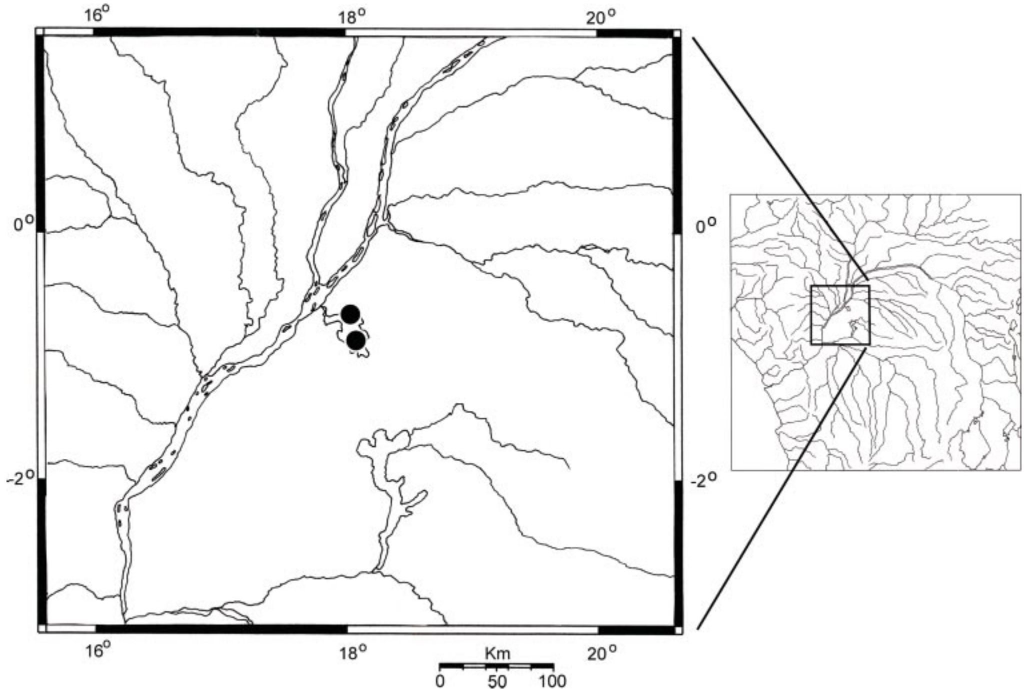


Fig. 11. Collection localities of *Lamprologus tumbanus.*

stead of 32 or more lateral line scales and 28–29 instead of 30 or more vertebrae and from all species save *L. lethops* in having four sensory pore openings on the lachrymal instead of five or six.

DESCRIPTION: Counts and measurements for 4 specimens, including lectotype and paralectotype MRAC 1042, are given in table 2. Achieves greatest relative body depth of the fluviatile *Lamprologus* (body depth 26.1–28.9%, mean 27.5% SL), with a greatest body depth at about base of second dorsal fin spine. Head length 34.6–37.0%, mean 35.7% SL, proportionally greatest of all riverine lamprologines. Dorsal head profile rises straight at angle of about 45°, angling sharply toward horizontal above orbit. Dorsal body profile gently convex, curving ventrally most steeply just anterior to caudal peduncle. Ventral body profile more or less straight, except for slight dorsal curvature anterior to caudal peduncle. Sexual dimorphism not obvious in limited material available.

Fins: Dorsal fin XVII–XVIII (mode XVII, lowest of riverine lamprologines) 7–9 (mode 9). Anal fin V 6–7. Filamentous extensions of dorsal and anal fins extend to midlevel of the caudal fin. Caudal fin large, rounded, and paddle-shaped, with 14 branched rays; often appears lance-shaped, subacuminate in preserved specimens. Pectoral fins short, not reaching vertical through anus. Pelvic fins relatively long (21.3–29.0%, mean 25.3% SL), reaching between anus and anal fin origin.

Teeth: Jaws isognathous, with sharply pointed unicuspid teeth. Six large canines implanted procumbently around jaw symphysis, with lateral teeth largest. Inner teeth are in 3–4 poorly defined rows of small, recurved, caniniform teeth, narrowing to single rows at about midpoint of dentigerous surface, and running most of length of dentary and premaxilla.

Gill Rakers: Moderately slender, elongate, non-denticulate. First arch ceratobranchial with 6–8 gill rakers (no rakers present on hypobranchial), often single raker at angle of arch, and 2–4 rakers along epibranchial of first arch.

Lower Pharyngeal Jaw: Wider than long, without interdigitation along ventral suture,

TABLE 2
Morphometric and Meristic Data for *Lamprologus tumbanus*

Measurements	Lectotype	*N*	Mean	Min	Max	SD
Standard length (mm)	54.9	4	46.8	38.1	54.9	8.08
Percentage of standard length						
Body depth	28.9	4	27.5	26.1	28.9	1.47
Head length	35.5	4	35.7	34.6	37.0	0.98
Caudal peduncle depth	11.5	4	12.0	11.5	12.7	0.53
Caudal peduncle length	14.1	4	14.4	13.6	15.4	0.77
Anal fin base length	17.4	4	18.6	17.4	20.4	1.26
Dorsal fin base length	58.1	4	57.9	54.8	61.1	2.56
Pelvic fin length	29.0	4	25.3	21.3	29.0	3.89
Caudal fin length	29.7	4	28.0	25.1	30.2	2.36
Pectoral fin length	23.9	4	22.8	21.6	23.9	0.96
Predorsal fin distance	35.3	4	34.8	31.9	38.0	2.57
Preanal fin distance	70.0	4	67.1	63.5	70.0	2.82
Prepectoral fin distance	37.3	4	38.0	36.7	39.8	1.33
Prepelvic fin distance	38.2	4	39.0	37.4	40.1	1.36
Percentage of head length						
Lower jaw length	37.1	4	40.1	37.1	43.3	3.26
Eye diameter	28.6	4	27.6	26.3	29.0	1.39
Snout length	33.5	4	31.7	29.1	34.1	2.48
Interorbital width	23.8	4	22.3	19.5	23.9	2.09

Counts	Lectotype	Variation
Lateral line scales	30	29 (1), 30 (1), 31 (2)
Dorsal fin spines and rays	XVII 9	XVII 7 (1), XVII 9 (2), XVIII 8 (1)
Anal fin spines and rays	V 7	V 6 (2), V 7 (2)
Gill rakers	6,1,2	6,1,2 (1), 6,1,4 (1), 7,1,2 (1) 8,0,3 (1)
Vertebrae	14+15	14+14 (1), 14+15 (4)

and with 24 or so teeth in most posterior row. Teeth slender and beveled or slightly hooked; medial posterior teeth slightly more robust, but without stout molariform teeth.

Scales: Flank scales ctenoid and uniformly sized. Lateral line scales 29–31, lower than any other riverine lamprologine species. Upper and lower branches of lateral line do not overlap. In some canal-bearing lateral line scales posterior half of canal is open or unroofed, resulting in forklike appearance to canal. Cheek naked, opercle and subopercle with a few embedded scales. Gradual transition to small scales on belly and above anterior portion of lateral line. Nape and region just below dorsal fin origin scaleless. Dorsal and anal fins scaleless, caudal fin partially scaled.

Vertebrae: 28–29; 14 + 14 (1), 14 + 15 (4).

Additional Osteology (fig. 10): Infraorbital series comprised of broad, platelike lachrymal with 4 sensory canal openings and 2–4 tubular infraorbitals adjacent to lachrymal. Dermosphenotic absent. Supraneurals absent. Supraoccipital crest elevated and extends anteriorly in low frontal ridge to median coronal pore (NLF0). Elongate, paired, clublike processes serve as attachment area for supracarinalis anterior tendons to supraoccipital crest.

Coloration: Boulenger (1899a) described violet hues on the body, with scales trimmed in black and five black bars on the back, gray or blackish fins, and the opercle and cheek tinged with red. Preserved base body color-

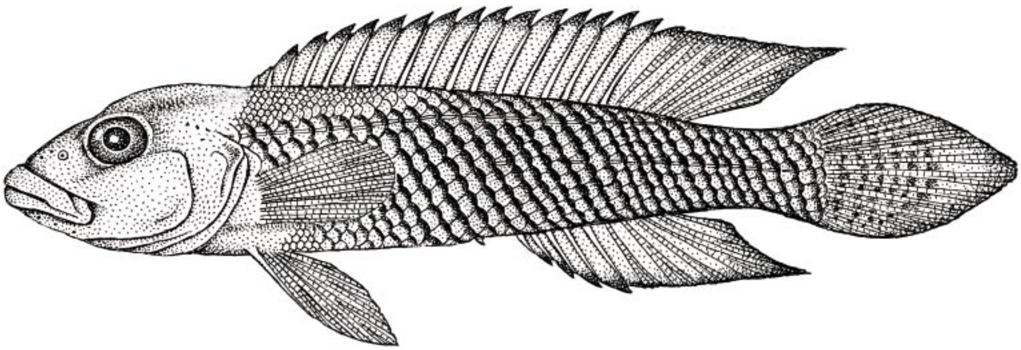


Fig. 12. *Lamprologus mocquardi*, AMNH 5897, male, 78 mm SL, drawn by Patricia Wynne.

ation yellowish brown. Individual flank scales with dark pigment distributed uniformly around exposed posterior margin, creating intersecting rows of thin, oblique bands of pigment that present appearance of chain-link fence or chain mail. Small, whitish maculae along interspinous membrane and between rays of dorsal, anal, and caudal fins. Dorsal, anal, and caudal fins with oblique black striations.

DIET: Gut short and simple, with length of about 50% of SL. Gut contents included small crustaceans, predominantly ostracods, along with insect parts, including a head that appeared to be from an adult dipteran.

DISTRIBUTION (fig. 11): Known only from Lake Tumba in the central Congo basin.

REMARKS: Although Poll (1933) and David and Poll (1937) considered *tumbanus* to be a subspecies of *L. congoensis*, a close examination of the material available at the time, along with some additional material collected since then, confirms *tumbanus* to be distinct and easily distinguishable from *congoensis*.

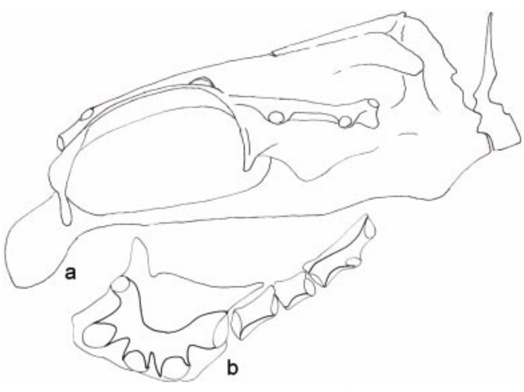


Fig. 13. *Lamprologus mocquardi*, AMNH 5828: (**a**) neurocranium and first vertebra; (**b**) lachrymal and adjacent infraorbitals.

Lamprologus mocquardi Pellegrin, 1903
Figures 12–14, Table 3, Plate 1c

Lamprologus mocquardi Pellegrin, 1903: 221 (Type locality: Upper Ubangi River).
Lamprologus mocquardii: Boulenger, 1915: 466, fig. 318.
Lamprologus moquardii: Roberts and Stewart, 1976: 283.
Lamprologus obliquus Nichols and Griscom, 1917: 731, fig. 31 (Type locality: Stanleyville).

LECTOTYPE: MNHN 1895–66, Upper Ubangi, Viancín. (This specimen is here designated as the lectotype because it is the largest of the syntypes.)

PARALECTOTYPE: MNHN 1895–65, Upper Ubangi, Viancín.

ADDITIONAL MATERIAL EXAMINED: 502 specimens. **Avakubi, Ituri River** (01°20′N, 27°34′E) MRAC 14528, 1/14/1914, J. Bequaert; MRAC 14587, 1/14/1914, J. Bequaert. **Bambari, Central African Republic** (05°45′N, 20°40′E) MRAC 82.21.P.891–894 (confluence of the Bougwa and Ouaka Rivers), 4/4/1982, J.P. Marquet; MRAC 84032.0336 (Baidou River, an affluent of the Ouaka), 3/8/1984, J.P. Marquet. **Bambesa** (03°22′N, 25°40′E) MRAC 56406, 6/1/1938–6/30/1938, J.M. Vrydagh. **Bangui, Ubangi River, Central African Republic** (04°22′N, 18°35′E) MRAC 98010.0025–0032, 1/1/1998–1/31/1998, M. Levy; MCZ 48394 ($N = 1$), Bangui fish market, 5/1971, T.R. Roberts; MNHN 1921–0442, Baudon.

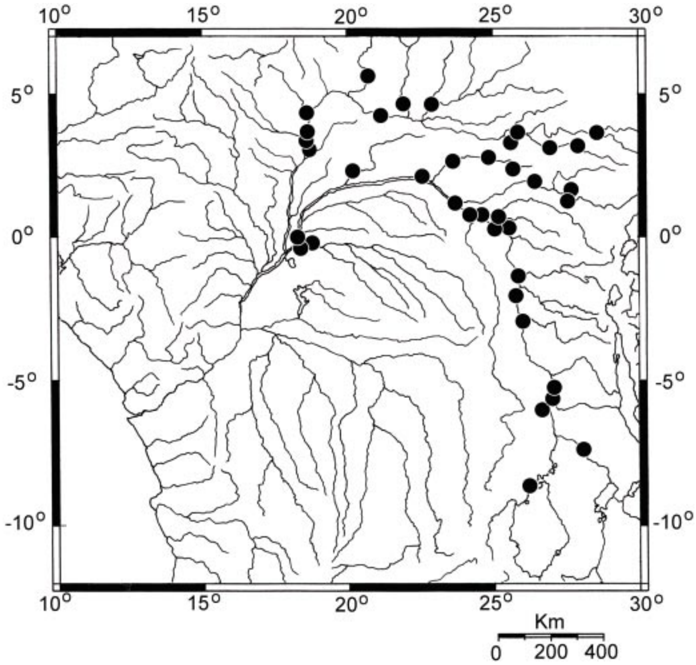


Fig. 14. Collection localities of *Lamprologus mocquardi*.

Binga (Bangala) (02°23′N, 20°31′E) MRAC 39575, 1/1/1933–12/31/1933, Van den Put. **Bokuma, Coquilhatville** (00°00′N, 18°20′E) MRAC 78593, 7/14/1951, P. Lootens. **Bokuma** (00°06′S, 18°41′E) MRAC 94512, 1/1/1954–12/31/1954, P. Lootens; MRAC 96772–96774, 1/1/1954–12/31/1954, P. Lootens; MRAC 101480, 7/17/1955, G. Hulstaert. **Bumba, Equateur** (02°11′N, 22°32′E) MRAC 100589–100603, 1/1/1955–12/31/1955, IMEXAF. **Bosabangi** (01°27′N, 27°37′E) MRAC 7534, C. Christy. **Buta** (02°47′N, 24°50′E) MRAC 21244, 1/28/1925–1/30/1925, H. Schouteden; MRAC 21245, 1/1/1925–1/31/1925, H. Schouteden; MRAC 21252–21255, 1/1/1925–12/31/1925, J. Hutsebaut; MRAC 29523, 1/1/1925–1/31/1925, H. Schouteden; MRAC 30339, 1/1/1931–12/31/1931, J. Hutsebaut; MRAC 30352–30353, 1/1/1931–12/31/1931, J. Hutsebaut; MRAC 60897, 1/1/1939–6/21/1939, J. Hutsebaut, MRAC 61923–61947, 1/1/1939–6/21/1939, J. Hutsebaut; MRAC 61948–61972, 1/1/1939–6/21/1939, J. Hutsebaut; MRAC 61973–61992, 1/1/1939–6/21/1939, J. Hutsebaut; MRAC 66643–66645, 1/1/1939–12/31/1939, J. Hutsebaut. **Coquilhatville** (00°04′N, 18°16′E) MRAC 94207, 1/1/1954–12/31/1954, R. Philippe. **Congo River sandspit between Kasongo and Kongolo** (5°23′S, 27°00′E) BMNH 1975.6.20.665, K.E. Banister. **Dungu, Kibali River** (03°37′N, 28°33′E) MRAC 1793, A. Hutereau; MRAC 6955, A. Hutereau; MRAC 77025.0452, 10/26/1959, J. Lambert. **Eala** (00°04′S, 18°20′E) MRAC 17482, H. Schouteden. **Elisabetha (Basoko)** (01°09′N, 23°37′E) MRAC 19667, Mme Tinant. **Gozobangui, Mbomou River, Central African Republic** MCZ 51998 (*N* = 14), 5/29/1971–5/30/1971, T.R. Roberts. **Gumugu, Ubangi River, Libenge** (03°39′N, 18°38′E) MRAC 167844–167867 (2 specimens c&s), 5/1/1948–5/31/1948, Cremer and Neumann. **Ibembo** (02°38′N, 23°37′E) MRAC 73970–73972, 1/1/1950–12/31/1950, J. Hutsebaut. **Kabalo, Lualaba River** (06°03′S, 26°32′E) MRAC 70062, 7/7/1947, M. Poll; MRAC 70063–70064, 7/7/1947, M. Poll. **Kala, Ubangi River, Libenge** (03°23′N, 18°39′E) MRAC 167841–167843, 12/16/1947, Cremer and Neumann. **Kabebwe, Katanga** (08°41′S, 26°08′E) MRAC 21214–21218, 5/1/25–5/31/25, G.-F. de Witte. **Kiambi, Lu-**

TABLE 3
Morphometric and Meristic Data for *Lamprologus mocquardi*

Measurements	Lectotype	*N*	Mean	Min	Max	SD
Standard length (mm)	48.8	21	53.5	33.6	67.9	9.90
Percentage of standard length						
Body depth	21.8	21	22.5	20.6	25.9	1.42
Head length	31.5	21	32.0	29.2	34.0	0.98
Caudal peduncle depth	11.3	21	10.9	10.2	11.7	0.37
Caudal peduncle length	15.7	21	15.1	13.4	17.4	1.00
Anal fin base length	17.8	21	21.0	17.8	24.8	1.62
Dorsal fin base length	58.8	21	57.9	54.7	60.8	1.73
Pelvic fin length	20.3	21	21.2	18.2	24.8	1.56
Caudal fin length	25.7	21	25.4	21.4	27.4	1.60
Pectoral fin length	19.7	21	19.8	14.7	21.9	1.72
Predorsal fin distance	31.7	21	32.4	30.1	35.0	1.08
Preanal fin distance	67.8	21	66.0	60.9	69.5	2.21
Prepectoral fin distance	35.0	21	35.8	32.9	39.0	1.69
Prepelvic fin distance	35.7	21	37.2	34.4	43.7	2.35
Percentage of head length						
Lower jaw length	38.4	21	38.7	30.9	48.5	4.00
Eye diameter	22.6	21	24.7	21.4	27.3	1.82
Snout length	32.0	21	35.7	27.3	46.1	4.38
Interorbital width	15.6	21	18.7	14.7	21.9	1.98

Counts	Lectotype	Variation
Lateral line scales	33	33 (4), 34 (12), 35 (5)
Dorsal fin spines and rays	XIX 7	XIX 7 (4), XIX 8 (11), XIX 9 (2), XX 7 (2), XX 8 (2)
Anal fin spines and rays	V 7	V 6 (1), V 7 (1), VI 5 (2), VI 6 (9), VI 7 (4), VII 6 (4)
Gill rakers	5,1,2	5,1,1 (1), 5,1,2 (2), 5,1,3 (1), 6,0,2 (1), 6,0,3 (2), 6,1,1 (1), 6,1,2 (6), 6,1,3 (1), 6,1,4 (2), 7,1,3 (2), 7,0,5 (1), 8,1,2 (1)
Vertebrae	14+17	13+18 (1), 14+16 (2), 14+17 (16), 14+18 (2)

vua River (07°20′S, 28°01′E) MRAC 125011, 10/1/1956–10/31/1956, N. Leleup. **Kindu, Lualaba River** (02°57′S, 25°56′E) MRAC 70331, 7/19/1947, M. Poll; MRAC 70336–70337, 7/19/1947, M. Poll; MRAC 70478, 7/17/1947, M. Poll; BMNH 1975.6.20.664, K.E. Banister. **Kisingani (Stanleyville)** (00°30′N, 25°12′E) MRAC 15593–15599, H. Lang and J.P. Chapin; MRAC 19955–19958, 1/1/1930–1/31/1930, Richard; MRAC 37098–37100, 1/1/1931–12/20/1931, Richard; MRAC 39065–39068, H. Lang and J.P. Chapin; MRAC 77458 (Wamba River, Stanleyville), 12/4/1947, A. Hulot; MRAC 89043.3396–3404 (Tshopo River), 2/20/1989, L. De Vos; MRAC 89043.3405–3406 (Tshopo River), 2/25/1989, L. De Vos; MRAC 89043.3407–3409 (Tshopo River), 3/5/1989, L. De Vos; MRAC 90029.0637 (Wagenias rapids), 1/1/1989–12/31/1989, U. Nyongombe; MRAC 124697 (Wagenias rapids), 9/28/1949, A. Hulot; AMNH 5828 (*N* = 159; Paratypes of *Lamprologus obliquus* Nichols and Griscom, 1917; 10 specimens c&s), 4/1915, H. Lang and J.P. Chapin; AMNH 5897 (*N* = 25; paratypes of *Lamprologus obliquus* Nichols and Griscom, 1917; 5 specimens c&s), 2/1915, H. Lang and J.P. Chapin; AMNH 5829 (Holotype of *Lamprologus obliquus* Nichols and Griscom, 1917), vicinity of Stanleyville, small forest brook, affluent of Tshopo River, 00°33′N, 25°07′E, 4/1915, H. Lang and J.P. Chapin. **Kotto River at Kembe, Central African Republic** (04°36′N, 21°54′E) MCZ 48392 (*N* = 25), 5/23/1971, T.R. Roberts;

MCZ 48393 ($N = 2$), Kotto River at village of Mbutu, near Kembe, 8/6/1971–12/6/1971, T.R. Roberts. **Landjia, Ubangi River, Central African Republic** (04°22′N, 18°39′E) MRAC 82013.1597–1599, 1/13/1982, De Vos and Kempeneers. **Lowa River** (1°24′S, 25°51′E) BMNH 1976.10.12.296, K.E. Banister. **Lualaba River** (2°0′S, 25°47′E) BMNH 1976.10.12.262, K.E. Banister. **Lualaba River at Lukuge junction** (5°39′S, 26°54′E) BMNH 1975.6.20.666–667, K.E. Banister. **Mobaye, Ubangi River, Central African Republic** (04°19′N, 21°11′E) MCZ 48395 ($N = 18$), 5/26/1971, T.R. Roberts. **Mongala River, Ubangi** (02°24′N, 20°13′E) MRAC 124696, 1/1/1948–12/31/1948, A. Hulot. **Motenge-Boma, Ubangi River, Libenge** (03°15′N, 18°39′E) MRAC 167839–167840, 11/25/1947, Cremer and Neumann. **Ngene Ngene** (00°23′N, 25°10′E) MRAC 85007.0307 (pisciculture), 1/1/1985–1/31/1985, D. Thys van den Audenaerde. **Panga** (01°52′N, 26°23′E) MRAC 21219–21222, 1/1/26–1/31/26, E. Bock. **Poko** (03°09′N, 26°53′E) MRAC 8126, C. Christy; MRAC 8150, C. Christy. **Rungu** (03°11′N, 27°53′E) MRAC 22456, 8/1/1925–8/31/1925, H. Schouteden. **Stanley Falls** (00°30′N, 25°12′E) MRAC 2339–2341 (1 specimen c&s), 6/25/1912, C. Christy. **Titule, Bima River** (03°17′N, 25°32′E) MRAC 72786–72788, 1/1/1949–12/31/1949, J. Hutsebaut; MRAC 72823, 6/1/1949–6/30/1949, J. Hutsebaut; MRAC 72826–72829, 6/1/1949–6/30/1949, J. Hutsebaut. **Wanie-Rukula, Lualaba River** (00°15′N, 25°32′E) MRAC 78019.0251, 5/23/1958, J. Lambert; BMNH 1919.9.10.310–311, C. Christy; BMNH 1919.9.10.312, C. Christy. **Wilia, Congo River, near Kisangani** (00°33′N, 25°04′E) MRAC 189519–189521, 7/10/1973, S.P. Klapwijck. **Yaekama, Congo River** (00°47′N, 24°17′E) MRAC 94912–94913, 12/1/1953–12/31/1953, J.P. Gosse. **Yaekela, Congo River** (00°48′N, 24°16′E) MRAC 102295–102298, 4/6/1955, J.P. Gosse; MRAC 135948, 12/23/1953, J.P. Gosse. **Yangambi, Congo River** (00°47′N, 24°28′E) MRAC 135949, 3/1/1960–3/31/1960, J.P. Gosse. **Yangambi, Congo River, Yaosuka cliff** (00°45′N, 24°29′E) MRAC 124695, 12/20/1948, A. Hulot. **Zongo, Ubangi River, Libenge** (04°21′N, 18°36′E) MRAC 167868–167870, 6/1/1948–6/30/1948, Cremer and Neumann. MRAC 52, locality given as Matadi (probably erroneously and therefore excluded from Fig. 14), E. Wilverth.

DIFFERENTIAL DIAGNOSIS: *Lamprologus mocquardi* is distinguished from *L. lethops* and *L. symoensi* by its regularly imbricating, large, uniformly sized flank scales. It is distinguished from *L. congoensis* by a shallow supraoccipital crest, and from *L. congoensis*, *L. teugelsi*, n.sp., *L. werneri*, and *L. tigripictilis*, n.sp., by always lacking a single supraneural and by having dark pigment that is restricted to dorsal half of exposed margin of flank scales, giving the appearance of parallel oblique lines. *Lamprologus mocquardi* differs from *L. tumbanus* in having 33–35 (versus 29–31) lateral line scales, a shorter HL as a percentage of SL, and five sensory pore openings on the lachrymal instead of four.

DESCRIPTION: Counts and measurements of 21 specimens, including lectotype and paralectotype, are given in table 3. Body depth moderate (20.6–25.9%, mean 22.5% SL). Greatest body depth at about base of third dorsal spine. Head length 29.2–34.0%, mean 32.0% SL. Dorsal profile convex, with no clear demarcation of forehead. Head profile rises smoothly at angle of 35–40° to dorsal fin origin. Dorsal body profile slopes gradually to caudal peduncle. Ventral profile more or less horizontal. Mature males lack nuchal hump development but differ from females in larger body size (largest male 67.9 mm SL, largest female 49.7 mm SL).

Fins: Dorsal fin XIX–XX (mode XIX) 7–9 (mode 8). Anal fin V–VII (mode VI) 5–7 (mode 6). Dorsal and anal fin spines increasing in length posteriorly, and with soft rays extending to middle of caudal fin. Caudal fin large, rounded, and paddle-shaped, with 14 branched rays; often appears lance-shaped, subacuminate in preserved specimens. Pectoral fins short, not reaching vertical through anus. Pelvic fins somewhat elongate, reaching anus in larger individuals, but nonetheless falling short of anal fin origin (pelvic fin length 18.2–24.8%, mean 21.2% SL). Second ray of pelvic fin is longest in fin of both sexes.

Teeth: Jaws isognathous, but with lower lip sometimes protruding slightly, both jaws with sharply pointed, unicuspid teeth in outer and inner rows. Single series of 6–8 greatly enlarged, recurved, procumbent canines situated anteriorly; lateral-most canines largest. These canines followed by about 5 poorly defined rows of densely packed, small caniniform teeth, tapering to single rows posteriorly, and running most of length of dentary and premaxilla. Teeth in lateral-most row somewhat larger than inner teeth in both jaws.

Gill Rakers: Slender and short to somewhat elongate, non-denticulate. Gill rakers number 5–8 (typically 6) along hypobranchial and ceratobranchial of first gill arch. Single raker almost always present in angle of arch. Rakers number 2–5 (mode 2) along epibranchial of first arch.

Lower Pharyngeal Jaw: Wider than long, interdigitations along ventral suture absent or very slight. Posterior-most tooth row with 24–26 teeth. Most teeth slender, either beveled or slightly hooked; median teeth somewhat more robust, but not molariform.

Scales: Flank scales ctenoid and uniformly sized. Lateral line scales 33–35. Upper and lower branches of lateral line sometimes overlapping. Cheek naked; opercle and subopercle partially scaled. Belly scales small and embedded, with gradual transition to larger flank scales. Nape and region just below dorsal fin origin scaleless; gradual transition to small, embedded scales between lateral line and anterior portion of dorsal fin.

Vertebrae: 30–32; 14 + 16 (2), 14 + 17 (16), 14 + 18 (2), or 13 + 18 (1).

Additional Osteology (fig. 13): Infraorbital series comprised of broad, platelike lachrymal with 5 sensory canal openings and 3–5 tubular infraorbitals adjacent to lachrymal. Dermosphenotic absent. Supraneurals absent. Supraoccipital crest low, without frontal ridge.

Coloration: Live coloration unknown. Preserved background coloration brown to yellowish brown. Four to six relatively dark vertical bars along flanks. Dark, scaleless opercular spot present. Individual flank scales with dark pigment on dorsal half of caudal field of each scale, creating series of thin, parallel bands running obliquely posteroventrally. Dorsal, anal, and caudal fins with black maculae. Oblique bands on flanks faded in some specimens that have been in preservative for decades, but pattern still remarkably conspicuous in many (particularly specimens from 1915, AMNH Lang-Chapin expedition).

DIET: Gut short and simple, with length of about 60% of SL. Gut contents include mostly insect parts, some of which appear to be aquatic insect larvae.

DISTRIBUTION (fig. 14): Widely distributed throughout the upper Congo Basin; from the Upemba lakes on the Lualaba to Mbandaka on the Congo mainstream; also most of the Ubangi-Uele drainage, the lower Ruki, the lower Mongala, the Itimbiri, the Ituri-Aruwimi, the Lindi, and the Luvua.

REMARKS: *Lamprologus mocquardi* is the most widely distributed of the Congo River *Lamprologus*, and the possibility exists that as more material becomes available, it may be revealed to constitute a species complex encompassing additional entities. In the course of the present study, however, we were unable to discern any meaningful variation between geographically disparate populations.

Lamprologus werneri Poll, 1959
Figures 15–17, Table 4, Plate 1d

Lamprologus werneri Poll, 1959 (part.): 108, pl. 19, figs. 2a–c (Type localities: MRAC 104003, MRAC 104004–104027, Regina Falls, near Kinsuka; MRAC 74905, Kalina, Léopoldville; MRAC 79195, Léopoldville, Stanley Pool; MRAC 118566–118567, Manianga (Stanley Pool); MRAC 118986–118988, Stanley Pool, rapids.

HOLOTYPE: MRAC 104003, Regina Falls, near Kinsuka, 04°20′S, 15°13′E, 1/1/1955–12/31/1955, A. Werner.

PARATYPES: MRAC 74905, Kalina, Léopoldville, 04°18′S, 15°16′E, 1/1/1949–12/31/1949, J. Deheyn; MRAC 79195, Léopoldville, Stanley Pool, 04°18′S, 15°18′E, 1/1/1952–12/31/1952, M.H. Pierret; MRAC 104004–104027 (1 specimen c&s), Regina Falls, near Kinsuka, 04°20′S, 15°13′E, 1/1/1955–12/31/1955, A. Werner; MRAC 118566–118567, Manianga (Stanley Pool), 04°54′S, 14°23′E, 8/17/1954, J. Mandeville; MRAC 118986–118988, Stanley Pool, rapids, 04°06′S, 15°15′E // 04°20′S, 15°23′E, 4/1/1958–4/30/1958, P. Brichard.

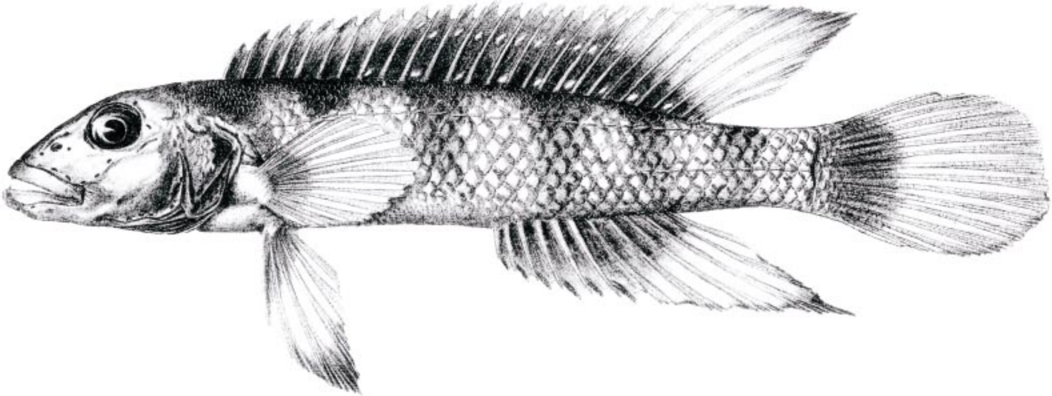


Fig. 15. *Lamprologus werneri*, male, 123 mm TL, modified from Poll (1959).

ADDITIONAL MATERIAL EXAMINED: 220 specimens. **Gombe or Ngombe,** mainstream rapids of Congo River, about 20 km west of Kinshasa (4°24′S, 15°10′E) MCZ 50157 (*N* = 24), 6/23/1973, T.R. Roberts and D.J. Stewart. **Kinshasa (Léopoldville)** (04°18′S, 15°18′E) MRAC 44158–44177, 1/1/1935–12/31/1935, A. Tinant; MRAC 47996, 1/1/1937–6/12/1937, A. Tinant; MRAC 48004, 1/1/1937–6/12/1937, A. Tinant; MRAC 55171–55185, 1/1/1937–12/31/1937, A. Tinant; MRAC 73068.0087–0088, P. Brichard; MRAC 79009.0970, 10/15/1961, P. Brichard. **Kinsuka rapids, Kinshasa** (04°20′S, 15°13′E) MRAC 177553, 1/1/1964–12/31/64, P. Brichard; MCZ 48002 (*N* = 4), 6/20/1971, T.R. Roberts. **Manianga,** Congo River rapids (04°54′S, 14°23′E) MRAC 98158–98192, 8/12/1954, J. Mandeville; MRAC 98193–98250, 9/24/1954, J. Mandeville. **Regina falls, near Kinsuka** (04°20′S, 15°13′E) MRAC 104003, 1/1/1955–12/31/1955, A. Werner; BMNH 1977.1.11.25–29. **Stanley Pool** (04°06′S, 15°15′E // 04°20′S, 15°23′E) MRAC 98269–98317, 9/3/1954, J. Mandeville; MRAC 118578, 8/10/1955, J. Mandeville. **Rapids below Stanley Pool** (4°15′2″S, 15°25′0″E) BMNH 1980.7.1.77.

Fig. 16. *Lamprologus werneri*, MRAC 104004–27: (**a**) neurocranium and first vertebra; (**b**) lachrymal and adjacent infraorbitals.

DIFFERENTIAL DIAGNOSIS: *Lamprologus werneri* is unique among the Congo River congeners in having 15 (rather than 14 or rarely 13) precaudal vertebrae. *Lamprologus werneri* is further distinguished from *L. lethops* and *L. symoensi* by its regularly imbricating, large, uniformly sized flank scales (vs. irregularly sized flank scales), from *L. mocquardi* and *L. tumbanus* by the presence of a single supraneural (vs. absence of supraneurals), from *L. congoensis*, *L. mocquardi*, *L. tumbanus*, *L. teugelsi*, n. sp., and *L. symoensi* by a lower range for BD as a percentage of SL (17.3–20.3% vs., collectively, 20.6–28.9%), and from *L. mocquardi* by its uniformly dark pigment around the exposed margin of flank scales, giving appearance of chain mail. *Lamprologus werneri* is further distinguished from *L. tigripictilis*, n.sp., by presence of 5–6 rather than 9–10 dark vertical bars on flanks.

DESCRIPTION: Counts and measurements of

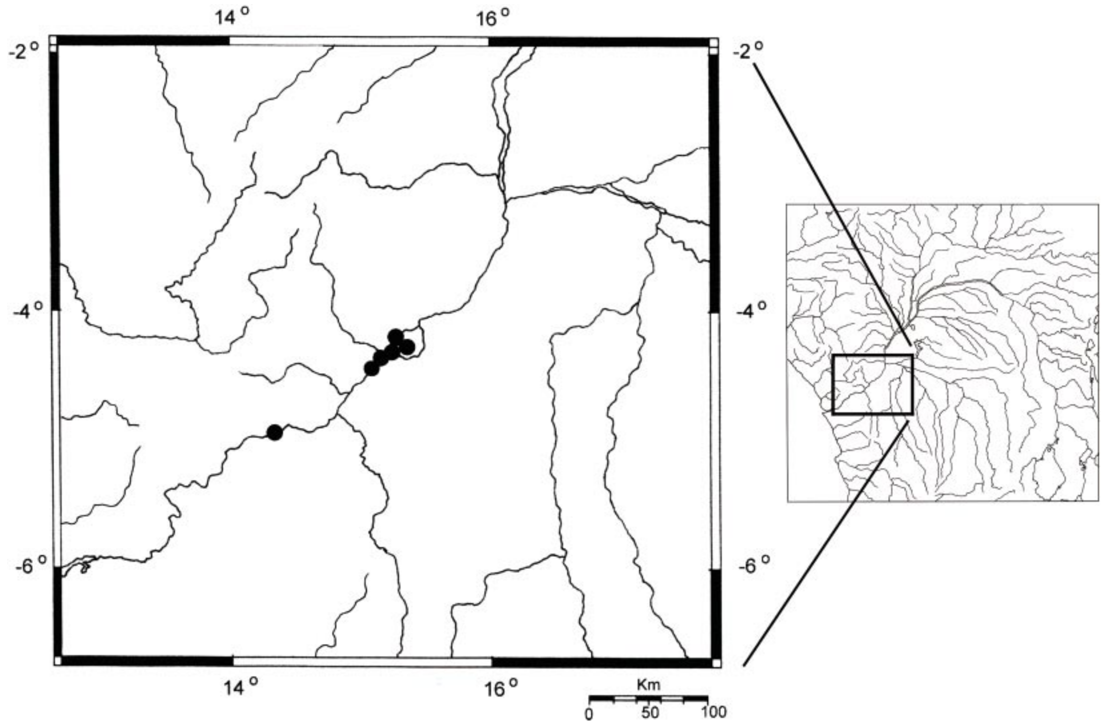


Fig. 17. Collection localities of *Lamprologus werneri*.

20 specimens, including seven paratypes from MRAC 104004–104027, are given in table 4. *Lamprologus werneri*, like *L. lethops*, is gracile with shallow body depth (17.3–20.3%, mean 18.7% SL). Greatest body depth at dorsal fin origin. Head length 29.1–32.9%, mean 30.6% SL. Dorsal head profile convex, rising at angle of about 40°, gently curving to horizontal along dorsum; only slightly and indistinctly curving ventrally at caudal peduncle. Ventral body profile mostly straight except for very slight concavity at caudal peduncle. Nuccal hump absent in males and no obvious sexually dimorphic features present except that males achieve larger body size (largest male 91.5 mm SL, largest female 58.6 mm SL).

Fins: Dorsal fin XVIII–XX (mode XIX) 7–9 (mode 9). Anal fin V–VII (mode VI) 5–7 (mode 6). Spines in both fins of gradually increasing length posteriorly. Filamentous extensions of soft dorsal and anal fins extending to about middle of caudal fin. Caudal fin large, rounded, and paddle-shaped, with 14 branched rays; often appears lance-shaped, subacuminate in preserved specimens. Pectoral fins short, not reaching vertical through anus. Pelvic fins reaching anus only in larger males; pelvic fins terminate anterior to anus in females and small males (pelvic fin length 19.0–24.4%, mean 21.6% SL). Second ray of pelvic fin longest in fin in both sexes.

Teeth: Jaws isognathous, but with lower lip sometimes protruding slightly; both outer and inner row teeth unicuspid and sharply pointed. Single series of 8 greatly enlarged, recurved, procumbent canines situated anteriorly; lateral-most canines considerably larger than inner canines. Inner teeth in 5–8 poorly defined rows of tightly packed, small, recurved caniniform teeth anteriorly. Tooth rows on each jaw reduced to single rows of medium sized caniniform teeth posteriorly, extending almost entire length of both dentary and premaxilla.

Gill Rakers: Slender, elongate, and non-denticulate. Gill rakers number 8–9 (mode 9) along hypobranchial and ceratobranchial of first arch; in most cases single raker occupies

TABLE 4
Morphometric and Meristic Data for *Lamprologus werneri*
The holotype was examined for diagnostic characters, but it was unavailable for detailed measurements and is not included in the table.

Measurements	*N*	Mean	Min	Max	SD
Standard length (mm)	20	57.8	42.7	91.5	13.56
Percentage of standard length					
Body depth	20	18.7	17.3	20.3	0.90
Head length	20	30.6	29.1	32.9	1.00
Caudal peduncle depth	20	9.8	9.3	10.4	0.33
Caudal peduncle length	20	15.6	13.5	17.3	1.05
Anal fin base length	20	20.5	19.0	22.3	0.99
Dorsal fin base length	20	56.0	52.5	59.8	1.83
Pelvic fin length	20	21.6	19.0	24.4	1.36
Caudal fin length	20	27.1	20.7	33.1	2.68
Pectoral fin length	20	20.2	17.2	22.1	1.32
Predorsal fin distance	20	30.8	28.5	32.6	1.27
Preanal fin distance	20	64.0	62.2	66.9	1.39
Prepectoral fin distance	20	33.3	25.2	35.7	2.35
Prepelvic fin distance	20	36.4	33.7	39.5	1.59
Percentage of head length					
Lower jaw length	20	36.5	27.3	41.8	4.16
Eye diameter	20	26.7	23.0	31.2	2.03
Snout length	20	35.5	30.3	40.3	2.70
Interorbital width	20	18.8	14.8	24.4	2.95

Counts	Variation
Lateral line scales	34 (1), 35 (9), 36 (8), 37 (2)
Dorsal fin spines and rays	XVIII 8 (1), XVIII 9 (1), XIX 7 (2), XIX 8 (6), XIX 9 (8), XX 7 (1), XX 8 (1)
Anal fin spines and rays	V 6 (1), VI 5 (2), VI 6 (15), VI 7 (1), VII 5 (1)
Gill rakers	8,1,3 (1), 8,1,4 (6), 8,1,5 (2), 9,1,3 (1), 9,1,4 (7), 9,1,5 (3)
Vertebrae	15+16 (1), 15+17 (17), 15+18 (2)

angle of arch. Epibranchial of first arch has 3–5 (mode 4) rakers.

Lower Pharyngeal Jaw: Wider than long, interdigitation along ventral suture absent or very slight. Most posterior row with 26–28 teeth. Median teeth enlarged, even slightly molariform; lateral teeth slender and beveled or bluntly hooked.

Scales: Flank scales ctenoid, of uniform size. Lateral line scales 34–37 (mode 35). Upper and lower branches of lateral line may or may not overlap. Cheek naked; opercle and subopercle partially scaled. Gradual transition to small scales on belly and above lateral line near dorsal fin origin, with small, embedded scales extending beyond dorsal fin origin onto nape. Dorsal and anal fins scaleless. Small scales occur over most of caudal fin.

Vertebrae: 31–33; 15 + 16 (1), 15 + 17 (17), 15 + 18 (2).

Additional Osteology (fig. 16): Infraorbital series comprised of broad, platelike lachrymal with 5–6 sensory canal openings and 1–2 tubular infraorbitals adjacent to lachrymal. Dermosphenotic absent. Single supraneural present. Supraoccipital crest low and poorly developed, but extends anteriorly as low frontal ridge to median coronal pore (NLF0). Coronal pore borne on anterior elevation of frontal ridge in most specimens examined.

Coloration: Live coloration unknown. In alcohol, base body coloration yellowish brown. Five or six broad, dark vertical bars

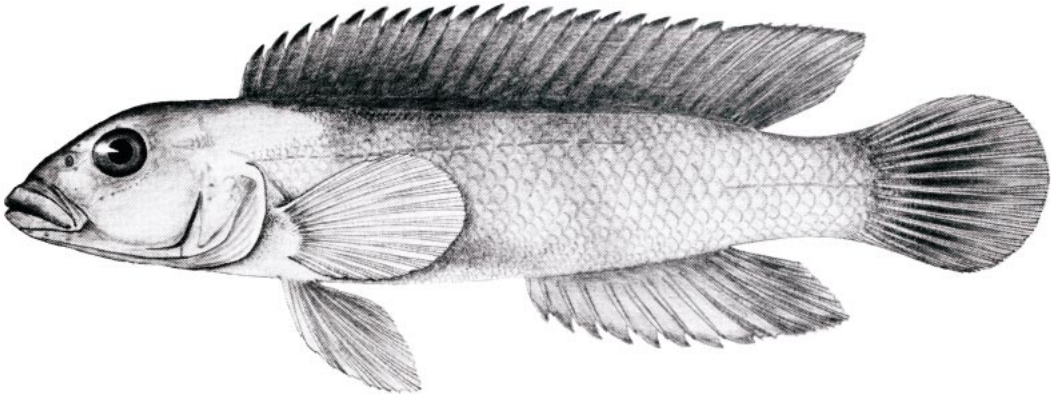


Fig. 18. *Lamprologus symoensi* holotype, MRAC 79001.6283, male, 53.5 mm SL, modified from Poll (1976).

along flanks. Dorsal, anal, and sometimes caudal fin darkly pigmented, but lacking conspicuous pattern of spots or striations. Individual flank scales with dark pigment distributed uniformly around exposed posterior margin, creating intersecting rows of thin, oblique bands of pigment that present appearance of chain-link fence or chain mail. Adult males with iridescent spots in posterior field of most flank scales (adjacent to overlapping edge of previous scale).

DIET: Gut short and simple, with length about 55% of SL. Fish scales and disarticulated insect parts were recovered.

Fig. 19. *Lamprologus symoensi*, MRAC 71435–40: (**a**) neurocranium and first vertebra; (**b**) lachrymal and adjacent infraorbitals.

DISTRIBUTION (fig. 17): Known from Malebo Pool and the rapids immediately downstream, with one collection as far west as Manianga.

REMARKS: In their collections from the rapids below Kinshasa, Roberts and Stewart (1976) mentioned two color varieties among material they considered to be *L. werneri*. While a few small lots from their upstream collections are in fact *L. werneri*, most of their material is recognized herein as *L. tigripictilis*, n.sp.

Lamprologus symoensi Poll, 1976
Figures 18–20, Table 5, Plate 2a

Lamprologus symoensi Poll, 1976: 110, fig. 65 (Type locality: Lufira River at Kilwezi, Upemba National Park).

HOLOTYPE: MRAC 79001.6283, Kilwezi, Lufira River, 09°06′S, 26°46′E, 8/10/48, G.-F. de Witte.

PARATYPES: MRAC 79001.6284–6285, 8/30/48, G.-F. de Witte; IRSNB 26.832.722, 8/10/48, G.-F. de Witte; IRSNB 26.832.723, 8/30/48, G.-F. de Witte. All from Kilwezi, Lufira River, 09°06′S, 26°46′E.

ADDITIONAL MATERIAL EXAMINED: 6 specimens. **Kaolia (Kisale)** (08°13′S, 26°29′E) MRAC 71435–71440 (2 specimens c&s), B. Dewit.

DIFFERENTIAL DIAGNOSIS: *Lamprologus symoensi* is distinguished from all other Con-

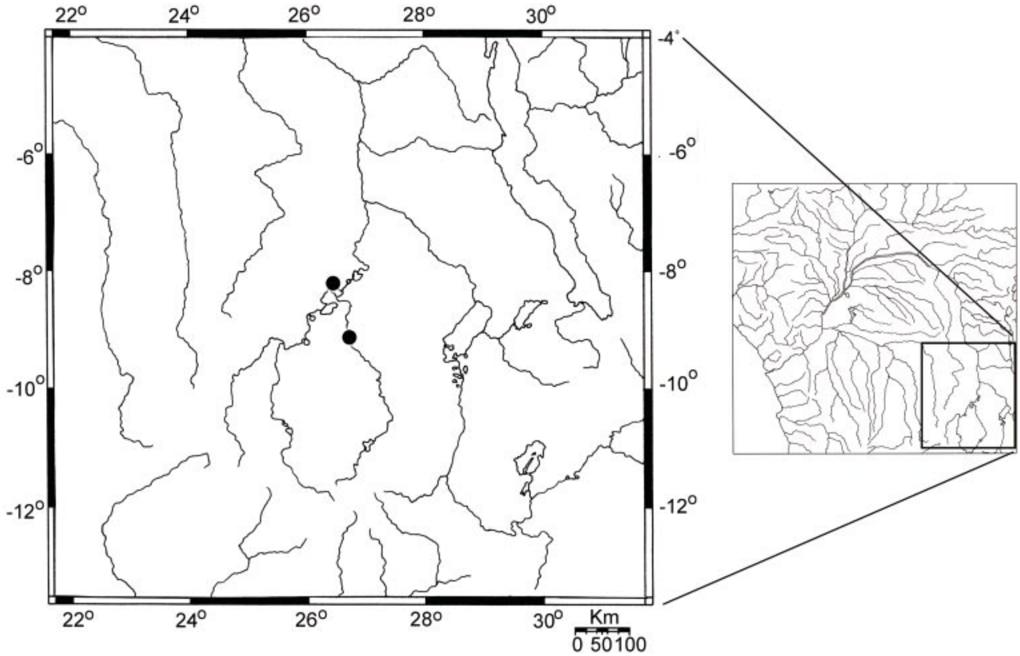


Fig. 20. Collection localities of *Lamprologus symoensi*.

go River *Lamprologus* species save *L. lethops* by its irregularly sized flank scales, among which clear parallel rows are not apparent, and a scaleless patch on the head extending posteriorly well beyond the dorsal fin origin. The presence of fully developed eyes and a much greater BD as a percentage of SL (22.5–27.4% vs. 17.9%) make *L. symoensi* easily distinguishable from *L. lethops*.

DESCRIPTION: Counts and measurements of eight specimens, including holotype and paratypes (except for MRAC 79001.6285, which was not on loan), are given in table 5. Among the more deep-bodied fluviatile species of *Lamprologus* (body depth 22.5–27.4%, mean 25.4% SL). Greatest body depth at dorsal fin origin. Head length 28.2–33.0%, mean 31.3% SL. Head profile rises straight at angle of about 40°, with more or less obvious angle above orbit, behind which dorsal profile is gently convex, becoming straight along caudal peduncle. Ventral body profile approximately straight, inclining posterodorsally just anterior to caudal peduncle. Sexual dimorphism not apparent in small number of specimens available for study.

Fins: Dorsal fin XIX–XXI (mode XX) 6–8 (mode 8). Anal fin VI–VIII (mode VI) 5–6 (mode 6). Spines in both fins gradually increasing in length posteriorly. Dorsal and anal fins relatively short, only reaching to base of caudal fin. Caudal fin large, rounded, and paddle-shaped, with 14 branched rays; often appears lance-shaped, subacuminate in preserved specimens. Pectoral and pelvic fins short, not reaching vertical through anus. Pelvic fin length 20.4–25.8%, mean 23.1% SL. Second ray of pelvic fin is longest in fin in both sexes.

Teeth: Jaws isognathous, both outer and inner row teeth unicuspid and sharply pointed. Single series of 6–8 greatly enlarged, recurved, procumbent canines situated anteriorly on premaxilla, with 6 such canines on dentary; lateral-most canines considerably larger than inner canines. Inner teeth in 4–5 poorly defined rows of tightly packed, small, recurved caniniform teeth anteriorly. Teeth thinning to single row of medium sized caniniform teeth posteriorly, and extending almost entire length of both dentary and premaxilla.

Gill Rakers: Slender, elongate, non-denticulate. Gill rakers numbers 5–6 along ceratobranchial of first gill arch (no rakers present on hypobranchial), typically with single rak-

TABLE 5
Morphometric and Meristic Data for *Lamprologus symoensi*

Character	Holotype	*N*	Mean	Min	Max	SD
Standard length (mm)	53.5	8	37.9	25.6	53.5	9.73
Percentage of standard length						
Body depth	22.5	8	25.4	22.5	27.4	1.82
Head length	29.7	8	31.3	28.2	33.0	1.76
Caudal peduncle depth	11.5	8	11.5	11.0	12.1	0.39
Caudal peduncle length	11.9	8	12.4	11.2	13.2	0.75
Anal fin base length	23.1	8	23.2	21.1	25.1	1.32
Dorsal fin base length	57.8	8	59.7	56.4	61.7	1.97
Pelvic fin length	21.3	8	20.6	17.8	21.9	1.37
Caudal fin length	20.4	8	23.1	20.4	25.8	1.77
Pectoral fin length	19.7	8	21.4	19.7	23.6	1.19
Predorsal fin distance	28.2	8	33.1	28.2	36.0	3.05
Preanal fin distance	64.2	8	62.6	61.6	64.2	0.96
Prepectoral fin distance	32.5	8	32.8	27.7	35.3	3.18
Prepelvic fin distance	34.8	8	34.5	30.3	36.4	1.95
Percentage of head length						
Lower jaw length	37.0	8	38.9	32.2	44.9	4.47
Eye diameter	20.4	8	23.6	20.4	26.5	2.01
Snout length	39.9	8	32.4	28.0	39.9	3.52
Interorbital width	19.5	8	19.3	14.9	22.2	2.38

Counts	Holotype	Variation
Lateral line scales	41	35 (1), 36 (2), 37 (1), 38 (1), 39 (1), 41 (1), 42 (1)
Dorsal fin spines and rays	XXI 8	XIX 7 (1), XIX 8 (2), XX 6 (1), XX 7 (2), XX 8 (1), XXI 8 (1)
Anal fin spines and rays	VIII 6	VI 5 (1), VI 6 (3), VII 5 (1), VII 6 (2), VIII 6 (1)
Gill rakers	6,1,2	5,1,1 (1), 5,1,2 (2), 6,1,2 (5)
Vertebrae	14+19	13+19 (1), 14+17 (2), 14+18 (3), 14+19 (2)

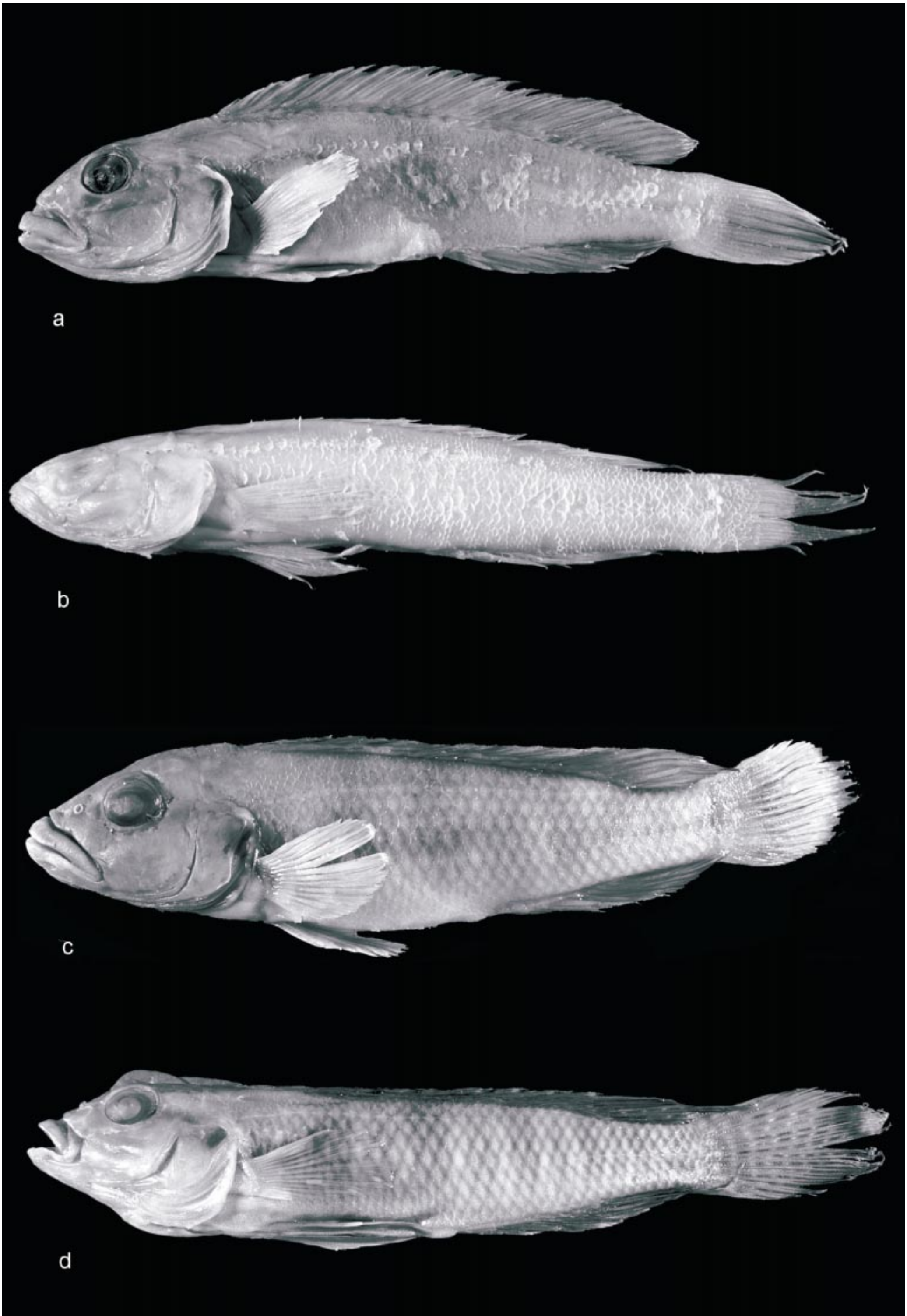
er in angle of arch, and 2 rakers along first epibranchial.

Lower Pharyngeal Jaw: Lower pharyngeal jaw wider than long, with no interdigitation along ventral suture. Usually 20 teeth in posterior most tooth row; posterior row teeth somewhat enlarged, especially medially, but not molariform. Remaining teeth slender, beveled, or bluntly hooked.

Scales: Flank scales ctenoid and variable in size, presenting jumbled pattern with parallel oblique scale rows mostly obscured. Lateral line scales 35–42. Lateral line branches fragmented to varying degrees by intervening scales lacking canals. Upper and lower branches of lateral line non-overlapping, separated by about 5 unpored scales. Cheek naked, subopercle naked, opercle with few scales. Gradual transition to uniformly small scales on belly and above lateral line to about middle of dorsal fin base. Nape scaleless, with scaleless patch between lateral line and dorsal fin extending below dorsal fin to about fourth spine or further posteriorly.

→

Plate 2. (**a**) *Lamprologus symoensi*, paratype, MRAC 79001.6284–85, female, 46 mm SL; (**b**) *Lamprologus lethops*, holotype, MCZ 50248, male, 26 mm SL; (**c**) *Lamprologus teugelsi*, n.sp., holotype, AMNH 233611, female, 60 mm SL; (**d**) *Lamprologus tigripictilis*, n.sp., holotype, AMNH 233609, male, 62 mm SL.


a
b
c
d

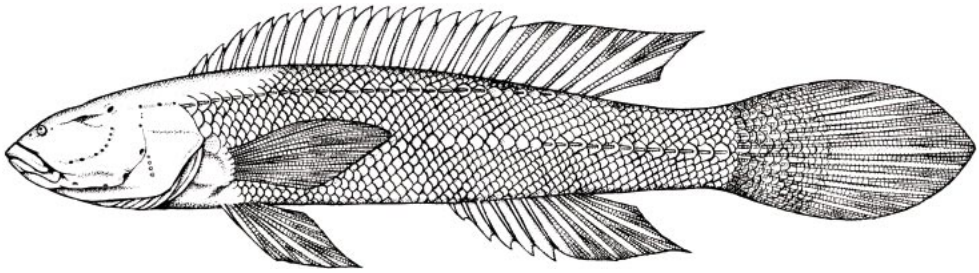


Fig. 21. *Lamprologus lethops* holotype, MCZ 50248, male, 26 mm SL, drawn by Patricia Wynne.

Dorsal and anal fins scaleless. Small scales occur over most of caudal fin.

Vertebrae: 31–33; 13 + 19 (1), 14 + 17 (2), 14 + 18 (3), 14 + 19 (2).

Additional Osteology (fig. 19): Infraorbital series comprised of broad, platelike lachrymal with 5 sensory canal openings and single tubular infraorbital adjacent to the lachrymal. Dermosphenotic absent. Presence of single supraneural polymorphic. Supraoccipital crest low and poorly developed. No frontal ridge extending to median coronal pore (NLF0).

Coloration: Live coloration unknown. Preserved coloration brownish, with 5–6 dark vertical bars faintly visible on flanks. Dorsal fin, posterior edge of caudal fin, anal fin, and pelvic fins darker than base body coloration. Maculae not apparent in fin membranes of preserved specimens.

DIET: Gut short and simple, with length about 70% of SL. Perhaps benthic macrophage; gut contents include disarticulated insect parts and fine gravel.

DISTRIBUTION (fig. 20): Known only from Upemba Lakes region of the upper Lualaba: Lake Kisale and the Kilwezi River.

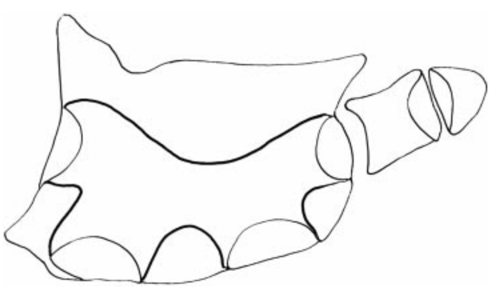


Fig. 22. *Lamprologus lethops* paratype, MCZ 50249: lachrymal and adjacent infraorbitals.

REMARKS: *Lamprologus symoensi*, like *L. lethops*, exhibits a characteristic flank squamation pattern, in which scales are irregularly sized and do not form easily recognizable parallel oblique rows.

Lamprologus lethops Roberts and Stewart, 1976

Figures 21–23, Table 6, Plate 2b

Lamprologus lethops Roberts and Stewart, 1976: 284, pl. 9, figs. a–c (Type locality: Congo River mainstream near Bulu, Zaire, 5°01′S, 14°01′E).

HOLOTYPE: MCZ 50248, Congo River mainstream near Bulu, West of Luozi, 5°1′S, 14°1′E, 7/15/1973, T.R. Roberts and D.J. Stewart.

PARATYPE: MCZ 50249, collected with holotype.

MATERIAL EXAMINED: Holotype and single paratype.

DIFFERENTIAL DIAGNOSIS: *Lamprologus lethops*, the only known blind cichlid, is further distinguished from all other Congo River species of *Lamprologus* save *L. symoensi* by its irregularly sized flank scales, among which clear parallel rows are not apparent, and a scaleless patch on the head extending posteriorly well beyond the dorsal fin origin. In addition, *L. lethops* has by far the highest lateral line scale count (43–49) of the Congo River *Lamprologus* and a low value for BD as a percentage of SL (17.9%) that overlaps only with *L. werneri* and *L. tigripictilis*, n.sp.

DESCRIPTION: Counts and measurements for the holotype and single paratype are given in table 6. Remarkably autapomorphic; lacking pigmentation, cryptophthalmic and cylindrically shaped. Raised, fleshy nostril tubes particularly well-developed. In holotype, two small, dark spheres visible beneath

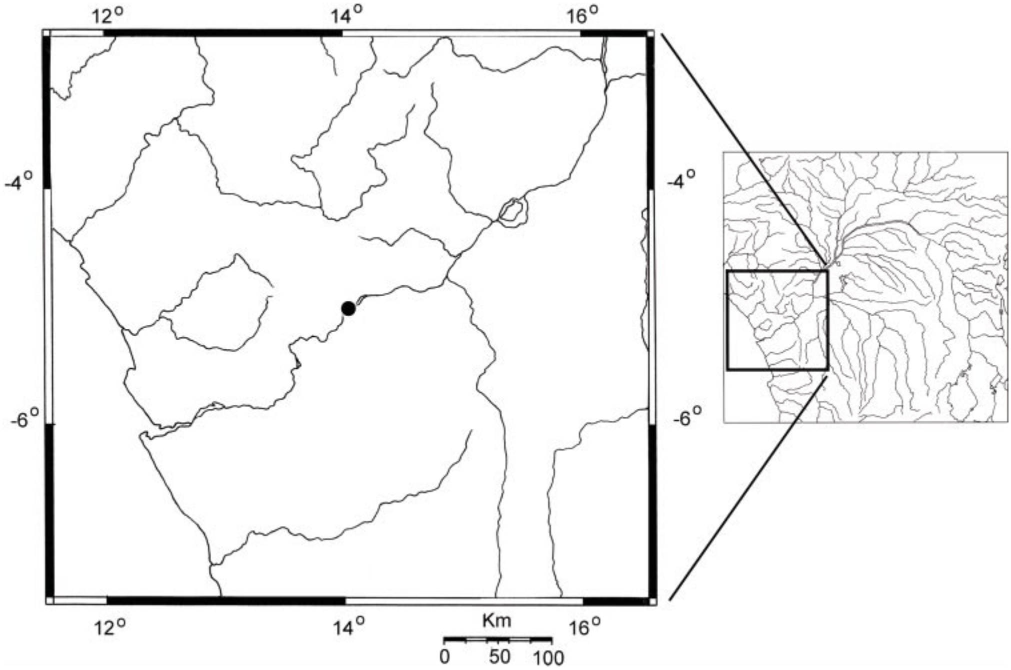


Fig. 23. Collection localities of *Lamprologus lethops*.

covering of thick skin in place of fully-formed eyes (corresponding tissues missing in damaged, eviscerated paratype). In overall appearance this unusual species superficially resembles members of the genus *Teleogramma*. *Lamprologus lethops*, along with *L. werneri*, with which its body depth range overlaps, has one of the shallowest body depths among fluviatile lamprologines (body depth measures 17.9% SL in both specimens). Head length 31.9–32.1%, mean 32.0% SL. Ascending process of premaxilla rises straight at angle of about 40°, blending into head profile without sharp angle; dorsal body profile gently convex, with greatest incline immediately ahead of caudal peduncle. Ventral body profile approximately straight. To date this species known only from two specimens, one eviscerated and dehydrated, and material is insufficient to comment on sexual dimorphism.

Fins: Dorsal fin XX 7. Anal fin VI–VII 5–6. Spines in both fins gradually increase in length posteriorly. Dorsal and anal fins with filamentous extensions to end of caudal peduncle. Caudal fin large, rounded, and paddle-shaped, with 14 branched rays; appears lance-shaped, subacuminate in preserved specimens. Pectoral and pelvic fins short, not reaching vertical through anus.

Teeth: Jaws isognathous. Both outer and inner row teeth unicuspid and sharply pointed. Six greatly enlarged, recurved, procumbent canines situated anteriorly in both jaws, increasing in size laterally. Inner teeth in about 7 poorly defined rows of tightly packed, small, recurved, caniniform teeth anteriorly, gradually thinning to single row posteriorly. Inner premaxillary teeth in lateral row are slightly enlarged.

Gill Rakers: Relatively slender, elongate, non-denticulate. Holotype with 12 gill rakers along hypobranchial and ceratobranchial of first gill arch, single raker in angle of arch and 4 rakers along epibranchial. Gill arches in paratype are damaged and partially missing.

Lower Pharyngeal Jaw: Wider than long, strongly interdigitating along ventral suture. Paratype with 38 teeth in posterior row. Median teeth, especially posteriorly, more robust. Teeth are beveled or simply cone-shaped and pointed.

Scales: Flank scales ctenoid and variable

TABLE 6
Morphometric and Meristic Data for *Lamprologus lethops*

Character	Holotype	*N*	Mean	Min	Max	SD
Standard length (mm)	26.0	2	56.8	26.0	87.6	43.60
Percentage of standard length						
Body depth	17.9	2	17.9	17.9	17.9	0.01
Head length	31.9	2	32.0	31.9	32.1	0.18
Caudal peduncle depth	11.0	2	11.1	11.0	11.2	0.20
Caudal peduncle length	15.2	2	15.7	15.2	16.2	0.72
Anal fin base length	21.9	2	21.0	20.2	21.9	1.24
Dorsal fin base length	54.1	2	55.4	54.1	56.8	1.93
Pelvic fin length	20.1	2	17.6	15.1	20.1	3.48
Caudal fin length	22.8	2	23.0	22.8	23.2	0.31
Pectoral fin length	21.6	2	19.7	17.8	21.6	2.69
Predorsal fin distance	32.5	2	32.4	32.4	32.5	0.07
Preanal fin distance	60.0	2	63.3	60.0	66.6	4.67
Prepectoral fin distance	33.7	2	35.1	33.7	36.6	1.99
Prepelvic fin distance	34.4	1	34.4	34.4	34.4	0.00
Percentage of head length						
Lower jaw length	32.9	2	34.7	32.9	36.5	2.52
Eye diameter	—	2	—	—	—	—
Snout length	32.6	2	35.1	32.6	37.6	3.58
Interorbital width	25.0	2	21.0	17.1	25.0	5.57

Counts	Holotype	Variation
Lateral line scales	43	43 (1), 49 (1)
Dorsal fin spines and rays	XX 7	XX 7 (2)
Anal fin spines and rays	VI 6	VI 6 (1), VII 5 (1)
Gill rakers	12,1,4	12,1,4 (1)
Vertebrae	14+18	14+18 (2)

in size, presenting jumbled pattern with parallel oblique scale rows mostly obscured, particularly so posteriorly on flanks. Lateral line 43–49. Lateral line branches variably fragmented by occasional scales lacking canals. Upper and lower branches of lateral line overlap. Cheek naked, subopercle and opercle with few large scales. Gradual transition to uniformly small scales above lateral line anteriorly, with uniformly sized small scales on belly. Nape scaleless, with scaleless patch between lateral line and dorsal fin extending below dorsal fin to about third spine. Dorsal and anal fins scaleless. Small scales occur over most of caudal fin.

Vertebrae: 32; 14 + 18 (2).

Additional Osteology: Infraorbital series comprised of broad, platelike lachrymal with 4 sensory canal openings and 1–2 tubular infraorbitals adjacent to lachrymal (fig. 22). Dermosphenotic absent. Supraneurals absent. Supraoccipital crest low and poorly developed. No frontal ridge extending to median coronal pore (NLF0).

Coloration: Depigmented. Scaleless but depigmented opercular spot present. Preserved coloration yellowish brown.

DIET: Unknown.

DISTRIBUTION (fig. 23): Known only from the lower Congo River rapids near Bulu.

REMARKS: *Lamprologus lethops* is remarkable as the only blind cichlid. Roberts and Stewart (1976) described *L. lethops* as cryptophthalmic, indicating that the eyes are reduced and covered over by thick skin. Interestingly, this condition is found independently in at least five other lower Congo River rapids endemics, and one species (a clariid

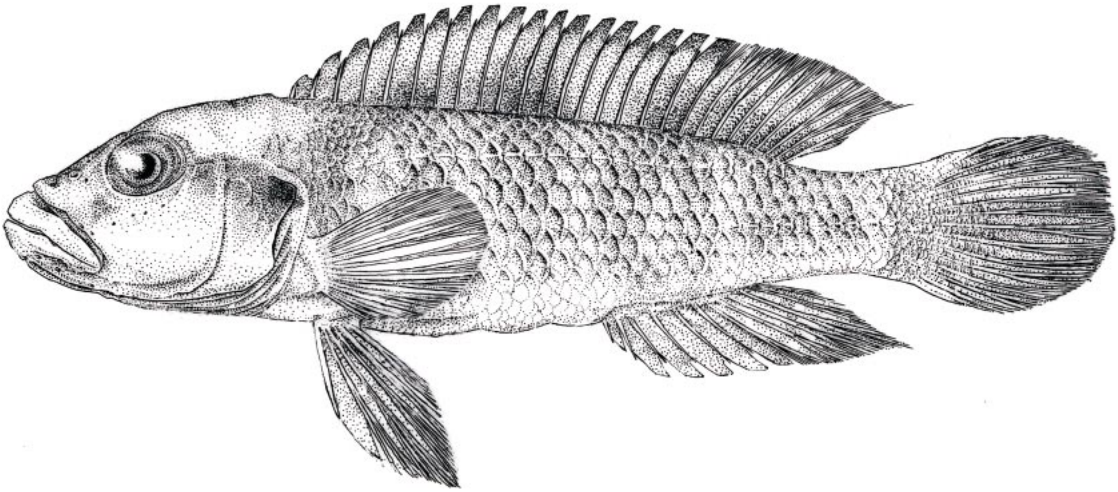


Fig. 24. *Lamprologus teugelsi*, n.sp., holotype, AMNH 233611, female, 60 mm SL, drawn by Ian Hart.

catfish, *Gymnallabes nops*) appears to lack eyes entirely, while in a further 26 lower rapids species the eyes are reduced although not covered by skin. The highly derived features of *L. lethops* alone make it attractive for further study, and the similarities it shares with *Teleogramma*, such as small scales and a gracile, dorsoventrally compressed body, suggest that it may be important to the determination of close outgroups to lamprologines. Unfortunately, the window of opportunity to collect more specimens of *L. lethops* may be closing. A new dam, planned to span the entire channel near Inga (SNEL, 2002), would, if constructed, make the survival of *L. lethops* and other rapids adapted endemics doubtful.

Lamprologus teugelsi, new species
Figures 24–27, Table 7, Plate 2c

HOLOTYPE: AMNH 233611, Kinshasa region, 04°06′S, 15°15′E // 04°20′S, 15°23′E, 1993, M. Smith.

PARATYPES: AMNH 233612 (*n* = 3, 1 specimen c&s), Kinshasa region, 04°06′S, 15°15′E // 04°20′S, 15°23′E, 1993, M. Smith; MCZ 50549 (*n* = 24), Congo River mainstream near Inga dam, 5°31′S, 13°37′E, 4/8/1973, T.R. Roberts and D.J. Stewart; MRAC 96029.0001–0002, Kinshasa region, 04°18′S, 15°18′E, 4/12/1996, W. van der Elst.

MATERIAL EXAMINED: 31 specimens of the type series.

DIFFERENTIAL DIAGNOSIS: *Lamprologus teugelsi*, n.sp., is distinguished from *L. lethops* and *L. symoensi* by its regularly imbricating, large, uniformly sized flank scales, and from *L. mocquardi* by its uniformly dark pigment around the exposed margin of flank scales, giving the appearance of chain mail. A shallow supraoccipital crest distinguishes *L. teugelsi*, n.sp., from *L. congoensis* and *L. tumbanus*, and pelvic fins never reaching the anus distinguish *L. teugelsi*, n.sp., from *L. congoensis*, *L. tumbanus*, and *L. tigripictilis*, n.sp. A larger value for BD as a percentage of SL (21.9–28.6% vs. 17.3–20.3%) and almost always fewer vertebrae (30–32 vs. 31–33) and lateral line scales (32–34 vs. 34–37) differentiates *L. teugelsi*, n.sp., from *L. werneri*.

DESCRIPTION: Counts and measurements for holotype and eight paratypes are given in table 7. Because most of the MCZ paratypes are under 20 mm SL, only eight paratypes were included for most measurements. Relatively stout, deep-bodied species, especially as adults (BD 21.9–28.6%, mean 25.2% of SL). Greatest body depth at about base of third or fourth dorsal fin spine. Head length 31.0–33.8%, mean 32.8% SL. Dorsal head profile rises straight at about 40° angle, curv-

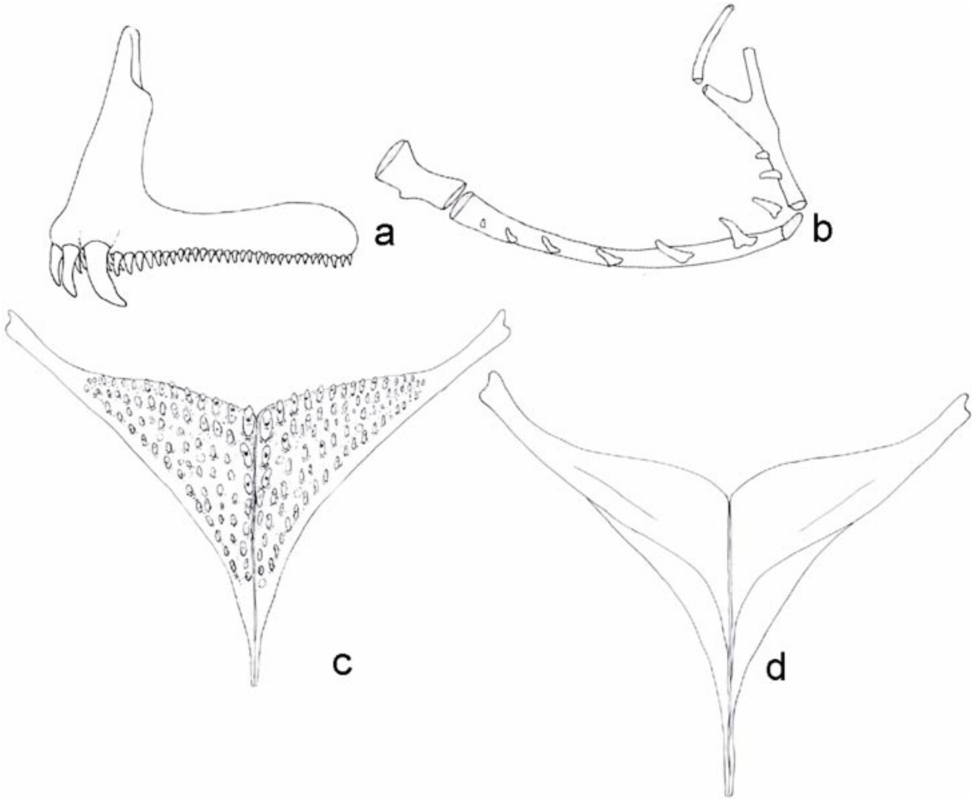


Fig. 25. *Lamprologus teugelsi*, n.sp., AMNH 233612: (**a**) premaxilla; (**b**) first gill arch; (**c**) lower pharyngeal jaw dorsal view; (**d**) lower pharyngeal jaw ventral view.

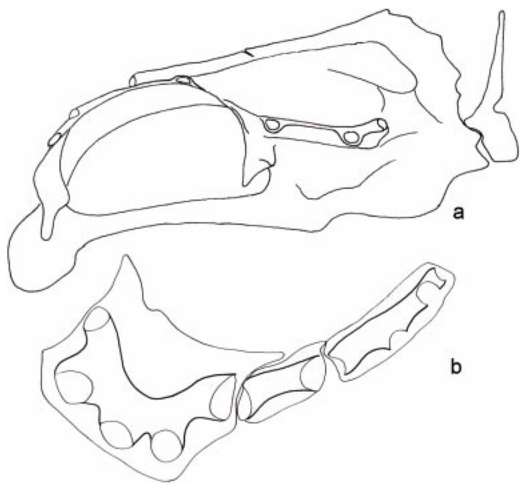


Fig. 26. *Lamprologus teugelsi*, n.sp., AMNH 233612: (**a**) neurocranium and first vertebra; (**b**) lachrymal and adjacent infraorbitals.

ing gently behind eye to become almost horizontal. Dorsal body profile slightly convex, with steepest angle curving ventrally at base of caudal peduncle. Ventral body profile also slightly convex, curving upward just anterior to caudal peduncle. Sexual dimorphism not apparent in limited material available.

Fins: Dorsal fin XVII–XIX (mode XVIII) 8–9 (mode 9). Anal fin V–VI (mode VI) 6–7 (mode 6). Spines in both fins gradually increasing in length posteriorly. Filamentous extensions of dorsal and anal fins extending beyond caudal fin base, to as far as middle of caudal fin in largest specimens. Caudal fin moderately large and rounded rather than paddle shaped, never appearing subacuminate, with 14 branched rays. Pectoral fins short, not reaching vertical through anus. Second pelvic fin ray is longest in fin in both sexes, but not reaching vertical through anus.

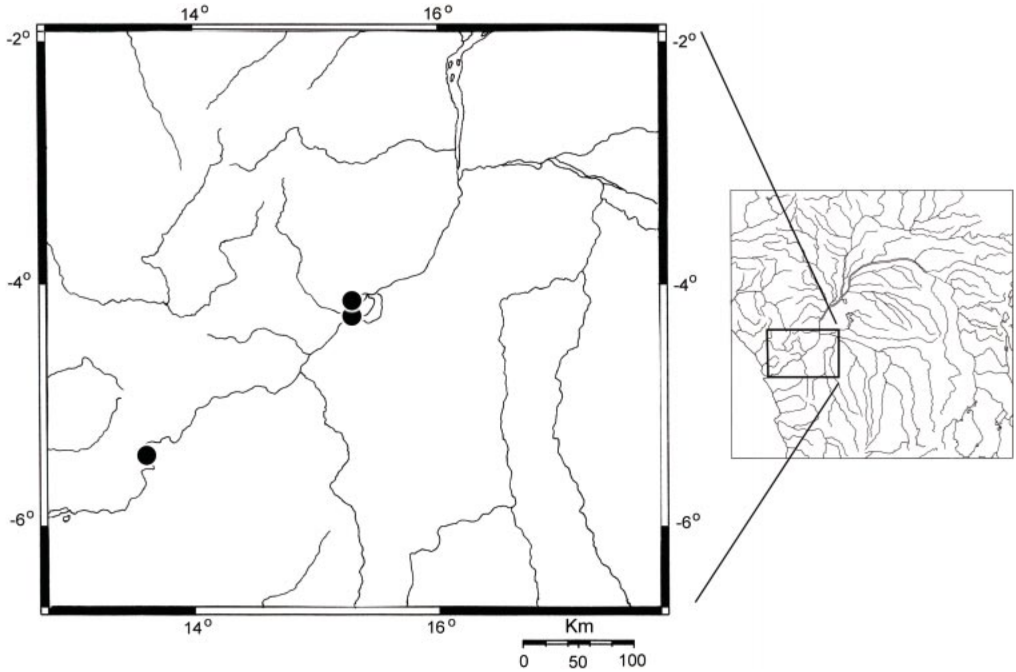


Fig. 27. Collection localities of *Lamprologus teugelsi*, n.sp.

Teeth: (fig. 25a): Jaws isognathous, but with lower lip sometimes protruding slightly; both outer and inner row teeth unicuspid and sharply pointed. Single series of 6–8 greatly enlarged, recurved, procumbent canines situated anteriorly on premaxilla, with 6 such canines on dentary; lateral-most canines considerably larger than those at symphysis. Inner teeth in about 5 poorly defined rows of tightly packed, small, recurved caniniform teeth anteriorly; outmost row medium sized. Inner teeth thinning posteriorly to single row of medium sized caniniform teeth, extending almost entire length of both dentary and premaxilla.

Gill Rakers: (fig. 25b): Moderately elongate and non-denticulate. Eight to 11 (mode 9) gill rakers along outer row of first gill arch. No rakers present on hypobranchial, 5–6 (mode 6) rakers along ceratobranchial, 1 raker in angle of arch, and 2–4 (mode 3) rakers along epibranchial.

Lower Pharyngeal Jaw (fig. 25c): Wider than long, and straight or slightly interdigitating along ventral suture. Usually 20–24 teeth in most posterior tooth row. Posterior median teeth somewhat more robust, even slightly molariform; lateral teeth slender and either beveled or bluntly hooked.

Scales: Flank scales large, ctenoid, and regularly imbricating. Pored lateral line scales 32–34; upper and lower branches not overlapping. Cheek and chest naked, belly with small scales. Nape predominantly scaleless to dorsal fin origin, though a few embedded scales may be present anterior to dorsal fin origin; transition to small scales above first 6 or so scales of upper lateral line. A few scattered scales on opercle and subopercle. Dorsal and anal fins scaleless. Small scales over proximal half of caudal fin.

Vertebrae: 30–32; 14 + 16 (6), 14 + 17 (10), 14 + 18 (4).

Additional Osteology (fig. 26): Infraorbital series comprised of broad, platelike lachrymal with 5 large sensory canal pores and 2–4 tubular infraorbitals adjacent to lachrymal. Dermosphenotic absent. Supraneural present in 4 of 10 specimens. Supraoccipital crest low, frontal ridge present and extends anteriorly to median coronal pore (NLF0).

Coloration: In a photograph of a live aquarium specimen from Kinshasa (Seegers, in litt.), base body coloration is light gray,

TABLE 7
Morphometric and Meristic Data for *Lamprologus teugelsi*, new species.
The holotype and all paratype lots are included.

Character	Holotype	*N*	Mean	Min	Max	SD
Standard length (mm)	60.4	20	33.0	14.52	82.3	22.2
Percentage of standard length						
Body depth	25.1	9	25.2	21.9	28.6	2.23
Head length	32.9	9	32.8	31.0	33.8	0.88
Caudal peduncle depth	11.4	9	11.6	10.8	12.1	0.43
Caudal peduncle length	12.5	9	13.3	11.5	14.9	1.31
Anal fin base length	19.7	9	20.5	18.6	23.1	1.38
Dorsal fin base length	57.8	9	55.9	49.1	59.7	3.34
Pelvic fin length	21.5	9	21.2	18.5	22.7	1.25
Caudal fin length	23.7	9	24.2	21.9	29.5	2.38
Pectoral fin length	18.4	9	20.5	18.4	21.6	1.04
Predorsal fin distance	33.2	9	33.1	31.0	35.7	1.46
Preanal fin distance	67.8	9	66.2	61.7	71.1	3.11
Prepectoral fin distance	35.7	9	36.3	34.1	37.3	1.17
Prepelvic fin distance	38.1	9	38.2	35.6	42.7	2.27
Percentage of head length						
Lower jaw length	40.9	9	38.5	35.5	40.9	1.99
Eye diameter	24.7	9	25.5	22.1	28.5	2.27
Snout length	37.6	9	34.9	25.4	42.2	5.85
Interorbital width	20.9	9	19.6	13.9	24.1	3.35

Counts	Holotype	Variation
Lateral line scales	32	32 (4), 33 (1), 34 (4)
Dorsal fin spines and rays	XVIII 9	XVII 9 (3), XVIII 8 (6), XVIII 9 (7), XIX 8 (5)
Anal fin spines and rays	VI 6	V 6 (3), V 7 (6), VI 6 (10), VI 7 (1)
Gill rakers	6,1,2	5,1,2 (1), 5,1,3 (1), 5,1,4, (1), 6,1,2 (3), 6,1,3 (2), 6,1,4 (1)
Vertebrae	14+16	14+16 (6), 14+17 (10), 14+18 (4)

with six wide, irregular, dark bars on flanks separated by thinner, whitish blotches. Dorsal, anal, and caudal fins are darkly pigmented, lacking obvious maculae. Dorsal fin with light yellow margin, caudal fin with reddish margin restricted to dorsal edge. Preserved specimens yellowish brown, with darker dorsal, anal, and pelvic fins and head. Scaleless, dark opercular spot present. About five dark vertical bars present on flanks. Individual flank scales with dark pigment distributed uniformly along exposed posterior margin, creating intersecting rows of thin, oblique bands of pigment that present the appearance of a chain-link fence or chain mail.

DIET: Unknown; the larger specimens in the type series were kept in aquaria prior to preservation, so gut contents analysis was not possible.

DISTRIBUTION (fig. 27): Known from Malebo Pool and the lower Congo River rapids near Inga.

ETYMOLOGY: Named in memory of our friend and colleague Guy Teugels. Guy's leadership in the field of African ichthyology and his commitment to the training and support of African ichthyologists were an inspiration. He will be sorely missed.

REMARKS: An examination of the voucher specimens identified as *Lamprologus mocquardi* in the analysis of Sturmbauer et al. (1994) reveals that they are *L. teugelsi*, n.sp., and two of these specimens have been included herein as paratypes.

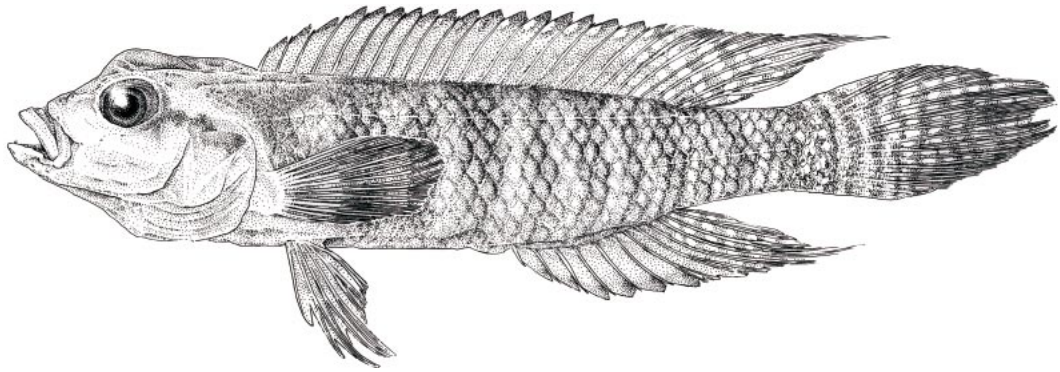


Fig. 28. *Lamprologus tigripictilis*, n.sp., holotype, AMNH 233609, male, 62 mm SL, drawn by Ian Hart.

***Lamprologus tigripictilis*, new species**
Figures 28–31, Table 8, Plate 2d

HOLOTYPE: AMNH 233609, Congo River mainstream a few kilometers northeast of Kinganga, 5°16′S, 13°47′E, 7/12/1973, T.R. Roberts and D.J. Stewart.

PARATYPES: AMNH 233610 (*N* = 4), collected with holotype; AMNH 233568 (*N* = 1), Nziya, near Inga, Congo River mainstream, 05°32′S, 13°34′E, 9/24/2002, C. Shumway et al.; BMNH 1899.2.20.10, Matadi, Lower Congo, 05°49′S, 13°27′E; MRAC 118708–118709 (also paratypes of *Lamprologus werneri* Poll, 1959), Inga, arm of Congo River, 05°29′S, 13°34′E, 10/6/1957, A. Ruzette; MRAC 118710 (also paratype of *Lamprologus werneri* Poll, 1959), Inga, arm of Congo River, 05°29′S, 13°34′E, 10/7/1957, A. Ruzette; MCZ 50201 (*N* = 17), Congo River near Wombe, about 10 km north of Gombe-Matadi and 1 km downstream from mouth of Luasi River, 04°54′S, 14°42′E, 7/05/1973, T.R. Roberts and D.J. Stewart; MCZ 50247 (*N* = 3), Congo River mainstream near Bulu, west of Luozi, 5°1′S, 14°1′E, 7/15/1973, T.R. Roberts and D.J. Stewart; MCZ 50419 (*N* = 6), Congo River mainstream near Isangila, 5°18′S, 13°36′E, 8/15/1973, T.R. Roberts and D.J. Stewart.

ADDITIONAL MATERIAL EXAMINED: 472 specimens. **Boma** (05°50′S, 13°03′E) MRAC 48562, 1/1/1937–8/4/1937, Delguste. **Tadi, near Kibunzi, Congo River mainstream** (5°14′S, 13°56′E) MCZ 50308 (*N* = 71), 7/21/1973, T.R. Roberts and D.J. Stewart. **Downstream a few kilometers from Kinganga,** Congo River mainstream near mouth of Grande-Pukusi River (5°20′S, 13°43′E) MCZ 50339 (*N* = 72), 7/11/1973, T.R. Roberts and D.J. Stewart. **Congo River mainstream few kilometers NE of Kinganga** (5°16′S, 13°47′E) MCZ 50390 (*N* = 75), 7/12/1973, T.R. Roberts and D.J. Stewart. **Congo River mainstream, upstream from Inga on south bank** (05°27′S, 13°36′E) MCZ 50473 (*N* = 219, 1 c&s), 8/01/1973, T.R. Roberts and D.J. Stewart; USNM 216359 (*N* = 20, 2 c&s), 8/01/1973, T.R. Roberts and D.J. Stewart. **Congo River mainstream, near Inga** (05°31′S, 13°37′E) MCZ 50550 (*N* = 14), 8/04/1973, T.R. Roberts and D.J. Stewart.

DIFFERENTIAL DIAGNOSIS: The 9–10 dark bars on the flanks of *Lamprologus tigripictilis*, n.sp., are unique among the Congo River species of *Lamprologus*. *Lamprologus tigripictilis*, n.sp., is further distinguished from *L. lethops* and *L. symoensi* by its regularly imbricating, large, uniformly sized flank scales, and from *L. mocquardi* by its uniformly dark pigment around the exposed margins of flank scales, giving the appearance of chain mail. A shallow supraoccipital crest further distinguishes *L. tigripictilis*, n.sp., from *L. congoensis* and *L. tumbanus*, and pelvic fins extending beyond the anus distinguish *L. tigripictilis*, n.sp., from *L. werneri* and *L. teugelsi*, n.sp. Finally, the possession of 14 precaudal vertebrae in *L. tigripictilis*, n.sp., instead of 15, further serve to differentiate the species from *L. werneri*.

DESCRIPTION: Counts and measurements

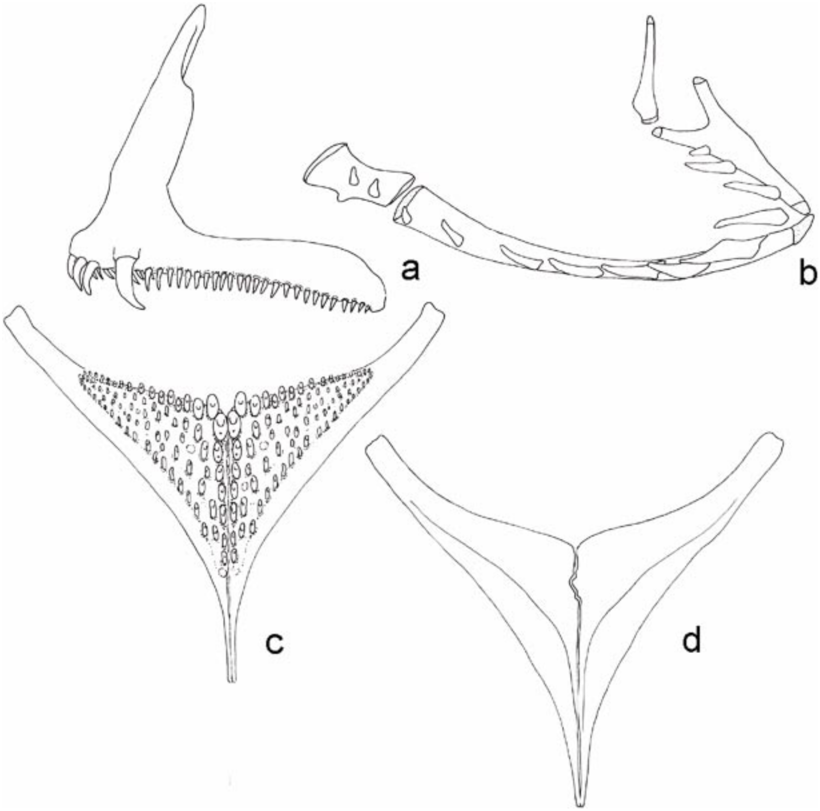


Fig. 29. *Lamprologus tigripictilis*, n.sp., USNM 216359: (**a**) premaxilla; (**b**) first gill arch; (**c**) lower pharyngeal jaw dorsal view; (**d**) lower pharyngeal jaw ventral view.

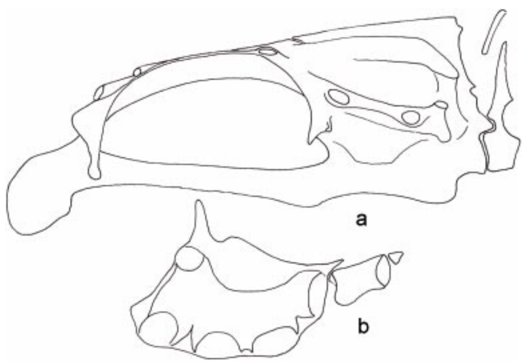


Fig. 30. *Lamprologus tigripictilis*, n.sp., USNM 216359: (**a**) neurocranium, first vertebra, and supraneural; (**b**) lachrymal and adjacent infraorbitals.

for the holotype, paratypes AMNH 233610 (*N* = 4), BMNH 1899.2.20.10, and MRAC 118708–118710, and additional specimens are given in table 8. An elongate, relatively shallow-bodied species (BD 17.1–24.4%, mean 21.2% of SL), though adult males have greater relative body depth than males of *L. werneri*. Greatest body depth at about base of third dorsal fin spine. Head length 29.4–33.1%, mean 31.4% of SL. Head profile rises at angle of 40–50°. In adult males head profile steepest, rising at 50° and curving abruptly toward horizontal above orbit. Both dorsal and ventral body profile slightly convex, curving most sharply at beginning of caudal peduncle. In many preserved large males, in-

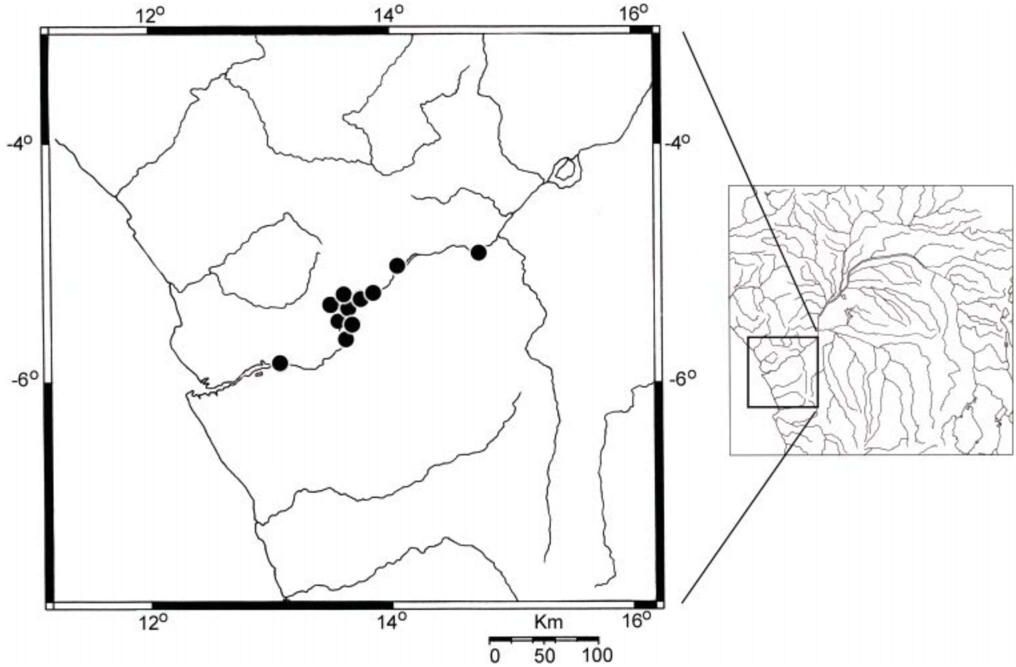


Fig. 31. Collection localities of *Lamprologus tigripictilis*, n.sp.

cluding holotype, loose skin folds in nape region give appearance of nuccal hump, but folds are devoid of muscle or fatty tissue.

Fins: Dorsal fin XVIII–XIX (mode XVIII) 8–10 (mode 9). Anal fin V–VII (mode VI) 6–8 (mode 7). Spines in both fins of gradually increasing length posteriorly. Dorsal and anal fins with tapering filamentous extensions reaching to middle of caudal fin. Caudal fin large, rounded, and paddle-shaped, with 14 branched rays; often appearing lance-shaped, subacuminate in preserved specimens or when adducted. Pectoral fins short, not reaching vertical through anus. Pelvic fins in both sexes somewhat produced, reaching to between anus and anal fin origin, with second ray longest in fin.

Teeth (fig. 29a): Jaws isognathous, but with lower lip sometimes protruding slightly, with both outer and inner row teeth pointed unicuspids in both jaws. Single series of eight enlarged, recurved, procumbent canines situated anteriorly in jaws, with most lateral teeth largest. Posterior to these canines are single rows of slightly enlarged canines extending almost entire length of dentary and premaxilla. Inner teeth are small and caniniform, in about 4 irregular rows, and tapering by mid-jaw to single row.

Gill Rakers (fig. 29b): Slender, elongate, non-denticulate. Twelve to 17 gill rakers along outer row of first gill arch. Two rakers present on hypobranchial, 7–10 rakers along ceratobranchial, almost always single raker in angle of arch, and 4–6 rakers on epibranchial.

Lower Pharyngeal Jaw (fig. 29c): Wider than long, with strongly interdigitating ventral suture. Usually 24–28 teeth in posterior tooth row. Median teeth moderately robust; lateral teeth slender. Teeth beveled or bluntly hooked.

Scales: Flank scales large, ctenoid, and regularly imbricating. Pored lateral line scales 35–37. Upper and lower branches of lateral line sometimes overlap by 1–2 scales. Cheek and chest naked; belly with small scales. Large, embedded scales on opercle and subopercle. Transition to small scales above anterior portion of lateral line, with small scales continuing anteriorly to about midway between dorsal fin origin and eye. Caudal fin with small scales over more than one-half of its length.

TABLE 8
Morphometric and Meristic Data for *Lamprologus tigripictilis*, new species
The holotype and nine paratypes from AMNH 233610, BMNH 1899.2.20.10, and MRAC 118708-10 are included.

Character	Holotype	*N*	Mean	Min	Max	SD
Standard length (mm)	61.9	24	58.0	34.7	79.3	10.47
Percentage of standard length						
Body depth	21.9	24	21.2	17.1	24.4	1.56
Head length	31.6	24	31.4	29.4	33.1	0.93
Caudal peduncle depth	10.4	24	10.1	8.8	11.3	0.49
Caudal peduncle length	13.8	24	15.0	13.1	17.7	1.34
Anal fin base length	21.9	24	22.0	18.9	25.2	1.63
Dorsal fin base length	55.4	24	56.7	52.6	60.9	2.30
Pelvic fin length	23.9	24	22.8	20.7	25.2	1.27
Caudal fin length	32.6	24	29.1	24.6	32.6	2.24
Pectoral fin length	20.6	24	21.4	19.2	24.7	1.40
Predorsal fin distance	32.6	24	30.7	25.5	34.1	2.39
Preanal fin distance	66.3	24	62.9	59.7	66.3	1.86
Prepectoral fin distance	37.8	24	34.3	31.1	37.8	1.58
Prepelvic fin distance	39.9	24	37.1	34.6	40.7	1.68
Percentage of head length						
Lower jaw length	38.9	24	39.8	32.5	44.5	2.90
Eye diameter	28.1	24	27.7	24.6	31.4	2.00
Snout length	38.5	24	35.7	30.4	42.0	3.19
Interorbital width	19.8	24	19.4	15.7	21.9	1.70

Counts	Holotype	Variation
Lateral line scales	35	35 (12), 36 (9), 37 (3)
Dorsal fin spines and rays	XVIII 9	XVIII 8 (6), XVIII 9 (9), XVIII 10 (1), XIX 8 (4), XIX 9 (4)
Anal fin spines and rays	VI 7	V 7 (1), VI 6 (3), VI 7 (17), VI 8 (1), VII 6 (2)
Gill rakers	10,1,5	7,1,4 (1), 8,0,6 (1), 8,1,4 (1), 9,0,4 (1), 9,1,4 (7), 9,1,5 (4), 10,0,6 (1), 10,1,4 (4), 10,1,5 (3), 10,1,6 (1)
Vertebrae	14+18	14+17 (2), 14+18 (33), 14+19 (1)

Vertebrae: 31–33; 14 + 17 (2), 14 + 18 (33), 14 + 19 (1).

Additional Osteology (fig. 30). Infraorbital series comprised of broad, platelike lachrymal with 5–6 large sensory canal pores and 1, sometimes 2 tubular infraorbitals adjacent to lachrymal. Dermosphenotic absent. Single supraneural present. Supraoccipital crest low, frontal ridge present and extends anteriorly to median coronal pore (NLF0).

Coloration: In life, base body coloration is dark gray-brown. Dorsum quite dark; brownish anterior to dorsal fin origin, more gray posteriorly. Nine to 10 relatively dark vertical bars of varying thickness along flanks. Scaleless, dark opercular spot present. Dorsal and anal fins blackish. Caudal fin membranes covered with rows of black maculae, often blending together to form about six blackish vertical bands. Transition from gray-brown through yellowish to white on belly. Hints of yellow on cheek, bluish highlights around ventral edge of orbit posterior to lachrymal. Individual flank scales with dark pigment distributed uniformly along exposed posterior margin, creating intersecting rows of thin, oblique bands of pigment presenting appearance of chain-link fence or chain mail. Preserved coloration dark brown, with blackish dorsal, anal, caudal, and pelvic fins. Banding and spotting visible on caudal fin.

DIET: Gut short and simple, length 50–

55% of SL. Gut contents included sand, detritus, and insect parts, including apparently aquatic insect larvae and an adult dipteran.

DISTRIBUTION (fig. 31): Lower Congo River mainstream, from just downstream of mouth of Inkisi River to Matadi. Upstream portion of *L. tigripictilis*, n.sp., range overlaps with the most downstream occurrences of *L. werneri*.

ETYMOLOGY: The specific name, *tigripictilis*, from the Latin *tigris*, for tiger, and *pictilis*, for colored or painted, refers to the characteristic pattern of dark bands on the flanks of this species.

REMARKS: In the several hundred specimens they identified as *Lamprologus werneri* from the lower Congo Rapids, Roberts and Stewart (1976) mention in passing the possibility of two color varieties. In notes accompanying that material at MCZ, specimens from rapids in the region of Inga were described as ''barred-variety *werneri*''. This ''barred-variety *werneri*'' is described herein as *L. tigripictilis*, n.sp. Within Poll's paratype-series for *L. werneri* are three specimens herein included as paratypes of *L. tigripictilis*, n.sp.

As is the case with *L. lethops*, *L. tigripictilis*, n.sp., appears to be restricted to the lower Congo rapids in the region of Inga. As a rapids endemic it should be a species of particular concern when considering the potential impacts of the new dam at Inga (see remarks for *L. lethops*).

DISCUSSION

A consideration of the distributions of the Congo River *Lamprologus* reveals several noteworthy details. Given that Lake Tanganyika is the locus of lamprologine diversity, it is surprising that six of the eight species considered herein are found in the lower reaches of the Congo River, in the western third of the drainage, more than 1000 km from the lake. Four of those, or one-half of the described species, are known only from the 400-km stretch of the river between Malebo Pool and the Atlantic Ocean. Most of the species have limited to exceedingly restricted known distributions; only two species, *L. congoensis* and *L. mocquardi*, have comparatively wide distributions. Of these, *L. mocquardi* occurs over the widest area, from the upper courses of the Lualaba River to the Congo–Ubangi confluence, including the entire course of the Ubangi–Uele River. Also, most taxa seem to be restricted to the main channels of the Congo and Ubangi Rivers, while a huge swath of the cuvette centrale, encompassing the upper reaches of the Kasai, Ruki, and Lomami Rivers, is entirely devoid of lamprologine collection localities. Whether this is an artifact of insufficient collecting, as seems probable, or an actual bias of lamprologines toward mainstream habitats is a question that deserves further examination.

The large voids in the distribution of known species and the existence of several poorly collected, narrowly endemic species suggests that perhaps much of the Congo River lamprologine diversity remains to be discovered. In particular, the diversity of endemics in the lower rapids provides stimulus for more targeted collection efforts in stretches of rapids in other parts of the basin, such as the Lualaba, upper Ubangi, and upper Kasai Rivers. The need for new collections in the lower rapids themselves is especially urgent since plans are in motion to build a large dam that will entirely span the channel at Inga (SNEL, 2002). If experience with dams in other large river systems holds true, this project would have dire consequences for the endemic fishes of the entire Lower Congo River.

A pressing question regarding the evolutionary history of Congo River lamprologines is how they relate to the Lake Tanganyika species flock. It is tempting to let the question rest on the results of molecular analyses, such as those of Sturmbauer et al. (1994) and Salzburger et al. (2002), which resolve several species of Congo River *Lamprologus* as nested within the Tanganyikan radiation. One recent discovery seemed initially to contradict this topology. De Vos et al. (2001) mentioned a new species of fluviatile lamprologine from the Malagarasi River, an eastern affluent of Lake Tanganyika, that was possibly allied with *Lamprologus mocquardi*, widespread in the Upper and Middle Congo to the west of the lake. If the lake is accepted as a barrier to riverine taxa, this would suggest that fluviatile lamprologines predate the formation of the lake, and that lake formation fragmented their range. However, a closer examination of this species (described as *Neolamprologus devosi*; Schelly et al., 2003), has revealed that any resemblance to *L. mocquardi* is merely superficial, while its true affinities lie with certain Lake Tanganyika endemics. The relevant characters in *Neolamprologus devosi* are derived and shared with members of the lacustrine radiation. Thus, it appears that *L. devosi* has secondarily invaded the river. This result neither confirms nor contradicts the molecular placement of Congo River *Lamprologus* species as derived within lamprologines.

Even if the molecular analyses are correct about the nested placement of a subset of the Congo River *Lamprologus* species within the Lake Tanganyika radiation, only three Congo River species have been sequenced, so the existing molecular data allow for the possibility that one or more Congo River taxa seeded the lake, and at a later date a lacustrine lineage returned to the Congo River. Morphologically, lamprologines appear to have closer affinities to *Teleogramma* and possibly also *Steatocranus*, two Congo River lineages, than to other Tanganyikan cichlids (Stiassny, 1997). These genera have not been included in molecular analyses of lamprologines to date, calling into question whether insufficient taxon sampling of close outgroups has led to inaccurate topologies. If one accepts that the plesiomorphic condition in the lamprologine ancestor is a complete post-lachrymal infraorbital series, as in *Steatocranus* and *Teleogramma* (Stiassny, 1997), then the condition in the Congo River species of a partial series could be interpreted as an intermediate stage in a progression culminating in complete loss of the post-lachrymal infraorbital series in almost all Lake Tanganyika species. Under this interpretation, Congo River taxa could be precursors to the lake radiation. Accurate interpretation of this apparent disagreement between morphology and molecules awaits a more comprehensive phylogenetic analysis (Schelly, in prep.).

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