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Revision of the *Amphilius jacksonii* complex (Siluriformes: Amphiliidae), with the descriptions of five new species

ALFRED W. THOMSON[1,2,3,4], LAWRENCE M. PAGE[1] & SAMANTHA A. HILBER[2]

[1]*Florida Museum of Natural History, University of Florida, Gainesville, FL 32611, USA*
[2]*Biology Department, University of Florida, Gainesville, FL 32611, USA*
[3]*Current address: Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute, Saint Petersburg, FL 33701, USA*
[4]*Corresponding auhtor. E-mail: Alfred.Thomson@MyFWC.com*

Abstract

The *Amphilius jacksonii* complex is revised, and five new species are described: *A. ruziziensis* **n. sp.** from the Ruzizi River drainage and northeastern tributaries of Lake Tanganyika; *A. pedunculus* **n. sp.** from the Malagarasi River drainage, Lake Rukwa basin, and upper Great Ruaha River drainage, Rufiji basin; *A. frieli* **n. sp.** from the upper Congo basin; *A. crassus* **n. sp.** from the Rufiji and Wami basins; and *A. lujani* **n. sp.** from the Lake Kyogo drainage, northeastern tributaries of Lake Victoria, and the Lake Manyara basin.

Key words: taxonomy, catfish, Africa, Kenya, Tanzania, Malawi, Burundi, Rwanda, Uganda, Zambia, Democratic Republic of the Congo

Introduction

The African catfish genus *Amphilius* is the most diverse and widely distributed genus in the family Amphilliidae. As currently recognized the genus includes 29 species distributed throughout Low Africa (northern and western Africa in which most of the land is at elevations between 500 and 1000 meters) and High Africa (southern and eastern Africa in which most of the land is at elevations well above 1000 meters (much above 4000 meters). Skelton (1984) identified two characters that distinguished most of the species from Low Africa from most of the species from High Africa. The Low African species have an epidermal fold at the base of the caudal fin and 6 + 7 or 7 + 8 principal caudal-fin rays, while the High African species lack the epidermal fold and have 8 + 9 principal caudal-fin rays. Only two species of the Low African group occur in High Africa: *Amphilius lentiginosus* in Angola and *Amphilius jacksonii,* widely distributed in eastern Africa.

Amphilius jacksonii was described from a single specimen collected from the Hima River, a tributary of Lake George in western Uganda (Boulenger, 1912). Subsequent authors have recorded this species throughout much of eastern Africa including the Lake Edwards drainage in western Uganda (Walsh *et al.*, 2000), the Malagarasi River drainage in Burundi & western Tanzania (David, 1937; De vos *et al.*, 2001), the Rizizi River drainage [as *Amphilius platychir* (Marlier, 1953)], the Rufiji basin in eastern Tanzania [as *Amphilius platychir* (Matthes, 1967; Bailey, 1969)], the Lake Rukwa basin in Tanzania (Seegers, 1996a), and the Upper Congo basin in Zambia (Seegers, 1996a).

Beyond distributional data, very little information is published on *Amphilius jacksonii*. Greenwood (1958, 1966) described and figured the species in both editions of "Fishes of Uganda". Seegers (1996a) figured the type specimen and described specimens from the Lake Rukwa basin. Walsh *et al.* (2000) redescribed the species and provided habitat and life-history notes from the Lake George drainage, Uganda. The Weberian complex of this species was described and figured by Chardon (1968), and Diogo & Chardon (2000) described the mandibular barbel structure. No studies have examined geographic variation in *A. jacksonii*.

A study of geographic variation in specimens identified as *Amphilus jacksonii* revealed substantial

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morphological differences among drainages. The aim of this study was to document this diversity and formerly diagnose and describe species within the complex.

Material and methods

Measurements were made point-to-point with digital calipers, and data were recorded to hundredths of a millimeter. Subunits of the head are presented as proportions of head length (HL). Head length and measurements of other body parts are given as proportions of standard length (SL). Use of the terms origin and insertion to designate, respectively, the most anterior and posterior points on the bases of all fins follows Cailliet *et al.* (1986). Counts and measurements were made on the left side of a specimen when possible and follow Skelton (1981, 1984, 1986) with the additional measurements of body depth at anus, prepectoral-fin length, preanal-fin length, dorsal-fin base length, adipose-fin base length, pelvic- and pectoral-fin lengths, prepelvic-fin length, postpelvic-fin length, and preanus length. Only specimens 40.0 mm SL or larger were measured, but counts were made on all type specimens. Descriptions of new species are based on the holotype and paratypes. Specimens from drainages that do not include the type locality and specimens that were examined but from which no morphometric or meristic data was taken are listed as non-types.

For fin-ray counts, numbers of unbranched soft rays are indicated by lower case Roman numerals, and branched soft rays by Arabic numerals. The number of anterior unbranched rays in the anal fin is difficult to determine, and the counts were checked with radiographs whenever possible. Amphiliids typically have a small spinelet in front of the first unbranched dorsal-fin ray. The spinelet is not included in the counts. Branchiostegal ray counts include all rays. Material examined is given under each species account and is listed by basin, drainage, or river system followed by catalog number, locality, geographic coordinates and, in parentheses, the number of specimens and the size range in mm SL. Geographic coordinates preceded by ca. are estimated from original locality data. Materials examined in this study are deposited in the following institutions: American Museum of Natural History, New York, New York (**AMNH**), Auburn University Museum Fish Collection, Auburn, Alabama (**AUM**), Natural History Museum, London (**BMNH**), Cornell University, Vertebrate Collections, Ithaca, New York (**CU**), Harvard Museum of Comparative Zoology, Cambridge, Massachusetts (**MCZ**), Royal Museum of Central Africa, Tervuren, Belgium (**MRAC**), South African Institute for Aquatic Biodiversity, Grahamstown, South Africa (**SAIAB**), and Florida Museum of Natural History, Gainesville, Florida (**UF**).

Synonymies include all references to the species in east-central Africa. The first page of the reference to the species and all figures are listed. If the species is also listed in a key on a separate page from the account, that page is also listed. The type of information in the reference is given followed by the locality for the species as given in the account. Additionally, any specimens on which the account is known to be based are listed. If the account is only based in part on the species, only the information that is applicable to that species is given. Accounts of species outside east-central Africa that give only a general distribution in east-central Africa are excluded.

Amphilius jacksonii complex

The *Amphilius jacksonii* complex differs from all other species of the genus (*A. atesuensis, A. brevis, A. caudosignatus, A. dimonikensis, A. grammatophorus, A. kakrimensis, A. korupi, A. lamani, A. longirostris, A. maesii, A. mamonekenensis, A. nigricaudatus, A. opisthophthalmus, A. platychir, A. pulcher, A. rheophilus*) except *A. lentiginosus* by its mottled body coloration that includes dark saddles that are joined to one another laterally (vs. body mottled, dark saddles not joined laterally). It differs from *A. lentiginosus* by having the head and body without spots (vs. head and body heavily spotted) and by having fewer total gill rakers on the first gill arch (6–11, rarely 5 or 12 vs. 14–16). The *A. jacksonii* complex further differs from *A. longirostris* and *A. opisthophthalmus* by having 6+7 principal caudal-fin rays (vs. 7+8) and a well developed crenelated epidermal fold (vs. rudimentary fold), and further differs from *A. brevis*, *A. dimonikensis*, *A. korupi*, and *A. maesii* by having distinct crenelations on the epidermal fold (vs. crenelations absent or very weak). It further differs from *A. grammatophorus, A. kakrimensis*, *A. platychir*, and *A. rheophilus* by having the lobes formed by epidermal fold crenelations rounded, Fig. 1A (vs. lobes formed by epidermal fold crenelations elongated and pointed, Fig. 1B) and from *A. brevis, A. caudosignatus,*

A. dimonikensis, A. korupi, A. lamani, A. maesii, A. mamonekenensis, A. nigricaudatus, and *A. pulcher* by having fewer branchiostegal rays (usually 6–8, rarely 5 or 9 vs. 9–10 in *A. pulcher*, more than 9 in the other species).

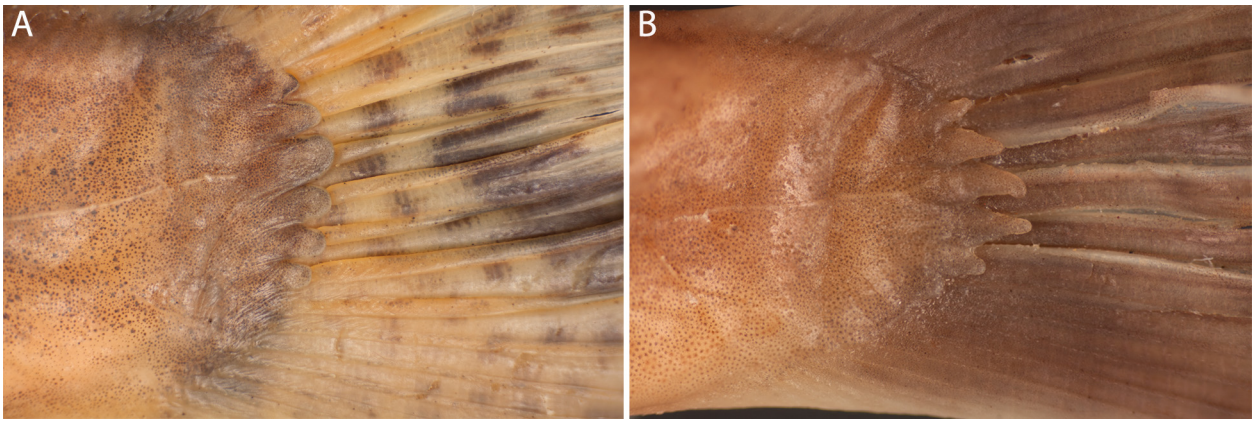

FIGURE 1. Epidermal fold of *Amphilius* species. A: Crenelations rounded (*Amphilius lujani*, UF 184238). B. Crenelations pointed (*Amphilius grammatophorus*, AMNH 248684).

Amphilius jacksonii Boulenger 1912

(Fig. 2, Table 1)

Amphilius jacksonii Boulenger 1912: 602, Original description, Type locality: Hima R. flowing into Lake George (Ruisamba), eastern Uganda, elev. 3500 ft. [Lake George drainage, Nile basin], holotype: BMNH 1912.10.15.47; Boulenger, 1916: 307, fig. 182, description based on type; David & Poll, 1937: 255, description, Rutshuru River [Lake Edward drainage, Nile basin]; Poll, 1939: 17, 62, records from Albert National Park [Lake George and Lake Edwards drainages]; Harry, 1953: 190, synonymy; Greenwood, 1957: 77, figs. 49, 80, description, size, habitat, distribution [Lake George and Lake Edwards drainages]; Copely, 1958: 154, Hima R.; Greenwood, 1958: 89, fig. 49, description, size, habitat, distribution [Lake George and Lake Edwards drainages]; Whitehead, 1958: 198, western Uganda rivers; Corbet, 1961: 81 [not examined]; Greenwood, 1966: 93, fig. 49, description, size, habitat, distribution [Lake George and Lake Edwards drainages]; Seegers, 1996a: 188, figs. 133–134 (in part), type information, holotype figured, Seegers, 1996b: 251 (in part), type information, distribution; Walsh *et al.*, 2000: 166, redescription, diagnosis, description, life-history aspects, habitat, distribution [Lake George drainage].

Material examined. Lake George drainage: AMNH 97419, Uganda, Dura River, Dura station, south end of Kibale Forest Reserve near Queen Elizabeth National Park, ca. 0°12'00”N, 30°22'00"E (6: 41.9–79.5); BMNH 1912.10.15.47, Uganda, Hima River, ca. 0°17'19”N, 30°10'23"E (1: 86.7, holotype); BMNH 1971.1.5.37–38, Uganda, Mapanga River, about 8 km upstream just below rapids, ca. 0°05'10.6”N, 30°23'03.8"E (2: 58.7–60.1); BMNH 1971.1.5.39, Uganda, Sibwe River, ca. 0°10'01.4”N, 30°12'36.8"E (1: 87.0); BMNH 1971.2.19.14–15, Uganda, Sibwe River, ca. 0°10'01.4”N, 30°12'36.8"E (1: 87.0); CU 97331, ex. UF 110746 (4: 37.6–92.7); MCZ 100587, Uganda, Middle Dura River, Kanyanchu, Kibale Forest Reserve, ca. 0°27'00”N, 30°22'00"E (1: 76.7); MRAC 90–046–P–68–78, Uganda, Ruimi (Rwimi) River, road between Fort Portal-Kasese [Route A 109], ca. 0°22'23.5”N, 30°12'40.8"E (11: 44.0–84.2); MRAC 90–046–P–79–87, Uganda, Ruimi (Rwimi) River, road between Fort Portal-Kasese [Route A 109], ca. 0°22'23.5”N, 30°12'40.8"E (11: 47.2–83.0); SAIAB 187245, ex. UF 110746 (42.3–97.0); UF 110743, Uganda, Middle Dura River, Kanyanchu, Kibale Forest Reserve, ca. 0°27'00”N, 30°22'00"E (12: 48.6–104.3); UF 110744, Uganda, Middle Dura River, Kanyanchu, Kibale Forest Reserve, ca. 0°27'00”N, 30°22'00"E (19: 23.6–115.9); UF 110745, Uganda, Middle Dura River, Kanyanchu, Kibale Forest Reserve, ca. 0°27'00”N, 30°22'00"E (5: 54.6–88.6); UF 110746, Uganda, Middle Dura River, Kanyanchu, Kibale Forest Reserve, ca. 0°27'00”N, 30°22'00"E (36: 34.1–102.0); UF 110747, Uganda, Dura River-Mainaro, ca. 0°37'00”N, 30°16'00"E (34: 54.4–111.1); UF 110748, Uganda, Ruimi River at bridge on road between Fort Portal and Hima, ca. 0°22'22.2”N, 30°12'41"E (41: 42.7–92.8); UF 110749, Uganda, Ruimi River at bridge on road between Fort Portal and Hima, ca. 0°22'22.2”N, 30°12'41"E (1: 47.6); UF 110750, Uganda, Mubuku River at bridge on road between Fort Portal and Kasese, ca. 0°15'30.8”N, 30°07'9.7"E (7: 52.8–85.1). **Lake Edward**

drainage: AUM 47138, Uganda, Munyage River, below Butogota town, DRC-Uganda border foot path, elev. 1190m, 0°53'00”S, 29°37'50"E (3: 60.1–69.9); AUM 47139, Uganda, Tributary of Ishasha at bridge between Karangara and Butogota. Outside BINP, sources in park, elev. 1180m, 0°52'18”S, 29°39'59"E (2: 73.41–80.8); AUM 47143, Uganda, River Ishash, below bridge in cattle farm on Butogota-Kanungu road. elev. 1300m, 0°49'50”S, 29°38'21"E (2: 65.7–73.4); AUM 47146, Uganda, Bwindi Impenetrable Forest National Park, ca. 0°1'26”S, 29°41'23"E (4: 58.8–86.6); MRAC 22551, Uganda, Rutshuru, Buseregenyi, ca. 1°04'00”S, 29°26'00"E (1: 80.0); MRAC 23233, Uganda, Rutshuru, Buseregenyi, ca. 1°04'00”S, 29°26' 00"E (1: 82.2); MRAC A5–019–P–0048–0056, Uganda, Munyage River, below Butogota town, DRC-Uganda border foot path, elev. 1190m, ca. 1°04'00”S, 29°26'00"E (9: 39.4–97.3); UF 169241, ex. AUM 47143 (3: 65.9–70.7); UF 169242, ex. AUM 47139 (3: 80.7–87.3); UF 169243, ex. AUM 47138 (2: 67.1–86.3); UF 169257, ex. AUM 47146 (3: 60.7–75.1). **Kagera River drainage:** MRAC 164876, Rwanda, Mwogo River, 18 km NE of Butare, ca. 2°29'00”S, 29°38'00"E (1: 77.2); MRAC 71783–850, Rwanda, Mwogo River, the source of the Nile, ss-tributary of Kagera River, ca. 2°22'52”S, 29°41'48"E (61: 38.5–107.0); MRAC 71851–925, Rwanda, Mwogo River, the source of the Nile, ss-tributary of Kagera River, ca. 2°22'52”S, 29°41'48"E (74: 38.5–106.4); MRAC 83417, Burundi, Urigoli, Nyalugogo [Nyabugogo?] River, Urigoli territory, ca. 3°25'26”S, 29°53'30"E (1: 34.7); MRAC 86–27–P–0088–0095, Rwanda, Rubondo River, tributary of Kiryango River, near town of Mukugi, ca. 2°12'00”S, 29°41'00"E (8: 51.8–86.1); MRAC 91–30–P–0296–0299, Burundi, Nyakijanda River, tributary of Ruvubu River, the bridge on Road of General Interest 4, 38 km from Kinyinya, ca. 3°36'00”S, 30°07'00"E (4: 49.5–65.0); MRAC 91–34–P–0147–0150, Burundi, Kavuruga River, tributary of Ruvubu River, near town of Buhinyuza, ca. 3°02'00”S, 30°21'00"E (4: 49.4–74.9); MRAC 91–34–P–0151–0152, Burundi, Kinyanderama River, tributary of Ruvubu River, near town Buhinyuza, ca. 3°02'00”S, 30°21'00"E (2: 66.6–71.1); MRAC 91–34–P–0160–0164, Burundi, Nyabiko River, on Muyinga-Gitega road, small tributary, rocky and sandy bottom, ca. 5°29'00”S, 30°14'00"E (5: 35.1–92.3); MRAC 91757–763, Rwanda, Nyabugogo River at confluence of Lusine River, ca. 1°47'41”S, 30°07'23"E (7: 58.9–96.8); MRAC 91764–836, Rwanda, Nyabugogo River at confluence of Lusine River, ca. 1°47'41”S, 30°07'23"E (72: 34.9–79.8); MRAC 93097–120, Rwanda, Nyabugogo River, at outlet of Lake Mohasi, ca. 1°46'45”S, 30°07'58"E (23: 28.2–77.0); MRAC 94272–276, Rwanda, ca. 2°32'15”S, 29°40'16"E (5: 40.1–82.9); MRAC 96031.1611–1614, Burundi, Karuzi, small tributary stream of the fish-farming ponds, Ndurumu system, ca. 3°06'05”S, 30°09'53"E (4: 29.3–78.4).

Diagnosis. Diagnostic characters are summarized in Table 2. *Amphilius jacksonii* is diagnosed from all other species of the *Amphilius jacksonii* complex by its more slender caudal peduncle (4.8–7.9% vs. 8.1–12.3% SL). It is further distinguished from *A. pedunculus*, *A. frieli*, and *A. crassus* by its longer caudal peduncle (caudal-peduncle length 16.7–20.6 vs. 13.3–18.8% SL), and from *A. frieli*, *A. crassus*, and *A. lujani* by its more slender body (body depth at anus 9.6–13.2% vs. 13.5–17.4% SL). It is further distinguished from *A. frieli* by having fewer total gill rakers on the first gill arch (6–9, rarely 10 vs. 10–11, rarely 9 or 12) and from *A. ruziziensis* by having a wider interorbital width (26.7–32.0 HL vs. 23.4–25.1% HL).

Description. Morphometric data are in Table 1. Body elongate, ventral profile flattened ventrally to anal-fin base, then tapered dorsally to end of caudal peduncle. Dorsal profile rising gently from tip of snout to origin of dorsal fin, then nearly horizontal to end of caudal peduncle. Greatest body depth at dorsal-fin origin. Caudal peduncle laterally compressed, with crenellated epidermal fold. Anus and urogenital opening located at midpoint of adpressed pelvic fin, closer to pelvic-fin insertion than to origin of anal fin. Skin smooth. Lateral line complete, extending from dorsal edge of opercular cavity to caudal-fin base.

Head and anterior part of body depressed and broad. Head wedge-shaped in lateral view. Snout broad, blunt when viewed from above. Head becoming wider from tip of snout to pectoral-fin base. Branchiostegal membranes moderately joined at isthmus forming a *U*-shaped connection.

Mouth broad, gently curved, subterminal. Lips moderately fleshy, slightly papillate. Rictal lobe large and papillate. Anterior portion of premaxillary tooth band exposed with mouth closed. Premaxillary tooth patches joined, forming *V*-shaped band with anterior broad protrusion. Premaxillary and dentary teeth short, conical. Dentary tooth patches forming *U*-shaped band, separated medially.

Three pairs of simple, tapered circumoral barbels. Maxillary barbel large, fleshy and flattened with pointed tip; barbel extending posterolaterally from corner of mouth to pectoral-fin base. Outer mandibular barbel thin with pointed tip, origin at posterior corner of lower jaw, extending to pectoral-fin origin. Inner mandibular barbel originates anterolaterally of inner mandibular barbel, extending to edge of branchiostegal membrane.

Branchiostegal membrane with 6 (5), 7 (85), 8 (147), or 9 (1) rays. Gill rakers on first epibranchial 1 (4), 2 (178) or 3 (47); rakers on first ceratobranchial 4 (22), 5 (88), 6 (99), 7 (15), or 8 (1); total gill rakers on first arch 6 (25), 7 (74), 8 (83), 9 (38), or 10 (6).

Eye small, positioned dorsolaterally approximately midway between tip of snout and posterior margin of operculum. Horizontal diameter of eye slightly wider than vertical diameter. Eye without free orbit, covered with skin confluent with dorsal surface of head. Anterior and posterior nares with prominent tubular rims; nares separate but relatively close to each other. Posterior nare located about midway between eye and tip of snout.

Dorsal-fin origin at point over tip of adpressed pectoral fin. Dorsal fin with i,6 (243) rays, margin straight. Pectoral fin with i,7 (1), i,8 (104), or i,9 (137) rays; unbranched ray greatly thickened. Pectoral fin with four or five innermost rays progressively shorter making posterior fin margin rounded. Origin of pelvic fin posterior to dorsal-fin insertion. Pelvic fin with i,5 (243) rays with first ray unbranched and greatly thickened. Pelvic fin with straight posterior margin.

Adipose-fin base longer than anal-fin base, origin anterior to origin of anal-fin base; fin extending past anal-fin insertion. Margin strongly convex with sharply rounded edge, not deeply incised posteriorly. Caudal fin deeply forked with tips of lobes rounded; fin with i,5,5,i (8), i,5,6,i (230), or i,6,6,i (1) principal rays. Anal fin with short base, origin posterior to origin of adipose-fin base, with ii,6 (62), ii,7 (107), ii,8 (9), iii,6 (48), iii,7 (16), or iv7 (1) rays. Anal-fin margin almost straight.

FIGURE 2. *Amphilius jacksonii*, UF 110743, 90.3 mm SL; lateral, dorsal and ventral views.

TABLE 1. Morphometric data for *Amphilius jacksonii*. Range and mean include the holotype.

	Holotype	Range (n=31)	Mean±SD
%SL			
Head length	22.2	21.2–26.6	24.0±1.3
Head width	18.2	18.1–21.7	19.4±1.0
Head height	11.8	11.5–14.0	12.5±0.8
Body depth	13.0	11.5–17.0	14.4±1.3
Body depth at anus	11.5	9.6–12.0	11.3±0.7
Predorsal length	37.7	31.7–39.8	36.2±1.5
Prepectoral length	18.5	17.4–22.7	19.5±1.4
Preanal length	73.1	67.8–77.4	71.2±2.0
Dorsal-fin base length	9.8	8.5–13.4	10.8±1.2
Adipose-fin base length	–	18.2–25.9	21.7±2.1
Anal-fin base length	10.6	10.2–18.0	12.0±1.5
Pelvic-fin length	19.3	17.9–23.6	20.5±1.3
Pectoral-fin length	22.8	19.7–27.7	23.6±1.8
Anal-fin length	15.6	13.7–22.5	19.3±1.9
Caudal-peduncle length	18.6	16.7–20.1	18.7±0.8
Caudal-peduncle depth	7.3	4.8–7.9	7.1±0.6
Anus to anal fin length	17.3	11.8–17.9	14.5±1.5
Prepelvic length	50.5	43.9–50.9	48.4±1.7
Postpelvic length	49.7	47.0–56.2	52.4±2.2
Dorsal-fin insertion to adipose	–	40.6–43.7	42.2±0.9
Dorsal-fin origin to caudal	–	59.7–71.7	66.2±2.1
Preanus length	–	51.7–60.0	56.6±2.0
%HL			
Snout length	44.8	44.8–55.1	48.3±2.2
Interorbital distance	29.2	26.7–32.2	28.3±1.2
Maxillary barbel length	65.1	64.8–90.2	75.5±6.5
Inner mandibular barbel length	–	34.1–47.2	40.8±3.1
Outer mandibular barbel length	–	49.8–73.1	62.2±6.1
Eye diameter	15.6	13.4–19.2	16.5±1.4

TABLE 2. External traits diagnostic for species of the *Amphilius jacksonii* complex.

Character	*Amphilius jacksonii*	*A. ruziziensis*	*A. pedunculus*	*A. frieli*	*A. crassus*	*A. lujani*
Branchiostegal rays	7–8, rarely 6 or 9	6–7	7–8	8–9	6–7, rarely 8	7–8
Branched pectoral rays	8–9, rarely 7	8–9	8–10	9–10	7–8, rarely 9	9
Total gill rakers	6–9, rarely 10	6–8, rarely 5 or 9	7–9, rarely 6 or 10	10–11, rarely 9 or 12	6–8, rarely 9	6–8, rarely 5 or 9
Gill rakers on first ceratobranchial	4–7, rarely 8	4–6, rarely 3 or 7	5–6, rarely 4 or 7	7–8, rarely 6 or 9	4–6, rarely 3	5–6, rarely 4 or 7
Caudal-peduncle depth	4.8–7.9	8.6–9.5	9.9–12.3	9.7–11.4	10.1–12.0	8.1–9.5
Caudal-peduncle length	16.7–20.6	18.7–20.3	16.0–18.8	14.4–16.4	13.3–15.5	16.8–20.9
Interorbital width	26.7–32.0	23.4–25.1	28.1–35.8	25.1–27.7	28.9–34.1	28.3–31.7
Dorsal-fin insertion to adipose-fin insertion	40.6–43.7	38.2–41.5	37.5–41.7	37.5–41.2	42.2–44.6	38.2–42.0
Body depth at anus	9.6–13.2	11.1–12.9	11.4–17.7	13.9–14.9	14.5–17.4	13.5–15.8

Coloration. Body variably mottled and with dark saddles. First saddle immediately posterior of head, second saddle under dorsal fin, third saddle between dorsal and adipose fins, fourth saddle under anterior part of adipose fin, and fifth saddle on caudal peduncle. All saddles connected laterally by broad stripe. Venter light brown with fourth and fifth saddles meeting those of opposite side. Dorsal and anal fins light brown with dark medial band. Adipose fin dark brown, cream-colored distally. Pectoral and pelvic fins positioned horizontally with upper surfaces brown and lower surfaces light yellow, each with dark medial band. Caudal fin brown with medial cream patch and tips of upper and lower lobes cream. Caudal coloration asymmetrical, lower lobe with more pigment than upper lobe.

Distribution. Lake George, Lake Edwards, and Kagera River drainages, Nile basin, eastern Uganda, Rwanda, and Burundi (Fig. 3).

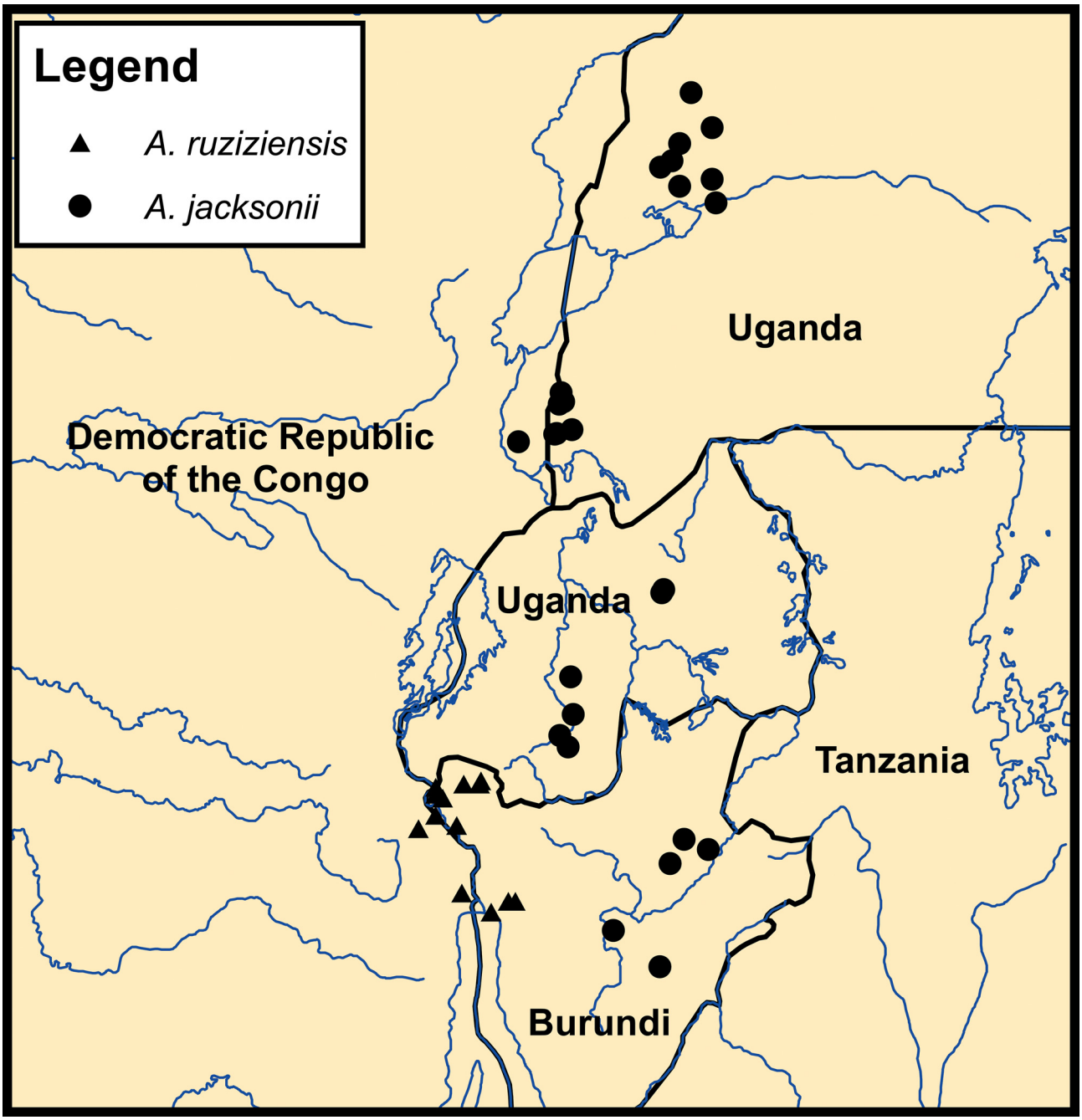

FIGURE 3. Distributions of *Amphilius jacksonii* (dots) and *A. ruziziensis* (triangles).

***Amphilius ruziziensis* Thomson & Page, new species**
(Fig. 4, Table 3)

Amphilius platychir (non Günther).—Marlier, 1953: 194, distribution in Ruzizi drainage; Distribution mapped.

Holotype. MRAC 93294, Rwanda, Lufiro River, upper reaches of Matchuza, Ruzizi River drainage, ca. 2°44'00”S, 29°02'99"E (82.8 mm SL)

Paratypes. CU 97332, ex. MRAC 93300, same data as holotype (1: 47.7); MRAC 91529–531, Democratic Republic of the Congo, Kiliba River, ca. 3°14'30”S, 29°09'36”E (3: 31.2–64.9); MRAC 93295–297, same data as holotype, (3: 41.3–45.3); MRAC 93126–128, Burundi, Nyakagunda River, ca. 2°47'S, 29°04'E (3: 37.5–66.5); MRAC 93129–130, Burundi, Nyamagana River, ca. 2°55'S, 29°08'E (2: 116.1–120.6); MRAC 93131, Burundi, Lua River, ca. 2°46'S, 29°02'E (1: 79.5); SAIAB 187262, ex. MRAC 93298, same data as holotype (1:64.2); UF 184236, ex. MRAC 93299, same data as holotype (69.8).

Non-types. Mutimbuzi River drainage: MRAC 91330–389, Burundi, Murago River, ca. 3°17'S, 29°23'E (59: 29.2–71.4); MRAC 93076–096, Burundi, Musazi River [=Muzazi River], ca. 3°17'S, 29°25'E (20: 33.1–91.0); MRAC 126266–267, Burundi, Murago River, ca. 3°17'S, 29°23'E (7: 41.3–82.8). **Ruzizi River drainage:** MRAC 91034.0153–0159, Burundi, Nyamagana River near town of Mabayi, ca. 2°42'S, 29°15'E (7: 47.7–79.9); MRAC 91390, Burundi, Nyakagunda River, Bugarama, ca. 2°47'S, 29°04'E (1: 25.6); MRAC 93051–054, Democratic Republic of the Congo, Muniowe River, Luvungi, ca. 2°56'S, 28°57'E (4: 43.9–95.2); MRAC 93055–075, Democratic Republic of the Congo, Luvubu River, ca. 2°52'S, 29°02'E (20: 27.3–108.5); MRAC 93121–125, Burundi, Nyamagana River, ca. 2°55'S, 29°08'E (5: 44.1–97.6), MRAC 96031.1571–1576, Burundi, Nyamagana River, 3 km after Mabayi, center Kivogero, ca. 2°42'56”S, 29°14'40”E (5: 46.2–88.0); MRAC 96031.1590–1595, Ikibenga River, 26 km on Cibitoke-Mabayi road, ca. 2°43'03”S, 29°10'05”E (6: 50.5–69.3). **Unknown drainage:** MRAC 91392–395, Burundi, Kikoma River, ca. 3°20'S, 29°18'E (4: 45.3–86.6).

FIGURE 4. *Amphilius ruziziensis*, MRAC 93294 82.8 mm SL, holotype; lateral, dorsal and ventral views.

Diagnosis. Diagnostic characters are summarized in Table 2. *A. ruziziensis* is diagnosed from *A. pedunculus, A. frieli*, and *A. crassus* by its more slender caudal peduncle (caudal peduncle depth 8.6–9.5% SL vs. 9.7–12.3% SL) and from *A. jacksonii*, *A. pedunculus, A. crassus*, and *A. lujani* by its narrower interorbital width (23.4–25.1% HL vs. 26.7–35.8% HL). It is further diagnosed from *A. frieli, A. crassus*, and *A. lujani* by its more slender body (body depth at anus 11.1–12.9% SL vs. 13.5–17.4% SL). *A. ruziziensis* is further diagnosed from *A. frieli* by having fewer branchiostegal rays (6–7 vs. 8–9), fewer total gill rakers on the first gill arch (6–8, rarely 5 or 9 vs. 10–11, rarely 9 or 12), and a longer caudal peduncle (caudal peduncle length 18.7–20.3% SL vs. 14.4–16.4% SL). It is further diagnosed from *A. crassus* by a longer caudal peduncle (caudal peduncle length 18.7–20.3% SL vs. 13.3–15.5% SL) and shorter dorsal-fin insertion to adipose-fin insertion length (38.2–41.5% SL vs. 42.2–44.6% SL). It is further diagnosed from *A. jacksonii* by its deeper caudal peduncle (caudal peduncle depth 8.6–9.5% SL vs. 4.8–7.9% SL).

Description. Morphometric data are in Table 3. Body elongate, ventral profile flattened ventrally to anal-fin base, then tapered dorsally to end of caudal peduncle. Dorsal profile rising gently from tip of snout to dorsal-fin origin, then nearly horizontal to end of caudal peduncle. Greatest body depth at dorsal-fin origin. Caudal peduncle laterally compressed, with crenellated epidermal fold. Anus and urogenital openings located at midpoint of adpressed pelvic fin, much closer to pelvic-fin insertion than to origin of anal fin. Skin smooth. Lateral line complete, extending from dorsal edge of opercular cavity to caudal-fin base.

Head and anterior part of body depressed and broad. Head wedge-shaped in lateral view. Snout broad, blunt to rounder when viewed from above. Head becoming wider from tip of snout to pectoral-fin base. Branchiostegal membranes moderately to broadly joined at isthmus forming a *U*-shaped connection.

Mouth broad, gently curved, subterminal. Lips moderately fleshy, slightly papillate. Rictal lobe large and slightly papillate. Anterior portion of premaxillary tooth band exposed with mouth closed. Premaxillary tooth patches joined, forming crescent shaped band. Premaxillary and dentary teeth short, conical. Dentary tooth patches forming *U*-shaped band, separated medially.

Three pairs of simple, tapered circumoral barbels. Maxillary barbel large, fleshy and flattened with pointed tip; barbel extending posterolaterally from corner of mouth, not reaching pectoral-fin base. Outer mandibular barbel thin with pointed tip, origin at posterior corner of lower jaw, extending to just short of origin of pectoral-fin. Inner mandibular barbel originates anterolaterally of inner mandibular barbel, extending to about two-thirds of distance to edge of branchiostegal membrane. Branchiostegal membrane with 6 (7), or 7 (8) rays. Gill rakers on first epibranchial 2 (15) or 3 (1); rakers on first ceratobranchial 3 (1), 4 (8), 5(2), 6 (4), or 7 (1); total gill rakers on first arch 5 (1), 6 (8), 7 (1), 8 (5), or 9 (1).

Eye small, positioned dorsolaterally approximately midway between tip of snout and posterior margin of operculum. Horizontal diameter of eye slightly wider than vertical diameter. Eye without free orbit; covered with skin confluent with dorsal surface of head. Anterior and posterior nares with prominent tubular rims; nares separate but relatively close to each other. Posterior nare located about midway between eye and tip of snout.

Dorsal-fin origin at point over or just posterior to tip of pectoral fin. Dorsal fin with i,6 (16) rays, and fin margin straight. Pectoral fin with i,8 (2), or i,9 (14) rays; unbranched ray greatly thickened. Pectoral fin with four or five innermost rays progressively shorter making posterior fin margin rounded. Origin of pelvic fin posterior of dorsal-fin insertion. Pelvic fin with i,5 (16) rays with first ray unbranched and greatly thickened. Pelvic fin with straight posterior margin.

Adipose-fin base longer than anal-fin base, origin anterior to origin of anal-fin base, fin extending past anal-fin insertion. Margin strongly convex with sharply rounded edge, deeply incised posteriorly. Caudal fin moderately forked with tips of lobes rounded; fin with i,5,6,i (15) principal rays. Anal fin with short base, origin posterior to origin of adipose-fin base, with ii,5 (3), ii,6 (2), iii5 (1), iii,6 (7), or iii,7 (3) rays. Anal-fin margin almost straight.

Coloration. Body variably mottled with dark saddles. First saddle posterior of head, second saddle at dorsal fin, third saddle between dorsal and adipose fins, fourth saddle under anterior part of adipose fin, and fifth saddle on caudal peduncle. All saddle connected laterally by broad stripe. Venter light brown with fourth saddle meeting that of opposite side Dorsal, and anal fins brown with dark medial band (band on anal fin often indistinct on small specimens). Adipose fin dark brown, cream-colored anteriorly, posteriorly and on distal edge. Pectoral and pelvic fins positioned horizontally with upper surfaces brown with cream-colored distal edge. Lower surfaces light yellow. Caudal fin cream-colored with medial dark band.

TABLE 3. Morphometric data for *Amphilius ruziziensis*. Range and mean include the holotype.

	Holotype	Range (n=7)	Mean±SD
%SL			
Head length	21.6	21.6–26.9	24.5±2.1
Head width	17.9	17.9–20.3	19.2±1.1
Head height	11.5	11.5–13.7	12.5±0.8
Body depth	14.0	12.9–14.2	13.6±0.5
Body depth at anus	11.1	11.1–12.9	12.1±0.8
Predorsal length	37.8	35.2–40.1	37.6±1.7
Prepectoral length	16.6	15.1–22.4	18.9±2.7
Preanal length	69.2	68.8–72.4	70.1±1.2
Dorsal-fin base length	8.6	8.6–10.7	9.7±0.7
Adipose-fin base length	15.0	15.0–18.9	16.4±1.3
Anal-fin base length	8.1	8.1–10.5	8.9±0.9
Pelvic-fin length	17.9	16.6–21.3	19.2±1.7
Pectoral-fin length	20.9	19.9–24.9	22.5±2.1
Anal-fin length	15.7	15.7–19.3	17.7±1.8
Caudal-peduncle length	20.3	18.7–20.3	19.4±0.6
Caudal-peduncle depth	8.6	8.6–9.5	9.1±0.3
Anus to anal fin length	17.9	13.8–17.9	15.0±1.5
Prepelvic length	47.4	46.5–50.3	48.2±1.3
Postpelvic length	51.4	51.4–53.6	52.5±0.9
Dorsal-fin insertion to adipose	40.6	38.2–41.5	39.9±1.3
Dorsal-fin origin to caudal	64.5	62.2–66.2	64.1±1.5
Preanus length	53.7	53.7–58.9	56.3±1.8
%HL			
Snout length	51.5	45.6–51.5	48.1±2.3
Interorbital distance	23.7	23.4–25.1	24.2±0.7
Maxillary barbel length	59.5	43.2–59.5	53.0±6.2
Inner mandibular barbel length	26.2	25.6–33.3	29.2±2.8
Outer mandibular barbel length	42.3	40.3–47.3	44.2±2.7
Eye diameter	12.7	11.6–14.3	12.8±0.8

Distribution. Ruzizi River drainage, eastern Rwanda and Burundi; western Democratic Republic of the Congo; northeastern tributaries of Lake Tanganyika in Burundi (Fig. 3).

Etymology. Named for the Ruzizi River drainage in eastern Rwanda and Burundi, where type specimens of this species were collected and the species is primarily distributed.

Amphilius pedunculus Thomson & Page, new species

(Fig. 5, Table 4)

Amphilius jacksonii.—David, 1937: 418, Malagarasi River; De vos *et al.*, 2001: 131, Malagarasi River.

Holotype. CU 97334, ex. CU 95207, Tanzania, Malagarasi River at Lower Igamba Falls (Kasagwe), Malagarasi River drainage, 5°10'48”S, 30°03'03"E (52.3 mm SL).

Paratypes. Malagarasi River drainage: CU 90414, Tanzania, downstream of bridge across Malagarasi River

at Uvinza, 5°07'03.7”S, 30°22'27.1"E (1: 50.8); CU 95207, same data as holotype, (16: 41.3–69.8); CU 95208, Tanzania, Malagarasi River up river 12 km E of Uvinza near village of Kanzibwe, 5°08'23.5”S, 30° 29' 21.6"E (1: 55.3); CU 95209, Tanzania, Malagarasi River downriver 4 km W from Uvinza; village of Nkwasa, 5°05'52.6”S, 30°21'16.2"E (5: 38.1–74.7); CU 95210, Tanzania, Malagarasi River near fork in road to Ngutu, 5°06'56.3”S, 30°17'48.1"E (1: 67.6), CU 95211, Tanzania, Malagarasi River in first site in gorge, 5°13'44.2”S, 30°13'26.5"E (6: 41.2–52.9); CU 95212, Tanzania, Malagarasi River in gorge, 5°12'10.2”S, 30°10'11.1"E (1: 44.8); MRAC B3–06–P–1–3, ex. CU 95209 (3: 46.3–54.6); SAIAB 187275, ex CU 95209 (3: 45.6–52.6); UF 184234, ex CU 95209 (3: 41.8–64.7).

Non-types. Malagarasi River drainage: CU 90426, Tanzania, Malagarasi River at bridge between Kafuru and Makere, 4°01'32.5”S, 30°33'06.5"E (3:24.6–29.3), CU 90469, Tanzania, Malagarasi River at bridge between Kafuru and Makere, 4°01'32.5”S, 30°33'06.5"E (26: 24.7–46.7); MRAC 47343–362, Burundi, Malagarazi River and its tributaries, (19: 38.7–96.2), MRAC 91030.0217, Burundi, Nyesasa River, trib of Muyovozi River (which is a tributary of the Malagarazi), at bridge on RN8 [now RN11] just before Gihofi, ca. 3°59'S, 30°09'E (1: 51.4); MRAC 91030.0218–0225, Burundi, Kinywa River, Trib of Malagarazi, at the bridge on Route Pr85, near town of Buyaga, ca. 3°55'S, 30°10'E (7: 16.2–69.7); MRAC 91030.0226–0248, Burundi, Nyankanda River, Trib of Malagarazi, in the Fault of the Germans, on Route Pr 85, ca. 3°54'S, 30°13'E (23: 33.5–65.4); MRAC 91030.0249–0295, Burundi, Ntanga River, Trib of Malagarazi, at the bridge on Road of General Interest 4, 7 km from Kinyinya, ca. 3°37'39.3”S, 30°17'54.5”E (47: 26.4–76.6); MRAC 91030.0300–0309, Burundi, Musasa River, Trib of Muyovozi, at the bridge on RN8, ± 5 km Rutana, ca. 3°58'44.9”S, 30°01'56.0”E (10: 45.6–71.5); MRAC 91030.0310–0315, Burundi, Mutsindozi River, trib of Malagarazi at bridge on Route RN12, km 39 from Lake Nyanza, ca. 4°05'S, 29°57'E (6: 54.7–67.5); MRAC 91061.0106, Burundi, Musasa River, Trib of Muyovozi, at the bridge on RN8, ± 5 km Rutana, ca. 3°58'44.9”S, 30°01'56.0”E (1: 55.3); MRAC 91062.0896–0923, Burundi, Mutsindozi River, near the sugar refinery, Gihofi, ca. 4°02'S, 30°09'E (28: 29.6–73.1); MRAC 91062.0924–0929, Burundi, Musasa River, Trib of Muyovozi, at the bridge on RN8, ± 5 km Rutana, ca. 3°58'44.9”S, 30°01'56.0”E (6: 36.4–85.9); MRAC 91062.0930–0932, Burundi, Mashuro River, about 5 km from Gihofi towards Giharo, 3°57'37”S, 30°09'54.6”E (3: 28.9–48.7); MRAC 91062.0933, Burundi, Ruru River, trib of Rumpungwe River, on the road towards Cendajuru, ca. 3°19'S, 30°34'E (1: 79.2); MRAC 91062.0950–0957, Burundi, Kabingo, Mazimero River, on Rutana-Kinyinya road, 3°53'01.5”S, 30° 11'54.2”E (8: 37.1–63.1); MRAC 91062.0958–1056, Burundi, Rugoma River, trib of Rumpungwe River, 4 km from Kinyinya, ca. 3°38'S, 30°23'E (99: 24.6–100.9); MRAC 91062.1057–1081, Burundi, Rugaragara River, on Kinyinya-Gisuru road, about ± 20 km from Gisuru, ca. 3°27'S, 30°24'E (25: 25.9–67.7); MRAC 91062.1082–1094, Burundi, Kiruhura River, trib of Mwambu River, zone Muyange, ENE of Cendajuru, ca. 3°16'S, 30°40'E (13: 32.6–71.8); MRAC 91062.1095–1107, Burundi, Nyabigosi River, trib of Rumpungwe River, near Gisuru, ca. 3°29'S, 30°30'E (13: 28.3–68.5); MRAC 91062.1139–1168, Burundi, Gitinwa River, trib of Ruru River, trib of Rumpungwe River, near Cendajuru, before village of Gusiana, ca. 3°20'S, 30°34'E (30: 24.6–83.9); MRAC 91062.1169–1245, Burundi, Mukitcha River, ± 8 km towards Cendajuru from Gasenyi, ca. 3°17'S, 30°36'E (77: 28.7–74.6); MRAC 91079.0055–0058, Burundi, Musasa River, (local name Uruhuzi) 78 km SSE of Gitega, ± 10 km SE of Rutana, 4°00'00”S, 30°06'47.3”E (5: 25.9–71.9); MRAC 93150.0184–0186, Burundi, Mazimero River, on road from Rutana-Kinyinya, ca. 3°54'S, 30°13'E (3: 63.5–75.9); MRAC 93150.0187–0238, Burundi, Ruru River, about 9 km from Muyaga towards Cendajuru, ca. 3°18'S, 33°13'E (52: 35.4–80.4); MRAC 93150.0239, Burundi, Ntanga River, Trib of Malagarazi, at the bridge on Road of General Interest 4, 7 km from Kinyinya, ca. 3°38'S, 30°18'E (1: 52.7); MRAC 93150.0240–0260, Burundi, Mukazye River (Nyamabuye), 10 km from Giharo towards Kinyinya, ca. 3°47'S, 30°18'E (21: 26.9–72.9); MRAC 93150.0261–0333, Burundi, Idumaniro River, on Cendajuru-Gitwenge road, ca. 3°15'S, 30°39'E (73: 25.8–81.1); MRAC 93150.0351–0359, Burundi, Rumpungwe River, near Gisuru, on road from Kinyinya-Gisuru, ca. 3°27'S, 30°29'E (9: 26.2–74.3); MRAC 93150.0360–0378, Burundi, Kiruhura River, on Cendajuru-Gitwenge road, ca. 3°15'S, 30°39'E (18: 35.8–65.8), MRAC 93150.0379–0382, Burundi, Nyanzari River, on Cankuzo-Mushiha road, near Gishungo, 3°04'25”S, 30°39' 22”E (4: 48.3–68.6); MRAC 93150.0383–0392, Burundi, Mutsindozi River, near the sugar refinery, Gihofi, ca. 4°00'S, 30°40'E (12: 44.2–80.0); MRAC 93152.0613–0622, Tanzania, Malagarazi River, rapids at Uvinza, near salt mine, 5°06'07”S, 30°21'56”E (11: 37.1–59.9); MRAC 93152.0623–0643, Tanzania, Nyamgongo River, trib of Malagarazi River, km 46 from Uvinza to Kasulu, 4°48'34”S, 30°12'51”E (21: 28.3–69.0); MRAC 96031.1548–1549, Burundi, Nyarugunga River, km 30 after Kinyinya, on Kinyinya-Gisuru road, ca. 4°52'S, 29°50'E (2: 53.7–58.6); MRAC 96031.1550–1562, Burundi, Nyarugunga River,

km 30 after Kinyinya, on Kinyinya–Gisuru road, ca. 4°52'S, 29°50'E (13: 47.6–86.6); MRAC 96031.1563–1570, Burundi, Nyarubare River, km 15 on Kinyinya-Gisuru road, ca. 3°34'S, 30°26'E (8: 45.7–81.8); MRAC 96083.1141, Tanzania, Ruchigi River, 7 km after Kasulu to Kibando, trib of Malagarasi, 4°32'01.4"S, 30°08'58.6"E (1: 71.5); MRAC 96083.1142–1145, Tanzania, Mgandazi River, near Kasulu, ca. 4°37'S, 30°06'E (4: 48.7–72.6). **Luiche River drainage:** MRAC 93152.0644–0649, Tanzania, Mukuti River, trib. of Luiche River, on road from Kigoma to Kasulu, 4°53'12.1"S, 29°52'12"E (6: 35.0–118.8); MRAC 93152.0650–0651, Tanzania, Mungonya River, trib of Luiche River, ± 10 km from Kigoma, route Kigoma-Kasulu, 4°52'28"S, 29°49'52"E (2: 65.2–90.9); MRAC 93152.0652–0661, Tanzania, Kidahwe River, km 34 on Kigoma-Uvinza road, trib of Luiche River, ca. 4°53'S, 29°48'E (12: 68.6–112.0). **Lake Rukwa Basin:** MRAC 191055–057, Zambia, Saisi and Kalambo River, Tunduma road, ca. 9°06'S, 31°29'E (3: 30.6–39.1); MRAC 191092–113, Zambia, Saisi River, at crossing of Abercorn-Tunduma road, 9°05'38.1"S, 31°29'20.5"E (22: 27.5–104.8); MRAC 191423–424, Zambia, Lumi river, Kawimbe Road, ca. 8°50'S, 31°32'E (2: 31.6–35.4); MRAC 94034.0822–0831, Tanzania, Piti River, 63 km south of Rungwa River on road to Makongolosi, 7°26'48.5"S, 33°25'22.1"E (10: 32.9–66.6); SAIAB 37397, Zambia, Near Mbala, Saisi River at Tunduma Road near Neilsons Farm, ca. 9°05'S, 31°32'E (1: 55.4); SAIAB 38096, Zambia, Saisi River at Tunduma Road bridge, 9°05'39"S, 31°29'22"E (1: 35.8); SAIAB 39557, Zambia, Saisi River at Tunduma Road bridge, ca. 9°05'39"S, 31°29'22"E (1: 57.0); SAIAB 38108, Zambia, Chitungulu stream, Nsunzu Farm, trib of Saisi River, ca. 9°05'S, 31°32'E (2: 54.3–70.3); SAIAB 39543, Zambia, Chitungulu stream, Nsunzu Farm, trib of Saisi River, ca. 9°05'S, 31°32'E (1: 37.6); SAIAB 50333, Tanzania, Lupa River at Lupatingatinga, on Makongolsi-Rungwa road, 8°01'48.9"S, 33°16'18.9"E (1: 42.0). Rufiji basin, **Upper Great Ruaha River drainage:** SAIAB 59388, Tanzania, Bridge near Chinata on Mbeya-Iringa road, 8°51'35.7"S, 34°01'33"E (31: 49.2–111.7); SAIAB 59397, Tanzania, Great Ruaha River at Route A104 crossing just east of Chimala, 8°51'16.4"S, 34°05'7.0"E (32: 30.3–72.6).

FIGURE 5. *Amphilius pedunculus*, CU 97334, 52.3 mm SL, holotype; lateral, dorsal and ventral views.

Diagnosis. Diagnostic characters are summarized in Table 2. *Amphilius pedunculus* is diagnosed from *A. jacksonii, A. ruziziensis* and *A. lujani* by its deeper caudal peduncle (caudal peduncle depth 9.9–12.3% SL vs. 4.8–9.5% SL), and from *A. ruziziensis* and *A. frieli* by its wider interorbital width (28.1–35.8% HL vs. 23.4–27.7% HL). It is distinguished from *A. crassus* by its longer caudal peduncle (caudal peduncle length 16.0–18.8% SL vs. 13.3–15.5% SL) and shorter dorsal-fin insertion to adipose-fin insertion length (37.5–41.7% SL vs. 42.2–44.6% SL). It is further diagnosed from *A. frieli* by having fewer total gill rakers on the first gill arch (7–9, rarely 6 or 10 vs. 10–11, rarely 9 or 12).

Description. Morphometric data are in Table 4. Body elongate, ventral profile flattened ventrally to anal-fin base, then tapered dorsally to end of caudal peduncle. Dorsal profile rising gently from tip of snout to dorsal-fin origin, then nearly horizontal to end of caudal peduncle. Greatest body depth at dorsal-fin origin. Caudal peduncle laterally compressed, with crenellated epidermal fold. Anus and urogenital openings located at midpoint of adpressed pelvic fin, much closer to pelvic-fin insertionthan to origin of anal fin. Skin smooth. Lateral line complete, extending from dorsal edge of opercular cavity to caudal-fin base.

TABLE 4. Morphometric data for *Amphilius pedunculus*. Range and mean include the holotype.

	Holotype	Range (n=32)	Mean±SD
%SL			
Head length	25.7	23.2–26.8	25.1±0.9
Head width	22.0	20.2–22.6	21.0±0.6
Head height	15.3	12.8–16.8	14.6±0.9
Body depth	20.0	14.1–20.2	17.9±1.5
Body depth at anus	16.9	13.7–17.7	15.7±0.9
Predorsal length	37.4	32.7–39.5	37.0±1.3
Prepectoral length	19.5	18.6–22.7	20.1±1.0
Preanal length	72.7	70.1–76.7	72.5±1.7
Dorsal-fin base length	10.9	9.1–13.3	11.4±1.0
Adipose-fin base length	16.8	16.7–23.5	20.2±1.7
Anal-fin base length	11.7	10.0–14.1	11.9±1.1
Pelvic-fin length	19.0	17.7–20.7	19.2±0.7
Pectoral-fin length	21.6	19.7–24.3	22.0±1.1
Anal-fin length	19.3	17.7–21.3	19.8±0.9
Caudal-peduncle length	17.9	16.0–18.8	16.8±0.8
Caudal-peduncle depth	11.4	10.1–12.3	11.3±0.5
Anus to anal fin length	15.5	12.4–16.9	14.9±1.1
Prepelvic length	50.7	47.3–52.1	49.6±1.2
Postpelvic length	50.6	49.2–55.1	51.6±1.3
Dorsal-fin insertion to adipose	40.5	37.5–41.7	40.3±1.0
Dorsal-fin origin to caudal	66.6	62.4–67.9	65.5±1.5
Preanus length	56.5	55.8–61.4	58.3±1.2
%HL			
Snout length	48.5	41.7–51.2	46.7±2.4
Interorbital distance	29.8	28.1–35.8	31.6±2.0
Maxillary barbel length	72.5	61.4–98.0	77.3±8.2
Inner mandibular barbel length	40.0	28.3–54.3	41.5±5.7
Outer mandibular barbel length	60.4	44.0–81.0	62.5±8.3
Eye diameter	15.1	14.0–19.3	16.1±1.3

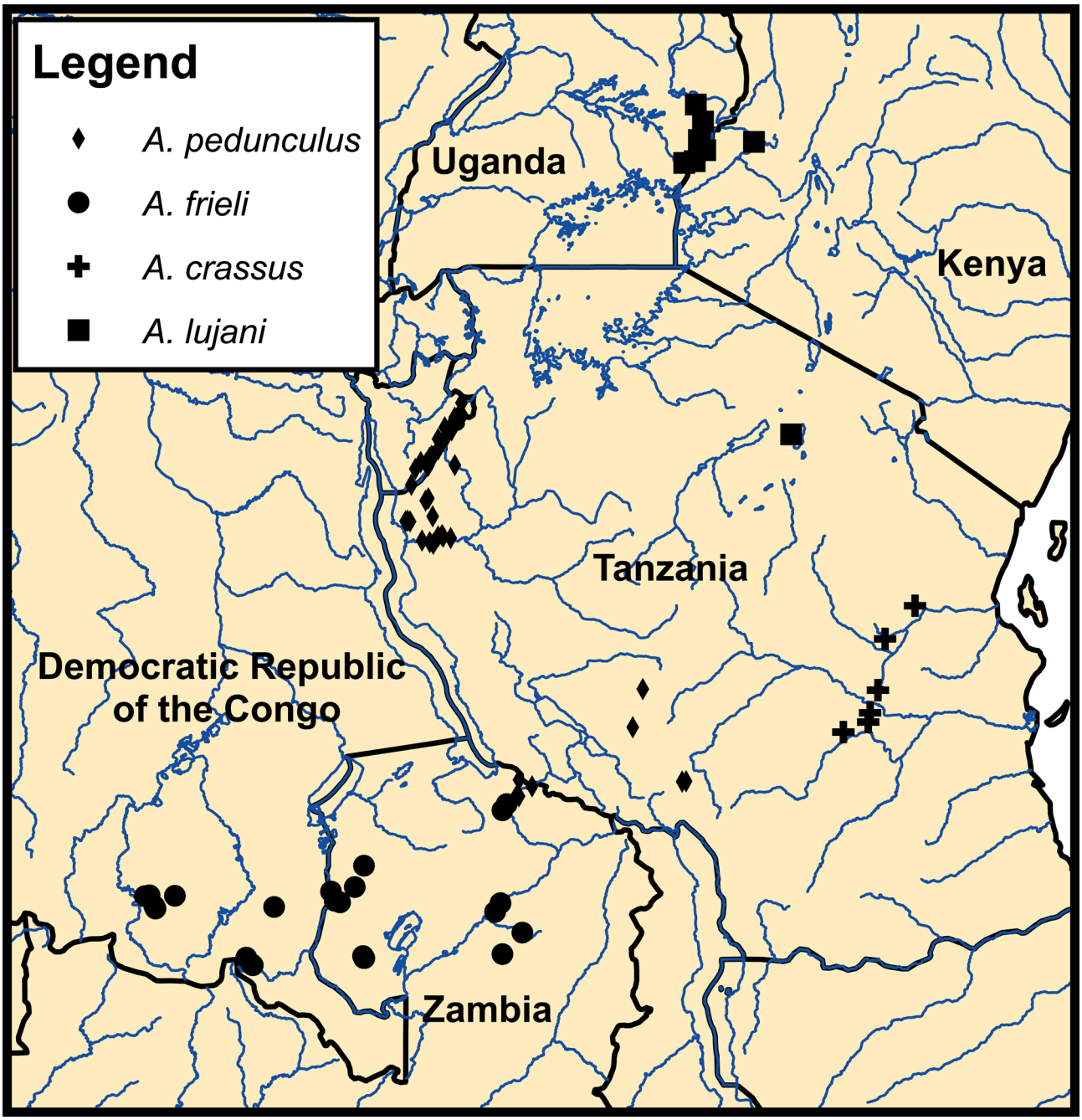

FIGURE 6. Distributions of *Amphilius pedunculus* (diamonds), *A. frieli* (dots), *A. crassus* (crosses) and *A. lujani* (squares).

Head and anterior part of body depressed and broad. Head wedge-shaped in lateral view. Snout broad, blunt when viewed from above. Head becoming wider from tip of snout to pectoral-fin base. Branchiostegal membranes moderately joined at isthmus forming a *V*-shaped connection.

Mouth broad, gently curved, subterminal. Lips moderately fleshy, slightly papillate. Rictal lobe large and slightly papillate. Anterior portion of premaxillary tooth band exposed with mouth closed. Premaxillary tooth patches joined, forming crescent shaped band. Premaxillary and dentary teeth short, conical. Dentary tooth patches forming *U*-shaped band, separated medially.

Three pairs of simple, tapered circumoral barbels. Maxillary barbel large, fleshy and flattened with pointed tip; barbel extending posterolaterally from corner of mouth, to pectoral-fin base. Outer mandibular barbel thin with pointed tip, origin at posterior corner of lower jaw, extending to origin of pectoral-fin. Inner mandibular barbel originates anterolaterally of inner mandibular barbel, extending to edge of branchiostegal membrane. Branchiostegal membrane with 7 (17), or 8 (24) rays. Gill rakers on first epibranchial 2 (20) or 3 (21); rakers on first ceratobranchial 4 (1), 5 (8), 6 (25), or 7 (7); total gill rakers on first arch 6 (1), 7 (4), 8 (16), 9 (16) or 10 (4).

Eye small, positioned dorsolaterally approximately midway between tip of snout and posterior margin of operculum. Horizontal diameter of eye slightly wider than vertical diameter. Eye without free orbit; covered with skin confluent with dorsal surface of head. Anterior and posterior nares with prominent tubular rims; nares separate but relatively close to each other. Posterior nare located about midway between eye and tip of snout.

Dorsal-fin origin at point over or just posterior to tip of pectoral fin. Dorsal fin with i,6 (41) rays, and fin margin straight. Pectoral fin with i,8 (35), or i,9 (6) rays; unbranched ray greatly thickened. Pectoral fin with four or five innermost rays progressively shorter making posterior fin margin rounded. Origin of pelvic fin posterior of dorsal-fin insertion. Pelvic fin with i,5 (41) rays with first ray unbranched and greatly thickened. Pelvic fin with straight posterior margin.

Adipose-fin base longer than anal-fin base, origin anterior to origin of anal-fin base, fin extending past anal-fin insertion. Margin strongly convex with sharply rounded edge, deeply incised posteriorly. Caudal fin deeply forked with tips of lobes rounded; fin with i,5,6,i (40) principal rays. Anal fin with short base, origin posterior to origin of adipose-fin base, with ii,6 (7), ii,7 (2), iii5 (4), iii,6 (27), or iii,7 (1) rays. Anal-fin margin almost straight.

Coloration. Body variably mottled with dark saddles. First saddle posterior of head, second saddle at dorsal fin, third saddle between dorsal and adipose fins, fourth saddle under anterior part of adipose fin, and fifth saddle on caudal peduncle. All saddle connected laterally by broad stripe. Venter light brown with fourth and fifth saddles meeting those of opposite side. Dorsal, and anal fins light brown with dark medial band. Adipose fin dark brown to black, with posterior distal edge cream-colored. Pectoral and pelvic fins positioned horizontally with upper surfaces cream-colored with dark fin base and dark medial band. Lower surfaces light yellow. Caudal fin cream-colored with dark markings on upper and lower lobes. Caudal coloration asymmetrical, with lower lobe almost completely dark (except for small cream-colored mark at base of caudal and cream-colored tip). Upper lobe with less dark pigment, with dark blotch covering dorsal edge, but caudal base, medial ventral edge, and tip cream-colored.

Distribution. Malagarasi River drainage, western Tanzania and southern Burundi; Luiche River drainage, western Tanzania; Lake Rukwa basin, Tanzania and Zambia; and upper Great Ruaha River system, Rufiji basin, eastern Tanzania (Fig. 6).

Etymology. The diminutive of *pes*, *pedunculus,* a noun, refers to the distinctively short and deep caudal peduncle of this species.

Amphilius frieli Thomson & Page, new species

(Fig. 7, Table 5)

Amphilius platychir (non Günther).—Boulenger, 1920: 26, Lubumbashi à Élisabethville (MRAC P–6787) [Kafubu River system, Upper Congo basin]

Holotype. CU 97335, ex. CU 91052, Zambia, Tswishi Stream at bridge under construction, Lwela River system, 11°33'26”S, 29°09'59"E (83.1 mm SL).

Paratypes. Lwela River system: AUM 57570, ex. CU 91049 (3: 36.3–51.7); CU 91049, Zambia, Lwela River at bridge on Mansa-? road, 11°33'25”S, 29°10'10"E (21: 32–104.5); CU 91050, Zambia, Ngo Stream, about 40 km SW of Mansa, 11°31'33”S, 29°09'03"E (4: 34.2–46.8); CU 91052, same data as holotype, (11: 31.7–44.9); SAIAB 76634, same data as CU 91049 (12: 32.7–86.7); SAIAB 76789, same data as CU 91050 (5: 36.0–47.5); MRAC B3–06–P–4–6, ex. CU 91049 (3: 41.9–47.4); SAIAB 76799, same data as holotype (13: 27.3–57.2); UF 184235, ex. CU 91049 (3: 39.0–50.8).

Non-types. Chambeshi River system: CU 91056, Zambia, Kanchibiya Stream at bridge on Kasama-Mpika road, 11°29’44.2”S, 31°16'46.6"E (28: 32.5–57.0); MRAC 96031.1540–1547, Zambia, Musombizi River, trib of Chambeshi, ± 55km on the road Mbala-Kasama, ca. 09°18’S, 31°16.5'E (8: 25.8–57.8); MRAC 96031.1620–1625, Zambia, Chambeshi River, at bridge km 40 on road Mbala-Kasama, 09°12’15.3”S, 31°20'49.8"E (6: 57.7–135.6); SAIAB 40125, Zambia, Chambeshi River, rapids near Kapoloso Stream, ca. 10°43’S, 31°15'E (1: 47.8); SAIAB 46788, Zambia, Mansha River, Shiwa Hot Springs & road bridge, ca. 11°10’S, 31°35'E (16: 32.0–64.8); SAIAB 77139, Zambia, Samfa Rapids at pontoon on Chambeshsi River, 10°51’07.6”S, 31°10'02.3"E (1: 69.5); SAIAB 77142, same data as CU 91056 (28: 29.4–85.3). **Kafubu River system:** MRAC 6787, Democratic Republic of the Congo, Lubumbashi River, at Elisabethville [Lubumbashi], ca. 11°39’S, 27°28'E (1: 39.1); MRAC 183365–366,

Democratic Republic of the Congo, at the bridge on Lubumbashi River, forested camp of the Kipopo, ca. 11°33'S, 27°22'E (2: 31.7–33.1); MRAC 183367–369, Democratic Republic of the Congo, Lubumbashi River, ± 25 km upstream of Elisabethville, ca. 11°33'S, 27°22'E (3: 33.9–39.2); MRAC 73025.0803, Democratic Republic of the Congo, Lubumbashi, in front of Lido, Lubumbashi River, ca. 11°39'S, 27°27'E (1: 118.8). **Luapula River system:** SAIAB 76705, Zambia, Mambilima Falls on Luapula River, 10°32'22.2"S, 28°39'40.3"E (1: 57.0). **Lufira River system:** MRAC 165341, Democratic Republic of the Congo, Gombela, Kafila River, Katanga, 10°46'31"S, 27°47'38"E (1: 60.8); SAIAB 77478, Democratic Republic of Congo, Diptera River near Fungurume, 10°36'20.9"S, 26°16'40.1"E (4: 43.5–77.0). **Luongo River system:** CU 91051, Zambia, Luongo River, below Musonda Dam, on road from Mansa to Kashiba (Route D79), 10°42'15.5"S, 28°48'03.6"E (2: 60.0–62.0); CU 91053, Zambia, Luongo River above pontoon south of Musonda Falls, Mansa-Serenje road (Route D235), 10°40'51.6"S, 28°43'09.1"E (2: 57.0–78.7); CU 91054, Zambia, Luongo River at bridge on Kashiba-Mwenda road (Route M3), 10°28'12.7"S, 31°01'28.2"E (3: 44.0–105.1); SAIAB 76663, same data as CU 91053 (3: 54.6–94.3); SAIAB 76670, same data as CU 91051 (1: 83.2); SAIAB 76729, same data as CU 91054 (5: 39.9–65.4); SAIAB 76925, Zambia, Luongo River at Mukonshi Bridge on Mwenda-Kawambwa road (Route M13), 10°08'39"S, 29°10'01.2"E (41: 32.2–53.8). **Upper Congo (Lualaba) River drainage:** SAIAB 81501, Democratic Republic of the Congo, Bona River [Tributary of Lac Delcommune (= Lac Nzilo)], Near Lenge Village, 10°36'34"S, 25°49'15"E (1: 78.8); SAIAB 81566, Democratic Republic of the Congo, large stream 1, Bona River system, 10°35'49"S, 25°53'23"E (1: 43.0); SAIAB 82855, Democratic Republic of the Congo, Kisanfu River, Upstream of Nayebe crossing, 10°48'01.1"S, 25°58'52.6"E (2: 46.8–85.4); SAIAB 82877, Democratic Republic of the Congo, Kisanfu River, just below bridge by hydroelectric station, 10°45'49.3"S, 25°57'49.3"E (6: 36.5–42.1); SAIAB 82898, Democratic Republic of the Congo, Kisanfu River, channel downstream of hydro station, 10°45'49.3"S, 25°57'49.3"E (6: 37.5–74.3).

FIGURE 7. *Amphilius frieli*, CU 97335, 83.1 mm SL, holotype; lateral, dorsal and ventral views.

Diagnosis. Diagnostic characters are summarized in Table 2. *Amphilius frieli* is diagnosed from all other species of the *Amphilius jacksonii* complex by having more gill rakers on the first gill arch (10–11, rarely 9 or 12 vs. 6–9, rarely 5 or 10). It is further diagnosed from A. jacksonii by its deeper caudal peduncle (caudal peduncle

depth 9.7–11.4% SL vs. 4.8–7.9% SL), shorter caudal peduncle (caudal peduncle 14.4–16.4% SL vs. 16.7–20.6% SL), and less slender body (body depth at anus 13.9–14.9% SL vs. 9.6–13.2% SL). It is further diagnosed from *A. ruziziensis* by having more branchiostegal rays (8–9 vs. 6–7), a deeper caudal peduncle (caudal peduncle depth 9.7–11.4% SL vs. 8.6–9.5% SL), shorter caudal peduncle (caudal peduncle 14.4–16.4% SL vs. 18.7–20.3% SL), and less slender body (body depth at anus 13.9–14.9% SL vs. 11.1–12.9% SL). *Amphilius frieli* is further diagnosed from *A. pedunculus, A. crassus*, and *A. lujani* by its narrower interorbital width (25.1–27.7% HL vs. 28.1–35.8% HL), and from *A. crassus* by having more branchiostegal rays (8–9 vs. 6–7, rarely 8), more branched pectoral-fin rays (9–10 vs. 7–8, rarely 9), and a shorter dorsal-fin insertion to adipose-fin insertion length (37.5–41.2% SL vs. 42.2–44.6% SL). It is further diagnosed from *A. lujani* by its deeper caudal peduncle (caudal peduncle depth 9.7–11.4% SL vs. 8.1–9.5% SL), shorter caudal peduncle (caudal peduncle 14.4–16.4% SL vs. 16.8–20.9% SL).

Description. Morphometric data are in Table 5. Body elongate, ventral profile flattened ventrally to anal-fin base, then tapered dorsally to end of caudal peduncle. Dorsal profile rising gently from tip of snout to dorsal-fin origin, then nearly horizontal to end of caudal peduncle. Greatest body depth at dorsal-fin origin. Caudal peduncle laterally compressed, with crenellated epidermal fold. Anus and urogenital openings located at midpoint of adpressed pelvic fin, closer to pelvic-fin insertionthan to origin of anal fin. Skin smooth. Lateral line complete, extending from dorsal edge of opercular cavity to caudal-fin base.

Head and anterior part of body depressed and broad. Head wedge-shaped in lateral view. Snout broad, blunt when viewed from above. Head becoming wider from tip of snout to pectoral-fin base. Branchiostegal membranes moderately joined at isthmus forming a *V*-shaped connection.

Mouth broad, gently curved, subterminal. Lips moderately fleshy, slightly papillate. Rictal lobe large and slightly papillate. Anterior portion of premaxillary tooth band exposed with mouth closed. Premaxillary tooth patches joined, forming crescent shaped band. Premaxillary and dentary teeth short, conical. Dentary tooth patches forming *U*-shaped band, separated medially.

Three pairs of simple, tapered circumoral barbels. Maxillary barbel large, fleshy and flattened with pointed tip; barbel extending posterolaterally from corner of mouth, to pectoral-fin base. Outer mandibular barbel thin with pointed tip, origin at posterior corner of lower jaw, extending to origin of pectoral-fin. Inner mandibular barbel originates anterolaterally of inner mandibular barbel, extending to edge of branchiostegal membrane. Branchiostegal membrane with 8 (25), or 9 (12) rays. Gill rakers on first epibranchial 2 (1) or 3 (37); rakers on first ceratobranchial 7 (22), or 8 (15); total gill rakers on first arch 10 (22) or 11 (15).

Eye small, positioned dorsolaterally approximately midway between tip of snout and posterior margin of operculum. Horizontal diameter of eye slightly wider than vertical diameter. Eye without free orbit; covered with skin confluent with dorsal surface of head. Anterior and posterior nares with prominent tubular rims; nares separate but relatively close to each other. Posterior nare located about midway between eye and tip of snout.

Dorsal-fin origin at point over tip of pectoral fin. Dorsal fin with i,6 (37) rays, and fin margin straight. Pectoral fin with i,9 (37) rays; unbranched ray greatly thickened. Pectoral fin with four or five innermost rays progressively shorter making posterior fin margin rounded. Origin of pelvic fin posterior of dorsal-fin insertion. Pelvic fin with i,5 (37) rays with first ray unbranched and greatly thickened. Pelvic fin with straight posterior margin.

Adipose-fin base longer than anal-fin base, origin anterior to origin of anal-fin base, fin extending past anal-fin insertion. Margin strongly convex with sharply rounded edge, deeply incised posteriorly. Caudal fin deeply forked with tips of lobes rounded; fin with i,5,6,i (36) principal rays. Anal fin with short base, origin posterior to origin of adipose-fin base, with ii,6 (2), ii,7 (2), iii,6 (24), or iii,7 (10) rays. Anal-fin margin almost straight.

Coloration. Body variably mottled with dark saddles. First saddle posterior of head, second saddle at dorsal fin, third saddle between dorsal and adipose fins, fourth saddle under anterior part of adipose fin, and fifth saddle on caudal peduncle. All saddle connected laterally by broad stripe. Venter light brown with fourth and fifth saddles meeting those of opposite side. Dorsal, and anal fins light brown with dark medial band. Adipose fin dark brown to black, with anterior and posterior distal edges cream-colored. Pectoral and pelvic fins positioned horizontally with upper surfaces cream-colored with dark fin base and dark medial band. Lower surfaces light yellow. Caudal fin cream-colored with dark markings on upper and lower lobes. Caudal coloration asymmetrical, with lower lobe almost completely dark (except for small cream colored mark at base of caudal and cream-colored tip). Upper lobe with less dark pigment, with dark blotch covering dorsal edge, but caudal base with large cream-colored patch and tip cream-colored.

TABLE 5. Morphometric data for *Amphilius pedunculus*. Range and mean include the holotype.

	Holotype	Range (n=20)	Mean±SD
%SL			
Head length	25.6	25.4–28.0	27.1±0.7
Head width	19.8	19.8–22.2	21.1±0.6
Head height	12.5	12.1–14.1	13.5±0.5
Body depth	15.3	15.0–17.3	16.0±0.7
Body depth at anus	14.1	13.9–14.9	14.3±0.3
Predorsal length	37.2	36.2–37.8	37.2±0.6
Prepectoral length	20.4	19.7–21.3	20.6±0.5
Preanal length	72.4	71.2–73.6	72.5±0.7
Dorsal-fin base length	11.8	9.6–12.7	11.0±1.0
Adipose-fin base length	20.0	18.6–22.9	20.5±1.1
Anal-fin base length	11.6	11.5–14.3	12.6±0.8
Pelvic-fin length	18.1	17.9–19.2	18.4±0.4
Pectoral-fin length	19.2	19.2–23.5	21.8±1.0
Anal-fin length	19.1	19.0–22.3	20.2±0.9
Caudal peduncle length	15.7	14.4–16.4	16.9±0.7
Caudal peduncle depth	10.2	9.9–12.3	15.4±0.5
Anus to anal fin length	14.5	11.7–15.7	13.8±0.9
Prepelvic length	49.6	48.6–50.9	50.0±0.7
Postpelvic length	50.8	50.3–53.1	51.1±0.7
Dorsal-fin insertion to adipose	40.7	37.5–41.2	39.5±1.1
Dorsal-fin origin to caudal	66.5	63.5–66.5	64.9±0.9
Preanus length	56.3	56.4–58.7	57.7±0.8
%HL			
Snout length	47.3	43.2–47.4	45.4±1.3
Interorbital distance	27.1	25.1–27.7	26.3±0.7
Maxillary barbel length	72.7	59.4–72.7	66.5±3.8
Inner mandibular barbel length	40.1	31.3–40.6	36.1±2.4
Outer mandibular barbel length	59.8	47.0–63.6	54.3±4.3
Eye diameter	13.3	12.1–16.2	14.3±1.1

Distribution. Upper Congo River basin upstream of Kabalp, Democratic Republic of the Congo including tributaries of the Upper Congo mainstem, the Lufira River drainage, and the Kafubu, Chambeshi, Lwela, and Luongo River systems of the Luapula River drainage (Fig. 6).

Etymology. Named for John P. Friel in recognition of his excellent contributions to the study of African fishes.

Amphilius crassus Thomson & Hilber, new species

(Fig. 8, Table 6)

Amphilius platychir (non Günther) .—Bailey, 1969: 192 (in part), Kilombero (BMNH 1969.2.11.192–194) [Rufiji River basin].

Holotype. UF 184237, ex. UF 170743, Tanzania, Sonjo River at bridge in Man'gula on road from Mikumi to Ifakara, altitude 302 m, Rufiji River basin, 07° 48' 29.6”S, 36° 53' 47.6"E (86.3 mm SL).

Paratypes. Rufiji River basin: AMNH 258334, same data as holotype, ex. CU 93734 (10: 43.4–61.5); AUM

57571, same data as holotype, ex. CU 93734 (10: 40.7–66.8); BMNH 1969.2.11.192–194, Tanzania, Near Kiberege, trib of Kilombero River, ca. 07°57'S, 36°52'E (3: 30.8–31.7); CU 93731, Idete River at bridge in Idete on road from Ifakara to Taveta, altitude 310 m, 08°06'14”S, 36°29'17"E (7: 27.3–67.3); CU 93732, Tanzania, 12 Bridges River at overhead bridge for train on road from Mikumi to Ifakara, altitude 419 m, 07°27'53”S, 37°00'52"E (4: 49.7–72.4); CU 93734, same data as holotype, (40: 36.7–69.9); MRAC B3–06–P–7–16, same data as holotype, ex. UF 170743 (10: 43.3–60.5); SAIAB 187279, same data as holotype, ex. UF 170743 (10: 45.1–57.0); UF 170706, same data as CU 93732 (5: 47.6–80.3); UF 170729, same data as CU 93731 (8: 28.9–84.7); UF 170743, same data as holotype (40: 39.8–84.7).

Non-types. Wami River basin: CU 93730, Tanzania, Divue River above & below falls along road from Dumila to Turiani, altitude 374 m, 06°10'26.8”S, 37°34'59.8"E (10: 27.1–57.5); CU 93733, Tanzania, Wami River at bridge in Rudewa on road from Dumila to Kilosa, altitude 433 m, 06°40'45.2”S, 37°07'27.0"E (8: 27.1–41.2); UF 170707, same data as CU 93733 (10: 25.9–77.0); UF 170708, same data as CU 93730 (10: 40.0–59.4).

FIGURE 8. *Amphilius crassus*, UF 184237, 86.3 mm SL, holotype; lateral, dorsal and ventral views.

Diagnosis. Diagnostic characters are summarized in Table 2. *Amphilius* **n. sp.**. *Rufiji* is diagnosed from A. *jacksonii, A. ruziziensis, A. pedunculus*, and *A. lujani* by its shorter caudal peduncle (caudal peduncle length 13.3–15.5% SL vs. 16.0–20.9% SL), and from *A. jacksonii, A. ruziziensis*, and *A. lujani* by its deeper caudal peduncle (caudal peduncle depth 10.1–12.0% SL vs.4.8–9.5% SL). It is diagnosed from *A. ruziziensis, A.* **n. sp.**. Malagarasi, and *A. frieli* by its longer dorsal-fin insertion to adipose-fin insertion length (42.2–44.6% SL vs. 37.5–41.7% SL). *Amphilius crassus* is further diagnosed from *A. jacksonii* by its deeper body (body depth at anus 14.5–17.4% SL vs. 9.6–13.2% SL), and from *A. ruziziensis* by wider interorbital width (28.9–34.1% HL vs. 23.4–25.1% HL) and deeper body (body depth at anus 14.5–17.4% SL vs. 11.1–12.9% SL). It is further diagnosed from *A. lujani* by having fewer branched pectoral-fin rays (7–8, rarely 9 vs. 9), and from *A. frieli* by its fewer branchiostegal rays (6–

7, rarely 8 vs. 8–9), fewer branched pectoral-fin rays (7–8, rarely 9 vs. 9–10), fewer gill rakers on the first gill arch (6–8, rarely 9 vs. 10–11, rarely 9 or 12), and wider interorbital width (28.9–34.1% HL vs. 25.1–27.7% HL).

Description. Morphometric data are in Table 6. Body elongate, ventral profile flattened ventrally to anal-fin base, then tapered dorsally to end of caudal peduncle. Dorsal profile rising steeply from tip of snout to dorsal-fin origin, then nearly horizontal to end of caudal peduncle. Greatest body depth at dorsal-fin origin. Caudal peduncle laterally compressed, with crenellated epidermal fold. Anus and urogenital openings located at midpoint of adpressed pelvic fin, closer to pelvic-fin insertion than to origin of anal fin. Skin smooth. Lateral line complete, extending from dorsal edge of opercular cavity to caudal-fin base.

TABLE 6. Morphometric data for *Amphilius crassus*. Range and mean include the holotype.

	Holotype	Range (n=68)	Mean±SD
%SL			
Head length	25.9	24.0–26.7	25.4±0.7
Head width	21.1	19.6–22.1	20.6±0.5
Head height	13.5	12.9–15.2	13.8±0.5
Body depth	17.3	15.6–19.3	17.0±0.8
Body depth at anus	17.0	14.5–17.4	15.7±0.7
Predorsal length	37.7	35.6–39.7	37.4±1.1
Prepectoral length	19.2	18.4–21.1	19.8±0.6
Preanal length	74.1	70.7–75.0	72.9±1.1
Dorsal-fin base length	12.2	10.1–12.3	11.1±0.6
Adipose-fin base length	22.7	19.3–24.2	21.2±1.2
Anal-fin base length	10.9	10.5–13.8	11.9±0.7
Pelvic-fin length	20.6	18.2–20.9	19.8±0.7
Pectoral-fin length	21.7	20.5–24.1	22.2±0.7
Anal-fin length	19.2	18.1–21.4	19.7±0.8
Caudal peduncle length	15.3	13.3–15.5	14.8±0.6
Caudal peduncle depth	10.5	10.1–12.0	10.9±0.4
Anus to anal fin length	14.9	12.4–16.6	14.2±0.9
Prepelvic length	49.8	46.7–51.6	49.2±1.1
Postpelvic length	50.7	49.3–54.6	51.4±1.1
Dorsal-fin insertion to adipose	43.3	42.2–44.6	43.1±0.6
Dorsal-fin origin to caudal	67.8	63.2–68.3	66.2±1.2
Preanus length	58.5	56.8–60.9	58.8±1.1
%HL			
Snout length	50.5	45.3–50.7	48.2±1.2
Interorbital distance	28.9	28.9–34.1	31.0±1.3
Maxillary barbel length	76.1	65.5–91.4	75.0±5.6
Inner mandibular barbel length	34.3	33.7–50.7	39.8±3.7
Outer mandibular barbel length	60.4	51.1–82.2	64.1±6.0
Eye diameter	12.5	12.1–16.7	13.8±1.1

Head and anterior part of body depressed and broad. Head wedge-shaped in lateral view. Snout broad, blunt when viewed from above. Head becoming wider from tip of snout to pectoral-fin base. Branchiostegal membranes moderately joined at isthmus forming a *V*-shaped connection.

Mouth broad, gently curved, subterminal. Lips moderately fleshy, slightly papillate. Rictal lobe large and slightly papillate. Anterior portion of premaxillary tooth band exposed with mouth closed. Premaxillary tooth patches joined, forming crescent shaped band. Premaxillary and dentary teeth short, conical. Dentary tooth patches forming *U*-shaped band, separated medially.

Three pairs of simple, tapered circumoral barbels. Maxillary barbel large, fleshy and flattened with pointed tip; barbel extending posterolaterally from corner of mouth, to pectoral-fin base. Outer mandibular barbel thin with pointed tip, origin at posterior corner of lower jaw, extending to origin of pectoral-fin. Inner mandibular barbel originates anterolaterally of inner mandibular barbel, extending to edge of branchiostegal membrane. Branchiostegal membrane with 6 (22), 7 (123), or 8 (2) rays. Gill rakers on first epibranchial 1 (1), 2 (122) or 3 (24); rakers on first ceratobranchial 4 (19), 5 (95), or 6 (33); total gill rakers on first arch 6 (19), 7 (79) 8 (42) or 9 (7).

Eye small, positioned dorsolaterally approximately midway between tip of snout and posterior margin of operculum. Horizontal diameter of eye slightly wider than vertical diameter. Eye without free orbit; covered with skin confluent with dorsal surface of head. Anterior and posterior nares with prominent tubular rims; nares separate but relatively close to each other. Posterior nare located about midway between eye and tip of snout.

Dorsal-fin origin at point over tip of pectoral fin. Dorsal fin with i,6 (147) rays, and fin margin straight. Pectoral fin with i,7 (13), i,8 (130), or i,9 (4) rays; unbranched ray greatly thickened. Pectoral fin with four or five innermost rays progressively shorter making posterior fin margin rounded. Origin of pelvic fin posterior of dorsal-fin insertion. Pelvic fin with i,5 (147) rays with first ray unbranched and greatly thickened. Pelvic fin with straight posterior margin.

Adipose-fin base longer than anal-fin base, origin anterior to origin of anal-fin base, fin extending past anal-fin insertion. Margin strongly convex with sharply rounded edge, deeply incised posteriorly. Caudal fin deeply forked with tips of lobes rounded; fin with i,5,5,i (4), i,5,6,i (141) or i,6,6,i (2) principal rays. Anal fin with short base, origin posterior to origin of adipose-fin base, with ii,6 (56), ii,7 (34), iii,5 (3), iii,6 (50), or iii,7 (5) rays. Anal-fin margin almost straight.

Coloration. Body variably mottled with dark saddles. First saddle posterior of head, second saddle at dorsal fin, third saddle between dorsal and adipose fins, fourth saddle under anterior part of adipose fin, and fifth saddle on caudal peduncle. All saddles connected laterally by broad stripe. Venter light brown with fourth and fifth saddles meeting those of opposite side. Dorsal, and anal fins light brown with dark medial band. Adipose fin dark brown to black, with anterior and posterior distal edges cream-colored. Pectoral and pelvic fins positioned horizontally with upper surfaces cream-colored with dark fin base and dark medial band. Lower surfaces light yellow. Caudal fin cream-colored with dark markings on upper and lower lobes. Caudal coloration variable but usually spotted and asymmetrical, with lower lobe more pigmented.

Distribution. Rufiji and Wami river basins, eastern Tanzania (Fig. 6).

Etymology. From the Latin noun *crassus* (m), meaning fat or stout in reference to the deep, stout body.

Amphilius lujani Thomson & Page, new species

(Fig. 9, Tables 7)

Amphilius jacksonii.—Seegers *et al.*, 2003: 37, Lake Victoria drainage (affluent rivers) [Nile basin]

Holotype. UF 184238, ex. UF 169233, Uganda, Manafwa River at Bumwangu, Lake Kyogo drainage, Nile basin, 00°56'26.2"N, 34°16'49.2"E (104.1 mm SL).

Paratypes. Lake Kyogo drainage: AUM 47147, same data as holotype (16: 37.7–112.3); AUM 47149, Uganda, Malaba River at Lwakhakha, border between Uganda and Kenya, 00°47'04"N, 34°22'44"E (7: 46.3–98.1); BMNH 1961.6.13.19, Uganda, Malawa [=Malaba] River, ca. 00°35'N, 34°03'E (1: 99.4); BMNH 1962.2.6.62–63, Uganda, Malawa [=Malaba] River, ca. 00°35'N, 34°03'E (2: 80.0–107.9); BMNH 1965.10.15.18–21, Kenya, Malikisi River, ca. 01°37'N, 34°13'E (4: 35.7–48.0); CU 97333, same data as holotype, ex. AUM 47147 (3: 50.3–90.5); MRAC B3–06–P–17–19, same data as holotype, ex. UF 169233 (3: 56.0–88.1); SAIAB 187280, same data as holotype, ex. UF 169233 (3: 47.9–98.0); UF 169233, same data as holotype (15: 43.0–107.6); UF 169235, same data as AUM 47149 (7: 45.4–90.1).

Non-types. Lake Kyogo drainage: BMNH 1965.10.15.11–13, Uganda, Sironko River, ca. 01°29'N, 34°14'E (2: 103.7–119.5); BMNH 1965.10.15.14–15, Uganda, Sironko River, ca. 01°29'N, 34°14'E (1: 101.1); BMNH 1965.10.15.16–17, Uganda, Zuzu River, tributary of the Manafwa River, ca. 01°13'N, 34°21'E (2: 40.9–42.1). **Lake Manyara basin:** BMNH 1969.2.20.1, Tanzania, Stream entering Lake Manyara, ca. 03°38'S, 35°41'E (1: 45.0). **Nzoia River system (NE Lake Victoria tributary):** SAIAB 65048, Kenya, Moi Brgidge, Little Nzoia River, ca. 00°55'N, 35°07'E (1: 74.5).

FIGURE 9. *Amphilius lujani*, UF 184238, 104.1 mm SL, holotype; lateral, dorsal and ventral views.

Diagnosis. Diagnostic characters are summarized in Table 2. *Amphilius lujani* is diagnosed from *A. pedunculus, A. frieli,* and *A. crassus* by having a more slender caudal peduncle (depth 8.1–9.5% SL vs. 9.9–12.3% SL). It is diagnosed from *A. jacksonii* by having a deeper caudal peduncle (depth 8.1–9.5% SL vs. 4.8–7.9% SL) and a deeper body (body depth at anus 13.5–15.8% SL vs. 9.6–13.2% SL). *Amphilius lujani* is diagnosed from *A. ruziziensis* by having a wider interorbital width (28.3–31.7% HL vs. 23.4–25.1% HL) and a deeper body (body depth at anus 13.5–15.8% SL vs. 11.1–12.9% SL). It is further diagnosed from *A. frieli* by having fewer gill rakers on the first gill arch (6–8, rarely 5 or 9 vs. 10–11, rarely 9 or 12) and a longer caudal peduncle (length 16.8–20.9% SL vs. 14.4–16.4% SL). *Amphilius lujani* is further diagnosed from *A. crassus* by having more branched pectoral-fin rays (9 vs. 7–8, rarely 9) and a longer caudal peduncle (length 16.8–20.9% SL vs. 13.3–15.5% SL).

Description. Morphometric data are in Table 7. Body elongate, ventral profile flattened ventrally to anal-fin base, then tapered dorsally to end of caudal peduncle. Dorsal profile rising gently from tip of snout to dorsal-fin origin, then nearly horizontal to end of caudal peduncle. Greatest body depth at dorsal-fin origin. Caudal peduncle laterally compressed, with crenellated epidermal fold. Anus and urogenital openings located at midpoint of adpressed pelvic fin, closer to pelvic-fin insertionthan to origin of anal fin. Skin smooth. Lateral line complete, extending from dorsal edge of opercular cavity to caudal-fin base.

Head and anterior part of body depressed and broad. Head wedge-shaped in lateral view. Snout broad, blunt when viewed from above. Head becoming wider from tip of snout to pectoral-fin base. Branchiostegal membranes moderately joined at isthmus forming a *V*-shaped connection.

TABLE 7. Morphometric data for *Amphilius lujani*. Range and mean include the holotype.

	Holotype	Range (n=45)	Mean±SD
%SL			
Head length	24.2	22.4–25.0	24.1±1.3
Head width	19.5	19.1–20.7	19.5±0.9
Head height	13.3	11.7–14.3	13.2±1.3
Body depth	16.7	14.4–18.5	16.7±2.1
Body depth at anus	15.6	13.5–15.8	14.3±1.2
Predorsal length	36.0	34.4–38.3	36.5±2.0
Prepectoral length	18.9	17.6–20.5	19.2±1.5
Preanal length	72.9	69.0–74.4	71.5±2.7
Dorsal-fin base length	11.4	10.3–13.3	11.5±1.5
Adipose-fin base length	22.5	18.1–23.1	20.3±2.5
Anal-fin base length	12.2	10.3–14.0	11.8±1.8
Pelvic-fin length	17.8	17.5–21.5	19.2±2.0
Pectoral-fin length	21.8	20.0–23.6	22.3±1.8
Anal-fin length	16.8	16.8–20.9	18.8±2.1
Caudal-peduncle length	17.1	16.8–20.9	18.1±2.1
Caudal-peduncle depth	9.6	8.1–9.5	8.9±07
Anus to anal fin length	15.1	11.8–16.2	14.4±2.2
Prepelvic length	50.1	46.5–50.3	48.6±1.9
Postpelvic length	51.8	49.3–56.2	52.1±3.5
Dorsal-fin insertion to adipose	41.8	38.2–42.0	40.6±1.9
Dorsal-fin origin to caudal	66.2	65.3–69.0	66.8±1.9
Preanus length	58.7	54.8–60.6	57.2±2.9
%HL			
Snout length	50.5	42.9–52.9	49.5±5.1
Interorbital distance	28.7	28.3–31.7	29.2±1.8
Maxillary barbel length	83.3	61.6–85.0	73.2±11.7
Inner mandibular barbel length	38.7	35.1–44.6	40.6±4.8
Outer mandibular barbel length	61.9	48.2–72.4	61.9±12.2
Eye diameter	13.8	12.6–18.0	15.2±2.7

Mouth broad, gently curved, subterminal. Lips moderately fleshy, strongly papillate. Rictal lobe large and papillate. Anterior portion of premaxillary tooth band exposed with mouth closed. Premaxillary tooth patches joined, forming crescent shaped band. Premaxillary and dentary teeth short, conical. Dentary tooth patches forming *U*-shaped band, separated medially.

Three pairs of simple, tapered circumoral barbels. Maxillary barbel large, fleshy and flattened with pointed tip; barbel extending posterolaterally from corner of mouth, to pectoral-fin base. Outer mandibular barbel thin with pointed tip, origin at posterior corner of lower jaw, extending to origin of pectoral-fin. Inner mandibular barbel originates anterolaterally of inner mandibular barbel, extending to edge of branchiostegal membrane. Branchiostegal membrane with 7 (21), or 8 (25) rays. Gill rakers on first epibranchial 2 (36) or 3 (10); rakers on first ceratobranchial 4 (2), 5 (22), 6 (1), or 7 (1); total gill rakers on first arch 6 (2), 7 (16) 8 (23) or 9 (5).

Eye small, positioned dorsolaterally approximately midway between tip of snout and posterior margin of operculum. Horizontal diameter of eye slightly wider than vertical diameter. Eye without free orbit; covered with skin confluent with dorsal surface of head. Anterior and posterior nares with prominent tubular rims; nares separate but relatively close to each other. Posterior nare located about midway between eye and tip of snout.

Dorsal-fin origin at point over tip of pectoral fin. Dorsal fin with i,6 (45) or i,7 (1) rays, and fin margin straight. Pectoral fin with i,9 (46) rays; unbranched ray greatly thickened. Pectoral fin with four or five innermost rays progressively shorter making posterior fin margin rounded. Origin of pelvic fin posterior of dorsal-fin insertion. Pelvic fin with i,5 (46) rays with first ray unbranched and greatly thickened. Pelvic fin with straight posterior margin.

Adipose-fin base longer than anal-fin base, origin anterior to origin of anal-fin base, fin extending past anal-fin insertion. Margin strongly convex with sharply rounded edge, deeply incised posteriorly. Caudal fin deeply forked with tips of lobes rounded; fin with i,5,6,i (46) principal rays. Anal fin with short base, origin posterior to origin of adipose-fin base, with ii,6 (10), ii,7 (12), iii,6 (19), or iii,7 (6) rays. Anal-fin margin almost straight.

Coloration. Body variably mottled with dark saddles. First saddle posterior of head, second saddle at dorsal fin, third saddle between dorsal and adipose fins, fourth saddle under anterior part of adipose fin, and fifth saddle on caudal peduncle. All saddles connected laterally by broad stripe. Venter light brown with fourth and fifth saddles meeting those of opposite side. Dorsal, and anal fins light brown with faint medial bands. Adipose fin dark brown to black, with posterior distal edge cream-colored. Pectoral and pelvic fins positioned horizontally with upper surfaces cream-colored with darkened fin base and faint medial bands. Lower surfaces light yellow. Caudal fin cream-colored with dark markings on upper and lower lobes. Caudal coloration asymmetrical, with lower lobe almost completely dark (except for small cream-colored mark at base of caudal and cream-colored tip). Upper lobe with less dark pigment, with dark blotch covering dorsal edge, but caudal base with large cream-colored patch and tip cream-colored.

Distribution. Lake Kyogo drainage, western Uganda; Nzoia River, a northeastern tributary of Lake Victoria, and Lake Manyara basin, Tanzania (Fig. 6).

Etymology. Named for Nathan K. Lujan who collected the holotype and most paratypes of this species, and who has made excellent contributions to our knowledge of freshwater fishes.

Discussion

The present study examined over 2000 specimens of the *A. jacksonii* complex and recognized six species, five of which were previously undescribed. Species of the complex are distinguished primarily by differences in body shapes, most notably by differences in body depth and caudal-peduncle length and depth. *Amphilius jacksonii* is the species with the most slender body and the longest and most slender caudal peduncle. *Amphilius crassus* has the deepest body and the shortest and deepest caudal peduncle, and appears to have a much smaller maximum body size than other species in the complex. The largest *Amphilius crassus* specimen examined is only 86.3 mm SL while specimens greater than 115 mm SL were examined for all other species. Only six of the 186 specimens examined of *Amphilius crassus* had a standard length greater than 70 mm while specimens greater than 80 mm SL were common in collections of all the other species, with many specimens being greater than 100 mm SL. All specimens of *A. frieli* have much bolder dark pigment on the fins and on the body than other species of the complex in juveniles and adults.

Frequency tables were constructed for counts of four different meristic characters (Tables 8 to 11). Branchiostegal ray counts, total gill raker counts, and branched pectoral-fin ray counts were found to be useful for distinguishing species. The high number of branchiostegal rays (8 or 9) found in *A. frieli* distinguishes it from both *A. crassus* and *A. ruziziensis*, which typically have 6 or 7 branchiostegal rays (Table 8). *Amphius frieli* also had higher total gill raker counts than all other species in the complex. Almost all specimens of *A. frieli* examined had 10 or 11 gill rakers on the first ceratobranchial while almost all specimens of other species had fewer than 10 (Table 9). The low number of branched pectoral-fin rays found in *A. crassus* distinguishes it from *A. frieli* and *A. lujani*. In *A. crassus*, 180 of 185 specimens had fewer than nine branched pectoral-fin rays while 47 specimens of *A. lujani* and 88 specimens of *A. frieli* examined had nine or more branched pectoral-fin rays (Table 10). No clear patterns were observed in the frequencydistribution of branched anal-fin rays (Table 11).

In addition to the characters in the diagnoses, there are coloration differences that can be used to identify the species, but they aren't as discrete as the morphological characters and somewhat subjective (bold vs. not bold). In *A. frieli* and *A. lujani*, the pigment on the caudal fins of juvenile and adult specimens is strongly asymmetrical, with the lower lobe almost completely pigmented (except for a small cream-colored mark at the base of the caudal fin and a cream-colored tip), and the upper lobe with less pigment, a dark blotch covering the dorsal edge, and the

caudal-fin base with a large cream-colored patch and a cream-colored tip. In *A. jacksonii, A. pedunculus*, and *A. crassus*, juveniles have similar caudal-fin coloration, but adults have spotted caudal fins that are less strongly asymmetrical.

TABLE 8. Branchiostegal ray counts in species of the *A. jacksonii* complex.

Branchiostegal Rays	5	6	7	8	9
A. jacksoni		5	85	147	1
A. ruziziensis		7	10		
A. pedunculus			37	138	
A. frieli				72	14
A. crassus		25	158	2	
A. lujani			22	25	

TABLE 9. Total gill raker counts in species of the *A. jacksonii* complex.

Total Gill Rakers	5	6	7	8	9	10	11	12
A. jacksoni		25	74	83	38	6		
A. ruziziensis	1	8	2	6	1			
A. pedunculus		5	27	72	59	10		
A. frieli					2	50	31	3
A. crassus	1	25	102	48	8			
A. lujani		2	16	24	5			

TABLE 10. Branched pectoral-fin ray counts in species of the *A. jacksonii* complex.

Branched Pectoral-Fin Rays	6	7	8	9	10
A. jacksoni		1	104	137	
A. ruziziensis			4	14	
A. pedunculus			81	94	5
A. frieli				84	4
A. crassus		14	166	5	
A. lujani				47	

TABLE 11. Branched anal-fin ray counts in species of the *A. jacksonii* complex.

Branched Anal-Fin Rays	5	6	7	8
A. jacksoni		110	124	9
A. ruziziensis	4	9	5	
A. pedunculus	6	97	63	
A. frieli	4	69	15	
A. crassus	5	134	47	
A. lujani		29	18	

Amphilius ruziziensis differs in caudal-fin coloration from all other species in the complex in not having an asymmetrical caudal-fin pigmentation pattern; instead it has a single dark band on the caudal fin with similar amounts of pigment on the upper and lower lobes. *Amphilius ruziziensis* also differs from other species in the complex in paired fin and body coloration. The paired fins in *A. ruziziensis* do not have dark medial bands as in the other species. Instead, the paired fins are almost entirely brown with only the distal edge cream-colored. The body coloration in *A. ruziziensis* is similar to that of other species in the complex in having the same mottled coloration

with dark saddles, but the areas between the saddles are uniformly cream-colored (vs. areas cream-colored but also stippled with darker pigment).At least one more species of the *A. jacksonii* complex, under study by another researcher, awaits description. There may be additional undescribed species in the Rufiji basin. Four specimens examined from the Little Ruaha River system (SAIAB 59406) were very similar to *A. crassus*, but differ in having eight unbranched anal-fin rays, more than any of the 186 specimens examined of *A. crassus* and more than in any other species in the complex with the exception of some specimens of *A. jacksonii* from the Kagera River drainage, Nile basin (Table 10). Several lots of specimens collected from the Rufiji and deposited at the American Museum of Natural History (AMNH 215916, 215922, 215930, and 215936) may also represent an undescribed species. These specimens were determined not to be A. *crassus* but were not studied further because their locality data are vague and it is unclear what part of the river basin they were collected from.

Further study is needed of the material from the Upper Malagarasi deposited in MRAC and treated here as conspecific with *A. pedunculus*. Although these specimens were examined during a visit to MRAC, meristic counts were not taken on them.

Comparative material examined

Amphilius cf. *crassus*: **Little Ruaha River system, Rufiji River basin:** SAIAB 59406, Tanzania, About 5 km on road Iringa to Ruaha, 7°46'58"S, 35°45'54"E (4: 54.7–65.2).

Amphilius sp.: **Kilombero River system, Rufiji River basin:** AMNH 215916, Tanzania, Udzungwa mountains national park, Man'gula camp site no. 3 on Mwaya River, ca. 7°51'S, 36°53'E (5: 37–41); AMNH 215922, same data as AMNH 215916 (1: 58.9); AMNH 215930, same data as AMNH 215916 (2: 60.9–36.3); AMNH 215936, same data as AMNH 215916 (1: 38.6).

Amphilius grammatophorus: **Bafing River drainage, Senegal River basin:** AMNH 248684, Guinea, Bafing River, Sogotoro, 10°39’44.701”W 11°45’06.120”W (10: 39.2–57.7)

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Literature cited

Bailey, R.G. (1969) The non-cichlid fishes of the eastward flowing rivers of Tanzania, East Africa. *Revue de Zoologie et Botanique Africaines. Tervuren*, 80, 170–199.

Boulenger, G.A. (1912) Descriptions of two new fishes from the Nile system. *Annals and Magazine of Natural History*, Series 8, 10, 601–602.
http://dx.doi.org/10.1080/00222931208693278

Boulenger, G.A. (1916) Catalogue of the fresh-water fishes of Africa in the British Museum (Natural History), Addenda. British Museum (Natural History) Trustees, London.

Boulenger, G.A. (1920) Poissons de la mission Stappers, 1911–1913 pour l'exploration hydrographique et biologique des Lacs Tanganyika et Moéro. *Revue de Zoologie Africaine*, 8, 1–57.
Cailliet, G.M., Love, M.S. & Ebeling, A.W. (1986) *Fishes: A Field and Laboratory Manual on Their Structure, Identification, and Natural History.* Wadsworth Publishing Company, Belmont, CA, 194 pp.
David, L. (1937) Poissons de l'Urundi. *Revue de Zoologie et Botanique Africaines*, 29, 413–420.
David, L. & Poll, M. (1937) Contribution à la faune ichthyologique du Congo Belge: Collections du Dr. H. Schouteden (1924–1926) et d'autres récolteurs. *Annales du Musée du Congo Belge, Zoologie*, Series 1, 3, 189–294, pl. 12.
De Vos, L., Seegers, L., Taverne, L. & Thys van den Audenaerde, D.F.E. (2001) L'ichtyofaune du bassin de la Malagarasi (Système du Lac Tanganyika): une synthèse de la connaissance actu elle. *Annales Musée Royal de l'Afrique Centrale, Série in 4º, Sciences Zoologiques*, 285, 117–135.
Diogo, R. & Chardon, M. (2000) The structures associated with catfish (Teleostei: Siluriformes) mandibular barbels: origin, anatomy, function and synonymy. *Netherlands Journal of Zoology*, 50, 455–478.
Chardon, M. (1968) Anatomie comparée de l'appareil de Weber et des structures connexes chez les Siluriformes. *Annales du Musée Royal de l'Afrique Centrale, Série in 8º, Sciences Zoologiques*. Tervuren, Belgique, 169, 1–285.
Copley, H. (1958) *Common Freshwater Fishes of East Africa*. H.F. & G. Witherby Ltd., London, 172 pp.
Greenwood, P.H. (1957) The Fishes of Uganda, III. *Uganda Journal*, 21, 47–80.
Greenwood, P.H. (1958) *The Fishes of Uganda*, Uganda Society, Kampala, 224 pp.
Greenwood, P.H. (1966) *The Fishes of Uganda*, 2nd edition. Uganda Society, Kampala, 131 pp.
Harry, R.R. (1953) A contribution to the classification of the African catfishes of the family Amphiliidae, with description of collections from Cameroon. *Revue de Zoologie et de Botanique Africaines*, 47, 177–200, 201–232.
Marlier, G. (1953) Etude biogéographique du bassin de la Rizizi basée sur la distribution des poissons. *Annales de la Société royale zoologique de Belgique*, 84, 175–224.
Matthes, H. (1967) The fishes and fisheries of the Ruaha River basin, Tanzania. *East African Freshwater Fisheries Research Organisation (EAFFO) Occasional Papers*, No. 9, 1–19.
Poll, M. (1939) Exploration du Parc National Albert. Mission G. F. de Witte (1933–1935). Poissons. *Exploration du Parc National Albert,* Fasc. 24, 1–81, Pls. 1–11.
Seegers, L. (1996a) The fishes of the Lake Rukwa drainage. *Annales de la Société Zoologique de Belgique*, 278, 1–407.
Seegers, L. (1996b) Die Amphilius-Arten Ostafrikas. *Die Aquarien- und Terrarienzeitschrift (DATZ)*, 49, 249–255, 16 figs.
Seegers, L., De Vos, L. & Okeyo, D.O. (2003) Annotated checklist of the freshwater fishes of Kenya (excluding the lacustrine haplochromines from Lake Victoria). *Journal of East African Natural History*, 92, 11–47. http://dx.doi.org/10.2982/0012-8317(2003)92[11:ACOTFF]2.0.CO;2
Skelton, P.H. (1981) The description and osteology of a new species of *Gephyroglanis* (Siluriformes, Bagridae) from the Olifants River, South West Cape, South Africa. *Annals of the Cape Provincial Museums, Natural History*, 13, 217–249.
Skelton, P.H. (1984) A systematic revision of species of the catfish genus *Amphilius* (Siluroidei, Amphiliidae) from east and southern Africa. *Annals of the Cape Provincial Museums, Natural History*, 16, 41–71.
Skelton, P.H. (1986) Two new *Amphilius* (Pisces, Siluroidei, Amphiliidae) from the Zaïre River system, Africa. *Revue de Zoologie Africaine*, 99, 263–291.
Walsh, S.J., Chapman, L.J. , Rosenberger, A.E. & Chapman, C.A. (2000) Redescription of *Amphilius jacksonii* (Siluriformes: Amphiliidae) with habitat and life-history notes. *Ichthyological Exploration of Freshwaters*, 11, 163–174.
Whitehead, P.J.P. (1958) A new species of *Chiloglanis* (Pisces, Mochocidae) in Kenya. *Annals and Magazine of Natural History*, Series 13, 1, 197–208.