TAXONOMIC REVISION OF THE *Amphilius uranoscopus* GROUP OF EAST-CENTRAL AFRICA (TELEOSTEI: AMPHILIIDAE)

By

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A THESIS PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE

UNIVERSITY OF FLORIDA

2007

ACKNOWLEDGMENTS

Funding for this study was provided by the All Catfish Species Inventory project funded by the U.S. National Science Foundation (DEB-0315963). I thank Dr. Lawrence Page for directing me on this topic of study and for instruction, and for his constructive criticism and guidance. I also thank Drs. Jon Armbruster and Rebecca Kimball for their contributions and guidance. Mark Allen kindly provided photographs for figures 4-3 and 4-5. For specimen loans and access to institutional specimens I thank Ralf Britz and James Maclain (BMNH), William N. Eschmeyer, Tomio Iwamoto and David Catania (CAS), Mary A. Rogers (FMNH), Karsten Hartel (MCZ), Guy Duhamel and Patrice Pruvost (MNHN), Jos Snoeks and Mark Hanssens (MRAC), Robert H. Robins (UF) and Jeffery T. Williams (USNM).

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Abstract of Dissertation Presented to the Graduate School
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August 2007

Chair: Lawrence M. Page
Major: Zoology

The taxonomy of species of the *Amphilius uranoscopus* group in east-central Africa is reviewed, and the *Amphilius uranoscopus* group is recognized by the following unique combination of characters: absence of a crenellated epidermal fold at the base of the caudal fin, usually 8+9 (i,7,8,i) principal caudal-fin rays, small bilateral bony swimbladder capsules, 36-39 total and 20-23 caudal vertebrae, and leading pterygiophore of the dorsal fin intercepting the vertebral column at the first, second or third post-Weberian vertebrae. The examination of all available museum specimens of the genus *Amphilius* from east-central Africa reveals the existence of at least five species of the *Amphilius uranoscopus* group in the region, *A. grandis*, *A. oxyrhinus*, *A. krefftii*, *A. uranoscopus* and *Amphilius* sp. 1.

Three of the species were previously believed to be synonyms of *Amphilius uranoscopus*, and *Amphilius* sp. 1 is new to science. *Amphilius* sp. 1 is distinguished from *A. grandis*, *A. oxyrhinus*, *A. krefftii* and *A. uranoscopus* by its distinctive adult pigment pattern consisting of many small darks spots on the head, body and fins (vs. body, head and fins lacking dark spots in *A. grandis*, *A. krefftii* and *A. uranoscopus* or large dark spots present on body in *A. oxyrhinus*). It is additionally distinguished from these species by its absence of a visible epidermal core extending posteriorly from the mandibular barbels (vs. presence in *A. oxyrhinus* and *A. krefftii*),

rounded caudal-fin lobes (vs. pointed in *A. grandis* and *A. oxyrhinus*), forked caudal fin and absence of light dorsal saddles (vs. caudal fin shallowly emarginate and light dorsal saddles present at the base of the dorsal and adipose fin in *A. krefftii* and *A. uranoscopus*), and fewer branchiostegal rays (6-7 vs. 8-9 in *A. uranoscopus*).

The caudal fin shape and pigment patterns observed suggest that a northern and a southern group of species exist in east-central Africa. The northern species (*A. grandis*, *A. oxyrhinus* and *Amphilius* sp. 1) have a more deeply forked caudal fin and dark markings either as adults or juveniles, and lack light dorsal saddles. The southern species (*A. krefftii* and *A. uranoscopus*) have no dark markings, shallowly emarginate caudal fins, and light dorsal saddles present at the bases of the dorsal and adipose fin.

Despite differences observed in pigment pattern and intensity between the *Amphilius* in the Wami, Ruvu and Rufiji drainages, all of these populations are tentatively recognized as a single species because most of the specimens examined were juveniles and only juvenile pigmentation could be compared. The three other nominal species synonymized with *A. uranoscopus*, *A. hargeri*, *A. brevidorsalis* and *A. platychir cubangoensis*, are discussed, but their status is beyond the geographic scope of this study and only tentative conclusions are made about the identity of these species.

CHAPTER 1
INTRODUCTION

Natural History

The catfish family Amphiliidae is widely distributed throughout sub-Saharan Africa and it includes 12 genera and about 66 species (Ferraris, 2007). Most amphiliid species are found in fast-flowing water of clear, rocky streams at high elevations or rapids of large lowland rivers (Berra, 2001; Roberts, 2003). Recent workers have recognized three subfamilies within Amphiliidae, with *Amphilius* and *Paramphilius* placed in the subfamily Amphiliinae. Twenty species are currently recognized in the genus *Amphilius*, with most of the species occurring in the drainages of western Africa and the Congo basin.

Two species of *Amphilius* are currently recognized in east-central Africa, an area herein defined as the area from and including the Ewaso Nyiro drainage in Kenya south to and including the Rufiji drainage in Tanzania (Fig. 1-1). This area generally corresponds to the east coast ichthyofaunal province of Roberts (1975). Roberts' ichthyofaunal province also includes the Lake Victoria basin and all eastern-flowing rivers south to but not including the Zambezi River. *Amphilius* has been reported from the Yala River, a tributary of Lake Victoria (Whitehead, 1958; 1959) and the Ruvuma drainage, the next large drainage south of the Rufiji (Tweddle, 1983), but these records are not supported by vouchers.

Species of the genus *Amphilius* are habitat specialists and are adapted for fast flow and rocky habitats (Skelton, 1986). Morphological adaptations for these habitats include expanded pectoral and pelvic fins with an expanded first ray, depressed body, upwardly directed eyes and reduced gas bladder (Skelton, 1986; Walsh et al., 2000). The large pelvic fins have been observed to form a feeble sucking disc, which in conjunction with the body, enable the fish to cling to rocks (Jackson, 1961b). The epidermal microstructure of the anterior ray of the pectoral

fin as observed by a scanning electron microscope (Bell-Cross & Jubb, 1973) is similar to the epidermal microstructure of the adhesive organs in Asian sisorid catfishes (Singh & Agarwal, 1991; Das & Nag, 2004, 2005).

In *Amphilius* species, males and females are generally similar, but the adductor mandibulae muscles attached to the head are sometimes greatly enlarged in mature males (J. Friel, Pers. Comm. 2007). This dimorphism has also been observed in species of *Paramphilius*, and was believed to be a derived character of *Paramphilius* by Skelton (1989).

Little information is available on the biology of *Amphilius* species. Skelton (2001) stated that South African species breed during the summer. Marriott et al. (1997) studied the reproductive biology of *A. natalensis* in South Africa and concluded that the species had a long breeding period extending from August to February. They observed that breeding coincided with the rainy season and postulated that spawning was initiated in response to increased water flow rate or changes in water quality following periods of rainfall (Marriott et al., 1997). Walsh et al. (2000) were not able to determine the breeding season of *A. jacksonii*, but suggested that it may have two breeding periods per year.

The diet of *Amphilius* species has been reported to predominantly consist of benthic aquatic insects (Marriott et al., 1997; Skelton, 2001; Walsh et al., 2000). Marriott et al. (1997) conducted a detailed stomach analysis of specimens of *A. natalensis* and found the diet to consist mostly of larval chironomids and ephemeropterans. Additionally, they found that small fishes fed predominantly on chironomid larvae, while in larger fishes, chironomid and ephemeropteran larvae contributed almost equally in volume. Walsh et al. (2000) analyzed the stomach contents of 118 specimens of *A. jacksonii*, and similarly found the diet of the species to consist mainly of larval Diptera, Ephemeroptera and Trichoptera.

Systematic History

In 1864, Günther described *Amphilius* as a section of the genus *Pimelodus* for a new species he described as *Pimelodus platychir* from Sierra Leone, western Africa. Soon thereafter he recognized *Amphilius* as a genus (Günther, 1865). In 1889, Pfeffer, apparently unaware of Günther's description, created the genus *Anoplopterus* for a new species he described as *An. uranoscopus* from the Wami River drainage in Tanzania. Nine years later, Vaillant created the genus *Chimarrhoglanis* for a supposedly new species, which he described as *C. leroyi* from the nearby Ruvu River drainage. Boulenger (1898a) synonymized *C. leroyi* with *Pimelodus platychir*, but overlooked Günther's description of the genus *Amphilius* and synonymized *Chimarrhoglanis* with *Anoplopterus*. Boulenger (1898a) also recognized Pfeffer's *A. uranoscopus* and suggested that the types of *A. platychir* did not come from Sierra Leone.

Poche (1902a) and Günther (1902) refuted Boulenger's (1898a) suggestion that the types of *Amphilius platychir* were not from Sierra Leone, and Poche (1902b), recognizing *Amphilius* as the correct name for the genus, synonymized *Anoplopterus* and *Chimarrhoglanis* with *Amphilius*. Despite Poche and Günther's assertions, Boulenger continued to question the type locality of Sierra Leone for *A. platychir* and recognized *A. platychir* as a species in eastern Africa (Boulenger, 1902, 1905a, 1907a,1907b).

In 1905, Boulenger described *Amphilius grandis* from the Tana River drainage in Kenya. He distinguished this species from *A. uranoscopus* by its longer head (length four times in total length v. five times in total length) and shorter barbels (maxillary barbel not reaching posterior border of head vs. extending beyond posterior border of head). He distinguished this species from *A. platychir* by its longer head (length 4 times in total length v. 4 to 4 1/2 times in total length), longer snout (snout length 1 2/3 interocular width vs. 1 1/3 to 1 1/2 interocular width), and a shorter caudal peduncle (not longer than deep vs. longer than deep).

In 1911, Boulenger published volume two of his "Catalogue of Freshwater Fishes of Africa" and recognized four species in the drainages of east-central Africa: *A. uranoscopus*, *A. platychir*, *A. grandis*, and *A. krefftii*, a new species that he described from the Sigi River, Tanzania. *Amphilius krefftii*, like *A. grandis*, was distinguished from the other species of *Amphilius* by relative proportions of it head, barbel and caudal peduncle lengths. Soon thereafter, he described a fifth species, *A. oxyrhinus*, from the Eusso Mara, a tributary of the Eusso Nyiro in Kenya. He distinguished this species from only *A. grandis*, the only other species of *Amphilius* he recorded from the Eusso Nyiro.

Since Boulenger's description of *Amphilius grandis*, no new species of *Amphilius* have been described from east-central Africa and there has been limited study of the genus in east-central Africa. Most workers continued to recognize all of the species that Boulenger recognized (Copley, 1941; Harry, 1953; Whitehead, 1958), but Bailey (1969: 192) questioned the validity of *A. krefftii* and stated that it is "very probably a synonym of *A. grandis*". Meanwhile, *A. grandis* was reported from throughout eastern and southern Africa (Van der Horst, 1931; Poll, 1952; Crass, 1960; Jubb, 1961; Crass, 1964).

Amphilius platychir was also being reported from these areas (Ricardo, 1939a, 1939b; Jackson, 1959; Maar, 1960; Jackson, 1961a; Jubb, 1963; Bell-Cross, 1972). Bell-Cross & Jubb (1973) referred records of *A. grandis* from eastern and southern Africa to *A. platychir*, and *A. platychir* became accepted as being widespread throughout eastern and southern Africa.

Skelton (1984) revised the genus *Amphilius* from eastern and southern Africa and identified two groups within *Amphilius*. One group is primarily western African, has a crenellated epidermal fold at the base of the caudal fin and 6 + 7 principal caudal-fin rays. The second group is primarily distributed in eastern and southern Africa, lacks the crenellated

epidermal fold and usually has 8 + 9 principal caudal-fin rays. *Amphilius platychir* was identified as a member of the first group, and all records of the species from eastern and southern Africa were determined to be based on a single widespread species. Skelton (1984) recognized the name *A. uranoscopus* for this widespread eastern and southern Africa species and considered *C. leroyi*, *A. grandis*, *A. krefftii* and *A. oxyrhinus* to be synonyms of this species. Three other taxa were also synonymized with *A. uranoscopus*: *Amphilius hargeri* from Mlangi, British Central Africa, *Amphilius brevidorsalis* from the Rivière Revue (Mozambique) and *Amphilius platychir cubangoensis* from Angola. Figure 1-2 shows the type localities of *A. uranoscopus* and the seven nominal species that Skelton synonymized with it.

Amphilius uranoscopus is the only *Amphilius* species of Skelton's eastern and southern African group currently recognized in east-central Africa. A single species of Skelton's western African *Amphilius* group, *A. jacksonii*, has been reported to occur in the Rufiji and Wami drainages in Tanzania (Seegers, 1996a) and is easily distinguished from *A. uranoscopus* by its deeply forked caudal fin, crenellated epidermal fold, and 6 + 7 principal caudal-fin rays. Although Skelton examined the type specimens of the five nominal species from east-central Africa, his recognition of *A. uranoscopus* as a single widespread species was based largely on the examination of specimens from South Africa. Additionally, his conclusions were based on the lack of clear meristic and morphometric differences between populations. He did not examine variation in other characters like pigment pattern and caudal fin shape. Variation in these characters in specimens identified as *A. uranoscopus*, suggests that the validity of the nominal species synonomized with *A. uranoscopus* and the acceptance of *A. uranoscopus* as a single species needs to be investigated.

The goals of this study are to examine morphological variation in *Amphilus* in east-central Africa and to recognize valid taxa. In the process, the identities of the five nominal species of *Amphilius* described from east-central Africa will be determined.

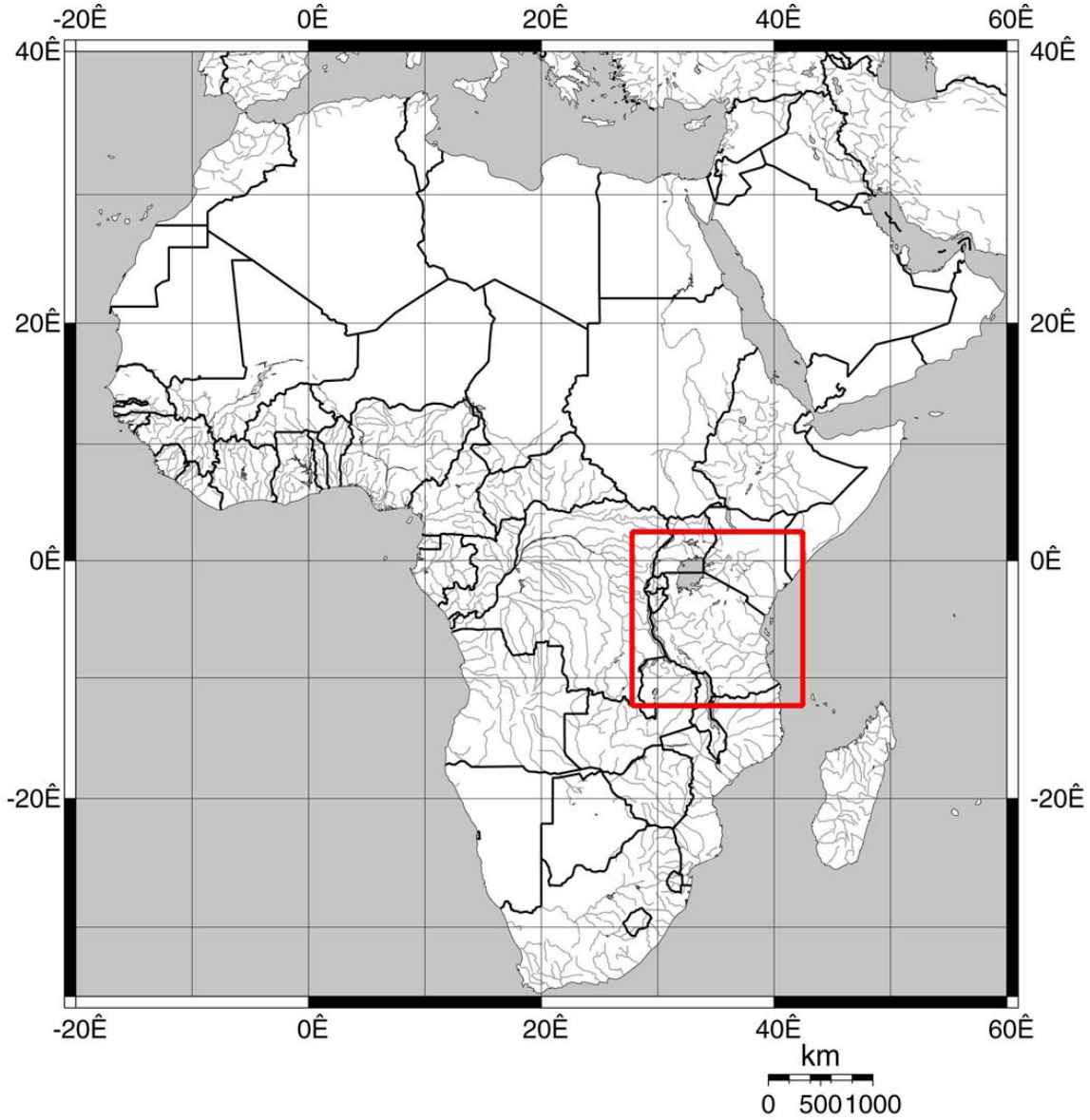

Figure 1-1. Map of Africa with the east-central region indicated by the red box.

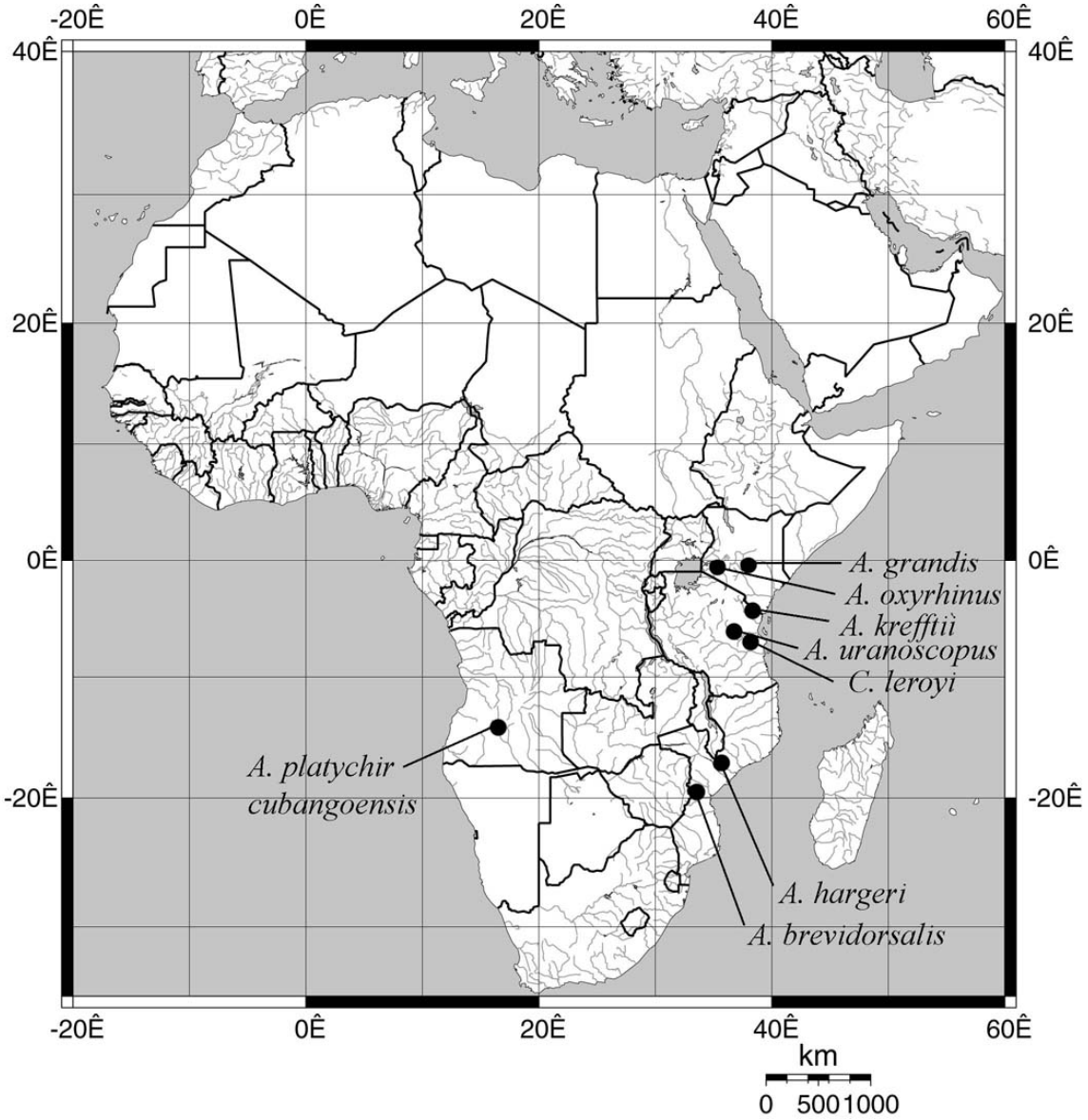

Figure 1-2. Map of Africa indicating type localities of species of the *Amphilius uranoscopus* group as defined by Skelton (1984).

CHAPTER 2
MATERIALS AND METHODS

Use of the terms origin and insertion to designate, respectively, anterior and posterior base of all fins follows Cailliet et al. (1986). Counts and measurements were made on the left side of specimens when possible and follow Skelton (1981, 1984, 1986), except head length was measured as the distance from the top of snout to the dorsal edge of the opercular cavity. In addition, the following measurements were made:

- Body depth at anus: depth of the body at the anus.
- Postorbital length: distance from the posterior margin of the orbit to the dorsal edge of the opercular cavity.
- Prepectoral length: distance from the origin of the pectoral fin to the tip of the snout.
- Preanal length: distance from the origin of the anal fin to the tip of the snout.
- Dorsal-fin base length: distance from the structural base of the first ray to the point where the membrane behind the last ray contacts the body.
- Adipose-fin base length: distance from the origin of the adipose fin to the posteriormost connection of the adipose fin to the body.
- Pelvic- and pectoral-fin lengths: distance from the origin of the fin to the tip of the fin.
- Anus to anal-fin length: distance from the origin of the anal fin to the center of the anus.
- Prepelvic length: distance from the origin of the pelvic fin to the tip of the snout.
- Postpelvic length: distance from the origin of the pelvic fin to the base of the caudal fin.
- Distance from insertion of dorsal fin to insertion of adipose fin (end dorsal – end adipose): distance from the point where the membrane behind the last dorsal-fin ray contacts the body to the posteriormost connection of the adipose fin to the body.
- Distance from origin of dorsal fin to base of caudal fin (front dorsal – caudal): distance from the origin of the dorsal fin to the base of the caudal fin.
- Preanus length: distance from tip of the snout to opening of the anus.

All available museum specimens from the Ewaso Nyiro, Tana, Galana, Pangani, Wami, Ruvu and Rifiji drainages were examined. In addition, the type specimens of *Amphilius hargeri*, *A. brevidorsalis* and *A. platychir cubangoensis* were examined; however, because large series of specimens from outside the east-central region could not be examined, only tentative conclusions can be made about the identity of these species.

Measurements were made point-to-point with digital calipers, and data were recorded to tenths of a millimeter. Subunits of the head are presented as proportions of the head length (HL). Head length and measurements of the body parts are given as proportions of the standard length (SL).

For the fin-ray counts, the numbers of unbranched soft rays are indicated by Roman numerals, branched soft rays are indicated 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. Vertebrae were counted by means of radiographs following the methods of Skelton (1976). Counts exclude 5 Weberian vertebrae and include the ural centrum as one.

Material examined is given under each species account and is listed by the drainage followed by the catalog number, country, locality, geographic coordinates, and in parentheses, the number of specimens and the size range in mm SL. Geographic coordinates were determined from maps. An effort was made to provide geographic coordinates for all specimens; however, these coordinates are only estimates and some lots with different specific localities have the same geographic coordinates because some localities could not be found on a map.

All maps were created using the Online Map Creator (OMC), which can be found at http://www.aquarius.ifm-geomar.de/ (Weinelt, 1996-2006). Distribution points on maps were added using Abode Photoshop CS2. Points indicate only specimens examined in this study.

Synonymies include all accounts of the species in east-central Africa. The first page of the account of 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 in the account. Additionally, any specimens known that the account may be based on are listed. If the account is only based in part on the species, only the information that is applicable to that species is listed. Accounts of species outside east-central Africa that give only a general distribution in east-central Africa are excluded.

CHAPTER 3
MATERIALS EXAMINED

Amphilius grandis

Eusso Nyiro drainage: BMNH 1908.9.17.13-18, Kenya: Nyiro-Narok; Niro-Narok system, elev. 4000-5000 ft., 0º16’00”N, 36º 31’33”E (6: 93.4-181.4); BMNH 1912.3.22.119, Kenya, Eusso Nyiro, below falls, 0º12’00”N, 38º 00’00”E (1: 113.6). **Tana drainage:** BMNH 1904.12.23.50-52, Kenya, Chania R. of Tetse, Tana system, Kenya, elev. 7000 ft., 1º02’58”N, 37º 05’34”E (2: 136.1-160.0, Syntypes); BMNH 1937.6.4.36-42, Kenya, Thika River, Ndula Falls, 1º02’58”N, 37º 05’34”E (12: 32.1-65.9).

Amphilius krefftii

Galina drainage: BMNH 1969.3.24.63-69, Kenya, Tsabo [Tasvo] River tributary of Athi [Galina] River, mountain Mbololo, 3º 0' N, 38º 20'E, (7: 43.6-99.5); BMNH 1969.3.24.70, Kenya, Voi River, Teita hills, Voi District, 3º22’44”N, 38º 34’07”E (1: 106.6). **Pangani drainage:** BMNH 1909.10.19.26-27, Tanzania, Usambara, in rivulet running from Anani Hills to Sigi R., 5º 0'N, 38º 48'E (2: 47.5-86.0, Syntypes); BMNH 1905.7.25.41-42, Kenya, Kibosho, Kilimandjaro, 3º 12', 37º 19' (2: 77.9-94.9); BMNH 1968.10.25.3, Tanzania, River Lume (upper reaches of Pangani River) at source, 5 miles east of Lake Chala, 3º23’22”N, 37º 43’45”E (1: 106.6); BMNH 1968.10.25.5-6, Tanzania, Kisiwani, near Amani, East Usambura mountains, elev. 1,475 ft., 5º11’34”N, 38º 37’39”E (2: 36.2-43.1); BMNH 1968.10.25.7, Tanzania, River Sigi, east Usumbura Mountains, 5º 0'N, 38º 48'E (1: 72.7); BMNH 1968.10.25.8, Tanzania, River Lume (upper reaches of Pangani River) east of Taveta, 3º23’22”N, 37º 43’45”E (1: 67.2); FMNH 111678, Tanzania, East Usambara Mountains, 4.5 km ESE Amani, Monga Tea Estate, 5º 6'N, 38º 36'E (1: 112.0); FMNH 111684, Tanzania, West Usambara Mts., in river (stream) near Ambangulu Tea Estate factory, 5º04’54”N, 38º 25’55”E (1: 29.0).

Amphilius oxyrhinus

Eusso Nyiro drainage: BMNH 1912.22.120, Kenya, Eusso Mara, a swift mountain stream, tributary of Eusso Nyiro, 0º 12'N, 38° 00'E (1: 166.0, Holotype). **Tana drainage:** BMNH 1965.12.7.125, Kenya, Rogati River, Sagana, 0º40’42”N, 37º 16’18”E (1: 42.9); BMNH 1965.12.7.126-128, Kenya, Rogati River, Sagana, 0º40’42”N, 37º 16’18”E (3: 60.9-89.7); BMNH 1965.12.7.129, Kenya, Rogati River, Sagana, 0º40’42”N, 37º 16’18”E (1: 156.8); BMNH 1965.12.7.130-131, Kenya, Rogati River, Sagana, 0º40’42”N, 37º 16’18”E (2: 74.9-98.7); BMNH 1965.12.7.132, Kenya, Rogati River, Sagana, 0º40’42”N, 37º 16’18”E (1: 51.8); BMNH 1966.6.28.2-3, Kenya, Rogati River, Sagana, 0º40’42”N, 37º 16’18”E (2: 65.9-102.6); BMNH 1966.8.25.18, Kenya, Rogati River, Sagana, 0º40’42”N, 37º 16’18”E (1: 34.8); 34.8; MRAC 74-48-P-12-13, Kenya, upper Tana, side creek, 00°42'S, 37°14'E (2: 52.6-60.3).

Amphilius uranoscopus

Rufiji drainage: FMNH 111679, Tanzania, Udzungwa Mts., Udzungwa Scarp Forest Reserve, 4 km W, 5 km N Chita, along the Chita-Ihimbo trail, elev. 1460 m, 8°28'30"S, 35°54'25"E (8: 24.4-40.4); FMNH 111680, Tanzania, Udzungwa Mts., Udzungwa Scarp Forest Reserve, 4.5 km W Chita, along Chita-Ihimbo trail, elev. 600 m, 8°31'10"S, 35°54'15"E (18: 25.0-68.4.0); FMNH 111681, Tanzania, Udzungwa Mts., Udzungwa Scarp Forest Reserve, 4.5 km W Chita, along Chita-Ihimbo trail, elev. 600 m, 8°31'10"S, 35°54'15"E (14: 25.5-77.4). **Ruvu drainage:** FMNH 111682, Tanzania, Uluguru Mountains, Uluguru North Forest Reserve, 3 km W, 1.3 km N Tegetero, elev. 1345 m, 6° 55' 45" S, 37° 42' 20" E (1:55.7); FMNH 111683, Tanzania, Uluguru Mts., Uluguru North Forest Reserve, 5.1 km W, 2.3 km N Tegetero, elev. 1535 m, 6°55'12"S, 37°41'0"E (3: 26.4-52.4); MNHN 1897-0003, Tanzania, Torrent of Mrogoro at Zanguebar, Oukami, 6°46'00"S, 37°43'45"E (1: 117.3, Holotype of *Chimarrhoglanus leroyi*),

UF 84882, Tanzania, Morogoro Region, southern side of Uluguro Mountains, about 1 km N of Ruvu River, S of Kibungo Village, Kimboza Forest, 7°00'00"S, 37°48'00"E (7: 21.9-40.4). **Wami drainage:** CAS 80494, Tanzania, Nguru Mountains, Nguru South Forest Reserve, 6°7'S, 37°32'E (2: 49.1-101.4); BMNH 1969.1.15.1, Tanzania, Stream at Arusha in the foothills of Mount Meru, 3°21'57"S, 36°40'28"E (1: 84.7).

***Amphilius* sp. 1**

Galina drainage: BMNH 1905.12.11.2, Kenya, Nairobi River, Kikaya, 1°16'28"S, 36°48'47"E (1: 160.3), BMNH 1909.11.15.21-23, Nairobi River, elev. 2500 ft., 1°16'28"S, 36°48'47"E (3: 89.1-119.5), BMNH 1910. 10.31.31, Nairobi, Kenya, 1°16'28"S, 36°48'47"E (1: 150.0), BMNH 1928.11.10.11-12, Nairobi River, elev. 6500 ft., 1°16'28"S, 36°48'47"E (3: 59.6-140.5), BMNH 1928.11.10.13-18, Kenya, Riara River, elev. 5700 ft., 1°10'01"S, 36°49'19"E (6: 37.6-92.6), BMNH 1937.12.11.16-18, Kenya, Mbakasi River (3: 58.1-110.3), BMNH 1969.3.24.61-62, Kenya, Ngong River, tributary of Nairobi River, 1°16'28"S, 36°48'47"E (2: 123.6-146.9), MCZ 32518, Kenya, Riara River, elev. 5700 ft., 1°10'01"S, 36°49'19"E (1: 96.5), USNM 72922, Kenya, Nairobi R., near Nairobi, 1°16'28"S, 36°48'47"E (2: 113.4-159.4).

CHAPTER 4
SYSTEMATIC ACCOUNTS

***Amphilius uranoscopus* group**

All species of *Amphilius* in east-central Africa belong to the *Amphilius uranoscopus* group and are recognized by the following unique combination of characters: absence of a crenellated epidermal fold at the base of the caudal fin, usually 8+9 (i,7,8,i) principal caudal fin rays, small bilateral bony swimbladder capsules, 36-39 total and 20-23 caudal vertebrae, and leading pterygiophore of the dorsal fin intercepting the vertebral column at the first, second or third post-Weberian vertebrae. Skelton (1984) recognized this species group as a single species, *A. uranoscopus*, but did not formally diagnose it.

Externally, species of the *A. uranoscopus* group are similar to *A. natalensis*, *A. lampei* and *A. kivuensis* but these species differ by having the leading pterygiophore of the dorsal fin intercepting the vertebral column after the third post-Weberian vertebrae. *Amphilius cryptobullatus* is also similar externally, but differs from *A. uranoscopus* in the development and extremely large size of its bilateral bony swimbladder capsules. Following are diagnoses and descriptions of valid species of the *Amphilius uranoscopus* group in east-central Africa. Species are aranged alpabetically. Diagnostic traits are summarized in Table 4-1.

Amphilius grandis **Boulenger 1905**

(Figure 4-1 and 4-2; Table 4-2)

Amphilius grandis Boulenger 1905a: 63, Pl. 7 (fig. 3), Original description, Type locality: Chania R. of Tetse, Tana system, Kenya, elev. 7000 ft.; Boulenger 1905b: 48, Headwaters of the Tana system; Boulenger 1911: 353, 355, fig. 275 (in part), in key, description, East Africa (Tana to Athi River systems) [Tana drainage only]; Boulenger, 1912: 675, diagnosis from *Amphilius oxyrhinus*, [Eusso Nyiro drainage], [BMNH 1912.3.22.119]; Boulenger, 1916: 306, Nairobi, Eusso Nyiro, below falls; Pellegrin 1936: 57, similarity to *Amphilius platychir* var. *cubangoensis*; Copley, 1941: 15 [Eusso Nyiro and Tana drainages], Harry, 1953: 189 (in part), synonymy; Copley, 1958: 98, [Tana drainage], [BMNH 1937.6.4.36-42], Whitehead, 1958: 198, [Kenya and Tanzania], Bailey, 1969: 192 (in part), eastern rivers of Kenya; Skelton, 1984: 45, in synonymy of *A. uranoscopus*.

Amphilius platychir (non Günther) Whitehead, 1958: 198 (in part), [Eusso Nyiro drainage].

Amphilius uranoscopus (non Pfeffer) Skelton, 1994: 126, [Tana drainage]; Seegers et al., 2003: 37 (in part), [Tana drainage].

Diagnosis

Visible epidermal core extending posteriorly from the mandibular barbels absent; caudal fin deeply emarginate or forked with tips of lobes pointed; adults plain-colored, without dark spots or blotches on body, head or fins; dorsal saddles absent.

The absence of a visible epidermal core extending posteriorly from the bases of the inner and outer mandibular barbels distinguishes *Amphilius grandis* from *A. oxyrhinus* and *A. krefftii*. *Amphilius grandis* is distinguished from *A. uranoscopus* and *A. krefftii* by its more deeply emarginate caudal fin with the tips of the caudal-fin lobes pointed (vs. caudal fin shallowly emarginate with rounded lobes) and the absence of light dorsal saddles (vs. light dorsal saddles present at the base of the dorsal and adipose fin). *Amphilius grandis* is distinguished from *Amphilius* sp. 1 and *A. oxyrhinus* by the absence of dark spots on the head or body of adults (vs. adults of *Amphilius sp. 1* with many small dark spots on head and body, and adults of *A. oxyrhinus* with dark spots or blotches on body). *Amphilius grandis* is distinguished from

Amphilius sp. 1 by having the lobes of the caudal fin pointed (vs. rounded) and the absence of spots on the fins.

Description

Morphometric data as in Table 4-2. 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, without crenellated epidermal fold. Anus and urogenital openings located at posteriormost extent of pelvic fin, closer to posterior base of pelvic fin than to origin of anal fin. Skin smooth. Lateral line complete, extending from dorsal edge of opercular cavity to base of caudal fin. Total vertebrae 38 (3), 39 (6) or 40 (1). Preanal vertebrae 20 (1), 21 (3) or 22 (6). Postanal vertebra 16 (1), 17 (4) or 18 (5). First dorsal pterygiophore intercept count 1 (2) or 2 (8).

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. Membranes connected by a small frenum at midline, but with shallow groove at posterior margin.

Mouth broad, gently curved, subterminal. Lips moderately fleshy, papillate. Rictal lobe large and papillate. Anterior portion of premaxillary tooth band exposed with mouth closed. Premaxillary tooth patches joined, forming *U*-shaped band, with short conical teeth. Dentary teeth short and conical, 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 just short of 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 (10) or 8 (9) rays. Gill rakers on first epibranchial 2 (7) or 3 (12); rakers on first ceratobranchial 4 (1), 5(3), 6 (6), 7 (8) or 8 (1); total gill rakers on first arch 6 (1), 7 (2), 8 (2), 9 (8), 10 (5) or 11 (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 tip of pectoral fin. Dorsal fin with i,6 (18) or i,7 (1) rays, and fin margin straight. Pectoral fin with i,9 (3) or i,10 (16) rays with first ray unbranched and greatly thickened. Outer part of posterior margin of pectoral fin straight, with 4-5 innermost rays progressively shorter making inner part of posterior fin margin rounded. Pelvic fin inserted posteriorly to dorsal-fin base. Pelvic fin with i,5 (19) 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, extending beyond posterior end of anal-fin base. Margin strongly convex with sharply rounded edge, not deeply incised posteriorly. Caudal fin deeply emarginate or forked with tips of lobes pointed, with i,7,8,i (18) or i,8,9,i (1) principal rays. Anal fin with short base, origin posterior to origin of adipose-fin base, with iii,6 (19) rays. Anal fin margin almost straight.

Coloration

Dorsal and lateral surfaces of head and body brown. Ventral region of head dark yellow. Ventral region of body brown to dark yellow. Light dorsal saddles absent. Dorsal, adipose,

caudal and anal fins brown. Dorsal surfaces of pectoral and pelvic fins brown with light distal edge; ventral surfaces light yellow. Maxillary and mandibular barbels brown. Caudal fin with dark crescent-shaped band at base. Juvenile coloration: medium-sized dark spots on head and body in specimens larger than 40.0 mm SL, but spots usually absent on specimens under 40.0 mm SL. Spots on body arranged in line along lateral line. All fins light yellow, with medial bands of brown pigment all rayed fins. Pectoral and pelvic fins with first unbranched ray dark brown dorsally.

Distribution

Tana and Eusso Nyiro (Ewaso Ng'iro) River drainages, Kenya.

***Amphilius krefftii* Boulenger 1911**

(Figures 4-3 and 4-4; Table 4-3)

Amphilius krefftii Boulenger, 1911: 356, fig. 276, Original description, Type locality: Usambara, in rivulet running from Anani Hills to Sigi River. [Sigi River drainage, Tanzania]; Harry, 1953: 189, synonymy; Copley, 1958: 100 [Pangani drainage]; Whitehead, 1958: 198 [Kenya and Tanzania]; Bailey, 1969: 192 [Sigi and Pangani drainages]; Bernacek, 1980: 36 [Tanzania]; Skelton, 1984: 45, in synonymy of *A. uranoscopus*.

Pimelodus (*Amphilius*) *uranoscopus* (non Pfeffer) Hilgendorf, 1905: 411 (in part), [Pangani drainage].

Amphilius grandis (non Boulenger) Copley, 1941: 15 (in part), [Galina drainage] [BMNH 1969.3.24.63-69, BMNH 1969.3.24.70]; Copley, 1958: 100 [Galina drainage] [BMNH 1969.3.24.63-69, BMNH 1969.3.24.70]; Bailey, 1969: 192 (in part), [Pangani drainage].

Amphilius uranoscopus (non Pfeffer) Harry, 1953: 189 (in part), synonymy; Skelton, 1994: 126 (in part), [Galina and Pangani drainages]; Seegers et al., 2003: 37 (in part), [Pangani drainage].

Amphilius platychir (non Günther) Copley, 1958: 100 (in part), [Pangani drainage].

Diagnosis

Visible epidermal core extending posteriorly from the mandibular barbels present; caudal fin emarginate with tips of lobes rounded; adults without dark spots on head, body or fins; light

dorsal saddles present at the base of the dorsal and adipose fin; branchiostegal rays usually seven.

The presence of a visible epidermal core extending posteriorly from the bases of the inner and outer mandibular barbels distinguishes *Amphilius krefftii* from *A. grandis*, *Amphilius* sp. 1 and *A. uranoscopus*. *Amphilius krefftii* is distinguished from *A. oxyrhinus*, *A. grandis* and *Amphilius* sp. 1 by the shape of the caudal fin (emarginate in *A. krefftii* vs. deeply emarginate or forked in *A. grandis* and forked in A. *oxyrhinus* and *Amphilius* sp. 1) and the presence of light dorsal saddles at the base of the dorsal and adipose fin (vs. light dorsal saddles absent). Additionally the caudal-fin lobes are rounded in *A. krefftii* (vs. pointed in *A. grandis* and A. *oxyrhinus*). *Amphilius krefftii* is further distinguished from *Amphilius* sp. 1 by the absence of dark spots or blotches on the head, body or fins in adults and further distinguished from *A. uranoscopus* by having usually seven branchiostegal rays (vs. eight or nine).

Description

Morphometric data as in Table 4-3. 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 origin of dorsal fin, then nearly horizontal to end of caudal peduncle. Greatest body depth at dorsal-fin origin. Caudal peduncle laterally compressed, without crenellated epidermial fold. Anus and urogenital openings located at posteriormost extent of pelvic fin, closer to posterior base of pelvic fin than to origin of anal fin. Skin smooth. Lateral line complete, extending from dorsal edge of opercular cavity to base of caudal fin. Total vertebrae 36 (7), 37 (3) or 38 (1). Preanal vertebrae 20 (7) or 21 (5). Postanal vertebra 15 (1), 16 (9) or 17 (1). First dorsal pterygiophore intercept count 1 (11) or 2 (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 or deeply concave connection. Membrane connected by a small frenum at midline, but with shallow groove at posterior margin.

Mouth broad, gently curved, subterminal. Lips moderately fleshy, papillate. Rictal lobe large and papillate. Anterior portion of premaxillary tooth band exposed with mouth closed. Premaxillary tooth patches joined, forming *U*-shaped band, with short conical teeth. Dentary teeth short and conical, 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 middle pectoral-fin base. Outer mandibular barbel thin with pointed tip, origin at posterior corner of lower jaw, extending to edge of branchiostegal membrane. Inner mandibular barbel originates anterolaterally of inner mandibular barbel, extending to edge of branchiostegal membrane. Branchiostegal membrane with 7 (16) or 8 (1) rays. Gill rakers on first epibranchial 2 (11), 3 (3), or 4 (1); rakers on first ceratobranchial 5 (5), 6 (8) or 7 (2); total gill rakers on first arch 7 (5), 8 (4), 9 (5) or 10 (1).

Eyes 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 (17) rays, and fin margin slightly convex. Pectoral fin with i,9 (11), i,10 (5) or i,11 (1) rays with first ray unbranched and greatly thickened. Outer part of posterior margin of pectoral fin straight, with

four to five innermost rays progressively shorter making inner part of posterior fin margin rounded. Pelvic fin inserted posteriorly to dorsal-fin base. Pelvic fin with i,5 (17) 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, extending over posterior end of anal-fin base. Margin strongly convex with sharply rounded edge, not deeply incised posteriorly. Caudal fin emarginate with tips of lobes rounded, with i,5,6,i (1) or i,7,8,i (15) principal rays. Anal fin with short base, origin posterior to origin of adipose-fin base, with iii,6 (15) or iii7 (2) rays. Anal fin margin almost straight.

Coloration

Dorsal and lateral surfaces of head and body brown. Ventral region light brown. Light dorsal saddles at anterior and posterior of dorsal-fin and adipose-fin bases. Dorsal, adipose, caudal and anal fins brown. Dorsal surfaces of pectoral and pelvic fins brown, ventral surfaces light yellow. Maxillary and mandibular barbels brown. Caudal fin with dark crescent shaped band at base. Juvenile coloration: similar to that of adults, except all fins light yellow, with small blotches of brown pigment on the branched rays. Pectoral and pelvic fins with first unbranched ray dark brown dorsally.

Distribution

Lower Galina and Pangani River drainages, Kenya and Tanzania.

Amphilius oxyrhinus **Boulenger 1912**

(Figures 4-5 and 4-6; Table 4-4)

Amphilius oxyrhinus Boulenger 1912: 675, Pl. 80, Original description, Type locality: Eusso Mara, a swift mountain stream, Kenya [Eusso Nyiro (Ewaso Ng'iro) drainage]; Boulenger, 1916: 306, [Eusso Nyiro drainage]; Skelton, 1984: 45, in synonymy of *A. uranoscopus*.

Amphilius leroyi (non Vaillant) Pellegrin, 1905: 177, Nairobi; Harry, 1953: 189 (in part), synonymy.

Amphilius grandis (non Boulenger) Copley, 1941: 15 (in part), [Eusso Nyiro drainage]; Harry, 1953: 189, synonymy; Copley, 1958: 98 (in part), [Tana drainage].

Amphilius platychir (non Günther) Whitehead, 1958: 198 (in part), [Eusso Nyiro drainage].

Amphilius uranoscopus (non Pfeffer) Skelton, 1994: 126, [Tana drainage]; Seegers et al., 2003: 37 (in part), [Tana drainage].

Diagnosis

Visible epidermal core extending posteriorly from the mandibular barbels present; caudal fin forked with tips of lobes pointed; adults with large dark spots or blotches on body; spots on head and fins absent or indistinct; dorsal saddles absent.

The presence of a visible epidermal core extending posteriorly from the bases of the inner and outer mandibular barbels distinguishes *Amphilius oxyrhinus* from *A. grandis*, *Amphilius* sp. 1 and *A. uranoscopus*. *Amphilius oxyrhinus* is distinguished from *A. krefftii* and further distinguished from *A. uranoscopus* by its forked caudal fin with the tips of the caudal-fin lobes pointed (vs. caudal fin shallowly emarginate with rounded lobes) and the absence of light dorsal saddles (vs. light dorsal saddles present at the base of the dorsal and adipose fin). It is further distinguished from *Amphilius* sp. 1 by the larger spots or blotches on the body of adults (vs. small spots present on head and body), its pointed caudal-fin lobes (vs. caudal fin with rounded lobes), and the absence of spots on the fins. Adults of *Amphilius oxyrhinus* are further distinguished from adults of *A. grandis*, *Amphilius* sp. 1 and *A. uranoscopus* by the presence of dark spots or blotches on the body of adults (vs. adults without dark spots or blotches on body).

Description

Morphometric data as in Table 4-4. 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 origin of dorsal fin, then nearly horizontal to end of caudal peduncle. Greatest

body depth at dorsal-fin origin. Caudal peduncle laterally compressed, without crenellated epidermial fold. Anus and urogenital openings located at posteriormost extent of pelvic fin, closer to posterior base of pelvic fin than to origin of anal fin. Skin smooth. Lateral line complete, extending from dorsal edge of opercular cavity to base of caudal fin. Total vertebrae 37 (4) or 38 (4). Preanal vertebrae 21 (7) or 22 (1). Postanal vertebra 16 (5) or 17 (3). First dorsal pterygiophore intercept count 1 (4) or 2 (4).

Head and anterior part of body depressed and broad. Head wedge shaped in lateral view. Snout broad, pointed 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 or deeply concave connection. Membrane connected by a small frenum at midline, but with shallow groove at posterior margin.

Mouth broad, gently curved, subterminal. Lips moderately fleshy, papillate. Rictal lobe large and papillate. Anterior portion of premaxillary tooth band exposed with mouth closed. Premaxillary tooth patches joined, forming *U*-shaped band, with short conical teeth. Dentary teeth short and conical, 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 middle pectoral-fin base. Outer mandibular barbel thin with pointed tip, origin at posterior corner of lower jaw, extending to edge of branchiostegal membrane. Inner mandibular barbel originates anterolaterally of inner mandibular barbel, extending just short of edge of branchiostegal membrane. Visible epidermal core extending posteriorly from bases of mandibular barbels. Branchiostegal membrane with 7 (4), 8 (6) or 9 (2) rays. Gill rakers on first epibranchial 3 (13);

rakers on first ceratobranchial 4 (1), 5(3) or 6 (9); total gill rakers on first arch 7 (1), 8 (3) or 9 (9).

Eyes small, positioned dorsolaterally approximately midway between tip of snout and posterior margins 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 (13) rays, and fin margin straight. Pectoral fin with i,10 (11) or i,11 (2) rays with first ray unbranched and greatly thickened. Outer part of posterior margin of pectoral fin straight, with 4-5 innermost rays progressively shorter making inner part of posterior fin margin rounded. Pelvic fin inserted posteriorly to dorsal-fin base. Pelvic fin with i,5 (13) 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, extending over posterior end of anal-fin base. Margin strongly convex with sharply rounded edge, not deeply incised posteriorly. Caudal fin forked with tips of lobes pointed, with i,7,7,i (1) or i,7,8,i (11) principal rays. Anal fin with short base, origin posterior to origin of adipose-fin base, with iii,6 (12) rays. Anal fin margin almost straight.

Coloration

Dorsal and lateral surfaces of head and body brown. Ventral and lateral regions of body covered with large black spots or blotches. Ventral region of head and body dark yellow. Light dorsal saddles absent, but pale regions sometimes present in front of dorsal and anal-fin bases. Dorsal, adipose, caudal and anal fins brown. Dorsal surfaces of pectoral and pelvic fins brown with light distal edge, ventral surfaces light yellow. Medial band of dark pigment on all rayed

fins. Maxillary and mandibular barbels brown. Caudal fin with dark crescent shaped band at base Juvenile coloration: Similar to that of adults, except all fins lighter brown, with medial bands of dark pigment all rayed fins. Pectoral and pelvic fins with first unbranched ray dark brown dorsally.

Distribution

Tana and Eusso Nyiro (Ewaso Ng'iro) River drainages, Kenya.

***Amphilius uranoscopus* (Pfeffer 1889)**

(Figures 4-7 and 4-8; Table 4-5)

Anoplopterus uranoscopus Pfeffer 1889: 16. Type locality: Ushonda and Monda, upper ranges of Wami R., Tanzania [Wami River drainage]; Pfeffer, 1893: 161, [Wami drainage]; Pfeffer, 1896: 33, fig. 14, [Wami drainage]; Boulenger, 1898a: 255, reference to original description; Boulenger, 1901: 447, diagnosis; Poche, 1902a: 21; Poche, 1902b: 211.

Chimarrhoglanis leroyi Vaillant, 1897: 82, Original description, Type locality: Zanquebar, torrent de Mroboro, 600 meters altitude [Ruvu drainage]; Boulenger, 1898a: 254, as a synonym of *Amphilius platychir*; Boulenger, 1898b: 4 [Ruvu drainage]; Poche, 1902a: 121; Poche, 1902b: 211; Pellegrin, 1905a: 177, type information; Pellegrin 1936: 57, similarity to *Amphilius platychir* var. *cubangoensis*; Harry, 1953: 186, in synonymy of *Amphilius platychir*; Bertin & Estève, 1950: 35, information on type; Skelton, 1984: 45, in synonymy of *Amphilius uranoscopus*.

Amphilius uranoscopus Boulenger, 1902: 41, in key; Boulenger, 1905b: 48, [Wami drainage]; Boulenger 1911: 253, 354, fig. 277, Description, [Wami drainage]; Harry, 1953: 187, synonymy; Copley, 1958: 99 [Wami drainage]; Bailey, 1969: 192 [Wami drainage]; Bernacek, 1980: 36, [Wami, Ruvu and Rufiji drainages]; Skelton, 1984: 41, information on types; Skelton, 1994: 126 [Wami, Ruvu and Rufiji drainages]; Seegers, 1996a: 192, figs. 136-137, information on types.

Pimelodus (*Amphilius*) *uranoscopus* (non Pfeffer) Hilgendorf, 1905: 411 (in part), [Rufiji drainage].

Amphilius platychir (non Günther) Matthes, 1967: 5, 15 [Rufiji drainage]; Bell-Cross, 1972: 18, table 7, [Rufiji drainage].

Amphilius grandis (non Boulenger) Bailey, 1969: 192 (in part) [Ruvu drainage].

Diagnosis

Visible epidermal core extending posteriorly from the mandibular barbels absent; caudal fin emarginate with tips of lobes rounded; no dark spots present on head, body or fins of adults; light dorsal saddles present at the base of the dorsal and adipose fin; branchiostegal rays 8-9.

The absence of a visible epidermal core extending posteriorly from the bases of the inner and outer mandibular barbels distinguishes *Amphilius uranoscopus* from *A. oxyrhinus* and *A. krefftii*. *Amphilius uranoscopus* is distinguished from A. *grandis, Amphilius* sp. 1 and further distinguished from *A. grandis* by the shape of the caudal fin (emarginate in *A. uranoscopus* vs. shallowly emarginate or forked in *A. grandis* and forked in *Amphilius* sp. 1 and A. *oxyrhinus*) and the presence of light dorsal saddles at the base of the dorsal and adipose fin (vs. light dorsal saddles absent). Additionally the caudal-fin lobes are rounded in *A. uranoscopus* (vs. pointed in *A. grandis* and *A. oxyrhinus*). *Amphilius uranoscopus* is further distinguished from *A. oxyrhinus* and *Amphilius* sp. 1 by the absence of dark spots or blotches on the head and body in adults. Its greater number of branchiostegal rays (8-9 vs. 6-7) and lack of spots on the fins further distinguishes it from *Amphilius* sp. 1.

Description

Morphometric data as in Table 4-5. 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 origin of dorsal fin, then nearly horizontal to end of caudal peduncle. Greatest body depth at dorsal-fin origin. Caudal peduncle laterally compressed, without crenellated epidermial fold. Anus and urogenital openings located at posteriormost extent of pelvic fin, closer to posterior base of pelvic fin than to origin of anal fin. Skin smooth. Lateral line complete, extending from dorsal edge of opercular cavity to base of caudal fin. Total vertebrae

36 (11), 37 (14) or 38 (2). Preanal vertebrae 19 (2), 20 (7), 21 (14) or 22 (9). Postanal vertebra 15 (9), 16 (19) or 17 (1). First dorsal pterygiophore intercept count 1 (30) or 2 (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. Membrane connected by a small frenum at midline, but with shallow groove at posterior margin.

Mouth broad, gently curved, subterminal. Lips moderately fleshy, papillate. Rictal lobe large and papillate. Anterior portion of premaxillary tooth band exposed with mouth closed. Premaxillary tooth patches joined, forming *U*-shaped band, with short conical teeth. Dentary teeth short and conical, 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 middle of pectoral-fin base. Outer mandibular barbel thin with pointed tip, origin at posterior corner of lower jaw, extending middle pectoral-fin base. Inner mandibular barbel originates anterolaterally of inner mandibular barbel, extending to edge of branchiostegal membrane. Branchiostegal membrane with 8 (25) or 9 (29) rays. Gill rakers on first epibranchial 2 (35), 3 (18) or 4(1); rakers on first ceratobranchial 4 (9), 5 (26), 6 (14), 7 (4) or 8 (1); total gill rakers on first arch 6 (5), 7 (24), 8 (15), 9 (5), 10 (4) or 11 (1).

Eyes 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 middle of pectoral fin. Dorsal fin with i,5 (1) or i,6 (53) rays, and fin margin slightly convex. Pectoral fin with i,8 (3), i,9 (23) or i,10 (28) rays with first ray unbranched and greatly thickened. Outer part of posterior margin of pectoral fin straight, with 4-5 innermost rays progressively shorter making inner part of posterior fin margin rounded. Pelvic fin inserted posteriorly to dorsal-fin base. Pelvic fin with i,5 (54) 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, extending beyond posterior end of anal-fin base. Margin strongly convex with sharply rounded edge, not deeply incised posteriorly. Caudal fin emarginate with tips of lobes rounded, with i,7,6,i (1), i,7,7,i (1) or i,7,8,i (52) principal rays. Anal fin with short base, origin posterior to origin of adipose-fin base, with ii,6 (6), iii,5 (2), iii,6 (15), iii7 (18) or iii,8 (11) rays. Anal fin margin almost straight.

Coloration

Dorsal and lateral surfaces of head and body brown. Ventral region light yellow. Light dorsal saddles at anterior and posterior of dorsal-fin and adipose-fin bases. Dorsal, adipose, caudal and anal fins brown. Dorsal surfaces of pectoral and pelvic fins brown, ventral surfaces light yellow. Maxillary and mandibular barbels brown. Caudal fin with dark crescent shaped band at base. Juvenile coloration: Similar to that of adults, except all fins light yellow, with small blotches of brown pigment on the branched rays. Pectoral and pelvic fins with first unbranched ray dark brown dorsally.

Distribution

Wami, Ruvu and River Rufiji drainages, Tanzania.

***Amphilius* sp. 1 n. sp.**

(Figures 4-9 and 4-10; Table 4-6)

Amphilius grandis (non Boulenger) Copley, 1941: 15 (in part), [Galina drainage] [BMNH 1937.12.11.16-18, BMNH 1969.3.24.61-62]; Copley, 1958: 98 (in part), [Galina drainage] [BMNH 1937.12.11.16-18, BMNH 1969.3.24.61-62].

Amphilius uranoscopus Skelton, 1994: 126 (in part) [Galina drainage]; Seegers, 1996b: 255, fig. 16 (in part), Athi River; Seegers et al., 2003: 37 (in part), Athi River syatem.

Holotype: BMNH 1910.10.31.31, Nairobi, Kenya, 1°16'28"S, 36°48'47"E (1: 150.0),

Paratypes: BMNH 1905.12.11.2, Kenya, Nairobi River, Kikaya, 1°16'28"S, 36°48'47"E (1: 160.3), BMNH 1909.11.15.21-23, Nairobi River, elev. 2500 ft., 1°16'28"S, 36°48'47"E (3: 89.1-119.5), BMNH 1928.11.10.11-12, Nairobi River, elev. 6500 ft., 1°16'28"S, 36°48'47"E (3: 59.6-140.5), BMNH 1928.11.10.13-18, Kenya, Riara River, elev. 5700 ft., 1°10'01"S, 36°49'19"E (6: 37.6-92.6), BMNH 1937.12.11.16-18, Kenya, Mbakasi River (3: 58.1-110.3), BMNH 1969.3.24.61-62, Kenya, Ngong River, tributary of Nairobi River, 1°16'28"S, 36°48'47"E (2: 123.6-146.9), MCZ 32518, Kenya, Riara River, elev. 5700 ft., 1°10'01"S, 36°49'19"E (1: 96.5), USNM 72922 Kenya, Nairobi R., near Nairobi, 1°16'28"S, 36°48'47"E (2: 113.4-159.4).

Diagnosis

Visible epidermal core extending posteriorly from the mandibular barbels absent; caudal fin forked with tips of lobes rounded; many small dark spots present on head, body and fins of adults; dorsal saddles absent; branchiostegal rays 6-7.

Amphilius sp. 1 is distinguished from *A. grandis*, *A. oxyrhinus*, *A. krefftii* and *A. uranoscopus* by its distinctive adult pigment pattern consisting of many small darks spots on the head, body and fins (vs. body, head and fins lacking dark spots in *A. grandis*, *A. krefftii* and *A. uranoscopus* or large dark spots present on body in *A. oxyrhinus*). The absence a visible epidermal core extending posteriorly from the bases of the inner and outer mandibular barbels distinguishes *Amphilius* sp. 1 from *A. oxyrhinus* and *A. krefftii*. *Amphilius* sp. 1 is distinguished from *A. grandis* and *A. oxyrhinus* by its rounded (vs. pointed) caudal-fin lobes. It is distinguished from *A. krefftii* and *A. uranoscopus* by its forked caudal (vs. caudal fin shallowly

emarginate) and the absence of light dorsal saddles (vs. light dorsal saddles present at the base of the dorsal and adipose fin). It is distinguished from *A. uranoscopus* by its fewer branchiostegal rays (6-7 vs. 8-9).

Description

Morphometric data as in Table 4-6. 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, without crenellated epidermial fold. Anus and urogenital openings located just posterior to base of pelvic fin, closer to posterior base of pelvic fin than to origin of anal fin. Skin smooth. Lateral line complete, extending from dorsal edge of opercular cavity to base of caudal fin. Total vertebrae 37 (2), 38 (7) or 39 (3). Preanal vertebrae 20 (2), 21 (3) or 22 (7). Postanal vertebra 15 (1), 16 (5), 17 (4) or 18 (2). First dorsal pterygiophore intercept count 1 (12) or 2 (1).

Head and anterior part of body depressed and broad. Head wedge shaped in lateral view. Snout broad, moderatly pointed 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 or deeply concave connection. Membrane connected by a small frenum at midline, but with shallow groove at posterior margin.

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

pectoral-fin base. Outer mandibular barbel thin with pointed tip, origin at posterior corner of lower jaw, extending to edge of branchiostegal membrane. Inner mandibular barbel originates anterolaterally of inner mandibular barbel, extending to edge of branchiostegal membrane. Branchiostegal membrane with 6 (1) or 7 (21) rays. Gill rakers on first epibranchial 3 (19) or 4 (3); rakers on first ceratobranchial 6 (8) or 7 (14); total gill rakers on first arch 6 (1), 9 (7), 10 (12) or 11 (2).

Eyes 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 (22) rays, and fin margin straight. Pectoral fin with i,9 (12) or i,10 (9) rays with first ray unbranched and greatly thickened. Outer part of posterior margin of pectoral fin straight, with 4-5 innermost rays progressively shorter making inner part of posterior fin margin rounded. Pelvic fin inserted posteriorly to dorsal-fin base. Pelvic fin with i,5 (22) 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, extending beyond posterior end of anal-fin base. Margin strongly convex with sharply rounded edge, not deeply incised posteriorly. Caudal fin deeply emarginate or forked with tips of lobes rounded, with i,5,6,i (1), i,6,7,i (1), i,7,7,i (2), i,7,8,i (16) or i,8,8,i (1) principal rays. Anal fin with short base, origin posterior to origin of adipose-fin base, with iii, 5 (7), iii,6 (13) or iii, 7 (2) rays. Anal fin margin almost straight.

Coloration

Dorsal and lateral surfaces of head and body brown with many small black spots. Ventral region of head dark yellow or brown. Ventral region of body brown to dark yellow. Light dorsal saddles absent. Dorsal, adipose, caudal and anal fins brown. Dorsal surfaces of pectoral and pelvic fins brown with light distal edge, ventral surfaces light yellow. Small black spots present on all fins. Maxillary and mandibular barbels brown. Caudal fin with dark crescent shaped band at base. Large juvenile coloration similar to that of adults.

Distribution

Known only from the Galana River drainage, Kenya.

Table 4-1. External traits diagnostic for species of the *Amphilius uranoscopus* group in east-central Africa.

Character	*A. grandis*	*A. krefftii*	*A. oxyrhinus*	*A. uranoscopus*	*Amphilius* sp. 1
Visible epidermal core extending posteriorly from the mandibular barbels	Absent	Present	Present	Absent	Absent
Caudal-fin shape	Deeply emarginate or forked	Emarginate	Forked	Emarginate	Forked
Caudal lobes	Pointed	Rounded	Pointed	Rounded	Rounded
Dark spots on body (adult)	Absent	Absent	Large	Absent	Small
Dark spots on head	Absent	Absent	Usually absent, indistinct if present	Absent	Present
Spots on fins	Absent	Absent	Absent	Absent	Present
Dorsal saddles	Absent	Present	Absent	Present	Absent
Branchiostegal rays	7-8	Usually 7	7-9	8-9	6-7

Table 4-2. Morphometric data for *Amphilius grandis*. Range and mean include the syntypes.

	Syntypes (n=2)	Range (n=21)	Mean±SD
%SL			
Head length	25.8-27.3	23.1-27.8	25.8±1.1
Head width	21.1-22.1	19.7-23.5	21.3±1.1
Head height	12.9-13.0	11.0-14.9	13.5±1.0
Body depth	14.6-15.4	12.2-17.6	13.9±1.2
Body depth at anus	11.9-14.4	11.6-14.4	12.9±0.7
Predorsal length	36.1-37.8	33.7-40.4	37.2±1.4
Prepectoral length	22.3-23.8	19.6-24.5	21.9±1.4
Preanal length	75.1-77.1	65.7-78.4	73.4±2.6
Dorsal-fin base length	8.4-9.2	7.9-13.9	10.2±1.5
Adipose-fin base length	18.6-19.0	15.0-24.9	20.4±2.6
Anal-fin base length	8.2-8.9	8.2-17.8	11.1±2.3
Pelvic-fin length	14.6-16.7	14.6-20.8	18.6±1.8
Pectoral-fin length	17.1-18.4	17.1-26.5	21.5±2.5
Anal-fin length	14.3-15.1	14.3-21.1	17.9±1.9
Caudal peduncle length	18.6-19.0	14.6-19.0	16.8±1.3
Caudal peduncle depth	9.9-10.1	9.3-12.6	10.6±0.8
Anus-to-anal fin length	13.8-14.0	8.6-14.0	11.3±1.7
Prepelvic length	55.9-56.3	48.5-56.4	53.3±1.8
Postpelvic length	47.0-48.2	47.0-51.0	48.9±1.1
End-of-dorsal to adipose fin	42.2-44.9	38.9-48.9	43.2±2.8
Front-of-dorsal to caudal fin	62.1-64.9	57.1-70.8	64.2±3.6
Preanus length	61.0-62.5	58.9-64.1	61.7±1.4
%HL			
Snout length	48.5-51.3	43.6-57.4	48.6±4.1
Interorbital distance	26.1-26.7	24.0-31.2	27.2±1.9
Maxillary barbel length	57.0-58.3	55.6-81.3	66.7±6.5
Inner mandibular barbel length	24.5-30.6	21.4-39.6	30.9±4.3
Outer mandibular barbel length	39.1-43.5	39.1-60.8	48.6±5.6
Eye diameter	10.8-11.9	8.0-17.3	13.4±2.7
Postorbital length	35.5-39.6	31.2-43.3	37.5±3.0

Table 4-3. Morphometric data for *Amphilius krefftii*. Range and mean include the syntypes.

	Syntypes (n=2)	Range (n=19)	Mean±SD
%SL			
Head length	22.7-22.8	21.9-25.9	23.8±1.1
Head width	20.2-20.6	18.7-23.6	21.2±1.1
Head height	12.6-12.8	9.1-14.7	11.7±1.7
Body depth	11.6-11.6	9.1-17.2	12.2±2.3
Body depth at anus	13.5-13.5	10.8-15.5	12.9±1.3
Predorsal length	34.3-34.5	31.8-36.9	34.7±1.5
Prepectoral length	19.8-20.8	17.4-23.9	20.1±1.8
Preanal length	72.8-73.7	62.5-76.3	72.1±3.9
Dorsal-fin base length	8.8-9.5	8.2-13.5	10.4±1.5
Adipose-fin base length	21.0-22.7	19.1-29.8	23.2±3.0
Anal-fin base length	10.6-10.7	8.8-15.0	11.2±1.5
Pelvic-fin length	19.3-19.8	17.6-20.6	19.5±0.9
Pectoral-fin length	19.0-21.3	19.0-24.8	21.5±1.4
Anal-fin length	16.2-17.9	15.4-21.7	18.6±2.1
Caudal peduncle length	17.3-18.6	14.9-18.6	16.5±1.0
Caudal peduncle depth	10.5-11.5	8.1-12.6	11.1±0.9
Anus to anal fin length	9.3-11.9	7.2-13.9	11.1±1.8
Prepelvic length	52.1-52.6	49.4-54.5	52.6±1.5
Postpelvic length	47.4-50.0	46.8-50.8	48.9±1.1
End of dorsal to adipose	46.9-50.2	42.5-50.8	47.1±2.5
Front of dorsal to caudal	65.5-67.0	63.4-71.3	66.9±2.0
Preanus length	61.3-63.2	59.3-64.8	62.3±1.7
%HL			
Snout length	45.4-45.4	45.4-53.1	49.6±2.4
Interorbital distance	24.5-26.9	23.2-31.3	26.9±2.4
Maxillary barbel length	72.2-86.7	52.6-95.9	73.7±12.2
Inner mandibular barbel length	28.1-30.6	20.7-47.8	30.8±6.2
Outer mandibular barbel length	48.1-55.6	36.8-68.6	53.9±8.7
Eye diameter	12.8-16.7	11.8-19.5	15.4±1.8
Postorbit length	34.2-40.7	34.2-43.1	38.7±2.1

Table 4-4. Morphometric data for *Amphilius oxyrhinus*. Range and mean include the holotype.

	Holotype	Range (n=14)	Mean±SD
%SL			
Head length	25.5	23.1-27.0	25.5±1.1
Head width	22.0	19.5-23.9	21.5±1.1
Head height	11.8	11.3-14.6	12.7±0.9
Body depth	13.2	9.6-15.2	12.9±1.7
Body depth at anus	11.6	11.0-14.2	12.9±1.0
Predorsal length	38.5	35.2-40.3	36.7±1.5
Prepectoral length	23.4	17.3-23.4	20.6±1.8
Preanal length	75.4	70.6-76.1	74.1±1.8
Dorsal-fin base length	8.4	8.4-12.7	10.9±1.2
Adipose-fin base length	15.6	15.6-26.0	21.5±2.9
Anal-fin base length	9.3	9.3-15.0	11.4±1.5
Pelvic-fin length	14.9	14.9-22.1	19.9±1.7
Pectoral-fin length	17.8	17.8-26.2	22.9±2.0
Anal-fin length	15.8	15.8-19.5	18.0±1.1
Caudal peduncle length	17.0	14.8-18.0	16.9±0.9
Caudal peduncle depth	9.0	9.0-12.1	10.9±0.9
Anus to anal fin length	13.0	9.5-14.1	11.7±1.3
Prepelvic length	55.6	49.9-57.4	53.0±2.0
Postpelvic length	46.0	46.0-52.1	49.1±2.0
End of dorsal to adipose	42.7	41.1-48.6	44.2±2.1
Front of dorsal to caudal	63.3	61.5-68.3	64.7±2.4
Preanus length	63.0	59.8-66.0	61.8±1.7
%HL			
Snout length	53.2	47.4-54.5	51.1±2.5
Interorbital distance	23.0	23.0-33.3	28.0±3.1
Maxillary barbel length	51.9	51.9-85.5	73.8±8.5
Inner mandibular barbel length	31.3	21.1-59.1	34.0±8.7
Outer mandibular barbel length	42.7	30.4-64.2	51.8±10.7
Eye diameter	8.1	8.1-16.5	13.5±2.6
Postorbit length	38.9	33.4-42.3	38.5±2.6

Table 4-5. Morphometric data for *Amphilius uranoscopus*. Range and mean include the specimens from the Wami drainage.

	Wami dr. (n=3)	Range (n=55)	Mean±SD
%SL			
Head length	24.9-26.1	23.4-30.1	25.8±1.4
Head width	22.7-23.3	19.3-25.5	21.3±1.4
Head height	12.3-13.6	10.0-16.4	13.3±1.3
Body depth	13.8-14.8	9.5-16.7	12.7±1.6
Body depth at anus	12.9-15.0	9.6-16.0	11.8±1.2
Predorsal length	36.0-36.2	33.8-40.8	36.6±1.5
Prepectoral length	20.3-21.4	17.0-25.4	20.6±1.9
Preanal length	73.2-74.9	60.2-78.6	72.1±3.9
Dorsal-fin base length	9.8-10.2	7.9-12.7	10.3±1.1
Adipose-fin base length	20.8-25.0	19.1-29.3	24.7±2.4
Anal-fin base length	9.2-10.6	7.0-19.4	11.8±2.4
Pelvic-fin length	18.2-20.6	15.0-21.0	18.4±1.5
Pectoral-fin length	19.9-23.5	17.7-23.8	21.3±1.3
Anal-fin length	18.0-19.4	15.4-21.6	18.3±1.7
Caudal peduncle length	16.3-18.4	14.5-19.7	17.0±1.1
Caudal peduncle depth	10.4-13.2	7.8-13.2	9.8±1.1
Anus to anal fin length	10.2-11.2	7.5-13.5	10.4±1.2
Prepelvic length	50.9-53.2	48.6-57.6	52.7±1.6
Postpelvic length	47.6-50.0	44.4-54.1	49.3±1.9
End of dorsal to adipose	42.4-47.0	39.2-49.8	44.2±2.5
Front of dorsal to caudal	63.9-67.3	63.2-72.5	66.3±2.0
Preanus length	60.6-64.1	58.0-69.4	62.3±2.0
%HL			
Snout length	46.6-51.7	40.1-52.4	46.1±3.2
Interorbital distance	27.8-30.3	23.7-32.3	28.3±3.3
Maxillary barbel length	54.5-82.8	54.5-112.8	78.7±11.1
Inner mandibular barbel length	29.4-34.3	22.6-45.4	33.5±5.5
Outer mandibular barbel length	53.5-64.9	36.5-77.4	55.2±9.4
Eye diameter	12.1-14.9	9.5-20.0	14.7±2.2
Postorbit length	37.7-39.6	31.0-45.7	38.3±3.1

Table 4-6. Morphometric data for *Amphilius* sp. 1. Range and mean include the holotype.

	Holotype	Range (n=21)	Mean±SD
%SL			
Head length	26.9	24.0-29.3	25.8±1.2
Head width	22.7	19.7-26.2	21.9±1.4
Head height	11.3	11.3-14.9	12.7±1.0
Body depth	13.0	12.4-17.3	14.8±1.4
Body depth at anus	11.8	11.1-15.3	13.3±1.1
Predorsal length	37.9	33.3-39.6	37.2±1.5
Prepectoral length	24.1	19.5-25.6	22.0±1.7
Preanal length	79.6	60.8-79.6	73.2±5.2
Dorsal-fin base length	9.2	8.0-11.7	9.5±0.9
Adipose-fin base length	18.7	18.5-24.3	20.5±1.8
Anal-fin base length	8.7	8.6-16.6	10.4±1.8
Pelvic-fin length	16.1	16.0-19.7	17.7±1.2
Pectoral-fin length	16.1	17.4-23.4	19.7±1.5
Anal-fin length	18.7	14.5-19.2	17.0±1.4
Caudal peduncle length	15.7	14.6-18.3	16.5±1.1
Caudal peduncle depth	15.8	10.1-12.6	11.0±0.7
Anus to anal fin length	13.0	10.4-14.1	12.1±0.9
Prepelvic length	56.1	50.9-58.3	54.2±1.9
Postpelvic length	49.9	42.8-51.2	47.2±2.3
End of dorsal to adipose	45.3	42.3-49.9	45.2±1.7
Front of dorsal to caudal	64.9	62.4-67.6	65.4±1.1
Preanus length	66.3	58.1-66.3	62.0±2.0
%HL			
Snout length	53.8	46.7-56.6	52.5±2.3
Interorbital distance	26.8	23.9-37.0	28.7±3.1
Maxillary barbel length	68.1	60.4-90.6	75.0±7.7
Inner mandibular barbel length	37.7	26.9-43.9	36.8±4.2
Outer mandibular barbel length	61.7	49.3-71.9	59.0±7.0
Eye diameter	9.0	9.0-15.3	11.4±2.0
Postorbit length	36.6	35.6-43.1	39.8±2.2

Figure 4-1. *Amphilius grandis*, BMNH 1912.3.22.119, 113.6 mm SL; lateral, dorsal and ventral view.

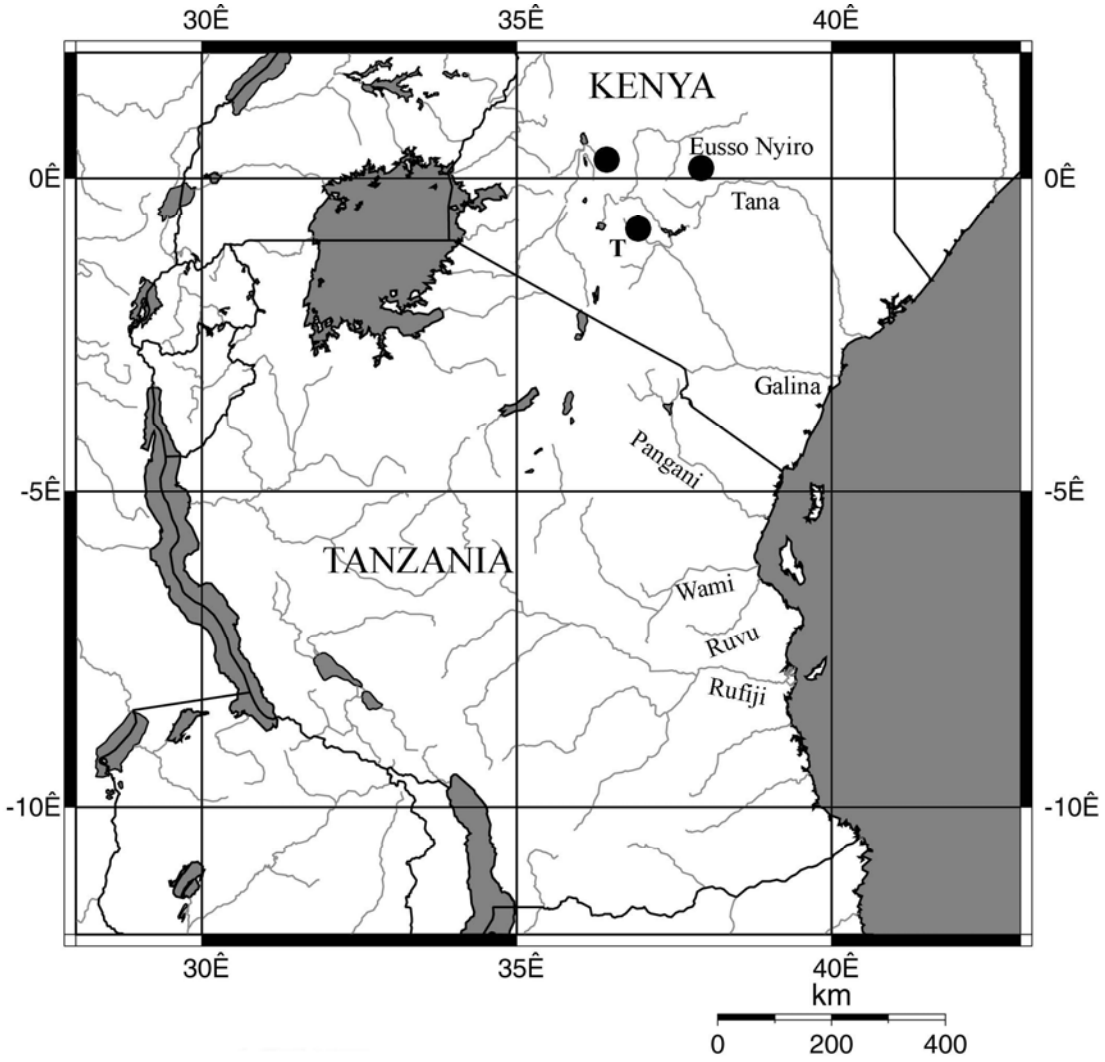

Figure 4-2. Known distribution of *Amphilius grandis*. Some symbols represent more than one collection site. **T** denotes type locality.

Figure 4-3. *Amphilius krefftii*, BMNH, 1909.10.19.26-27, Syntype 86.0 mm SL; lateral, dorsal and ventral view. Photograph by Mark Allen.

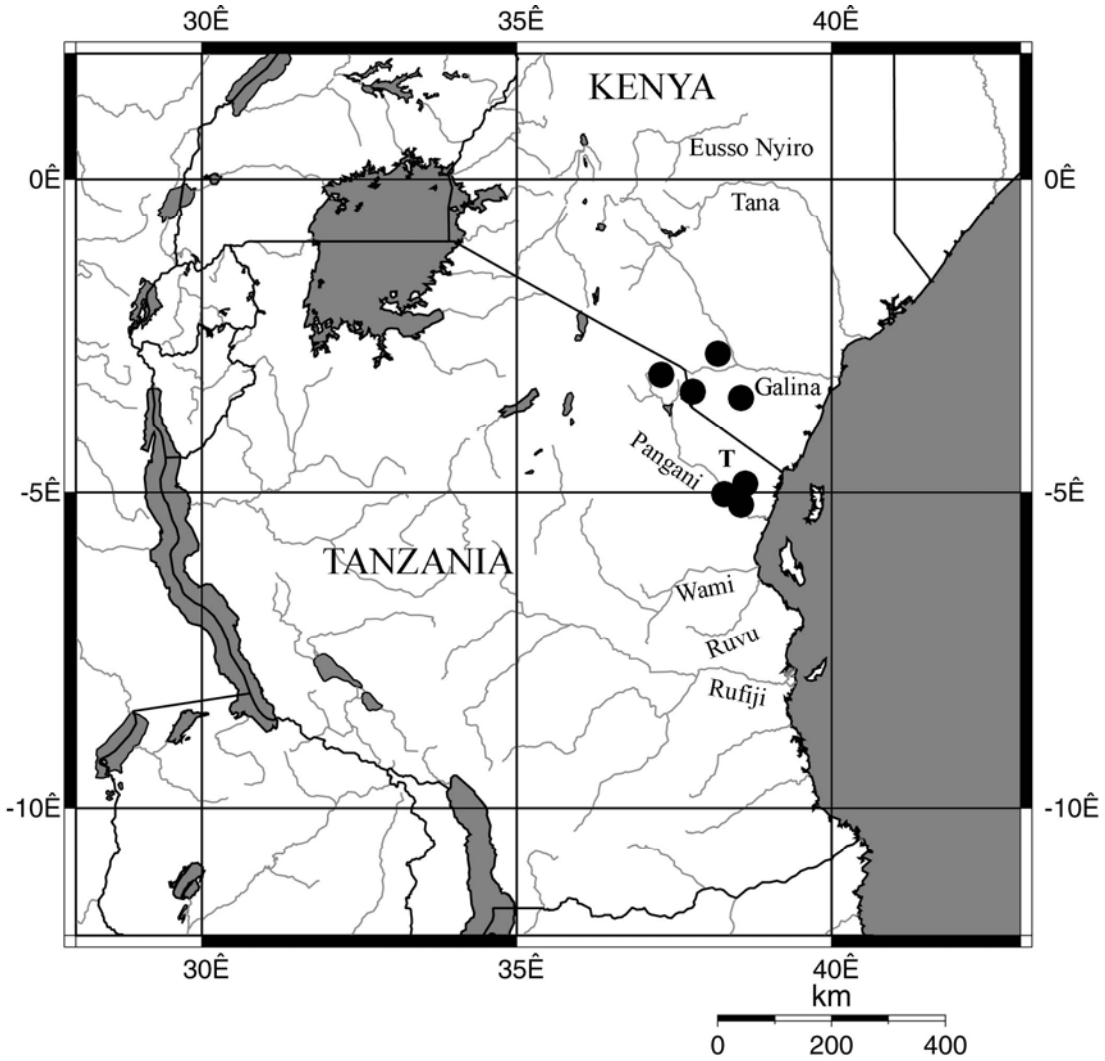

Figure 4-4. Known distribution of *Amphilius krefftii*. Some symbols represent more than one collection site. **T** denotes type locality.

Figure 4-5. *Amphilius oxyrhinus*, BMNH 1912.3.22.120, Holotype, 166.0 mm SL; lateral, dorsal and ventral view. Photograph by Mark Allen.

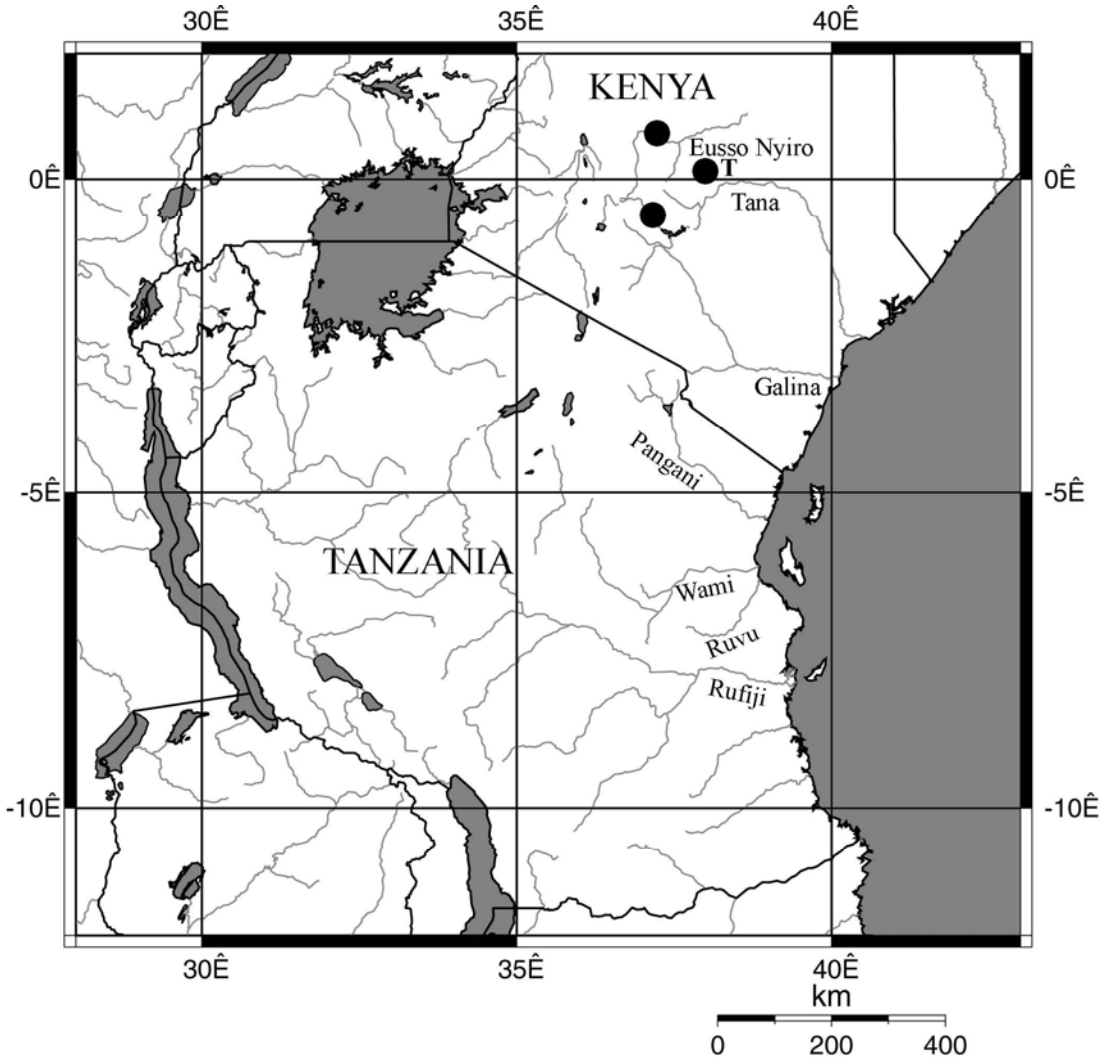

Figure 4-6. Known distribution of *Amphilius oxyrhinus*. Some symbols represent more than one collection site. **T** denotes type locality.

Figure 4-7. *Amphilius uranoscopus*, CAS 80494, 101.4 mm SL; lateral, dorsal and ventral view.

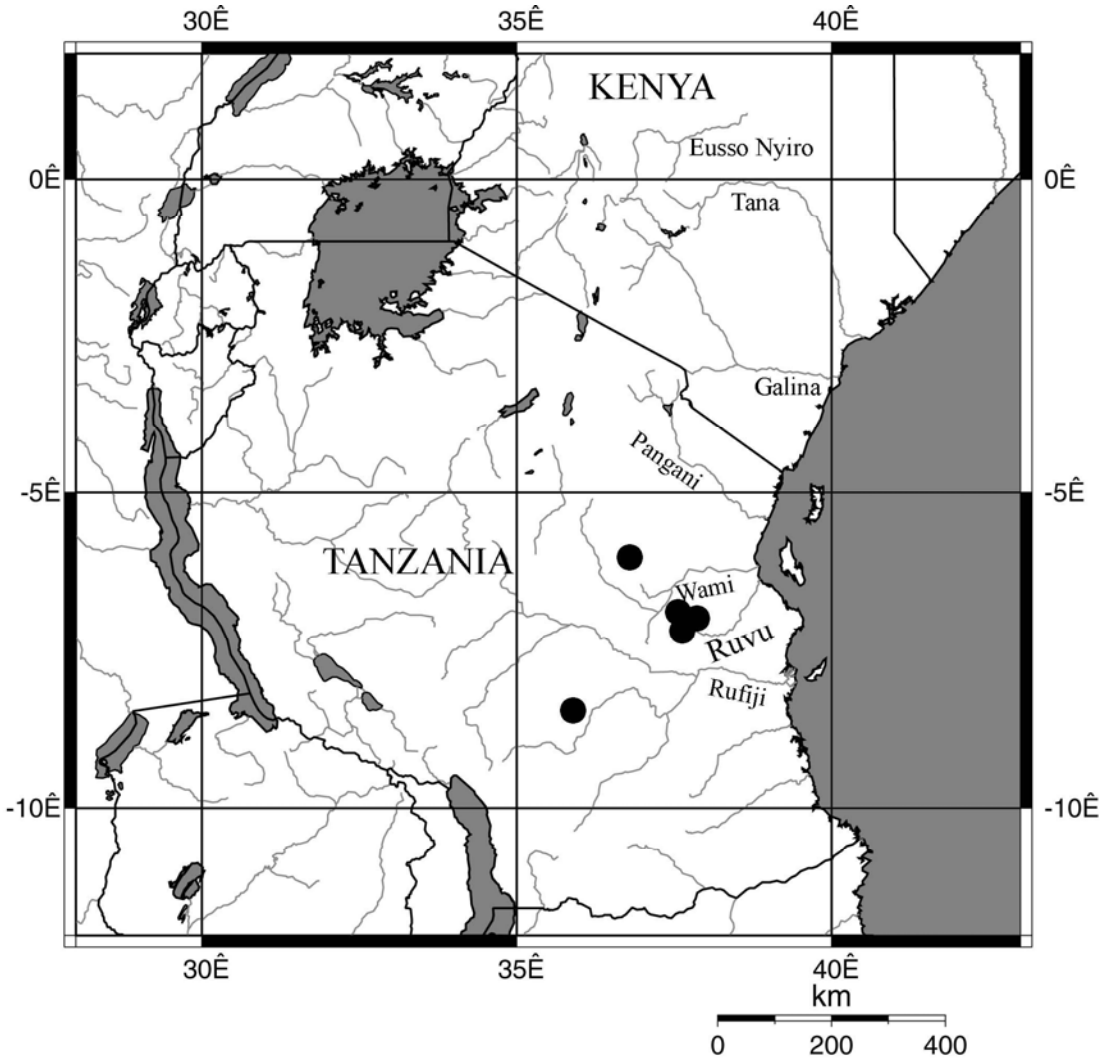

Figure 4-8. Known distribution of *Amphilius uranoscopus*. Some symbols represent more than one collection site.

Figure 4-9. *Amphilius* sp. 1, BMNH 1910.10.31.31, Holotype, 150.0 mm SL; lateral, dorsal and ventral view.

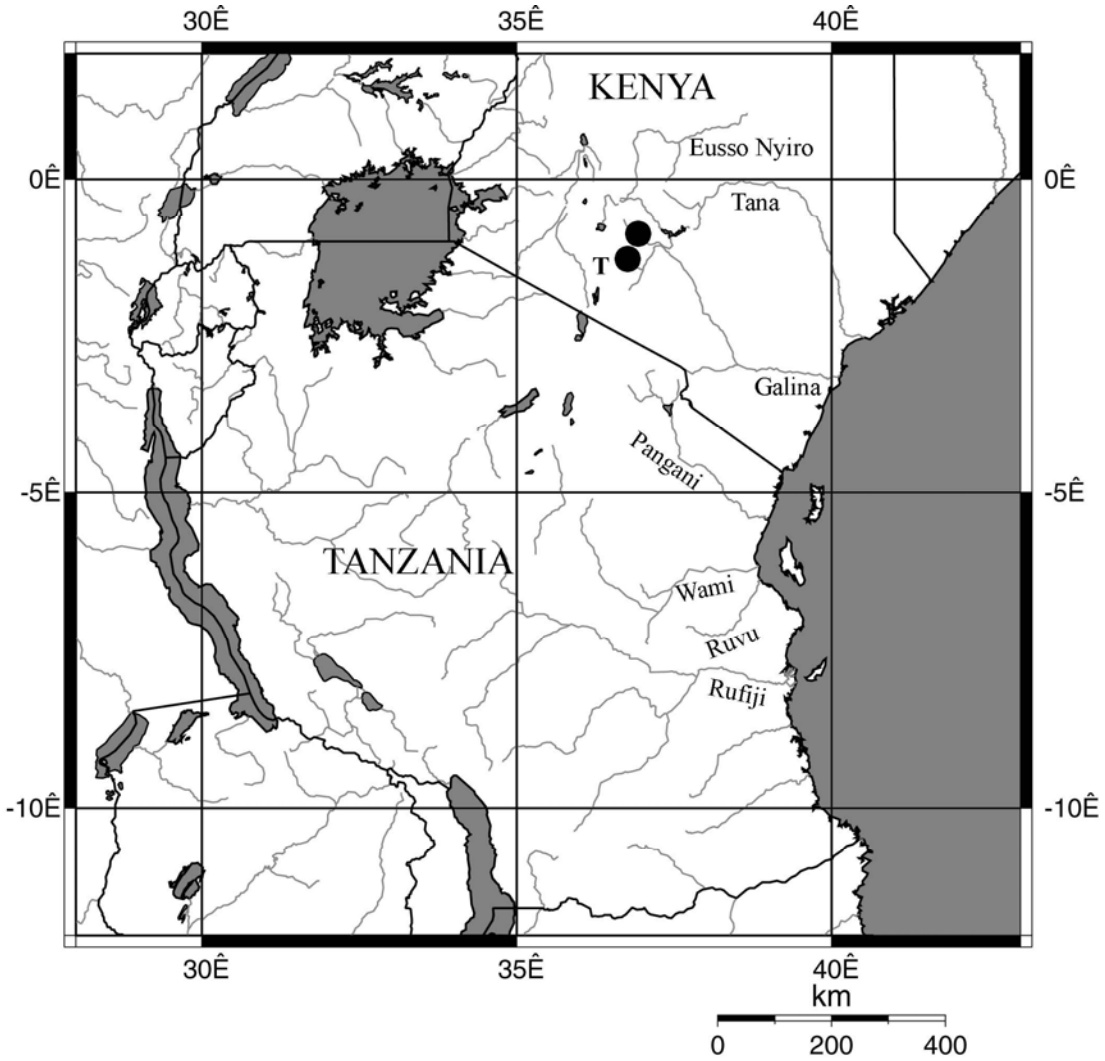

Figure 4-10. Known distribution of *Amphilius* sp. 1. Some symbols represent more than one collection site. **T** denotes type locality.

CHAPTER 5
RESULTS

The present study examined all available museum specimens of the genus *Amphilius* from east-central Africa and revealed the existence of at least five species of the *Amphilius uranoscopus* group in the region. Previously, only one species of the *Amphilius uranoscopus* group was recognized from the region. Three species previously believed to be synonyms of *Amphilius uranoscopus* are determined to be valid species, and one species new to science is described. Additionally, pigment differences were noticed in the *A. uranoscopus* from the Wami, Ruvu and Rufiji drainages, but because only a few adult specimens are available from these drainages only a single species is recognized from these drainages.

The recognition of *Amphilius uranoscopus* as a single widespread species has been based largely on the lack of clear meristic and morphometric differences between populations. Additionally, previous studies never looked at large number of specimens from the east-central region. Species that had been described from the region were based on just a few specimens, and only the type specimens of those species had been compared. Although differences in pigment pattern and caudal-fin shaped have been noticed previously (Copley, 1958; Seegers, 1996b), this is the first study to examine variation in these characters thoroughly.

Although there is some degree of intraspecific variation in pigment pattern, certain aspects are consistent and are useful in distinguishing the species. *Amphilius oxyrhinus* and *Amphilius* sp. 1 both have dark markings on the body in the form of blotches or spots as adults and juveniles. Adults of *A. grandis* lack dark markings on the body, but juveniles have dark spots. Dark markings are generally absent in adults and juveniles of *A. krefftii* and *A. uranoscopus*. *Amphilius krefftii* may have a few dark areas on its body but never has distinct dark blotches or spots. In *Amphilius* sp. 1, the dark markings are always present in the form of

small dark spots (although a few larger blotches may be present), and spots are also always present on the head. In *A. oxyrhinus*, the dark markings are always in the form of large blotches or spots, with only a few smaller spots or blotches present. Spots on the head are usually absent or indistinct. The pectoral, pelvic, dorsal, anal, adipose and caudal fins of *Amphilius* sp. 1 are also heavily spotted. *Amphilius oxyrhinus* lacks spots on the fins, although some dark pigment may be present. Light dorsal saddles at the base of the dorsal and adipose fins are present in *A. krefftii* and *A. uranoscopus* (except specimens from the Ruvu drainage, see discussion below). These light dorsal saddles are not present in *A. grandis*, *A. oxyrhinus* or *Amphilius* sp. 1.

Two forms of the caudal fin were observed. In *Amphilius grandis*, *A. oxyrhinus* and *Amphilius* sp. 1, the caudal fin is deeply emarginate or moderately forked, but in *A. krefftii* and *A. uranoscopus* the caudal fin is feebly emarginate. In *A. grandis* and *A. oxyrhinus*, the tips of the caudal-fin lobes are pointed, while in *Amphilius* sp. 1, *A. krefftii and A. uranoscopus* the tips of the caudal-fin lobes are noticeably more rounded.

A visible epidermal core extending posteriorly from the mandibular barbels is always present in *Amphilius oxyrhinus* and *A. krefftii* and always absent in *A. grandis*, *Amphilius* sp. 1 and *A. uranoscopus*. The visible epidermal core is a vein-like structure extending posteriorly from the bases of the inner and outer mandibular barbels. The structure is pigmented, but even in old specimens in which the pigment has faded, the structure is still noticeable.

Frequency tables were constructed for counts of eight different meristic characters. Branchiostegal ray count was the only meristic character found to be useful for distinguishing species. *Amphilius* sp. 1 had the fewest branchiostegal rays, with all specimens having 6 or 7 branchiostegal rays. *Amphilius uranoscopus* had the most, with all specimens having 8 or 9 branchiostegal rays. Branchiostegal ray count usually distinguishes *A. krefftii* from *A.*

uranoscopus; 18 specimens of *A. krefftii* had a count of 7 and one specimen had 8 branchiostegal rays (Table 5-1). Total gill-raker counts did not distinguish between species, but the counts for *A. uranoscopus* in the Wami, Ruvu and Rufiji did indicate differences in those populations (Table 5-2). No clear patterns were observed in the frequency-distribution tables of branched pectoral-fin rays, branched anal-fin rays, total vertebrae, preanal vertebrae, postanal vertebrae and first dorsal pterygiophore intercept count (Tables 5-3 to 5-8).

The characters examined in this study offer some preliminary insights into the possible relationships among species of the *Amphilius uranoscopus* group in east-central Africa and the biogeography of the region. *Amphilius grandis*, *A. oxyrhinus* and *Amphilius* sp. 1, the species with deeply emarginate or forked caudal fins, are distributed in the northern part of the east-central region, while all *A. krefftii* and *A. uranoscopus* populations are distributed to the south of these species. Additionally, *A. grandis*, *A. oxyrhinus* and *Amphilius* sp. 1 all have dark markings either as adults or juveniles, while *A. krefftii* and *A. uranoscopus* never have dark markings. Finally, light dorsal saddles are absent in the northern species, but present in the southern species.

The caudal fin shape and pigment patterns observed suggest that a northern and a southern group of species exist in east-central Africa. These northern and southern species groups correspond to the physical geography of the region. The Eusso Nyiro, Tana and Galina drainages all have high-gradient tributaries in the Mount Kenya-Aberdare highlands (Skelton, 1994). *Amphilius grandis* and *A. oxyrhinus* overlap in distribution in the Eusso Nyiro and Tana drainages. *Amphilius* sp. 1 is restricted to the upper reaches of the Galina drainage in close proximity to the Eusso Nyiro and Tana drainages.

The Pangani, Ruvu and Wami drainages drain the south-east slopes of Kilimanjaro and the eastern side of the Gregory Rift (Skelton, 1994). The present-day Rufiji drainage has grown from a series of captures (Willis, 1936). Its largest tributary may once have drained into the Indian Ocean via the Wami (Bailey, 1969) or the Pangani (Haldemann, 1962). Although *Amphilius krefftii* also occurs in the Galina drainage, it is found only in tributaries of the lower reaches of the river. These tributaries are in close proximity to the Pangani drainage, where the species also occurs.

The *Amphilius* in the Wami, Ruvu and Rufiji drainages are tentatively recognized here as a single species despite differences observed in pigment pattern and intensity. Because most of the specimens examined were juveniles, only juvenile pigmentation could be compared. All specimens examined from the Ruvu drainage, including the type of *Chimarrhoglanis leroyi* were lighter in color than specimens from the Wami and Rufiji (Fig. 5-1). Additionally, these specimens did not have the light dorsal saddles that were always observed in specimens from the Wami and Rufiji. Given that amount of variation in darkness observed in other species of *Amphilius*, the lighter color of the Ruvu population is not considered a significant taxonomic character. Additionally, the lighter color of the type of *C. leroyi* may be due to the age and preservation of the specimen, and the absence of light dorsal saddles in all specimens examined may only be because of the lighter color of these specimens. The Wami and Rufiji populations were similar in body coloration, but specimens from the Wami always had darker fins. Although this difference was consistent, no additional differences were observed. Although specimens from the different populations appeared to differ in body shape, no morphometric differences were found.

The status of three other species synonymized with *Amphilius uranoscopus*, *A. hargeri*, *A. brevidorsalis* and *A. platychir cubangoensis*, are beyond the geographic scope of this study, but tentative conclusions can be made about the identity of these species. The type of *A. hargeri* is similar to *A. uranoscopus*, but the first-dorsal pterygiophore intercepts the third post-Weberian vertebra. Skelton (1984) hypothesized that it could be a hybrid specimen, but concluded that it was best considered a junior synonym of *A. uranoscopus*. This character separates *A. hargeri* from the species in east-central Africa. All the specimens examined in east-central Africa have the dorsal pterygiophore intercepting the first or second post-Weberian vertebra, with the majority of specimens examined having the dorsal pterygiophore intercepting the first post-Weberian vertebra.

The type of *Amphilius brevidorsalis* from Mozambique is most similar to *A. uranoscopus* and may be a synonym of *A. uranoscopus*. The type of *A. brevidorsalis* lacks dark markings and has distinct light dorsal saddles. Additionally it a visible epidermal core extending posteriorly from the mandibular barbels and has a caudal fin shape characteristic of *A. uranoscopus*. The type specimens examined of *A. platychir cubangoensis* have a caudal fin shape similar to that of *A. krefftii* and *A. uranoscopus*, but differ from these species by having distinct dark markings on the body. Additionally, a visible epidermal core extending posteriorly from the mandibular barbelsis present in the type specimens examined, further distinguishing *A. platychir cubangoensis* from *A. uranoscopus*.

Table 5-1. Branchiostegal ray counts in *A. oxyrhinus*, *A. grandis*, *Amphilius* sp. 1, *A. krefftii* and three populations of *A. uranoscopus*

Branchiostegal Rays	**6**	**7**	**8**	**9**
A. oxyrhinus		4	9	2
A. grandis		9	8	
Amphilius sp. 1	1	21		
A. krefftii		18	1	
A. uranoscopus (Wami)			3	
A. uranoscopus (Ruvu)			6	5
A. uranoscopus (Rufiji)			17	9

Table 5-2. Total gill raker counts in *A. oxyrhinus*, *A. grandis*, *Amphilius* sp. 1, *A. krefftii* and three populations of *A. uranoscopus*

Total Gill Rakers	**6**	**7**	**8**	**9**	**10**	**11**
A. oxyrhinus		1	3	10		
A. grandis	1	2	2	8	7	1
Amphilius sp. 1	1			7	11	2
A. krefftii		5	5	6	1	
A. uranoscopus (Wami)				1	1	1
A. uranoscopus (Ruvu)		1	4	3	3	
A. uranoscopus (Rufiji)	6	23	8	1		

Table 5-3. Branched pectoral-fin ray counts in *A. oxyrhinus*, *A. grandis*, *Amphilius* sp. 1, *A. krefftii* and three populations of *A. uranoscopus*

Branched Pectoral-Fin Rays	**8**	**9**	**10**	**11**
A. oxyrhinus			12	2
A. grandis		3	17	1
Amphilius sp. 1		12	9	
A. krefftii		11	7	1
A. uranoscopus (Wami)		2	1	
A. uranoscopus (Ruvu)		8	4	
A. uranoscopus (Rufiji)	3	14	23	

Table 5-4. Branched anal-fin ray counts in *A. oxyrhinus*, *A. grandis*, *Amphilius* sp. 1, *A. krefftii* and three populations of *A. uranoscopus*

Branched Anal-Fin Rays	**5**	**6**	**7**	**8**
A. oxyrhinus		14		
A. grandis		21		
Amphilius sp. 1	7	13	2	
A. krefftii		17	2	
A. uranoscopus (Wami)		1	2	
A. uranoscopus (Ruvu)		6	6	
A. uranoscopus (Rufiji)	2	17	10	11

Table 5-5. Total vertebrae counts in *A. oxyrhinus*, *A. grandis*, *Amphilius* sp. 1, *A. krefftii* and three populations of *A. uranoscopus*

Total Vertebrae	**36**	**37**	**38**	**39**	**40**
A. oxyrhinus		4	4		
A. grandis			3	6	1
Amphilius sp. 1		2	7	3	
A. krefftii	7	3	1		
A. uranoscopus (Wami)		3			
A. uranoscopus (Ruvu)		2	2		
A. uranoscopus (Rufiji)	11	12	2		

Table 5-6. Preanal vertebrae counts in *A. oxyrhinus*, *A. grandis*, *Amphilius* sp. 1, *A. krefftii* and three populations of *A. uranoscopus*

Preanal Vertebrae	**19**	**20**	**21**	**22**
A. oxyrhinus			7	1
A. grandis		1	3	6
Amphilius sp. 1		2	3	7
A. krefftii		7	5	
A. uranoscopus (Wami)	1	1	1	
A. uranoscopus (Ruvu)			2	2
A. uranoscopus (Rufiji)	1	6	11	7

Table 5-7. Postanal vertebrae counts in *A. oxyrhinus*, *A. grandis*, *Amphilius sp. 1*, *A. krefftii* and three populations of *A. uranoscopus*

Postanal Vertebrae	**15**	**16**	**17**	**18**
A. oxyrhinus		5	3	
A. grandis		1	4	5
Amphilius sp. 1	1	5	4	2
A. krefftii	1	9	1	
A. uranoscopus (Wami)		1	1	1
A. uranoscopus (Ruvu)		4		
A. uranoscopus (Rufiji)	9	15	1	

Table 5-8. First dorsal pterygiophore intercept counts in *A. oxyrhinus*, *A. grandis*, *Amphilius* sp. 1, *A. krefftii* and three populations of *A. uranoscopus*

1st DPI	**1**	**2**
A. oxyrhinus	4	4
A. grandis	2	8
Amphilius sp. 1	12	1
A. krefftii	11	1
A. uranoscopus (Wami)	3	
A. uranoscopus (Ruvu)	4	
A. uranoscopus (Rufiji)	23	1

Figure 5-1. *Amphilius uranoscopus* (juveniles) from the Wami (top: CAS 80494, 49.1 mm SL), Ruvu (middle: UF 84882, 40.4 mm SL) and Rufiji (bottom: FMNH 111680, 46.0 mm SL) drainage.

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BIOGRAPHICAL SKETCH

Alfred W. Thomson was born December 30, 1978, in Englewood, New Jersey. One of three children, he was interested in the natural world from an early age and has always been especially interested in fishes. He received his bachelor of science degree from Mansfield University in August 2001, and moved to Kenosha, Wisconsin to work as a research technician for the Illinois Natural History Survey at the Lake Michigan Biological Station in Zion, Illinois. In January 2004 he moved to Gainesville, Florida and worked as a research technician on the All Catfish Species Inventory Project at the Florida Museum of Natural History. In August 2005 he enrolled in UF's Department of Zoology as a full-time graduate student with a research assistantship from the All Catfish Species Inventory Project. He is currently continuing his research on catfish systematics as a Ph.D. student in UF's Department of Zoology.