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Rediscovery and range extension for *Platyclarias machadoi* Poll, 1977 (Siluriformes, Clariidae) in the Kwanza River, Angola

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Abstract. We report the first record of *Platyclarias machadoi* Poll, 1977 since its original description. This species was sampled by electrofishing in rapids on the Kwanza River upstream of Capanda Dam in Angola. Morphometric and meristic data for the Kwanza River material were compared to published data from the *Platyclarias* type series. Osteology was compared between the Kwanza specimens and two *Platyclarias* paratypes using computed tomography (CT) scans. Prior to this discovery, the genus was known only from the Kwango River in Angola.

Keywords. Africa, catfishes, diversity, fishes

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Introduction

Platyclarias machadoi Poll, 1977 is an elongate clariid catfish (Siluriformes, Clariidae) with a distinctive dorsoventrally compressed head (Fig. 1). The monotypic genus was described by Poll in 1977 based on 22 specimens from the Upper Kwango River Basin (Portuguese: Rio Cuango) in Angola. The type series was collected in 1967 by S.A. Peles of the Museu do Dundo in Lunda Norte, Angola. The specimens were sent to Poll by A. Machado, then director of the museum. *Platyclarias machadoi* was one of 28 Angolan fish species that Poll would describe from Museu do Dundo materials.

The type locality of *Platyclarias machadoi* is "Angola; Cafunfo, Borio 2, bassin riv. Cuango." The coordinates listed with the specimens are 08°45′S, 018°05′E, which mark a point about 12 km northeast of the Kwango River and about 9 km east of the town of Cafunfo. Satellite maps show no permanent water nearer to this point than the Kwango River, so it is probable that the coordinates were a rough approximation, but it is also possible that the samples were collected from a seasonal stream. The name "Borio" could not be definitively traced but is associated with a hydrometric station on the Kwango River (Pettersson 2004), perhaps suggesting that *Platyclarias* was collected from the river itself and not a tributary stream.

Poll (1977) did not provide a differential diagnosis for *P. machadoi* but listed the following unique combination of characters, translated from French:

Body long and very depressed anteriorly, compressed posteriorly. Preanal distance long, averaging 40% of standard length. Postanal distance only slightly longer than the rest of the body. Much lower maximum body height than width (38–55% at the base of the pectoral fin), measuring except in the three juveniles less than half the length of the head. Head broad and very flat like the trunk and of comparable width or slightly larger, longer than wide (1.25 times on average). Head included seven (in juveniles) to nine times in the standard length, the cranial roof rough and clearly visible, not covered by the integuments or the lateral musculature. Head not protected laterally by the lateral cephalic bones (supraorbital and dermosphenotic), these bare

Figure 1. MRAC P-78-6.1345, holotype of *Platyclarias machadoi*, 181 mm SL, Cafunfo, Angola. Photo by M. Hanssens.

spaces only slightly enlarged by the musculature. Eyes superior, small but with free margin. Dorsal fin beginning far behind the head, its origin separated from the occipital process by a length equal to or a little shorter than the length of the head and further from the head than the origin of the anal fin. Dorsal fin with about 90 rays, the anal fin with about 80 rays (numbers counted on a cleared specimen), these two vertical fins not confluent but contiguous with the caudal fin. Pectoral fins large, with a strong, unserrated spine and 10 soft rays, measuring from half (juv.) to one-third of the length of the head, not reaching the origin of dorsal fin. Small pelvic fins present on all specimens, measuring about a third of the head, with 6 rays. Gill rakers five to six on the lower part of the first arch.

Poll noted the similarity between *Platyclarias* and the monotypic *Platyallabes* Poll, 1944 from the Lower Congo River. Both taxa are elongate with a dorsoventrally compressed head and trunk, and both have reduced suprabranchial chambers. However, *Platyallabes* is substantially more anguilliform, with a postanal region about three times the preanal length (vs. less than two times in *Platyclarias*). The dorsal and anal fins of *Platyallabes* are also confluent with the caudal fin, forming a single continuous median fin fold (as seen in other anguilliform clariids: *Channallabes* Günther, 1873; *Dolichallabes* Poll, 1942; and *Gymnallabes* Günther, 1867), whereas these fins are separate in *Platyclarias*.

Devaere et al. (2006) provided a more detailed morphological redescription of *P. machadoi* based on a reexamination of the type material. These authors identify several additional autapomorphic characters for the genus. These include 1) the absence of any additional outgrowth on the anterior bony plate and dorsal edge of the hyomandibula; 2) the dorsal margin of the quadrate and hyomandibula is nearly straight (vs. deeply indented); 3) the interopercle lies medial to the suspensorium; and 4) the presence of an extra muscle bundle between the A_3'' of the adductor mandibulae and the levator arcus palatini originating on the lateral ethmoid and frontal, extending to the large tendon complex of the jaw muscle and the medial tendon of the A_2A_3'. The authors also note the presence of a pale spot on the roof of the skull, a character also found in some species of *Channallabes* (Devaere et al. 2007a), and the position of the retroarticular process medial to the quadrate, which is shared only with *Platyallabes tihoni*. This latter character and the medial position of the interopercle are both associated with flattening of the head and the corresponding horizontal orientation of the suspensorium.

Following its redescription, few studies have included or referenced *Platyclarias*. Devaere et al. (2007b) presents a phylogeny for the African Clariidae based on analysis of 53 morphological characters. *Platyclarias* was therein found to be the sister to a clade containing all sampled species of *Clarias* Scopoli, 1777, *Bathyclarias* Jackson, 1959, *Clariallabes* Boulenger, 1887, *Dinotopterus* Boulenger, 1906, and *Heterobranchus* Geoffroy Saint-Hilaire, 1809. Wright and Bailey (2012), in a revision of the clariid genus *Tanganikallabes* Poll, 1943,

illustrated the well-developed anterior cleithral process of *Platyclarias* along with those of other clariid genera. No other publications to date have provided any novel data on the genus and no specimens identified as *Platyclarias* have been recorded in any public databases.

Recently, we identified two specimens from the Kwanza River (Portuguese: Rio Cuanza) in Angola as *Platyclarias machadoi*. These samples, cataloged at the South African Institute of Aquatic Biodiversity (SAIAB), were collected by field teams from SAIAB and the Angolan Instituto Nacional de Investigação Pesqueira (INIP) led by E. Swartz and D. Neto as part of a survey of Angolan fishes. The first specimen (Fig. 2) was captured in August 2007 using a backpack electrofisher in a series of rapids immediately upstream of the reservoir formed by Capanda Dam. The second specimen was also collected using electrofishing in August of 2008 about 75 km further upstream, immediately above the Kwanza Rapids (Portuguese: Rápidos do Cuanza) near the town of Camaça.

Methods

Thirty-five linear measurements following Devaere et al. (2006) and summarized in Table 1 were taken from the two SAIAB specimens using a ruler and digital

Table 1. Summary of morphometric data for *Platyclarias machadoi* comparing two newly collected specimens from the Kwanza River (SAIAB 85165 and 85482) to the type series. Data from type specimens were obtained from Devaere et al. (2006).

	SAIAB 85165	SAIAB 85482	Holotype	Paratype range	Paratype mean
Total length	163	140	195	89.5–160.0	—
Standard length	147	129	181	80.5–146.0	—
Preanal length	39.4	41.5	37.9	37.9–43.9	40.2
Anal fin length	59.9	57.4	58.6	52.2–60.0	56.3
Dorsal fin length	68.7	68.5	70.2	64.2–72.0	36.0
Prepectoral length	15.6	15.1	16.0	14.7–19.3	17.1
Prepelvic length	33.4	34.4	33.4	33.8–38.5	67.6
Predorsal length	30.0	30.2	28.5	28.2–33.5	30.8
Supraoccipital process to dorsal fin	12.4	13.6	13.0	10.1–17.2	13.2
Pectoral fin length	8.1	9.1	7.7	7.0–16.1	8.9
Pectoral spine length	4.1	4.6	4.1	3.3–5.1	4.2
Pelvic fin length	6.4	6.1	5.3	3.7–6.4	5.4
Caudal peduncle depth	4.6	5.0	3.8	3.1–5.1	4.1
Body depth at anus	5.6	6.5	4.4	4.1–6.5	5.1
Interpectoral distance	11	11.1	11.5	11.0–12.9	12.1
Interpelvic distance	3.1	3.3	3.8	2.9–5.0	4.0
Head Length	16.6	16.5	15.5	14.3–18.7	17.0
Skull height	4.1	5.5	4.5	3.7–5.7	4.7
Postorbital length	74.6	70.0	71.4	62.9–84.7	70.6
Supraoccipital process length	12.7	12.6	14.5	7.1–24.6	14.5
Skull width	77.9	79.3	74.0	64.2–85.6	73.9
Supraoccipital process width	15.6	14.1	12.9	9.5–28.8	18.6
Interorbital distance	38.5	40.4	37.9	28.9–41.7	35.7
Anterior internarial distance	16.0	16.0	15.4	14.5–30.8	17.2
Posterior internarial distance	25	29.1	30.2	15.1–35.8	29.2
Rostral skull width	42.6	41.3	36.6	29.4–43.8	36.9
Orbital skull width	52.0	53.1	40.6	42.9–57.8	49.2
Skull height	25.0	33.3	29.1	22.9–37.1	27.5
Eye diameter	7.0	8.0	5.5	4.6–8.5	6.8
Snout height	13.9	14.1	10.9	6.2–15.6	10.2
Orbital skull height	23.4	21.6	19.4	10.1–24.3	16.8
Prehyoid length	26.2	30.5	22.3	16.6–29.8	23.7
Internal mandibular interdistance	20.1	18.8	21.2	15.4–26.2	21.5
External mandibular interdistance	32.4	30.5	32.9	18.7–41.0	32.0
Mouth width	33.2	32.9	30.5	20.3–33.6	27.1
Skull roof width	19.7	20.7	19.2	21.1–29.6	23.8

Figure 2. SAIAB85482, *Platyclarias machadoi*, 129 mm SL, Kwanza River upstream of Capanda Dam, Angola.

calipers. These two specimens as well as two paratypes of *Platyclarias machadoi* were scanned using computed tomography (CT) at the Microscopy and Imaging Facility at AMNH using a GE Phoenix v|tome|x with a 180 kV Nano Tube (General Electric, Fairfield, CT, USA). Scan resolution ranged from 10.6 to 24.3 µm. Beam energy was 120 kV and 166 mA. Scans were reconstructed using Phoenix datos|x (General Electric, Wunstorf, Germany) and were rendered and edited using VGStudio Max 3.3.4 (Volume Graphics, Heidelberg, Germany). Counts of vertebrae and ribs were made from radiographs taken with a DSX-Pro digital Xray.

Results

***Platyclarias machadoi* Poll, 1977**

Figures 1–5

New records. ANGOLA – Cuanza Sul • Kwanza River in rapids upstream of reservoir formed by Capanda Dam; 09°44′7″S, 015°51′40″E; 18.VIII.2007; D. Neto, E. Swartz leg.; electrofishing; 1, SAIAB 85482 • Kwanza River above Calema Falls near Camaça; 09°53′28″S, 016°18′26″E; 22.VIII.2008; D. Neto, E. Swartz leg.; electrofishing; 1, SAIAB 85165.

Identification. Morphometric and meristic data for the two Kwanza River specimens (SAIAB), as well as the holotype and 21 paratypes of *Platyclarias machadoi* are shown in Table 1. All measurements for the two Kwanza specimens are within the range of the type series. SAIAB 85165 and SAIAB 85482 have 67 and 65 vertebrae, respectively (including the vertebrae of the Weberian apparatus). The type series of *P. machadoi* exhibit a range of 65 to 71 vertebrae. In the original description, Poll reported that *P. machadoi* has nine branchiostegal rays; however, in our examination of two paratypes, we find one specimen to have 8, 8 and the other to have 8, 9; and the paratype illustrated by Devaere et al. (2006, fig. 3a) also appears to have 8, 9. The two Kwanza specimens have 9, 9 and 8, 9 branchiostegal rays.

A comparison of CT scans of the Kwango paratypes to the more recently collected Kwanza specimens revealed close similarity in structure (Figs. 3–5). Of the four autapomorphic characters listed by Devaere et al. (2006), all but the muscle character were confirmed in scan reconstructions. Additionally, the medial position of the retroarticular process relative to the interopercle was observed in all four specimens. We also observe that in scans of both the type specimens and the new material, the fourth infraorbital (composed of two bony elements) is embedded in tissue dorsal to the frontals on the skull roof (Fig. 5). This characteristic is associated with the extreme dorsoventral flattening of the skull in *Platyclarias* and has not been observed in any other clariids.

We do note several osteological differences between the Kwango and Kwanza material. The two Kwango specimens each have two circular foramina in the coracoid at the base of the pectoral spine (Fig. 4A). The Kwanza specimens, by contrast, have a single, larger oblong foramen in the coracoid (Fig. 4B). The Kwango specimens and the paratype illustrated by Devaere et al. (2006) exhibit a small posterior median process of

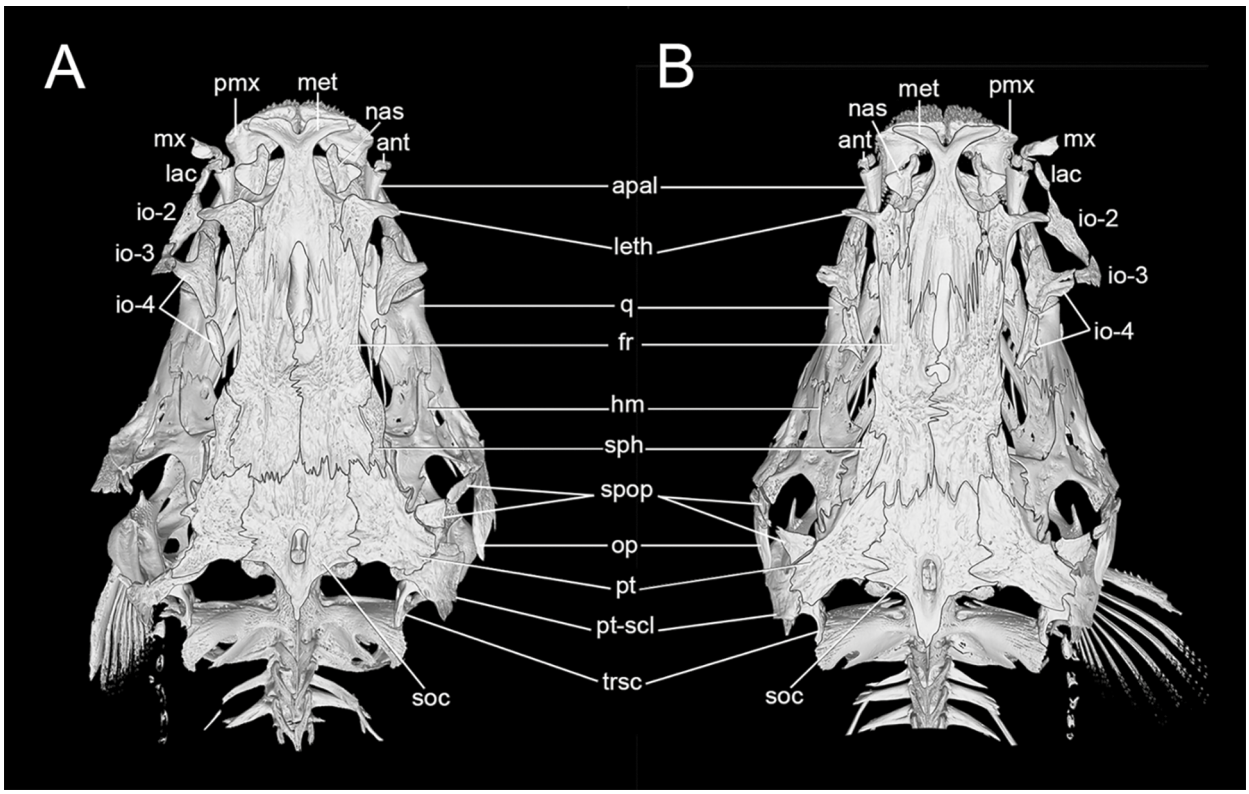

Figure 3. Computed tomography scan of skull in dorsal view of *Platyclarias machadoi*. **A.** MRAC P-78-6.1348, 132 mm SL.**B.** SAIAB 85482, 129 mm SL. Abbreviations: ant, antorbital; apal, autopalatine; fr, frontal; hm, hyomandibula; io-ii, infraorbital ii; io-iii, infraorbital iii; io-iv, infraorbital iv; lac, lacrimal; leth, lateral ethmoid; meth, mesethmoid; mx, maxilla; nas, nasal; op, opercle; pmx, premaxilla; pt, pterotic; pt-scl, posttemporo-supracleithrum; q, quadrate; soc, supraoccipital; sph, sphenotic; spop, suprapreopercle; trsc, transcapular process.

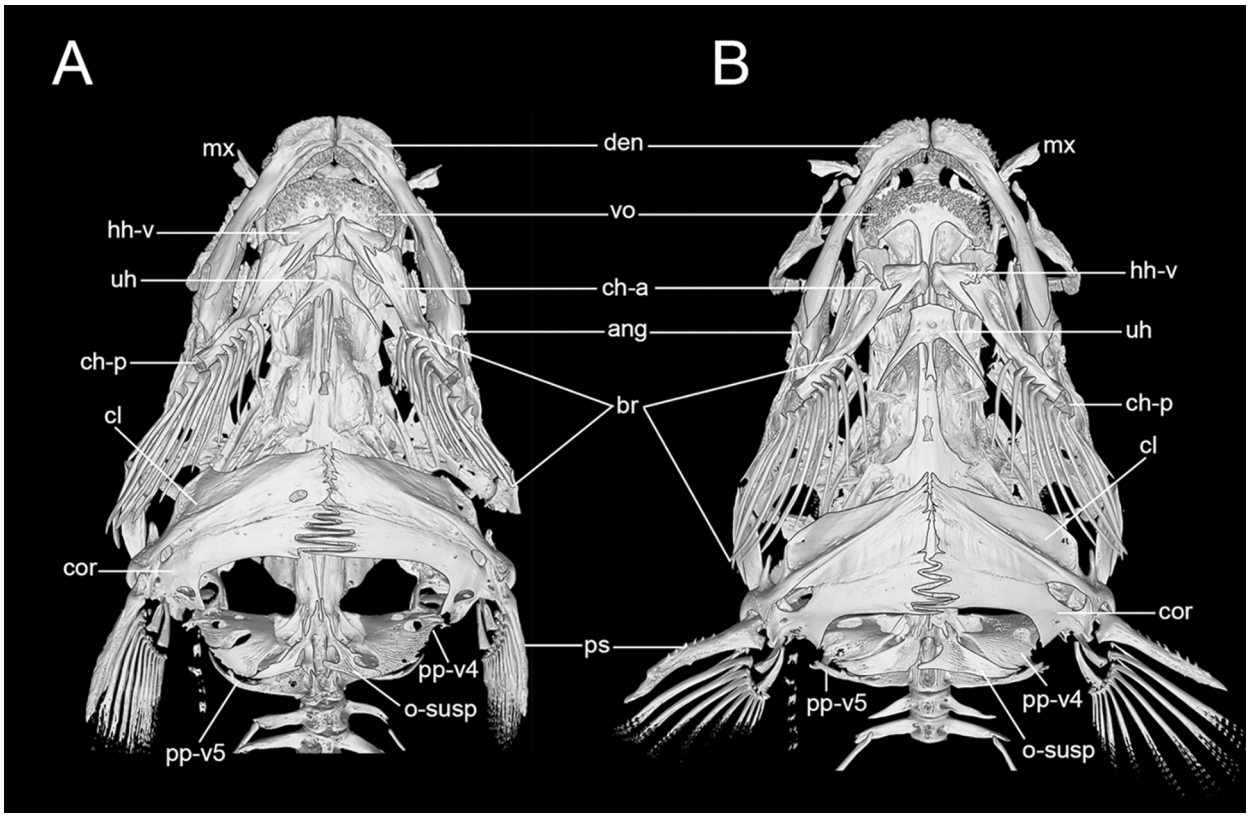

Figure 4. Ventral view of the skull of *Platyclarias machadoi*. **A.** MRAC P-78-6.1348. **B.** SAIAB 85482. Abbreviations: ang, anguloarticular; br, branchiostegal rays; ch-a, anterior ceratohyal; ch-p, posterior ceratohyal; cl, cleithrum; cor, coracoid; den, dentary; hhv, ventral hypohyal; mx, maxilla; o-susp, os suspensorium; pmx, premaxilla; pp-v4, parapophysis of 4th vertebra; pp-v5, parapophysis of 5th vertebra; ps, pectoral spine; uh, urohyal; vo, vomer.

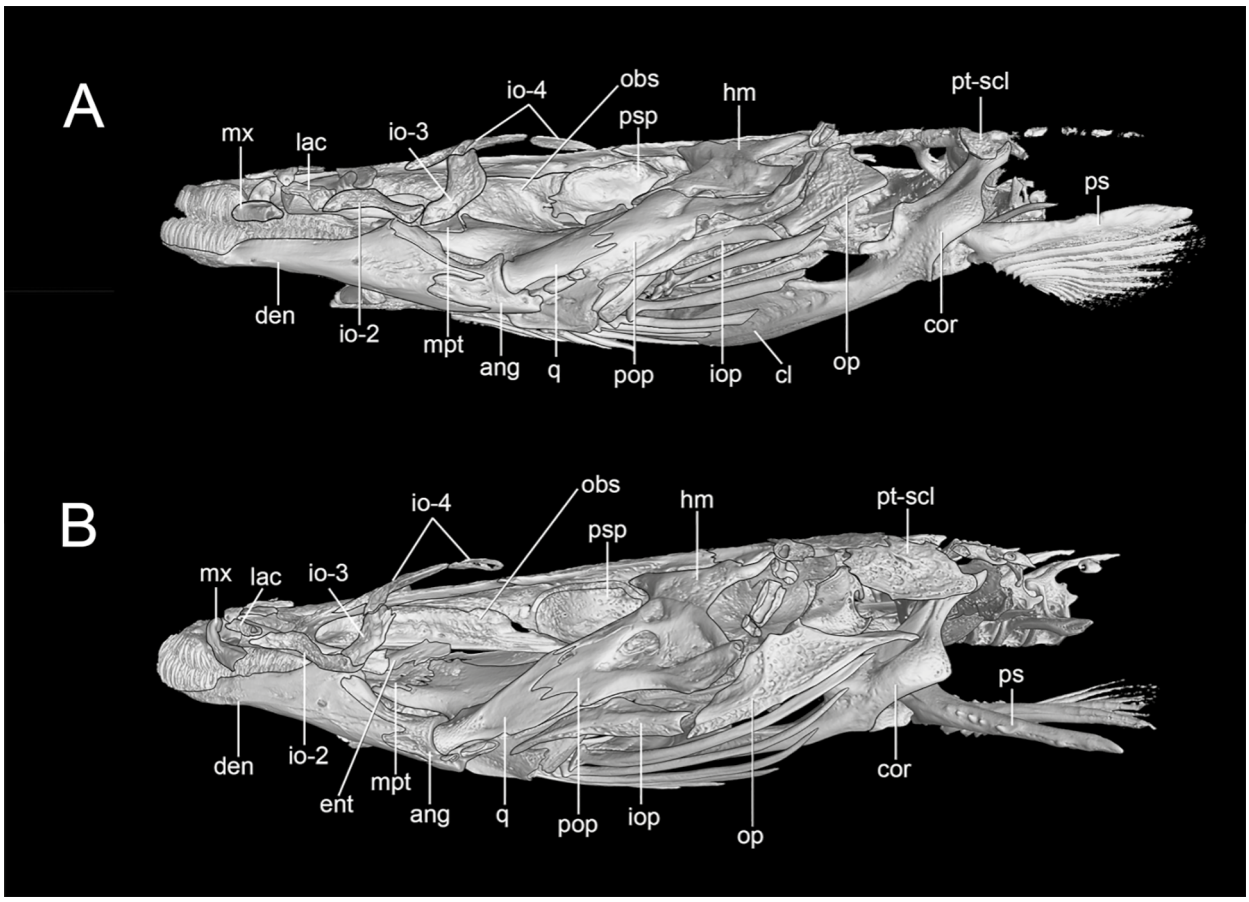

Figure 5. Lateral view of skull of *Platyclarias machadoi*. **A.** MRAC P-78-6.1348. **B.** SAIAB 85165. Abbreviations: ang, anguloarticular; apal, autopalatine; cl, cleithrum; cor, coracoid; den, dentary; ent, endopterygoid; hm, hyomandibula; io-ii, infraorbital ii; io-iii, infraorbital iii; io-iv, infraorbital iv; iop, interopercle; lac, lacrimal; mpt, metapterygoid; mx, maxilla; obs, orbitosphenoid; op, opercle; pop, preopercle; ps, pectoral spine; psp, pterosphenoid; pt-scl, posttemporo-supracleithrum; q, quadrate.

the vomerine toothplate, which was not observed in the Kwanza specimens. Finally, in the paratype specimens, the parapophyses of the fifth vertebra are more curved anteriorly, giving the Weberian apparatus a posteriorly rounded shape. In the Kwanza specimens, the parapophyses have less curvature, giving the Weberian apparatus a more rectangular shape (Figs. 3, 4). Poll (1977) stated in the original description that *P. machadoi* lacks serration on the pectoral spines. However, in the two type specimens we examined, one has serration on the anterior margin of the pectoral fin spine, while the other (Fig. 4A) does not. Both Kwanza specimens have serration on the anterior margin of the pectoral spine (Fig. 4B).

DNA sequence data from the mitochondrial cytochrome oxidase subunit 1 (CO1) gene for both Kwanza specimens are available from the Barcode of Life Data System (Ratnasingham and Hebert 2007) under sample identification codes SAFW242-08 and SAFW541-09.

Discussion

From our morphometric and osteological examination of SAIAB 85165 and 85482 from the Kwanza River, we conclude that these samples are conspecific with *Platyclarias machadoi*. The alternative possibilities are that these specimens belong to a different described species or that they represent a new taxon. In comparing these specimens to the 14 clariid genera known from Africa, *Bathyclarias*, *Clarias*, *Dinotopterus*, and *Xenoclarias* Greenwood, 1958 can be excluded from consideration as all of these taxa exhibit a robustly armored skull including a large plate-like fourth infraorbital and suprapreopercle. The anguilliform genera *Channallabes*, *Dolichallabes*, *Gymnallabes*, and *Platyallabes* can also be excluded, as these all have anal and dorsal fins that are confluent with the caudal fin. The genus *Tanganikallabes* can be discounted as its members lack an anterior cleithral process. The monotypic Lake Tanganyika endemic, *Pseudotanganikallabes* Wright, 2017 can be ruled out by its lack of an ossified infraorbital series and likewise the troglobitic *Uegitglanis* Gianferrari, 1923 by its lack of an encapsulated swim bladder. The genus *Clariallabes* is poorly defined and generally represents taxa with characteristics that are intermediate between *Clarias* and the more anguilliform genera. From examination of photographs of the type specimens of the 16 nominal *Clariallabes* species, we find all to differ from the Kwanza specimens by having the upper jaw extend beyond the lower. Additionally, six *Clariallabes* species (*C. brevibarbis* Pellegrin, 1913; *C. heterocephalus* Poll, 1967; *C. melas* Boulenger, 1887; *C.*

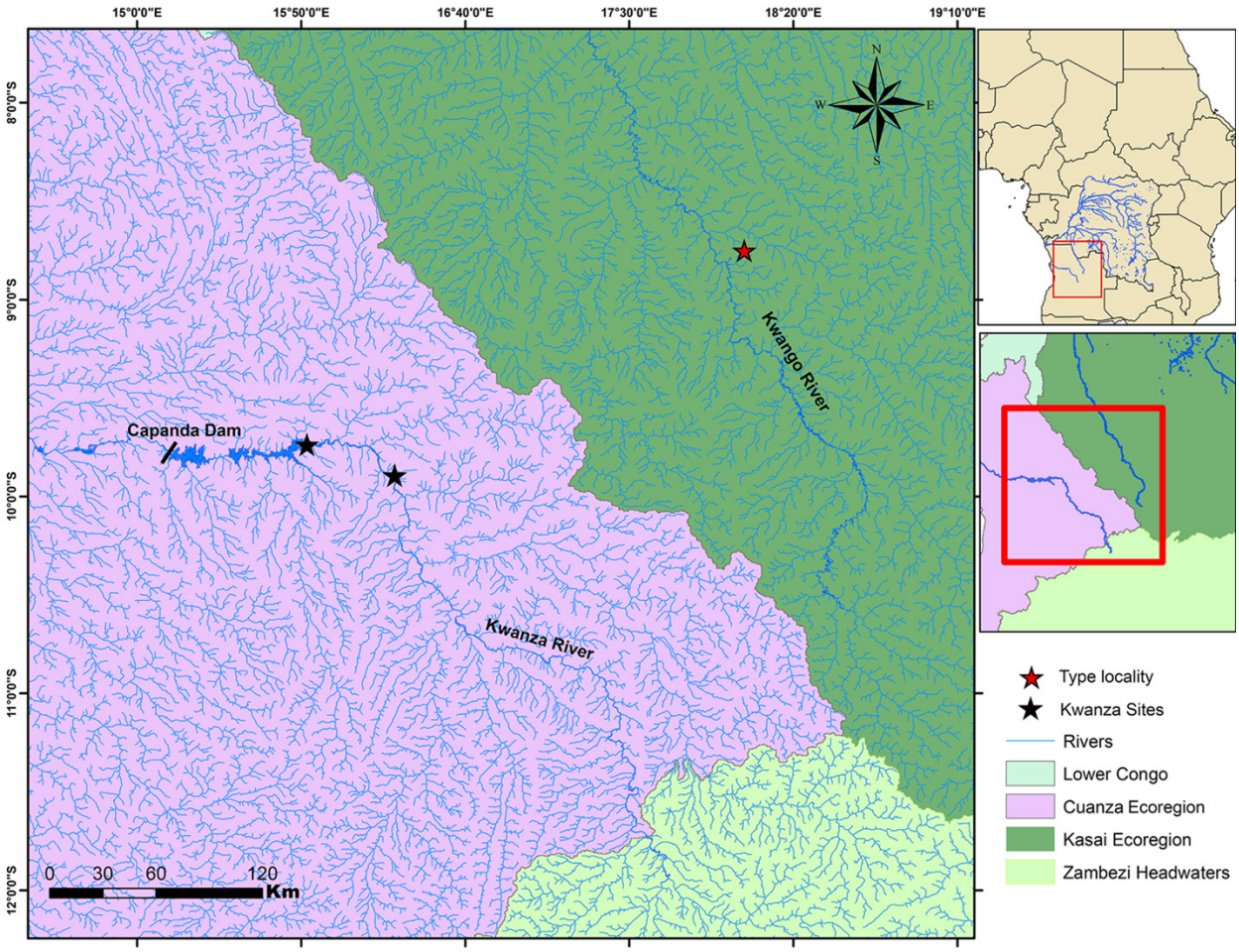

Figure 6. Map of northern Angola showing type locality of *Platyclarias machadoi* near the Kwango River at Cafunfo and recent collection sites on the Kwanza River.

petricola Greenwood, 1956; *C. uelensis* Poll, 1941; and *C. variabilis* Pellegrin, 1926) have anal and dorsal fins that are confluent with the caudal fin. We do note, however, that *C. teugelsi* Ferraris, 2007 and *C. platyprosopos* Jubb, 1965 both have wide, flattened heads and a drab brown coloration, giving them superficial similarity to the Kwanza specimens. *Clariallabes teugelsi* can be further differentiated by its long maxillary barbels, which extend to or beyond the pelvic fins (vs. not reaching the dorsal fin origin in *Platyclarias*) and the presence of robust serration on both the anterior and posterior margins of the pectoral spine (vs. weak serration on the anterior margin only). *Clariallabes platyprosopos* can be differentiated from *Platyclarias* by its greater interorbital width (48–60% head length vs. 29–42% head length) and a thicker band of vomerine teeth (8–12 rows of teeth at midline vs. 3–4).

While it is evident that the two clariid specimens from the Kwanza are most similar to *Platyclarias machadoi*, it remains possible that they are a distinct, undescribed species within *Platyclarias*. As noted above, we found three osteological differences between the Kwanza and Kwango specimens. However, these differences were only confirmed for the two *P. machadoi* paratypes that were CT-scanned and the one illustrated by Devaere et al. (2006). We consider two and three individuals to be insufficient to account for the potential range of variation at either location. Without additional samples from the Kwanza River, we find the available data to best support conspecificity between the two specimens in question and the *Platyclarias* types.

The collection localities of the two SAIAB specimens were about 250 km southwest of the type locality of *Platyclarias machadoi* (Fig. 6). Notably, the Kwango River is a tributary of the Kasai, itself a tributary of the Middle Congo River, while the Kwanza flows into the Atlantic far south of the Congo's mouth. The two localities correspond to separate freshwater ecoregions according to Thieme et al. (2005) and to separate ichthyofaunal provinces (Angolan and Congolian), following Lévêque and Paugy (2017). Of the 15 other clariid species known from Angola, six (*Channallabes apus* Günther, 1873; *Clarias angolensis* Steindachner, 1866; *C. dumerilii* Steindachner, 1866; *C. gariepinus* Burchell, 1822; *C. ngamensis* Castelnau, 1861; and *C. stappersii* Boulenger, 1915) also occupy both the southern Congo and Kwanza basins (Skelton 2019). Given the air-breathing capabilities of many clariid species, dispersal between drainages is more likely than for many other taxa (Roberts 1975). However, *Platyclarias* has a relatively reduced suprabranchial respiratory organ compared to these other clariids and appears to occupy a

different habitat. Whether it does in fact have more restricted dispersal abilities and a correspondingly narrow distribution will not be known until more thorough, targeted sampling is performed.

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Author Contributions

Conceptualization: MJB, MLJS. Data curation: ERS, DSN. Investigation: MJB, ERS, DSN. Methodology: MJB. Resources: DSN. Supervision: MLJS. Writing – original draft: MJB. Writing – review and editing: MJB, ERS, MLJS.

References

Devaere S, Adriaens D, Teugels GG, Verraes W (2006) Morphology of the cranial system of *Platyclarias machadoi* Poll, 1977: interdependencies of skull flattening and suspensorial structure in Clariidae. Zoomorphology 125: 69–85. https://doi.org/10.1007/s00435-005-0012-7

Devaere S, Adriaens D, Verraes W (2007a) Survey of the anguilliform Clariidae (Teleostei, Siluriformes) of Gabon and Republic of Congo, with description of two new species and key to the African clariid genera. Belgian Journal of Zoology 137: 99–109.

Devaere S, Jansen G, Adriaens D, Weekers P (2007b) Phylogeny of the African representatives of the catfish family Clariidae (Teleostei, Siluriformes) based on a combined analysis: independent evolution towards anguilliformity. Journal of Zoological Systematics and Evolutionary Research 45: 214–229. https://doi.org/10.1111/j.1439-0469.2006.00399.x

Lévêque C, Paugy D (2017) Geographical distribution and affinities of African freshwater fishes. In: Paugy D, Leveque C, Otero O (Eds.) The inland water fishes of Africa: diversity, ecology and human use. IRD Éditions, Tervuren, Belgium, 97–114.

Pettersson L (2004) National strategy plan for rehabilitation of the hydrometric network in Angola. Norwegian Water Resources and Energy Directorate 8: 1–31.

Poll M (1977) Les genres nouveaux *Platyallabes* et *Platyclarias* comparés au genre *Gymnallabes* GTHR. Synopsis nouveau des genres de Clariidae. Bulletin de la Classe des Sciences 5: 122–149.

Ratnasingham S, Hebert PD (2007) BOLD: the Barcode of Life Data System (http://www.barcodinglife.org). Molecular Ecology Notes 7: 355–364.

Roberts T (1975) Geographical distribution of African freshwater fishes. Zoological Journal of the Linnean Society 57: 249–319. https://doi.org/10.1111/j.1096-3642.1975.tb01893.x

Skelton P (2019) The Freshwater Fishes of Angola. In: Huntley BJ, Lages F, Russo V, Fernada N (Eds.) Biodiversity of Angola science & conservation: a modern synthesis. Springer, Cham, Switzerland, 207–242. https://doi.org/10.1007/978-3-030-03083-4

Thieme ML, Abell R, Stiassny MLJ, Skelton P, Lehner B, Teugels GG, Dinerstein E, Tohma AK, Burgess N, Olsen D (2005) Freshwater ecoregions of Africa and Madagascar: a conservation assessment. Island Press, Washington DC, USA, 183 pp.

Wright J, Bailey R (2012) Systematic revision of the formerly monotypic genus *Tanganikallabes* (Siluriformes: Clariidae). Zoological Journal of the Linnean Society 165: 121–142. https://doi.org/10.1111/j.1096-3642.2011.00789.x