

Redescription of *Dolichallabes microphthalmus* (Poll, 1942) (Siluriformes, Clariidae)

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As a part of the general revision of anguilliform clariid genera and species, the status of *Dolichallabes microphthalmus* Poll, 1942, is reviewed, based on morphology and osteology of all available museum specimens. *Dolichallabes microphthalmus*, the most elongate species within the Clariidae, has been redescribed. Compared to *Channallabes apus* and *Gymnallabes typus*, *D. microphthalmus* is characterized by, in addition to some meristic differences, an elongate body, reduced skull ossification, with (1) one elongate fontanel, (2) antorbital and infraorbital IV the only circumorbital bones present, (3) only one or two suprapreopercular bones on each side, and (4) a sphenotic bearing only one process. Osteological evidence suggests that *D. microphthalmus* could be considered a paedomorphic clariid.

CLARIIDAE is one of the 35 catfish families within the Siluriformes; they occur naturally in freshwaters in Africa, Middle East and Southeast Asia (Teugels, 1996). Their diversity is largest in Africa where 12 genera are known, including 74 species (Teugels, 1996).

Clariid catfishes are characterized by an elongate body, the presence of four barbels, long dorsal and anal fins, and especially by the unique presence of a suprabranchial organ, formed by arborescent structures from the second and fourth gill arches (Greenwood, 1961; Teugels and Adriaens, 2003).

Within the Clariidae, the presence of a range between fusiform and anguilliform genera has been noted (Pellegrin, 1927). Although this has been observed in other families of teleosts, amphibians, and reptiles (Lande, 1978), it is never so extreme as within the Clariidae. Together with the elongated body, a whole set of morphological changes are observed, such as decrease and loss of the adipose fin, continuous unpaired fins, reduction of paired fins, reduction of the skull bones, reduction of the eyes, and hypertrophied jaw muscles. The genus *Heterobranchius* Geoffrey St.-Hilaire, 1809, recognized by a large, robust body, a large adipose fin, and a strongly ossified head, has the most fusiform body, whereas the genus *Dolichallabes* Poll, 1942, with an extreme anguilliform body, continuous unpaired fins and reduced skull, is the most anguilliform within the clariids. In this study, *Dolichallabes microphthalmus* is compared to two other anguilliform species. *Channallabes* Günther, 1873, is a monotypic genus, *Channallabes apus* Günther, 1873, is found in the Congo River basin up to Kisangani, in North Angola and in the Kouilou region in Congo-Brazzaville. The genus *Gymnallabes* Günther, 1867, currently

comprises three species: *Gymnallabes alvarezi* Roman, 1970 (Ogooué River system and Equatorial Guinea), *Gymnallabes nops* Roberts and Stewart, 1976 (Lower Congo stream), and *Gymnallabes typus* Günther, 1867 (Niger delta, Nigeria and Cameroon). The phylogenetic relationships of these, phenetically similar, genera are not known but is the subject of a research in progress.

Presently, anguilliform clariid taxonomy is poorly understood and no reliable, updated keys are available. The only keys incorporating the anguilliform clariids are those of Poll (e.g., 1977). The characters used in this key, such as presence of paired fins, number of ribs, and vertebrae are no longer discriminative and overlap among species. This is partially because of the limited number of specimens used in the original descriptions of the species (*G. typus*: $n = 1$, *G. alvarezi*: $n = 1$, *C. apus*: $n = 1$, *D. microphthalmus*: $n = 7$). Preliminary research shows that the above-mentioned species should be valid but that inferences on a higher taxonomical level are inconclusive at this point (e.g. *G. alvarezi* is very phenetically and cladistically similar to *G. typus* and *C. apus*). The current redescription is based on the type material and 14 specimens from the Lower and Middle Congo Basin. This expands the size range (66–210 mm SL) considerably, compared to that given in Poll (1942a).

The objectives of this paper are (1) to demonstrate that *D. microphthalmus* is a valid species differing from other anguilliform representatives *G. typus* and *C. apus*; (2) to redescribe *D. microphthalmus* based on a substantially expanded dataset (compared to the original description) and (3) to provide diagnostic characters for this species.

MATERIALS AND METHODS

This study is based on all known museum material of *D. microphthalmus*. All 19 specimens are housed in the Royal Museum for Central Africa (MRAC; Tervuren, Belgium). These include the holotype (MRAC 44655) and the four paratypes (MRAC 44656–659, $n = 3$; and 62407). Two of these specimens (MRAC 62407 and 79260) are cleared and stained following the procedure of Taylor and Van Dyke (1985), for osteological examination. Because the taxonomic status at the genus level is indistinct, as already mentioned, we compared this material to a large sample of two species, *G. typus* and *C. apus*, which are according to Poll (1977), morphologically the closest relatives of the former species (list of specimens is given in the section Comparative material examined). In this paper we use *G. typus* as the only representative of the genus *Gymnallabes*. This is due to the questionable generic placement of *G. alvarezi* (Roman, 1970; research on the systematic position of *G. alvarezi* in progress), and furthermore we do not take into account the, one specimen based, description of the albino and eyeless species *Gymnallabes nops* (Roberts and Stewart, 1976), of which only the holotype is known.

Measurements.—On each specimen, 36 measurements were taken point-to-point using digital callipers to 0.1 mm (digital ruler, Mauser), interfaced directly with a computer.

Measurements terminology follows that of Teugels (1986), with some additions: total length (TL); standard length (SL); preanal length (PaL); prepelvic length (PPvL); prepectoral length (PPcL); predorsal length (PdL); distance between the occipital process and the dorsal fin (SPDFL); pelvic-fin length (PvFL), pectoral-fin length (PcFL); pectoral-spine length (PcSL); caudal-peduncle depth (CPD); body depth at anus (ABD); maxillary barbel length (MxB); external mandibular barbel length (EmnB); internal mandibular barbel length (ImnB); nasal barbel length (NB); interpelvic distance (IpdV); interpectoral distance (IpcD); skull length (SKL); preorbital length (PoL): measured from the tip of the premaxillae to rostral border of the eye; skull width (SkW); supraoccipital process length (SpL); supraoccipital process width (SpW), interorbital distance (IoD); anterior nostril interdistance (ANID); posterior nostril interdistance (PNID); rostral skull width (RSkW): measured at the level of the maxillary barbel; orbital skull width (OskW): measured at the level of the eyes; skull height (SkH); eye diameter (ED); snout height

(SnH); prehyoid length (PhL): measured from tip of premaxillae to hyoid skinfold; internal mandibular interdistance (ImnID); external mandibular interdistance (EmnID); mouth width (MW) and skull roof width (SkR): minimal width. For the analyses, measurements involving the paired fins are not considered because of their high level of intraspecific variation in their absence or presence in the anguilliform catfishes (Adriaens et al., 2002). For discussion on the nomenclature of the circumorbital bones in clariids, we refer to Adriaens et al. (1997).

The following meristic counts were made on each specimen with a MPG 65 generator and a RSN 620 X-ray-tube (General Electric; 42kV, 320Ma, 10msec, focus distance: 1 m): total number of vertebrae (TV), number of ribs (RB). Holotype values are given in parentheses. Institutional abbreviations follow Leviton et al. (1985)

Dolichallabes microphthalmus Poll, 1942

Specimens examined.—Dem. Rep. Congo. Kunungu, MRAC 44655, adult male, 229 mm SL (holotype), MRAC 44656–659 ($n = 3$; 196–210 mm SL) and 62407, 188 mm SL (paratypes), MRAC 57662, 196 mm SL, MRAC 18850, 90 mm SL; Boende swamps, MRAC 101843, 149 mm SL, MRAC 176123–124 ($n = 1$), 68 mm SL; Bokuma, MRAC 79093, 134 mm SL, MRAC 93774, 66 mm SL; Bokuma–Tchuapa, MRAC 79258–260 ($n = 3$; 85–126 mm SL); Ndwa (Boloko), MRAC 78808–810 ($n = 3$; 99–110 mm SL); Inonge, MRAC 96672, 110 mm SL; Maylimbe, Tshela, MRAC 66721, 97 mm SL.

Diagnosis.—*Dolichallabes microphthalmus* can be distinguished from *C. apus* and *G. typus*, by the presence of one elongate fontanel; a reduced set of circumorbital bones (only antorbital and infraorbital IV are present); the presence of at most two suprapreopercular bones and the sphenotic bearing only one process. *Dolichallabes microphthalmus* can be further distinguished from *C. apus* by a narrow skull roof, a small distance between supraoccipital process and the dorsal fin, low number of ribs (6–9 instead of 10–17; Fig. 1A) and by a high number of precaudal rib less vertebrae (10–12 instead of 1–8); *D. microphthalmus* can be further distinguished from *G. typus* by a very elongate body (SL/ABD: 18–31 instead of 12.6–22), a narrow and short supraoccipital process, a large distance between the supraoccipital process and the dorsal fin and a high number of vertebrae (95–116 instead of 78–86; Fig. 1B).

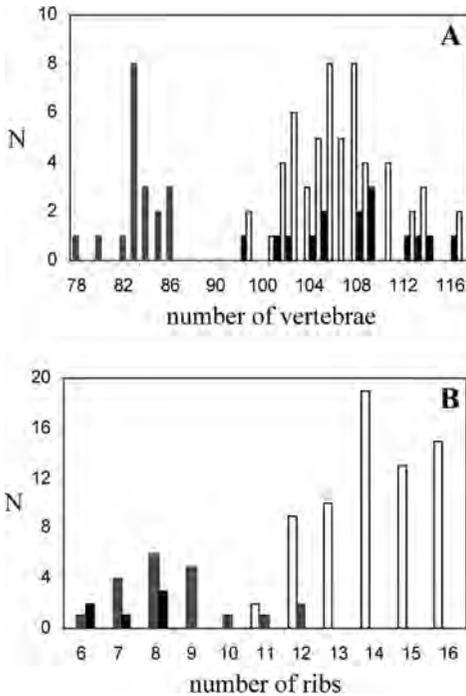


Fig. 1. (A) Histogram of the number of vertebrae. (B) Histogram of the number of ribs. □: *Channallabes apus*; ■: *Gymnallabes typus*; ▒: *Dolichallabes microphthalmus*.

Description.—Proportional measurements and counts given in Table 1. *Dolichallabes microphthalmus* characterized by very elongate body (Fig. 2; ABD up to 3.4–5.8% of SL). Skull length to SL ratio very small. Skull width 45.5–62.5% of skull length. Very narrow skull roof, width 25–40% of maximal skull width. Large specimens with skull roof nearly hidden by large, dorsomedial outgrowth of hypertrophied adductor mandibulae complex (pars A_2A_3'). In smaller specimens, adductor mandibulae situated lateral to skull roof (at level of lateral ethmoid and frontal), leaving skull roof clearly visible. Eyes small.

Mouth width equals or exceeds interorbital distance. Lower lip equals or overgrows upper lip. Distinct tubelike anterior nostrils are present.

Unpaired fins continuous. Pectorals always present, although in some specimens extremely reduced. Length 10–41% of SkL. Pelvic fins present, though very small, in only two specimens (MRAC 78808–810 and MRAC 66721); in the other specimens no evidence of pelvic fins. Supraoccipital process-dorsal fin distance small. Vertebrae 95–114 (mode = 109) (112). Ribs 6–9 (mode = 8) (6). Branchiostegal rays 10 (10). Dorsal fin (156). Anal fin (136).

Teeth present on premaxilla and prevomer. On premaxilla, tooth plates width 30% of tooth plates length. Prevomer tooth plate shows two backwardly curved wings, as in most other clariids (Cabuy et al., 1999; Devaere et al., 2001).

The coloration of the alcohol preserved specimens mainly brown, with continuous transition from darker dorsal side to lighter ventral side. Unpaired fins light brown. Pectorals and nares lack any colour. The barbels have light-brown coloration except for darker bases.

In the skull roof, both anterior and posterior fontanel elongate and continuous with each other (Fig. 3B), resulting in typical longitudinal furrow on dorsomedial skull roof. Left and right frontals do not come in contact, apart from the ossification surrounding the epiphysial bridge.

Extreme reduction of circumorbital series. Except for infraorbital IV and antorbital, all bones of that series as well as the lacrimal (first infraorbital) absent. Infraorbital IV reduced to tubelike bone and only remaining protection for infraorbital canal. This is the most reduced situation observed within anguilliform clariids.

Suprapreopercular bones, enclosing proximal part of preoperculo-mandibular canal, also reduced. One or two suprapreopercular bones present, with dorsal one always bearing platelike extension and ventral ones tubular.

Sphenotic of *D. microphthalmus* only has small cartilaginous articular ridge for hyomandibula and one distinct process that descend to fix latter at its rostral margin. Pterotic bears two or three processes, which lock posterior hyomandibular processes.

Distribution.—*Dolichallabes microphthalmus* was originally described from Kunungu, close to the central Congo River. Furthermore, this species is found in the same region around Bolobo and in the swamp areas near to Boende, Bokuma (Tshuapa) and Ingonge, in the Ruki Basin; it has also been collected around Maylimbe, Tshela region, on the Lower Congo Basin (Fig. 4).

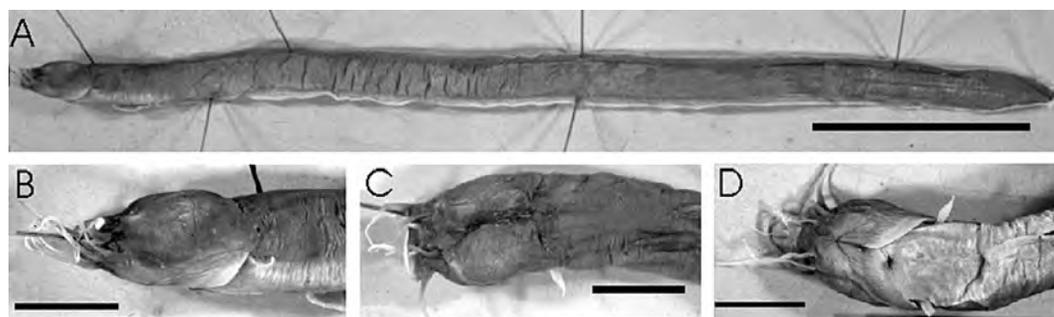
DISCUSSION

According to Poll (1942a, 1977), *Dolichallabes* is diagnosed from other anguilliform species by a very elongate body; small skull roof, covered with muscles; eyes hardly visible, covered with skin; small pectoral fins and the absence of pelvic fins; 106 vertebrae and 6 pairs of ribs. Based on this study, Poll's diagnostic characters do not delineate *D. microphthalmus* unambiguously.

The two best characteristics for diagnosing *D. microphthalmus* (Fig. 3B), are (1) the presence of a single large fontanel in the skull roof, com-

TABLE 1. MEASUREMENTS AND MERISTIC DATA FOR *Dolichallabes microphthalmus*. Abbreviations used are explained in the text. Because of decalcification, it was impossible to count the number of ribs of most specimens.

	Holotype	Paratypes				n	Other specimens examined	
		1	2	3	4		Range	Mean \pm SD
TL (mm)	240	216	221	206	195	14	69–202	
SL (mm)	229	205	210	195	188	14	66–196	
Measurements in % SL								
PaL	21.5	22.8	22.8	22.1	19.7	14	20.8–29.3	24.2 \pm 2.2
PPcL	6.5	7.1	6.9	7.1	7.4	14	6.8–10.3	8.5 \pm 0.9
PdL	11.8	13.0	12.2	13.3	12.2	14	12.7–17.4	15.3 \pm 1.6
SPDFL	5.3	5.3	5.6	6.3	5.3	14	5.2–8.0	6.6 \pm 0.9
PcFL	1.8	1.9	2.0	2.0	1.0	14	0.8–3.8	2.2 \pm 0.8
CPD	2.4	2.0	2.3	1.7	1.1	14	1.7–3.7	2.3 \pm 0.5
ABD	3.8	3.3	3.2	3.3	3.3	14	3.4–5.8	4.2 \pm 0.6
IpcD	3.7	3.7	3.8	3.3	3.5	14	3.4–5.9	4.4 \pm 0.7
SkL	6.5	7.2	6.7	6.9	6.6	14	6.7–10.4	8.6 \pm 0.9
Measurements in % SKL								
PoL	69.4	72.4	73.8	73.8	63.6	14	67.6–78.6	72.6 \pm 3.0
SpL	7.8	12.6	14.0	9.4	8.3	14	9.0–24.1	17.2 \pm 4.7
SkW	59.7	53.1	61.3	55.6	66.7	14	44.5–60.1	52.2 \pm 4.3
SpW	18.5	11.9	15.0	13.4	14.5	14	13.0–28.5	22.4 \pm 4.5
IoD	28.2	31.0	26.4	30.9	20.2	14	18.0–32.6	25.0 \pm 3.8
ANID	13.3	15.0	13.1	15.6	8.9	14	11.6–26.3	15.3 \pm 3.8
PNID	31.2	27.6	25.0	22.3	23.1	14	16.5–30.5	25.6 \pm 4.2
RSkW	41.3	35.7	36.8	37.4	33.0	14	22.4–39.7	32.6 \pm 4.5
OSkW	53.9	45.8	51.2	49.8	50.6	14	36.4–51.5	44.1 \pm 4.4
SkH	49.4	36.6	62.6	46.6	45.8	14	31.0–43.3	38.5 \pm 3.6
ED	6.2	5.3	5.8	6.0	8.0	14	7.2–14.1	9.1 \pm 1.8
SnH	11.9	17.3	20.0	19.7	16.5	14	11.8–39.3	17.3 \pm 6.6
OSkH	31.2	28.3	32.8	32.2	36.6	14	17.3–32.4	24.0 \pm 4.4
PhL	30.9	32.6	32.9	35.2	20.9	14	18.3–31.1	23.7 \pm 4.2
IMnID	22.7	18.3	20.0	18.9	22.8	14	13.8–22.5	17.7 \pm 2.4
EMnID	39.1	33.9	35.5	31.1	38.1	14	25.1–37.9	31.3 \pm 3.3
MW	33.4	33.2	37.9	30.2	30.9	14	18.6–33.9	26.9 \pm 4.1
SkR	11.1	11.1	8.6	14.6	33.2	14	8.6–33.2	17.3 \pm 5.3
Meristics								
TV	112	109	109	114	108	14	95–113	106 \pm 6.1
RB	6	8	7	8	6			

Fig. 2. (A) Holotype of *Dolichallabes microphthalmus* (MRAC 44655); (B) lateral side, (C) dorsal side, and (D) ventral side of head. (Photographs: S. Devaere).

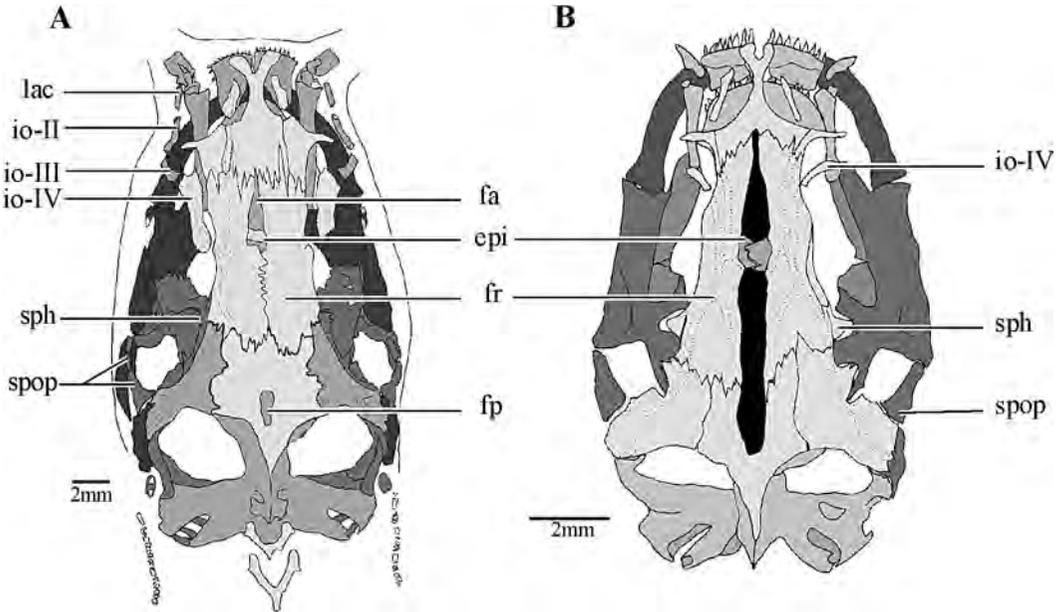


Fig. 3. Comparison of the dorsal view of the skull of (A) *Channallabes apus* (175247–270; after Devaere et al., 2001) and (B) *Dolichallabes microphthalmus* (229 mm SL; MRAC 62407). eph: epiphysial bridge, fa: anterior fontanel, fp: posterior fontanel, fr: frontal, io-II: infraorbital II, io-III: infraorbital III, io-IV: infraorbital IV, lac: lacrimal, sph: sphenotic, spop: suprapreopercular.

pared to two smaller fontanels (anterior and posterior) in other clariids (see below) and (2) infraorbital IV and antorbital as the only two bones present in the circumorbital series.

The situation of both characters in *D. microphthalmus* appears to correspond to that of larval *Clarias* (Adriaens and Verraes, 1998). During the early ontogeny of the skull roof in *C. gariepinus* (Burchell, 1822), a large fontanel is enclosed by the mesethmoid, the frontals and the parieto-supraoccipital bones. Later on, the configuration as observed in *D. microphthalmus* is

reached, where the frontals contact each other anteriorly and at the level of the epiphysial bridge. In *C. gariepinus*, as well as in all other clariids that have been examined, the large fontanel becomes subdivided as the posterior part of the frontals and anterior part of the parieto-supraoccipital contact each other at the midline (David, 1935; Poll, 1977). Consequently, an anterior fontanel is bordered by the paired frontals, whereas a posterior fontanel is enclosed by the unpaired parieto-supraoccipital bone (whose anterior halves subdividing the initial large fontanel have completely fused).

During that same period after hatching the different bones of the circumorbital series are formed. Again in *C. gariepinus*, it is shown that the lacrimal (infraorbital I) and the antorbital are the first bones of that series formed, followed by infraorbital II. In the next stage, infraorbital III and IV are the last bones that are formed (Adriaens and Verraes, 1998). In *C. gariepinus*, there is an antero-posterior developmental sequence.

When we compare the extreme reduction in the morphology of the circumorbital bones in *D. microphthalmus* to those of *C. apus* and *G. typus*, only a tubular infraorbital IV and antorbital are present in *D. microphthalmus*. Within *G. typus* and *C. apus* all infraorbital bones (II–IV), the antorbital and the lacrimal, are still present, al-

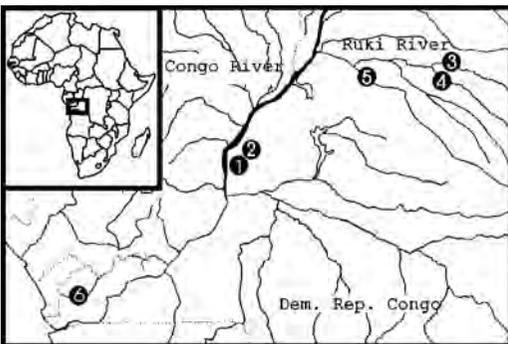


Fig. 4. Geographical distribution of *Dolichallabes microphthalmus* (dotted lines: state borders). 1: Kunungu; 2: Bolobo; 3: Boende; 4: Bokuma (Tshuapa); 5: Ingonge; 6: Maylimbe.

though very small compared to most other clariids (Cabuy et al., 1999; Devaere et al., 2001). In both species, the infraorbitals are reduced to tubular bones protecting the infraorbital canal, except for the infraorbital IV in *C. apus* where a lamina is still present. As a consequence, the eye and especially the infraorbital canal may no longer be sufficiently supported and protected. The reduction of the eye could then be considered as being advantageous when proper protection is lacking. However, both characters could be a consequence of the extensive jaw muscle hypertrophy. These similarities of the diagnostic features of *D. microphthalmus* with early stages of *C. gariepinus* suggest that *D. microphthalmus* could be a paedomorphic clariid. However, it has to be noted that both traits seem to be the result of different heterochronic processes, since only one of them (the neurocranial fontanel) strictly follows the ontogenetic sequence of *Clarias*.

A remarkable feature within the Clariidae is the presence of a continuous series of morphotypes between fusiform and anguilliform genera. The elongation of the body coexists with a whole set of morphological changes, such as continuous median fins, reduction of the paired fins, reduction of the eyes, reduction of several skull bones and hypertrophied jaw muscles. *Dolichallabes microphthalmus* can be considered as being the most anguilliform clariid from a group showing similar adaptations. Therefore it is important to look from this point of view at the different characteristics these anguilliform clariids have in common, as well as look for additionally characters in which they differ.

The high level of variation in the paired fins is not only present in *D. microphthalmus* but also in other anguilliform clariids (e.g., *G. alvarezi* and especially *C. apus*). This intraspecific level of variation represents a unique example of morphological variability at a microevolutionary level. In these species, fin reduction is related to body elongation and also coupled to girdle reduction, as observed in *C. apus* where the loss of pelvic fins is accompanied by the loss of the pelvic girdle (Adriaens et al., 2002). This makes the absence of paired fins no longer diagnostic for distinguishing the anguilliform clariid species. Additionally, pelvic fin loss has been reported for non-anguilliform clariids as well (Poll, 1941). Furthermore, the loss of fins in clariids may be related to a highly specialized fossorial life, as is observed in other vertebrates by O'Reilly et al. (1997).

Another adaptation to this fossorial life style is a reduced eye (Withers, 1981), since the utility of eyes is questionable in a burrowing life

style. Reduced eyes are also present in the other anguilliform species (Cabuy et al., 1999; Devaere et al., 2001) and some mastacembelid species (Poll, 1973). A reduced eye size is transformation related to the benthic and nocturnal life style of Siluriformes, as is also reflected in the general morphology of the chondrocranium (David and Poll, 1937; Adriaens and Verraes, 1997a,b).

The reduction of several skull bones (e.g., infraorbitals, frontals) and a hypertrophy of the adductor-mandibulae complex can be linked, since the reduction of these bones facilitates a more extensive growth and expansion in volume (e.g., during contraction) of the jaw muscles (Cabuy et al., 1999). The reduction of the skull roof is especially marked in the orbitotemporal and otoccipital region (Devaere et al., 2001). The orbitotemporal region of the skull in *D. microphthalmus* and *G. typus* is narrower, compared to that of *C. apus* (Fig. 3; Poll, 1942b; Cabuy et al., 1999).

The number of suprapreopercular bones is also reduced in contrast to *C. apus* and *G. typus*, where up to three suprapreopercular bones are present. At the level of the sphenotic there is also a reduction in the number of processes and the size of the articulation ridge.

COMPARATIVE MATERIAL EXAMINED

Channallabes apus. Angola. Ambriz, BMNH 1873.7.28.16 (Holotype); Other specimens, Dem. Rep. Congo. Bokalakala, MRAC 175247-270 ($n = 10$); Kinshasa, MRAC 97-056-P-0001-0003 ($n = 2$); Bumba, MRAC 88-25-P-2192-227 ($n = 36$); Boma, MRAC 939; Riv. Lula, Bushimaie, MRAC 153505; Kelé, MRAC 1491; Stanleyville, MRAC 30893-30900 ($n = 8$), MRAC 88-01-P-1976-1992 ($n = 17$); Riv. Ruki, Eala, MRAC 14747-49 ($n = 3$); Lake Tumba swamp area, MRAC 46299; Katanga, MRAC 39480; Riv. Botota, keseki, MRAC 67763-77 ($n = 15$); Mwila-bongongo, MRAC 72886-887 ($n = 2$); Dekese, Riv. Lofu, Anga, MRAC 153352; Yangambi, MRAC 68700; Riv. Oubangui, Imfondo, MNHN 1922-0029; Loango, MNHN 1924-0079, MNHN 1924-0080; Sangha, MNHN 1925-0137; Mogen-de, MNHN 1926-0155-59; Riv. Congo, MNHN, 1937-0124-25; Stanley pool, Bamu, MNHN 1958-0111; Boloko, Riv. Likouala, MNHN 1962-0401 ($n = 7$); Mossaka, Riv. Likouala, MNHN 1963-0402 ($n = 2$); Riv. Loadjili, Songolo, MNHN 1967-0143 ($n = 6$); Mangala, BMNH 1896.3.9.17; Riv. Lebuzi, Kaka Munu, BMNH 1912.4.1411-12 ($n = 2$); Lower Congo, BMNH 1887.1.13.8-9 ($n = 2$); Stanley Falls, BMNH 1889.11.20.5; New Antwerp, Upper Congo,

BMNH 1899.2.20.16; Siala-Ntoto Swamps, BMNH 99.11.27.92; Bangyville, Ubangi, BMNH 1907.12.26.34; Kashi, Lulua, MHNG 1248.3; Banana, NMW 47240-42; Mollunda, NMW 47245 ($n = 4$), NMW 47246. Congo. Yangala Youbi, MNHN 1967-0146; Djembo, Kouilou, MNHN 1967-0147; Cayo, MNHN 1989-0527; Riv. Nanga, between Boukou-Zassi and Kouilou swamp area, MRAC 90-57-P2315; Sintou, Riv. Kibombo, Kouilou, MNHN 1967-0144; Riv. Loadjili, Songolo, Pointe Noire, MNHN 1967-0145 ($n = 6$); Riv. Youbi, Noubi. Angola. Caungula, Mabete, Riv. Uamba, MRAC 162088; Riv. Camuconda, Tchimenji, MRAC 162089, MRAC 162090-094 ($n = 5$), MRAC 162095-100 ($n = 6$); Riv. Ganga-Ludchimo, MRAC162083-086 ($n = 4$)

Gymnallabes typus. Nigeria. Old Calabar, BMNH 1866.12.4 ($n = 2$) (Syntypes); Other specimens, Nigeria. Umu-Eze Amambra, MRAC 84-16-P-1-2; Riv. Sombreiro, East of Erema, MRAC 91-067-P0134; Niger Delta, MRAC 97-030-P-0001-0010 ($n = 10$); lake Odediginni, Agudama, Yenagoa, MRAC 92-083-P-0035-0036; Okaka, Epie Creek, Between Nun an Rashi Riv, MRAC 97-085-P-0001-0004 ($n = 4$); Riv. Sombreiro, Odiemerenyi, Ahoada, MRAC 91-067-P-0135-0136; New Calabar, Choba, MRAC 91-105-P-1; Rumuji Swamps, MRAC 86-10-P-72; Oshika, MRAC 84-28-P-28, MRAC 84-28-P-25; Riv. Cron, Itu, MRAC 88-36-P-10; Between Sapele and War, Niger Delta, MRAC 74-29-P-600; Muoha, New Calabar, MRAC 91-10-P-478; Biseni, Taylor Creek, MRAC 91-01-P278; Ossomari, BMNH 1902.11.10.119. Cameroun. Riv. Kom, Ntem, Aboulou, MRAC 73-18-P-3307-309.

ACKNOWLEDGMENTS

The authors thank F. Verschooten (University of Ghent) for the assistance during photographing the x-rays. Special thanks to M. Stiassny, C. Hopkins, J. Okouyi (M'Passa, Makokou) and the I.R.A.F. (Gabon) for assistance during sampling. Research was funded by the BOF of the Ghent University (project 01104299 and 01103401) and the FWO (project G.0388.00).

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