

The identity of *Clarias batrachus* (Linnaeus, 1758), with the designation of a neotype (Teleostei: Clariidae)

HEOK HEE NG^{1*†} and MAURICE KOTTELAT²

¹*Fish Division, Museum of Zoology, University of Michigan, 1109 Geddes Avenue, Ann Arbor, MI 48109-1079, USA*

²*Case Postale 57, Cornol, CH-2952, Switzerland*

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The identity of *Clarias batrachus*, a species hitherto thought to be widely distributed throughout South and Southeast Asia, is clarified by the designation of a neotype. The neotype designation is necessary because of the ambiguous data in Linnaeus' original description and it fixes the type locality to Java. The variability observed in what is currently recognized as *C. batrachus* is discussed; morphological and karyological data indicate that four species are confused under the name *C. batrachus*. © 2008 The Linnean Society of London, *Zoological Journal of the Linnean Society*, 2008, **153**, 725–732.

ADDITIONAL KEYWORDS: catfish – Clariidae – Ostariophysi – Siluriformes – taxonomy – walking catfish.

INTRODUCTION

Clarias Scopoli, 1777 is the largest genus in the Old World catfish family Clariidae, with about 48 species (Teugels, 1986; Ng, 2004) distributed in Africa and Asia. Of the 16 Asian species, perhaps none is more well studied than *Clarias batrachus* (Linnaeus, 1758). It is a species widely utilized in aquaculture, has appeared in the aquarium fish trade, and has been the subject of numerous studies on its biochemistry (e.g. Triparthi & Verma, 2003), behaviour (e.g. Ghosh & Pati, 2004), culture (e.g. Verreth *et al.*, 1993; Sahoo, Giri & Sahoo, 2004), toxicology (e.g. Chakraborty *et al.*, 1998) among others. The species is also of concern, because it has been introduced in many parts of the world (reviewed in Lever, 1996). Despite (or perhaps because of) the economic importance and the wealth of studies conducted about this species, the identity of *C. batrachus* has been assumed to be without problem and has never been seriously questioned. To date, *C. batrachus* is believed to be a

common species widely distributed throughout South and Southeast Asia (e.g. Hora, 1936; Kottelat, 2001).

While trying to establish the identity of *C. batrachus* for the description of a new *Clarias* from Pulau Redang (Ng, 2004), we discovered problems with the identity and nomenclature of *C. batrachus*, necessitating the designation of a neotype. This neotype designation forms the basis of this study. Further, we re-described the species on the basis of material from Java (where the type locality is located).

MATERIAL AND METHODS

Measurements were made point to point with dial callipers and data recorded to tenths of a millimetre. Counts and measurements were made on the left side of specimens whenever possible. Subunits of the head are presented as proportions of head length (HL). Head length and measurements of body parts are given as proportions of standard length (SL). Measurements follow those of Ng (1999). Asterisks after meristic counts indicate values for neotype. Numbers in parentheses indicate number of specimens examined.

Material examined in this study is deposited in the Naturhistoriska Riksmuseet, Stockholm (NRM), the

*Corresponding author. E-mail: heokheen@umich.edu

†Current address: Raffles Museum of Biodiversity Research, Department of Biological Sciences, National University of Singapore, 6 Science Drive 2, #03-01, Singapore 117546.



Figure 1. *Clarias batrachus*, neotype, NRM 54718, 174.1 mm SL. Dorsal, lateral and ventral views.

Museum of Zoology, University of Michigan, Ann Arbor (UMMZ) and the Zoological Reference Collection, Raffles Museum of Biodiversity Research, Singapore (ZRC).

CLARIAS BATRACHUS (LINNAEUS, 1758)

FIG. 1

Silurus batrachus Linnaeus, 1758: 305 (type locality: Asia, Africa).

Neotype: NRM 54718, 174.1 mm SL; Java: vicinity of Bandung; C. L. Hubbs, 22.v.1929.

Other material examined: UMMZ 155807 (3), 168.0–215.0 mm SL; data as for neotype. UMMZ 70684 (1), 101.2 mm SL; Java: Kali Mandiku Jember. UMMZ 155704 (3), 193.1–206.2 mm SL; Java: vicinity of Bogor. UMMZ 155708 (3), 136.8–153.0 mm SL; UMMZ 155710 (5), 55.3–139.0 mm SL; UMMZ 155711 (5), 162.0–209.0 mm SL; Java: Ranu Lamongan, lake at Klakah. UMMZ 155709 (1), 172.2 mm SL; Java: Ranu Klidungan. UMMZ 155801 (1), 116.6 mm SL; Java: Cikedang, tributary to Citanduy, 1.5 km N of Ciawi. UMMZ 155802 (2), 128.7–131.9 mm SL; Java: Ciwalen, tributary of Citanduy at Godebak between Panaunbangan and Panjalu. UMMZ 155803 (5), 128.0–152.0 mm SL; Java: vicinity of Singaparna. UMMZ 155805 (3), 81.8–159.7 mm SL; Java: Citi'i's (creek), just below road near mouth in Cimanuk, 3 km N of Garut. UMMZ 155806 (3), 153.6–183.9 mm SL;

Java: vicinity of Jakarta. UMMZ 155809 (1), 187.5 mm SL; Java: vicinity of Tasikmalaja. UMMZ 213398 (1), 170.4 mm SL; Java: vicinity of Bobotsari (near Gunung Slamet). ZRC 2585 (4), 170.1–244.8 mm SL; Java: Cilebut.

Diagnosis: *Clarias batrachus* is distinguished from all Asian congeners in having a narrow snout, in dorsal view with straight lateral outline and convex anteriorly (Fig. 1). It can be further distinguished from all Asian congeners in having a unique combination of the following characters: 63–74 dorsal-fin rays (vs. 82–108 in *C. nigricans*, *C. nieuhofii* and *C. pseudonieuhofii*; 56–63 in *C. fuscus*), 47–58 anal-fin rays (vs. 56–96 in *C. anfractus*, *C. nigricans*, *C. nieuhofii*, *C. pseudonieuhofii* and *C. sulcatus*), 54–60 vertebrae (vs. 61–71 in *C. anfractus*, *C. batu*, *C. insolitus*, *C. leiacanthus*, *C. microstomus* and *C. planiceps*), distance between occipital process and dorsal fin 5.5–8.9% SL (vs. 1.2–5.6% in *C. intermedius*, *C. macrocephalus*, *C. meladerma* and *C. pseudoleiacanthus*; 9.9–13.1% in *C. batu*, *C. insolitus* and *C. microstomus*), frontal fontanelle long and thin (vs. short and squat in *C. anfractus*, *C. brachysoma*, *C. dussumieri*, *C. kapuasensis*, *C. leiacanthus*, *C. olivaceus*, *C. planiceps* and *C. pseudoleiacanthus*), anterior margin of pectoral spine rugose and with irregular bumps (vs. smooth in *C. anfractus*, *C. kapuasensis* and *C. pseudoleiacanthus* and with distinct serrations in *C. brachysoma*, *C. dussumieri*, *C. fuscus*, *C. insolitus*, *C. intermedius*, *C. magur*, *C. meladerma*, *C. olivaceus* and *C. planiceps*).

Description: Biometric data as in Table 1. Head depressed; dorsal profile slightly convex and ventral profile almost straight. Snout narrow, lateral outline straight and anterior outline convex when viewed dorsally. Bony elements of dorsal surface of head covered with thick skin; bones not readily visible, but sutures sometimes evident. Frontal fontanelle long and thin ('knife-shaped' of Teugels, 1986: 6); anterior tip reaching just posterior to line through posterior orbital margin. Occipital process rounded. Eye ovoid, horizontal axis longest, subcutaneous; located dorso-laterally on head. Gill openings narrow, extending from dorsalmost point of pectoral-fin base to isthmus. Gill membranes free from but united to each other across isthmus.

Mouth narrow and subterminal, with fleshy, plicate lips. Oral teeth small and in irregular rows on all tooth-bearing surfaces. Premaxillary tooth band rectangular, with median notch on posterior edge. Dentary tooth band much narrower than premaxillary tooth band at symphysis, tapering laterally. Vomerine tooth band unpaired, continuous across midline; crescentic and smoothly arched along ante-

Table 1. Morphometric data for *Clarias batrachus* ($N = 20$)

	Neotype	Range	Mean \pm SD
Standard length (mm)	174.1	81.8–215.0	
%SL			
Predorsal length	34.7	32.9–37.8	35.1 \pm 1.5
Preanal length	51.8	49.6–54.0	52.4 \pm 1.4
Prepelvic length	43.7	42.4–46.9	44.4 \pm 1.4
Prepectoral length	21.9	19.0–23.3	21.5 \pm 1.4
Length of dorsal-fin base	68.7	61.2–70.0	66.0 \pm 2.7
Anal-fin length	48.2	44.0–50.1	47.2 \pm 1.9
Pelvic-fin length	10.5	9.3–10.5	9.8 \pm 0.5
Pectoral-fin length	16.0	12.5–16.0	14.4 \pm 1.1
Pectoral-spine length	13.3	8.7–13.5	11.8 \pm 1.5
Caudal-fin length	14.7	13.7–17.8	15.4 \pm 1.4
Body depth at anus	14.9	12.5–15.9	14.2 \pm 1.0
Caudal peduncle depth	6.8	6.6–8.1	7.2 \pm 0.5
Distance between occipital process and dorsal fin	6.4	5.5–8.9	7.1 \pm 1.1
Head length	28.8	26.8–30.4	28.6 \pm 1.2
Head width	19.7	17.9–20.5	19.4 \pm 0.9
Head depth	13.3	11.5–14.0	12.8 \pm 0.9
%HL			
Snout length	27.3	26.1–33.6	29.1 \pm 2.3
Interorbital distance	42.8	41.1–44.6	42.4 \pm 1.1
Eye diameter	6.2	5.5–9.2	6.7 \pm 1.2
Frontal fontanelle length	22.3	18.8–28.5	22.9 \pm 2.7
Frontal fontanelle width	6.2	3.6–6.4	5.4 \pm 0.9
Occipital fontanelle length	13.1	6.8–13.1	10.8 \pm 2.1
Occipital fontanelle width	4.0	2.7–6.9	4.8 \pm 1.2
Occipital process length	13.1	12.5–17.4	14.5 \pm 1.8
Occipital process width	30.1	26.1–30.7	28.6 \pm 1.7
Nasal barbel length	68.9	54.4–83.0	68.8 \pm 8.0
Maxillary barbel length	105.1	84.7–130.2	104.2 \pm 11.7
Inner mandibular barbel length	68.5	51.2–80.9	63.2 \pm 9.0
Outer mandibular barbel length	83.7	73.9–99.7	85.0 \pm 8.5

rior margin, posterior margin with a median posteriorly directed process. Premaxillary and dentary teeth viliform, vomerine teeth subgranular.

Barbels in four pairs; long and slender with thick fleshy bases. Maxillary barbel extending nearly to base of first dorsal-fin ray. Nasal barbel extending nearly to tip of occipital process. Inner mandibular-barbel origin close to midline; barbel thicker and longer than nasal barbel and extending to base of pectoral spine. Outer mandibular barbel originating posterolateral of inner mandibular barbel, extending to tip of pectoral fin.

Body cylindrical, becoming compressed towards caudal peduncle. Dorsal profile rising gently from tip of snout to origin of dorsal fin and thereafter almost horizontal to end of caudal peduncle. Ventral profile slightly convex to middle of head and thereafter almost horizontal to end of caudal peduncle.

Skin smooth. Lateral line complete and midlateral in position. Vertebrae 17 + 37 = 54 (1), 19 + 39 = 58 (2), 20 + 38 = 58 (2), 19 + 40 = 59 (1), 20 + 39 = 59 (5), 21 + 38 = 59 (2), 19 + 41 = 60 (1), 20 + 40 = 60* (3) or 21 + 39 = 60 (3).

Dorsal fin with long base, spanning posterior three-quarters of body; with 63 (1), 64 (2), 65 (1), 66 (3), 67 (1), 68 (4), 69* (2), 70 (1), 71 (3) or 74 (2) rays covered by thick layer of skin and without spine. Dorsal-fin margin straight, parallel to dorsal edge of body. Anal fin with long base and 47 (1), 50 (1), 51* (6), 53 (4), 54 (2), 55 (2), 56 (1), 57 (2) or 58 (1) rays covered by thick layer of skin; margin straight and parallel to ventral edge of body. Dorsal and anal fins separate from caudal fin. Caudal fin rounded, with i,7,7,i* (16) or i,8,7,i* (4) principal rays.

Pectoral fin with small spine, sharply pointed at tip, and 8,i (20) rays. Anterior margin of spine rugose,

with a series of low, irregular bumps. Pectoral fin margin straight anteriorly, convex posteriorly. Pelvic fin origin at anterior third of body, with i,5 (20) rays and convex margin; tip of fin reaching base of first few anal-fin rays. Anus and urogenital openings located at vertical through middle of pelvic fin.

Coloration: Dorsal and lateral surfaces of head and body grey to dark grey, fading to pale grey on ventral surfaces. Eleven to 15 vertical rows of two to five minute white spots present, subtended ventrally with an irregular row of minute white spots running just below lateral line. An additional irregular row or two of white spots sometimes present on body dorsal to anal-fin base. Dorsal and caudal fins grey to dark grey with very thin hyaline distal margin. Anal fin light grey, with thin hyaline distal margin. Pectoral-fin rays grey to dark grey, with hyaline interradiation membranes. Pelvic fin hyaline. Barbels and pectoral spine grey to dark grey dorsally and light grey ventrally.

Distribution: *Clarias batrachus* is definitively known only from river drainages in Java. Records of *C. batrachus* from mainland Southeast Asia and the rest of Sundaic Southeast Asia are likely to refer to two separate, undescribed species (see Discussion). The species has been recorded from the Philippines, but we were unable to examine material to ascertain the identity of this population.

DISCUSSION

Neotype designation: *Silurus batrachus* Linnaeus, 1758 is the name applied to a species usually considered to be widely distributed in Asia (e.g. Hora, 1936; Kottelat, 2001). However, the original description by Linnaeus could apply to a number of other *Clarias* species (see below), the type series is lost, the type locality is not clear and several species are presently confused under this name. This is a *prima facie* case of a situation that can only be resolved by a neotype designation (International Code of Zoological Nomenclature, art. 75.3.1).

Linnaeus's (1758) original description of *Silurus batrachus* is a very brief diagnosis based on the account in the second volume of his *Museum Adolphii Friderici*. This last work was already written prior to the publication of Linnaeus (1758) but was not published until 1764. In the 1758 work, in the reference to the 1764 text, the page number is replaced by '..'. Nevertheless, the specimen(s) on which the 1764 account is based constitute(s) the type series.

Linnaeus (1764) starts with a reference to the 1758 work (obviously added in the time interval) and is followed by a description from which it is not possible

to deduce whether it was based on one or more than one specimen. There is no further bibliographic reference, which indicates that the description was original and therefore material [specimen(s), drawing(s)] was available to Linnaeus (S. O. Kullander, pers. comm.). The fact that Linnaeus gave a single value (without a range) for the meristic characters may indicate he had a single specimen, but this is not certain. Fernholm & Wheeler (1983: 219) lists NRM 71 as holotype of *Silurus batrachus* but Teugels & Roberts (1987) have shown that this specimen in fact is part of the type series of *Silurus anguillaris* also described by Linnaeus (1758). Teugels & Roberts considered it as the holotype of *Silurus anguillaris*, but it is in fact a syntype [the references listed under *Silurus anguillaris* in Linnaeus (1764) include the works of Russell and Gronovius, so the material used by these authors is part of the type series; see also Ferraris (2007)]. The whereabouts of the type series of *Clarias batrachus* are not known. It is not listed in the catalogues of Linnaean material in NRM (Fernholm & Wheeler, 1983), the collection of the Linnaean Society, London (Wheeler, 1985) or Uppsala University (Wheeler, 1991).

The geographical origin of the material used by Linnaeus is enigmatic. Linnaeus (1758) indicated the distribution of the species as 'Asia, Africa' but in the actual description on which the 1758 account is based (Linnaeus, 1764) he did not give any distribution information. It might be that the mention of Asia and Africa means that he had two specimens, but, again, there is no evidence.

The description of *Silurus batrachus* in Linnaeus (1764) is vague, and does not mention many characters used presently to diagnose *Clarias* species. The only data of possible diagnostic value are the counts of the dorsal- and anal-fin rays, but the values given (60 dorsal-fin rays and 48 anal-fin rays) could refer to any of at least three African (*C. anguillaris*, *C. buettikoferi* and *C. gariepinus*) or at least three Asian species (*C. batrachus*, *C. fuscus* and *C. macrocephalus*). With the absence of the type series, the lack of critical information in the original description and the uncertainties with the type locality, the identity of the species can only be cleared by a neotype designation. The information in Linnaeus (1758) suggests that the description was potentially based on two or more specimens from two continents, thus belonging to two species as no *Clarias* species is present on both Asia and Africa. Because the name has always been used for an Asian species, current usage dictates that the neotype should be of an Asian origin.

As discussed below, there is evidence that more than one species have been confused under the name *C. batrachus* and before retaining the name for one of them, it seems appropriate to discuss the possible

origins of the Asian material that was potentially available to Linnaeus for study.

Based on the other Asian collections among the fish material examined by Linnaeus, the most likely origin would be Indonesia or China (S. O. Kullander, pers. comm.). There is no information allowing us to identify a possible source or collector for the *Silurus batrachus* material examined by Linnaeus, so it is impossible to reconstruct an itinerary that would restrict the list of possible localities. Much of the Far Eastern material collected at that time would have come from naturalists aboard trading ships that had visited these regions. Ships of the Swedish East India Company (Svenska Ostindiska Companiet) were regularly sailing from Gothenburg (Göteborg) to southern China (Canton, present-day Guangzhou) to trade during this period (1733–1813). Along the way, they frequently stopped over in Bengal and Java (Koninckx, 1980), so, if collected during one of these travels, there are three areas where specimens are more likely to have been collected: southern China, Bengal and Java.

It is impossible to determine if the Asian syntype(s) of *C. batrachus* has (have) been collected in one of these areas. The original description is too scant to offer any information that might distinguish between the material from these three areas. Therefore, we use our prerogative as first revisers to select the neotype from Java. We select specimen NRM 54718, from the vicinity of Bandung in Java, as neotype. The specimen, originally in UMMZ, was transferred to NRM because we believe it is important and most useful to taxonomists to have the neotypes of a nominal species described by Linnaeus available at the institution where one is most likely to search for it.

Identity of non-Javanese Clarias 'batrachus': What is currently recognized as *C. batrachus* consists of four species. Our comparison of the material from north-eastern India and Bangladesh available to us shows that the Indian material has a different head shape, resulting from a wider snout, with rounded lateral margins in dorsal view, than the Southeast Asian material (Fig. 2) and a more strongly serrated pectoral spine (Fig. 3). The Javanese material shows no significant ontogenetic change in head shape, but we do not have any small specimens of the Indian populations to determine if this is true for these fishes as well. Head shape in *Clarias* species does not change significantly with ontogeny (e.g. Ng, 1999: fig. 6), neither does it change much with the degree of mouth closure or barbel articulation (due to the inflexibility associated with the heavy ossification of the neurocranium) and can be reliably used as a diagnostic character for species. The same is also true of pectoral spine morphology. Furthermore, there is karyological evidence to

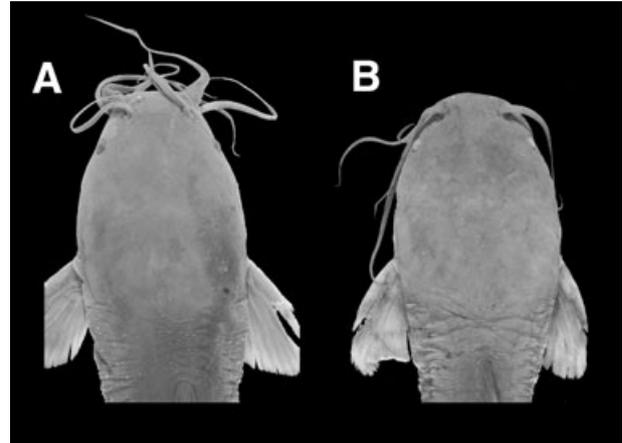


Figure 2. Head shapes of: A, *Clarias batrachus*, NRM 54718, neotype, 174.1 mm SL; B, *C. magur*, UMMZ 244686, 183.1 mm SL, showing the broader snout of the latter species.

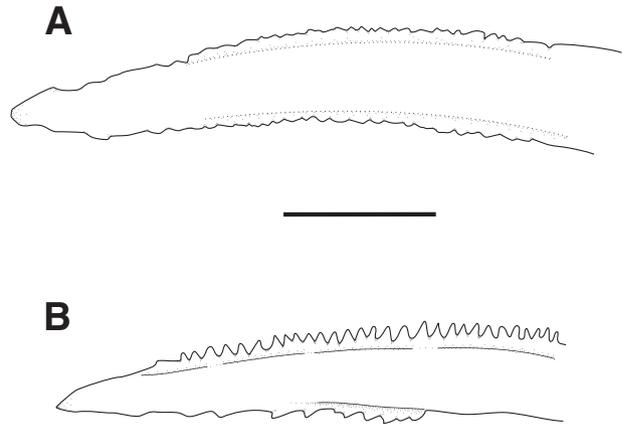


Figure 3. Schematic illustrations of left pectoral spines of: A, *Clarias batrachus*, UMMZ 155806, 183.9 mm SL; B, *C. magur*, UMMZ 244686, 183.1 mm SL. Scale bar = 5 mm.

indicate the distinctiveness of populations from parts of South and Southeast Asia previously identified as *C. batrachus*: material of various populations identified in the literature as *C. batrachus* from India has been recorded to possess a chromosome number ($2n$) of 50–54 and an arm number (FN) of 58–88 (reviewed in LeGrande, 1981), while material from Thailand similarly identified has been recorded with $2n = 100$ and FN = 108 (Donsakul & Magtoon, 1989). The significance of variation in chromosome number and arm number within the Indian material remains unclear and has not yet been investigated.

Because of the neotype designation, the Javanese species retains the name *C. batrachus*. The earliest available names for the north-eastern Indian species are *C. jagur* and *C. magur*, both nominal species

described by Hamilton (1822). They are simultaneous subjective synonyms, but Day (1889: 115), as first reviser, selected *C. magur* as the valid name, which should be used for the species of *Clarias* occurring in north-eastern India previously identified as *C. batrachus*. We were unable to examine material from other parts of India (most notably southern India) to determine their identities and to ascertain if all '*C. batrachus*' earlier recorded from the subcontinent belong to a single species only. However, Hora (1936) documented diversity in the toothplate morphology of Indian and Burmese material he identified as *C. batrachus* and this suggests that more than one species is involved.

We choose to retain the name *C. batrachus* for the Javanese species and not for the Indian, Indochinese or Sundaland (see below) species because of the likelihood of the original material having a Javanese origin. Although it is equally valid to argue that the original type material of *C. batrachus* might have come from India, we are using our prerogative as first revisers because it is currently not possible (nor will it ever be possible in the foreseeable future) to determine whether the original type material came from southern China, India or Java. The four species recognized here are cultured, but it is difficult to ascertain which is the most widely cultured (*C. batrachus*, *C. aff. batrachus* 'Indochina' and *C. aff. batrachus* 'Sundaland', and *C. magur*). Regardless, the choice of which of these four well-studied species will retain the name *C. batrachus* is a Gordian knot and whichever choice is made, the decision certainly frustrates more than half of the users, who will have to adjust to a new name. Unfortunately, there is no other way around this problem.

Our evidence that there are three species from Southeast Asia in what is now known as *C. batrachus* is presented below. All of the material from the Mekong River drainage (identified here as *C. aff. batrachus* 'Indochina') we have examined has a different shape of the supraoccipital process compared with the Sundaic material (assuming a more triangular shape; Fig. 4), which suggests that it is a different species (the shape of the supraoccipital process has been shown to be a useful diagnostic character in Asian *Clarias*; Teugels *et al.*, 1999). Material from the Malay Peninsula and Borneo (identified here as *C. aff. batrachus* 'Sundaland') is not considered conspecific with Javanese material in this study, because '*C. batrachus*' populations from the Malay Peninsula and Borneo have wider frontal fontanelles ('sole-shaped' of Teugels, 1986) than those from Java and mainland Southeast Asia ('knife-shaped' of Teugels, 1986). The significance of whether or not this truly represents an interspecific difference awaits close study of a large series of material from Sundaic

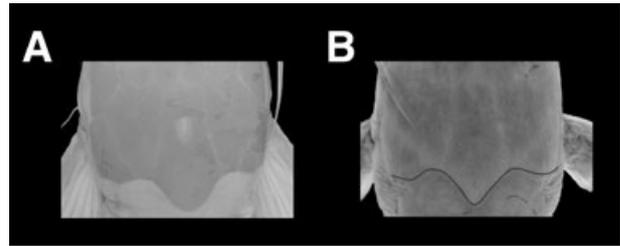


Figure 4. Posterior half of heads in: A, *Clarias batrachus*, ZRC 2585, 203.5 mm SL; B, *C. aff. batrachus* 'Indochina', ZRC 51005, 189.6 mm SL, showing differences in the shape of the supraoccipital process (outlined in black in the latter).

Southeast Asia. All of this previously undocumented diversity within what is now known as *C. batrachus* bolsters our argument for the need to fix the identity of *C. batrachus* with the designation of a neotype. However, the underlying need for a neotype fixation remains the unclear exact identity of *C. batrachus* (as defined in the original description) and the fact that the type series of *C. batrachus* contains both Asian and African species. Ideally, such a designation should be done in the context of a revisionary study of the *C. batrachus* species complex, but such a study is presently not possible because the required material is not available and will not be in a reasonably near future. While some of the areas where these species occur are fairly well sampled (e.g. Java), others (e.g. Borneo, India) are very poorly represented in museum collections. Considering the commercial and scientific importance of some of these species, and the volume of literature, an unambiguous application of the name *C. batrachus* is needed and therefore the neotype designation should not be postponed.

COMPARATIVE MATERIAL

Clarias aff. batrachus 'Indochina': UMMZ 181189 (1), 211.7 mm SL; Cambodia: Pursat province, fishpond at Bamnak. UMMZ 235749 (1), 97.7 mm SL; Cambodia: Mandulkiri, O Por at Busara waterfall, 40 km E of Senmonoron on Route 142. UMMZ 235407 (1), 131.2 mm SL; Laos: Champasak, Mekong River at Ban Hang Khone. ZRC 51005 (4), 120.3–189.6 mm SL; Laos: Nam Ngouang at Ban Sensi. ZRC 51004 (1), 179.1 mm SL; Laos: Nam Ngouang at Ban Sensi, Ban Sopchat and Ban Soporn. ZRC 51006 (4), 113.3–164.9 mm SL; Laos: Nam Katak, tributary of Nam Phao.

Clarias aff. batrachus 'Sundaland': ZRC 1589 (4), 120.8–186.8 mm SL; Malaysia: Penang, Kampong Sungai Kluang. ZRC 40516 (2), 185.9–192.2 mm SL; Borneo: Sarawak, Marudi market. ZRC 45777 (1), 134.5 mm SL; Borneo: Sarawak, Sungai Kuhas.

Clarias magur: UMMZ 187861 (3), 210.7–212.7 mm SL; Bangladesh: Comilla, pond at Hajiganj, 29 km N of Chandpur. UMMZ 208609 (1), 163.3 mm SL; Bangladesh: Kunti Choumaham, PS Kaska, roadside ditch 27 km S of Brahmabaria. UMMZ 208766 (1), 147.8 mm SL; Bangladesh: Piyain Gang River below Sangram, 3 km below bridge at Indian border. UMMZ 244686 (1), 183.1 mm SL; India: West Bengal, market at Mathabhangha.

Data from the following references were used for the diagnosis of *C. batrachus* (relevant species given in parentheses): Arai & Hirano, 1974 (*C. fuscus*); Lim & Ng, 1999 (*C. batu*); Ng, 1999 (*C. anfractus*, *C. leiacanthus* and *C. planiceps*); Ng, 2001 (*C. microstomus*); Teugels *et al.*, 1999 (*C. macrocephalus*); Teugels, Sudarto & Pouyaud, 2001 (*C. intermedius* and *C. meladerma*); Ng, 2003a (*C. insolitus*); Ng, 2003b (*C. nigricans*); Sudarto, Teugels & Pouyaud, 2003 (*C. kapuasensis* and *C. pseudoleiacanthus*); Ng, 2004 (*C. sulcatus*); Sudarto, Teugels & Pouyaud, 2004 (*C. pseudonieuhofii*). In addition, the syntypes of *C. brachysoma* and the holotype of *C. dussumieri* were examined from photographs stored in the All Catfish Species Inventory image database (<http://acsi.acnatsci.org/base/index.html>).

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