

**THE CATFISHES (TELEOSTEI: SILURIFORMES)  
OF BENTUANG KARIMUN NATIONAL PARK,  
WEST KALIMANTAN, INDONESIA**

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**ABSTRACT.** - Fifteen species of catfishes belonging to five families are recorded from the Bentuang Karimun National Park in West Kalimantan, Indonesia. *Pseudomystus flavipinnis*, new species, is described herein. Sexual dimorphism for the akysid catfish genus *Acrochordonichthys* is reported here for the first time.

**KEY WORDS.** - Catfish, diversity, new species, Bagridae, sexual dimorphism, *Acrochordonichthys*, Borneo.

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**INTRODUCTION**

Bentuang Karimun National Park (BKNP) is located in West Kalimantan, Indonesia and was established in 1995 under the auspices of the International Tropical Timber Organization (ITTO). Five watersheds drain the park, namely the Embaloh, Sibau, Mendalam, Bungan and Kapuas Koheng watersheds whose headwaters originate in the Kapuas Hulu Range and eventually drain into the Kapuas River. Part of the BKNP around the region of the Betung and Condong Mountains (in the Embaloh watershed) is contiguous with the similarly-established Lanjak Entimau Wildlife Sanctuary in Sarawak (Malaysia).

For the purposes of establishing an effective management plan of the BKNP, a series of expeditions was organised by the World Wide Fund for Nature/Indonesia Programme to study the biodiversity of the region. For the assessment of freshwater fish biodiversity, three of the five (the Embaloh, Sibau and Mendalam) watersheds have been studied.

Although the freshwater ichthyofauna of the Kapuas River has been relatively well-studied (e.g. Imaki et al., 1981; Roberts, 1989), we still know relatively little about the freshwater

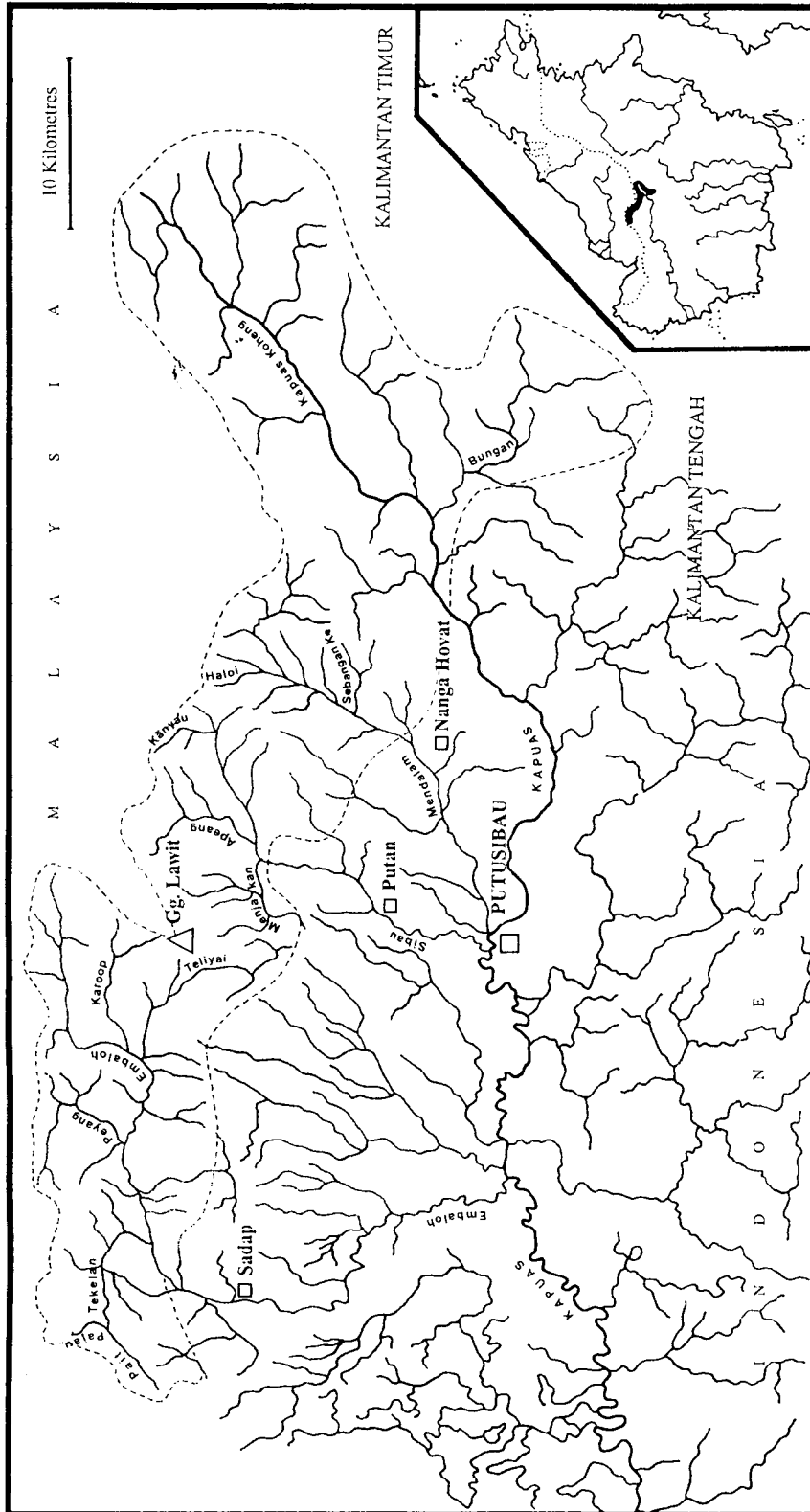


Fig. 1. Map of Bentuang Karimun National Park showing drainages.

fishes found in its headwaters and several species described from the headwaters of the Kapuas River basin are still only known from the types. The expeditions to the BKNP have obtained fresh specimens of many of these species and afforded us with an excellent opportunity to study the poorly-known fish fauna of this particular region of the Kapuas River basin.

This report serves to record the catfish fauna of Bentuang Karimun National Park, which consist of 15 species in five families. Of these 15 species, one species of bagrid catfish is undescribed and is named here as *Pseudomystus flavipinnis*, new species.

## MATERIALS AND METHODS

All measurements are taken from the left side of body with a pair of dial calipers (0.05 mm) and follow those of Ng & Ng (1995) with the following exceptions: head length is measured from the tip of the snout to the posteriormost extremity of the fleshy opercular flap. Length of the adipose-fin base is measured from the anteriormost point of origin to the posteriormost point of the adipose-fin base. Post-adipose distance is measured from the posteriormost point of the adipose-fin base to the posterior margin of the hypural complex.

The following additional measurements were made: predorsal, preanal, prepelvic and prepectoral lengths are those measured from the tip of the snout to the anterior bases of the dorsal, anal, pelvic and pectoral fins respectively. Lengths of the dorsal- and anal-fin bases include the respective bases of the first and last rays and the distance between them. Pelvic- and pectoral-fin lengths are measured from the origin to the tip of the longest ray. Dorsal and pectoral spine lengths are measured from the base to the tip. Dorsal to adipose distance is measured from the base of the last dorsal-fin ray to the origin of the adipose fin. Adipose maximum height is the maximum height of the adipose fin. Caudal-fin length is the length of the longest ray of the lower lobe measured from the posterior margin of the hypural complex. The length of the caudal peduncle is measured from base of the last anal-fin ray to the posterior margin of the hypural complex. Nasal-, maxillary- and mandibular-barbel lengths are measured from the base to the tip.

Fin ray counts were obtained under transmitted light using a binocular dissecting microscope, using the terminology of Hubbs & Lagler (1947). Only principal caudal-fin rays were counted, i.e. rays attached to the upper + lower part of the hypural complex. Gill raker counts were made using the method and terminology of Roberts (1992). Vertebral counts were taken from radiographs using the method of Roberts (1994). Numbers in parentheses following a particular count are the numbers of examined specimens with that count.

## TAXONOMY

### AKYSIDAE

#### *Acrochordonichthys chamaeleon* (Vaillant, 1902)

*Sosia chamaeleon* Vaillant, 1902: 82, figs. 19-24; Weber & de Beaufort, 1913: 370.  
*Acrochordonichthys chamaeleon* [sic.] - Roberts, 1989: 137, fig. 105.

**Material examined.** - SIBAU DRAINAGE: MZB 7553, 1 ex., 64.2 mm SL; Sungai Putan. MENDALAM DRAINAGE: MZB 9423, 1 ex., 83.0 mm SL; Sungai Mendalam. - MZB 9431, 1 ex., 97.9 mm SL; Sungai Mentibat.

**Remarks.** - This species, previously considered a synonym of *A. melanogaster* by Weber & de Beaufort (1913), was regarded as a valid species by Roberts (1989), who differentiated it from all other *Acrochordonichthys* species in having a relatively wide head, extremely short nasal barbels, absence of tubercles on nearly the entire caudal fin and a pale-coloured snout and occipital region. Our examination of the types and fresh material indicates that only the broad head and extremely short nasal barbels are useful diagnostic characters for this species. There is no trace of any pale colour on the snout or occipital region, and considering the fact that considerable colour variation exists in members of this genus (first author, pers. obs.), it is to be expected that colour is not a useful diagnostic character. We have also observed the presence of tubercles on the caudal-fin rays of fresh specimens of *A. chamaeleon*. We believe that the absence of tubercles in the type specimens examined by Roberts (1989) is due to the effects of inadequate preservation and long-term storage in alcohol.

Sexual dimorphism has been reported in two other akysid genera, namely *Akysis* by Ng & Kottelat (1996; 1998) and *Breitensteinia* by Ng & Siebert (1998). We report sexual dimorphism here in *Acrochordonichthys* for the first time. Males have the anus situated immediately in front of a genital papilla, which is located posterior to the pelvic fin base (Fig. 2). The genital opening is situated at the tip of the papilla, covered by a fleshy flap. In females, the anus is situated more posteriorly and the genital opening is located at the tip of a short genital appendage (Fig. 2). The pelvic fins of females also appear to be shorter (length of pelvic fin 9.5 %SL vs. 12.7). The single male specimen of *A. chamaeleon* dissected possesses testes with elongate digitiform lateral processes similar to those reported in

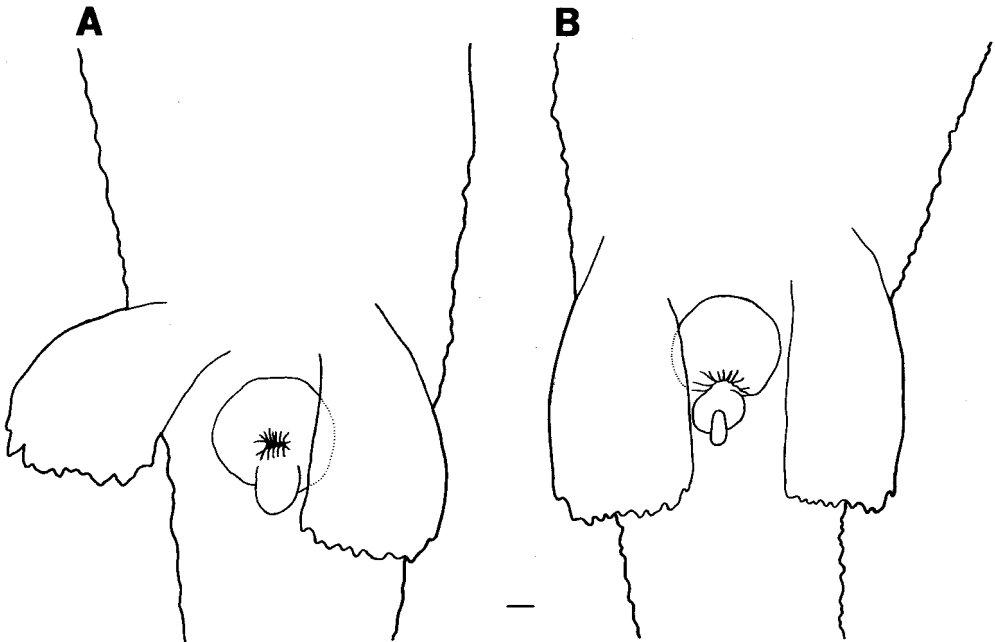


Fig. 2. Schematic illustration of the ventral view of the pelvic fins and external genitalia of *Acrochordonichthys chamaeleon*: A. male (MZB 9423, 83.0 mm SL) and b. female (MZB 9431, 97.9 mm SL). Scale bar represents 1 mm.

*Breitensteinia* by Roberts (1989), while the single female dissected had numerous ripe ova of about 0.8 mm in diameter.

***Acrochordonichthys* cf. *rugosus* (Bleeker, 1847)**

?*Pimelodus rugosus* Bleeker, 1847: 11.

*Acrochordonichthys* cf. *melanogaster* - Roberts, 1989: 138, fig. 106.

**Material examined.** - EMBALOH DRAINAGE: MZB 9170, 1 ex., 66.2 mm SL; Sungai Peyang. - MZB 9424, 1 ex., 102.1 mm SL; Sungai Sebaya.

**Remarks.** - The taxonomy of *Acrochordonichthys* is currently very poorly-understood. Examination of all the types of the nominal species by the first author revealed that with the exception of *A. ischnosoma*, *A. pachyderma* and *A. chamaeleon*, the types of all other nominal species look morphologically similar and seem to belong to a single species. Until a critical revision of this genus is carried out, the species from the Kapuas basin obtained here and identified as *A. cf. melanogaster* by Roberts (1989) cannot be identified with certainty. We therefore tentatively consider all of the other nominal species conspecific and tentatively identify this species as *A. cf. rugosus*.

This species is found sympatrically with *A. chamaeleon* and can be differentiated from the latter species in having longer nasal barbels (19.0-23.9 % HL vs. 2.7-7.8) and a narrower head (head width 23.0-23.6 % SL vs. 24.6-28.3) with a more convex snout when viewed dorsally (Fig. 3).

***Akysis fuscus* Ng & Kottelat, 1996**

*Akysis fuscus* Ng & Kottelat, 1996: 20.

**Material examined.** - EMBALOH DRAINAGE: MZB 6528, 4 ex., 33.7-37.2 mm SL; Sungai Embaloh, downstream of confluence with Sungai Labu. - MZB 6523, 1 ex., 34.1 mm SL; Sungai Embaloh,

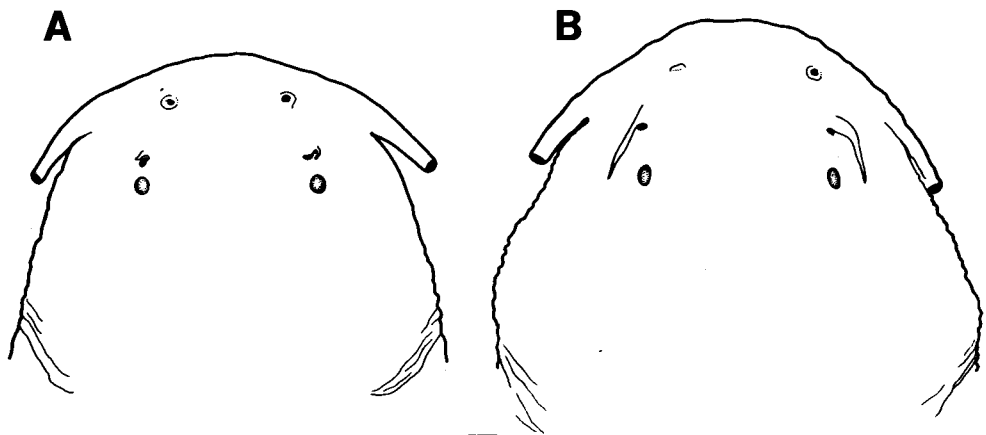


Fig. 3. Schematic illustration of the dorsal view of heads of *Acrochordonichthys*: A. *A. chamaeleon*, MZB 9423, 83.0 mm SL; Sungai Mendalam B. *A. cf. rugosus*, MZB 9424, 102.1 mm SL; Sungai Sebaya. Scale bar represents 1 mm.

upstream of Nanga Tungun. - MZB 6558, 3 ex., 30.9-39.5 mm SL; Sungai Peyang. - MZB 9172, 4 ex., 32.1-35.7 mm SL; Sungai Peyang. - MZB 7313, 2 ex., 32.2-35.1 mm SL; mouth of Sungai Tawang.

## BAGRIDAE

### *Hemibagrus bongan* (Popta, 1904)

*Macrones bongan* Popta, 1904: 182; 1906: 35, pl. II fig. 5.

*Macrones nemurus* (in part) - Weber & de Beaufort, 1913: 341.

*Mystus nemurus* (in part) - Roberts, 1989: 121.

*Macrones planiceps* (not Valenciennes, in Cuvier & Valenciennes, 1840) - Vaillant, 1902: 18.

**Material examined.** - BUNGAN DRAINAGE: RMNH 7548, 2 ex., syntypes, 60.4-128.2 mm SL; Sungai Bungan; A. W. Nieuwenhuis, Jul. 1898. EMBALOH DRAINAGE: - MZB 9429, 1 ex., 120.72 mm SL; Sungai Dajo. - MZB 6545, 1 ex., 123.8 mm SL; Sungai Embaloh, near the mouth of Sungai Tekelan. - MZB 9166, 2 ex., 97.6-111.5 mm SL; Sungai Embaloh. - MZB 9428, 1 ex., 45.1 mm SL; Sungai Pajau. - MZB 9425, 1 ex., 77.0 mm SL; Sungai Sebaya. - MZB 9427, 1 ex., 78.3 mm SL; Sungai Senentang. MENDALAM DRAINAGE: - MZB 9437, 2 ex., 63.4 - 134.1 mm SL; Sungai Jepala. - MZB 9438, 7 ex., 56.60 - 153.45 mm SL; ZRC 43014, 2 ex., 152.4-174.9 mm SL; Sungai Haloi, Mendalam. - MZB 9436, 2 ex., 94.8-99.3 mm SL; Sungai Menjulang. - MZB 9439, 5 ex.,

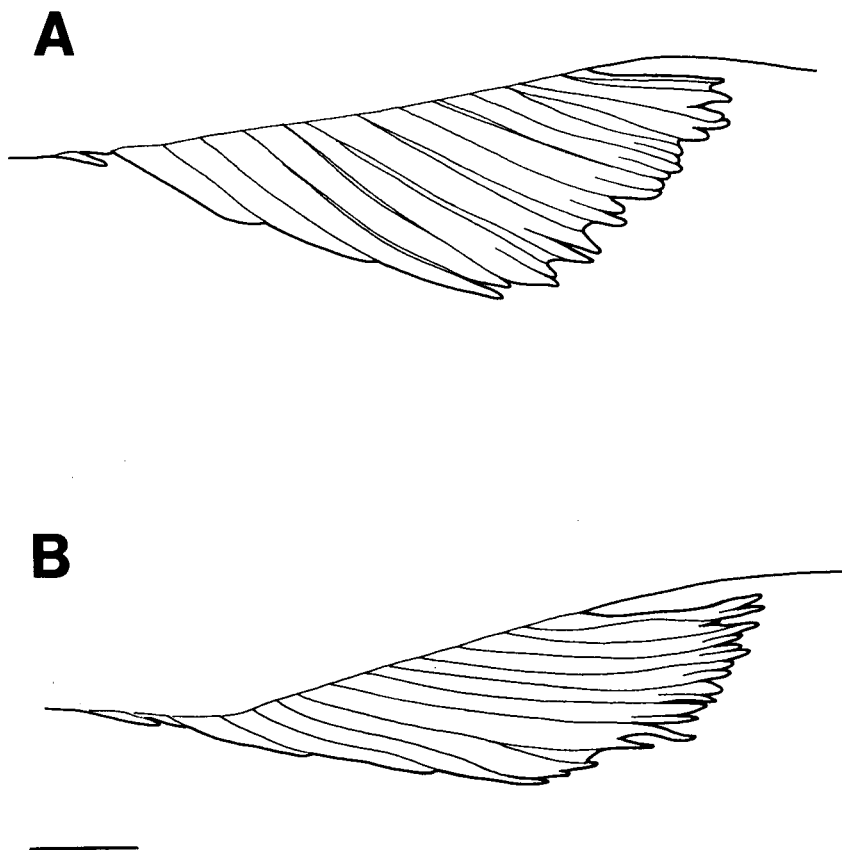


Fig. 4. Schematic illustration showing genital papilla of male: A. papilla not touching anal base in *H. bongan*, *H. gracilis* and *H. planiceps* (drawing of *H. planiceps*, ZRC 42563, 257 mm SL); B. papilla touching anal base in *H. aff. planiceps* (drawing of *H. aff. planiceps*, ZMA 121.627, 185 mm SL). Scale bar represents 10 mm.

51.8-116.8 mm SL; Sungai Mentibat. - ZRC 43015, 1 ex., 205.0 mm SL; Sungai Nyampi. - MZB 9434, 3 ex., 99.4-162.0 mm SL; Sungai Otang. - MZB 9440, 3 ex., 60.6-165.7 mm SL; ZRC 43013, 1 ex., 100.1 mm SL; Sungai Sebangan Ke. SIBAU DRAINAGE: MZB 7844, 1 ex., 91.7 mm SL; Sungai Putan. - MZB 7715, 1 ex., 85.6 mm SL; Sungai Sekedam Besar. - MZB 7958, 3 ex., 42.7-76.9 mm SL; Sungai Sibau.

**Remarks.** - Ng & Ng (1995) provided a brief review of the taxonomy of Sundaic *Hemibagrus* in which they recognised four different "groups" within the Sundaic *Hemibagrus*. The "group" consisting of *H. planiceps* and allied species, is characterised by its members having an elongate body with a high vertebral count (47-51), a body with no midaxial streak and the longest dorsal fin ray does not, or just reaches the beginning of the adipose fin. The nominal species placed in this group include *H. planiceps* (Valenciennes, in Cuvier & Valenciennes, 1840), *H. anisurus* (Valenciennes, in Cuvier & Valenciennes, 1840), *H. flavus* (Bleeker, 1846), *H. bongan* (Popta, 1904) and *H. gracilis* Ng & Ng, 1995. The synonymy of *H. planiceps* has been discussed at length by Ng & Ng (1995) and Roberts (1993), and they concluded that *H. planiceps*, *H. anisurus* and *H. flavus* are all conspecific.

Studies by the first author have shown that *H. planiceps* s. str. is restricted to Java only (unpublished data) and that material identified as *H. planiceps* from Peninsular Malaysia is referable to *H. gracilis* (see Ng & Ng, 1995), while those from Sumatra belong to a previously undescribed species (currently being described by the first author in another study). The species from Borneo previously identified as *H. planiceps* is referable to *H. bongan*, here considered a valid species distinct from *H. planiceps*.

*Hemibagrus bongan* can be differentiated from *H. planiceps* in having a more slender body (body depth at anus 9.5-12.3 %SL vs. 12.2-14.7), more closely-set eyes (interorbital distance 28.2-32.4 %HL vs. 33.4-36.8) and longer nasal and maxillary barbels (length of nasal barbel 33.3-46.7 %HL vs. 26.3-34.8; length of maxillary barbel 214.6-283.0 %HL vs. 165.2-220.1). *Hemibagrus bongan* has a relatively shorter genital papilla in the males (not reaching anal origin, vs. reaching, Fig. 4), longer maxillary (230.8-282.5 %HL vs. 198.3-238.2) and inner mandibular (53.6-88.4 %HL vs. 44.7-52.1) barbels compared to the currently-undescribed species of *Hemibagrus* from Sumatra.

*Hemibagrus bongan* has been reported from the Kapuas, Rajang and Baram River drainages in northern Borneo.

**Additional material examined:**

*Hemibagrus bongan*: ANSP 176572, 1 ex., 194.1 mm SL; Borneo: Sarawak, Sungai Lawa, gravel area about 1.0 km up from confluence with Batang Baram (3°30'N 114°27'E); D. Watson, 1 Aug. 1981. - FMNH 68063, 7 ex., 41.7-216 mm SL; Borneo: Sarawak, Third Division, headwaters of Baleh River, 1000-1700 ft; N. S. Haile, Aug. 1956. - FMNH 68092, 13 ex., 74.0-211.0 mm SL; Borneo: Sarawak, Third Division, Baleh River, Sungai Putai camp, Sungai Dapu (0°48'N 113°45'E); R. F. Inger, 8 Aug. 1956. - FMNH 68925, 18 ex., 44.1-109.3 mm SL; Borneo: Sarawak, Third Division, Kapit District, Mengiang River, Nanga Tekalit camp, tributary of Sungai Tekalit; Inger, Greenberg & King, 22 Sep. 1962. - FMNH 68931, 48 ex., 36.7-174.6 mm SL; Borneo: Sarawak, Third Division, Kapit District, Mengiang River, Nanga Tekalit camp, Sungai Satu; Inger, Greenberg & King, 27 Sep. 1962. - NRM 41292, 1 ex., 217.4 mm SL; Borneo: Sarawak, Fourth Division, Baram River drainage, Sungai Kaha about 200 m from mouth (3°23'N 114°34'E); D. Watson, 24 Mar. 1980. - USNM 324567, 1 ex., 158.7 mm SL; Borneo: Sarawak, Batang Balui tributary stream, Jangan Aya flowing into Batang Besua; L. Parenti, K. Luhat & A. Among, 2 Aug. 1991.

*Hemibagrus gracilis*: ZRC 21484, 1 ex., holotype, 247 mm SL; Peninsular Malaysia: Johor, Ulu Endau, Sungai Jasin; J. Dodson, 4-5 Apr. 1992. - ZRC 21482, 21486-21487, 3 ex., paratypes, 162-214

mm SL; data as for holotype. - ZRC 8294-8295, 2 ex., paratypes, 236-266 mm SL; Peninsular Malaysia: Pahang, Rompin, Sungai Kinchin (base camp); P. K. L. Ng et al., 18 Jun.1989. - ZRC 8296, 1 ex., paratype, 198 mm SL; Peninsular Malaysia: Pahang, Rompin, Sungai Kinchin at confluence of Sungai Selindang; P. K. L. Ng et al, 15 Jun.1989. - ZRC 8726-8728, 3 ex., paratypes, 182-264 mm SL; Peninsular Malaysia: Pahang, Rompin, Sungai Kernam (tributary of Sungai Kinchin); Y. H. Koo et al., 20 Jul.1989. - ZRC 8752-8753, 2 ex., paratypes, 295-405 mm SL; Peninsular Malaysia: Johor-Pahang border, Sungai Taku (tributary of Sungai Endau); Y. H. Koo et al., 18 Jul.1989. - ZRC 8757, 1 ex., paratype, 277 mm SL; Peninsular Malaysia: Pahang, Rompin, Sungai Kinchin (base camp); Y. H. Koo et al., 18 Jul.1989. - ZRC 8758-8759, 2 ex., paratypes, 230-245 mm SL; Peninsular Malaysia: Pahang, Rompin, Sungai Kinchin (base camp); Y. H. Koo et al., 19 Jul.1989.

*Hemibagrus planiceps*: BMNH 1870.6.7: 11-13, 3 ex., 163-176 mm SL; Java; purchased of W. Cutter, date unknown. - MNHN B615, 1 ex., 97.9 mm SL; Java; Kuhl and van Hasselt, date unknown. - NMW 45267, 5 ex., 84.9-127.6 mm SL; Java; E. Salmin, 1881. - RMNH 2956, 1 ex., 283 mm SL (holotype of *Bagrus anisurus*); Java; Kuhl and van Hasselt, date unknown. - RMNH 2939, 1 ex., 179 mm SL; Java; Kuhl and van Hasselt, date unknown. - ZMA 121.593, 3 ex., 67.5-124.7 mm SL; Java: Buitenzorg [=Bogor]; Max Weber, 1888. - MZB 9313, 4 ex., 198-216 mm SL; ZRC 42563, 9 ex., 171-263 mm SL; Java: Garut, Cimanuk, Kampung Patro, 7°10'52.7" S 107°56'13.1" E; Y. Y. Goh et al., 2 Jul.1997.

*Hemibagrus aff. planiceps*: CMK 9038, 1 ex., 132.3 mm SL; Sumatra: Riau province, Kecamatan Seberida, Sungai Gangsal; A. J. Whitten, 30 Nov.1991. - UMMZ 155684, 2 ex., 183.7, 194.8 mm SL; Sumatra: Sumatra Barat province, Danau Singkarak; A. Thienemann, 23 Feb.1929. - UMMZ 155685, 4 ex., 191.4-263.6 mm SL; UMMZ 155717, 2 ex., 240.3, 276.9 mm SL; UMMZ 155718, 3 ex., 261.8-277.0 mm SL; Sumatra: Sumatra Selatan province, Danau Ranau; A. Thienemann, date unknown. - ZMA 121.627, 5 ex., 162.0-185.0 mm SL; Sumatra: Sumatra Barat province, highlands of Padang, Batang Pangian; E. Jacobson, Mar.1914. - ZMA 121.628, 3 ex., 238.0-357.0 mm SL; Sumatra: Sumatra Barat province, highlands of Padang, Batang Pangian, from the cave of Buo; E. Jacobson, Mar.1914. - ZMA 121.629, 1 ex., 264.0 mm SL; Sumatra: Sumatra Barat province, highlands of Padang, Batang Sario near Puntian (Kumanis); E. Jacobson, Mar 1915. - ZRC 40549, 1 ex., 269.0 mm SL; Sumatra: Jambi province, Kerinci, Sungaipenuh market; H. H. Tan et al., 10-11 Jun.1996. - ZRC 40550, 2 ex., 236.0, 249.0 mm SL; Sumatra: Jambi province, Kerinci, Sungaipenuh market; H. H. Tan et al., 10-11 Jun.1996. - ZRC 41503, 3 ex., 145.2-199.0 mm SL; Sumatra: Jambi province, Kerinci, Sungaipenuh market; T. H. T. Tan, 16-23 May.1997. - MZB 9305, 1 ex., 175.0 mm SL; ZRC 41505, 23 ex., 68.7-162 mm SL; Sumatra: Sumatra Barat province, Sungai Dareh, Pulau Punjung market; H. H. Tan & H. H. Ng, 22 Jul.1997.

### ***Leiocassis poecilopterus* (Valenciennes, in Cuvier & Valenciennes, 1840)**

*Bagrus poecilopterus* Valenciennes, in Cuvier & Valenciennes, 1840: 431.

*Leiocassis micropogon* (in part) - Roberts, 1989: 117.

*Leiocassis poecilopterus* - Popta, 1906: 50.

**Material examined.** - EMBALOH DRAINAGE: ZRC 43009, 1 ex., 103.0 mm SL; Sungai Jaket. - MZB 6569, 1 ex., 49.0 mm SL; Sungai Nyauk. - ZRC 43011, 1 ex., 84.2 mm SL; Sungai Pait. - MZB 9433, 3 ex., 39.6-47.2 mm SL; ZRC 43008, 1 ex., 40.7 mm SL; Sungai Pajau. - MZB 6557, 1 ex., 38.6 mm SL; Sungai Peyang. - MZB 6625, 1 ex., 39.8 mm SL; Sungai Peyang, upstream of confluence with Sungai Tawang. - MZB 9432, 2 ex., 96.8-98.3 mm SL; Sungai Sebaya. - MZB 7317, 2 ex., 46.4-51.9 mm SL; Sungai Tawang. MENDALAM DRAINAGE: MZB 9441, 1 ex., 73.4 mm SL; Sungai Jepala. - ZRC 43010, 1 ex., 73.0 mm SL; Sungai Lebang Ajem. - MZB 9443, 7 ex., 65.9-120.6 mm SL; Sungai Mentibat. - MZB 9435, 1 ex., 97.2 mm SL; Sungai Otang. - MZB 9442, 2 ex., 50.3-89.9 mm SL; Sungai Sebangon Ke. SIBAU DRAINAGE: MZB 9020, 1 ex., 60.8 mm SL; Sungai Sekedan Besar.

**Remarks.** - Roberts (1993) considers *L. micropogon* and *L. poecilopterus* to be conspecific. However, they are clearly distinct species. *Leiocassis poecilopterus* differs from *L. micropogon* in having the occipital process touching (vs. not touching) the predorsal plate,



a wider head (head width 18.2-21.4 %SL vs. 15.5) and a deeper body (body depth at anus 21.5-22.7 %SL vs. 11.8).

***Mystus nigriceps* (Valenciennes, in Cuvier & Valenciennes, 1840)**

*Bagrus nigriceps* Valenciennes, in Cuvier & Valenciennes, 1840: 412.

*Macrones micracanthus* - Weber & de Beaufort, 1913: 339.

*Mystus micracanthus* - Imaki et al., 1981: 41, fig. 80; Roberts, 1989: 120.

**Material examined.** - SIBAU DRAINAGE: MZB 7840, 2 ex., 99.1-107.5 mm SL; Sungai Pengkaran.

**Remarks.** - Roberts (1994) has shown that the original description of *M. nigriceps* is based on Kuhl and van Hasselt material of the species usually identified as *M. micracanthus*. However, we have examined fresh material of *M. nigriceps* from western Java (the type locality) and conclude that they represent a species distinct from material usually identified as *M. nigriceps* (previously *M. micracanthus*) from Peninsular Malaysia, Sumatra and Borneo. Pending a detailed study of the types and more material from throughout Southeast Asia, we tentatively identify this species as *M. nigriceps*.

***Pseudomystus flavipinnis*, new species**

Fig. 5

*Leiocassis stenomus* - Vaillant, 1893: 17.

*Leiocassis* sp. undet. - Roberts, 1989: 120, fig. 94.

**Material examined.** - Holotype: MZB 6593, 47.0 mm SL; Borneo: Kalimantan Barat, Sungai Embaloh at Benua Martinus; Albertus, 19 Nov. 1996.

**Paratype:** MNHN 1891-475, 1 ex., 75.1 mm SL; Borneo: Kenepai; M. Chaper, 1890-1891.

**Diagnosis.** - A species of *Pseudomystus* with the following unique combination of characters: absence of any markings on all other fins except the dorsal fin; colour pattern a series of transverse yellow stripes on a brown body; caudal fin 29.1 %SL, without a filamentous extension to the principal ray of the upper lobe; caudal peduncle 17.7-18.4 %SL; head length 26.2-26.6 %SL; head depth 15.8-16.8 %SL; body depth at anus 14.1-15.7 %SL; length of adipose-fin base 21.9-24.0 %SL; dorsal surface of the head smooth and covered with skin; absence of supraclavicular process; dorsal spine without serrations, and pectoral spine with 9 serrations.

**Description.** - Head depressed and broad, body moderately compressed. Dorsal profile rising evenly but not steeply from tip of the snout to origin of the dorsal fin, then sloping gently ventrally from there to the end of the caudal peduncle. Ventral profile horizontal to origin of anal, then sloping dorsally to the end of the caudal peduncle. In %SL: head length 26.2-26.6, head width 18.1-20.0, head depth 15.8-16.8, predorsal distance 36.6-39.3, preanal length 64.8-66.2, prepelvic length 47.8-50.0, prepectoral length 21.5-21.8, body depth at anus 14.1-15.7, length of caudal peduncle 17.7-18.4, depth of caudal peduncle 6.9-8.5, pectoral-fin length 23.4, length of dorsal-fin base 11.6-12.6, pelvic-fin length 13.8-14.9, length of anal-fin base 15.3-16.5, caudal-fin length 29.1, length of adipose-fin base 21.9-24.0, dorsal to adipose distance 18.1; in %HL: snout length 29.6-33.5, interorbital distance 31.2-32.5, eye diameter 14.1-16.8, nasal barbel length 64.0, maxillary barbel length 154.4, inner mandibular

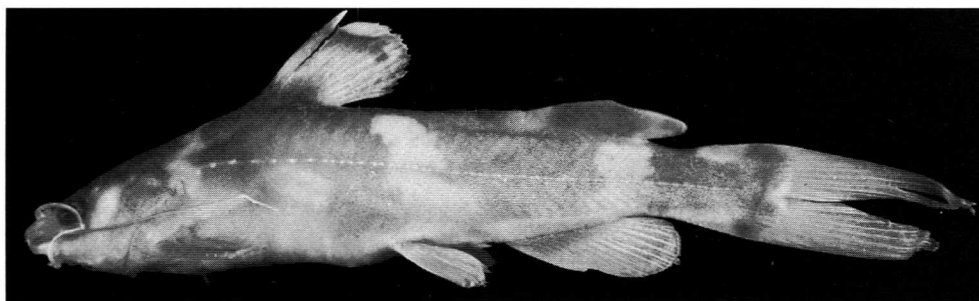


Fig. 5. *Pseudomystus flavipinnis*, MZB 6593, holotype, 47.0 mm SL; Sungai Embaloh.

barbel length 50.4, outer mandibular barbel length 92.8. Branchiostegal rays 8 (1) or 9 (1). Gill rakers 3+11 (1). Vertebrae 19+21=40 (1).

Fin ray counts: dorsal I,6 (1), pectoral I,6 (1), pelvic i,5 (1), anal iv,10 (1), caudal 8/8 (1). Dorsal origin nearer tip of snout than caudal flexure. Pectoral spine stout, with 9 (1) large serrae posteriorly. Anal origin slightly posterior to adipose origin. Depressed dorsal not reaching adipose fin. Caudal fin forked.

**Colour:** Dorsal and lateral surfaces of head and body brown, ventral surfaces of head and body pale yellow. Dorsal and lateral surfaces of head and body with three irregular pale yellow bands running transversely across: the first across occipital region, the second immediately below dorsal-fin base and the third immediately below adipose-fin base. Dorsal surface of body with three pale yellow horizontally elongate patches: the first on anterior base of adipose fin, the second immediately behind dorsal fin base and the third on caudal peduncle. Lateral surfaces of body with pale yellow horizontally elongate patch below dorsal-fin base. Lateral surfaces of head immediately behind eye with a pale yellow horizontally elongate patch. Pores of laterosensory canal with depigmented rims. Dorsal fin pale yellow with transverse brown band. All other fins pale yellow without any markings. Adipose fin brown with pale yellow posterior quarter.

**Distribution.** - Known from the upper Kapuas basin.

**Etymology.** - From the Latin *flavus*, meaning yellow, and *pinnis*, meaning fin; in reference to the uniformly yellow caudal fin.

**Remarks.** - *Pseudomystus* was first erected as a subgenus of *Leiocassis* by Jayaram (1968) for species with a subterminal mouth (vs. inferior mouth in *Leiocassis*), which was later raised to the status of a full genus by Mo (1991) on the account of the hypertrophied nuchal plates, which he considered synapomorphic for the genus. Additional characters used by Mo (op. cit.) to define the genus include: posterior fontanelle lost or reduced to a small hole enclosed entirely in the supraoccipital, cranial elements largely exposed on the roof, and sensory canal in the pterotic passing by the extrascapular to the posttemporal.

*Pseudomystus flavipinnis* can be differentiated from all other congeners by the absence of any markings (vs. presence of brown marks) on all other rayed fins except the dorsal fin. The colour pattern of *P. flavipinnis*, consisting of a series of transverse yellow stripes, is shared only with *P. albicollaris*, *P. bicolor*, *P. fuscus*, *P. rugosus* and *P. siamensis*; all other

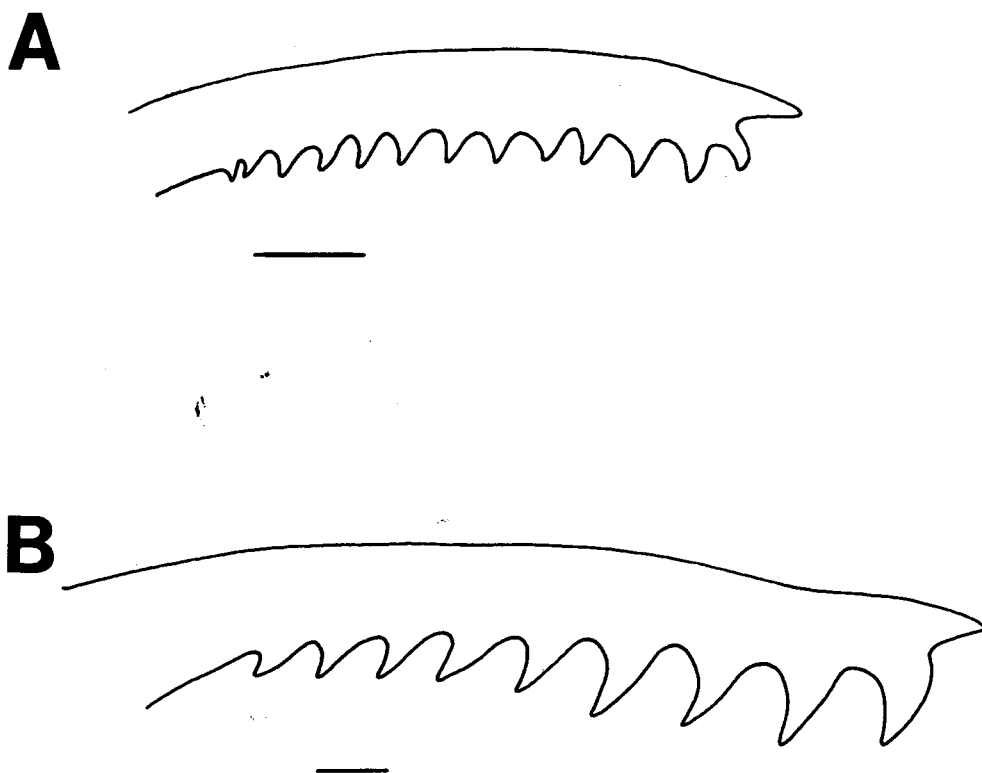


Fig. 6. Schematic illustration of the pectoral spines of *Pseudomystus*: A. *P. rugosus*, ZRC 37523, 40.4 mm SL; Pulau Bintan; B. *P. flavipinnis*, MZB 6593, holotype, 47.0 mm SL; Sungai Embaloh. Scale bars represent 1 mm.

nominal species of *Pseudomystus* are either uniformly coloured without any pale markings, or have a pattern of pale patches and not stripes.

*Pseudomystus flavipinnis* resembles both *P. rugosus* and *P. stenomus*, but can be differentiated from the former species in having fewer serrations on the pectoral spine (9 vs. 11-13; Fig. 6), and from the latter species in lacking (vs. presence of) a filamentous extension to the principal ray of the upper caudal-fin lobe and a shorter caudal peduncle (17.7-18.4 %SL vs. 18.4-21.8). It can be differentiated from *P. leiacanthus* in having a shorter caudal fin (29.1 % SL vs. 31.8-37.6) and fewer serrations on the pectoral spine (9 vs. 11-14).

*Pseudomystus flavipinnis* can be differentiated from *P. fuscus* and *P. mahakamensis* by its more robust body (body depth at anus 14.1-15.7 %SL vs. 9.0-13.4). It can be further differentiated from *P. fuscus* by its less depressed head (head depth 15.8-16.8 %SL vs. 9.5-12.2), and from *P. mahakamensis* in lacking (vs. presence of) a filamentous extension to the principal ray of the upper caudal-fin lobe and a different colour pattern (vertical vs. horizontal stripes).

*Pseudomystus flavipinnis* can be differentiated from *P. breviceps* in having a longer head (26.2-26.6 %SL vs. 20.0-22.2) and adipose-fin base (21.9-24.0 %SL vs. 11.4-13.3), from *P. moeschii* in lacking (vs. presence of) a supraclavicular process, and from *P. vaillanti* in having a straight (vs. sinuous and strongly concave) dorsal edge to the clavicular process

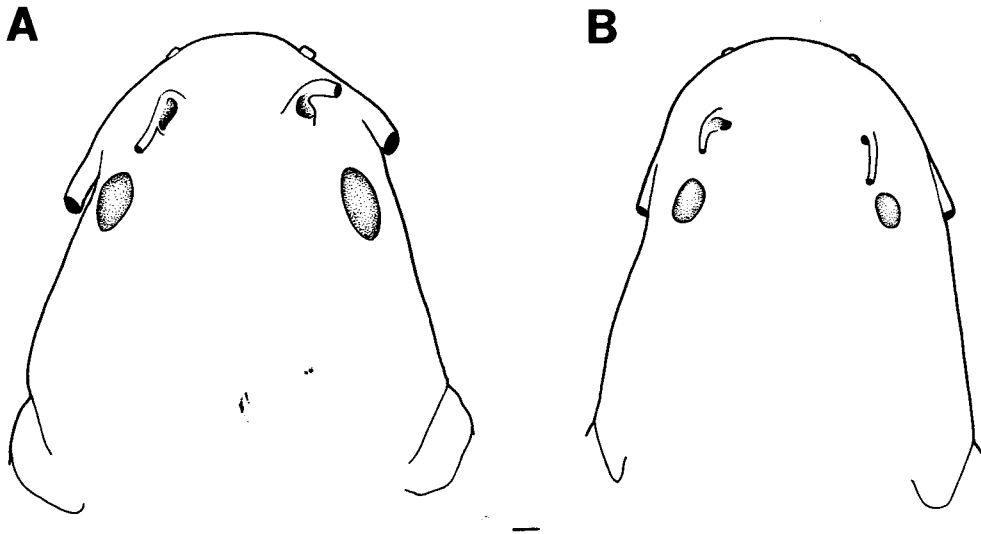


Fig. 7. Schematic illustration of the dorsal view of heads of *Pseudomystus*: A. *P. flavipinnis*, MZB 6593, holotype, 47.0 mm SL; Sungai Embaloh; B. *P. inornatus*, MZB 6579, 43.6 mm SL; Sungai Penyalin. Scale bar represents 1 mm.

and the dorsal surface of the head smooth and covered with skin (vs. with exposed, rugose bone).

*Pseudomystus bicolor* and *P. albicollaris* are possibly conspecific with *P. siamensis*, although Jayaram (1968) considers *P. siamensis* and *P. bicolor* to be distinct species, with *P. albicollaris* being a junior synonym of *P. bicolor*. In any case, *P. flavipinnis* differs from all three nominal species in having a smooth (vs. distinctly serrated) dorsal spine.

*Pseudomystus flavipinnis* can be differentiated from *P. robustus* in having a more slender body (body depth at anus 14.1-15.7 %SL vs. 20.2-23.9) and the dorsal surface of the head smooth and covered with skin (vs. rugose and exposed), from *P. inornatus* in having a bluntly pointed head (vs. sides of head almost parallel at base; Fig. 7), and from *P. myersi* in having the adipose fin separate from (vs. confluent with) the procurrent rays of the upper caudal-fin lobe.

Roberts (1989) recorded an additional lot (RMNH 7837), which he tentatively considered conspecific with the paratype of *P. flavipinnis* (both lots were identified as *Leiocassis* sp. undet.), but we did not examine this lot to ascertain its identity.

#### **Comparative material.**

*Pseudomystus albicollaris*: ANSP 60178, 1 ex., holotype, 85.6 mm SL; Thailand: Bangkok; R. M. de Schauensee, 5 Feb. 1934. - ANSP 76850, 1 ex., 71.0 mm SL; Thailand: waterfall at Chong, 12 miles E of Trang; R. M. de Schauensee collectors, 13 Oct. 1936. - ANSP 89474, 3 ex., 67.9-81.7 mm SL; Thailand: Phitsanulok; R. M. de Schauensee collectors, 1936.

*Pseudomystus bicolor*: ANSP 59284, 1 ex., holotype, 42.4 mm SL; Thailand: Chiang Mai on Mae Nam Ping; R. M. de Schauensee, 22 Jan. 1933. ANSP 59272, 4 ex., 53.9-76.4 mm SL; Thailand: Chiang Mai on Mae Nam Ping; R. M. de Schauensee, Dec. 1932.

*Pseudomystus breviceps*: BMNH 1889.11.12.66, 1 ex., holotype, 71.3 mm SL; Sumatra: Deli [=Medan].

- Pseudomystus fuscus*: ZRC uncat., 18 ex., 36.8-42.4 mm SL; Borneo: Sarawak, Sungai Sebiris 13.8 km after Kampung Puteh turnoff, towards Lundu on Sematan-Lundu road (1°41'32.0"N 109°47'0.8"E); H. H. Tan et al., Aug.1996.
- Pseudomystus leiacanthus*: ZMA 112.672, 1 ex., syntype, 49.9 mm SL; Sumatra: Riau, Taluk; collector and date unknown. - ZRC 39069, 17 ex., 31.0-46.5 mm SL; Sumatra: Riau, peat swamp draining into Sg. Bengkwan, tributary of Indragiri river, P. K. L. Ng et al., 14 Jun.1995. - ZRC 38523, 25 ex., 37.9-53.2 mm SL; Sumatra: Jambi, Sungai Bakung, north tributary of Sungai Kembang which joins Danau Arang Arang and Sungai Kumpeh Hulu in Arang Arang, flooded peat swamp forest; M. Kottelat & H. H. Tan, 29 May.1994.
- P. mahakamensis*: RMNH 7838, 2 ex., syntypes, 83.8-84.6 mm SL; Borneo: Mahakam. - CMK 7785, 1 ex., 92.0 mm SL; Borneo: Kalimantan Timur, Mahakam River, boulders upstream of Melak (10°12'S 115°47'E); M. Kottelat, 4 Aug.1991.
- Pseudomystus moeschii*: BMNH 1889.11.12.64-65, 2 ex., syntypes, 66.7-81.0 mm SL; Sumatra: Deli [=Medan].
- Pseudomystus robustus*: FMNH 68001, 1 ex., holotype, 215.5 mm SL; Borneo: Sabah, Kinabatangan district, Deramakot Camp, Kinabatangan River; R. F. Inger, 12 May.1956. - FMNH 68002, 1 ex., paratype, 203.4 mm SL; Borneo: Sabah, Kinabatangan, Deramakot camp; R. F. Inger, 12 May.1956. - FMNH 68003, 1 ex., paratype, 103.0 mm SL; Borneo: Sabah, Kinabatangan district, Deramakot, Kinabatangan River; R. F. Inger, 16 May.1956. - FMNH 68040, 1 ex., paratype, 253.3 mm SL; Borneo: Sabah, Kinabatangan district, Deramakot Camp, Kinabatangan River; R. F. Inger, 12 May.1956.
- Pseudomystus rugosus*: ZRC 37523, 2 ex., 40.4-41.3 mm SL; Riau Archipelago: Pulau Bintan, 49 km on highway from Tanjung Ubon to Tanjung Pinang; H. H. Tan et al., 27 Apr.1994.
- Pseudomystus siamensis*: ZRC 12745, 4 ex., 39.1-69.5 mm SL; Laos: Khammouan province, Xe Bangfai near Ban Kengkao (14°28'35"N 105°31'5"E); M. Kottelat et al., 21 Mar.1996. - ZRC 41983, 5 ex., 76.9-88.9 mm SL; Thailand: Prachuap Khiri Khan province, Kui Buri district, stream near Ban Yang Chum; D. C. J. Yeo et al., 13 Aug.1997.
- Pseudomystus stenomus*: ZRC 42587, 5 ex., 67.3-79.8 mm SL; Java: Bogor, Pasar Anya. - ZRC 42760, 22 ex., 28.8-78.2 mm SL; Malaysia: Johor, Sungai Kahang; H. H. Tan et al., 1 Apr.1998.
- Pseudomystus vaillantii*: data from Vaillant (1902).

***Pseudomystus inornatus* (Boulenger, 1894)**

*Liocassis inornatus* Boulenger, 1894: 245.

**Material examined.** - EMBALOH DRAINAGE: MZB 6579, 1 ex., 43.6 mm SL; Sungai Penyalin.

**Remarks.** - Comparison of our material with material identified as *P. inornatus* from Sarawak reveals that they are conspecific. There are faint pale yellow bands in the specimen from the Embaloh drainage which are absent in larger specimens from Sarawak. The bands most probably fade with age, as has been observed by the second author in its congener, *P. robustus*. Small specimens of *P. robustus* have pale bands which gradually fade and disappear with increasing size (and hence with age), resulting in uniformly-coloured adult specimens.

CLARIIDAE

***Clarias planiceps* Ng, 1998**

*Clarias planiceps* Ng, 1998: 23, Figs. 1a, 2a, 4a.

**Material examined.** - EMBALOH DRAINAGE: MZB 7255, 6 ex., 89.0-164.0; Sungai Aur. - MZB 6666, 1 ex., paratype, 230.0 mm SL; unnamed small stream just downstream of the mouth of Sungai

Tekelan. - MZB 9414, 3 ex., 122.76- 221.5 mm SL; Sungai Pait. - MZB 6607, 2 ex., 128.1-136.4 mm SL; Sungai Peyang, approx. 700m upstream from mouth. - MZB 9416, 1 ex., 109.0 mm SL; Sungai Senentang. - MZB 9415, 1 ex., 66.2 mm SL; Sungai Tawang.- MZB 9419, 2 ex., 87.3-190.4 mm SL; ZRC 43006, 1 ex., 125.1 mm SL; Sungai Tekelan.- ZRC 43007, 163.6 mm SL; Sungai Tekelan. - MZB 6544, 1 ex., 111.4 mm SL; tributary of Sungai Tekelan. - MZB 9410, 2 ex., 61.1-96.9 mm SL; tributary of Sungai Tekelan, approx. 500 m downstream of confluence with Sungai Derian. MENDALAM DRAINAGE: MZB 9420, 2 ex., 113.2-166.6 mm SL; Sungai Pari. - MZB 9421, 1 ex., 85.0 mm SL; Sungai Menjulang. SIBAU DRAINAGE: MZB 7636, 1 ex., 130.8 mm SL; Sungai Putan.

## SILURIDAE

### *Belodontichthys dinema* (Bleeker, 1851)

*Wallago dinema* Bleeker, 1851a: 202.

**Material examined.** - None.

**Remarks.** - The second author had observed very large specimens of this species (ca. 1000 mm TL) obtained by fishermen from the Embaloh River.

### *Kryptopterus lais* (Bleeker, 1851)

*Silurus lais* Bleeker, 1851b: 428.

*Cryptopterus lais* - von Martens, 1876: 399.

**Material examined.** - SIBAU DRAINAGE: MZB 7972, 1 ex., 113.4 mm SL; Sungai Sekedam.

### *Silurichthys marmoratus* Ng & Ng, 1998

*Silurichthys marmoratus* Ng & Ng, 1998: 310, fig. 11.

*Silurichthys Hasselti* - von Martens, 1876: 399.

*Silurichthys hasseltii* - Vaillant, 1902: 20, 22.

**Material examined.** - EMBALOH DRAINAGE: MZB 7502, 3 ex., 76.4-107.3 mm SL; Sungai Pait, near Kampung Sadap.

## SISORIDAE

### *Bagarius yarrelli* (Sykes, 1839)

*Bagrus Yarrelli* Sykes, 1839: 163.

**Material examined.** - None.

**Remarks.** - The second author had observed very large specimens of this species (ca. 1500 mm TL) obtained by fishermen from the Sibau and Embaloh Rivers.

*Glyptothorax major* (Boulenger, 1894)

*Akysis major* Boulenger, 1894: 246.

*Glyptothorax platypogon* (not Valenciennes in Cuvier & Valenciennes, 1840) - Roberts, 1989: 135, fig. 104 (middle).

**Material examined.** - EMBALOH DRAINAGE: MZB 9411, 1 ex., 48.8 mm SL; Sungai Embaloh. MENDALAM DRAINAGE: MZB 9422, 1 ex., 81.4 mm SL; Sungai Menjulang.

**Remarks.** - The species from the Kapuas drainage identified by Roberts (1989) as *G. platypogon* is actually *G. major* (M. Kottelat, pers. comm. to first author). *Glyptothorax major* can be differentiated from the other species of *Glyptothorax* found in the BKNP, *G. cf. platypogonoides*, in having a deeper body (body depth at anus 14.8-17.7 %SL vs. 13.7; caudal-peduncle depth 7.5-10.3 %SL vs. 7.1) and relatively slender (vs. deep) caudal-fin lobes (Fig. 8).

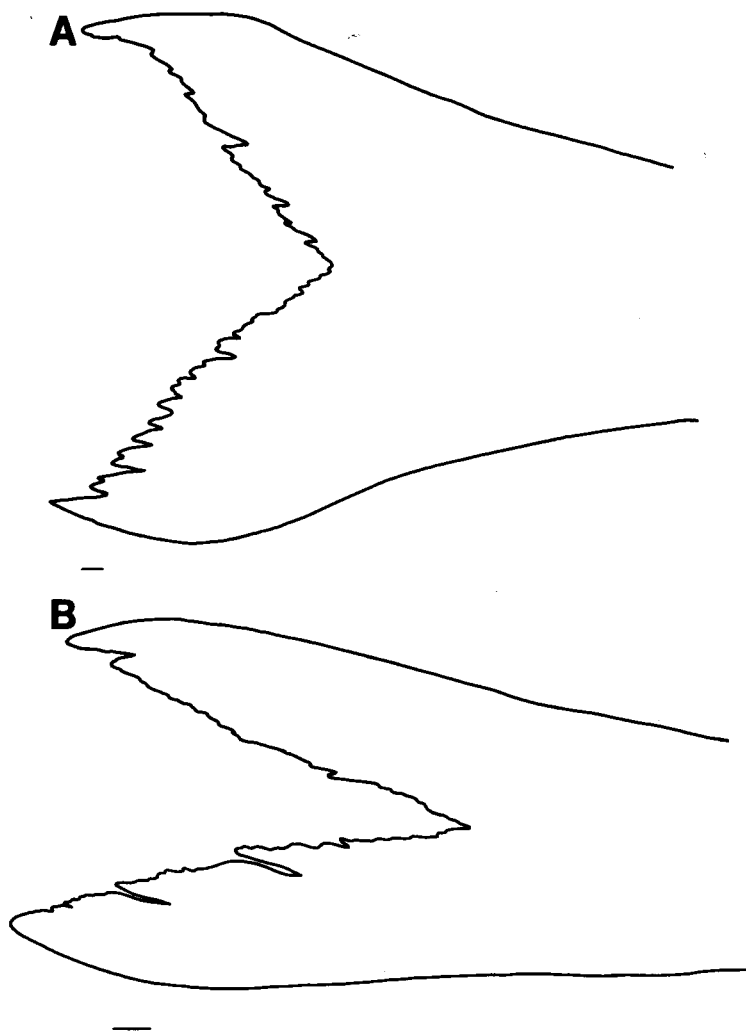


Fig. 8. Schematic illustration of the caudal fins of *Glyptothorax*: A. *G. major*, CAS 49418, 99.7 mm SL; Kapuas: Sungai Tamang; *G. cf. platypogonoides*, CAS 49419, 59.0 mm SL; Kapuas: Sungai Pinoh. Scale bars represent 1 mm.

***Glyptothorax cf. platypogonoides* (Bleeker, 1855)**

?*Pimelodus platypogonoides* Bleeker, 1855: 272.

*Glyptothorax platypogonoides* - Roberts, 1989: 136, fig. 104 (below).

**Material examined.** - EMBALOH DRAINAGE: MZB 6529, 1 ex., 50.7 mm SL; Sungai Embaloh, upstream of confluence with Sungai Tungun. - MZB 9204, 1 ex., 42.2 mm SL; Sungai Embaloh, downstream of confluence with Sungai Labu.

**Remarks.** - The species from Borneo identified as *G. platypogonoides* does not appear to be conspecific with that from western Sumatra (the type locality of *G. platypogonoides*) (M. Kottelat pers. comm. to second author). Until a critical revision of Southeast Asian *Glyptothorax* is carried out, the identification of this species remains tentative.

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