CONTRIBUTIONS TO THE STUDY OF BAGRID FISHES (SILUROIDEA: BAGRIDAE). 3. A SYSTEMATIC ACCOUNT OF THE JAPANESE, CHINESE, MALAYAN AND INDONESIAN GENERA *

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I. INTRODUCTION

1. General.

Fishes of the family Bagridae are widely distributed from Africa through Syria, Pakistan, India, Burma, Thailand, Malaya, Indonesia to China, Formosa, Korea and Japan. In the two earlier papers (JAYARAM, 1966, 1966a) the systematic account of the four Indian and 12 African genera was published. This paper deals with the remaining seven genera of Indonesia, China and Japan. Of the seven genera *Pelteobagrus* BLEEKER, *Pseudobagrus* BLEEKER, *Coreobagrus* MORI may be termed as the Japanese and Chinese genera; *Leiocassis* BLEEKER, *Heterobagrus* BLEEKER, *Bagroides* BLEEKER, and *Bagrichthys* BLEEKER as the Malayan and Indonesian genera. Many earlier writers, however, considered *Leiocassis* as more a Chinese genus rather than Indonesian. For reasons discussed elsewhere (infra pp. 292-293), I have excluded most of the Chinese species from *Leiocassis*, with the exception of two, thereby restricting its geographical range to Malaya and Indonesia only.

The classification of this family has been published in part 2 of this series (JAYARAM, 1966*a*). As per the proposed classification, *Pelteobagrus*, *Pseudobagrus* and *Coreobagrus* fall under the tribe Pelteobagrini of the subfamily Chrysichthyinae; *Leiocassis* and *Heterobagrus* under the subfamily Bagrinae, and *Bagroides* and *Bagrichthys* under the subfamily Bagroidinae. Bagroidinae was proposed as new in the earlier paper, but a fuller description is published only here.

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* cf. Part. 1. *Int. Rev. ges. Hydrobiol.*, Leipzig, *LI (3)*, 1966, pp. 433 - 450. Deals with four Indian genera.
Part. 2. *Bull. IFAN*, Dakar, *XXVIII (3)*, 1966a, pp. 1064 - 1139. Deals with the African genera, with a new classification of the family.

2. Abbreviations used.

Certain symbols, abbreviations and condensations have been uniformly used which are as below.

Symbols used for Museums/Institutions

AMNH	:	American Museum of Natural History, New York, U. S. A.
BMNH	:	British Museum of Natural History, London, U. K.
NMS	:	National Museum, Singapore.
RML	:	Rijksmuseum van Natuurlijke Historie, Leiden, Netherlands.
SNHM	:	Stanford Natural History Museum, Stanford, U. S. A.
USNM	:	United States National Museum, Washington, U. S. A.
VNHM	:	Naturhistorisches Museum, Wien, Austria.
ZMB	:	Zoological Museum, Berlin, Germany.
ZSI	:	Zoological Survey of India, Calcutta, India.

a. Abbreviations.

In tables. — SL: Standard length; LH: Head length; IOW: Interorbital width; LCPD: Length of caudal peduncle; HCPD: Least height of caudal peduncle.

In figures. — BO: Basiooccipital; FONT: Fontannelle; FR: Frontal; HYM: Hyomandibular; IOP: Interoperculum; LE: Lateral ethmoids; MSP: Mesopterygoids; MTP: Metapterygoids; OPR: Operculum; PAL: Palatines; PMX: Premaxillary; PRS: Parasphenoid; PTG: Pterygoid; PTM: Post-temporals; PTM Ul: Post-temporal's upper limb; PTR: Pterotics; Q: Quadrate; SE: Supraethmoids; SO: Supraoccipital; SOP: Supraoccipital process; SPH: Sphenotics; STM: Supratemporal; VM: Prevomer.

b. Descriptions.

In the descriptions the initial value given is the arithmetic mean of the specimens measured; the values cited within brackets are the extremes. Under the heading "Colour", a description of the basic colour pattern as observed in the alcoholically preserved specimens is given unless otherwise stated.

3. Acknowledgements.

This study was carried out by the writer in the laboratories of the Zoological Survey of India, Calcutta. The National Institute of Sciences of India awarded a Research Fellowship (1953 - 1956) for which I am indebted. I am thankful to the Director, Zoological Survey of India for facilities, to Drs. L. P. SCHULTZ and E. TREWAVAS of the U. S. National Museum, and British Museum respectively for helpful cooperation in lending material and also for criticisms.

II. EVALUATION OF CHARACTERS

1. General.

The taxonomy of the genera *Pelteobagrus* BLEEKER, *Pseudobagrus* BLEEKER and in particular their distinction from the genera *Mystus* and *Leiocassis* has been considerably difficult. Many earlier authors like PETERS (1880), HERZENSTEIN & WARPACHOWSKI (1887), KREYENBERG & PAPPENHEIM (1908, 1909), and TCHANG & SHIH (1934) followed GÜNTHER (1873) in treating these genera either as synonyms or as subgenera of *Mystus*. NICHOLS (1943) considered recognition of *Leiocassis* as largely a matter of convenience.

The confusion is largely due to the fact that most of the external characters used for differentiating siluroid genera are unhelpful in these genera. There are indeed very few fairly constant characters by which these genera can be distinctly separated from each other. The chief characters which have been thus so far used, and their taxonomic value are discussed below.

2. Evaluation.

a. *Size and position of the eyes.* WEBER & BEAUFORT (1913), HAIG (1950), JAYARAM (1955) have used the relative size, shape and position of the eyes in differentiating siluroid genera. In respect of the genera under discussion, this character is not however useful. Though in general, species of *Mystus* have comparatively large eyes, some species of the other genera such as *Pseudobagrus brevianalis* (REGAN), *Pseudobagrus pratti* (GÜNTHER), *Pelteobagrus fulvidraco* (RICHARDSON), *Pelteobagrus nitidus* (SAUVAGE), *Leiocassis bicolor* FOWLER, *Leiocassis baramensis* (REGAN) have also large eyes. Contrarily some species of *Mystus* such as *M. wyckii,* and *M. punctatus,* have small eyes. The size of the eye seems to be reliable only for specific separation within a genus. WEBER & BEAUFORT (1913) believed that the fused or free condition of the orbital rim with the eye as useful for separating these genera. This character depends largely to the extent of preservation of the material. Since most taxonomical studies are based on preserved material, this feature is bound to be of little use only. In all the four genera, the position of the eye is more or less similar and not unique as in *Horabagrus* JAYARAM to be of generic value. As such, the eye characters are not reliable in separating these genera.

b. *Nature of teeth bands on the palate.* HORA (1936) showed that variations are not uncommon in the siluroids in respect of the palate

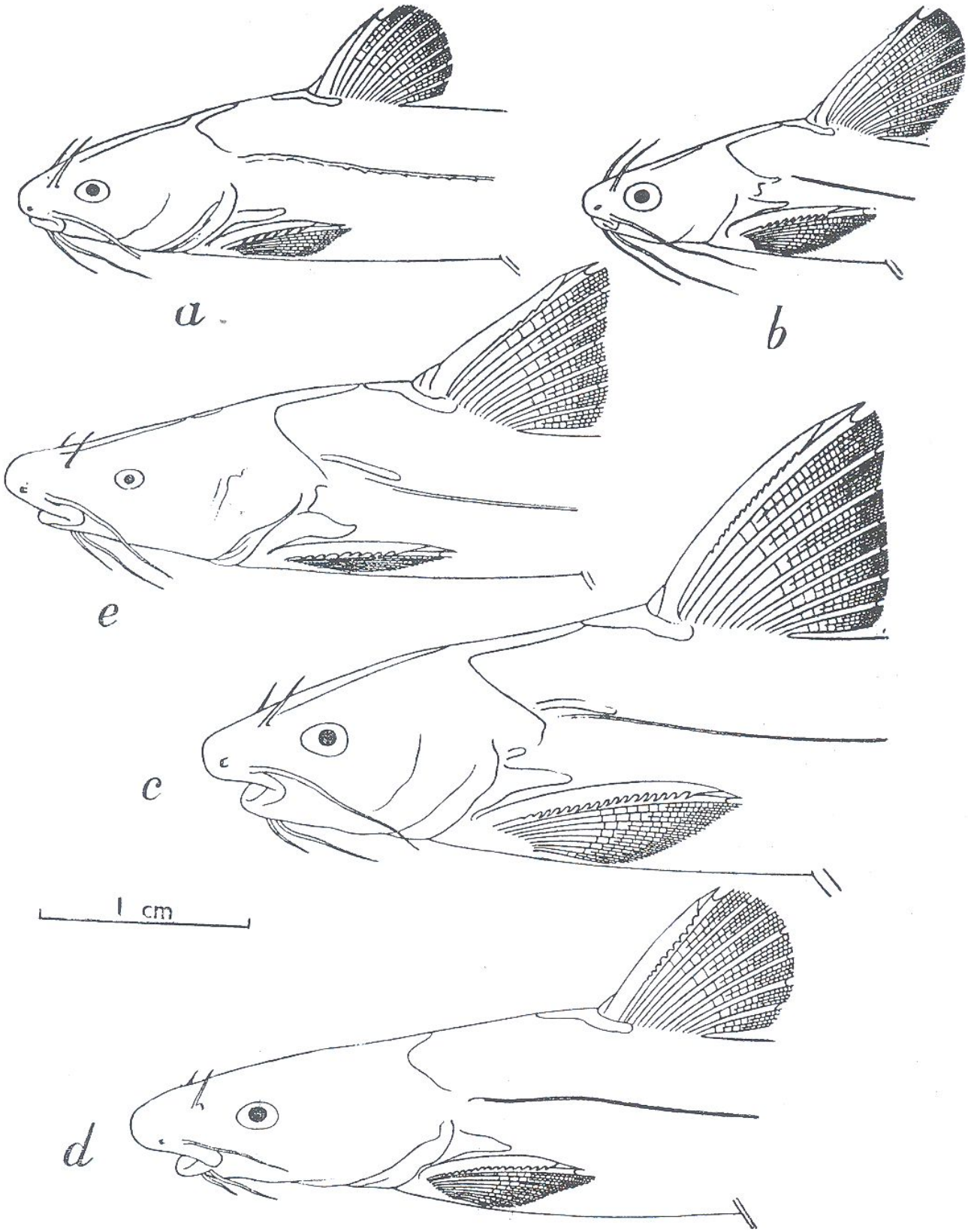

Fig. 1. Variation in shape of snout, position of eye and dorsal fin in *Pseudobagrus*, *Pelteobagrus*, and *Leiocassis* species. *a. P. aurantiacus; b. P. vachellii (juvenile); c. P. vachellii (adult); d. L. micropogon; e. L. longirostris.*

dentition. WORTHINGTON & RICARDO (1937) on the other hand demonstrated that in the species of the African genus *Chrysichthys* BLEEKER, there is no variability. *Pseudobagrus, Pelteobagrus, Leiocassis,* and *Mystus* all have a common pattern of dentition. In almost all the species of these genera the vomerine teeth are continuous. There are no striking differences intra-generically to be of value for separating them. However, the width of the premaxillary band and the arrangement of the teeth on the palatines are useful in separating the species of these genera.

c. *Occipital region.* GÜNTHER (1873) was of the view that the covered or exposed condition of the occipital region was unreliable for separating *Pseudobagrus* and *Leiocassis* from *Mystus.* JORDAN & FOWLER (1903), however, separated *Leiocassis* from *Pseudobagrus* by the same character. It must be mentioned that these authors used this character to separate only the Japanese species. When all the species of these genera are considered *in toto* this character becomes very varying even inter-specifically. The occipital region, covered with skin and mucous in fresh specimens, becomes exposed in old long-preserved specimens. This character is therefore highly unreliable and should be ignored.

d. *Length and nature of the dorsal spine.* The dorsal spine is of moderate length in all the four genera and is not uniquely long as in *Heterobagrus* BLEEKER to be of generic value. The serrated or smooth condition of the dorsal spine also varies intra-specifically and is not of much use.

e. *Shape of the caudal fin.* This is one character which I have found useful in separating *Pseudobagrus* from the other genera. JORDAN & FOWLER (1903) also utilized this character for differentiating *Leiocassis* and *Pseudobagrus.* In the remaining genera the forked condition of the caudal fin is uniformly present, unlike in *Pseudobagrus* where the caudal fin is always truncate, rounded, cuneate or only slightly emarginate.

f. *Count of caudal fin rays.* SCHULTZ (1944) found the number of total branched and simple rays in the two lobes of the caudal fin as of some value in the American siluroids. A preliminary study of this feature indicates that in *Pseudobagrus* and *Pelteobagrus* generally, the upper lobe of the caudal fin has 7 and the lower lobe 8 segmented, branched rays respectively. Besides, each lobe has an unbranched principal ray as the outermost ray. These counts appear to be constant in all the species. The utility of this character in this family needs further investigation. Whether these counts of branched rays are constant in all the genera of the family is yet to be studied.

g. *Count of anal fin rays.* GÜNTHER (1873) considered the presence of a many-rayed anal fin in *Pseudobagrus* and *Leiocassis* as of little use in separating them, but JORDAN & FOWLER (1903) placed great reliance on it. JAYARAM (1955) utilized this character for differentiating *Horabagrus* from *Mystus*. However, in respect of these genera it is seen that generally *Mystus* has 9 - 16 total anal fin rays; *Leiocassis* 12 to 16; *Pelteobagrus* and *Pseudobagrus* 15 to 27. These ranges are not strictly significantly divergent. Some species of *Leiocassis* occasionally have more than 16 rays and similarly some of *Pelteobagrus* have less than 15 rays. In most cases the divergence from the minimum or maximum is however only to the extent of about 2. In combination with the shape of the caudal fin this character is useful in separating these genera. The count of simple and branched anal fin rays is not helpful in differentiating these genera.

3. Classification.

In addition to the characters of the caudal fin shape and the count of total anal fin rays, the distribution pattern of these genera is also worth attention. It is seen from a study of the density of the number of species, that as a rule *Leiocassis* and *Mystus* are more concentrated in Indonesia and farther west than towards China. Likewise there are no species of *Pelteobagrus* or *Pseudobagrus* recorded so far from south of China (exception *Pelteobagrus ornatus* DUNCKER from Malaya).

With these facts in view, if the distribution of the species of these genera are plotted, it is seen that with the exception of 6 species of *Leiocassis* and 15 species of *Mystus* (see table 1), all others conform to the above conclusions. These species have been first described under these respective genera and are found in areas north of Yunnan.

Of the 6 species of *Leiocassis*, excepting *L. longirostris* all the others have 15 to 27 anal fin rays, have a forked caudal fin and are all from within the range of distribution of *Pelteobagrus*. By transferring these five species (excluding *L. longirostris*) from *Leiocassis* to *Pelteobagrus*, the distribution and generic limits of both genera become clear and well defined. As such I consider that *Leiocassis* should be excluded from Chinese lists and be treated more as a genus of Indonesia and Malaya rather than of China.

Of the 15 species of *Mystus*, *M. hoi* and *M. virgatus* have a forked caudal fin and the anal fin rays count also within the range of *Pelteobagrus*. They are thus easily referred to *Pelteobagrus*. Seven other species of *Mystus* (nos. 8 to 14 in table 1) are assigned to *Pseudobagrus* because of

the shape of their caudal fin and also the range of anal fin rays count. *Aoria cornula* CHU is a misprint for *Aoria corsula* (HAMILTON) = *Mystus menoda* (HAMILTON), which is known from Orissa, Bengal, Assam (India) up to Burma. Its record from Yunnan is based on ANDERSON (1875) and quoted in turn by CHAUDHURI (1911) and CHU (1932) in an index of species without description. Its occurrence in China is doubtful. *Macrones sinensis* is inadequately described and as such unidentifiable.

Table 1. Present generic position of certain bagrid fishes known from China, and originally described under *Leiocassis* or *Mystus*.

Sl. No.	Name of species as given in the first reference.	First reference	Type-locality	Count of total anal rays
A.	Species now assigned to *Pelteobagrus* BLEEKER:			
1.	*Liocassis crassilabris crassilabris* GÜNTHER	*Cat. Fish. Brit. Mus., V:* 88, 1864.	"China"	15—19
2.	*Liocassis crassilabris macrops* NICHOLS	*Amer. Mus. Novit., No. 214:* 2, 1926.	near Yenping	17—18
3.	*Liocassis crassirostris* REGAN	*Ann. Mag. nat. Hist., (8) XI:* 552, 1913.	Kiatiang-Fu.	17—18
4.	*Aoria hoi* PELLEGRIN & FANG	*Bull. Soc. zool. Fr., LXIV* 341, 1940.	Foochow	24
5.	*Liocassis microps* RENDAHL	*Ark. Zool., XXIVA, No. 16:* 93, 1933.	Chungking	17—18
6.	*Liocassis tenuifurcatus* NICHOLS	*Amer. Mus. Novit., No. 449:* 1, 1931.	Chungan-Hsien.	19—24
7.	*Aoria virgatus* OSHIMA	*Annot. zool. jap., XI:* 4, 1926.	R. Kachek, Hainan I.	16—18
B.	Species now assigned to *Pseudobagrus* BLEEKER:			
8.	*Aoria henryi* HERRE	*Lingnan Sci. J., XI:* 432, 1932.	Canton, China	18—20
9.	*Macrones medianalis* REGAN	*Ann. Mag. nat. Hist., XIII:* 194, 1904.	Yunnan Lake	17—19
10.	*Macrones pratti* GÜNTHER	In PRATT, A. E. *To the Snows of Tibet*, London: 245, 1892.	Kiatiang-Fu	18
11.	*Aoria rendahli* PELLEGRIN & FANG	*Bull. Soc. zool. Fr., LXIV:* 341, 1940.	Tchang-Ho	19
12.	*Macrones (Liocassis) taeniatus* GÜNTHER	*Ann. Mag. nat. Hist., (4) XII:* 245, 1873.	Shanghai	18
13.	*Macrones (Pseudobagrus) tenuis* GÜNTHER	*Ibid.,:* 244, 1873.	Shanghai	20—22
14.	*Macrones ussuriensis* HERZENSTEIN & WARPACHOWSKI	*Trud. St. Petersb. nat., XVIII:* 24, 1887.	R. Amur	17—18

Table 1. (concluded).

Sl. No.	Name of species as given in the first reference.	First reference	Type-locality	Count of total anal rays
C. Species that continue to remain under *Mystus* (generic position unchanged).				
15.	*Aoria amemiyae* KIMURA	*J. Shanghai Sci. Inst., I (3):* 166, 1934.	Howchwan	11
16.	*Macrones argentivittatus* REGAN	*Rev. Suisse Zool., XIII:* 390, 1905.	"China"	14—15
17.	*Macrones chinensis* STEINDACHNER	*S. B. Akad. Wiss. Wien., (1) LXXXVIII:* 1111, *pl. VIII*, [1883], 1884.	China	13—16
18.	*Pimelodus corsula* HAMILTON = *Mystus corsula* = *Aoria cornula* CHU	*Fish. Ganges:* 203, 1822. *Biol. Bull. St. John's Univ.:* 76, 1931.	Kosi, Mahananda, North Bihar, Bengal.	11—13
19.	*Macrones pluriradiatus* VAILLANT	*Bull. Soc. philom., IV* (8) : 126, 1892.	Tonkin	9
20.	*Macrones chinensis* BLEEKER	*Ned. Tijdschr. Dierk., IV:* 153, 1872.	"China"	Not given
D. Species that continues to remain under *Leiocassis* (generic position unchanged).				
21.	*Liocassis longirostris* GÜNTHER	*Cat. Fish. Brit. Mus., V:* 87, 1864.	North China	13—16

The remaining four species of *Mystus viz., M. argentivittatus* REGAN, *M. chinensis* STEINDACHNER, *M. pluriradiatus* VAILLANT, and *M. amemiyae* KIMURA have the anal fin count as in the other species of *Mystus* (9 - 16). These seem to be relic species of the genus fastly disappearing from China. A point worthy of attention is that with the exception of *M. chinensis*, the other species have not been so far recorded from China again. Considering the general distribution of the species of *Mystus*, it would seem best to exclude this genus also from Chinese lists.

III. SYSTEMATIC ACCOUNT

Family **Bagridae**

The family has now been divided into five subfamilies: Ritinae, Bagrinae, Chrysichthyinae, Bagroidinae, and Auchenoglanidinae; the last two being new. The description of these new taxa and classification are discussed in part 2 of this series (JAYARAM, 1966a).

Subfamily Chrysichthyinae

Type-genus. *Chrysichthys* BLEEKER, from Africa.

This subfamily is divided into three tribes: Chrysichthyini, Gephyroglinidini and Pelteobagrini, all being new. The first two deal with the African genera, an account of which is published in part 2 of this series (JAYARAM, 1966a).

Tribe Pelteobagrini Jayaram, 1966

Type-genus. *Pelteobagrus* BLEEKER.

Diagnosis. Nostrils simple; no flap on posterior nostril to form base of nasal barbels. Teeth on palate well developed and confined to prevomer only in villiform bands. Maxillary bone rudimentary. Anal fin with 13 to 28 rays (15 to 27 in *Pelteobagrus* and *Pseudobagrus*; 13 to 20 in *Coreobagrus*, and 23 to 28 in *Horabagrus*).

Key to genera

1*a*. Caudal fin forked.

2*a*. Eyes inferior, visible when viewed from below ventral surface . . . . . *Horabagrus* JAYARAM *

2*b*. Eyes superior, not visible when viewed from below ventral surface . . . . . *Pelteobagrus* BLEEKER

1*b*. Caudal fin truncate, cuneate, rounded or only slightly emarginate.

3*a*. Head width more than 1.2 times in head length. Body long and low, its depth generally more than 5 times in standard length . . . *Pseudobagrus* BLEEKER

3*b*. Head width less than 1.2 times in head length. Body short and high, its depth generally less than 5 times in standard length . . . . *Coreobagrus* MORI

Genus **Pelteobagrus** BLEEKER

Pelteobagrus BLEEKER, *Ned. Tijdschr. Dierk., II.* p. 9, 1864.
(Type-species, *Silurus calvarius* BASILEWSKI, by original designation).

Fluvidraco JORDAN & FOWLER, *Proc. U. S. natnl. Mus., XXVI,* p. 904, 1903. (Type-species, *Fulvidraco ransonnetii* (STEINDACHNER), by original designation).

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* The systematic account of this genus found in India is dealt in part 1 of this series *vide Int. Rev. ges. Hydrobiol., Leipzig, 51 (3)*, pp. 433 - 450 (1966).

Body short and compressed. Dorsal profile arched. Head large and slightly compressed. Snout obtusely rounded. Jaws subequal, but variable in certain species. Lips usually thin and plain. Mouth generally subterminal and moderately wide. Villiform teeth on premaxillaries, prevomer and mandibular in bands; that on latter produced laterally and separated at the centre by an edentate space; that on prevomer semi-lunar and continuous. Eyes large, superior and in anterior part of head. Supraoccipital covered with skin or not covered and with a backward extending process. Four pairs of barbels: one maxillary, two mandibular and one nasal. Gill membranes free from each other and also from isthmus. Branchiostegals eight to ten.

Rayed dorsal fin inserted above half pectoral fin; with six or seven rays; adipose dorsal fin long, low, posteriorly free. Pelvic fins inserted below last ray of dorsal fin or slightly away towards posteriorly. Anal fin with 15 to 27 rays. Lateral line simple.

44 to 48 vertebrae, 20 to 22 precaudal and 24 to 26 caudal.

Distribution. Widely distributed from the Soviet Far east to Yunnan in south China, Japan, Hainan and Hong-Kong Island; with one species in Malaya.

DUNCKER (1904: 173) described *Pseudobagrus ornatus* from the River Muar at Tubing Tinggi (Malaya). HORA & GUPTA (1941: 22) after examining the Malayan fishes in the collection of the Raffles Museum, Singapore, stated "we have not examined any specimen of it". The species has not been subsequently recorded so far. Through the kind courtesy of Dr W. K. LADIGES of the Zoologisches Staatsinstitut und Zoologisches Museum, Hamburg, I have been able to obtain the necessary photographs and data of the Lectotype and Syntype of *ornatus* preserved in their museum. Mr F. ROSSEL of Senckenberg Museum, Frankfurt kindly examined these types and furnished the following details:

Nostrils well separated; posterior nostril with a small barbel. Sensory pores on dorsal and ventral surface of head present; four pairs of barbels, all shorter than head. Mouth subterminal; teeth on premaxillaries in several irregular rows; on the vomer in a curved continuous band. Dorsal spine smooth. Some of the measurements are reproduced below.

	Lectotype	Syntype
Standard length (in mm)	25.5	24.0
Length of head	7.0	6.5
Depth of body	6.0	6.0
Diameter of eye	1.7	1.8

	Lectotype	Syntype
Length of snout	2.3	1.7
Interorbital space width	2.5	2.4
Width of head	4.0	4.0
Pre-dorsal distance	10.0	10.0
Length of dorsal spine	4.5	4.0
Length of pectoral spine	4.0	4.0
Least height of caudal peduncle	2.4	2.2
Count of Anal fin rays (total rays)	23	22
Dorsal fin rays	1.6	1.6
Pectoral fin rays	1.6	1.6
Pelvic fin rays	6	6

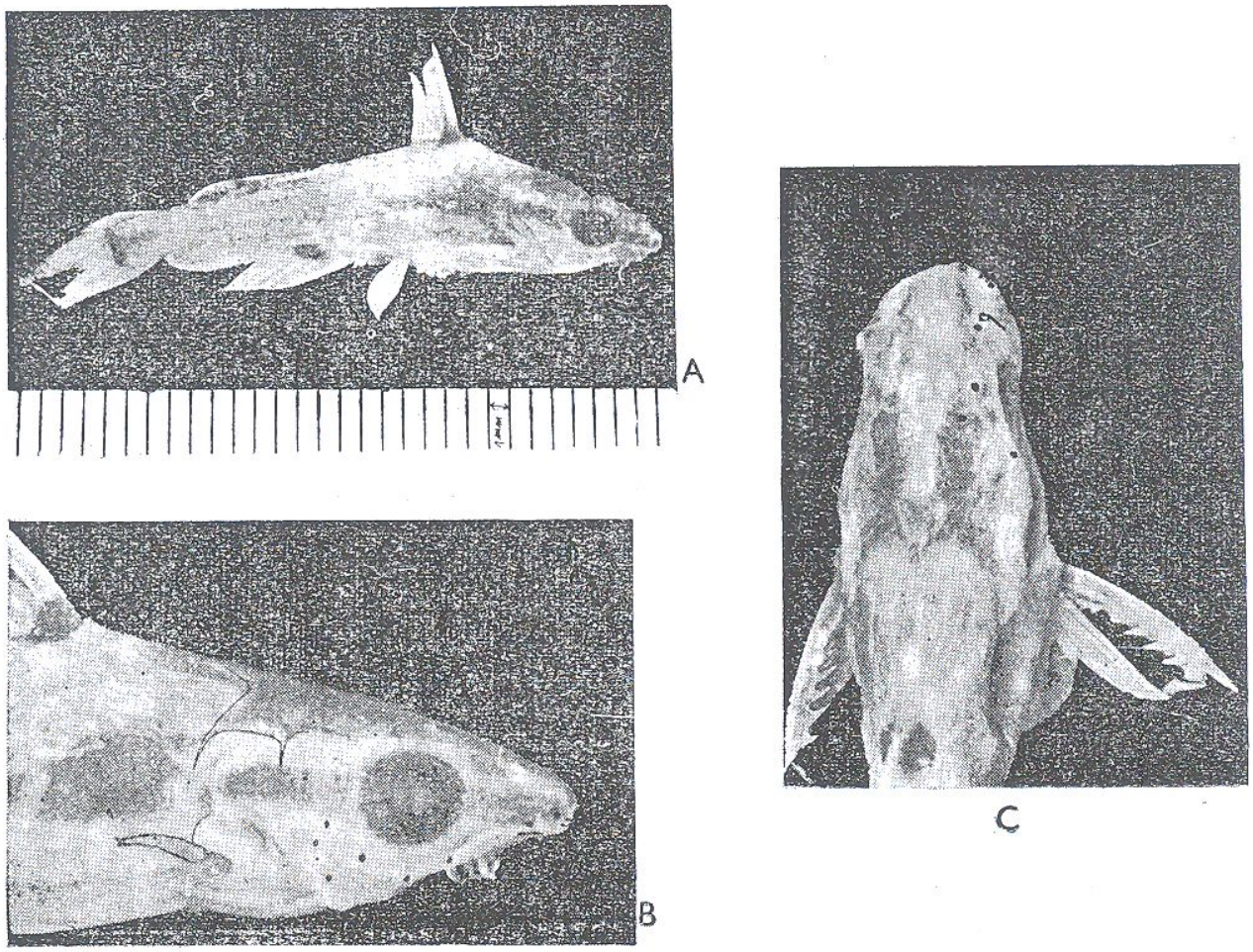

PLATE I. *Pelteobagrus ornatus* (DUNCKER). A. Lateral view of Paratype; B. Lateral view of Lectotype showing pores; C. Dorsal view of lectotype showing pores.

From the description and photographs of the specimens (Plate I, figs. A-C) and also from the count of the anal fin rays besides the caudal fin shape, the species is referable to *Pelteobagrus*. This is the only species of this genus found in Malaya.

Key to species

1*a*. Adipose dorsal fin base equal to or longer than anal fin base.

2*a*. Anal fin with more than 20 rays. Pelvic fins not reaching anal fin . . . . . *brashnikowi*

2*b*. Anal fin with fewer than 20 rays. Pelvic fins reach anal fin.

3*a*. Interorbital space width more than 5 times in head length . . . . . *microps*

3*b*. Interorbital space width less than 5 times in head length.

4*a*. Body depth more than 5 times in standard length.

5*a*. Least height of caudal peduncle 1.64 times in its length. Occipital process 4.0 times as long as wide at base. *Pelteobagrus* sp. prox. *crassirostris*

5*b*. Least height of caudal peduncle 2.96 times in its length. Occipital process 2.5 times as long as wide at base . . . . . *crassirostris*

4*b*. Body depth less than 5 times in standard length.

6*a*. Body depth 4.71 times in standard length . . . . . *crassilabris crassilabris*

6*b*. Body depth 3.91 times in standard length . . . . . *crassilabris macrops*

1*b*. Adipose dorsal fin base shorter than anal fin base. *

7*a*. Premaxillary band of teeth 4 or more than 4 times as long as broad.

8*a*. Occipital process more than 2.5 times as long as wide at base.

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* *P. ornatus* (DUNCKER) from Malaya comes under this group. I am unable to place it exactly since I have not seen the type, and the published characters are too inadequate.

9*a*. Body depth 5 to 8 times in standard length . . . . . *tenuifurcatus*

9*b*. Body depth less than 5 times in standard length . . . . . *eupogoides*

8*b*. Occipital process less than 2.5 times as long as wide at base.

10*a*. Pelvic fins do not reach anal fin. Body depth 6 or 7 times in standard length . . . *eupogon*

10*b*. Pelvic fins reach anal fin. Body depth less than 6 times in standard length.

11*a*. Body with broad, horizontal olive-brown bands, three above and below lateral line drawn intermittantly and one along upper dorsal profile of body drawn continuously. . . . *wittenburgii*

11*b*. Body plain without any colour bands. . *fulvidraco*

7*b*. Premaxillary band of teeth fewer than 4 times as long as broad.

12*a*. Occipital process less than 4 times as long as wide at base.

13*a*. Occipital process not more than 2.0 times as long as wide at base.

14*a*. Dorsal spine smooth. Width of gape of mouth 1.94 to 2.46 in head length. *ransonnetii*

14*b*. Dorsal spine serrated. Width of gape of mouth 2.40 to 2.96 in head length . . . . . *nudiceps*

13*b*. Occipital process more than 2.0 times as long as wide at base.

15*a*. Maxillary barbels extend beyond head.

16*a*. Body depth 4.25 to 8.0 times in standard length . . . . . *vachellii*

16*b*. Body depth 3.75 times in standard length . . . . . *wangi*

15*b*. Maxillary barbels do not extend beyond head.

17*a*. Occipital process 2.5 to 3.0 times as long as wide at base. Least height of caudal peduncle less than 1.75 times in its length. . *virgatus*

17*b*. Occipital process 3.0 to 3.5 times as long as wide at base. Least height of caudal peduncle more than 2.0 times in its length . . *nitidus*

12*b*. Occipital process more than 4 times as long as wide at base.

18*a*. Anal fin with 24 rays. Maxillary barbels extend beyond eye . . . . . *hoi*

18*b*. Anal fin with 27 rays. Maxillary barbels extend to pectoral fin base . . . . . *fui*

Pelteobagrus vachellii (RICHARDSON)

Bagrus vachellii RICHARDSON, *Report on the ichthyology of the seas of China and Japan*, p. 284, 1845 (type locality, Canton).

Pseudobagrus vachellii GÜNTHER, *Catalogue of the Fishes in the British Museum, V*, p. 85, 1864 (China). KOLLER, *Ann. naturh. (Mus). Hofmus. Wien. XLI*, p. 28, pl. 1, fig. 1, 1927 (Kang Kong, River Wutschi). RENDAHL, *Ark. Zool., XXA*, p. 165, 1928 (An-hwei, Ho-nan, Soochow, see for synonymy). KIMURA, *J. Shanghai Sci. Inst., I*, p. 171, 1934 (How-Chwan). WU, *Rept. mar. biol. Ass. China, no. 3*, p. 99, 1934 (Chengchow, Foochow). TCHANG & SHIH, *Contr. biol. Dept. Sci. Inst. W. China, V*, p. 9, 1934 (Kialing Kiang). HERRE & LIN, *Bull. Chekiang Fish. Exp. Stn., II, no. 7*, p. 24, 1936 (River Tsien Tang). NICHOLS, *The Freshwater fishes of China, IX*, p. 39, 1943 (Fu-kien, Tungting Hu).

Macrones (Pseudobagrus) vachellii PETERS, *Mber. Akad. Wiss. Wien.*, p. 924, 1880 (Ningpo).

Macrones vachellii GÜNTHER, *Ann. Mag. nat. Hist., (6) I*, p. 430, 1888 (Ichang). TCHANG & SHIH, *Sci. Quart. nat. Univ. Peking, IV, no. 3*, p. 344, 1934 (Sze-Chwan).

Pelteobagrus vachellii KIMURA, *J. Shanghai Sci. Inst., I*, p. 171, 1934 (How-Chwan).

Pseudobagrus chinensis WU, *Contr. biol. Lab. Sci. Soc. China, VI*, pp. 46, 53, fig. 4, 1930 (type locality, Sze-Chwan).

? *Pseudobagrus fangi* WU, *Sinensia, I, no. 6*, p. 84, fig. 8, 1930 (type locality, Kiating).

? *Pseudobagrus wui* MIAO, *Contr. biol. Lab. Sci. Soc. China, X*, p. 210, fig. 42, 1934 (type locality, Chinkiang).

Specimens studied. — BMNH 1855. 3. 27. 9, Che-kiang, FORTUNE's collection, one specimen (Neotype), 150 mm; BMNH 1851. 12. 17. 216, China, purchased of WARWICK, one specimen, 155 mm; BMNH 1936. 10. 19. 71 - 73, Chungking, China, MANSELL coll., four specimens, 74 to 104 mm; BMNH 1858. 10. 19. 140, Che-kiang, purchased of

CUMING, one specimen, 131 mm; AMNH 921, Siberia, 1900, BUXTON coll., four specimens, 127 to 136 mm; AMNH 924, Lake Hanka, Siberia, 1900, BUXTON coll., one specimen, 130 mm; MCZ 29832, Luchon, Sze-Chwan, 1908, W. R. ZAPPEY coll., one specimen, 220.5 mm; MCZ 29848, Ichang, 1907, W. R. ZAPPEY coll., one specimen, 46 mm; MCZ 29849, Ichang, 1907, W. R. ZAPPEY coll., one specimen, 104.0 mm; ZSI F. 12211/1, locality unknown, Fan Memorial Institute of Biology, Peking, China, one specimen, 135 mm; ZSI F. 11583/1, Wuchow, China, A. W. C. T. HERRE coll., one specimen, 176 mm; ZSI F. 818/2, Yangtze Kiang, received from the Peoples Republic of China, May 31, 1955, eight specimens, 244 to 327 mm; USNM 87432, Suifu, China, one specimen, 106 mm; USNM 94595, Wuchow, China, HERRE & LIN coll., one specimen, 245 mm; USNM 86447, Shanghai, Kiang-su, China, Oct. 1923, SOWERBY coll., one specimen, 172 mm; USNM 86481, Nanking, China, Oct. 1923, SOWERBY coll., one specimen, 161 mm; USNM 86482, Nanking, China, Oct. 1923, SOWEREY coll., one specimen 147.5 mm; USNM 130421, Kashing, about 150 miles south of Shanghai, China, 1925, SOWERBY coll., one specimen, 67.5 mm; USNM 87194, Chengtu, China, 1925, GRAHAM coll., one specimen, 163 mm; USNM 130570, Foochow, Fu-kien, China, June 1926, SOWERBY coll., two specimens, 169 and 185 mm; USNM 86303, Suifu, China, 1922, K. C. GRAHAM coll., four specimens, 94 to 110.5 mm; USNM 85952, River Min, Sachi, about 300 miles from mouth, Dec. 1921, SOWERBY coll., four specimens, 121 to 237 mm; USNM 130386, Shanghai, Kiang-su, China, 1925, SOWERBY coll., thirteen specimens, 98 to 121 mm; USNM 86930, Foochow, China, Sept. - Nov., 1923, SOWERBY coll., one specimen, 121 mm.

Description. Body depth 5.25 (4.30 to 7.68); head length 4.37 (3.65 to 5.21); head width 5.68 (4.88 to 7.83); head depth 6.44 (5.56 to 9.73); predorsal length 2.82 (2.49 to 3.33); postdorsal length 1.53 (1.31 to 1.69); prepelvic distance 2.10 (1.90 to 2.96); length of longest ray of caudal fin 4.71 (3.93 to 5.88); all in standard length. Eye 4.52 (3.33 to 6.48) in head length; 1.86 (1.20 to 3.09) in interorbital space width; 1.60 (1.18 to 2.29) in snout length. Dorsal spine 1.20 (1.00 to 1.58) (N = 52); pectoral spine 1.36 (1.15 to 1.53) (N = 17) in head length. Adipose dorsal fin base 1.56 (1.21 to 1.84) in anal fin base. Least depth of caudal peduncle 1.96 (1.29 to 2.96) (N = 55) in its length.

Dorsal profile at about 35° to body axis. Occipital process exposed, 3.0 or 3.5 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth produced laterally, 2.0 to 4.0 times as long as broad. Maxillary barbels reaching middle of pectoral spine, others shorter. Orbital rims partly free along antero-lateral and lower margins. Longest ray of dorsal fin not extending to adipose fin when depressed; dorsal spine smooth. Pectoral spine with 10 to 15 strong, antrorse teeth over posterior margin. Pelvic fins reach anal fin. Longest anal ray not extending to caudal fin. Caudal fin forked. Lateral line straight.

Colour. Deep dark-brown above and on sides, pale brown beneath. Fresh specimens are light pink or buff colour.

Relationship. Related to *P. fulvidraco,* but differing in having shorter and narrower head, longer caudal peduncle and lighter colouration (see table 3, figure 5, graphs 1 - 3).

Distribution. Widely distributed in Siberia, China and Hainan Island. Not known from Japan and Hong-Kong Islands.

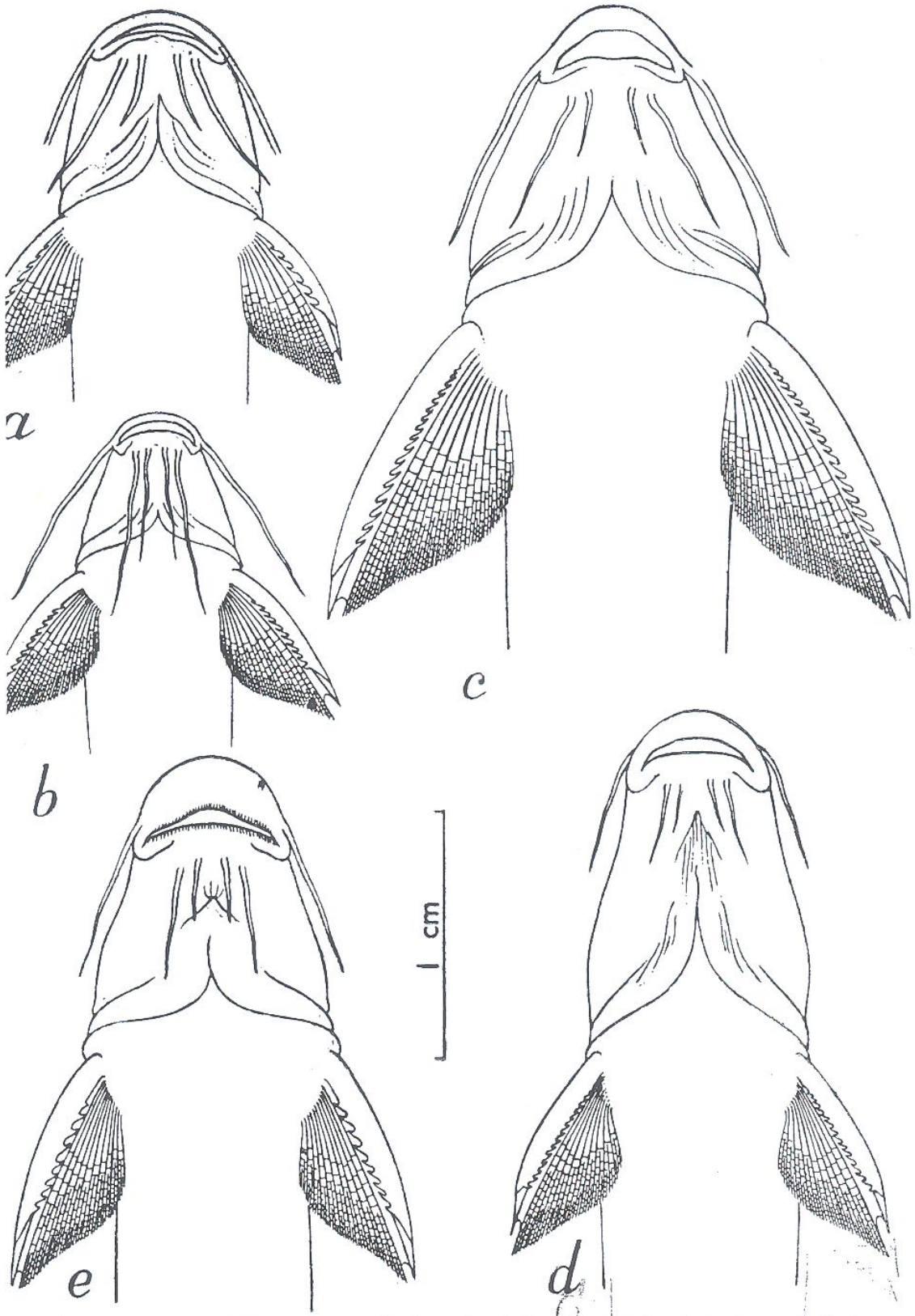
Remarks. WU (1930: 53, 1930*a*: 83) described *P. chinensis* and *P. fangi* as new species of this genus. NICHOLS (1943) considered the first as a doubtful synonym of *vachellii* and the second as a separate taxon. I have followed NICHOLS in considering *chinensis* as a synonym of *vachellii*. *P. fangi* is separable from *vachellii* only by its long occipital process (six times longer than wide at base). The species is so far known only by its holotype and it is not known whether this measurement is constant in a series of specimens. As such, it is kept as a probable synonym of *vachellii*.

MIAO (1934: 210) separated *P. wui* from *vachellii, eupogon, eupogoides, chinensis,* and *fangi* by its anal fin rays count and length of occipital process. Of these five species, *wui* has greater affinities with *vachellii* than with others. Comparison of the two species however, indicates that they intergrade in respect of many features save the lengths of the pectoral and caudal fins. These differences do not warrant a specific status for *wui* and therefore I have kept it as a probable synonym of *vachellii* pending examination of the type.

RENDAHL (1933: 91) published the proportional measurements and counts of 13 specimens, 89 to 215 mm long, of which one (123 mm) is stated to have 31 rays in the anal fin. This is unusually a high count and is probably a *lapsus calami*.

Neotype. RICHARDSON (1845: 284) briefly described *Bagrus vachellii* from a specimen presented to the Cambridge Philosophical Institution by the Rev. G. VACHELL. He stated that the "under jaw is shorter than the snout", an expression usually meaning that the snout is produced beyond the lower jaw. Fishes of the genus *Leiocassis* have in general a produced snout; but in respect to other features given by Richardson *Bagrus vachellii* is rather referable to *Pelteobagrus* than to *Leiocassis*.

From my studies of Bagridae I have come to the conclusion that certain specimens in the British Museum (Natural History), named *Bagrus vachellii* agree well enough with RICHARDSON's description to be accepted as that species, and I have examined 56 specimens (including these) which I believe to be conspecific. Only two of these can be described as having the snout slightly produced beyond the upper jaw, one (AMNH 921) being in a poor state of preservation, but the other (BMNH 1855. 3. 27. 9) is



2. Variation in shape of mouth in *Pseudobagrus*, *Pelteobagrus* and *Leiocassis* ies. *a. P. aurantiacus; b. P. vachellii (juvenile); c, P. vachellii (adult); d. L. micro- m; e. L. longirostris.*

well preserved with a rather sharply conical snout and the lower jaw less advanced than the upper. In neither of these is the snout so markedly produced as in species of *Leiocassis* such as *L. longirostris* GÜNTHER and *L. micropogon* BLEEKER.

It is therefore probable that RICHARDSON's holotype was similar to one of these two specimens and like them was a little atypical in the shape of the snout, which in general is not produced in *vachellii*. For comparative purposes, loan of the holotype was requested from the Cambridge Philosophical Institution through the late Lt. Col. R. B. SEYMOUR SEWELL. It was learnt that "the collections of the Cambridge Phil. Soc. were handed over to the Dept. of Zoology about the middle of the last century, but it is not mentioned in the catalogue of the collection that was made in 1893". The British Museum (Natural History), informed that none of the specimens there assigned to *Bagrus vachellii* is recorded as coming from Cambridge or as being collected by VACHELL. "The only specimen of 5" (the length of the type) and of vague provenance was registered 1858. 10. 19. 140 as from 'Chiking (sic) purchd. of Mr. CUMING'. Mr. CUMING travelled himself in the east, so he may have collected it himself. It is hardly likely that he would have acquired it from the Cambridge Philosophical Society".

I have obtained in connection with my revision of the Bagridae lists of all Bagrid material preserved in various museums and none of these seems to possess the holotype of *Bagrus vachellii*.

It is evident from the above, that the type specimen of *Bagrus vachellii* is lost for all intents and purposes. In order to clarify the confused specific limits of this species, a specimen in the BMNH (No. BMNH 1855. 3. 27. 9) collected from Che-kiang by Mr. FORTUNE is hereby designated as the **neotype** in the interests of stability and reference.

Pelteobagrus hoi (PELLEGRIN & FANG)

Aoria hoi PELLEGRIN & FANG, *Bull. Soc. zool. Fr., LXIV*, p. 341, 1940 (type locality, Foochow).

Specimen studied. No specimen seen by me.

Relationship. Related to *P. fui*, but differing from it in having more anal fin rays and longer maxillary barbels.

Distribution. China: Foochow.

Pelteobagrus fui (MIAO)

Pseudobagrus fui MIAO, *Contr. biol. Lab. Sci. Soc. China, X*, p. 217, fig. 45, 1934 (type locality, Chinkiang). NICHOLS, *The Freshwater fishes of China, IX*, p. 273, 1943 (as a doubtful synonym of *nitidus*).

Specimen studied. No specimen seen by me.

Relationship. Related to *P. vachellii*, but differing in having smaller caudal peduncle depth and more anal fin rays.

Distribution. China: Chinkiang.

Pelteobagrus brashnikowi (BERG)

Macrones brashnikowi BERG, *Ann. Mus. zool. Acad. St. Petersb., XII*, p. 421, 1907 (type locality, River Onon).

Macrones (Leiocassis) brashnikowi BERG, *Zool. Jb., Syst. Abt., XXXII*, p. 477, 1912 (River Amur).

Specimens studied. USNM 86934, Foochow, Sept. - Nov., 1923, SOWERBY coll., one specimen, 88.5 mm; USNM 86935, Foochow, China, Sept. - Nov., 1923, SOWERBY coll., one specimen, 98 mm; USNM 87611, Sze-Chwan, 1925, GRAHAM coll., one specimen, 46 mm; USNM 89146, China, GRAHAM coll., one specimen, 53.5 mm; MCZ 32409, Lake Hanka, basin of River Usuri, a tributary of River Amur, two specimens, 125 and 132 mm.

Description. Body depth 4.68 (4.26 to 4.92); head length 3.73 (3.40 to 4.17); head width 5.06 (4.84 to 5.35); head depth 5.75 (5.41 to 6.39); predorsal length 2.63 (2.51 to 2.72); postdorsal length 1.60 (1.44 to 1.76); prepelvic distance 1.95 (1.84 to 2.01); length of longest ray of caudal fin 4.28 (3.69 to 5.11), all in standard length. Eye 4.29 (3.57 to 5.42) in head length; 1.63 (1.11 to 2.00) in interorbital space width; 1.59 (1.25 to 2.00) in snout length. Dorsal spine 1.29 (1.13 to 1.60) (N = 5); pectoral spine 1.27 (1.03 to 1.67) in head length. Adipose dorsal fin base nearly equal to anal fin base. Least depth of caudal peduncle 1.73 (1.55 to 2.00) in its length.

Dorsal profile at about 30° to body axis. Occipital process exposed, 2.0 or 3.0 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth not produced laterally and 3.0 or 3.5 times as long as broad. Maxillary barbels reaching preoperculum, others shorter. Orbital rims partly free. Longest ray of dorsal fin not extending to adipose fin when depressed; dorsal spine with seven to nine feeble, downward facing teeth over posterior margin. Pectoral spine with 13 to 15 strong, antrorse teeth (seven to nine in young specimens) over posterior margin, occasionally over anterior margin also. Pelvic fins not reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin forked. Lateral line straight.

Colour. Light brown all over, with vertical black bands on body below each dorsal fin.

Relationship. Related to *P. vachellii,* but differing in having slightl longer head, greater body depth, larger eye and fewer anal fin rays.

Distribution. River Amur, Lake Hanka, River Onon: Siberia. Foochow Sze-Chwan: China.

Remarks. Excepting two specimens under MCZ 32409, the remainin four of the six specimens studied are from localities outside the norm range of distribution of this species. NICHOLS (1943) doubted the occu rence of *brashnikowi* in China. SHAW (1933) discussed the presence c *P. ussuriensis* in China which species is generally confined to north Chines areas. The four specimens of *brashnikowi* from China differ from th two from Siberia in having slightly larger eyes, longer barbels and a uniformly brown colour. I am unable to determine their subspecific statu if any, for want of more material. The differences between the two lo of specimens are given below.

TABLE 2. — Comparison of certain specimens of *Pelteobagrus brashnikowi.*

Characters	Specimens from Siberia (N =2) MCZ 32409	Specimens from Chi (N = 4) USNM 869 86935, 89146, 87611
SL/Body depth	4.46 to 4.71	4.26 to 4.92
SL/Head width	5.00 to 5.04	4.84 to 5.35
SL/Head depth	5.50 to 5.68	5.41 to 6.39
LH/Eye	4.84 to 5.42	3.57 to 4.48
LH/LCPD	1.43 to 1.81	1.47 to 1.79
Stand. Length	125 & 132	46 to 98

Pelteobagrus wangi (MIAO)

Pseudobagrus wangi MIAO, *Contr. biol. Lab. Sci. Soc. China, X,* no. 3, p. 215, fig. 4 1934, (type locality, Chinkiang).

Specimen studied. No specimen seen by me.

Relationship. Related to *P. nitidus,* but differing in having a great body depth and broader interorbital space.

Distribution. China: Chinkiang.

Pelteobagrus nitidus (SAUVAGE & THIERSANT)

Pseudobagrus nitidus SAUVAGE & THIERSANT, *Ann. Sci. nat., (6) I,* p. 5, 1874 (ty locality, Yangtze-Kiang). WU *Bull. Mus. Hist. nat. Paris, (2) III,* p. 43 1931 (Tong-lu). HERRE & LIN, *Bull. Chekiang Fish. Exp. Sta., II, no. 7,* 24, 1936 (River Tsien Tang). NICHOLS, *The freshwater fishes of China, I.* pp. 41, 273, 1943 (Tungting Hu, River Min).

Specimens studied. ZSI F. 805/2, Tungting Hu, Hun-nan province, China, C. H. POPE coll., two specimens, 85.0 and 96.5 mm.

Description. Body depth 4.65 (4.47 to 4.83) ; head length 3.94 (3.86 to 4.02) ; head width 5.195 (5.08 to 5.31) ; head depth 5.96 (5.85 to 6.07) ; predorsal length 2.465 (2.42 to 2.51) ; postdorsal length 1.525 (1.52 to 1.53) ; prepelvic distance 1.90 (1.72 to 2.08) ; length of longest ray of caudal fin 4.47, all in standard length. Eye 4.235 (3.67 to 4.80) in head length; 1.535 (1.17 to 1.90) in interorbital space width; 1.65 (1.50 to 1.80) in snout length. Dorsal spine 1.13; pectoral spine 1.26 in head length. Adipose dorsal fin base 1.75 (1.65 to 1.85) in anal fin base. Least depth of caudal peduncle 2.13 (2.13 to 2.13) in its length.

Dorsal profile at about 25° to body axis. Occipital process exposed, 3.2 or 3.5 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth slightly produced laterally, 2.5 times as long as broad. Maxillary barbels reaching operculum, others shorter. Orbital rims partly free along upper margins. Longest ray of dorsal fin not extending to adipose fin when depressed; dorsal spine with eight to ten feeble, downward facing teeth over posterior margin. Pectoral spine with 10 to 12 strong, antrorse teeth over posterior margin. Pelvic fins reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin forked. Lateral line straight.

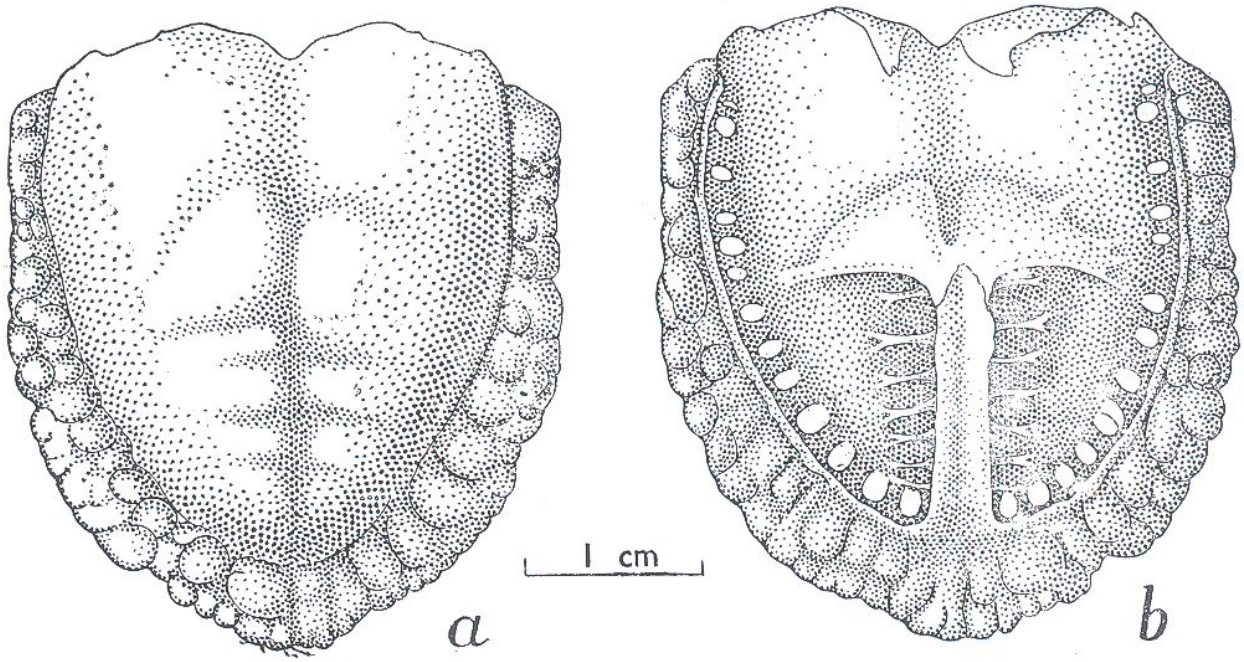


Fig. 3. Air-bladder of *Pelteobagrus nitidus* (SAUVAGE & THIERSANT). *a*. Intoto; *b*. dissected to show internal modifications.

Colour. Uniformly pale brown above and on sides, dull white beneath.

Relationship. Distantly related to *P. vachellii*, but differing in having greater body depth, larger eye and other secondary characters.

Distribution. China: Kiating, River Min, Tong-lu, River Tsien Tang, Tungting Hu, Yangtze Kiang.

Remarks. The air-bladder in the specimens examined is peculiar. A fringed border along the sides representing internally numerous small secondary lateral compartments is present (Text-fig. 3).

Pelteobagrus sp. prox. **crassirostris** (REGAN)

Specimen studied. USNM 86357, Foochow, Fu-kien vicinity, China, 1923, SOWERBY coll., one specimen, 145 mm.

Description. The main characters of this specimen are as follows: Body depth 5.80; head width 7.44; head depth 7.44; in standard length. Premaxillary band of teeth produced laterally. Longest ray of dorsal fin extending to adipose fin when depressed. Least height of caudal peduncle 3.45 in head length.

This specimen is very close to *P. crassirostris*, and is intermediate between *brashnikowi* and *crassirostris*.

Colour. Uniformly ash-grey above and on sides, dull-grey beneath. Head dark-brown.

Relationship. Most closely related to *crassirostris*, but differing as stated above in respect of the caudal peduncle and also in having a longer occipital process.

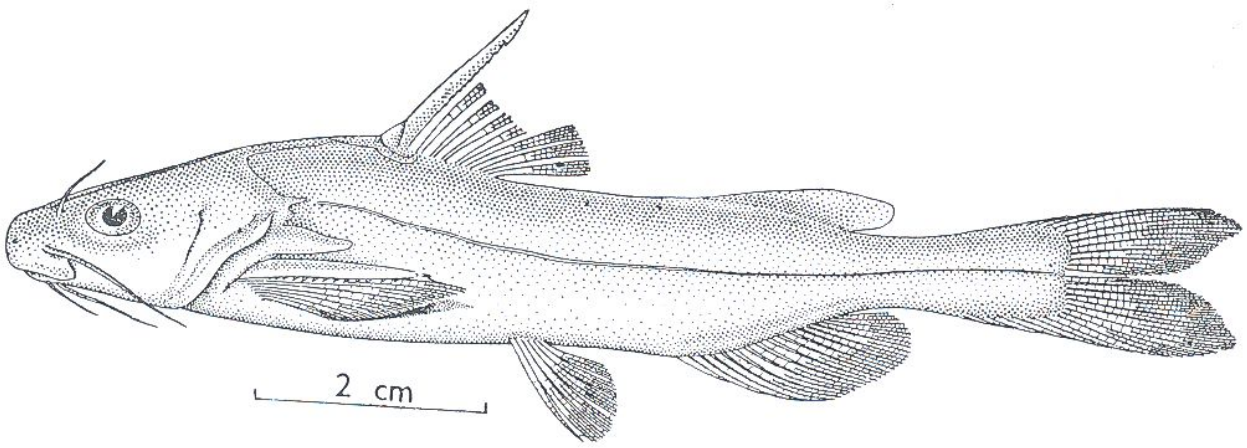


Fig. 4. *Pelteobagrus* sp. prox. *crassirostris* (REGAN). Lateral view.

Distribution. China: Foochow.

Remarks. Lack of more material has rendered an accurate determination of the specific status of this species difficult. It may prove to be a new species.

Pelteobagrus crassirostris (REGAN)

(Plate II, Fig. E)

Leiocassis crassirostris REGAN, *Ann. Mag. nat. Hist., (8) XI*, p. 552, 1913 (type locality, Kiatiang-fu).

Leiocassis (Nassocassis) crassirostris NICHOLS, *Bull. Amer. Mus. nat. Hist., LVIII*, p. 7, 1928 (Sze-Chwan).

? *Leiocassis torosilabris* SAUVAGE & THIERSANT, *Ann. Sci. nat., (6) I*, p. 7, 1874 (type-locality, "Canaux du Tschuang occidental").

Specimens studied. USNM 87433, Suifu, China, Oct.-Nov., 1924, D. C. GRAHAM coll., one specimen, 127.5 mm.

Description. REGAN (1913) gave a description of this species.

Relationship. Related to *P. crassilabris crassilabris*, but differing in having longer head, smaller body depth, longer barbels and greater caudal peduncle depth.

Distribution. Kiatiang-fu, Suifu, Sze-Chwan: China.

Remarks. SAUVAGE & THIERSANT (1874: 7) described *L. torosilabris* from the Yangtze Kiang. Since in the description it is stated that there are movable labial teeth on the jaws, REGAN (1913: 547) thought the species as related to *Bagrichthys* BLEEKER. NICHOLS (1943: 44) however, referred the species as a probable synonym of *crassilabris*.

Through the courtesy of the late Prof. LEON BERTIN of Paris Museum, I obtained (*in litt.*,) the following details regarding the holotype (No. 5. 936). The mandibular barbels are simple. The premaxillary teeth are longer and stronger than the others, but they are not particularly movable; they are numerous and arranged in rows. There are no labial teeth. The caudal fin does not possess any filamentous rays.

The smooth dorsal spine and greater body depth indicates its probable relationship with *crassirostris* to a greater extent than with *crassilabris*, but the head seems to be shorter than in either of these species. The premaxillary teeth seems to be somewhat enlarged, but they cannot be termed as labial teeth. It is likely that this species is a synonym of *crassirostris*.

Pelteobagrus crassilabris crassilabris (GÜNTHER)

(Plate II, Fig. F)

Liocassis crassilabris GÜNTHER, *Catalogue of the fishes in the British Museum, V*, p. 88, 1864 (type locality, "China").

Macrones crassilabris GÜNTHER, *Ann. Mag. nat. Hist., (6) I*, p. 429, 1888 (Yangtze Kiang). TCHANG & SHIH, *Sci. Quart. nat. Univ. Peking IV*, no. 3, p. 341, 1934 (Foochow).

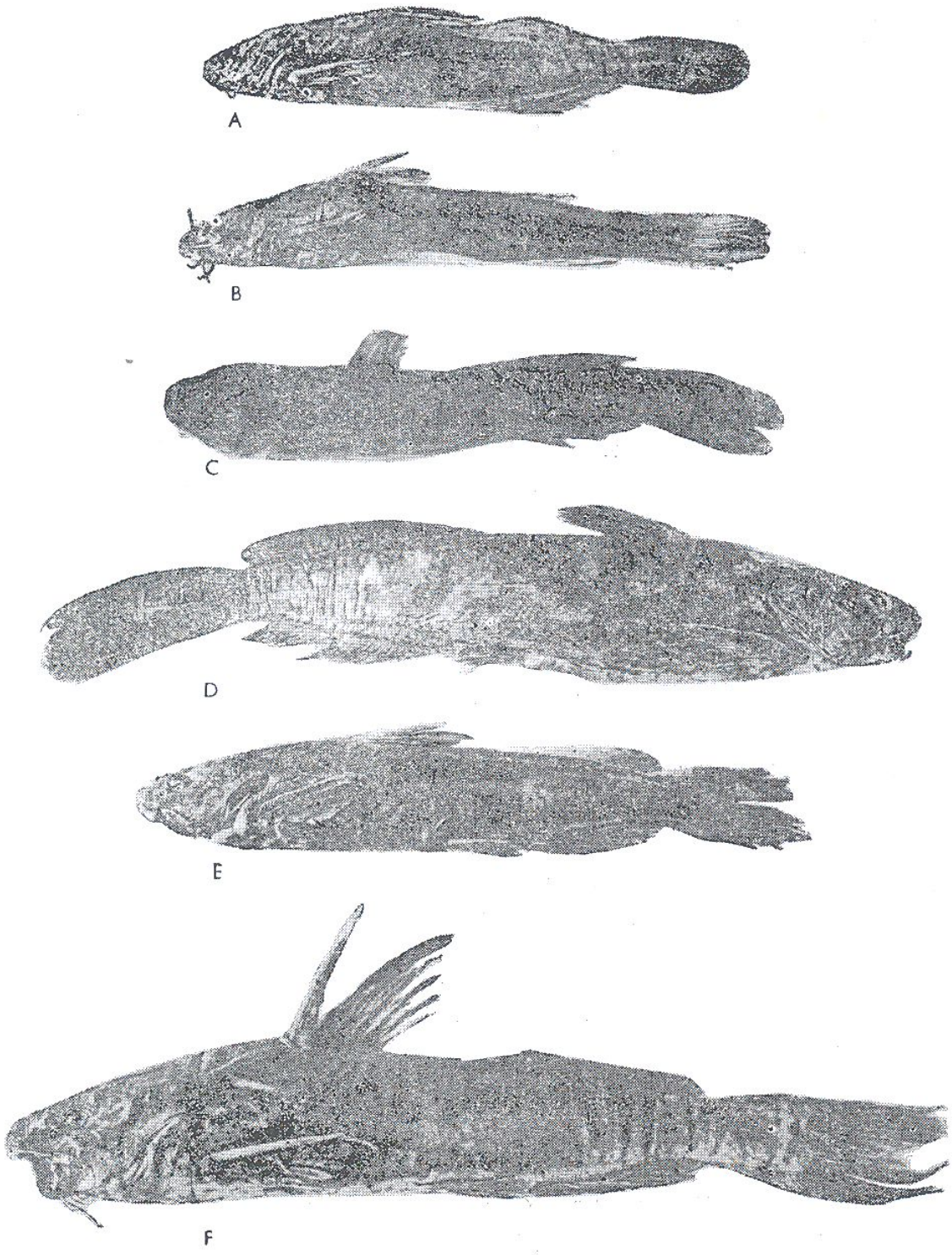


PLATE II. Photographs of some Bagrid species.

A. *Pseudobagrus truncatus* (REGAN) (USNM 130508).
B. *Pseudobagrus emarginatus* (REGAN) (USNM 87435).
C. *Pseudobagrus medianalis* (REGAN). (ZSI Not numbered; 183 mm SL).
D. *Pseudobagrus taeniatus* (GÜNTHER). (USNM 130509).
E. *Pelteobagrus crassirostris* (REGAN) (USNM 87433).
F. *Pelteobagrus crassilabris crassilabris* (GÜNTHER). (USNM 130573).

Leiocassis crassilabris RENDAHL, *Ark. Zool. XXA*, no. 1, p. 169, 1928 (China). RENDAHL, *Ark. Zool., XXIVA*, no. 16, p. 90, 1933 (Kialin-Ho). MIAO, *Contr. biol. Lab. Sci. Soc. China, X*, p. 219, 1934 (Kiang-su).

Liocassis (Nassocassis) crassilabris crassilabris NICHOLS, *The Freshwater fishes of China, IX*, p. 44, 1943 (Hokow, Kiang-si, Kienning, Yenping).

Specimen studied. USNM 130573, Foochow, China, One specimen, 165 mm.

Description. Body depth 4.71; head length 3.71; head width 5.50; head depth 6.35; predorsal length 2.62; postdorsal length 1.51; prepelvic distance 1.83; length of longest ray of caudal fin 4.23, all in standard length. Eye 5.93 in head length, 1.67 in interorbital space width; 2.27 in snout length. Dorsal spine 1.31; pectoral spine 1.47 in head length. Adipose dorsal fin base longer than anal fin base. Least depth of caudal peduncle 2.03 in its length.

Dorsal profile at about 30° to body axis. Occipital process subcutaneous, 3.0 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth not produced laterally, 4.0 times as long as broad; teeth on palate confined to prevomer, in a slightly curved, broad continuous band. Maxillary barbels reaching posterior margin of eye, others shorter. Orbital rims fused with eye. Longest ray of dorsal fin extending to adipose fin when depressed; dorsal spine with 10 strong, downward facing teeth over posterior margin. Pectoral spine with 10 strong, antrorse teeth over posterior margin. Pelvic fins reach anal fin. Longest anal ray not extending to caudal fin. Caudal fin deeply forked with pointed lobes. Lateral line straight. Axillary pores present.

Colour. Uniformly dark-brown all over.

Relationship. Related to *P. crassirostris*, but differing in having a greater body depth, shorter head, shorter barbels and smaller caudal peduncle depth.

Distribution. China: Foochow, Hokow, Kiang-si, Kiang-su, Kialin-Ho, Kien-ning, Tungting Hu, Jangtze Kiang, Jenping.

Pelteobagrus crassilabris macrops (NICHOLS)

Leiocassis crassilabris macrops NICHOLS, *Amer. Mus. Novit.*, no. 214, p. 2, fig. 2, 192 (type locality, near Yenping).

Leiocassis (Nassocassis) crassilabris macrops NICHOLS, *Bull. Amer. Mus. nat. Hist. LVIII*, p. 7, 1928 (Fu-kein).

Leiocassis (Rhinobagrus) macrops NICHOLS, *The freshwater fishes of China, IX*, 45, fig. 6, 1943 (Chungan Hsien near Yenping, Hokow).

Specimen studied. No specimen seen by me.

Relationship. Related to *P. crassilabris crassilabris*, but differing in having larger eye and greater body depth.

Distribution. China: Chungan Hsien, Fu-kein, Hokow.

Pelteobagrus microps (RENDAHL)

Leiocassis microps RENDAHL, *Ark. Zool., XXIVA*, no. 16, p. 93, 1933 (type locality, Chungking).

Macrones crassilabris macrops TCHANG & SHIH, *Sci. Quart. nat. Univ. Peking, IV*, no. 3, p. 348 (Foochow).

Specimen studied. No specimen seen by me.

Relationship. Related to *P. crassilabris crassilabris*, but differing in having smaller eye, smaller caudal peduncle depth, narrower head and shorter occipital process.

Distribution. China: Chungking, Foochow.

Pelteobagrus fulvidraco (RICHARDSON)

Pimelodus fulvidraco RICHARDSON, *Report on the ichthyology of the seas of China and Japan*, p. 286, 1845 (type locality, Canton).

Silurus calvarius BASILEWSKI, *Nouv. Mem. Soc. nat. Moscou, X*, p. 241, pl. ix, fig. 1, 1855 (no locality cited).

Pseudobagrus fulvidraco GÜNTHER, *Catalogue of the fishes in the British Museum, V*, p. 85, 1864 (China). SAUVAGE & THIERSANT, *Ann. Sci. nat., (6) I*, p. 6, 1874 (Shanghai). KAROLI, *Termeszetr. Fuz., V*, p. 178, 1882 (Canton). GÜNTHER, *Ann. Mag. nat. Hist., (6) IV*, p. 219, 1889 (Ichang). POPTA, *Zool. Anz. XXXII*, p. 250, 1907 (Kaiser Canal). FOWLER, *Bull. Amer. Mus. nat. Hist., L*, p. 401, 1924 (Hsing Hung Shan). KOLLER, *Ann. naturh. (Mus.) Hofmus. Wien., XLI*, p. 27, 1927 (Kang Kong, River Wutschi). SHAW, *Bull. Fan. Inst. Biol. Peking, I*, p. 110, 1930 (Kashing, Shing-Tsong). TCHANG, *Bull. Fan. Inst. Biol. Peking, III*, no. 8, p. 109, 1932 (Lake Chingpo). NICHOLS, *The Freshwater fishes of China, IX*, p. 40, 1943 (An-hwei, Fu-kien, Tungting Hu).

Bagrus calvarius DYBOWSKY, *Verh. Zool. bot. Ges. Wien, XIX*, p. 950, 1869 (River Onon),

Macrones (Pseudobagrus) fulvidraco GÜNTHER, *Ann. Mag. nat. Hist., (4) XII*, p. 244, 1873 (Shanghai). KREYENBERG & PAPPENHEIM *S. B. Ges. naturf. Fr. Berl.*, p. 107, 1908; *Abh. Mus. nat. u. Heimatk. Magdeburg, II*, p. 1, 1909 (Hankow, Tungting Hu). BERG, *Zool. Jb., Syst. Abt., XXXII*, p. 477, 1912 (River Amur).

Pelteobagrus calvarius BLEEKER, *Verh. Akad. Amsterdam, XVIII*, p. 3. 1879 (Shanghai).

Macrones fulvidraco HERZENSTEIN & WARPACHOWSKI, *Trud. St. Petersb. nat., XVIII*, p. 24, 1887 (Rivers Darja, Lefu, Onon, Usuri). TCHANG & SHIH, *Sci. Quart. nat. Univ. Peking, IV*, no. 3, p. 343, 1934 (Tang-Shan).

Fulvidraco fulvidraco JORDAN & SEALE, *Proc. U. S. nat. Mus., XXIX*, p. 519, 1905 (Shanghai). JORDAN & METZ, *Mem. Carneg. Mus., VI*, p. 12, 1913 (Suigen). EVERMAN & SHAH, *Proc. Calif. Acad. Sci., (4) XVI*, p. 111, 1927 (Chuchi, Hangchow). TANAKA, *Figures and descriptions of fishes of Japan*, p. 659, pl. cliii, 1927 (River Rakuto).

Pelteobagrus fulvidraco RENDAHL, *Ark. Zool., XXA*, no. 1, p. 164, 1928 (An-hwei, Kiang-su, Nanking, Soochow). WU, *Bull. Mus. Hist. nat. Paris, (2) III*, p. 438, 1931 (Tong-lu). KIMURA, *J. Shanghai Sci. Inst., III*, p. 105, 1935 (Tsung-ming Island). HERRE & LIN, *Bull. Chekiang Fish. exp. Sta., II*, p. 23, 1936 (River Tsientang).

? *Pseudobagrus changi* MIAO, *Contr. biol. Lab. Sci. Soc. China, X*, p. 213, fig. 53, 1934 (Chinkiang).

Specimens studied. AMNH 922, Lake Hanka, Siberia, May 31, 1900, BUXTON coll., one specimen, 248 mm; AMNH 10410, Fu-kien, R. CALDWELL coll., three specimens, 98 to 133.5 mm; ZSI F. 804/2, Tungting Hu, Hun-nan province, C. H. POPE coll., three specimens, 66 to 119 mm; ZSI F. 817/2 Yangtze Kiang, received from the Peoples Republic of China, May 31, 1955, ten specimens, 103 to 157 mm; ZSI F. 12714/1, River Amur near Belge, A. TARANETZ coll., one specimen, 127.5 mm; ZSI F. 12212/1, locality unknown, Fan Memorial Institute of Biology, Peking, China, one specimen, 97 mm; USNM 148372, Shanghai, June 1882, D. C. JENSEN coll., one specimen, 110 mm (damaged); USNM 86395, Shanghai, Kiang-su, China, Oct. 1923, SOWERBY coll., six specimens, 50 to 151.5 mm; USNM 85898, Shanghai, China, Oct. 1921, SOWERBY coll., five specimens, 140 to 162 mm; USNM 112465, Ningpo, China, Y. T. CHU coll., three specimens 99 to 104 mm; USNM 83988, Soochow, China, N. GIST GEE coll., one specimen, 85 mm; USNM 86592, Shanghai, China, Aug. 1922, WULSIN coll., two specimens, 48.5 and 71.0 mm; USNM 56407, Shanghai, China, P. L. JOUY coll., one specimen, 144.0 mm; USNM 130544, Kashing about 150 miles S. E. Shanghai, Dec. 1915, A. C. SOWERBY coll., one specimen, 142.8 mm; USNM 86398, Shanghai, Kiang-su, China, Oct. 1923, SOWERBY coll., one specimen, 111 mm; USNM 48931, River Khingen, Paris Museum, one specimen (damaged), 130 mm; USNM 87133, China, WULSIN coll., three specimens, 155 to 177.5 mm; USNM 87134, China, WULSIN coll., one specimen, 161 mm; USNM 87135, in canal two miles east of Peking, Aug. 11, 1922, WULSIN coll., one specimen, 125 mm; USNM 86085, "Fenghsien", China, C. PING coll., one specimen, 163 mm; USNM 130505, Shanghai, Kiang-su, China, Dec. 1925, SOWERBY coll., two specimens, 133 & 165.5 mm; USNM 105229, River Amur near Belgo, Siberia, July 30, 1935, A. TARNETZ coll., one specimen, 74 mm; USNM 112557, HUMAZEN, Korea, Mar. 10, 1951, W. E. OLD Jr. coll., four specimens, (very hard and not measured).

Description. * Body depth 4.41 (3.63 to 5.56); head length 3.64 (3.23 to 4.43); head width 4.72 (4.12 to 7.08); head depth 5.38 (4.22 to 7.97);

* Unless otherwise stated the proportional measurements and counts given are of 50 specimens only.

predorsal length 2.54 (2.34 to 2.79) ; postdorsal length 1.61 (1.47 to 1.75) ; prepelvic distance 1.89 (1.15 to 2.11) ; length of longest ray of caudal fin .60 (3.57 to 5.63), all in standard length. Eye 4.64 (3.50 to 6.25) in head ength; 1.90 (1.40 to 2.82) in interorbital space width; 1.60 (1.20 to 2.14) n snout length. Dorsal spine 1.43 (1.19 to 2.54) (N = 48) ; pectoral spine .35 (1.23 to 1.55) (N = 36) in head length. Adipose dorsal fin base 1.47 1.03 to 2.37) in anal fin base. Least depth of caudal peduncle 1.49 (1.19 o 2.22) in its length.

Dorsal profile at 35 to 40° to body axis. Occipital process exposed, .2 to 2.5 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth produced laterally, 4.0 to 6.0 times as long as road. Maxillary barbels reaching middle of pectoral spine, others shorter. Orbital rims free. Longest ray of dorsal fin not extending to adipose fin when depressed, dorsal spine with feeble teeth over posterior margin. Pectoral spine with 10 to 22 strong, antrorse teeth over posterior margin. Pelvic fins reach anal fin. Longest anal ray not extending to caudal fin. Caudal fin forked. Lateral line nearly straight.

Colour. Dark brown above and on sides, lighter beneath. Fresh pecimens are deep dark-brown, more of a black shade than of brown.

Relationship. Related to *P. vachellii*, but differing in having longer nd broader head, shorter caudal peduncle and brighter colouration.

Distribution. Widely distributed in Siberia, China, Japan, Hainan nd Hongkong Islands.

Remarks. MIAO (1934: 213) considered *P. changi* as related to *fulvi-raco* and *chinensis*. It differs from *chinensis* in having a shorter occipital rocess (two times longer than wide at base *versus* three times in *chinen-is*) and from *fulvidraco* in having the supraoccipital region covered with kin. These characters are not of taxonomic significance to warrant a pecific status for *changi* and therefore, I have kept it as a synonym of *ulvidraco*.

P. fulvidraco and *P. vachellii* are widely distributed and are closely elated. KREYENBERG & PAPPENHEIM (1908, 1909) considered the nature f the serrations on the pectoral spines and the orbital rim being free r fused with eye as of value in separating the two species. The occipital rocess is not exposed in fresh specimens, but in long preserved specimens is uncovered. The differences between the two species are analysed tatistically (table 3, fig. 5, graphs 1-3) which indicates that only the ngth and width of the head and length of the caudal peduncle are of axonomic value.

Table 3. Biometric comparison of (A) *P. fulvidraco* and (B) *P. vachellii.*

Characters	Samples	N	Range	Mean	σ	$\pm \sigma M$	t	P
SL/Head length	A	50	3.23 to 4.43	3.64	0.260	0.037	13.52	Less than
	B	56	3.65 to 5.21	4.37	0.296	0.039		0.01
SL/Head width	A	50	4.12 to 7.08	4.72	0.462	0.065	8.97	Less than
	B	56	4.88 to 7.83	5.68	0.637	0.085		0.01
LH/Eye	A	50	3.50 to 6.25	4.64	0.637	0.090	0.882	More than
	B	56	3.33 to 6.48	4.52	0.766	0.102		0.10
LH/LCPD	A	50	1.23 to 2.44	1.83	0.244	0.034	11.41	Less than
	B	56	1.12 to 1.77	1.38	0.149	0.020		0.01
LH/HCPD	A	50	2.26 to 3.30	2.68	0.217	0.031	0.42	More than
	B	56	2.20 to 3.48	2.70	0.266	0.036		0.10

Pelteobagrus wittenburgii (POPTA)

Pseudobagrus wittenburgii POPTA, *Mitt. natkab. Stuttgart*, p. 335, 1911, fig. (type locality, River Amur).

Specimens studied. USNM 77004, River Sungari near junction with River Amur, China, SOWERBY coll., one specimen, 236 mm; USNM 77003, River Sungari near junction with River Amur, China, SOWERBY coll., one specimen, 200 mm; USNM 86472, Hangchow, Che-kiang, China, Oct. 1923, SOWERBY coll., one specimen, 191.5 mm; USNM 78201, Tientsin, China, SOWERBY coll., two specimens, 114.5 and 157.0 mm.

Description. Body depth 4.39 (4.19 to 4.60); head length 3.69 (3.45 to 4.06); head width 4.79 (4.49 to 5.62); head depth 5.51 (5.32 to 5.87); predorsal length 2.69 (2.61 to 2.79); postdorsal length 1.63 (1.59 to 1.65); prepelvic distance 1.97 (1.86 to 2.11); length of longest ray of caudal fin 4.97 (4.78 to 5.13), all in standard length. Eye 5.13 (4.58 to 5.55) in head length; 2.28 (1.87 to 2.59) in interorbital space width; 1.68 (1.39 to 1.80) in snout length. Dorsal spine 1.56 (1.32 to 1.83) (N = 4); pectoral spine 1.46 (1.35 to 1.68) in head length. Adipose dorsal fin base 1.39 (1.21 to 1.49) in anal fin base. Least depth of caudal peduncle 1.34 (1.03 to 1.50) in its length.

Dorsal profile at about 35° to body axis. Occipital process subcutaneous, 1.0 or 2.0 times longer than wide at base extending to predorsal plate. Premaxillary band of teeth produced laterally, 5.0 or 6.0 times as long as broad. Maxillary barbels reaching pectoral fin base, others shorter. Orbital rims free. Longest ray of dorsal fin not extending to adipose fin when depressed; dorsal spine with feeble teeth over posterior margin. Pectoral spine with 10 to 14 strong, antrorse teeth over posterior margin. Pelvic fins reach anal fin. Longest anal ray not extending to caudal fin. Caudal fin forked. Lateral line straight.

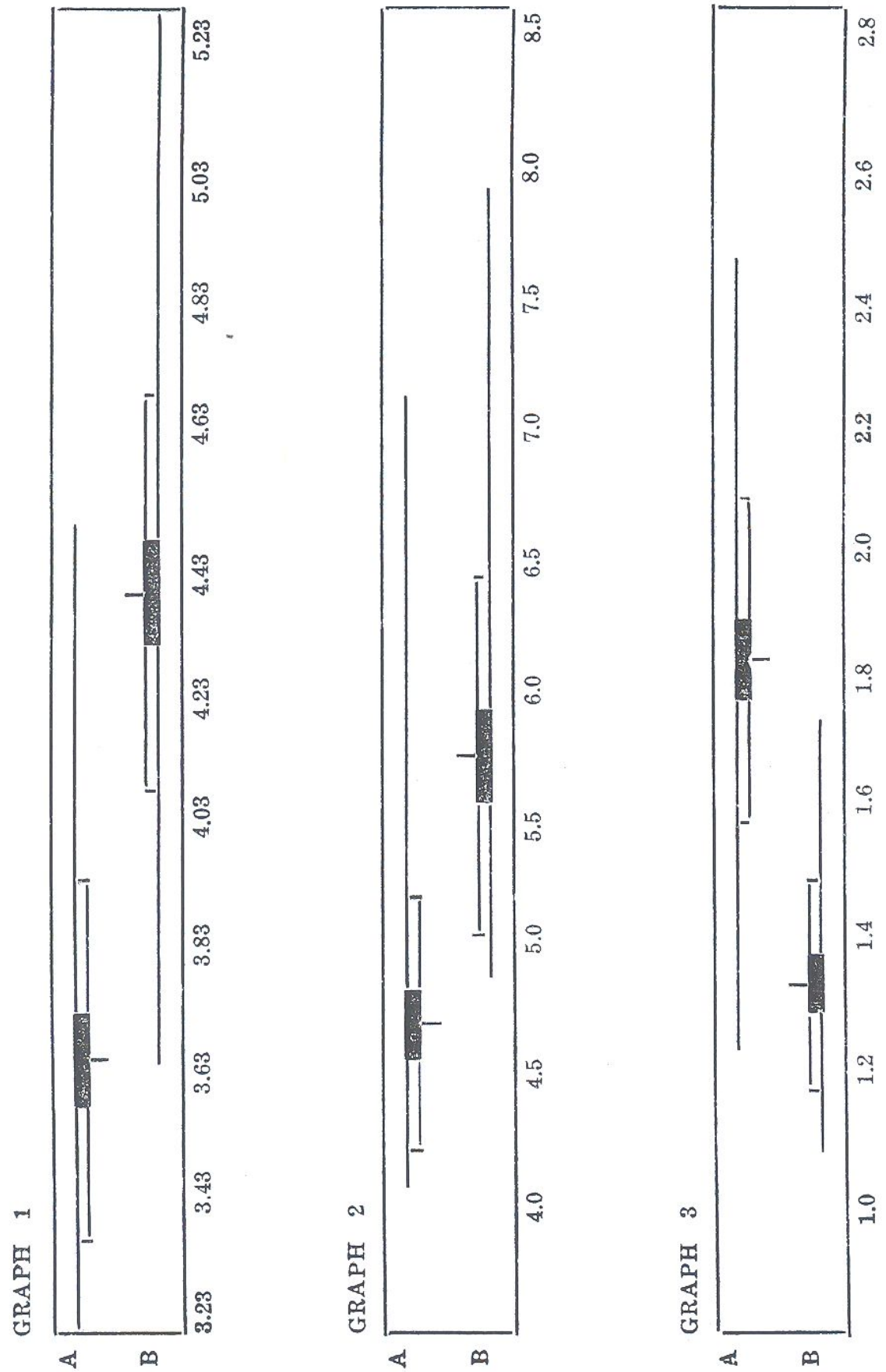


Fig. 5. Biometric comparison of *Pelteobagrus fulvidraco* and *P. vachellii*. Graph 1. SL/Head length, Graph 2. SL/Head width, Graph 3. LH/LCPD.

Colour. Body with broad, horizontal olive-brown bands; three above and below lateral line drawn intermittently, and one along upper dorsal profile of body drawn continuously.

Relationship. Closely related to *P. fulvidraco*, but differing by its colouration. It seems to represent the northern form of the widely distributed *fulvidraco*.

Distribution. Siberia: River Amur, River Sungari; China: Hangchow, Tient-sin.

Pelteobagrus virgatus (OSHIMA)

Aoria virgatus OSHIMA *Annot. zool. Jap., XI*, p. 4, 1926 (type locality, River Kachek).
Pseudobagrus virgatus NICHOLS & POPE, *Bull. Amer. Mus. nat. Hist., LIV*, p. 332, fig. 6, 1927 (Nodoa).

Specimens studied. AMNH 10264, Hainan, C. H. POPE coll., three specimens, 55.2 to 90.0 mm.

Description. The specimen examined by me agree well with the description given by OSHIMA (1926), and NICHOLS & POPE (1927).

Relationship. Distantly related to *P. fulvidraco*, but differing in having longer occipital process, larger eye, narrower interorbital space, greater caudal peduncle depth and fewer anal fin rays.

Distribution. Hainan Island: River Kachek, Nodoa.

Remarks. NICHOLS & POPE (1927: 332) stated that this species is "apparently related to but distinct from *Pseudobagrus brachysoma* GÜNTHER from Cochin-China". This view was due to the then supposed existence of *brachysoma* in Cochin-China as stated by GÜNTHER (1864). It is now known (JAYARAM, 1952) that this locality is a misprint for Cochin which is the real type-locality of *brachysoma*.

Pelteobagrus eupogon (BOULENGER)

Pseudobagrus eupogon BOULENGER, *Ann. Mag. nat. Hist., (6) IX*, p. 247, 1892 (type locality, Shanghai).

Specimen studied. ZSI F. 12213/1, locality unknown, Fan Memorial Institute of Biology, Peking, China, one specimen, 179.8 mm (dorsal spine broken).

Description. Body depth 6.66; head length 4.86; head width 6.42; head depth 7.99; predorsal length 3.42; postdorsal length 1.44; prepelvic distance 2.26; length of longest ray of caudal fin 4.86, all in standard length. Eye 4.63 in head length; 1.75 in interorbital space width; 1.31 in snout length. Pectoral spine 1.48 in head length. Adipose dorsal fin base 1.25 in anal fin base. Least depth of caudal peduncle 2.25 in its length.

Dorsal profile at about 25° to body axis. Occipital process exposed, 2.0 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth produced laterally, 4.0 times as long as broad. Maxillary barbels reaching middle of pectoral spine, others shorter. Orbital rims free. Longest ray of dorsal fin not extending to adipose fin when depressed; dorsal spine broken. Pectoral spine with 14 strong, antrorse teeth over posterior margin. Pelvic fins not reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin forked. Lateral line straight.

Colour. Olive-green above and on sides, olive-brown below. Head slightly dark.

Relationship. Related to *P. vachellii*, but differing in having smaller body depth, shorter occipital process and longer dorsal spine.

Distribution. China: Shanghai.

Pelteobagrus eupogoides (WU)

Pseudobagrus eupogoides WU, *Contr. biol. Lab. Sci. Soc. China, VI*, pp. 46, 52, fig. 3, 1930 (type locality, Sze-Chwan).

Specimen studied. No specimen seen by me.

Relationship. Related to *P. eupogon*, but differing in having greater body depth, longer head, longer occipital process and more anal fin rays.

Distribution. China: Sze-Chwan.

Pelteobagrus nudiceps (SAUVAGE)

Pseudobagrus nudiceps SAUVAGE, *Bull. Soc. philom. Paris, (7) VII*, pp. 145, 155, 1883 (type locality, Biwa Ko).

Fluvidraco nudiceps JORDAN & THOMPSON, *Mem. Carneg. Mus., VI*, p. 213, 1913 (Biwa Ko, Matsubara).

Pelteobagrus nudiceps JORDAN & HUBBS, *Mem. Carneg. Mus., X*, p. 159, 1925 (Biwa Ko, Himeji, Okayama).

Specimens studied. ZSI F. 811/2, Sasayama, Central Japan, April 11, 1955, gift from T. MORI, two specimens, 74.0 and 95.5 mm; ZSI F. 807/2, Japan, Mie Prefecture coll., twelve specimens (badly preserved), 70 to 135 mm; USNM 152502, Okayama, Japan, 1922, K. MIKAME coll., one specimen, 110.0 mm.

Description. Body depth 5.17 (4.57 to 6.37) (N = 13); head length 3.61 (3.27 to 3.96); head width 4.99 (4.50 to 6.17) (N = 13); head depth 6.23 (5.65 to 7.55) (N = 12); predorsal length 2.58 (2.40 to 2.96) (N = 14); postdorsal length 1.54 (1.35 to 1.60) (N = 14); prepelvic distance 1.94 (1.85 to 2.05) (N = 14); length of longest ray of caudal fin 4.57 (4.00 to 5.29) (N = 10), all in standard length. Eye 4.09 (3.67 to 4.63) (N = 11) in head length; 1.56 (1.30 to 1.88) (N = 12) in interorbital space

width; 1.40 (1.08 to 1.64) (N = 13) in snout length. Dorsal spine 1.39 (1.19 to 1.73) (N = 10); pectoral spine 1.37 (1.22 to 1.65) (N = 10) in head length. Adipose dorsal fin base 1.39 (1.09 to 1.87) (N = 12) in anal fin base. Least depth of caudal peduncle 1.85 (1.61 to 2.00) in its length.

Dorsal profile at 25° to 30° to body axis. Occipital process exposed, 1.0 or 2.0 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth 3.0 or 4.0 times as long as broad. Maxillary barbels reaching middle of pectoral spine, others shorter. Orbital rims free. Longest ray of dorsal fin not extending to adipose fin when depressed; dorsal spine with feeble teeth over anterior margin. Pectoral spine with eight to ten strong, antrorse teeth over posterior margin, occasionally over anterior margin also. Pelvic fins reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin forked. Lateral line slightly arched above pectoral fin.

Colour. Uniformly amber-brown above and on sides, pale beneath. Body sometimes with vertical dark-brown bands.

Relationship. Distantly related to *P. fulvidraco*, but differing in having smaller body depth, larger eyes, narrower interorbital space and smaller caudal peduncle depth (table 4, fig. 6 graphs 4 - 7).

Distribution. Japan: River Azusa, Biwa Ko, Himeji, Matsubara, Okayama, Sasayama.

Table 4. Biometric comparison of (A) *P. fulvidraco* and (B) *P. nudiceps*.

Characters	Sample	N	Range	Mean	σ	$\pm\sigma M$	t	P
SL/Body depth	A	50	3.63 to 5.56	4.41	0.422	0.059	5.85	Less than
	B	13	4.57 to 6.37	5.17	0.419	0.116		0.01
SL/Head length	A	50	3.23 to 4.43	3.64	0.260	0.037	0.508	Greater
	B	14	3.27 to 3.96	3.61	0.173	0.046		than 0.10
SL/Head width	A	50	4.12 to 7.08	4.72	0.462	0.065	1.94	Less than
	B	13	4.50 to 6.17	4.99	0.443	0.090		0.10
LH/Eye	A	50	3.50 to 6.25	4.64	0.637	0.090	4.26	Less than
	B	11	3.67 to 4.63	4.09	0.304	0.092		0.10
LH/IOW	A	50	2.07 to 2.83	2.43	0.187	0.026	2.545	Less than
	B	14	2.33 to 2.92	2.57	0.182	0.049		0.02
LH/LCPD	A	50	1.23 to 2.44	1.83	0.244	0.034	3.98	Less than
	B	10	1.33 to 1.73	1.61	0.133	0.042		0.01
LH/HCPD	A	50	2.26 to 3.30	2.68	0.217	0.031	5.69	Less than
	B	13	2.67 to 3.29	3.05	0.205	0.057		0.01

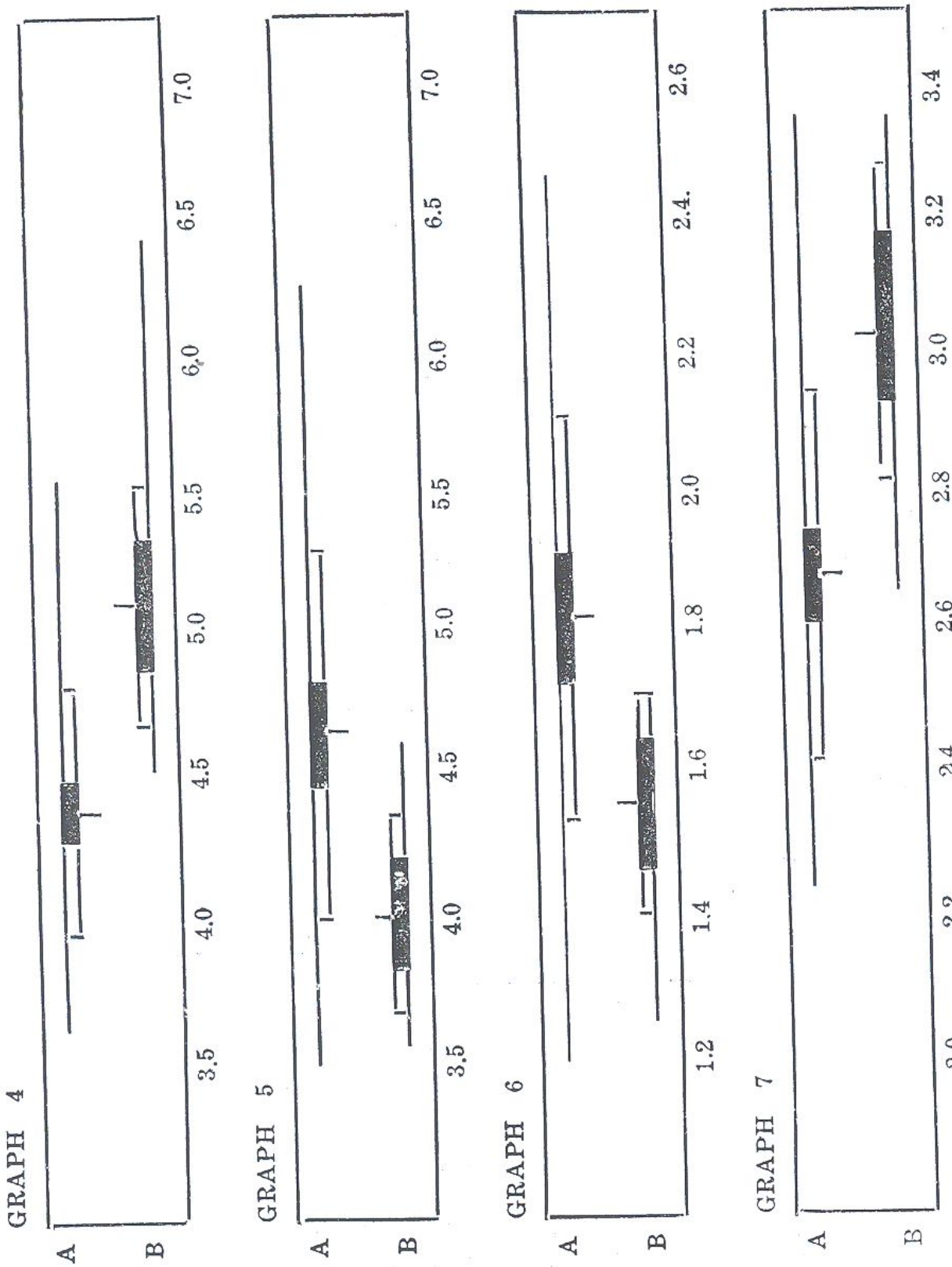


Fig 6. Biometric comparison of *Pelteobagrus fulvidraco* and *P. nudiceps*. Graph 4. SL/Body depth. Graph 5. LH/Eye. Graph 6. LH/LCPD. Graph 7. LH/HCPD.

Pelteobagrus ransonnetii (STEINDACHNER)

Pseudobagrus ransonnetii STEINDACHNER, *Fische Japan..... IV*, p. 287, 1887 (type locality, Osaka).

Pseudobagrus fulvidraco ISHIKAWA & MATSUBARA (not RICHARDSON), *Preliminary Catalogue.....* p. 23, 1897 (Biwa Ko).

Fulvidraco ransonnetii JORDAN & FOWLER, *Proc. U. S. nat. Mus., XXVI*, p. 904, fig. 1, 1903 (Osaka).

Specimens studied. ZSI F. 790/2, Japan, Mie Prefecture coll., five specimens, 95 to 132 mm; BMNH 1910. 6.30.24, River Kyoto, GORDON SMITH coll., one specimen, 108.5 mm; USNM 59784, Kochi, Japan, 1903, H. M. SMITH coll., one specimen, 75 mm.

Description. Body depth 5.23 (4.71 to 6.14); head length 3.92 (3.75 to 4.13); head width 5.13 (5.08 to 5.19); head depth 6.16 (5.61 to 6.97); predorsal length 2.70 (2.61 to 2.84); postdorsal length 1.55 (1.47 to 1.74); prepelvic distance 1.85 (1.08 to 2.06); length of longest ray of caudal fin 4.57 (4.05 to 5.00), all in standard length. Eye 4.01 (3.56 to 4.57) in head length; 1.89 (1.45 to 2.17) in interorbital space width; 1.47 (1.19 to 1.67) in snout length. Dorsal spine 1.55 (1.27 to 1.78); pectoral spine 1.39 (1.18 to 1.66) in head length. Adipose dorsal fin base 1.15 (1.03 to 1.34) in anal fin base. Least depth of caudal peduncle 1.73 (1.45 to 2.00) in its length.

Dorsal profile at about 20° to body axis. Occipital process exposed, 1.5 or 2.0 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth produced laterally, 3.0 or 3.5 times as long as broad. Maxillary barbels reaching middle of pectoral spine, others shorter. Orbital rims free. Longest ray of dorsal fin not extending to adipose fin when depressed; dorsal spine smooth. Pectoral spine with 9 to 13 strong, antrorse teeth over posterior margin. Pelvic fins reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin forked. Lateral line slightly arched above pectorals.

Colour. Uniformly brown all over.

Relationship. Related to *P. nudiceps*, but differing in having shorter head, wider interorbital space and wider mouth (table 5, fig. 7, graphs 8 - 10).

Distribution. Japan: Biwa Ko, Kochi, River Kyoto, Osaka.

Table 5. Biometric comparison of (A) *P. nudiceps* and (B) *P. ransonnetii*.

Characters	Sample	N	Range	Mean	σ	$\pm \sigma M$	t	P
SL/Body depth	A	13	4.57 to 6.37	5.17	0.419	0.116	0.26	Greater
	B	7	4.71 to 6.14	5.23	0.524	0.197		than 0.10
SL/Head length	A	14	3.27 to 3.96	3.61	0.173	0.046	2.01	Greater
	B	7	3.75 to 4.13	3.92	0.132	0.049		than 0.05
SL/Head width	A	13	4.50 to 6.17	4.99	0.443	0.123	1.13	Greater
	B	7	5.08 to 5.19	5.13	0.041	0.015		than 0.10
SL/Head depth	A	12	5.65 to 7.55	6.23	0.606	0.175	0.38	Greater
	B	7	5.61 to 6.97	6.16	0.445	0.167		than 0.10
LH/IOW	A	14	2.33 to 2.92	2.57	0.182	0.049	4.26	Less than
	B	7	2.00 to 2.67	2.14	0.239	0.090		0.01
LH/HCPD	A	13	2.67 to 3.29	3.05	0.205	0.057	3.52	Less than
	B	7	2.36 to 3.08	2.68	0.235	0.088		0.01
LH/Width of	A	14	2.40 to 2.96	2.72	0.156	0.043	4.94	Less than
gape of mouth	B	7	1.94 to 2.46	2.23	0.185	0.089		0.01

Pelteobagrus tenuifurcatus (NICHOLS)

Leiocassis tenuifurcatus NICHOLS, *Amer. Mus. Novit., no. 449*, p. 1, 1931 (type locality, Chungan Hsien).

Leiocassis (Rhinobagrus) tenuifurcatus NICHOLS, *Amer. Mus. Novit., no. 499*, p. 5, fig. 6, 1931 (figure of holotype). HERRE & LIN, *Bull. Chekiang Fish Exp. Sta., II*, p 25, 1936 (River Tsien Tang).

Specimens studied. USNM 91670, Suifu, China, 1930, D. C. GRAHAM coll., one specimen, 282 mm; USNM 81687, Suifu, China, 1930, D. C. GRAHAM coll., one specimen, 241 mm; USNM 130157, China, D. C. GRAHAM coll., five specimens, 139 to 210 mm; USNM 130090, China, D. C. GRAHAM coll., one specimen, 262 mm; USNM 89385 Suifu, China, 1929, D. C. GRAHAM coll., one specimen, 232 mm.

Description. Body depth 6.46 (4.98 to 7.63); head length 4.43 (4.15 to 4.83); head width 5.74 (4.98 to 8.19); head depth 6.86 (5.81 to 8.59); predorsal length 2.92 (2.64 to 3.18); postdorsal length 1.595 (1.49 to 1.72); prepelvic distance 2.09 (1.96 to 2.27); length of longest ray of caudal fin 4.97 (4.61 to 5.56), all in standard length. Eye 4.82 (3.95 to 6.89) in head length; 1.98 (1.71 to 2.50) in interorbital space width; 1.67 (1.28 to 2.44) in snout length. Dorsal spine 1.39 (1.14 to 1.68); pectoral

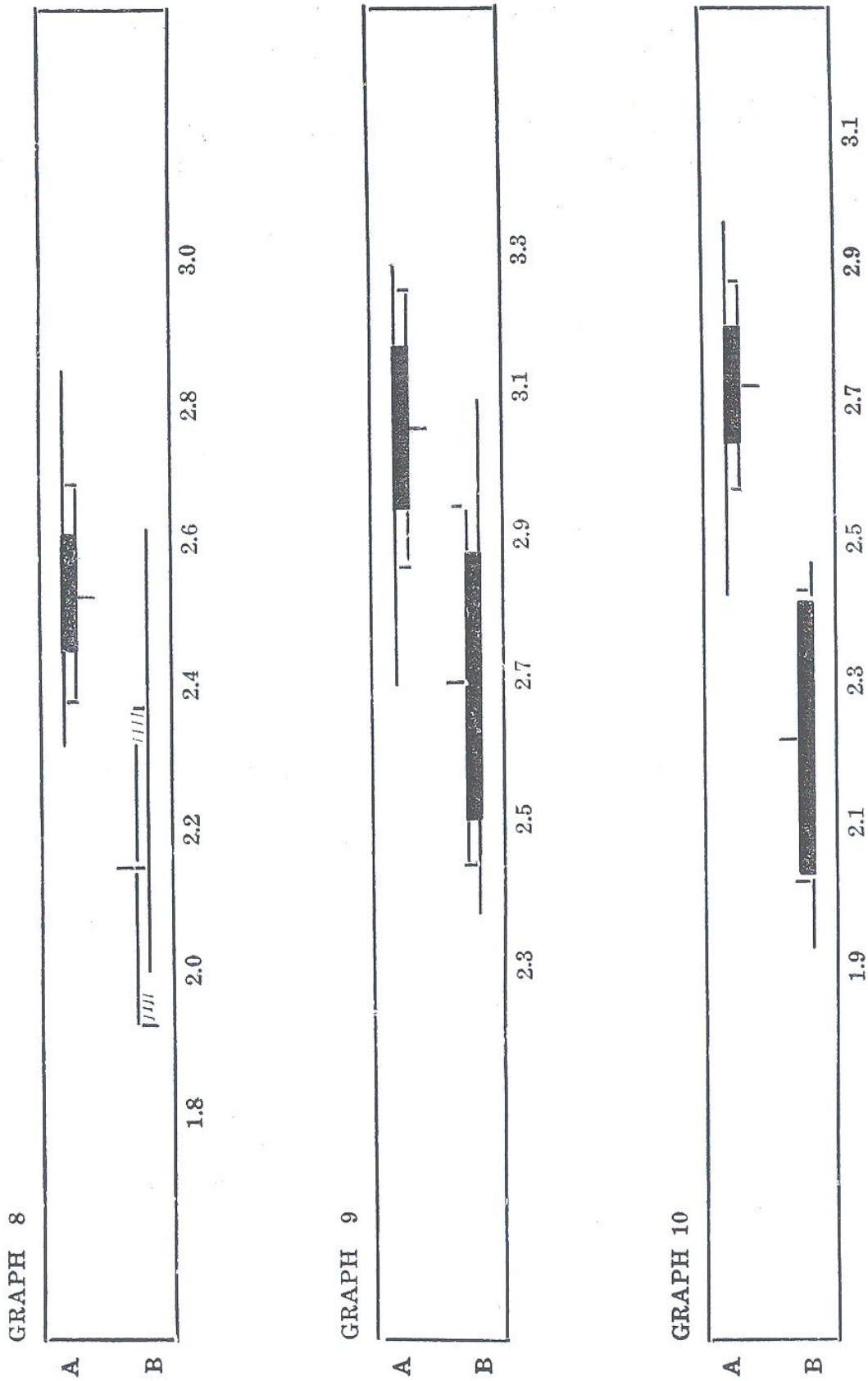


Fig. 7. Biometric comparison of *Pelteobagrus nudiceps* and *P. ransonnetti*. Graph 8. LH/IOW. Graph 9. LH/HCPD. Graph 10. LH/Width of gape of mouth.

spine 1.35 (1.19 to 1.68) in head length. Adipose dorsal fin base 1.22 (1.00 to 1.82) in anal fin base. Least depth of caudal peduncle 2.35 (1.57 to 3.20) in its length.

Dorsal profile at about 20° to body axis. Occipital process exposed, 2.5 to 4.0 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth slightly produced laterally, 5.0 or 6.0 times as long as broad; teeth on palate confined to prevomer, in a slightly curved continuous band. Maxillary barbels reaching pectoral fin, others shorter. Orbital rims free. Longest ray of dorsal fin not extending to adipose fin when depressed; dorsal spine with feeble downward facing teeth over posterior margin. Pectoral spine with 15 to 18 strong, antrorse teeth over posterior margin. Pelvic fins reaching anal fin. Longest anal ray just extending to caudal fin. Caudal fin deeply forked. Lateral line nearly straight.

Colour. Deep dark brown above and on sides, lighter beneath.

Relationship. This is an unique species of this genus with apparently no close relative.

Distribution. China: River Tsien Tang, Chungan Hsien, Suifu.

Table 6. Total counts of fin rays recorded for certain species of *Pelteobagrus*.

Species	Fin Rays (Total branched and simple)																	
	Dorsal		Pectoral				Anal											
	6	7	6	7	8	9	15	16	17	18	19	20	21	22	23	24	25	26
vachellii	4	21	1	4	9	11	—	—	—	—	—	2	2	5	3	9	3	1
brashnikowi	—	6	2	2	2	—	—	—	—	—	—	—	—	3	—	1	1	1
nitidus	1	1	—	1	1	—	—	—	—	—	—	1	1	—	—	—	—	—
prox. *crassirostris*	—	1	—	—	1	—	—	—	1	—	—	—	—	—	—	—	—	—
crassirostris	—	1	—	—	—	1	—	—	—	1	—	—	—	—	—	—	—	—
crassilabris crassilabris	—	1	—	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—
fulvidraco	4	14	1	8	10	—	—	—	—	4	—	4	7	2	2	—	—	—
wittenburgii	—	5	1	3	1	—	—	—	—	1	—	1	2	1	—	—	—	—
virgatus	1	2	1	2	—	—	—	—	2	1	—	—	—	—	—	—	—	—
eupogon	—	1	—	1	—	—	—	—	—	—	—	—	—	1	—	—	—	—
nudiceps	8	6	8	6	—	—	—	—	—	1	7	3	3	—	—	—	—	—
ransonnetii	1	6	5	2	—	—	—	—	—	—	1	4	2	—	—	—	—	—
tenuifurcatus	—	10	1	3	5	1	—	—	—	—	1	1	1	2	1	4	—	—

Genus **Pseudobagrus** BLEEKER

Pseudobagrus BLEEKER, *Acta Soc. Sc. Indo-Neerl., VIII*, p. 87, 1860 (Type-species, *Bagrus aurantiacus* TEMMINCK & SCHLEGEL, by subsequent designation in 1862). BLEEKER *Atlas ichthyologique..... II*, p. 9, 1862 (type-species designated). GÜNTHER, *Catalogue of the fishes in the British Museum, V*, p. 84, 1864 (China, Japan and Cochin-China, last locality in error). OSHIMA, *Ann. Carneg. Mus., XII*, p. 178, 1919 (Formosa) NICHOLS & POPE, *Bull. Amer. Mus. nat. Hist., LIV*, p. 331, 1927 (Hainan Island).

Body moderately long, compressed, dorsal profile nearly straight. Head small, compressed; snout obtuse; jaws subequal; lips thin, plain. Mouth subterminal, moderately wide. Villiform teeth on premaxillaries, prevomer and mandibular in bands. Eyes small, superior. Supraoccipital covered with skin. Four pairs of barbels; one maxillary, two mandibular, one nasal. Gill membranes free from each other and also from isthmus. Branchiostegals eight.

Rayed dorsal fin inserted above half pectoral fin, with six or seven rays; adipose dorsal fin long, low, posteriorly free. Pelvic fins inserted far posterior to last ray of dorsal fin. Anal fin with 13 to 24 rays, usually about 18. Lateral line simple.

30 to 32 caudal and 22 to 24 precaudal vertebrae.

Distribution. Soviet Far east to Yunnan in south China, Japan, Formosa and Hainan Islands.

Key to species

1*a*. Caudal fin emarginate. *

2*a*. Pelvic fins reach anal fin.

3*a*. Occipital process does not extend to predorsal plate. Body depth 6.0 to 6.5 times in standard length. . . *emarginatus*

3*b*. Occipital process extends to predorsal plate. Body depth not more than 5.0 times in standard length.

4*a*. Occipital process 5.0 times as long as broad at base. . . . . *brevicaudatus*

4*b*. Occipital process not more than 3.0 times as long as broad at base.

5*a*. Maxillary barbels extend upto front of eye; adipose dorsal fin base equal to anal fin base. *intermedius*

*) *Pseudobagrus henryi* (HERRE) falls under this group. For want of certain details, I am unable to place it exactly in the key.

5*b*. Maxillary barbels extend upto pectoral fin base; adipose dorsal fin base shorter than anal fin base . . . . . *rendahli*

2*b*. Pelvic fins do not reach anal fin.

6*a*. Adipose dorsal fin base longer than anal fin base.

7*a*. Body depth 9.93 times in standard length; interorbital width 3.88 times in head length . . . . . *pratti*

7*b*. Body depth not more than 6.0 times in standard length; interorbital width not more than 3.0 times in head length.

8*a*. Maxillary barbels extend upto operculum. Occipital process does not extend to predorsal plate. . . . . *hwanghoensis*

8*b*. Maxillary barbels extend upto eye; occipital process extends to predorsal plate . . . . *herzensteini*

6*b*. Adipose dorsal fin base equal to or shorter than anal fin base.

9*a*. Anal fin with 15 rays. Least depth of caudal peduncle 1.45 times in its length. . . . . *taiwanensis*

9*b*. Anal fin with 18 - 22 rays. Least depth of caudal peduncle more than 2.5 times in its length.

10*a*. Occipital process extends to predorsal plate . . . . . *tenuis*

10*b*. Occipital process does not extend to predorsal plate.

11*a*. Body depth 7.2 times in standard length. Adipose dorsal fin base equal to anal fin base . . . . . *kaifenensis*

11*b*. Body depth 8.35 times in standard length. Adipose dorsal fin base 1.39 in anal fin base . . . . . *sinyanensis*

1*b*. Caudal fin truncate, rounded or cuneate.

12*a*. Caudal fin rounded or cuneate.

13*a*. Pelvic fins reach anal fin.

14*a*. Anal fin with 24 rays . . . . . *analis*.

14*b*. Anal fin with not more than 22 rays (18 - 22).

15*a*. Body depth not more than 6.0 times in standard length.

16*a*. Least height of caudal peduncle 1.88 to 2.28 times in head length. Caudal fin without any colour markings . . . . . *truncatus*

16*b*. Least height of caudal peduncle 2.20 to 2.80 in head length. Caudal fin with a white coloured margin . . . . . *albomarginatus*

15*b*. Body depth 6.6 to 7.16 times in standard length . . . . . *adiposalis*

13*b*. Pelvic fins do not reach anal fin.

17*a*. Body depth 3.6 times in standard length. . *omeihensis*

17*b*. Body depth more than 6.0 times in standard length.

18*a*. Least height of caudal peduncle 2.44 times in its length. Premaxillary band of teeth 4.0 times as long as broad . . . . . *taeniatus*

18*b*. Least height of caudal peduncle 3.31 to 4.27 times in its length. Premaxillary band of teeth 5 or 6 times as long as broad . . . . . *ussuriensis*

12*b*. Caudal fin truncate.

19*a*. Adipose dorsal fin base longer than anal fin base . . . . . *brevianalis*

19*b*. Adipose dorsal fin base equal to or shorter than anal fin base.

20*a*. Pelvic fins reach anal fin. Anal fin with 17 rays. . *lui*

20*b*. Pelvic fins do not reach anal fin. Anal fin with more than 17 rays (17 - 20).

21*a*. Occipital process does not extend to predorsal plate. . . . . *aurantiacus*

21*b*. Occipital process extends to predorsal plate.

22*a*. Body depth 7.0 times in standard length. Anal fin with 20 rays . . . . . *ondon*

22*b*. Body depth 3.7 to 6.5 times in standard length. Anal fin with 17 or 18 rays. . . *medianalis*

Pseudobagrus aurantiacus (TEMMINCK & SCHLEGEL)

Bagrus aurantiacus TEMMINCK & SCHLEGEL *in Siebold's Fauna Japonica, IV*, p. 227, pl. civ, fig. 2, 1846 (type locality, Sutzuma). BOESEMAN, *Zool. Meded., XXVIII*, p. 169, 1947 (Japan).

Pseudobagrus aurantiacus BLEEKER, *Acta Soc. Sc. Indo-Neerl., VIII*, p. 85, 1860 (Jedo). SAUVAGE, *Bull. Soc. Philom. Paris, (7) VII*, p. 145, 1883 (Biwa Ko). JORDAN & FOWLER, *Proc. U. S. nat. Mus., XXVI*, p. 906, 1903 (River Kitakami). JORDAN & THOMPSON, *Mem. Carneg. Mus., VI*, p. 214, 1913 (Tokyo). JORDAN & HUBBS, *Mem. Carneg. Mus., X*, no. 2, p. 159, 1925 (Fukuoka, Hamada). MORI, *Mem. Hyogo Univ. Agric., II*, no. 3, p. 8, 1956 (San-in district, Oki Islands).

Pseudobagrus tokiensis DODERLEIN, *Fische Japans, IV*, p. 238, 1887 (type locality, Tokyo).

Specimens studied. BMNH 1905. 2. 4. 177, River Kinu, Japan, JORDAN coll., one specimen, 108 mm; ZSI F. 788/2, Tokyo, Japan, Mie Prefecture coll., five specimens, 99 to 161 mm; ZSI F. 810/2, Sendaigawa, N. Japan, April 11, 1955, T. MORI coll., three specimens, 89 to 116 mm.

Description. Body depth 5.29 (4.14 to 7.14) ; head length 4.15 (3.79 to 4.90) ; head width 5.39 (4.70 to 6.25) ; head depth 6.36 (5.65 to 7.31) ;

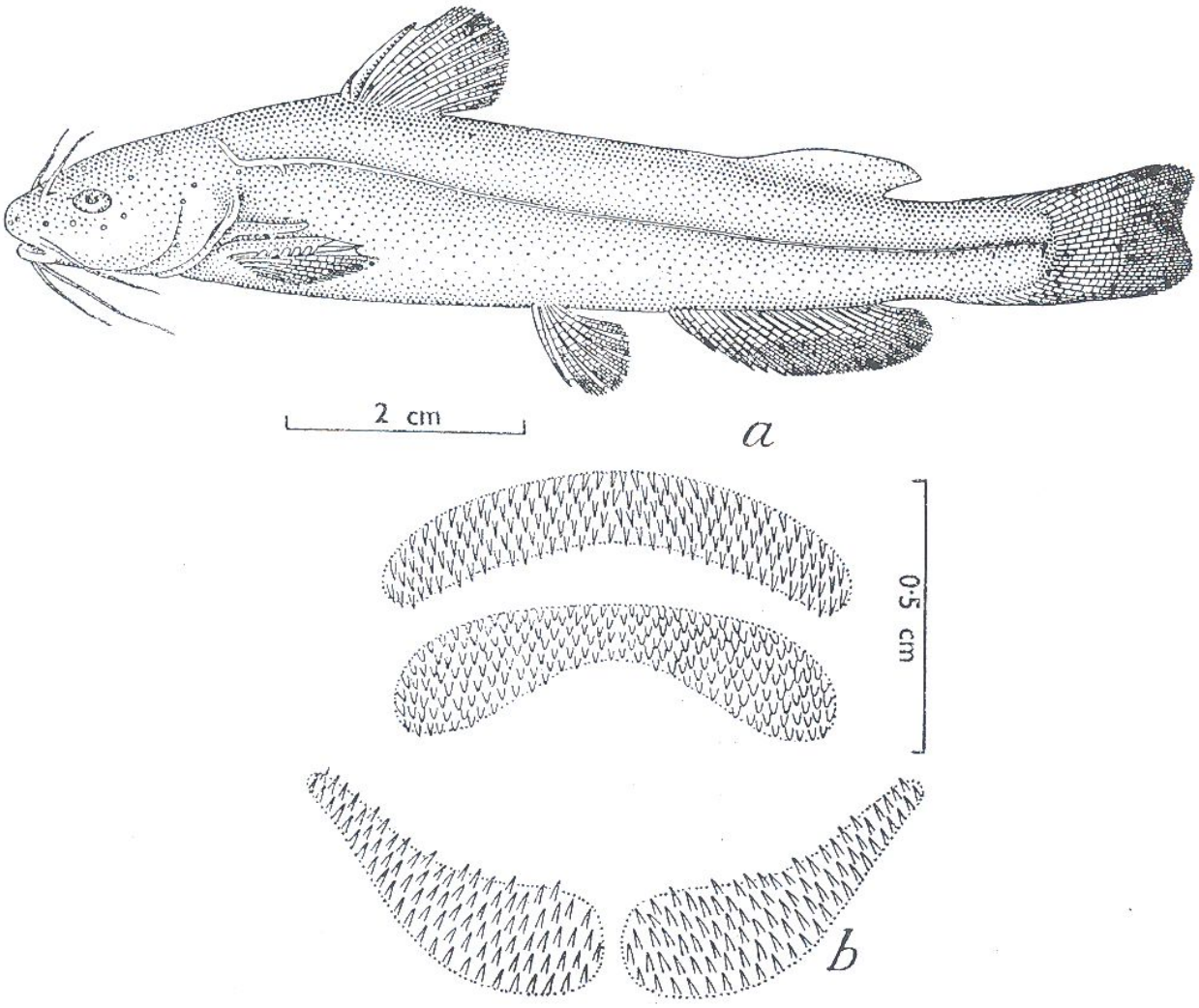


Fig. 8. *Pseudobagrus aurantiacus* (TEMMINCK & SCHLEGEL). *a*. Lateral view; *b*. Dentition.

predorsal length 2.93 (2.78 to 3.40) ; postdorsal length 1.46 (1.42 to 1.50) ; prepelvic distance 1.93 (1.78 to 2.03) ; length of longest ray of caudal fin 6.23 (5.65 to 7.14), all in standard length. Eye 5.63 (5.00 to 6.44) in head length, 2.25 (1.70 to 2.67) in interorbital space width; 2.13 (1.85 to 2.67) in snout length. Dorsal spine 2.20 (1.61 to 2.63) ; pectoral spine 1.80 (1.61 to 1.96) in head length. Adipose dorsal fin base 1.30 (1.04 to 1.55) in anal fin base. Least depth of caudal peduncle 1.53 (1.43 to 1.71) in its length.

Dorsal profile at about 25° to body axis. Occipital process subcutaneous, 2.0 times longer than wide at base, not extending to predorsal plate. Premaxillary band of teeth produced laterally, 3.0 or 4.0 times as long as broad; teeth on palate in a dumpel-shaped, continuous band. Maxillary barbels reaching operculum, others shorter. Longest ray of dorsal fin not extending to adipose fin when depressed; dorsal spine smooth. Pectoral spine with five to 12 strong, antrorse teeth over posterior margin. Pelvic fins not reaching anal fin. External urogenital papillae common. Longest anal ray not extending to caudal fin. Caudal fin truncate or slightly rounded. Lateral line arched above pelvic fin.

Colour. Uniformly brown above and on sides, dull white beneath. Fins dark-brown. Freshly preserved specimens dark, cement-grey above and on sides, dull white beneath.

Relationship. Related to *P. adiposalis*, but differing in having shorter adipose dorsal fin and longer maxillary barbels. It is also related to *P. brevianalis*, but differing in having smaller eye, narrower head and more anal fin rays.

Distribution. Japan: River Azusa, Biwa Ko, Fukuoka, Hamada, Jedo, River Kinu, River Katakami, Oki Islands, Tokyo.

Pseudobagrus adiposalis OSHIMA

Pseudobagrus adiposalis OSHIMA, *Ann. Carneg. Mus., XII*, p. 181, pl. xlviii, fig. 2, 1919 (type locality, River Tamusui).

Leiocassis adiposalis TCHANG, *Bull. Fan. Inst. Biol. Peking, VII*, p. 40, 1936 (Foochow, ? in error).

Specimens studied. SNHM 23175, River Tamusui, Formosa, 1915 - 1917, TAKEO AOKI coll., one specimen (cotype), 118 mm.

Description. OSHIMA (1919) gave a description of this species.

Relationship. Related to *P. aurantiacus*, but differing in having longer adipose dorsal fin and shorter maxillary barbels.

Distribution. Formosa: River Tamusui near Shinten. The record from Foochow is doubtful.

Pseudobagrus brevianalis REGAN

Pseudobagrus brevianalis REGAN, *Ann. Mag. nat. Hist., (8) I*, p. 151, 1908 (type locality, Lake Candidus). OSHIMA, *Ann. Carneg. Mus., XII*, p. 178, 1919 (Lake Candidus).

Specimens studied. USNM 161712, River Toiko, Formosa, April 12, 1952, D. H. JOHNSON coll., five specimens, 35 to 83 mm.

Description. Body depth 4.96 (4.38 to 5.44) ; head length 3.68 (3.33 to 4.05) ; head width 4.64 (4.38 to 4.88) ; head depth 5.57 (5.00 to 6.80) ; predorsal length 2.83 (2.69 to 3.02) ; postdorsal length 1.57 (1.50 to 1.64) ; prepelvic distance 2.06 (1.87 to 2.18) ; length of longest ray of caudal fin 4.98 (4.00 to 5.93), all in standard length. Eye 4.16 (3.33 to 5.13) in head length; 1.59 (1.33 to 2.01) in interorbital space width; 1.65 (1.33 to 2.05) in snout length. Dorsal spine 1.97 (1.83 to 2.17) (N = 4) ; pectoral spine 1.77 (1.57 to 2.16) in head length. Adipose dorsal fin base longer than anal fin base. Least depth of caudal peduncle 1.44 (1.20 to 1.70) in its length.

Dorsal profile at 20° to 25° to body axis. Occipital process subcutaneous, 2.0 or 3.0 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth produced laterally and 3.0 to 3.5 times as long as broad. Teeth on palate in a semi-lunar, continuous band. Maxillary barbels reaching pectoral spine base, others shorter. Longest ray of dorsal fin not extending to adipose fin when depressed; dorsal spine smooth. Pectoral spine with six to eight strong, vertical teeth over posterior margin. Pelvic fins not reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin truncate. Lateral line straight.

Colour. Greyish-brown above and on sides, lighter beneath. Fin tips and occiput slightly tinged black.

Relationship. Related to *P. aurantiacus*, but differing in having larger eye, broader head and fewer anal fin rays.

Distribution. Formosa: Lake Candidus, River Toiko.

Pseudobagrus taiwanensis OSHIMA

Pseudobagrus taiwanensis OSHIMA, *Ann. Carneg. Mus., XII*, p. 180, pl. xlviii, fig. 1, 1919 (type locality, River Tozen near Taichu).

Specimen studied. SNHM 23128, Shinchiku, Formosa, 1915 - 1917, Takeo Aoki coll., one specimen (cotype), 43.2 mm.

Description. OSHIMA (1919) gave a description of this species.

Relationship. Related to *P. aurantiacus*, but differing in having smaller body depth, smaller eye, shorter maxillary barbels and fewer anal fin rays.

Distribution. Formosa: River Tozen near Taichu, Shinchiku.

Pseudobagrus medianalis (REGAN)
(Plate II, Fig. C)

Macrones medianalis REGAN, *Ann. Mag. nat. Hist. (7) XIII*, p. 194, 1904 (type locality, Yunnan Lake). TCHANG & SHIH, *Sci. Quart. nat. Univ. Peking, IV*, no. 3, p. 341, 1934 (Sze-Chwan).

Aoria medianalis NICHOLS, *Proc. Biol. Soc. Wash., XXXI*, p. 15, 1918 (Yunnan).

? *Hemibagrus taphrophilus* SAUVAGE & THIERSANT, *Ann. Sci. nat., (6) I*, p. 6, 1874 (type locality, "Western Tschuang").

Leiocassis (Dermocassis) taphrophilus NICHOLS, *The Freshwater fishes of China, IX*, p. 49, 1943 (Hokow).

Specimens studied. BMNH 1921. 7. 26. 83, 84, Yunnan Lake, GRAHAM coll., two specimens, 112 and 133 mm; ZSI (Not numbered), Yunnan, exchange from the Peoples Republic of China, May 31, 1955, two specimens, 162 and 183 mm; ZSI F. 12216/1, locality unknown, Fan Memorial Institute of Biology, Peking, China, one specimen, 129 mm; USNM 87479, Suifu, China, GRAHAM coll., six specimens, 74.0 to 131.0 mm; USNM 89268, Sze-Chwan, China, GRAHAM coll., three specimens, 55 to 69 mm.

Description [1]. Body depth 5.10 (3.70 to 6.55); head length 4.04 (3.68 to 5.06); head width 5.36 (4.60 to 6.14); head depth 7.11 (6.20 to 8.40); predorsal length 2.84 (2.64 to 3.01); postdorsal length 1.48 (1.39 to 1.60); prepelvic distance 1.97 (1.80 to 2.10); length of longest ray of caudal fin 6.45 (5.09 to 7.63), all in standard length. Eye 5.71 (5.00 to 6.30) in head length; 1.95 (1.50 to 2.40) in interorbital space width; 2.03 (1.85 to 2.36) in snout length. Dorsal spine 1.76 (1.40 to 2.00); pectoral spine 1.61 (1.30 to 1.94) (N = 9) in head length. Adipose dorsal fin base equal to anal fin base. Least depth of caudal peduncle 1.78 (1.06 to 2.30) in its length.

Dorsal profile at about 30° to body axis. Occipital process subcutaneous, 2.0 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth slightly produced laterally, 4.0 or 5.0 times as long as broad; teeth on palate in a slightly curved, continuous band. Maxillary barbels reaching pectoral fin base, others shorter. Longest ray of dorsal fin not extending to adipose fin when depressed; dorsal spine with four to eight feeble teeth over posterior margin. Pectoral spine with nine to 13 strong, antrorse teeth over posterior margin. Pelvic fins not reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin truncate. Lateral line nearly straight.

Colour. Light brown above and on sides, dull white beneath. Freshly preserved specimens are of uniform buff colour with the barbels tinged light-violet.

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[1]) Unless otherwise stated, the proportions and counts are of only 11 specimens.

Relationship. Distantly related to *P. truncatus*, but differing in having smaller eye, fewer anal fin rays, shorter dorsal spine and shorter adipose dorsal fin.

Distribution. China: Hokow, Ningpo, Suifu, Sze-Chwan, Yunnan Lake.

Remarks. *Hemibagrus taphrophilus* SAUVAGE & THIERSANT is a probable synonym of this species. RENDAHL (1928: 163) considered *taphrophilus* as belonging to the genus *Aoria* JORDEN (= *Mystus* SCOPOLI) whereas NICHOLS (1928: 7) assigned it to *Leiocassis* BLEEKER. The latter author (1943: 49) stated that "they have a rather small adipose for *Leiocassis* and further suggest the young of *Pseudobagrus* in a faint pattern consisting of a pale collar and obscure dark blotches on the sides". Some of the characters of the species as given by SAUVAGE & THIERSANT are as follows: Orbital rims with an imperfect fold, pronounced below. Dorsal spine smooth. Caudal fin 'non-dilatee' and with a spine. The description is defective [1]) and inadequate to determine exactly its generic position. It is probable that this species is either a *Pelteobagrus* or a *Pseudobagrus*.

Pseudobagrus rendahli (PELLEGRIN & FANG)

Aoria rendahli PELLEGRIN & FANG, *Bull. Soc. Zool. Fr., LXIV*, pp. 341 - 343, 1940 (type locality, Ou Tchang Ho).

Specimen studied. No specimen seen by me.

Relationship. Related to *P. medianalis*, but differing in having an emarginate caudal fin, shorter adipose dorsal fin and longer pelvic fins.

Distribution. China: Tchang Ho.

Pseudobagrus omeihensis NICHOLS

Pseudobagrus omeihensis NICHOLS, *Amer. Mus. Novit., no. 1107*, p. 1, 1941 (type locality, Omeihsien).

Specimen studied. No specimen seen by me.

Relationship. Related to *P. medianalis*, but differing in having smaller eyes, shorter caudal peduncle, shorter maxillary barbels, shorter pectoral and dorsal spines, besides colouration.

Distribution. China: Omeihsien.

Pseudobagrus taeniatus (GÜNTHER)

(Plate II, fig. D)

Macrones (Liocassis) taeniatus GÜNTHER, *Ann. Mag. nat. Hist., (4) XII*, p. 245, 1873 (type locality, Shanghai).

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[1]) GÜNTHER (1888: 429, foot-note) doubted the status of the species described by these authors. According to him these are "work of persons not conversant with the rudiments of descriptive ichthyology and as likely to lead to misconceptions ...".

Macrones taeniatus GÜNTHER, *Ann. Mag. nat. Hist, (6) I*, p. 430, 1888 (Ichang, Yangtze Kiang). TCHANG & SHIH, *Sci. Quart nat. Univ. Peking, IV*, no. 3, p. 339, 1934, (Chekiang).

Leiocassis (Dermocassis) taeniatus NICHOLS, *The Freshwater fishes of China, IX*, p. 47, 1943 (Fu-kien).

Specimen studied. USNM 130509, Shanghai, China, SOWERBY coll., one specimen, 220 mm.

Description. Body depth 6.03; head length 5.02; head width 6.29; head depth 7.45; predorsal length 3.24; postdorsal length 1.49; prepelvic distance 2.09; length of longest ray of caudal fin 8.46, all in standard length. Eye 6.26 in head length; 2.14 in interorbital space width; 2.14 in snout length. Dorsal spine 1.69; pectoral spine 1.62 in head length. Adipose dorsal fin base longer than anal fin base. Least depth of caudal peduncle 2.44 in its length.

Dorsal profile at about 25° to body axis. Occipital process subcutaneous, 3.0 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth slightly produced laterally, 4.0 times as long as broad; teeth on palate in a slightly curved, continuous band. Maxillary barbels reaching operculum, others shorter. Longest ray of dorsal fin not extending to adipose fin when depressed; dorsal spine smooth. Pectoral spine with 14 strong, vertical teeth over posterior margin. Pelvic fins not reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin rounded. Lateral line straight.

Colour. Uniformly dark-brown all over, with intermittant patches of dusty-white.

Relationship. Related to *P. truncatus*, but differing in having smaller body depth, shorter head, smaller eyes and broader interorbital space.

Distribution. China: Che-kiang, Fu-kien, Ichang, Ningpo, Shanghai, Yangtze Kiang.

Pseudobagrus ondon SHAW

Pseudobagrus ondon SHAW, *Bull. Fan. Inst. Biol. Peking, I*, p. 111, figs. 1, 2, 1930 (type locality, Shing-Tsong).

Specimen studied. No specimen seen by me.

Relationship. Related to *P. taeniatus*, but differing in having smaller body depth and shorter adipose dorsal fin.

Distribution. China: Shing-Tsong.

Remarks. The locality of specimen No. USNM 130698 (130 mm in standard length) is " ? Chengtu" (Sze-Chwan province). It differs from the published description of *P. ondon* in having a longer adipose dorsal fin,

wider mouth (2.4 in head length *versus* 3.6 in *P. ondon*) ; shorter dorsal spine (1.94 in head length *versus* 1.50 in *P. ondon*) ; and fewer anal fin rays 17 (*versus* 20 in *P. ondon*). *P. ondon* is known so far only from Shing-Tsong (Chekiang province). The specimen may be this species.

Pseudobagrus truncatus REGAN

(Plate II, Fig. A)

Liocassis truncatus REGAN, *Ann. Mag. nat. Hist., (8) XI*, p. 553, 1913 (type locality, Kiating-Fu). WU, *Sinensia, I*, no. 6, p. 81, 1930 (Suifu).
Macrones truncatus TCHANG & SHIH, *Sci. Quart. nat. Univ. Peking, IV*, no. 3, p. 340, 1943 (Sze-Chwan).

Specimens studied. USNM 86462, Shanghai, Kiang-su province, China, 1923, SOWERBY coll., four specimens, 77 to 96 mm; USNM 130508, Shanghai, Kiang-su province, China, Dec. 1925, SOWERBY coll., one specimen, 108 mm.

Description. Body depth 5.16 (4.47 to 6.06) ; head length 3.83 (3.66 to 3.93) ; head width 5.96 (5.64 to 6.35) ; head depth 7.02 (6.71 to 7.38) ; predorsal length 2.74 (2.68 to 2.81) ; postdorsal length 1.46 (1.43 to 1.49) ; prepelvic distance 1.94 (1.87 to 2.02) ; length of longest ray of caudal fin 5.74 (5.27 to 6.00), all in standard length. Eye 5.36 (4.44 to 6.25) in head length; 1.51 (1.28 to 1.75) in interorbital space width; 1.85 (1.56 to 2.25) in snout length. Dorsal spine 1.46 (1.22 to 1.69) (N = 3) ; pectoral spine 1.35 (1.25 to 1.45) (N = 2) in head length. Adipose dorsal fin base longer than anal fin base. Least depth of caudal peduncle 2.06 (1.88 to 2.28) in its length.

Dorsal profile at about 15° to body axis. Occipital process exposed, 2.0 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth slightly produced laterally, 3.2 or 3.5 times as long as broad; teeth on palate in a dumbel-shaped, continuous band. Maxillary barbels reaching operculum, others shorter. Longest ray of dorsal fin not extending to adipose fin when depressed; dorsal spine smooth. Pectoral spine with 10 to 12 strong, antrorse teeth over posterior margin. Pelvic fins reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin cuneate. Lateral line straight and not very conspicuous.

Colour. Uniformly dark-brown above and on sides, lighter beneath.

Relationship. Related to *P. taeniatus*, but differing in having greater body depth, longer head, larger eye and narrower interorbital space.

Distribution. China: Kiating-Fu, Shanghai, Suifu, Sze-Chwan.

Pseudobagrus emarginatus (REGAN)

(Plate II, Fig. B)

Leiocassis emarginatus REGAN, *Ann. Mag. nat. Hist., (8) XI*, p. 553, 1913 (type locality, Sze-Chwan). RENDAHL, *Ark. Zool., XXA*, no. 1, p. 169, 1928 (Kiating-Fu). RENDAHL, *Ark. Zool., XXIV A, no. 16*, p. 94, 1933 (Chungking). FU, *Rept. marine biol. Ass. China, no. 3*, p. 99, 1934 (Foochow).

? *Leiocassis similis* NICHOLS, *Amer. Mus. Novit., no. 214*, fig. 1, p. 1, 1926 (type locality, River Min near Yenping).

Specimen studied. USNM 87435, Suifu, China, Oct.-Nov., 1954, GRAHAM coll., one specimen, 110.0 mm.

Description. The specimen studied by me agrees well with the description of REGAN (1913).

Relationship. Related to *P. taeniatus*, but differing in having longer head, larger eye and narrower interorbital space, besides a slightly emarginate caudal fin.

Distribution. China: Chungking, Foochow, Kiating-Fu, R. Min, Suifu, Sze-Chwan.

Remarks. The two specimens (93 and 138 mm long) referred to this species by RENDAHL (1933: 94) differ from the type in having smaller body (7.46 and 7.75) and caudal peduncle depth. RENDAHL doubted the correct identity of these specimens in view of this differences in the body proportions. These two specimens may be abnormally lean due to lack of sufficient food, parasitic infection etc., similar to a specimen of *P. aurantiacus* (ZSI F. 788/2).

NICHOLS (1926: 1) described *Leiocassis similis* referable to this genus, from a single specimen 119 mm long and stated that it differs from *P. emarginatus* in having longer barbels. Comparison of the description of *similis* and *emarginatus* indicates that the former further possesses larger eyes than the latter (5.0 in head length *versus* 5.5 to 6.0 in *emarginatus*). These differences are not significant to warrant a specific status for *similis* and therefore, I have kept it as a probable synonym of *emarginatus*.

Pseudobagrus henryi (HERRE)

Aoria henryi HERRE, *Lingnan Sci. J., XI*, p. 432, 1932 (type locality, Canton wholesale fish market, China). NICHOLS, *The Freshwater fishes of China, IX*, p. 37, 1943.

Specimen studied. No specimen seen by me.

Relationship. Related to *P. intermedius*, but differing in having narrower interorbital space, larger eye, and deeper caudal peduncle.

Distribution. China: Canton.

Pseudobagrus brevicaudatus (WU)

Liocassis brevicaudatus WU, *Sinensia, I*, p. 81, fig. 7, 1930 (type locality, Chungking).

Specimen studied. No specimen seen by me.

Relationship. Related to *P. intermedius*, but differing in having slightly smaller body depth, larger eyes and fewer anal fin rays.

Distribution. China: Chungking.

Pseudobagrus intermedius NICHOLS & POPE

Pseudobagrus intermedius NICHOLS & POPE, *Bull. Amer. Mus. nat. Hist., LIV*, p. 331, fig. 5, 1927 (type locality, Nodoa). HERRE, *Lingnan Sci. J., XV*, p. 627, 1936 (Taiping).

Specimen studied. No specimen seen by me.

Relationship. Related to *P. brevicaudatus*, but differing in having slightly greater body depth, longer head, smaller eyes and more anal fin rays.

Distribution. Hainan Island: Nodoa, Taiping.

Pseudobagrus ussuriensis (DYBOWSKI)

Bagrus ussuriensis DYBOWSKI, *Verh. zool. bot. Ges. Wien., XXII*, p. 210, 1872 (type locality, River Usuri).

Macrones (Leiocassis) ussuriensis BERG, *Zool. Jb., Syst. Abt., XXXII*, p. 477, 1912 (River Amur).

Pseudobagrus ussuriensis MORI & UCHIDA, *J. Chosen nat. Hist. Soc., No. 19*, p. 6, 1934 (Korea).

Liocassis (Dermocassis) ussuriensis NICHOLS, *The Freshwater fishes of China, IX*, p. 49, 1943 (Tungting Hu, Shan-si, Hu-nan).

? *Pseudobagrus emarginatus* SOWERBY (not REGAN), *Proc. U. S. nat. Mus., L*, p. 1, 1921 (type locality, River Yalu).

Specimens studied. MCZ 32408, Lake Chanka, Eastern Siberia, one specimen, 426 mm; USNM 130506, Shanghai, China, SOWERBY coll., one specimen, 350 mm; USNM 77005, River Sungari near junction with Amur, China, SOWERBY coll., one specimen, 314.5 mm; USNM 86399, Shanghai, Kiangsu province, 1923, SOWERBY coll., one specimen, 250 mm; USNM 89369, Yachow, China, D. C. GRAHAM coll., one specimen, 64 mm; USNM 87430, Suifu, China, Oct.-Nov., 1924, D. C. GRAHAM col., one specimen, 72 mm; ZSI F. 12715/1, Amur near Khabaroos, USSR, A. TARANETZ coll., one specimen, 264 mm.

Description. (based on 4 specimens). Body depth 7.17 (6.29 to 8.33); head length 5.11 (4.71 to 5.56); head width 6.86 (6.39 to 7.35); head depth 8.43 (7.49 to 9.46); predorsal length 3.43 (3.22 to 3.72); postdorsal length

1.46 (1.43 to 1.51) ; prepelvic distance 2.39 (2.31 to 2.49) ; length of longest ray of caudal fin 7.81 (6.69 to 8.35), all in standard length. Eye 7.99 (6.30 to 9.94) in head length; 2.78 (1.90 to 3.54) in interorbital space width; 3.19 (2.75 to 3.93) in snout length. Dorsal spine 1.41 (1.29 to 1.62) ; pectoral spine 1.61 (1.38 to 1.85) in head length. Adipose dorsal fin base longer than anal fin base. Least depth caudal peduncle 3.70 (3.31 to 4.27) in its length.

Dorsal profile at 20° to 25° to body axis. Occipital process subcutaneous, 2.0 or 2.5 times longer than wide at base, just extending to predorsal plate. Premaxillary band of teeth slightly produced laterally, 5.0 or 6.0 times as long as broad; teeth on palate in a semi-lunar, continuous band. Maxillary barbels reaching posterior border of eye, others shorter. Longest ray of dorsal fin not extending to adipose fin when depressed; dorsal spine smooth. Pectoral spine with 12 to 17 strong, antrorse teeth over posterior margin. Pelvic fins not reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin rounded. Lateral line nearly straight.

Colour. Uniformly dark-grey all over. USNM 77005 is however, brownish-yellow above and on sides, lighter beneath.

Relationship. This species belongs to the *pratti*-complex with a low elongate body and small eyes. The nearest relatives are *P. pratti* and *P. sinyanensis.*

Distribution. Manchuria: River Amur, Lake Chanka, Khabaroos, River Sungari, River Usuri, River Yalu; Korea; China: Hu-nan, Shanghai, Shansi, Suifu, Tungting Hu, Yachow.

Remarks. There is confusion regarding the generic position and specific limits of *Bagrus ussuriensis.* DYBOWSKI (1872 : 210) stated that the head is obtuse and the caudal fin rounded. These two characters are alone sufficient to indicate its rightful place under *Pseudobagrus.* Lack of rigid application of these characters has resulted in many misidentifications and erroneous generic allocations. Thus, HERZENSTEIN & WARPACHOWSKI (1887: 24) erroneously named a specimen 205 mm long as *Bagrus ussuriensis* and referred it under *Macrones* (= *Mystus*). BERG (1907: 418) named this specimen as *Macrones herzensteini,* which has been included under *Pseudobagrus* in this paper.

SOWERBY (1921: 1) described *P. emarginatus* (not of REGAN) from a single specimen 460 mm long and stated that it differs from *tenuis* in having the caudal fin "deeply cleft". No other details are given in the description regarding the shape of the caudal fin. Information regarding the holotype was obtained from the USNM. It is learnt that the caudal

fin is only slightly emarginated and not forked as SOWERBY's expression "deeply cleft" would mean. Further, the measurements and counts, furnished kindly by Dr. L. P. SCHULTZ, indicate that the species nearly intergrades into *ussuriensis*, and that the differences are not significant to warrant a separate status for it.

A comparison of certain characters of *emarginatus*, *ussuriensis* and *tenuis* is given below.

The occurrence of *ussuriensis* in Shanghai and other places far south to its normal range is interesting. SHAW (1933) discussed this point. Whether the population in the southern regions is different from its northern counterparts needs investigation.

Table 7. Comparison of certain characters in three species of *Pseudobagrus*

Characters	*emarginatus*	*ussuriensis*	*tenuis*
SL/Head length	5.86	4.71 to 5.56	4.50 to 5.30
SL/Body depth	8.67	6.29 to 8.33	6.50 to 8.00
LH/Eye	8.67	6.30 to 9.94	5.80 to 7.60
LH/Interorbital space	3.18	2.56 to 3.32	3.00 to 3.39
LH/HCPD	3.68	3.03 to 3.71	3.55
Anal fin rays	16 to 18	16 to 18	20 to 22

Pseudobagrus herzensteini (BERG)

Macrones ussuriensis HERZENSTEIN & WARPACHOWSKI, *Trud. St. Petersb. nat., XVIII*, p. 24, 1887 (type locality, River Amur). TCHANG & SHIH, *Sci. Quart. nat. Univ. Peking, IV*, no. 3, p. 340, 1934 (Tung Chow).

Macrones herzensteini BERG, *Annu. Mus. zool. Acad. St. Petersb., XII*, p. 421, 1907 (River Onon).

Macrones (Leiocassis) herzensteini BERG, *Zool. Jb., Syst. Abt., XXXII*, p. 477, 1912 (River Onon).

Specimens studied. USNM 76718, River Yalu, China, SOWERBY coll., two specimens, 157.0 and 161.5 mm.

Description. Body depth 5.39 (5.21 to 5.57) ; head length 4.19 (4.14 to 4.24) ; head width 5.265 (5.15 to 5.38) ; head depth 6.315 (6.04 to 6.59) ; predorsal length 2.895 (2.88 to 2.91) ; postdorsal length 1.63 (1.60 to 1.66) ; prepelvic distance 2.02 (1.97 to 2.07) ; length of longest ray of caudal fin 6.185 (6.09 to 6.28), all in standard length. Eye 5.77 (5.57 to 5.97) in

head length; 2.08 (2.07 to 2.09) in interorbital space width; 2.16 (2.14 to 2.18) in snout length. Dorsal spine 1.335 (1.22 to 1.45); pectoral spine 1.315 (1.26 to 1.37) in head length. Adipose dorsal fin base longer than anal fin base. Least depth of caudal peduncle 2.18 (2.14 to 2.22) in its length.

Dorsal profile at about 25° to body axis. Occipital process exposed, 2.0 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth slightly produced laterally, 3.0 or 4.0 times as long as broad; teeth on palate in a slightly curved, continuous band. Maxillary barbels reaching slightly beyond eye, others shorter. Longest ray of dorsal fin extending to adipose fin when depressed; dorsal spine with feeble teeth over posterior margin. Pectoral spine with 12 to 14 strong, antrorse teeth over posterior margin. Pelvic fins not reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin slightly emarginate. Lateral line simple and straight.

Colour. Dark-grey above and on sides, with spines, occipital and cleithral processes tinged green; light-grey beneath.

Relationship. Related to *P. ussuriensis,* but differing in having greater body depth, longer head, larger eyes and shorter caudal peduncle.

Distribution. Manchuria: River Amur, River Onon, River Yalu; China: Tung Chow.

Pseudobagrus hwanghoensis (MORI)

Leiocassis hwanghoensis MORI, *Jap. J. Zool., V,* p. 167, figs. 3, 4, 1933 (type locality, Hwang Ho).

Specimen studied. No specimen seen by me.

Relationship. Related to *P. ussuriensis,* but differing in having smaller body depth and shorter caudal peduncle.

Distribution. China: Hwang Ho.

Pseudobagrus pratti (GÜNTHER)

Macrones pratti GÜNTHER *in* PRATT, *To the snows of Tibet through China,* p. 245, fig. b, pl. 1, 1892 (type locality, Kiating Fu). GÜNTHER, *Annu. Mus. zool. St. Petersb., I,* p. 199, 1896 (River Ya). TCHANG & SHIH, *Sci. Quart. nat. Univ. Peking, IV,* no. 3, p. 338, 1934 (Sze-Chwan).

Specimen studied. USNM 91618, Suifu, Sze-Chwan province, D.C. GRAHAM coll., one specimen, 149 mm.

Distribution. Body depth 9.93; head length 4.81; head width 6.48; head depth 9.93; predorsal length 3.24; postdorsal length 1.59; prepelvic distance 2.24; length of longest ray of caudal fin 5.14, all in standard

length. Eye 4.77 in head length; 1.23 in interorbital space width; 1.77 in snout length. Dorsal spine 1.82; pectoral spine 1.72 in head length. Adipose dorsal fin base longer than anal fin base. Least depth of caudal peduncle 2.89 in its length.

Dorsal profile of head at about 15° to body axis. Occipital process subcutaneous, 2.0 times longer than wide at base, not extending to predorsal plate. Premaxillary band of teeth produced laterally, 4.5 times as long as broad; teeth on palate in a semi-lunar, continuous band. Maxillary barbels reaching operculum, others shorter. Longest ray of dorsal fin not extending to adipose fin when depressed; dorsal spine smooth. Pectoral spine with 12 strong, antrorse teeth over posterior margin. Pelvic fins not reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin emarginate. Lateral line straight.

Colour. Pale brown above and on sides, dull beneath.

Relationship. This species is probably derived from *P. taeniatus* like fishes, but the differences are so great that it cannot be said that they are allied. It is more related to *sinyanensis* and *kaifenensis* than to any other species.

Distribution. China: Kiating Fu, River Ya, Suifu, Sze-Chwan.

Pseudobagrus sinyanensis (FU)

Leiocassis sinyanensis FU, *Bull. Fan. Inst. Biol. Peking, VI*, p. 178, fig. 1, 1935 (type locality, "Szewangshan" of Sinyang).

Specimen studied. ZSI F. 12215/1, locality unknown, Fan Memorial Institute of Biology, Peking, one specimen, 108.5 mm.

Description. The specimen agrees with the description of FU (1935). However, it differs from the holotype in having larger eyes (4.84 in head length *versus* 8.00); longer head (4.48 in standard length *versus* 5.50), and least depth of caudal peduncle (2.69 in its length *versus* 3.03).

Relationship. Related to *P. pratti*, but differing in having a greater body depth, longer head and smaller eyes.

Distribution. China: Sinyang.

Pseudobagrus kaifenensis (TCHANG)

Liocassis kaifenensis TCHANG, *Bull. Fan. Inst. Biol. Peking V*, p. 41, 1934 (type locality, Kai-feng).

Specimen studied. No specimen seen by me.

Relationship. Related to *P. pratti*, but differing in having greater body depth, smaller eyes and longer dorsal spine.

Distribution. China: Kai-feng.

Remarks. USNM 87195 (154.5 mm in standard length) may be this species but has larger eyes (5.26 in head length) and is from ? Chengtu.

Pseudobagrus tenuis (GÜNTHER)

Macrones (Pseudobagrus) tenuis GÜNTHER, *Ann. Mag. nat. Hist., (4) XII*, p. 244, 1873 (type locality, Shanghai).

Pseudobagrus tenuis SAUVAGE & THIERSANT, *Ann. Sci. nat., (6) I*, p. 6, 1874 (Shanghai). WU, *Bull. Mus. Hist. nat. Paris, (2) III*, p. 438, 1931 (Sing Ting). WU, *Rep. mar. biol. Ass. China, no. 3*, p. 99, 1934 (Foochow). HERRE & LIN, *Bull. Chekiang Fish exp. Sta., II, (7)*, p. 24, 1936 (River Tsien Tang).

Specimen studied. USNM 85949, from mouth of River Min, Sachi, about Nov.-Dec., 1921, SOWERBY coll., one specimen, 182 mm.

Description. Body depth 7.91; head length 4.67; head width 6.50; head depth 10.11; predorsal length 3.25; postdorsal length 1.05; prepelvic distance 2.19; length of longest ray of caudal fin 7.28, all in standard length. Eye 6.5 in head length; 1.92 in interorbital space width; 2.37 in snout length. Dorsal spine 1.44, pectoral spine 1.44 in head length. Adipose dorsal fin base equal to anal fin base. Least depth of caudal peduncle 3.09 in its length.

Dorsal profile at about 20° to body axis. Occipital process exposed, 3.0 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth slightly produced laterally, 4.0 times as long as broad; teeth on palate in a semi-lunar, continuous band. Maxillary barbels reaching preoperculum; other shorter. Longest ray of dorsal fin not extending to adipose fin when depressed; dorsal spine smooth. Pectoral spine with 12 strong, antrorse teeth over posterior margin. Pelvic fins not reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin slightly emarginate. Lateral line straight.

Colour. Light brown above and on sides, white beneath, head of a darker shade.

Relationship. Distantly related to *P. pratti*, but differing in having greater body depth, larger eyes, more anal fin rays and greater caudal peduncle depth.

Distribution. China: Foochow, River Min, Shanghai, Sing Ting, River Tsien Tang.

Pseudobagrus lui (TCHANG & SHIH)

Liocassis lui TCHANG & SHIH, *Contr. biol. Dept. Sci. Inst. W. China, V*, p. 9, 1934 (type locality, Lower Kialin Kiang).

Macrones lui TCHANG & SHIH, *Sci. Quart. nat. Univ. Peking, IV, no. 3*, p. 338, 1934 (Sze-Chwan).

Specimen studied. No specimen seen by me.

Relationship. Related to *P. tenuis,* but differing in having greater body depth, longer head, broader interorbital space, shorter barbels, greater caudal peduncle depth and fewer anal fin rays.

Distribution. China: Kialin Kiang, Sze-Chwan.

Pseudobagrus albomarginatus (RENDAHL)

Leiocassis albomarginatus RENDAHL, *Ark. Zool., XXA, no. 1,* p. 170, 1928 (type locality, Tangtu-Hsien). HERRE & LIN, *Bull. Chekiang Fish exp. Sta., II,* no. 7, p. 24, 1936 (River Tsien Tang).

Specimen studied. No specimen seen by me.

Relationship. Related to *P. tenuis,* but differing in having shorter caudal peduncle, shorter dorsal spine and fewer anal fin rays.

Distribution. China: Tangtu-Hsien, River Tsien Tang.

Pseudobagrus analis (NICHOLS)

Leiocassis analis NICHOLS, *Amer. Mus. Novit., No. 440,* p. 4, fig. 3, 1930 (type locality, Hokow).

Specimen studied. No specimen seen by me.

Relationship. Related to *P. lui,* differing in having a shorter head and more anal fin rays.

Distribution. China: Hokow.

Genus Coreobagrus MORI

Coreobagrus MORI, *Zool. Mag., XLVIII,* p. 672, 1936. (Type-species, *Coreobagrus brevicorpus* MORI, by monotypy). UCHIDA, *Bull. Fish. Exp. Gover-Gener. Tyosen, VI,* p. 39 (Korea). OKADA & KUBOTA, *Jap. J. Ichthyol., V (3-6),* p. 143, 1957 (generic diagnosis emended).

Body short and compressed. Dorsal profile arched. Head small and depressed when viewed from above. Snout blunt, slightly overhanging the mouth. Jaws subequal. Lips slightly thick and fleshy. Mouth transverse and moderately wide. Villiform teeth on premaxillaries, prevomer and mandibular in bands; that on latter produced laterally and separated in the middle by an edentate space; that on prevomer semi-lunar and continuous. Eyes large, supra-lateral and in anterior part of head. Supraoccipital covered with skin and with a backward extending process. Four pairs of barbels: one maxillary, two mandibular and one nasal. Gill membranes free from each other and also from the isthmus. Branchiostegals eight.

Origin of rayed dorsal fin above tip of pectoral spine; with 6 or 7 rays and a spine. Adipose dorsal fin moderately long, not very low, smooth

and with the posterior margin free. Pectoral fins horizontally inserted and with a spine. Pelvic fins inserted on ventral surface, posterior to last ray of dorsal fin. Anal fin with 13 to 20 rays. Caudal fin emarginate or incompletely biforked.

Distribution. Korea, Japan.

MORI (1936) proposed the genus *Coreobagrus* to accommodate "short bodied catfishes" with "very large" eyes and with "very short" anal fin (13 to 16 rays). The genus was monotypic with *C. brevicorpus* MORI from Korea as the type-species. The type-species was described from 11 specimens of which the largest, the holotype, was 92 mm in total length (= standard length). OKADA & KUBOTA (1957) described *C. ichikawai* from Japan as the second species of this genus. They emended the generic diagnosis to include forms with incompletely forked caudal fin and with the anal fin rays ranging from 13 to 17 (including rudimentary rays) instead of 13 to 16. A third species of this genus *C. okadai* JAYARAM has also been described (JAYARAM, 1967) which has 16 to 20 anal fin rays.

Through the kind courtesy of Prof. Y. OKADA and Prof. K. SUZUKI of Mie Prefecture, Japan, I have examined the holotype of *C. ichikawai*. This has helped to compare *Coreobagrus* and *Pseudobagrus* and to determine the salient differences between the two.

In a preliminary review of the family Bagridae (JAYARAM, 1955) I had stated that *Coreobagrus* may be synonymous with *Leiocassis* BLEEKER. I had not at that time seen either the original description of *Coreobagrus* nor the type-specimens of any of the two genera. *Coreobagrus* is undoubtedly very closely allied to *Pseudobagrus*, also known from Japan, Korea, China and Formosa. There is only one species of *Pseudobagrus*, *P. aurantiacus* TEMMINCK & SCHLEGEL the type-species, known from Japan; only one from Korea *viz.*, *P. ussuriensis* (DYBOWSKI). Both these species are markedly different from *Coreobagrus*. Nevertheless, it is seen that the characters by which the genus was established and emended overlap with those of *Pseudobagrus*. Thus, the anal fin in *Coreobagrus* has 13 to 20 rays. There are no species of *Pseudobagrus* with so short an anal fin as with 13 or 14 rays, * but species such as *P. taiwanensis* OSHIMA and *P. omeihensis* NICHOLS have 15 rays in the anal fin. Likewise the "in-

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* While emending the generic diagnosis, OKADA & KUBOTA *(op. cit.)* stated that the anal fin rays include rudimentary rays. In *C. okadai* JAYARAM the anal fin is with 16 to 20 rays including the rudimentary rays. Similarly in the holotype of *C. ichikawai* which I examined, the anal is with 16 rays including rudimentary rays. It is not known whether in *C. brevicorpus* the rudimentary rays were also included or not.

completely biforked" condition of the caudal fin also do not separate it from *Pseudobagrus*, since there are many species of *Pseudobagrus* which have a similar type of caudal fin.

Looking for other significant characters, it is seen that the head width in *Coreobagrus* is always contained less than 1.2 times in the head length whereas in *Pseudobagrus* it is always more than 1.2 times. This character is of some importance in distinguishing the two genera. Further, the body depth in *Coreobagrus* is below 5 times in standard length and in *Pseudobagrus* it is generally more than 5 times. The head length is likewise contained less than 4 times in *Coreobagrus* and in *Pseudobagrus* it is more than 4 times. However, in respect of these last two characters, there are other species of *Pseudobagrus* which overlap with *Coreobagrus*.

Coreobagrus as such, is best defined by a combination of characters as follows:

Coreobagrus is distinguished from *Pseudobagrus* by its wider head (less than 1.2 times in head length *versus* more than 1.2 times); shorter body (less than 5 times in standard length *versus* generally more than 5 times), and longer head (less than 4 times in standard length *versus* more than 4 times).

Key to species

1*a*. Body depth less than 4.5 times (3.7 to 4.3) in standard length.

2*a*. Diameter of eye 4.4 to 5.3 times, length of pectoral spine 1.3 times in head length. (Korea) . . . . . *brevicorpus*

2*b*. Diameter of eye 6.2 to 6.8 times, length of pectoral spine 1.7 to 1.8 in head length. (Japan) . . . . . *ichikawai*

1*b*. Body depth more than 4.5 times (4.43 to 5.0) in standard length. (Japan) . . . . . *okadai*

Coreobagrus brevicorpus MORI

Coreobagrus brevicorpus MORI, *Zool. Mag.*, *XLVIII*, p. 672, 1936. (type locality, R. Rakuto at Ei-Yo, Korea).

Specimen studied. No specimen seen by me.

Relationship. Related to *C. ichikawai*, but differing from it in having larger eyes, longer pectoral spines, longer snout and narrower interorbital space.

Distribution. Korea: Bun-kei, R. Rakuto at Tai-kyu, Ho-ki, Kan-yo and R. Kin at Ko-kan.

Coreobagrus ichikawai OKADA & KUBOTA

Coreobagrus ichikawai OKADA & KUBOTA, *Jap. J. Ichthyol., V (3-6)*, p. 144, fig. 1, 1957 (type locality, R. Miya, Mie Prefecture, Japan).

Specimen studied. 6230, Faculty of Fisheries, University of Mie, Japan, R. Miya, Mie Prefecture, May, 1952, one specimen (Holotype), 108.0 mm.

Description. OKADA & KUBOTA (1957) have given a good description of this species.

Relationship. Related to *C. brevicorpus*, but differing from it in having smaller eyes, shorter pectoral spines, shorter snout and wider interorbital space.

Distribution. Japan: R. Miya, Mie Prefecture.

Coreobagrus okadai JAYARAM

Coreobagrus okadai JAYARAM, *Bull. biogeogr. Soc. Japan, 24 (3)*, p. 30, 1967 (type locality, R. Suzuka, Mie Prefecture, Honshu, Japan).

Specimens studied. ZSI F. 5116/2, from upper region of R. Suzuka, Mie Prefecture, Honshu, Japan, Apr. 1965, K. SUZUKI coll., one specimen (Holotype), 62.5 mm; ZSI F. 5117/2, F. 5118/2, same data as Holotype, two examples (Paratypes), 57.5 and 32.0 mm respectively; not numbered, with Prof. Y. OKADA, Tokai University, Shimizu City, Japan, same data as holotype, one example (Paratype), 62.0 mm (figured, and published in *Bull. biogeogr. Soc. Japan, 24 (3)*, p. 30, 1967.

Description. JAYARAM (1967) has given a good description of this species.

Relationship. Related to *C. ichikawai*, also known from Japan, but differing from it in having a lower body depth, larger eyes, narrower interorbital space width and more anal fin rays.

Distribution. Known so far only from Japan: R. Suzuka, Honshu.

Subfamily Bagrinae

Type-genus. *Porcus* GEOFFROY SAINT-HILAIRE.

The characters of this subfamily have been detailed in part 2 of this series (JAYARAM, 1966a). This subfamily comprises the following four genera:

1. *Porcus* GAOFFROY SAINT - HILAIRE: West Africa to Tanganyika.
2. *Mystus* SCOPOLI: Syria, Pakistan, India, Ceylon, Burma, Thailand, Malaya, Indonesia, China.
3. *Leiocassis* BLEEKER: Malaya, Thailand, Indonesia, China.
4. *Heterobagrus* BLEEKER: Thailand.

Table 8. Counts of fin rays recorded for certain species of *Pseudobagrus* and *Coreobagrus*

Species	Fin rays (total branched and simple)														
	Dorsal		Pectoral				Anal								
	6	7	6	7	8	9	14	15	16	17	18	19	20	21	22
Pseudobagrus															
aurantiacus	4	5	5	3	1	—	—	—	—	4	1	2	1	1	—
brevianalis	1	4	1	4	—	—	3	2	—	—	—	—	—	—	—
medianalis	7	4	—	5	6	—	—	—	—	4	5	2	—	—	—
taeniatus	—	1	—	—	—	1	—	—	—	—	1	—	—	—	—
truncatus	—	1	—	—	1	—	—	—	—	—	—	—	—	1	—
emarginatus	—	1	1	—	—	—	—	—	1	—	—	—	—	—	—
ussuriensis	2	2	—	3	1	—	—	—	1	1	2	—	—	—	—
herzensteini	2	—	1	1	—	—	—	—	—	1	1	—	—	—	—
pratti	1	—	1	—	—	—	—	—	—	—	1	—	—	—	—
sinyaensis	1	—	—	1	—	—	—	—	—	—	—	1	—	—	—
tenuis	1	—	—	—	1	—	—	—	—	—	—	—	—	—	1
Coreobagrus															
ichikawai	—	1	—	1	—	—	—	—	1	—	—	—	—	—	—
okadai	3	1	3	1	—	—	—	—	1	—	—	2	1	—	—

Mystus overlaps in distribution with *Leiocassis* in being found from Thailand through Indonesia to China.

Key to genera

1*a*. Dorsal spine strong, short, its length less than the body depth or equal to it.

2*a*. Dorsal fin with 7 to 11 rays. . . . . *Porcus*

2*b*. Dorsal fin with 6 to 8 rays.

3*a*. Eyes not subcutaneous. Barbels usually longer than head. Total Anal fin rays usually 9 - 16 . . . . . *Mystus*

3*b*. Eyes subcutaneous. Barbels usually shorter than head. Total Anal fin rays usually 12 - 16 . . . . . *Leiocassis*

2*a*. Dorsal spine slender, long, its length more than the body depth . . . . . *Heterobagrus*

A systematic account of the Indian species of the genus *Mystus* (JAYARAM, 1955); an account of its nomenclatural position and status of the type-species (JAYARAM, 1962), and a complete list of species (JAYARAM, 1966) are published. The systematic account of *Porcus* is also published in part 2 of this series (JAYARAM, 1966*a*).

Genus **Leiocassis** BLEEKER

Leiocassis BLEEKER, *Acta Soc. Sc. Indo-Neerl., IV, p.* 139, 1858. (Type-species, *Bagrus poecilopterus* CUVIER & VALENCIENNES, by original designation).

Liocassis [1]) GÜNTHER, *Catalogue of the fishes in the British Museum, V,* p. 65, 1864 (not as a new genus, generic spelling changed without reason).

Rhinobagrus BLEEKER, *Ned. Tijdschr. Dierk., II,* p. 7, 1864. (Type-species, *Bagrus dumerili* BLEEKER, by original designation).

Body moderately long, compressed, dorsal profile arched. Head large, anteriorly depressed; snout angular, slightly produced; jaws subequal; lips thick, papillated or thin and plain. Mouth inferior, or subterminal, moderately wide. Villiform teeth on premaxillaries, prevomer and/or palatines. Eyes small, superior. Supraoccipital covered or not covered with skin. Four pairs of barbels: one maxillary, two mandibular, one nasal. Gill membranes free from each other and also from isthmus. Branchiostegals eight to ten.

Rayed dorsal fin inserted above tip of pectoral fin, with six or seven rays; adipose dorsal fin long, low, posteriorly free. Pelvic fins inserted posterior to last ray of dorsal fin. Anal fin with 12 to 16 (usually about 15) rays. Lateral line simple.

Vertebrae 45 to 48, 25 or 26 precaudal, and 20 to 22 caudal.

Distribution. Thailand, Malaya, Indonesia with one species extending to Hongkong, China up to Korea.

Key to subgenera

1*a*. Snout angular and produced beyond inferior mouth; snout length greater than interorbital width . . . . . *Leiocassis*

1*b*. Snout rounded or obtuse, not produced beyond subterminal mouth; snout length equal to or lesser than interorbital space width . . . . . *Pseudomystus*

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[1]) This is an invalid emendation with status in nomenclature as a junior objective synonym of the original name.

Subgenus **Leiocassis**

Type-species. *Bagrus poecilopterus* VALENCIENNES.

Key to species

1*a*. Occipital process extending to predorsal plate.
  2*a*. Least depth of caudal peduncle 2.11 to 3.30 in head length. Pelvic fins not reaching anal fin. (Thailand, Malaya, Indonesia) . . . . . *poecilopterus*
  2*b*. Least depth of caudal peduncle 3.63 to 4.87 in head length. Pelvic fins reaching anal fin. (Hongkong through China to Korea) . . . . . *longirostris*
1*b*. Occipital process not extending to predorsal plate.
  3*a*. Least depth of caudal peduncle two or fewer than two times in its length.
    4*a*. Occipital process 3.0 times longer than wide at base. Eye 8.0 or 9.0 in head length . . . . . *merabensis*
    4*b*. Occipital process one or two times longer than wide at base. Eye fewer than 8.0 in head length.
      5*a*. Head width not more than 1.5 in head length.
        6*a*. Least depth of caudal peduncle 1.30 to 1.60 in its length. Eye 5.17 to 6.00 in head length. *baramensis*
        6*b*. Least depth of caudal peduncle 2.0 in its length. Eye 7.00 in head length . . . . *saravacensis*
      5*b*. Head width more than 1.5 in head length. Least depth of caudal peduncle 1.70 to 1.92 in its length. Eye 6.90 to 7.42 in head length . . . . . *regani*
  3*b*. Least depth of caudal peduncle more than two times in its length.
    7*a*. Occipital process two or fewer than two times longer than wide at base.
      8*a*. Body depth about 5.0 in standard length. Least depth of caudal peduncle 2.50 to 2.75 in its length. . . *hosii*
      8*b*. Body depth 5.5 to 8.0 in standard length. Least depth of caudal peduncle 2.86 in its length . . *micropogon*
    7*b*. Occipital process more than two times longer than wide at base.
      9*a*. Band of teeth on prevomer with a long median posterior projection. . . . . *doriae*
      9*b*. Band of teeth on prevomer without any median posterior projection . . . . . *microps*

Leiocassis baramensis REGAN

Liocassis baramensis REGAN, *Ann. Mag. nat. Hist., (7) XVIII*, p. 67, 1906 (type locality, River Baram).

Leiocassis baramensis HORA & GUPTA, *Bull. Raffles Mus., IV*, no. 17, p. 24 pl. iv, fig. 1, 1941 (River Jelan, Sungai Lumpat).

Mystus baramensis HERRE & MYERS, *Bull. Raffles Mus, no. 13*, p. 68, 1937 (Lake Chin Chin, Singora).

Leiocassis chaseni BEAUFORT, *Bull. Raffles Mus., no. 8*, p. 34, 1933, (type locality, Ulu Jelai).

Specimens studied. ZSI F. 121/2, Sungai Lumpat, F.M.S., one specimen, 122 mm; NMS (not numbered), Johore, 1938, Raffles Museum coll., one specimen, 99 mm.

Description. Body depth 4.37 (3.96 to 4.77); head length 3.71 (3.47 to 3.94); head width 4.89 (4.84 to 4.95); head depth 5.66 (3.50 to 5.81); predorsal length 2.24 (2.22 to 2.25); postdorsal length 1.77 (1.77 to 1.77); prepelvic distance 1.80 (1.79 to 1.81); length of longest ray of caudal fin 4.80 (4.30 to 5.30), all in standard length. Eye 5.59 (5.17 to 6.00) in head length; 1.87 (1.83 to 1.90) in interorbital space width, 2.39 (2.37 to 2.40) in snout length. Dorsal spine 1.52 (1.39 to 1.64); pectoral spine 1.57 (1.50 to 1.64) in head length. Adipose dorsal fin base equal to or longer than anal fin base. Least depth of caudal peduncle 1.45 (1.30 to 1.60) in its length.

Dorsal profile at 25 to 30° to body axis. Occipital process subcutaneous, 2.0 times longer than wide at base, not extending to predorsal plate. Premaxillary band of teeth not produced laterally, 3.0 or 3.5 times as long as broad; teeth on palate confined to prevomer, palatines, in a horse-shoe shaped continuous band, with a rudimentary median posterior projection. Maxillary barbels reaching middle of orbit, others shorter. Orbital rims free. Longest ray of dorsal fin not extending to adipose fin when depressed; dorsal spine with 13 strong, downward facing teeth over posterior margin. Pectoral spine with 18 to 20 strong, antrorse teeth over posterior margin. Pelvic fins not reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin forked. Lateral line nearly straight.

Colour. Uniformly light brown above and on sides, dull white beneath. Fin rays mottled with brown patches.

Relationship. Related to *L. saravacensis*, but differing in having longer head, wider interorbital space and shorter adipose dorsal fin besides the prevomerine band of teeth with a rudimentary posterior projection.

Distribution. Malaya: Lake Chin Chin, River Jelan, Johore, Singora, Sungai Lumpat, Ulu Jelai; Borneo: River Baram.

Subgenus **Leiocassis**

Type-species. *Bagrus poecilopterus* VALENCIENNES.

Key to species

1*a*. Occipital process extending to predorsal plate.

2*a*. Least depth of caudal peduncle 2.11 to 3.30 in head length. Pelvic fins not reaching anal fin. (Thailand, Malaya, Indonesia) . . . . . *poecilopterus*

2*b*. Least depth of caudal peduncle 3.63 to 4.87 in head length. Pelvic fins reaching anal fin. (Hongkong through China to Korea) . . . . . *longirostris*

1*b*. Occipital process not extending to predorsal plate.

3*a*. Least depth of caudal peduncle two or fewer than two times in its length.

4*a*. Occipital process 3.0 times longer than wide at base. Eye 8.0 or 9.0 in head length . . . . . *merabensis*

4*b*. Occipital process one or two times longer than wide at base. Eye fewer than 8.0 in head length.

5*a*. Head width not more than 1.5 in head length.

6*a*. Least depth of caudal peduncle 1.30 to 1.60 in its length. Eye 5.17 to 6.00 in head length. *baramensis*

6*b*. Least depth of caudal peduncle 2.0 in its length. Eye 7.00 in head length . . . . *saravacensis*

5*b*. Head width more than 1.5 in head length. Least depth of caudal peduncle 1.70 to 1.92 in its length. Eye 6.90 to 7.42 in head length . . . . . *regani*

3*b*. Least depth of caudal peduncle more than two times in its length.

7*a*. Occipital process two or fewer than two times longer than wide at base.

8*a*. Body depth about 5.0 in standard length. Least depth of caudal peduncle 2.50 to 2.75 in its length. . . *hosii*

8*b*. Body depth 5.5 to 8.0 in standard length. Least depth of caudal peduncle 2.86 in its length . . *micropogon*

7*b*. Occipital process more than two times longer than wide at base.

9*a*. Band of teeth on prevomer with a long median posterior projection. . . . . *doriae*

9*b*. Band of teeth on prevomer without any median posterior projection . . . . . *microps*

Leiocassis baramensis REGAN

Liocassis baramensis REGAN, *Ann. Mag. nat. Hist., (7) XVIII*, p. 67, 1906 (type locality, River Baram).

Leiocassis baramensis HORA & GUPTA, *Bull. Raffles Mus., IV*, no. 17, p. 24 pl. iv, fig. 1, 1941 (River Jelan, Sungai Lumpat).

Mystus baramensis HERRE & MYERS, *Bull. Raffles Mus, no. 13*, p. 68, 1937 (Lake Chin Chin, Singora).

Leiocassis chaseni BEAUFORT, *Bull. Raffles Mus., no. 8*, p. 34, 1933, (type locality, Ulu Jelai).

Specimens studied. ZSI F. 121/2, Sungai Lumpat, F.M.S., one specimen, 122 mm; NMS (not numbered), Johore, 1938, Raffles Museum coll., one specimen, 99 mm.

Description. Body depth 4.37 (3.96 to 4.77); head length 3.71 (3.47 to 3.94); head width 4.89 (4.84 to 4.95); head depth 5.66 (3.50 to 5.81); predorsal length 2.24 (2.22 to 2.25); postdorsal length 1.77 (1.77 to 1.77); prepelvic distance 1.80 (1.79 to 1.81); length of longest ray of caudal fin 4.80 (4.30 to 5.30), all in standard length. Eye 5.59 (5.17 to 6.00) in head length; 1.87 (1.83 to 1.90) in interorbital space width, 2.39 (2.37 to 2.40) in snout length. Dorsal spine 1.52 (1.39 to 1.64); pectoral spine 1.57 (1.50 to 1.64) in head length. Adipose dorsal fin base equal to or longer than anal fin base. Least depth of caudal peduncle 1.45 (1.30 to 1.60) in its length.

Dorsal profile at 25 to 30° to body axis. Occipital process subcutaneous, 2.0 times longer than wide at base, not extending to predorsal plate. Premaxillary band of teeth not produced laterally, 3.0 or 3.5 times as long as broad; teeth on palate confined to prevomer, palatines, in a horse-shoe shaped continuous band, with a rudimentary median posterior projection. Maxillary barbels reaching middle of orbit, others shorter. Orbital rims free. Longest ray of dorsal fin not extending to adipose fin when depressed; dorsal spine with 13 strong, downward facing teeth over posterior margin. Pectoral spine with 18 to 20 strong, antrorse teeth over posterior margin. Pelvic fins not reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin forked. Lateral line nearly straight.

Colour. Uniformly light brown above and on sides, dull white beneath. Fin rays mottled with brown patches.

Relationship. Related to *L. saravacensis*, but differing in having longer head, wider interorbital space and shorter adipose dorsal fin besides the prevomerine band of teeth with a rudimentary posterior projection.

Distribution. Malaya: Lake Chin Chin, River Jelan, Johore, Singora, Sungai Lumpat, Ulu Jelai; Borneo: River Baram.

Remarks. BEAUFORT (1933: 34) differentiated *L. chaseni* from *baramensis* by its larger eye, longer dorsal and pectoral spines and other secondary features. Through the courtesy of Mr. TWEEDIE, I have examined a specimen of *chaseni* preserved in the National Museum, Singapore. The following table compares certain characters between *baramensis* and *chaseni*.

Among the characters tabulated, the difference in respect of the dorsal and pectoral spines and the caudal peduncle depth is barely significant. The length of anal fin base and length of inner mandibular barbels are known to vary considerably in these fishes. The only remaining character that may distinguish *chaseni* from *baramensis* is the size of the eye. BEAUFORT (*op. cit.*, p. 35) stated that the large eye may be due to

Table 9. Comparison of certain characters of *Leiocassis baramensis* and *L. chaseni*.

Characters	*L. baramensis* (ZSI F. 121/2)	*L. chaseni* (NMS, not numbered)
SL/Anal fin base	6.42	5.50
LH/Length of inner mandibular barbel	4.50	3.55
LH/Length of dorsal spine	1.64	1.39
LH/Length of pectoral spine	1.64	1.50
LH/HCPD	2.88	2.48
LH/Eye	5.17	6.00
Standard length in mm	122	99

the small size of the specimen, but the eye is incredibly large since in the specimen of *chaseni* examined by me (nearly of the same size as BEAUFORT's holotype), the eye is 6.00 in head length. HORA & GUPTA (1941: 25) thought that the proportion of the eye being 3.7 may be a misprint for 5.7 or something else. Therefore I conclude that *chaseni* is a synonym of *baramensis* which agrees with HORA & GUPTA.

Leiocassis hosii REGAN

Liocassis hosii REGAN, *Ann. Mag. nat. Hist., (7) XVIII*, p. 67, 1906 (type locality, Sibu).

Specimen studied. No specimen seen by me.

Relationship. Closely related to *L. baramensis*, but differing in respect of the head length, eye size and caudal peduncle depth (see table 10).

Distribution. North Borneo: Sibu.

Remarks: REGAN described *L. hosii* (1906: 67), *L. merabensis* (1913: 550), and *L. doriae* (1913: 551) from Borneo. The three species are closely related to *baramensis*. A comparison of these species (Table 10) indicates that *hosii* is distinct from *baramensis* and that *merabensis* and *doriae* nearly intergrades into *hosii*.

Leiocassis merabensis REGAN

Liocassis poecilopterus BOULENGER (not of CUVIER & VALENCIENNES), *Ann. Mag. nat. Hist., (6) XIII*, p. 247, 1893 (type locality Bongon, Merabeh).

Liocassis merabensis REGAN, *Ann. Mag. nat. Hist., (8) XI*, p. 550, 1913 (Bongon, Merabeh).

Specimen studied. No specimen seen by me.

Relationship. Closely related to *L. hosii*, but differing in having shorter head and smaller eye.

Distribution. North Borneo: Bongon, Merabeh.

Leiocassis doriae REGAN

Liocassis doriae REGAN, *Ann. Mag. nat. Hist., (8) XI*, p. 551, 1913 (type locality, Sarawak).

Specimen studied. No specimen seen by me.

Relationship. Closely related to *L. hosii*, but differing in having longer occipital process and a long median projection of the vomerine band of teeth.

Distribution. North Borneo: Sarawak.

Leiocassis saravacensis BOULENGER

Liocassis saravacensis BOULENGER, *Ann. Mag. nat. Hist., (6) XIII*, p. 246, 1893 (type locality, Senah).

Specimen studied. No specimen seen by me.

Relationship. Related to *L. baramensis*, but differing in having slightly shorter head, narrower interorbital space, longer adipose dorsal fin and vomerine band of teeth without a posterior median projection.

Distribution. North Borneo: Senah.

Leiocassis micropogon (BLEEKER)

Bagrus micropogon BLEEKER *Natuurk. Tijdschr. Ned. Ind., III*, p. 94, 1852 (type locality, River Tjirutjup).

Bagrus poecilopterus BLEEKER, *Natuurk. Tijdschr. Ned. Ind., V*, p. 445, 1853 (River Sambas).

Leiocassis micropogon BLEEKER, *Acta Soc. Sc. Indo-Neerl., IV*, p. 142, 1858 (Lahat, Marawang, Palembang, River Tjirutjup, River Sambas). BLEEKER, *Natuurk. Tijdschr. Ned. Ind., XV*, p. 225, 1858 (Biliton Is.). WEBER & BEAUFORT, *Fishes of the Indo-Australian Archipelago, II*, p. 357, 1913 (Sumatra, Borneo, Malacca). TWEEDIE, *Bull. Raffles Mus., no. 12*, p. 19, 1936 (Bukit Merah reservoir). HERRE & MYERS, *Bull. Raffles Mus., no. 13*, p. 69, 1937 (Lake Chin Chin, Jasin). VINCIGUERRA, *Ann. Mus. Stor. nat. Genova, XVI*, p. 171, 1880 (Borneo). VOLZ, *Zool. Jb. Syst. Abt., XIX*, p. 388, 1904 (Djapura). DUNCKER, *Mitt. naturh. Mus. Hamburg, XXI*, p. 173, 1904 (Kuala Lumpur). VOLZ, *Natuurk. Tijdschr. Ned.-Ind. LXVI*, p. 167, 1906 (Sumatra).

Specimen studied. ZMA 101. 462, Bogor, one specimen, 140 mm.

Description. The specimen agrees with the description of WEBER & BEAUFORT (1913) in most respects. However, it differs in respect of the body depth which is 6.67, head length 3.94, head width 8.48, head depth 9.66 in standard length.

Table 10. Comparison of certain characters in five species of *Leiocassis*.

Characters	*baramensis*	*merabensis*	*doriae*	*saravacensis*	*hosii*
SL/Body depth	3.96 to 4.77	4.70 to 5.0	4.80	4.5 to 5.0	about 5.0
SL/Head length	3.47 to 3.94	3.60 to 3.70	3.50	4.0	3.0 to 3.5
LH/Eye	5.17 to 6.00	8.00 to 9.00	8.00	7.0	7.0 to 9.5
LCPD/HCPD	1.30 to 1.60	2.00	2.25	2.0	2.5 to 2.75
Occipital process length/width	2.0	3.0	3.0	1.0	2.0
Anal fin rays	13 or 14	14	14	14 or 15	13 to 16
Median posterior projection of prevomerine band of teeth	Short	Absent or Short	Long	Absent	Absent or short

Relationship. Distantly related to *L. poecilopterus*, but, differing in having smaller body depth, shorter head, shorter occipital process, shorter dorsal fin and smaller eyes.

Distribution. Malaya: Bukit Merah reservoir, Lake Chin Chin, Jasin, Kuala Lumpur; Sumatra: Djapura, Palembang, Lahat; Borneo: River Sambas, River Tjirutjup; Billiton Island; Banka; Marawang; Java: Bogor.

Leiocassis regani JAYARAM

Leiocassis regani JAYARAM, *Bull. syst. Zool., Calcutta, I (1)*, p. 9, 1965 (type locality, Sadong, N. Borneo).

Specimens studied. USNM 35732, Sadong, N. Borneo, HORNADAY coll., one specimen (Holotype), 161.5 mm; USNM 35732, Sadong, N. Borneo, HORNADAY coll., one specimen (Paratype), 121.5 mm.

Description. JAYARAM (1965) gave a good description of this species.

Relationship. Related to *L. micropogon*, but differing in having a longer occipital process, narrower caudal peduncle, broader mouth and brighter colouration.

A comparison of this species with its close allies is given below.

Table 11. Comparison of certain characters of *L. regani* with *L. baramensis* and *L. micropogon*.

Characters	*regani*	*baramensis*	*micropogon*
SL/Body depth	5.38 to 6.23	3.96 to 4.77	5.50 to 8.00
SL/Head depth	6.87 to 7.15	3.50 to 5.81	9.66
LH/Length of dorsal spine	1.84 to 1.92	1.39 to 1.64	1.87
LH/Head width	1.73 to 1.76	1.42 to 1.43	2.15
LH/Eye	6.90 to 7.42	5.17 to 6.00	6.00 to 8.00
LH/Interorbital width	4.51 to 4.95	3.00 to 3.27	4.44
LH/Width of gape of mouth	3.00 to 3.29	2.71 to 2.88	3.74
LH/Least height of caudal peduncle	3.45 to 3.68	2.48 to 2.88	3.38

Leiocassis poecilopterus (VALENCIENNES)

Bagrus poecilopterus VALENCIENNES *in* CUVIER & VALENCIENNES, *Histoire naturelle des poissons, XIV*, p. 431, 1839 (type locality, River Hebak).

Bagrus (Bagrus) ramentosus MÜLLER & TROSCHEL, *Horae ichthyologique* ..... *III*, p. 7, 1845.

Leiocassis poecilopterus BLEEKER, *Acta Soc. Sc. Indo-Neerl., IV*, p. 140, 1858 (Buitenzorg). SMITH, *U. S. nat. Mus. Bull., no. 188*, p. 379, 1945 (Siam).

Liocassis poecilopterus PETERS, *Mber. Akad. Wiss. Wien* p. 272, 1868 (Siam). BOULENGER, *Ann. Mag. nat. Hist., (6) XIII* p. 247, 1893 (Borneo). WEBER & BEAUFORT, *Fishes of the Indo-Australian Archipelago, II*, p. 356, 1913 (Java, Sumatra, Borneo, Siam).

Specimens studied. ZMA 101. 463, Lebang Hora, Borneo, two specimens, 124.8 and 167.0 mm; ZMA 101. 464, Solok, Sumatra, one specimen, 147 mm; RML 15899, Lampoeng, Sumatra, VAN HASSELT, coll., three specimens, 114 to 118 mm; RML 6872, East Indies, BLEEKER coll., two specimens, 147 and 153 mm; RML 7553, Bongan (Borneo?), NIEWEINHUIS coll., two specimens, 111.5 and 113.5 mm; RML 15898, S. Sumatra, VAN HASSELT coll., two specimens, 92.5 and 140.5 mm.

Description. [1]) Body depth 4.21 (3.59 to 5.44); head length 3.54 (3.28 to 3.71); head width 6.59 (5.39 to 7.71); head depth 6.78 (6.02 to 7.71); predorsal length 2.26 (2.12 to 2.42); postdorsal length 1.67 (1.59 to 1.73); prepelvic distance 1.74 (1.66 to 1.83); length of longest ray of caudal fin 4.15 (3.54 to 5.14), all in standard length. Eye 6.004 (5.32 to 7.31) in head length; 1.74 (1.61 to 2.02) in interorbital space width; 2.34 (2.00 to 2.92) in snout length. Dorsal spine 1.47 (1.28 to 1.73); pectoral spine 1.53 (1.31 to 1.74) in head length. Adipose dorsal fin base longer than anal fin base. Least depth of caudal peduncle 1.58 (1.26 to 1.83) in its length.

Dorsal profile at about 30° to body axis. Occipital process subcuteneous, 3.0 or 4.0 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth not produced laterally, 3.0 or 4.0 times as long as broad; teeth on palate confined to prevomer, in a semi-lunar continuous band. Maxillary barbels reaching posterior border or orbit, other shorter. Orbital rims fused with eye. Longest ray of dorsal fin not extending to adipose fin when depressed; dorsal spine with six feeble, downward facing teeth over posterior margin. Pectoral spine with 12 to 14 strong, antrorse teeth over posterior margin. Pelvic fins not reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin forked with rounded lobes. Lateral line arched above pectoral fin, otherwise straight.

Colour. Dark brown above and on sides, lighter beneath. Fins with alternating dark bands. Eyes somewhat bluish along borders.

Relationship. Distantly related to *L. micropogon*, but differing in having greater body depth, longer head and longer occipital process.

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[1]) Unless otherwise stated the proportional measurements and counts are of 11 specimens only.

Distribution. Malaya: Tasek Bora; Sumatra: Lampoeng B, Solok, River Sumanik; Java: Buitenzorg, River Hebak; North Borneo: Bongon, Lebang Hora. Thailand.

Remarks. NMS (not numbered) labelled *L. micropogon*, 176 mm long from Tasek Bora belongs to this species, but differs in having shorter dorsal, pectoral spines and caudal peduncle, besides fewer anal fin rays. The rayed dorsal fin base is also shorter, but this may be due to the dissected state of the fin base. This is the first record of this species from Malaya.

Sexual dimorphism is conspicuous in this species. Of the 12 specimens studied, eleven are sexually mature: five are males and six females. Generally the males have brighter colouration than the females, the body with alternating deep brown vertical bands.

Leiocassis longirostris GÜNTHER

Liocassis longirostris GÜNTHER, *Catalogue of the fishes in the British Museum, V*, p. 87, 1864 (type locality, north China, by subsequent correction). SAUVAGE & THIERSANT, *Ann. Sci. nat., (6) I*, p. 7, 1874 (Shanghai). JORDAN & SEALE, *Proc. U. S. nat. Mus., XXIX*, p. 519, 1905 (China, 'probably Hongkong'). EVERMAN & SHAW, *Proc. Calif. Acad. Sci., XVI*, p. 110, 1927 (Nanking).

Leiocassis longirostris JORDAN & METZ, *Mem. Carneg. Mus., VI*, p. 12, 1913 (River Han). MORI, *Jap. J. Zool., II*, p. 70, 1928 (Tainan, Hwang-Ho). TCHANG, *Bull. Fan. Inst. Biol. Peking, III*, p. 211, 1932 (Kai-feng). MIAO, *Contr. biol. Lab. Sci. Soc. China, X*, p. 220, 1934 (Southern Kiang-su). TCHANG & SHIH, *Contr. biol. Dept. Sci. Inst. W. China, V*, p. 9, 1934 (Kialin Kiang).

Macrones (Liocassis) longirostris GÜNTHER, *Ann. Mag. nat. Hist., (4) XII*, p. 245, 1873 (Shanghai). PETERS, *Mber. Akad. Wiss. Wien, XLV*, p. 924, 1880 (Ningpo).

Macrones longirostris GÜNTHER *Ann. Mag. nat. Hist., (6) I*, p. 429, 1888 (Ichang). TCHANG & SHIH, *Sci. Quart. nat. Univ. Peking, IV*, no. 3, p. 342, 1934 (Sze-Chwan).

Leiocassis (Nassocassis) longirostris NICHOLS, *Bull. Amer. Mus. nat. Hist., LVIII*, p. 7, 1928 (Ningpo, probably Hongkong, Tungting Hu).

Rhinobagrus dumerili BLEEKER, *Ned. Tijdschr. Dierk., II*, p. 7, 1864 (China). MORI, *Mem. Hyogo Univ. Agric., I, no. 3*, p. 61, 1952 (Korea).

Leiocassis dumerili MORI & UCHIDA, *J. Chosen nat. Hist. Soc., no. 19*, p. 6, 1934 (Korea). KIMURA, *J. Shanghai Sci. Inst., I*, p. 173, 1934 (Chinkiang, Chungking, Ichang, Fu-shan, Suifu). KIMURA, *J. Shanghai Sci. Inst., III*. p. 106, 1935 (Yangtze Kiang). HERRE & LIN, *J. Shanghai Sci. Inst., II*, no. 7, p. 24, 1936 (River Tsien Tang).

Leiocassis (Rhinobagrus) dumerili RENDAHL, *Ark. Zool., XXA*, p. 168, 1928 (Kiang-su). WU, *Sinensia, I, no. 6*, p. 81, 1930 (Chungking). WU, *Rept. Marine biol. Ass China, no. 3*, p. 99, 1934 (Foochow).

Leiocassis (Rhinobagrus) longirostris NICHOLS, *The Freshwater Fishes of China, IX.* p. 43, 1943 (River Min, Tungting Hu).

? *Liocassis naso* GARMAN, *Mem. Mus. comp. Zool., XL*, p. 123, 1912 (type locality, Ichang).

Specimens studied. USNM 45221, Korea, W. L. ABBOTT coll., one specimen, 353.5 mm; USNM 130553, "Kaochiao G. near Wusung". China, Sept. 1925, SOWERBY coll., one specimen, 339.0 mm; USNM 130572, Foochow, Fu-kien, China, June 1926, SOWERBY coll., one specimen, 179 mm; USNM 86438, Shanghai, Kiang-su, China, Dec. 1925, SOWERBY coll., one specimen, 266.5 mm; USNM 86083, Nanking, China, C. Ping coll., one specimen, 185 mm; USNM 86479, Nanking, China, SOWERBY coll., one specimen, 170.5 mm; USNM 86480, Nanking, China, 1923, one specimen, 148 mm; USNM 87434, Suifu, China, Oct.-Nov., 1924, D. C. GRAHAM coll., one specimen, 143 mm; USNM 130507, Kiang-su, Shanghai, China, Dec. 1925, SOWERBY coll., five specimens, 113 to 176 mm; BMNH 1927. 3. 26. 20, Nanking, China, Ping coll., one specimen, 118 mm; MCZ 7963, Shanghai, China, one specimen, 128 mm; ZSI F. 10155/1, Ningpo, ANNANDALE coll., one specimen, 364 mm.

Description. Body depth 5.18 (4.33 to 5.74); head length 3.48 (3.32 to 3.95); head width 6.26 (4.77 to 7.30); head depth 6.72 (5.30 to 7.68); predorsal length 2.40 (2.17 to 2.52); postdorsal length 1.60 (1.36 to 1.72); prepelvic distance 1.74 (1.52 to 1.86); length of longest ray of caudal fin 4.79 (4.11 to 5.51), all in standard length. Eye 8.94 (6.83 to 10.56) in head length; 2.53 (1.92 to 3.60) in interorbital space width; 3.41 (2.70 to 4.11) in snout length. Dorsal spine 1.51 (1.28 to 1.80); pectoral spine 1.68 (1.55 to 1.87) in head length. Adipose dorsal fin base equal to or longer than anal fin base. Least depth of caudal peduncle 2.72 (2.18 to 3.33) in its length.

Dorsal profile at about 45° to body axis. Occipital process exposed, 3.0 or 4.0 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth slightly produced laterally and 4.0 or 5.0 times as long as broad; teeth on palate confined to prevomer, palatines, in a semilunar continuous band with or without any median posterior projection. Maxillary barbels reaching beyond eye, others shorter. Orbital rims fused with eye. Longest ray of dorsal fin just extending to adipose fin when depressed; dorsal spine with 15 to 18 feeble, downward facing teeth over posterior margin. Pectoral spine with 17 to 20 strong, antrorse teeth over posterior margin. Pelvic fins reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin bifurcate with pointed lobes. Lateral line straight.

Colour. Dark-brown all over with darker shades of brown above and on sides. In larger specimens a tinge of golden-yellow is not uncommon. Fin tips tinged deep brown.

Relationship. Related to *L. poecilopterus*, but differing in having smaller body depth, smaller eye and smaller caudal peduncle depth (table 12, figure 9, graphs 11-14).

Distribution. Korea: River Han, Seoul; China: Chengtu-fu, Chinkiang, Chungking, Foochow, Fu-shan, Hankow, Hwang Ho, Ichang, Kai-feng, Kialin Kiang, Kiang-su, River Min, Nanking, Ningpo, Shanghai, Soochow, Suifu, Sze-Chwan, River Tsien Tang, Tsinan, Tungting Hu, Wusung; Hongkong.

Remarks. There is controversy regarding the priority of the specific names *longirostris* and *dumerili*. GÜNTHER (1864: 87) described the former species from "Japan" whereas BLEEKER (1864: 7) proposed the latter name for the same fish. GÜNTHER (Zool. Rec., 1864: 165) realising that BLEEKER's

Table 12. Biometric comparison of (A) *L. poecilopterus* and (B) *L. longirostris*.

Characters	Samples	N	Range	Mean	n	$\pm n$ M	t	P
SL/Body depth	A	11	3.59 to 5.44	4.21	0.664	0.200	4.01	Less than
	B	15	4.33 to 5.74	5.18	0.402	0.104		0.01
SL/Head length	A	11	3.28 to 3.71	3.54	0.130	0.039	0.62	Greater
	B	15	3.32 to 3.95	3.48	0.151	0.089		than 0.10
SL/Head width	A	11	5.39 to 7.71	6.59	0.655	0.197	1.19	Greater
	B	15	4.77 to 7.30	6.26	0.754	0.194		than 0.10
LH/Eye	A	11	5.32 to 7.31	6.004	0.621	0.187	9.01	0.01
	B	15	6.83 to 10.56	8.94	1.035	0.267		Less than
LH/Snout	A	11	2.35 to 2.90	2.58	0.189	0.057	0.99	Greater
	B	15	2.41 to 2.83	2.65	0.159	0.041		than 0.10
LH/Interorbital	A	11	2.96 to 4.33	3.47	0.381	0.115	0.61	Greater
width	B	15	2.81 to 3.81	3.55	0.256	0.066		than 0.10
LH/Least depth	A	11	2.11 to 3.30	2.79	0.256	0.077	12.23	Less than
of caud. ped.	B	15	3.63 to 4.87	4.19	0.362	0.093		Less than
LH/LCPD	A	11	1.58 to 1.83	1.70	0.079	0.024	5.00	0.01
	B	15	1.38 to 1.70	1.52	0.103	0.027		0.01
LH/Dorsal spine	A	11	1.28 to 1.73	1.47	0.103	0.027	0.67	Greater
	B	15	1.28 to 1.80	1.51	0.153	0.039		than 0.10

species is identical with his, notified that *dumerili* is a synonym of *longirostris*. Since then authors such as REGAN (1913: 549) followed GÜNTHER in treating *dumerili* as a synonym of *longirostris* whereas RENDAHL (1928: 168), and NICHOLS (1943: 43) gave priority for *dumerili*. Examination of

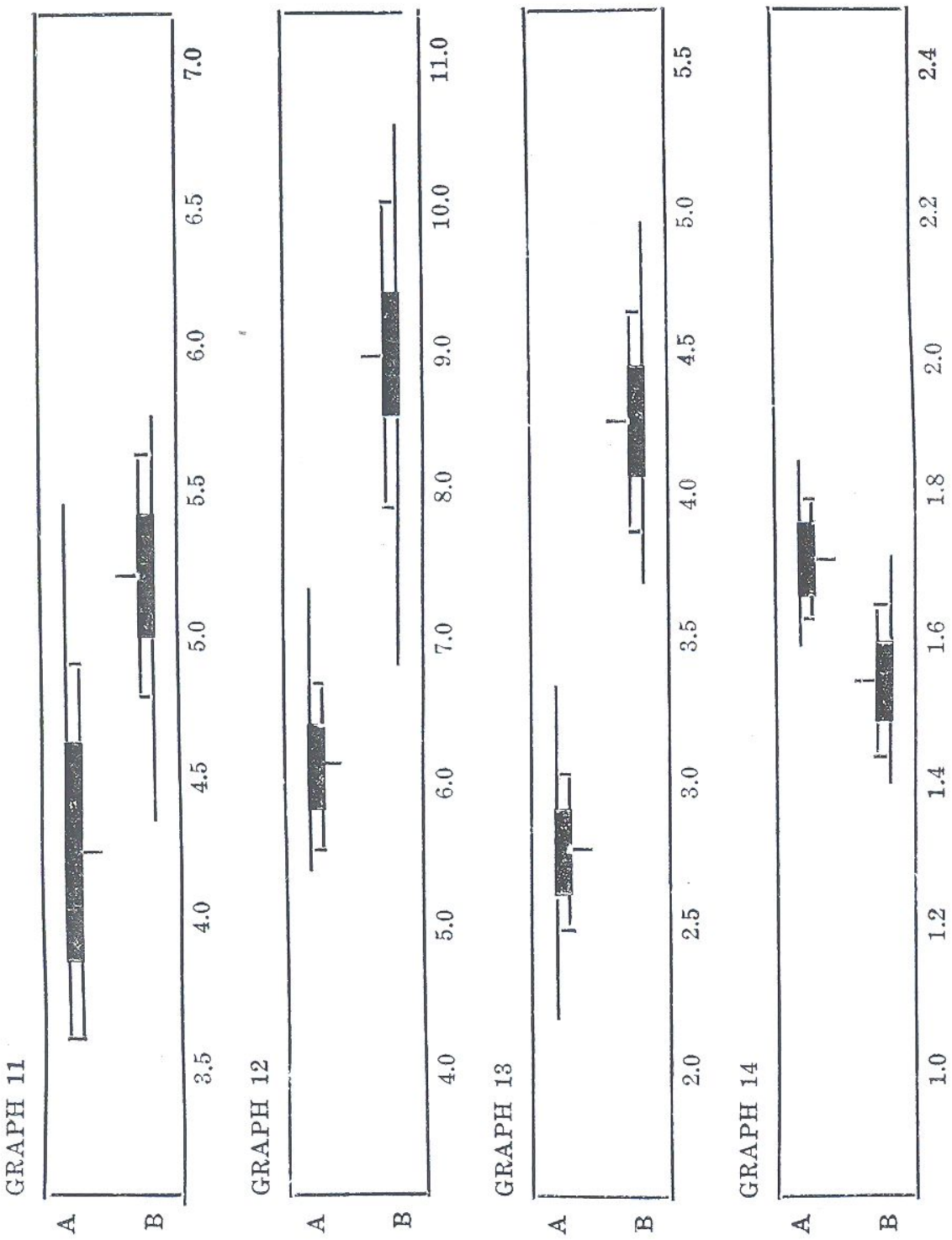

Fig. 9. Biometric comparison of *Leiocassis poecilopterus* and *L. longirostris*. Graph 11. SL/Body depth Graph 12. LH/Eye. Graph 13. LH/HCPD. Graph 14. LH/LCPD.

the publications of BLEEKER and GÜNTHER indicates the former author's work having no priority (April 1864) over the latter (February 1864). Therefore, *dumerili* is a synonym of *longirostris*.

NICHOLS (1943: 43) considered *Leiocassis naso* GARMAN as probably synonymous with *L. dumerili* (= *L. longirostris*). REGAN (1913: 549), RENDAHL (1928: 169), and TCHANG & SHIH (1934: 342) on the other hand, considered it distinct. *L. naso* differs from *longirostris* in having greater body depth and the prevomerine band of teeth separated in the middle by an edentate space. Though the nature of dentition on the prevomer is of importance, lack of other significant characters precludes the consideration of *naso* as a distinct species. I follow NICHOLS (1943) in considering it as a probable synonym of *longirostris*.

Subgenus **Pseudomystus**, nov.

Type-species. *Bagrus stenomus* VALENCIENNES.

Among the species referable to this subgenus there are two groups which I recognize as the *stenomus*-complex and the *leiacanthus* complex. To the former belong the following species: *stenomus, vaillanti, inornatus, mahakamensis, fuscus, moeschii, breviceps,* and *robustus*. To the latter, *leiacanthus, siamensis,* and *bicolor*. The three species in the *leiacanthus* complex have nearly an uniform pattern of colouration, a comparatively high body, small eyes, short anal fin and obtuse snout, whereas those in the *stenomus* complex differ in respect of these features and resemble the species of the genus *Mystus*.

However, these species comprising these complexes differ from each other morphologically and cannot be termed as sibling species. A comparison of the morphometric characters of the *leiacanthus* complex of species with the *stenomus* complex indicates that as a group the former intergrade into the latter without any marked divergence. It is likely that these species represent the transitional stage in the evolution of the subgenus *Pseudomystus* from the more generalised *Mystus*.

Provisional key to species

1*a*. Depth of body six or more than six times in standard length.

2*a*. Pelvic fins reaching anal fin. Depth of body 6.66 to 7.00 in standard length. Diameter of eye 7.00 to 9.00 in head length . . . . . *inornatus*

Table 13. Comparison of certain characters of the *Leiacanthus* complex of species with the *Stenomus* complex.

Characters	*leiacanthus* complex	*stenomus* complex
SL/Body depth	3.50 to 5.02	3.42 to 7.00
SL/Head length	2.83 to 4.05	3.26 to 4.80
SL/Head depth	4.67 to 7.35	5.50 to 7.40
SL/Head width	3.89 to 6.37	4.56 to 6.80
LH/Eye	3.67 to 10.67	2.90 to 10.00
LH/Snout	2.36 to 3.20	1.90 to 3.33
LH/Int. Orb. Width	2.50 to 3.57	1.86 to 3.60
LH/LCPD	1.27 to 2.00	1.14 to 2.03
LH/HCPD	1.91 to 2.82	1.56 to 3.08

2*b*. Pelvic fins not reaching anal fin.

3*a*. Body dark coloured with a pale white streak along the lateral line. Diameter of eye 7.7 in head length . . *mahakamensis*

3*b*. Body uniformly brown. Diameter of eye 8.0 in head length . . . . . *vaillanti*

1*b*. Depth of body fewer than six times in standard length.

4*a*. Occipital process two to four times longer than wide at base.

5*a*. Dorsal spine smooth.

6*a*. Pectoral fin with 9 rays. Body depth 3.42 in standard length . . . . . *robustus*

6*b*. Pectoral fin with 6 or 7 rays. Body depth four to six times in standard length.

7*a*. Adipose dorsal fin shorter than anal fin base. Eye 6.67 to 10.0 in head length . . . . . *fuscus*

7*b*. Adipose dorsal fin longer than anal fin base. Eye 2.90 to 6.00 in head length . . . . *stenomus* [1])

5*b*. Dorsal spine serrated along posterior margin.

8*a*. Eye 5.25 to 7.14 in head length. Colour bands over body three. Cleithral processes half length of pectoral spine. . . . . *siamensis*

[1]) Occasionally the body depth is 6.09 in standard length.

8*b*. Eye 4.38 to 4.86 in head length. Colour bands over body four. Cleithral processes one-fourth length of pectoral spine . . . . . *bicolor*

4*b*. Occipital process as long as wide at base.

9*a*. Length of head fewer than four times in standard length.

10*a*. Pelvic fins not reaching anal fin. Dorsal spine serrated. Least depth of caudal peduncle 2.20 to 2.50 in its length . . . . . *moeschii*

10*b*. Pelvic fins reaching anal fin. Dorsal spine smooth. Least depth of caudal peduncle 1.09 to 1.60 in its length . . . . . *leiacanthus*

9*b*. Length of head more than four times in standard length.

11*a*. Pelvic fins reaching anal fin. Diameter of eye 4.50 to 5.00 in head length. Least depth of caudal peduncle 2.0 in its length . . . . . *breviceps*

11*b*. Pelvic fins not reaching anal fin. Diameter of eye 8.0 in head length. Least depth of caudal peduncle 1.75 in its length . . . . . *rugosus*

Leiocassis inornatus BOULENGER

Liocassis inornatus BOULENGER, *Ann. Mag. nat. Hist., (6) XIII*, p. 245, 1893 (type locality, Senah, Sarawak).

Specimen studied. USNM 35718, Borneo, HORNADY coll., one specimen, 106.5 mm.

Description. Body depth 6.66; head length 3.80; head width 6.26 head depth 7.34; predorsal length 2.54; postdorsal length 1.59;prepelvic distance 190, all in standard length. Eye 7.0 in head length; 2.13 in interorbital space width; 2.50 in snout length. Dorsal spine 1.37; pectoral spine 1.30 in head length. Adipose dorsal fin base longer than anal fin base. Least depth of caudal peduncle 2.26 in its length.

Dorsal profile at about 15° to body axis. Occipital process exposed, 1.5 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth slightly produced laterally, 6.0 times as long as broad; teeth on palate confined to prevomer, in a slightly curved continuous band. Maxillary barbels reaching operculum; others shorter. Orbital rims fused with eye. Longest ray of dorsal fin extending to adipose fin when depressed; dorsal spine smooth. Pectoral spine with 17 strong, antrorse teeth over posterior margin. Pelvic fins reaching anal fin. Longest anal

ray not extending to caudal fin. Caudal fin deeply forked. Lateral line straight.

Colour. Uniformly dark-brown all over.

Relationship. This species connects the two subgenera and is distantly related to *L. baramensis*.

Distribution. North Borneo: Senah.

Leiocassis vaillanti REGAN

Leiocassis moeschii VAILLANT (not BOULENGER, 1893), *Notes Leyden Mus., XXIV*, p. 61, fig. 8, 1902 (type locality, River Raoen).

Liocassis vaillanti REGAN, *Ann. Mag. nat. Hist., (8) XI*, p. 549, 1913 (new specific name, because *moeschii* is preoccupied).

Specimen studied. No specimen seen by me.

Relationship. Closely related to *L. inornatus* but differing in having greater body depth and shorter occipital process.

Distribution. North Borneo: River Raoen.

Leiocassis moeschii BOULENGER

Liocassis moeschii BOULENGER, *Proc zool. Soc. London*, p. 39, 1890 (type locality, Deli). VOLZ, *Natuurk. Tijdschr. Ned.-Ind., LXVI*, p. 167, 1906 (Sumatra).

Specimens studied. RML 15859, Soekadana, Sumatra, June 1883, VAN HASSELT coll., two specimens, 68 and 81 mm; RML 15860, Lampoeng B, Sumatra, Dec. 1881, VAN HASSELT coll., two specimens, 64 and 84 mm.

Description. Body depth 5.13 (4.91 to 5.44); head length 3.695 (3.56 to 3.86); head width 6.54 (6.22 to 6.80); head depth 6.99 (6.80 to 7.11); predorsal length 2.55 (2.46 to 2.61); postdorsal length 1.54 (1.51 to 1.56); prepelvic distance 1.99 (1.88 to 2.19); length of longest ray of caudal fin 4.33 (3.76 to 5.23), all in standard length. Eye 6.42 (6.00 to 7.00) in head length; 1.93 (1.67 to 2.17) in interorbital space width; 2.52 (2.33 to 2.67) in snout length. Dorsal spine 1.43 (1.38 to 1.52); pectoral spine 1.25 (1.12 to 1.32) in head length. Adipose dorsal fin base longer than anal fin base. Least depth of caudal peduncle 2.36 (2.20 to 2.50) in its length.

Dorsal profile at about 20° to body axis. Occipital process exposed, as long as wide at base, extending to predorsal plate. Premaxillary band of teeth not produced laterally, 3.0 or 4.0 times as long as broad; teeth on palate confined to prevomer, in a semi-lunar continuous band. Maxillary barbels reaching preoperculum, others shorter. Orbital rims fused with eye. Longest ray of dorsal fin extending to adipose fin when depressed; dorsal spine with feeble teeth over posterior margin. Pectoral spine with

12 to 15 strong, antrorse teeth over posterior margin. Pelvic fins not reaching anal fin. Longest anal ray extending to caudal fin. Caudal fin deeply forked, with acutely pointed lobes. Lateral line straight.

Colour. Uniformly brown above and on sides, lighter beneath.

Relationship. Related to *L. stenomus*, but differing in having narrower head, smaller eye, narrower interorbital space and smaller caudal peduncle depth.

Distribution. Sumatra: Deli, Lampoeng B, Soekadana.

Remarks. Three specimens were described under the specific name *Leiocassis moeschii* as follows: BOULENGER (1890) described from Sumatra *L. moeschii* as a new species. In 1893, he obtained another specimen which he referred to this species. In 1902, VAILLANT procured a specimen from Borneo which he erroneously referred to *L. moeschii* BOULENGER, 1890. He followed BOULENGER in considering the specimen obtained in 1893 as belonging to *L. moeschii*. However, REGAN (1913), after examining the type of *L. moeschii* BOULENGER 1890 and the 1893, and 1902 specimens found VAILLANT's specimen undescribed and named it *L. vaillanti*. WEBER & BEAUFORT (1913) found BOULENGER's 1893 specimen referable to *L. rugosus* and thus corrected another misidentification. The synonymy of this confusion is:

L. moeschii BOULENGER, 1890 = *L. moeschii* BOULENGER.
L. moeschii BOULENGER, 1893 = *L. rugosus* REGAN.
L. moeschii BOULENGER,
VAILLANT, 1902 = *L. vaillanti* REGAN.

Leiocassis breviceps REGAN

Liocassis breviceps REGAN, *Ann. Mag. nat. Hist., (8) XI*, p. 551, 1913 (type locality, Deli).

Specimen studied. No specimen seen by me.

Relationship. Related to *L. moeschii*, but differing in having slightly shorter head, larger eye and greater caudal peduncle depth.

Distribution. Sumatra: Deli.

Leiocassis rugosus REGAN

Liocassis moeschii BOULENGER (not BOULENGER, 1890), *Ann. Mag. nat. Hist., (6) XIII*, p. 247, 1893 (type locality, Poeh).

Liocassis rugosus REGAN, *Ann. Mag. nat. Hist., (8) XI*, p. 552, 1913 (new specific name because *moeschii* is preoccupied).

Specimen studied. No specimen seen by me.

Relationship. Related to *L. moeschii*, but differing in having slightly shorter head, larger eye and greater caudal peduncle depth.

Distribution. Poeh: Sumatra.

Remarks. REGAN (1913: 247) gave the type locality as Poeh, Sarawak, which should read as Poeh, Sumatra.

Leiocassis stenomus (VALENCIENNES)

Bagrus stenomus VALENCIENNES *in* CUVIER & VALENCIENNES, *Histoire naturelle des poissons, XIV*, p. 415, 1839 (type locality, Java).

Leiocassis stenomus BLEEKER, *Atlas ichthyologique..... II*, p. 34, pl. lxvii, fig. 3, 1862 (Java, Sumatra). SMITH, *U. S. nat. Mus Bull., no. 188*, p. 381, 1945 (River Chantabun).

Liocassis stenomus GÜNTHER, *Catalogue of the fishes in the British Museum, V*, p. 90, 1864 (Java, Sumatra). VAILLANT, *Nouv. Arch. Mus. nat. Hist. Paris, (3) V*, p. 73, 1893 (Knapei). DUNCKER, *Mitt. naturh. Mus. Hamburg, XXI*, p. 173, 1904 (Kuala Lumpur). POPTA, *Notes Leyden Mus., XXVII*, p. 51, 1906 (River Mahakam). VOLZ, *Natuurk. Tijdschr. Ned. Ind., LXVI*, p. 168, 1906 (Deli, Lahat).

Specimens studied. USNM 109592, River Chantabun, Siam, H. M. SMITH coll., one specimen, 62 mm; RML 7554, Borneo, NIEUWENHUIS coll., two specimens, 34 and 34.2 mm; RML 6874, ? BLEEKER's coll., two specimens, 74 and 76 mm; RML 7837, Sintang, BUTTIKOEFER coll., twelve specimens, 26 and 70 mm; RML 15969, Krawang, Java, S. MULLER coll., seven specimens, 29 to 40 mm; ZSI F. 12099/1, River Batang Hari, Djambi, Sumatra, Zoology Museum, Amsterdam, one specimen, 46.5 mm.

Description. Body depth 5.18 (4.25 to 6.09); head length 3.73 (3.26 to 4.28); head width 5.29 (4.56 to 6.08); head depth 5.96 (5.50 to 6.91); predorsal length 2.58 (2.23 to 2.86); postdorsal length 1.47 (1.41 to 1.54); prepelvic distance 1.90 (1.28 to 2.24); length of longest ray of caudal fin 4.65 (3.65 to 5.20), all in standard length. Eye 4.08 (2.90 to 6.00) in head length; 1.71 (1.12 to 2.27) in interorbital space width; 1.74 (1.20 to 2.20) in snout length. Dorsal spine 1.39 (1.09 to 1.63); pectoral spine 1.18 (1.00 to 1.50) in head length. Adipose dorsal fin base longer than anal fin base. Least depth of caudal peduncle 1.58 (1.14 to 2.00) in its length.

Dorsal profile at about 20° to body axis. Occipital process exposed, 2.0 or 3.0 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth slightly produced laterally, 3.0 or 4.0 times as long as broad, teeth on palate confined to prevomer and in an uninterrupted narrow, semi-lunar continuous band. Maxillary barbels reaching pectoral fin end, others shorter. Orbital rims fused with eye. Longest ray of dorsal fin not extending to adipose fin when depressed; dorsal spine smooth.

Pectoral spine with six to 14 strong, antrorse teeth over posterior margin. Pelvic fins not reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin deeply forked. Lateral line straight.

Colour. Deep brown above with irregular dark-brown markings on head and body. A pale rounded spot above cleithral processes. Long preserved specimens tend to become creamy-white.

Relationship. Distantly related to *L. inornatus*, but differing in having smaller body and shorter pelvic fin.

Distribution. Thailand: River Chantabun; Malaya: Kuala Lumpur, Perak; Sumatra: River Batang Hari, Deli, Djambi, Lahat; Java: Krawang; Borneo: Knapei, River Mahakam, Sintang.

Leiocassis robustus INGER & CHIN

Leiocassis robustus INGER & CHIN, *Fieldiana, Zoology, XXXIX, no. 27*, p. 290, fig. 48, 1959 (type locality, Kinabatangan River at Dermakot, N. Borneo).

Specimen studied. No specimen seen by me.

Relationship. Related to *L. stenomus*, but differing in having deeper body, wider head and smaller eye.

Distribution. N. Borneo: River Kinabatangan.

Leiocassis mahakamensis VAILLANT

Leiocassis mahakamensis VAILLANT, *Notes Leyden Mus., XXIV*, p. 55, figs. 4, 5, 1902 (type locality, River Mahakam).

Specimen studied. No specimen seen by me.

Relationship. Related to *L. stenomus*, but differing in having smaller body depth, shorter occipital process, longer barbels, longer dorsal spine and different colouration.

Distribution. Borneo: River Mahakam.

Leiocassis fuscus * POPTA

Liocassis fuscus POPTA, *Notes Leyden Mus., XXIV*, p. 186, 1904 (type locality, River Mahakam).

Leiocassis fuscus HORA & GUPTA, *Bull. Raffles Mus., no. 17*, p. 25, 1941 (Johore).

Specimen sttudied. NMS (not numbered), Swift stream in Mawai district, Johore, March 1938, M. W. F. TWEEDIE coll., one specimen, 37 mm.

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* HORA & GUPTA (1941: 25) in synonymizing *Leiocassis bicolor* FOWLER *under* this species stated that it is not of FOWLER but of HERRE (1940: 36). HERRE stated clearly that his specimens agree with FOWLER's description and figure. As such, the addition of the words "nec Fowler" by HORA & GUPTA is a *lapsus calami*.

Description. Body depth 5.29; head length 3.70; head width 5.29; head depth 7.40; predorsal length 2.39; postdorsal length 1.68; prepelvic distance 1.89; length of longest ray of caudal fin 4.11, all in standard length. Eye 6.67 in head length; 2.86 in interorbital space width; 3.33 in snout length. Dorsal spine 1.82; pectoral spine 1.43 in head length. Adipose dorsal fin base 1.64 in anal fin base. Least depth of caudal peduncle 1.44 in its length.

Dorsal profile at about 20° to body axis. Occipital process subcutaneous, 2.0 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth not produced laterally, 3.0 times as long as broad; teeth on palate confined to prevomer, palatines in a slightly curved continuous band. Maxillary barbels reaching pectoral fin base, others shorter. Orbital rims fused with eye. Longest ray of dorsal fin not extending to adipose fin when depressed; dorsal spine smooth. Pectoral spine with 14 strong, antrorse teeth over posterior margin. Pelvic fins not reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin deeply forked. Lateral line straight.

Colour. Deep brown above and on sides with three vertical black cross bands, lighter beneath.

Relationship. Related to *L. stenomus,* but differing in having smaller eye and brighter colouration, besides a spatulate snout and non-filamentous caudal fin.

Distribution. Borneo: River Mahakam; Malaya: Johore.

Leiocassis leiacanthus WEBER & BEAUFORT

Leiocassis leiacanthus WEBER & BEAUFORT *in Alfred Maasz, Durch Zentral-Sumatra, II, Fische,* p. 15, 1912 (type locality, River Kwantum). HERRE & MYERS, *Bull. Raffles Mus., no. 13,* p. 69, 1937 (Johore, River Plus).

Specimens studied. USNM 101263, Lake Chin Chin, Malacca, JASIN, March 26, 1934, one specimen, 35 mm; ZMA 101. 461, Faloek, Sumatra, one specimen, 43 mm; NMS (not numbered), Kota Tinggi, Johore, Malaya, 1955, W. E. TAFT coll., two specimens, 45.2 and 47.5 mm.

Description. Body depth 4.27 (3.50 to 4.75); head length 3.31 (2.83 to 3.65); head width 4.01 (3.89 to 4.32); head depth 5.16 (4.67 to 5.65); predorsal length 2.34 (2.06 to 2.64); postdorsal length 1.59 (1.52 to 1.69); prepelvic distance 1.94 (1.84 to 2.02); length of longest ray of caudal fin 4.26 (3.80 to 4.67), all in standard length. Eye 7.25 (3.67 to 10.67) in head length; 2.59 (1.31 to 3.33) in interorbital space width; 2.75 (1.50 to 3.67) in snout length. Dorsal spine 1.86 (1.57 to 2.29); pectoral spine 1.32 (1.20 to 1.60) in head length. Adipose dorsal fin base longer than anal fin base. Least depth of caudal peduncle 1.34 (1.09 to 1.60) in its length.

Dorsal profile at about 25° to main axis. Occipital process exposed, nearly as long as wide at base, extending to predorsal plate. Premaxillary band of teeth slightly produced laterally, 3.0 or 4.0 times as long as broad; teeth on palate confined to prevomer, in a slightly curved continuous band. Maxillary barbels reaching operculum, others shorter. Longest ray of dorsal fin extending to adipose fin when depressed; dorsal spine smooth. Pectoral spine with 11 to 14 strong, antrorse teeth over posterior margin. Pelvic fins reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin forked. Lateral line straight.

Colour. Brown above and on sides, with three or four white cross bands, lighter beneath. NMS specimens are dark-brown.

Relationship. Related to *L. siamensis*, but differing in having longer and broader head, besides smaller eye.

Distribution. Malaya: Lake Chin Chin, Johore, Kota Tinggi, Malacca, Mawaii, River Plus; Sumatra: Faloek, River Kwantum.

Leiocassis siamensis REGAN

Liocassis siamensis REGAN, *Ann. Mag. nat. Hist., (8) XI*, p. 550, 1913 (type locality, River Bangpakong). HORA, *J. nat. Hist. Soc. Siam, VI*, p. 172, 1923 (Nontaburi). SMITH, *U. S. nat. Mus. Bull., no. 188*, p. 379, 1945 (Menam Chao Phya, River Chantabun, Mewang, Meklong, Menam Mun, Menam Tapi, Menam Tadi).

Leiocassis albicollis FOWLER, *Proc. Acad. nat. Sci. Philad., XCI*, p. 58, 1939 (type locality, Trang).

Specimens studied. ZSI F. 787/2, Menam Khan, H. G. DEIGNAN coll., two specimens, 105.5 and 111.0 mm; ZMA 101.465, Pak Jong, Siam, one specimen, 95.5 mm; MCZ 35548, Doi Angka, northern Siam, Harvard Primate expedition, April 1937, one specimen, 85 mm.

Description. Body depth 4.32 (3.98 to 5.02); head length 3.90 (3.82 to 4.05); head width 5.69 (4.32 to 6.37); head depth 6.65 (5.67 to 7.35); predorsal length 2.56 (2.52 to 2.65); postdorsal length 1.58 (1.50 to 1.70); prepelvic distance 1.85 (1.78 to 1.91); length of longest ray of caudal fin 4.31 (4.15 to 4.47), all in standard length. Eye 6.002 (5.25 to 7.14), in head length; 1.99 (1.73 to 2.22) in interorbital space width; 2.18 (1.92 to 2.57) in snout length. Dorsal spine 1.32 (1.23 to 1.47) (N = 3); pectoral spine 1.28 (1.25 to 1.31) in head length. Adipose dorsal fin base equal to anal fin base. Least depth of caudal peduncle 1.73 (1.36 to 1.93) in its length.

Dorsal profile at about 25° to body axis. Occipital process subcutaneous, 3.0 or 3.5 times longer than wide at base, extending to predorsal

plate. Premaxillary band of teeth slightly produced, 3.0 or 4.0 times as long as broad; teeth on palate confined to prevomer, in a deeply curved, continuous band. Maxillary barbels reaching operculum, others shorter. Orbital rims fused with eye. Longest ray of dorsal fin not extending to adipose fin when depressed; dorsal spine with feeble teeth over posterior margin. Pectoral spine with 15 to 17 strong, antrorse or vertical teeth over posterior margin. Pelvic fins not reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin forked. Lateral line straight.

Colour. Dark brown with three pale vertical white cross bands at nearly equal intervals above and on sides, lighter beneath. Fins tipped pale yellow. The bands always extending over the fins. A black spot on each lobe of the caudal fin is also present.

Relationship. Related to *L. leiacanthus*, but differing in having narrower and smaller head depth, larger eye, somewhat smaller body depth and greater caudal peduncle depth.

Distribution. Thailand: River Bangpakong, River Chantabun, Menam Chao Phya, Doi Angka, Menam Khan, Meklong, Mewang, Menam Mun, River Nontaburi, Pak Jong, Menam Tadi, Menam Tapi, Trang.

Remarks. FOWLER (1936, 1939) described three species: *Leiocassis albicollaris*, *L. bicolor* and *L. albicollis*, all related to *siamensis*. SMITH (1945: 379) synonymized the former two species doubtfully and the last definitely with *siamensis*. He also stated that *bicolor* is separable from fishes that are considered representing normal variation in *siamensis*. FOWLER's figure of *bicolor* shows the nasal barbels very near the eyes which, as SMITH doubted, is an error and not shown by the specimens examined by me. However, *bicolor* differs from *siamensis* in having a broader and deeper head, besides larger eye. These differences justify the recognition of *bicolor*.

Leiocassis bicolor FOWLER

Leiocassis bicolor FOWLER, *Proc. Acad. nat. Sci. Philad., LXXXVI*, p. 95, fig. 43, 1934 (type locality, Chiengmai).

Leiocassis albicollaris FOWLER, *Proc. Acad. nat. Sci. Philad., LXXXVI*, p. 337, fig 2, 1934*a* (type locality, Bangkok). FOWLER, *Proc. Acad. nat. Sci. Philad., LXXXIX*, p. 150, figs. 54 to 63, 1937 (Bangkok Pitsanulok, Mepoon).

Specimens studied. USNM 103107, Chiengmai, northern Siam, Dec. 1932, DE SCHAUENSEE coll., one specimen, 73 mm; USNM 103108, Chiengmai, northern Siam, Dec. 30, 1933, DE SCHAUENSEE coll., two specimens, 56 and 62 mm.

Description. FOWLER (1934, 1934a) gave a good description of the species.

Table 14. Counts recorded for certain species of *Leiocassis*.

Species	Fin rays (total branched and simple)											
	Dorsal		Pectoral					Anal				
	6	7	6	7	8	9	10	12	13	14	15	16
baramensis	1	1	—	—	2	—	—	—	—	1	1	—
poecilopterus	1	10	—	6	5	—	—	—	2	8	1	—
longirostris	1	9	—	—	2	6	2	—	2	3	3	2
inornatus	—	1	—	—	1	—	—	—	—	1	—	—
moeschii	—	4	—	4	—	—	—	1	2	1	—	—
stenomus	3	9	4	6	—	—	—	4	4	2	2	—
fuscus	—	1	1	—	—	—	—	1	—	—	—	—
leiacanthus	1	3	3	1	—	—	—	2	1	—	—	—
siamensis	—	4	—	—	4	—	—	3	1	—	—	—

Relationship. Related to *L. siamensis*, but differing in having broader and deeper head, larger eye, less preminent colouration and shorter cleithral processes.

Distribution. Thailand: Bangkok, Chiengmai, Mepoon, Pitsanulok.

Genus **Heterobagrus** BLEEKER

Heterobagrus BLEEKER, *Versl. Med. Akad. Wet. Amsterdam, XVI*, pp. 354, 355, 1864*a*. (Type-species, *Heterobagrus bocourti* BLEEKER, by monotypy).

Prajadhipokia FOWLER, *Proc. Acad. nat. Sci. Philad., LXXXVI*, p. 339, 1934*a*. (Type species, *Prajadhipokia rex* FOWLER, by original designation).

Body long, compressed, dorsal profile arched. Head small, compressed; snout obtusely rounded; jaws subequal; lips thin, plain. Mouth subterminal, moderately narrow. Villiform teeth on premaxillaries, prevomer and/or palatines, mandibular in bands. Eye large, superior. Supraoccipital covered with skin. Four pairs of barbels: one maxillary, two mandibular, one nasal. Gill membranes free from each other and also from isthmus. Branchiostegals ten to twelve.

Rayed dorsal fin inserted above half pectoral fin; with six or seven rays. Adipose dorsal fin long, high, posteriorly free. Pelvic fins inserted below last ray of dorsal fin. Anal fin with eight to ten rays. Lateral line simple.

Distribution. Known so far only from Thailand.

Heterobagrus bocourti BLEEKER

Heterobagrus bocourti BLEEKER, *Versl. Med. Akad. Wet. Amsterdam, XVI*, p. 355, 1864a (type locality, Siam). BOCOURT, *Nouv. Arch. Mus. Hist. nat. Paris, II*, p. 19, pl. i, figs. 1, 1*a*, 1*b*, 1866 (Bangkok). FOWLER, *Proc. Acad. nat. Sci. Philad., LXXXIX*, p. 150, figs. 48 to 51, 1937 (Pitsanulok). SMITH, *U. S. nat. Mus. Bull., no. 188*, p. 392, 1945 (Menam Chao Phya, Menam Sak, Menam Lopburi).

Prajadhipokia rex FOWLER, *Proc. Acad. nat. Sci. Philad., LXXXVI*, p. 339, figs. 3, 4, 1934*a* (type locality, Bangkok).

Specimens studied. ZSI F. 786/2, Menam Lopburi, H. M. SMITH coll., one specimen, 130 mm; USNM 103202, Menam Lopburi, Central Siam, Oct. 22, 1922, DEIGNAN coll., four specimens, 108.0 to 129.5 mm; USNM 109605, Menam Ping, Chiengmai, N. Siam, Apr. 22, 1935, DEIGNAN coll., one specimen, 100.5 mm.

Description. Body depth 4.82 (4.04 to 5.08); head length 3.88 (3.44 to 4.42); head width 7.24 (5.78 to 8.36); head depth 7.56 (6.84 to 8.36); predorsal length 2.60 (2.42 to 2.87); postdorsal length 1.50 (1.47 to 1.52); prepelvic distance 2.06 (1.99 to 2.18); length of longest ray of caudal fin 2.85 (2.35 to 2.79), all in standard length. Eye 4.33 (3.21 to 5.31) in head length; 1.44 (1.29 to 1.85) in interorbital space width; 2.02 (2.00 to 2.46)

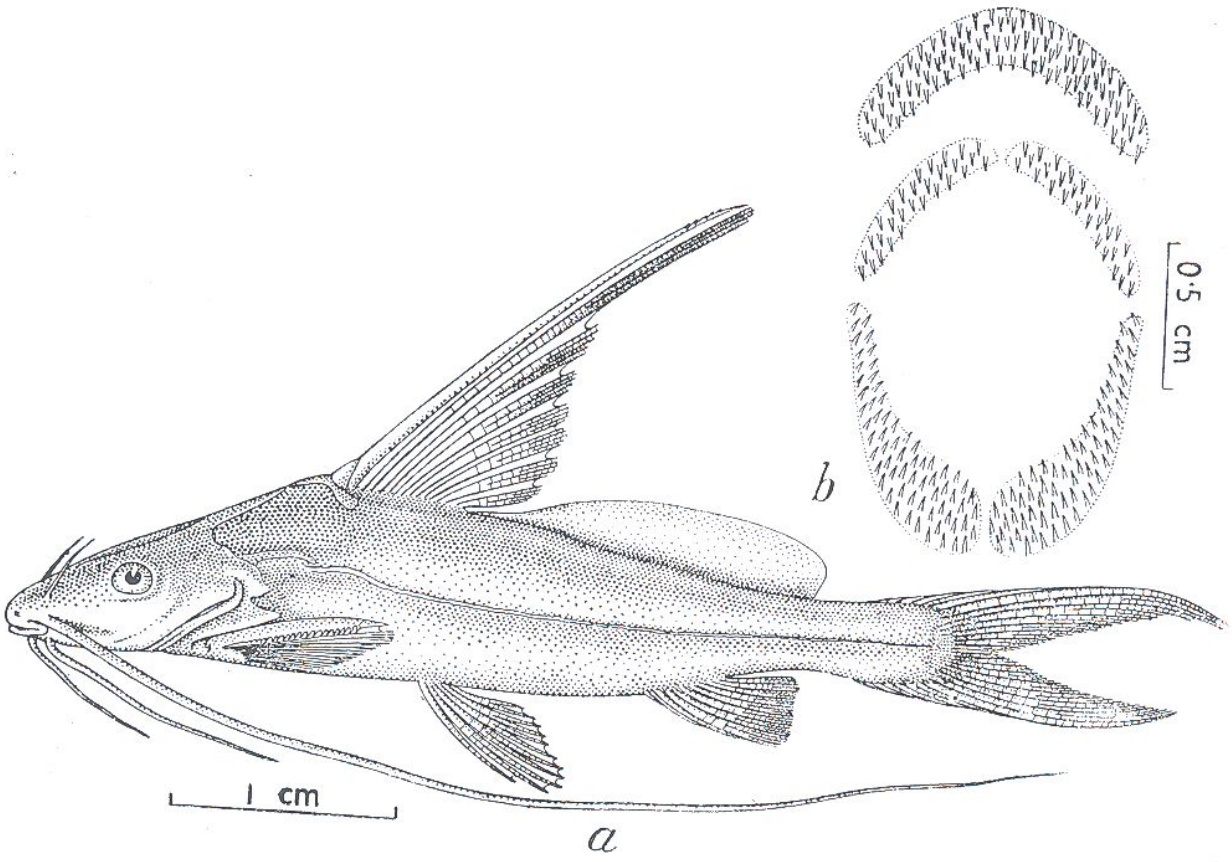

Fig. 10. *Heterobagrus bocourti* BLEEKER. *a*. Lateral view; *b*. Dentition.

in snout length. Dorsal spine longer than head length. Pectoral spine 1.35 (1.29 to 1.43) in head length. Adipose dorsal fin base longer than anal fin base. Least depth of caudal peduncle 2.63 (2.50 to 2.76) in its length.

Dorsal profile at about 30° to body axis. Occipital process exposed, 3.0 or 4.0 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth produced laterally, 5.0 or 6.0 times as long as broad; teeth on palate in a horse-shoe shaped band, separated in the middle by an edentate space. Maxillary barbels reaching beyond caudal fin base, others shorter. Longest ray of dorsal fin extending to adipose fin when depressed; dorsal spine smooth. Pectoral spine with 17 to 20 strong, antrorse teeth over posterior margin. Pelvic fins not reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin forked with upper lobe produced into filaments. Lateral line nearly straight.

Colour. Dark-brown above and on sides, lighter beneath. Spines and osseous plates tinged green.

Relationship. An unique species, apparently without any close relative.

Distribution. Thailand: Bangkok, Khlong Ban Po, Menam Chao Phya, Chiengmai, Lopburi, Menam Mun, Paknampo, Menam Pasak, Menam Ping, Pitsanulok, Nakon Rachasima, Menam Sak.

Remarks. FOWLER (1934*a*: 339) described *Prajadhipokia rex* as differing from *Heterobagrus bocourti* in the count of the gill rakers, dentition and colour. A year later FOWLER (1935a: 106) considered *P. rex* as a synonym of *H. bocourti*, but in (1937: 152) he reconsidered *rex* as valid. SMITH (1945: 393) after examining three specimens taken at random from the Menam Lopburi found the contrasting characters of *rex* to be within the range of individual variation of *bocourti*. *Prajadhipokia rex* is stated to have the gill rakers on the long arch of the first gill arch as 4 + 9, whereas in *bocourti* it is 4 + 12. The specimens examined by SMITH had the gill rakers: 4 + 7, 4 + 10 and 4 + 11. The material examined by me have the gill rakers: 4 + 7, 4 + 9 and 4 + 10. It is clear that the difference in the count of gill rakers is not significant in separating the two species. Therefore, following SMITH (1945) I have considered *rex* as a synonym of *bocourti*.

Subfamily **Bagroidinae**, nov.

(Figure 11)

Cranium longer than broad, completely ossified, deeply excavated at back. Lateral ethmoid facet for articulation of palatines strictly ventral

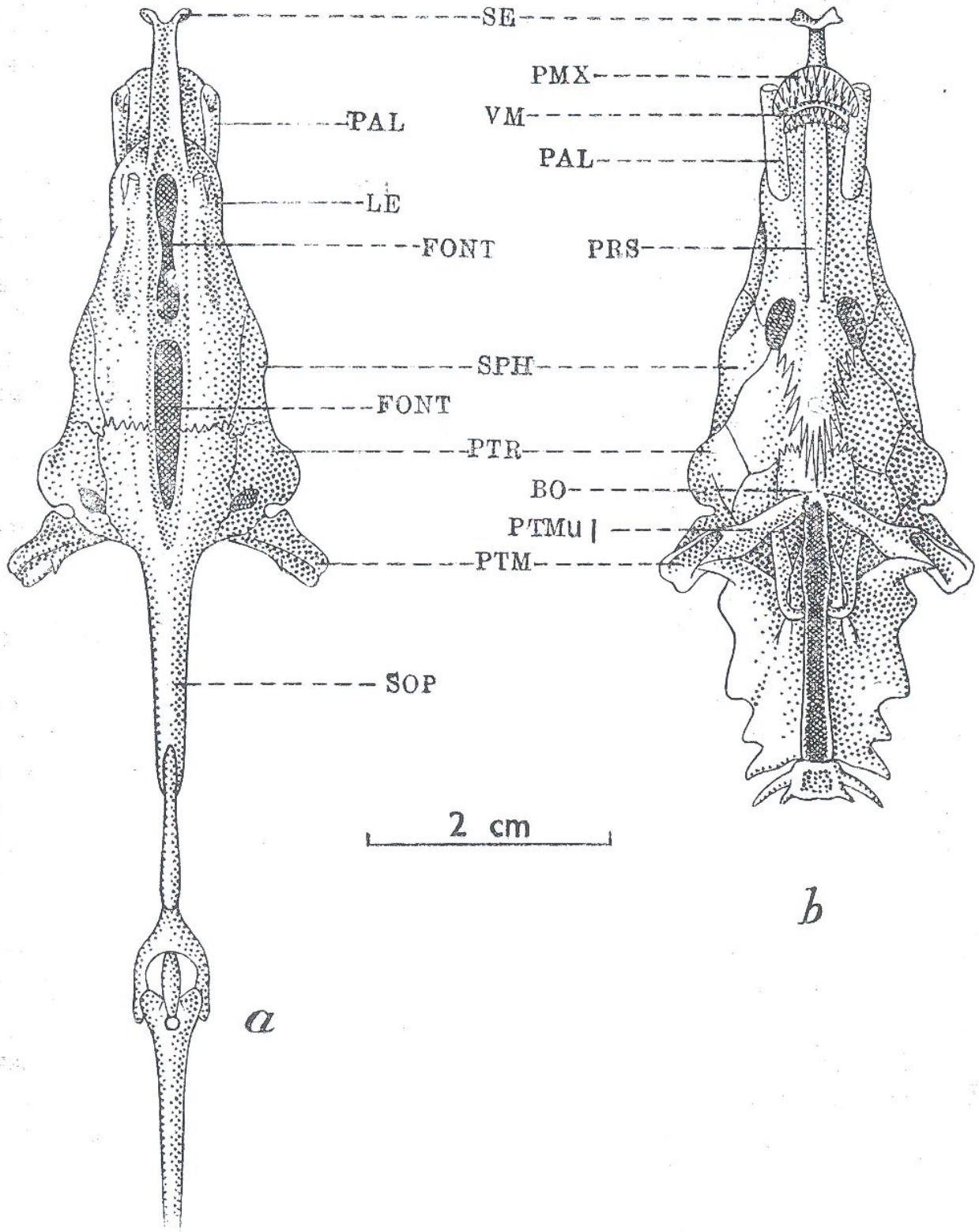

Fig. 11. Cranium of *Bagroides melapterus* (BLEEKER). *a.* Dorsal view; *b.* Ventral view.

and seen only from below. Palatines edentate, rod-like, firmly connected to palato-quadrate bar. Maxillary reduced. Prevomer median, large, single lobed, dentigerous. Pterygoid fused with mesopterygoid; latter firmly united suturally with metapterygoid and also connected firmly to palato-quadrate bar, remains with metapterygoid when disarticulated. Upper limb of post-temporals bordering post-temporal fossa; lower limb continuous along its lower border with an unusually large, irregularly oval post-temporal plate (not shown in figure) with a median perforation. Parapophysis of fourth vertebra not deeply cleft anteriorly and posteriorly, expanded laterally wing-like; anterior division decurved, short, firmly applied to inner and ventral margin of post-temporal plate, not secured by any ligament and supporting anterior wall of air-bladder; posterior division broad, thin and fused with base of parapophyses of fifth and sixth vertebrae. Vertebrae 39 to 42.

Nostrils simple; the posterior pair bears nasal barbels. Pelvic fins with 6 rays. Air-bladder pyriform, rigidly thick-walled. Lateral or posterior caecum absent.

Key to genera

1*a*. Dorsal spine short, with downward facing teeth over posterior margin. Labial teeth never present. Inner mandibular barbels never branched . . . . . *Bagroides*

1*b*. Dorsal spine long, with upward facing teeth over posterior margin. Labial teeth may be additionally present. Inner mandibular barbels occasionally branched . . . . . *Bagrichthys*

Genus **Bagroides** BLEEKER

Bagroides BLEEKER, *Natuurk. Tijdschr. Ned.-Ind., II*, p. 204, 1851. (Type-species, *Bagroides melapterus* BLEEKER, by monotypy). GÜNTHER, *Catalogue of the fishes in the British Museum, V*, p. 90, 1864 (Borneo and Sumatra). SMITH, *U. S. nat. Mus. Bull., no. 188*, p. 377, 1945 (Siam).

Body short, compressed, dorsal profile strongly arched. Head small, compressed; snout conical, but not produced; jaws subequal; lips thick, papillated. Mouth subterminal, narrow. Villiform teeth on premaxillaries and mandibular in bands; the band on latter with rounded ends; only molariform teeth on prevomer. Eye large, superior. Supraoccipital covered with skin. Four pairs of barbels: one maxillary, two mandibular, one nasal. Mental pores conspicuous. Gill membranes united with each other, but free from isthmus. Branchiostegals seven or eight.

Rayed dorsal fin inserted above three-fourth pectoral fin, with seven rays; adipose dorsal fin long, high, posteriorly free, but occasionally adnate also. Pelvic fins inserted below last ray of dorsal fin. Anal fin with 13 to 18 rays. Lateral line may be with a row of white fibrils.

39 vertebrae, 18 precaudal and 21 caudal.

Distribution. Mainly found in Borneo, Sumatra and Thailand with one species in China.

BLEEKER (1863: 94) synonymized *Pseudobagrichthys* BLEEKER (1862) with *Bagroides* instead of with *Bagrichthys*. The illustrations of *Pseudobagrichthys macropterus* and *P. macracanthus*, the only two species of the genus, indicate the inner mandibular barbels (also the outer in the case of *macropterus*) branched (BLEEKER, 1862, pl. xix, figs. 2, 1). Moreover, these species have the prevomerine teeth in a semi-lunar or transverse band, and the adipose dorsal fin and dorsal spine long. These characters are like those shown by *Bagrichthys hypselopterus*, the type species of *Bagrichthys*. *Pseudobagrichthys* resembles *Bagroides*, in having no labial teeth on the lower jaw and a simple non-filamentous caudal fin. Of these two characters, the latter varies considerably and in most instances females or immature examples of both sexes or non-breeding individuals often lack the filaments or prolongations. Likewise, the presence or absence of labial teeth is also an unreliable character. Thus, the characters shown by *Pseudobagrichthys* are more like those of *Bagrichthys* than of *Bagroides*, and I conclude that it should be synonymized with the former.

Key to species

1*a*. Depth of body 3.47 to 4.69 in standard length. Body without any hair-like dermal papillae . . . . . *melapterus*

1*b*. Depth of body 3.25 in standard length. Body with hair-like dermal papillae . . . . . *hirsutus*

Bagroides melapterus BLEEKER

(Fig. 12)

Bagroides melapterus BLEEKER, *Natuurk. Tijdschr. Ned.-Ind., II*, p. 204, 1851 (type locality, River Bandjermassin). WEBER & BEAUFORT, *The Fishes of the Indo-Australian Archipelago, II*, p. 348, fig. 147, 1913 (Rivers Barito, Kahajan, Kapuas, Kwantang, Indragiri, Djambi, Palembang, Rajang, Sambas). SUVATTI, *Index to Fishes of Siam*, p. 78, 1936 (Siam).

Bagroides melanopterus BLEEKER, *Natuurk. Tijdschr. Ned.-Ind., III*, p. 413, 1852 (River Bandjermassin, Sambas). GÜNTHER, *Catalogue of the fishes in the British Museum, V*, p. 90, 1864 (Borneo and Sumatra). SAUVAGE, *Bull. Soc. Philom. Paris, (7) VII*, p. 154, 1883 (Siam). VOLZ, *Rev. suisse Zool., V, no. 12*, p. 469, 1904 (Djapura, Indragiri, Prowap).

Bagroides sp. HORA, *J. Siam, Soc. nat. Hist., VI. no. 2*, p. 172, 1923 (type locality, Nontaburi).

Specimens studied. ZMA 101. 458, Palembang, Sumatra, one specimen, 120 mm; ZMA 101. 459, Sintang, Borneo, June 25, 1909, H. A. LORENTZ coll., two specimens, 260 and 270 mm; ZMA 101. 460, Palembang, Sumatra, Feb. 1911, SALM coll., one specimen, 159 mm; ZMA 101. 461, Indo-Australian Archipelago, BLEEKER's collection, one specimen (with one eye), 196 mm; RML 7841, Sintang, Borneo, BUTTIKOFER coll., one specimen, 109 mm; RML 7842, Sintang, Borneo, BUTTIKOFER coll., one specimen, 295 mm; RML 2928, Borneo, MÜLLER coll., two specimens, 173 and 174 mm; RML 15188, locality unknown, Rotterdam Zoological Museum coll., one specimen, 129 mm; RML 2930, Borneo, 1846, SCHWANER coll., one specimen, 108.5 mm; ZSI F. 10556/1, Nontaburi, Siam, Dr. & Mrs. SMITH coll., two specimens, 72 and 85 mm.

Description. Body depth 4.01 (3.47 to 4.69); head length 4.11 (3.63 to 4.47); head width 7.42 (6.53 to 8.62); head depth 6.73 (6.02 to 7.59); predorsal length 2.41 (2.12 to 2.81); postdorsal length 1.55 (1.50 to 1.64); prepelvic distance 1.84 (1.71 to 1.93); length of longest ray of caudal fin 5.15 (4.74 to 6.00) (N = 4), all in standard length. Eye 5.76 (4.50 to 6.94) in head length; 1.60 (1.29 to 2.14) interorbital space width; 1.99 (1.50 to 2.52) in snout length. Dorsal spine 1.12 (1.01 to 1.25) (N = 11); pectoral spine 1.11 (1.05 to 1.19) (N = 11) in head length. Adipose dorsal fin base longer than anal fin base. Least depth of caudal peduncle 2.03 (1.56 to 2.71) in its length.

Dorsal profile at about 40° to body axis. Occipital process subcutaneous, 3.0 or 4.0 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth 1.25 times as long as broad; teeth on palate confined to prevomer and in a single undivided semioval patch. Maxillary barbels reaching pectoral fin base, others shorter. Longest ray of dorsal fin extending to adipose fin when depressed; dorsal spine with 10 to 12 strong, downward facing teeth over posterior margin. Pectoral spine with 17 to 20 strong, antrorse teeth over posterior margin. Pelvic fins reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin deeply forked. Lateral line straight.

Colour. Pale olive-green with patches of black above and on sides, white beneath. Fins tipped black. Some specimens have chocolate-brown body with white patches.

Relationship. Related to *B. hirsutus*, but differing by characters cited in the key.

Distribution. Borneo: Rivers Bandjermassin, Barito, Kapuas, Kahajan, Rajang, Sambas, Sintang; Sumatra: Djapura, Djambi, Indragiri, River Kwantang, Palembang, Prowap; Thailand: Menam Chao Phya, Nontaburi.

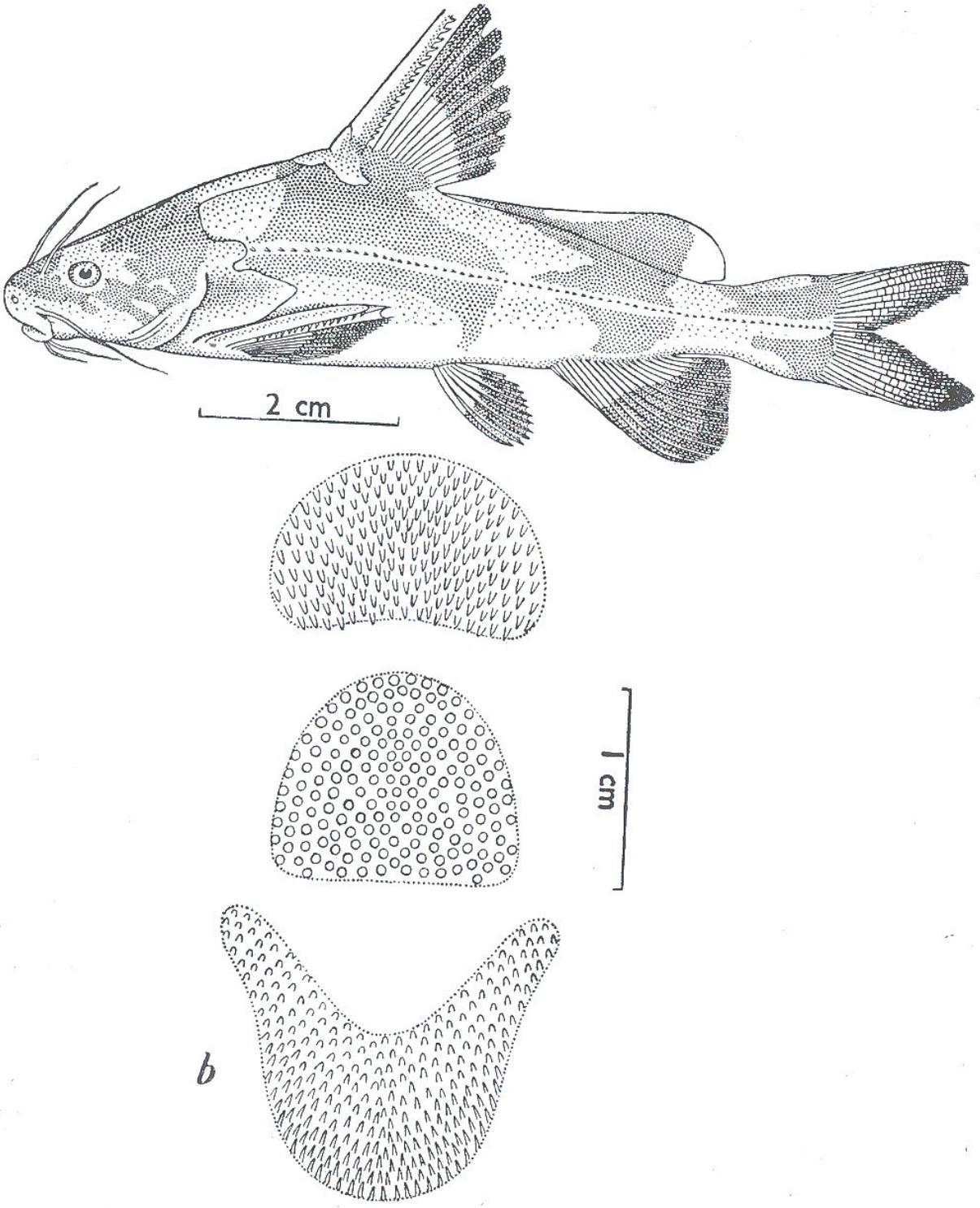

Fig. 12. *Bagroides melapterus* BLEEKER. *a*. Lateral view; *b*. Dentition.

Remarks. I have examined the two specimens referred by HORA (1923: 172), and find them referable to *melapterus*. The caudal fin is completely damaged, but HORA's description states that the lobes are produced into filaments, which is not a feature of *Bagroides*. Further, the dorsal spine serrations are facing upwards. The spine is longer than the head length. These features are as in *Heterobagrus* and *Bagrichthys*. However, the teeth on prevomer are in a single semioval patch, the maxillary barbels are shorter than the head, the adipose dorsal fin is of moderate length, the nape is low and the mandibular barbels are not branched as in *Bagrichthys*. The juvenile nature of the specimens may be a reason for the variations in respect of the caudal fin filaments and the dorsal spine serrations.

ZMA 101. 461 and ZSI F. 10556/1 have no eyes on their left side. In the case of the second specimen, a rudimentary subcutaneous eye is present, but the first has no trace of an eye.

Bagroides hirsutus (HERRE)

Liocassis hirsutus HERRE, *Lingnan Sci. J., XIII*, p. 285, 1934 (type locality, Wuchow).

Specimen studied. SNHM 13885, Wuchow market, Kwang-si province, Feb. 15, 1934, A. W. C. T. HERRE coll., one specimen (paratype), 230 mm.

Description. HERRE (1934) gave a good description of this species.

Relationship. Related to *B. melapterus*, but differing by characters cited in the key.

Distribution. China: Wuchow, Kwang-si province.

Remarks. HERRE (1934: 285) described this species from two specimens 230 and 280 mm long. The description of the species states that the nape is noticeably bulging, vomerine teeth in two broad masses, lateral line with a row of white fibrils, and epidermis hair-like. Since none of these features is common to the genera *Leiocassis, Pseudobagrus, Pelteobagrus*, or *Mystus*, the generic assignment of the species seemed doubtful. Through the courtesy of Prof. GEORGE S. MYERS, the paratype of *Leiocassis hirsutus* was borrowed for study. It was found that the fish is referable to *Bagroides* in view of the above cited features and also because of the presence of mental pores. The gill membranes are free only along their posterior borders as in *Bagroides*, unlike in *Liocassis* where they are totally free.

Bagroides is generally found in Thailand, Sumatra, and Borneo. The occurrence of *hirsutus* far north in China is remarkable.

Genus Bagrichthys BLEEKER

Bagrichthys BLEEKER, *Acta Soc. Sc. Indo-Neerl., IV*, p. 130, 1858. (Type-species, *Bagrus hypselopterus* BLEEKER, by monotypy). GÜNTHER, *Catalogue of the fishes in the British Museum, V*, p. 92, 1864 (Borneo and Sumatra).

Pseudobagrichthys BLEEKER, *Atlas ichthyologique..... II*, pp. 9, 49, 1862. (Type species, *Pseudobagrichthys macropterus* BLEEKER, by original designation).

Body rather long, much compressed, dorsal profile strongly arched. Head small, compressed; snout blunt; jaws subequal; lips thick, papillated. Mouth subterminal, narrow. Villiform teeth on premaxillaries, prevomer and mandibular in bands; enlarged labial teeth may be additionally present on later and with the band produced laterally. Eyes large, superior. Supraoccipital covered with skin. Four pairs of barbels: one maxillary, two mandibular, one nasal; mandibular pair occasionally branched in adults. Gill membranes united with each other, but free from isthmus. Branchiostegals seven or eight.

Rayed dorsal fin inserted above three-fourth pectoral fin, with seven rays; adipose dorsal fin long, high, posteriorly adnate to back. Pelvic fins inserted below last ray of dorsal fin. Anal fin with 13 to 15 rays. Lateral line simple.

42 vertebrae, 28 caudal and 14 precaudal.

Distribution. Mainly found in Indonesia and Thailand.

Key to species

1*a*. Caudal peduncle length 0.65; interorbital space width 3.20 in head length . . . . . *hypselopterus*

1*b*. Caudal peduncle length more than 1.0; interorbital space width more than 3.25 in head length.

2*a*. Interorbital space width 3.33 to 3.50 in head length. Depth of body 5.0 to 5.5 in standard length . . . . . *macropterus*

2*b*. Interorbital space width 3.74 to 4.13 in head length. Depth of body 3.74 to 4.50 in standard length . . . . *macracanthus*

Bagrichthys macracanthus (BLEEKER)

Bagroides macracanthus BLEEKER, *Natuurk. Tijdschr. Ned.-Ind., VII*, p. 88, 1854 (type locality, confluenze of Rivers Enim and Lamatang). SAUVAGE, *Nouv. Arch. Mus. Hist. nat. Paris, (2) IV*, p. 161, 1881 (Siam and Sumatra). VOLZ, *Rev. suisse Zool., V, no. 12*, p. 469, 1904 (Si Russu, Djapura, Selten). WEBER & BEAUFORT, *The fishes of the Indo-Australian Archipelago, II*, p. 350, 1913 (Djapura, Rivers Enim, Si Russu, River Mahakam). SUVATTI, *Index to Fishes of Siam*, p. 77, 1936 (Menam Chao Phya, Nakon Nayok, Yai Island). SMITH, *U. S. nat. Mus. Bull., no. 188*, p. 378, 1945 (Menam Chao Phya above Bangkok, Nakon Nayok).

Pseudobagrichthys macracanthus BLEEKER, *Atlas ichthyologique..... II*, p. 50, pl. xix, fig. 1, 1862 (Rivers Enim and Lamatang).

Leiocassis macropterus VAILLANT, *Notes Leyden Mus. XXIV*, p. 58, figs. 6, 7, 1902 (type locality, River Mahakam).

Specimens studied. ZMA 101. 457, Djambi, River Batang Hari, Sumatra, three specimens, 113.0 to 205.5 mm. (caudal fin damaged).

Description. Body depth 3.92 (3.74 to 4.13); head length 4.92 (4.71 to 5.14); head width 9.30 (8.93 to 9.83); head depth 7.97 (7.53 to 8.22); predorsal length 2.67 (2.60 to 2.74), postdorsal length 1.44 (1.43 to 1.45); prepelvic distance 2.29 (2.26 to 2.34), all in standard length. Eye 4.94 (4.62 to 5.33) in head length; 1.22 (1.15 to 1.33) in interorbital space width; 1.88 (1.81 to 2.00) in snout length. Dorsal spine longer than head length; pectoral spine 1.48 (1.18 to 1.78) (N = 2) in head length. Adipose dorsal fin base longer than anal fin base, or nearly equal to it. Least depth of caudal peduncle 3.85 (3.27 to 4.54) in its length.

Dorsal profile at about 45° to body axis. Occipital process subcutaneous, 5.0 or 6.0 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth not produced laterally, 2.25 times as long as broad; a few teeth towards outer edge enlarged; teeth on palate confined to prevomer and in a single reniform band, a few towards outer edge enlarged (Figure 13 c). Maxillary barbels reaching posterior margin of eye, others shorter. Longest ray of dorsal fin extending to adipose fin when depressed; dorsal spine with 20 feeble, upward facing teeth over posterior margin. Pectoral spine with 18 to 20 strong, vertical teeth over posterior margin. Pelvic fins not reaching anal fin. Longest anal ray not extending to caudal fin.

Caudal fin forked. Lateral line nearly straight.

Colour. Chocolate-brown above, and on sides, dull olive-green beneath. Lateral line tinged white.

Relationship. Related to *B. macropterus*, but differing in having broader interorbital space and smaller body depth.

Distribution. Sumatra: River Batang Hari, Djambi, Djapura, River Enim, Indragiri, River Lematang, Palembang, Selten, River Si Russu; Borneo: River Mahakam; Siam: Menam Chao Phya, Nakon Nayok, Yai Island.

Remarks. WEBER & BEAUFORT (1913: 350) doubtfully synonymized *Leiocassis macropterus* with this species. POPTA (1906: 228) assigned *L. macropterus* to *Bagroides* and proposed a substitute specific name *vaillanti* since *macropterus* is preoccupied. The species is undoubtedly a *Bagrichthys* as seen from the description and figures. *B. vaillanti* differs from *macracanthus* in having shorter dorsal fin and spine and a less elevated nape. The length of the dorsal spine is correlated with growth

and as such, is variable. Considering that *vaillanti* is known from an example of 93 mm which is comparatively a small specimen, I prefer to follow WEBER & BEAUFORT (1913) in synonymizing *vaillanti* with *macracanthus*.

Bagrichthys macropterus (BLEEKER)

Bagroides macropterus BLEEKER, *Natuurk. Tijdschr. Ned.-Ind., V*, p. 515, 1853 (type locality, Muara Kompeh, Sumatra). BLEEKER, *Acta Soc. Sc. Indo-Neerl., IV*, p. 136, 1858 (Palembang). SAUVAGE, *Nouv. Arch. Mus. Hist. nat. Paris, (2) IV*, p. 161, 1881 (Siam and Sumatra). SMITH, *U. S. nat. Mus. Bull., no. 188*, p. 377, 1945 (Bangpakong, Nakon Nayok).

Pseudobagrichthys macropterus BLEEKER, *Atlas ichthyologique..... II*, p. 50, pl. xix, fig. 2, 1862 (Muara Kompeh, Palembang).

Bagroides (Pseudobagrichthys) macropterus SUVATTI, *Index to Fishes of Siam*, p. 77, 1936 (Bangpakong, Nakon Nayok).

Specimens studied. USNM 103201, Bangpakong, Siam, H. M. SMITH coll., two specimens, 137 and 150 mm.

Description. Body depth 5.265 (5.26 to 5.27) ; head length 4.945 (4.89 to 5.00) ; head width 8.68 (8.33 to 9.03) ; head depth 7.975 (7.89 to 8.06) ; predorsal length 2.825 (2.82 to 2.83) ; postdorsal length 1.455 (1.45 to 1.46) ; prepelvic distance 2.14 (2.14 to 2.14) ; length of longest ray of caudal fin 3.935 (3.84 to 4.03), all in standard length. Eye 5.80 (5.60 to 6.00) in head length; 1.70 (1.60 to 1.80) in interorbital space width; 2.10 (2.00 to 2.20) in snout length. Dorsal spine 1.055 (1.01 to 1.10) ; pectoral spine 1.03 (1.00 to 1.06) in head length. Adipose dorsal fin base longer than anal fin base. Least depth of caudal peduncle 3.28 (3.14 to 3.42) in its length.

Dorsal profile at about 30° to body axis. Occipital process subcutaneous, 4.0 or 5.0 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth not produced laterally, 1.5 times as long as broad; teeth on palate confined to prevomer, in a narrow, semilunar band. Maxillary barbels reaching operculum, others shorter. Longest ray of dorsal fin extending to adipose fin when depressed; dorsal spine with six to eight feeble, downward facing teeth over posterior margin. Pectoral spine with 20 to 22 strong, antrorse teeth over posterior margin. Pelvic fins not reaching anal fin. Longest anal ray not extending to caudal fin. Caudal fin forked. Lateral line nearly straight.

Colour. Deep brown above and on sides, dull white beneath. Cleithral processes and spines tinged bright green.

Relationship. Related to *B. macracanthus*, but differing in having narrower interorbital space and greater body depth

Distribution. Sumatra: Djambi, Muara Kompeh, Palembang; Thailand: Rivers Bangpakong, Nakon Nayok.

Bagrichthys hypselopterus (BLEEKER)
(Fig. 13)

Bagrus hypselopterus BLEEKER, *Natuurk. Tijdschr. Ned.-Ind., III*, p. 413, 1852 (type locality, Palembang).

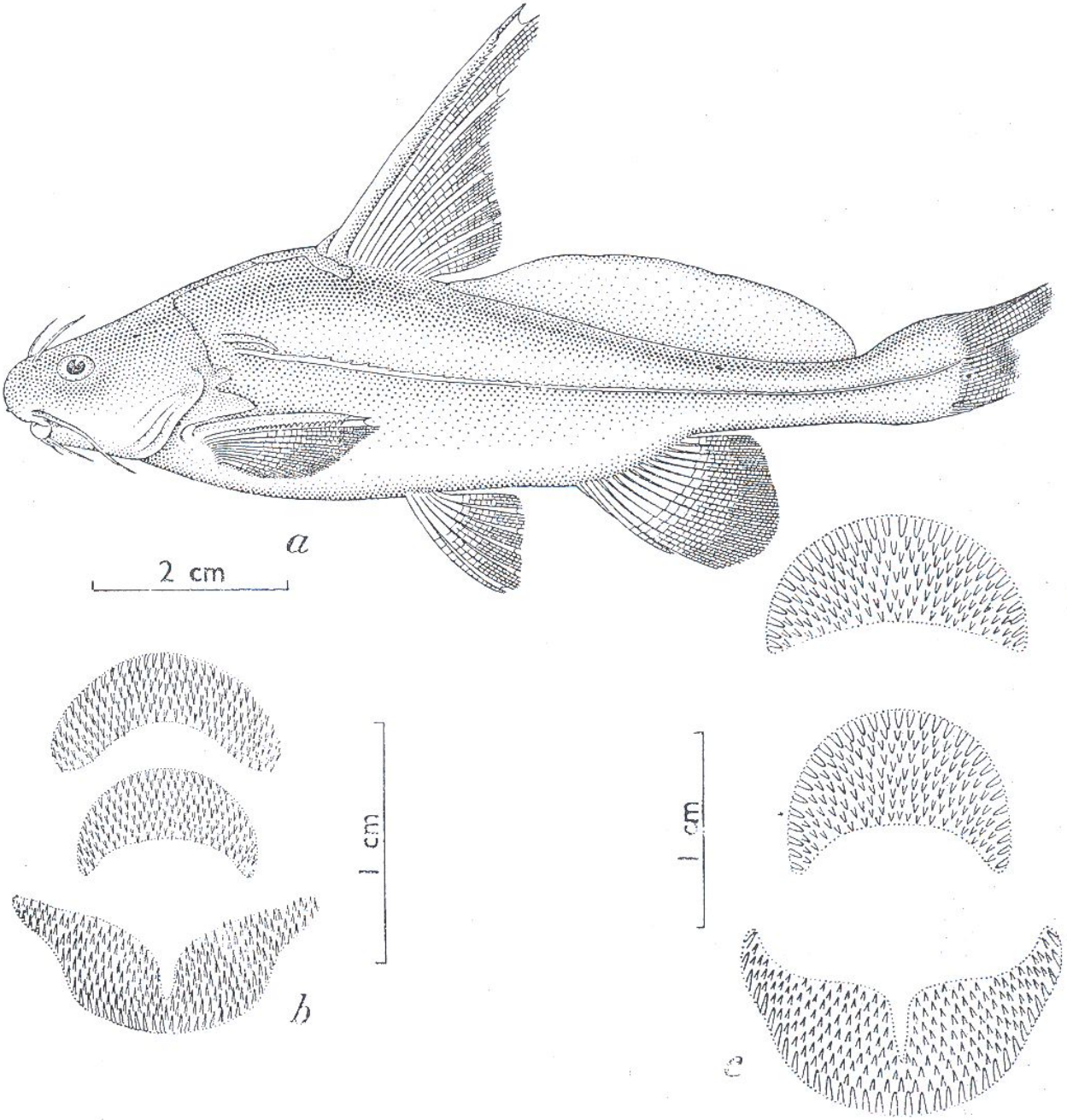

Fig. 13. *Bagrichthys hypselopterus* BLEEKER. *a*. Lateral view; *b*. Dentition; *c*. Dentition of *Bagrichthys macracanthus*.

Bagrichthys hypselopterus BLEEKER, *Acta Soc. Sc. Indo-Neerl., IV*, p. 131, 1858 (River Mussi, Palembang, River Kapuas, Sintang). WEBER & BEAUFORT, *The fishes of the Indo-Australian Archipelago, II*, p. 346, fig. 146, 1913 (Djambi, Palembang, River Rokan, Sintang).

Specimen studied. VNHM (not numbered), River Solo, Java, 1899, C. KRAUSS coll., one specimen, 96 mm.

Description. Body depth 4.47; head length 5.00; head width 7.38; head depth 6.40; predorsal length 2.81; postdorsal length 1.48; prepelvic distance 2.26; length of longest ray of caudal fin 4.80, all in standard length. Eye 3.84 in head length; 1.20 in interorbital space width; 1.40 in snout length. Dorsal spine longer than head length. Pectoral spine 1.20 in head length. Adipose dorsal fin base longer than anal fin base. Least depth of caudal peduncle 3.69 in its length.

Dorsal profile at about 25° to body axis. Occipital process subcutaneous, 2.0 times longer than wide at base, extending to predorsal plate. Premaxillary band of teeth slightly produced at sides, 3.0 times as long as broad, a few teeth towards outer edge enlarged; teeth on palate confined to prevomer, in a semi-lunar band, a few teeth towards outer edge enlarged. Maxillary barbels reaching operculum, others shorter. Longest ray of dorsal fin extending to adipose fin when depressed; dorsal spine with ten feeble, upward facing teeth over posterior margin. Pectoral spine with 13 strong, antrorse teeth over posterior margin. Pelvic fins reaching anal fin. Longest anal ray extending to caudal fin. Caudal fin forked with filamentous lobes. Lateral line nearly straight.

Table 15. Counts recorded for certain species of the genera *Heterobagrus*, *Bagroides*, and *Bagrichthys*.

Genus and Species	Fin rays (total branched and simple)																		
	Dorsal		Pectoral							Anal									
	6	7	7	8	9	10	11	12	13	9	10	11	12	13	14	15	16	17
Heterobagrus bocourti	4	2	—	—	—	1	2	2	1	2	1	3	—	—	—	—	—	—
Bagroides melapterus	—	15	1	1	13	—	—	—	—	—	—	—	—	—	6	4	2	3
Bagrichthys macracanthus	—	3	1	1	1	—	—	—	—	—	—	—	—	—	1	2	—	—
Bagrichthys macropterus	—	2	—	—	2	—	—	—	—	—	—	—	—	—	1	1	—	—
Bagrichthys hypselopterus	—	1	—	—	1	—	—	—	—	—	—	—	—	—	—	1	—	—

Colour. Dark-brown (lighter in juveniles) above and on sides, lighter beneath. Lateral line in a narrow white band. Fin tips tinged black.

Relationship. Related to *B. macracanthus*, but differing in having the caudal peduncle longer than head.

Distribution. Borneo: River Kapuas, Sintang; Sumatra: Djambi, Palembang, River Mussi, River Rokan; Java: River Solo. The last locality is a new record.

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