Genus MYSTUS Scopoli

A revision of this genus has been published by me (Jayaram, 1955b. See part II, paper no. 4).

The nomenclatorial status of the generic name has been discussed in another paper which is under publication (Jayaram, 1956a. See part II, paper no. 8).
(Type species, *Bagr속 pectolipterus* Cuvier & Valenciennes, by original designation).


(Type species, *Bagrę cumerili* Bleeker, by original designation).

(Type species, *Leiocassis longirostris* Günther, by original designation).

(Type species, *Leiocassis ussuriensis* Berg, by original designation).

Body moderately long and compressed. Dorsal profile arched. Head large and anteriorly depressed. Snout angular and produced beyond mouth. Jaws subequal. Lips thick and papillated or thin and plain. Mouth inferior, or subterminal and moderately wide. Villiform teeth on premaxillaries, vomer and/or palatines and mandibular in bands; that on latter produced laterally and separated at the centre by an edentate space. Eyes small, 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.

Origin of rayed dorsal fin above tip of pectoral fin; with six or seven rays and a spine. Adipose dorsal fin long, low, smooth and with the posterior margin free. Pectoral fins

1. This is an invalid emendation which has status in nomenclature as a separate name with its own author and date. It is a junior objective synonym of the original name, and therefore all such usages have been listed separately in the synonymies.
horizontally inserted and with a spine. Pelvic fins inserted on ventral surface, posterior to last ray of dorsal fin. Anal fin with 12 to 18 (usually about 15) rays (exception *L. tenuifurcatus*). Lateral line simple.

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

DISTRIBUTION.—Siberia, Korea, China, Siam, Malaya, Sumatra, Java and Borneo.

Bleeker (1858: 139) proposed the genus *Leiocassis* to accommodate *L. poecilopterus* (Cuvier & Valenciennes) from Java. The genus was grouped (1: 59) with *Bagroides* Bleeker and *Bagrichthys* Bleeker, and was differentiated from them by their dentition, nature of the dorsal spine and the extent of fusion of the gill membranes. *Pseudobagrus* Bleeker, related to this genus in its external characters, was grouped with the African genera *Bagrus* Cuvier and *Chrysichthys* Bleeker. In his subsequent publications (1862: 9, 52) Bleeker retained this grouping. Günther (1864: 86) changed, without reasons, the spelling into *Liocassis* and also described *longirostris* and *crassilabris* as two new species from Japan and China respectively. The type locality of the first species was later (1888: 429) clarified to be a possible error for China. Bleeker (1864: 7) described a new genus *Rhinobagrus* to accommodate *Bagrus dumerili*, which is identical with Günther's *L. longirostris* and indeed, Günther (1864: 165) himself recognised the similarity of the two species.

Günther (1873: 244) having found that the presence of a many-rayed anal fin, the nature of the occipital region remaining covered or exposed, to be of an arbitrary nature, thought that *Pseudobagrus* and *Leiocassis* are only subgenerically
different from the widely distributed \textit{Macronem} Duméril (= \textit{Mystus} Scopoli). Other authors such as Peters (1880), Herzenstein & Warpachowski (1887), Kreyenberg & Pappenheim (1908, 1909) and Tochang & Shih (1934), all followed Günther in treating these genera either as synonyms or as subgenera of \textit{Mystus}.

Jordan & Fowler (1903: 90) however, utilised the very same two characters rejected by Günther, \textit{viz.}, the anal fin rays count and the nature of the occipital region, in addition to the shape of the caudal fin for differentiating \textit{Leiocassis} from \textit{Pseudobagrus}. Regan (1911: 562) in his classification of the Bagridae, utilised the osteological differences between \textit{Leiocassis} and \textit{Pseudobagrus} such as the relative shape and modifications of the supracleithrum, the pterygoids and the parapophysis of the fourth vertebra. He rightly grouped \textit{Leiocassis} under \textit{Bagrinae} along with \textit{Bagrus}, \textit{Macronem}, \textit{Bagroide} and \textit{Olyra}. In his revision (1913), he gave a key for the identification of 24 species of \textit{Leiocassis}. Weber & Beaufort (1913) followed Regan's synopsis and separated \textit{Leiocassis} from \textit{Bagroide} and \textit{Bagrichthys} by the extent of fusion of the gill membranes and the nature of the dorsal spine serrations, and from \textit{Mystus} by the eye being covered with skin.

Nichols (1925: 1) proposed \textit{Nassccassis} and \textit{Dermocassis} as two new subgenera of \textit{Leiocassis} with \textit{L. longirostris} and \textit{L. ussuriensis} as the type species respectively. \textit{Nassccassis} was later (Nichols, 1943: 44) merged with \textit{Rhinobagrus} Bleeker.
Nichols (1943: 44) thought, that the series of forms assigned to *Leiocassis* as not sharply separated from those referred to *Pseudobagrus*, recognition of the genus being largely a matter of convenience. Smith (1945) listed all the Siamese species, but gave no opinion regarding the generic affinities.

EVALUATION OF DIAGNOSTIC CHARACTERS

The differentiation of *Leiocassis* from allied genera such as *Pseudobagrus* and *Mystus* has been shown to be difficult, due to lack of agreement on the diagnostic nature of the external characters. Further, indiscriminate assignment of species to wrong genera has also contributed towards the obscure taxonomic status of the various genera.

*Leiocassis* and *Mystus* are separable from *Pseudobagrus* and *Pelteobagrus* by the firm union of their ento-pter ygoid with the ecto-pter ygoid, and also by the modified condition of the lower limb of the post-temporal bones. Regan (1911: 562) rightly adopted these features to differentiate those genera. He provided the subfamily Bagrinae for *Leiocassis*, *Mystus* and others, differentiating them from *Pseudobagrus*, which is under Chrysichthyinae. Therefore, any attempt to consider *Pseudobagrus* or *Pelteobagrus* as synonyms or as subgenera of *Mystus* would be untenable.

However, these characters are of little value to the Museum taxonomist or to the field naturalist who is occasionally confronted with the task of identifying a single
specimen. Considering the various external features, we find that certain species of *Leiocassis* such as *longirostris*, *micropogon*, *poecilopterus*, *crassilabris* have a produced snout with the resultant inferior mouth. But, this condition is not constantly present in all the species or even in all individuals of the same species. Species such as *baramensis*, *vaillanti*, and juvenile specimens of *poecilopterus* and *crassilabris* often lack a produced snout. Besides *Leiocassis* some species of *Pelteobagrus*, such as *vachellii* also show this condition in certain stages of its growth. This character is correlated with the growth of the fish and as such, is not constant (Figures 43, 44). Therefore, I feel that undue importance has often been attached to this character alone.

The relative shape, size and position of the eyes.

This character has been used in differentiating silurid genera (Weber & Beaufort, 1913; Haig, 1950; Jayaram, 1955a). All species of *Nystus* differ from *Pseudobagrus* and *Leiocassis* by having the orbital rim free. However, species such as *N. wycki* may occasionally have the lower rim of the orbit fused with the eye. The size of the eye varies among individuals of the same species. However, in none of these genera the eyes are placed so low as in *Hosbagrus*. The anterior or posterior position of the eyes depends on the elongation of the snout, which has been shown to vary. But, the position in relation to the width of interorbital space varies very little. Therefore, it is an useful character.
The dentition on the palate.-- The dentition on the palate is confined to the vomer alone in most species of the genera Pseudobagrus, Pelteobagrus and Leiocassis. The interrupted or continuous condition of vomerine band of teeth is only of specific or subspecific value. Although Hora (1936: 350, 353) showed that variations are not uncommon in the siluroid genera in regard to this character, Worthington & Ricardo (1937: 1090) showed that in the case of Chrysichthys species, that the character is constant.

The length of the anal fin and the number of anal fin rays.-- This character has been used and later abandoned by Günther (1864; 1873), probably because he did not compare all the species of these genera. In general Mystus has about 10 rays, Leiocassis about 15, Pseudobagrus 15 to 20 and Pelteobagrus 20 to 25, which indicate their phylogenetic affinity.

The shape of the caudal fin.-- The caudal fin may be forked, truncate or rounded with varying degrees of emargination. These features are constant and uncorrelated with growth. Therefore, Pseudobagrus is defined as having an emarginate to truncate or rounded caudal fin and all the other related genera (Leiocassis, Pelteobagrus, and Mystus) a forked caudal fin.

The number of caudal fin rays.-- This character has the disadvantage that when the caudal fin damaged, especially if they have prolonged lobes, the rays cannot be counted accurately. A comparison of the counts of the maximum species of Bagridae (Table 77) indicates that the range for this character in each species is about four and that among different
genera there is little variability. However, the number of simple rays is useful in distinguishing certain genera, although the difference between the genera is not high.

The number of gill rakers on the upper limb of the first gill arch.—The range between different species of a genus is about five and between genera somewhat more.

The adipose dorsal fin varies so much that it is of no importance, especially in characterizing genera. Similarly the subcutaneous or exposed condition of the supra-occipital region is largely influenced by the preservative and the length of preservation of the specimens. These features are no longer considered important by ichthyologists.

The genus *Leiocassis* is divisible into two subgenera. The first, *Leiocassis*, inhabiting China, Siam, Malaya and the East Indies has the snout elongated to varying degrees and an inferior mouth. The second, *Pseudomystus*, new subgenus, from East Indies, Malaya and Siam has the snout rounded or obtuse like that of *Mystus*, and the mouth subterminal. Otherwise the two subgenera have the same principal features. The type species of the new subgenus *Pseudomystus* is *Bagrus stenomus* Cuvier & Valenciennes.

**KEY TO THE SUBGENERA**

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

   *Leiocassis*

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

   *Pseudomystus*
<table>
<thead>
<tr>
<th>Genera and Species</th>
<th>Total simple rays on both lobes</th>
<th>Total branched rays on both lobes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>lv v vi vii viii ix x 12 13 14 15 16 17 18 19 20</td>
<td></td>
</tr>
<tr>
<td>RITA</td>
<td>10 4 1 - - - - - 4 5 3 2 - 1 - -</td>
<td></td>
</tr>
<tr>
<td>chrysea</td>
<td>- - 2 1 6 2 - - 2 2 3 - 1 1 -</td>
<td></td>
</tr>
<tr>
<td>kuturnee</td>
<td>3 - 4 2 2 - - 2 6 2 - - 1 - -</td>
<td></td>
</tr>
<tr>
<td>gohra</td>
<td>- - 3 10 4 - - 1 2 2 4 5 3 - -</td>
<td></td>
</tr>
<tr>
<td>rita</td>
<td>CHRYSTYS</td>
<td>2 - 2 - - - - 1 1 1 1 -</td>
</tr>
<tr>
<td>auratus</td>
<td>- -</td>
<td>1 - - - - - - - - - - - - - - - - - - - - - - - -</td>
</tr>
<tr>
<td>cranchii</td>
<td>- -</td>
<td>1 - - - - - - - - - - - - - - - - - - - - - - - -</td>
</tr>
<tr>
<td>siannemann</td>
<td>- -</td>
<td>1 - - - - - - - - - - - - - - - - - - - - - - - -</td>
</tr>
<tr>
<td>nigrodigitatus</td>
<td>- -</td>
<td>1 - - - - - - - - - - - - - - - - - - - - - - - -</td>
</tr>
<tr>
<td>CLAROTES</td>
<td>- -</td>
<td>2 - - - - - - 1 - 1 - -</td>
</tr>
<tr>
<td>laticeps</td>
<td>PHYLLOMUS</td>
<td>- -</td>
</tr>
<tr>
<td>HORABAGRUS</td>
<td>- -</td>
<td>11 1 4 - - - - 7 1 2 3 3</td>
</tr>
<tr>
<td>brachysoma</td>
<td>PELTOBAGRUS</td>
<td>- -</td>
</tr>
<tr>
<td>PSEUDOBAGRUS</td>
<td>1 - 3 - - - - - - - - - - - - - - - - - - - - - - -</td>
<td></td>
</tr>
<tr>
<td>aurantiacus</td>
<td>BAGRICHYS</td>
<td>- -</td>
</tr>
<tr>
<td>PORCUS</td>
<td>- -</td>
<td>1 - - - - - - - - - - - - - - - - - - - - - - - -</td>
</tr>
<tr>
<td>haxad</td>
<td>NYSUS</td>
<td>- -</td>
</tr>
<tr>
<td>LEIOCASSIS</td>
<td>1 - 2 - - - - - - - - - - - - - - - - - - - - - - -</td>
<td></td>
</tr>
<tr>
<td>leaegrestra</td>
<td>AUCHEGOGLANIS</td>
<td>- -</td>
</tr>
<tr>
<td>PARIACHEGOGLANIS</td>
<td>- -</td>
<td>1 - - - - - - - - - - - - - - - - - - - - - - - -</td>
</tr>
</tbody>
</table>
Subgenus LIIOCASSIS

PROVISIONAL KEY TO THE SPECIES

1a. Occipital process not extending to the predorsal plate.

2a. Least depth of caudal peduncle two or fewer than two times in its length.

3a. Occipital process three times longer than width at its base. Diameter of eye eight or nine times in head length.

   merabensis

3b. Occipital process one or two times longer than width at its base. Diameter of eye fewer than eight times in head length.

   4a. Least depth of caudal peduncle 1.30 to 1.60 in its length. Diameter of eye 5.17 to 6.00 in head length.

   baramensis

   4b. Least depth of caudal peduncle 2.00 in its length. Diameter of eye 7.00 in head length.

   saravacensis

   4c. Least depth of caudal peduncle 1.70 to 1.92 in its length. Diameter of eye 6.90 to 7.42 in head length.

   regani, nov.

2b. Least depth of caudal peduncle more than two times in its length.

5a. Occipital process two or fewer than two times longer than width at its base.

   6a. Greatest depth of body about 5.0 in standard length. Least depth of caudal peduncle 2.50 to 2.75 in its length.

   hosii

   6b. Greatest depth of body 5.5 to 8.0 in standard length. Least depth of caudal peduncle 2.86 in its length.

   micropogon
5b. Occipital process more than two times longer than width at its base.

7a. Band of teeth on vomer with a long median posterior projection. *doriae*

7b. Band of teeth on vomer without any median posterior projection. *microps*

1b. Occipital process extending to the predorsal plate.

8a. Anal fin rays 19 to 24. Premaxillary band of teeth five or six times as long as broad. *tegnifurcatus*

8b. Anal fin rays fewer than 19. Premaxillary band of teeth fewer than five times as long as broad.

9a. Occipital process fewer than three times (2.5 to 3.00) longer than width at its base.

10a. Least depth of caudal peduncle 3.06 to 3.56 in head length. *crassilatia*

10b. Least depth of caudal peduncle 2.96 in head length. *crassirostris*

9b. Occipital process more than three times (3.0 or 4.00) longer than width at its base.

11a. Least depth of caudal peduncle 2.11 to 3.30 in head length. *pescilopterus*

11b. Least depth of caudal peduncle 3.63 to 4.87 in head length. *longirostris*

**LEIOCASSIS BARAMENSIIS Regan**


**Mystus baramensis** Herre & Myers, Bull. Raffles Mus., no. 13, p. 68, 1937 (Lake Ching Singora).

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

SPECIMENS STUDIED.— ZSI F. 121/2, Sungai Lumat, F. M. S., one specimen, 122 mm.

RFM (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 longer than anal fin base. Least depth of caudal peduncle 1.45 (1.30 to 1.60) in its length.

Dorsal profile of head at an angle of 25 to 30 degrees to main body axis. Occipital process subcutaneous, 2.0 times longer than width at its base and not extending to the predorsal plate. Premaxillary band of teeth not produced laterally and 3.0 or 3.5 times as long as broad. Teeth on palate confined to vomer, palatines and in a horse-shoe shaped continuous band with a rudimentary median posterior projection. Maxillary barbels reaching middle of orbit; other 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, antorose teeth over posterior margin. Cheithral processes half pectoral spine length. Pelvic fin not reaching anal fin origin. Longest anal ray not extending to caudal fin. Caudal fin forked. Lateral line nearly straight.

Proportional measurements, not given in the description, are recorded in table 83, and counts in table 87.

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

RELATIONSHIP.—This species is related to *L. sarawacensis* differing in having longer head, wider interorbital space and shorter adipose dorsal fin besides the vomerine band of teeth with a rudimentary posterior projection.

DISTRIBUTION.—Lake Ching, River Jelai, Johore, Singora, Sungai Lumpur, Ulu Jelai; Malaya. River Baram; Borneo.

REMARKS.—Beaufort (1933: 34) described *L. chaseni* from a single specimen 85 mm. long and differentiated it 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 Raffles Museum, Singapore. The following table compares certain characters between *baramensis* and *chaseni*.
TABLE 78.- COMPARISON OF CERTAIN CHARACTERS OF *LEIOCASSIS*
*BARAMENSIS* AND *L. CHASENI*.

<table>
<thead>
<tr>
<th>Characters</th>
<th>baramensis (ZSI F. 121/2)</th>
<th>chaseni (RPM, Not numbered)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL/Anal fin base</td>
<td>6.42</td>
<td>5.50</td>
</tr>
<tr>
<td>LH/Length of inner mandibular barbel</td>
<td>4.58</td>
<td>7.55</td>
</tr>
<tr>
<td>LH/Length of dorsal spine</td>
<td>1.64</td>
<td>1.39</td>
</tr>
<tr>
<td>LH/Length of pectoral spine</td>
<td>1.64</td>
<td>1.50</td>
</tr>
<tr>
<td>LH/HCPD</td>
<td>2.80</td>
<td>2.40</td>
</tr>
<tr>
<td>LI/Eye</td>
<td>5.17</td>
<td>6.00</td>
</tr>
<tr>
<td>Standard length in mm.</td>
<td>152</td>
<td>90</td>
</tr>
</tbody>
</table>

There are the only characters that show possible differences, but among the characters tabulated, the difference in respect to 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 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 and 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 *chasepi* is a synonym of *baramensis* which agrees with Hora & Gupta.

LEIOCASSIS HOSII Regan


SPECIMEN STUDIED.—No specimen seen by me.

RELATIONSHIP.—This species is closely related to *L. baramensis* differing in respect to the head length, eye size and caudal peduncle depth (table 79).

REMARKS.—Regan described *L. hosii* (1906: 67), *L. merabensis* (1913: 550) and *L. dorias* (1913: 551) from Borneo. The three species are closely related to *baramensis*. They have not been recorded from outside Borneo and are known only by the type specimens. A comparison of these species (table 79) indicates that *hosii* is distinct from *baramensis* and that *merabensis* and *dorias* nearly intergrades into *hosii*.

DISTRIBUTION.—Sibu, North Borneo.

LEIOCASSIS MERABENSIS Regan


SPECIMEN STUDIED.—No specimen seen by me.

RELATIONSHIP.—This species is closely related to *L. hosii* differing in having shorter head and smaller eye.

DISTRIBUTION.—Bongon, Merabeh: North Borneo.
LEIOCASSIS DORIAE Regan


SPECIMEN STUDIED.—No specimen seen by me.

RELATIONSHIP.—This species is closely related to *L. homilii* differing in having longer occipital process and a long median projection of the vomerine band of teeth.

DISTRIBUTION.—Sarawak: North Borneo.

LEIOCASSIS SARAVACENSIS Boulenger


SPECIMEN STUDIED.—No specimen seen by me.

RELATIONSHIP.—This species is related to *L. baramensis* differing in having slightly shorter head, narrower interorbital space, longer adipose dorsal fin and vomerine band of teeth without a posterior median projection.

DISTRIBUTION.—Senah: North Borneo.

REMARKS.—Regan (1913: 548) differentiated this species from *baramensis, micropogon* and *perabensis* by the difference in the length of occipital process and width of head. The affinities of this species are more with *baramensis* than with *micropogon* from which it differs in having a smaller body depth, shorter head and longer dorsal spine.

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1. I am indebted to Miss Ann J. Barfield of the British Museum (Natural History), London, for information regarding the type locality.
### TABLE 79.— COMPARISON OF CERTAIN CHARACTERS IN FIVE SPECIES OF **LEIOCASSIS**.

<table>
<thead>
<tr>
<th>Characters</th>
<th>baramensis</th>
<th>merabensis</th>
<th>dorise</th>
<th>sarayacensis</th>
<th>bosiit</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL/Body depth</td>
<td>3.96 to 4.77</td>
<td>4.70 to 5.0</td>
<td>4.80</td>
<td>4.5 to 5.0</td>
<td>about 5.0</td>
</tr>
<tr>
<td>SL/Head length</td>
<td>3.47 to 3.94</td>
<td>3.60 to 3.70</td>
<td>3.50</td>
<td>4.0</td>
<td>3.0 to 3.5</td>
</tr>
<tr>
<td>LH/Eye</td>
<td>5.17 to 6.00</td>
<td>8.00 to 9.00</td>
<td>8.00</td>
<td>7.0</td>
<td>7.0 to 9.5</td>
</tr>
<tr>
<td>LCPD/HCPD</td>
<td>1.30 to 1.60</td>
<td>2.00</td>
<td>2.25</td>
<td>2.0</td>
<td>2.5 to 2.75</td>
</tr>
<tr>
<td>Occipital process length/width</td>
<td>2.0</td>
<td>3.0</td>
<td>3.0</td>
<td>1.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Anal fin rays</td>
<td>13 or 14</td>
<td>14</td>
<td>14</td>
<td>14 or 15</td>
<td>13 to 16</td>
</tr>
<tr>
<td>Median posterior projection of vomerine band of teeth</td>
<td>Short</td>
<td>Absent or Short</td>
<td>Long Absent</td>
<td>Absent or Short</td>
<td></td>
</tr>
</tbody>
</table>

**LEIOCASSIS MICROPOGON** (Bleeker)


SPECIMEN STUDIED.—ZMA 101. 462, Buitenzorg, Bogor, one specimen, 140 mm.

DESCRIPTION.—Body depth 6.67; head length 3.94; head width 8.48; head depth 9.66; predorsal length 2.55; postdorsal length 1.63; prepelvic distance 2.06; length of longest ray of caudal fin 4.38, all in standard length. Eye 7.89 in head length; 1.78 in inter-orbital space width; 2.67 in snout length. Dorsal spine 1.87; pectoral spine 2.06 in head length. Adipose dorsal fin base nearly equal to anal fin base. Least depth of caudal peduncle 2.86 in its length.

Dorsal profile of head at an angle of about 20 degrees to main body axis. Occipital process subcutaneous, equal to width at its base and not extending to the predorsal plate. Premaxillary band of teeth slightly produced laterally and 2.5 times as long as broad. Teeth on palate confined to vomer and in a deeply curved, continuous band. Maxillary barbels reaching posterior border of eye; others shorter. Orbital rims fused with eye. Longest ray of dorsal fin not extending to adipose fin when depressed. Dorsal spine with eight feeble, vertical teeth over
posterior margin. Pectoral spine with 10 strong, antroso teeth over posterior margin. Cheithral processes half pectoral spine length. Pelvic fin not reaching anal fin origin. Longest anal ray not extending to caudal fin. Caudal fin deeply forked. Lateral line arched above pelvic fin onwards; anterior quarter with fibrils.

Proportional measurements, not given in the description, are recorded in table 83, and counts in table 87.

COLOUR.— Uniformly light brown all over.

RELATIONSHIP.— This species is distantly related to _L. poecilonterus_ differing in having smaller body dept., shorter head, shorter occipital process, shorter dorsal fin and smaller eye.


**LEIOCASSIS REGANI, sp. nov.**

(Figure 45)

**HOLOTYPE.—** USNM 35732, Sadong, North Borneo, Hornaday coll., one specimen, 161.5 mm.

**PARATYPE.—** Same data as the holotype, one specimen, 121.5 mm.

**DESCRIPTION.—** Body depth 5.80 (5.38 to 6.23); head length 3.515 (3.51 to 3.52); head width 6.14 (6.07 to 6.21); head depth 7.01 (6.87 to 7.15); predorsal length 2.265 (2.24 to 2.29); postdorsal length 1.73 (1.72 to 1.74); prepelvic distance 1.80 (1.79 to 1.81)
all in standard length. Eye 7.16 (6.90 to 7.42) in head length; 1.53 (1.40 to 1.65) in interorbital space width; 2.53 (2.44 to 2.66) in snout length. Dorsal spine 1.88 (1.84 to 1.92); pectoral spine 1.76 (1.68 to 1.84) in head length. Adipose dorsal fin base longer than anal fin base. Least depth of caudal peduncle 1.81 (1.70 to 1.92) in its length.

Dorsal profile of head at an angle of about 20 degrees to main body axis. Occipital process subcutaneous, 2.0 times longer than width at its base and not extending to the predorsal plate. Premaxillary band of teeth not produced laterally and 3.0 times as long as broad. Teeth on palate confined to vomer, palatines and in an anchor-shaped continuous band, with a rudimentary median posterior projection. Maxillary barbels reaching posterior border of eye; others shorter.

Orbital rims fused with eye. Longest ray of dorsal fin extending to adipose fin when depressed. Dorsal spine with 13 to 16 feeble, downward facing teeth over posterior margin. Pectoral spine with 17 to 20 strong, anterose teeth over posterior margin. Cheilental processes half pectoral spine length. Pelvic fin not reaching anal fin origin. Longest anal ray not extending to caudal fin. Caudal fin damaged. Lateral line nearly straight.

Proportional measurements, not given in the description, are recorded in table 83, and counts in table 87.

COLOUR.—Brown above, pale brown on sides and white beneath; head of a darker tinge.
RELATIONSHIP.-- This new species is related to *L. micropogon* differing in having longer occipital process, smaller caudal peduncle depth, broader mouth and brighter colouration (Table 80).

DISTRIBUTION.-- Sadong: North Borneo.

REMARKS.-- A comparison of the new species with *baramensis* and *micropogon* is given below.

TABLE 80.-- COMPARISON OF CERTAIN CHARACTERS OF *LEIOPOSSIS REGANI* WITH *BARAMENSIS* AND *MICROPOGON*.

<table>
<thead>
<tr>
<th>Characters</th>
<th>regani</th>
<th>baramensis</th>
<th>micropogon</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL/Body depth</td>
<td>5.78 to 6.37</td>
<td>3.96 to 4.77</td>
<td>5.90 to 8.00</td>
</tr>
<tr>
<td>SL/Head depth</td>
<td>6.27 to 7.11</td>
<td>3.50 to 5.81</td>
<td>9.60</td>
</tr>
<tr>
<td>Lh/Length of a real spine</td>
<td>1.81 to 1.93</td>
<td>1.39 to 1.64</td>
<td>1.87</td>
</tr>
<tr>
<td>Lh/Head width</td>
<td>1.77 to 1.76</td>
<td>1.50 to 1.43</td>
<td>2.15</td>
</tr>
<tr>
<td>Lh/Eye</td>
<td>6.90 to 7.42</td>
<td>5.17 to 9.00</td>
<td>6.00 to 8.00</td>
</tr>
<tr>
<td>Lh/Int. Orb. whl.</td>
<td>4.51 to 4.93</td>
<td>3.00 to 3.27</td>
<td>3.47</td>
</tr>
<tr>
<td>Lh/Width of one of mouth</td>
<td>3.00 to 3.29</td>
<td>2.71 to 3.88</td>
<td>3.74</td>
</tr>
<tr>
<td>Lh/hCPD</td>
<td>3.45 to 3.68</td>
<td>2.45 to 3.86</td>
<td>3.58</td>
</tr>
</tbody>
</table>

DERIVATION OF NAME.-- This new species is named for Dr. C. Tate Regan of the British Museum (Natural History), London, who has contributed so much to the taxonomy of the siluroids and other fishes.
LEIOCASSIS POECILOPTERUS (Ouvier & Valenciennes)

Bagrus poecilopterus Cuvier & Valenciennes, Histoire naturelle des poissons, XIV, p. 451, 1839 (type locality, River Rebak).

Bagrus (Bagrus) ramentosus Müller & Troschel, Horae icthyoologicae .........., III, p. 7, 1845.


SPECIMENS STUDIED.—ZMA 101. 463, Lebong Hora, Borneo, two specimens, 124.8 and 167.0 mm.

ZMA 101. 464, Solok, Sumatra, one specimen, 147 mm.

RML 15899, Lampoen B, 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, 3, Sumatra, van Hasselt coll., two specimens, 92.5 and 140.5 mm.

DESCRIPTION.—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

1. Unless otherwise stated, the proportional measurements and counts are of 11 specimens.
standard length. Eye 6.00 (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 of head at an angle of about 30 degrees to main body axis. Occipital process subcutaneous, 3.0 or 4.0 times longer than width at its base and extending to the predorsal plate. Premaxillary band of teeth not produced laterally and 3.0 or 4.0 times as long as broad. Teeth on palate confined to vomer and in a semi-lunar continuous band. Maxillary barbels reaching posterior border of orbit; others 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, antrose teeth over posterior margin. Cheilothral processes half pectoral spine length. Pelvic fin not reaching anal fin origin. Longest anal ray not extending to caudal fin. Caudal fin forked with rounded lobes. Lateral line arched above pectoral fin, otherwise straight.

Proportional measurements, not given in the description, are recorded in table 83, and counts in table 87.

COLOUR.— Dark-brown above and on sides, lighter beneath. Fins with alternating dark bands. Eyes somewhat bluish along borders.
RELATIONSHIP.- This species is distantly related to *L. microopus*, differing in having greater body depth, longer head and longer occipital process.

DISTRIBUTION.- Tasek Bora; Malaya. Lampoeng b, Solok, River Sumanik; Sumatra. Buitenzorg, River Kebak; Java.

Bongon, Lebang Hora; North Borneo. Sinn.

REMARKS.- RFM (Not numbered) labelled *L. microopus*, 176 mm. long from Tasek Bora may belong to this species. But, the specimen differs from *pocillopterus* 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.

Further, this is the first record of this species from Malaya. The data of this specimen are not included in the description and table 83.

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. The variations are statistically analysed (table 81 and graphs 76 & 78).
### TABLE 81. – BIOMETRIC COMPARISON OF (A) MALES AND (B) FEMALES
OF LEIOCASSIS POECILOPTERUS.

<table>
<thead>
<tr>
<th>Characters</th>
<th>Samples</th>
<th>N</th>
<th>Range</th>
<th>Mean</th>
<th>s</th>
<th>t</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL/Body depth</td>
<td>A</td>
<td>5</td>
<td>3.59 to 3.93</td>
<td>3.69</td>
<td>0.134</td>
<td>0.059</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>6</td>
<td>4.05 to 5.44</td>
<td>4.63</td>
<td>0.631</td>
<td>0.758</td>
<td>3.24</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Less than 0.01</td>
</tr>
<tr>
<td>LH/Head width</td>
<td>A</td>
<td>5</td>
<td>1.45 to 1.88</td>
<td>1.71</td>
<td>0.222</td>
<td>0.099</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>6</td>
<td>1.85 to 2.16</td>
<td>2.03</td>
<td>0.125</td>
<td>0.051</td>
<td>3.04</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Less than 0.01</td>
</tr>
<tr>
<td>SL/Head depth</td>
<td>A</td>
<td>5</td>
<td>6.02 to 6.94</td>
<td>6.42</td>
<td>0.331</td>
<td>0.148</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>6</td>
<td>6.47 to 7.71</td>
<td>7.08</td>
<td>0.452</td>
<td>0.184</td>
<td>2.71</td>
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<td></td>
<td></td>
<td>Less than 0.02</td>
</tr>
<tr>
<td>LH/Eye</td>
<td>A</td>
<td>5</td>
<td>5.32 to 6.43</td>
<td>5.74</td>
<td>0.311</td>
<td>0.138</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>6</td>
<td>5.32 to 7.31</td>
<td>6.23</td>
<td>0.699</td>
<td>0.285</td>
<td>1.45</td>
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<td></td>
<td></td>
<td>Greater than 0.10</td>
</tr>
<tr>
<td>LH/Int. Orb. with</td>
<td>A</td>
<td>5</td>
<td>2.67 to 3.16</td>
<td>2.92</td>
<td>0.180</td>
<td>0.081</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>6</td>
<td>2.75 to 3.55</td>
<td>3.16</td>
<td>0.297</td>
<td>0.121</td>
<td>1.57</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Greater than 0.10</td>
</tr>
</tbody>
</table>

**LEIOCASSIS LONGIROSTRIS Günther**


Leiocassis (Rhinobagrus) longirostris Nichols, The Freshwater Fishes of China, IX, p. 43, 1943 (River Min, Tungting Fu).


SPECIMENS STUDIED.—USNM 45221, Koren, W. L. Abbott coll., one specimen, 353.5 mm.

USNM 130553, "Kaochiao 0. near huang", China, Sept. 1925, Sowerby coll., one specimen, 330.0 mm.

USNM 130572, Foochow, Fu-kuin, China, 26, Sowerby coll., one specimen, 179 mm.

USNM 66438, Shanghai, Kiang-su, China, 25, Sowerby coll., one specimen, 766.5 mm.

USNM 66083, Hanking, China, S. Pinc. coll., cimen, 185 mm.

USNM 66480, Nanking, China, 1927, one specimen, 148 mm.

USNM 87141, Sui-fu, China, Oct.-Nov. 1924, D. C. Graham coll., one specimen, 143 mm.

USNM 130507, Kiang-su, Shanghai, China, Dec. 1925, Sowerby coll., five specimens, 117 to 176 mm.

BMNH 1927. 3. 26. 28, Nanking, China, Ping coll., one specimen, 118 mm.

MCZ 7963, Shanghai, China, one specimen, 128 mm.

ZSI F. 1015/1, Minpu, 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 2.46 (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 (6.87 to 10.56) in head length;
2.53 (1.92 to 3.60) in interorbital space width; 7.41 (4.70 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 3.27) in its length.

Dorsal profile of head at an angle of about 1.5 degrees
to main body axis. Occipital process exposed, 5.0 or 4.0 times
longer than width at its base and extending to the prefrontal
plate. Premaxillary band of teeth slightly produced laterally
and 4.0 or 5.0 times as long as broad. Teeth in palato-quadrate
confining to vomer, palatines and in a semi-lunar 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 feable, downward
facing teeth over posterior margin. Pectoral spine with 17 to
20 strong, anterose teeth over posterior margin. Cheilothal
processes half sectoral spine length. Pelvic fin reaching anal
fin origin. Longest anal ray not extending to caudal fin.
Caudal fin bifurcate with pointed lobes. Lateral line straight.

Proportional measurements, not given in the description,
are recorded in Table 87, and counts in Table 87.

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.— This species is related to \textit{L. poeciloopterus}
differing in having smaller body depth, smaller eye and smaller
caudal peduncle depth (table 82, graphs 79 to 82).

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

REMARKS.— There is controversy regarding the priority of the
specific names \textit{longirostris} and \textit{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 species is
identical with his, notified that \textit{dumerili} is a synonym of
\textit{longirostris}. Since then authors such as Regan (1913: 549)
followed Günther in treating \textit{dumerili} as a synonym of
\textit{longirostris}, whereas Rendahl (1928: 168), and Nichols (1943: 43)
gave priority for \textit{dumerili}.

Examination of the publications of Bleeker and
Günther indicates the former author's work having priority
(April 1864) over the latter (February 1864). Therefore,
\textit{dumerili} is a synonym of \textit{longirostris}.

TYPE LOCALITY.— Günther (1864: 88) stated that his specimen
of \textit{longirostris} came from "Japan" and purchased of Mr. Jamrach,
but later (1888: 429) thought that the locality may be an error
for China. Jordan & Seale (1905: 519) also recommended the
species to be removed from Japanese lists. My information from
the British Museum (Natural History), London, is that the
holotype was registered in 1862 as "1862. 11. 1. 1. Siluridae.
Japan. Pugh. of Mr. Jamrach". Mr. Jamrach's collection is of
about 286 fishes. They came from Japan, N. China, Siam and of some the provenance are unknown" (from personal communication). It is probable that the localities got mixed up in the case of longirostris and as subsequently revised by Günther, Jordan & Seale, it should be north China.

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 vomerine band of teeth separated at the centre by an edentate space. Though the nature of dentition on the vomer is of importance, lack of other significant characters precludes the consideration of neso as a distinct species. I follow Nichols (1943) in considering it as a probable synonym of longirostris.

A biometric comparison of this species with poecilopterus is presented in table 82, and the significant variations are delineated in graphs 79 & 92. The comparison indicates the body depth, eye size and caudal peduncle length and depth are useful in separating the two species.
<table>
<thead>
<tr>
<th>Characters</th>
<th>Samples</th>
<th>Range</th>
<th>Mean</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL/Body depth</td>
<td>A 11</td>
<td>3.50 to 5.14</td>
<td>4.21</td>
<td>0.664</td>
<td>0.206</td>
</tr>
<tr>
<td></td>
<td>B 15</td>
<td>4.33 to 5.74</td>
<td>5.18</td>
<td>0.402</td>
<td>0.104</td>
</tr>
<tr>
<td>SL/Head length</td>
<td>A 11</td>
<td>3.28 to 3.71</td>
<td>3.54</td>
<td>0.130</td>
<td>0.039</td>
</tr>
<tr>
<td></td>
<td>B 15</td>
<td>3.32 to 3.95</td>
<td>3.48</td>
<td>0.151</td>
<td>0.089</td>
</tr>
<tr>
<td>SL/Head width</td>
<td>A 11</td>
<td>5.39 to 7.71</td>
<td>6.59</td>
<td>0.655</td>
<td>0.197</td>
</tr>
<tr>
<td></td>
<td>B 15</td>
<td>4.77 to 7.30</td>
<td>6.26</td>
<td>0.754</td>
<td>0.194</td>
</tr>
<tr>
<td>LH/Eye</td>
<td>A 11</td>
<td>5.32 to 7.31</td>
<td>6.004</td>
<td>0.621</td>
<td>0.187</td>
</tr>
<tr>
<td></td>
<td>B 15</td>
<td>6.83 to 10.56</td>
<td>8.94</td>
<td>1.035</td>
<td>0.267</td>
</tr>
<tr>
<td>LH/Int. Orb. &amp; WD</td>
<td>A 11</td>
<td>2.96 to 4.33</td>
<td>3.47</td>
<td>0.381</td>
<td>0.115</td>
</tr>
<tr>
<td></td>
<td>B 15</td>
<td>2.81 to 3.81</td>
<td>3.55</td>
<td>0.256</td>
<td>0.066</td>
</tr>
<tr>
<td>LH/HCPD</td>
<td>A 11</td>
<td>2.11 to 3.30</td>
<td>2.79</td>
<td>0.256</td>
<td>0.077</td>
</tr>
<tr>
<td></td>
<td>B 15</td>
<td>3.63 to 4.87</td>
<td>4.19</td>
<td>0.362</td>
<td>0.093</td>
</tr>
<tr>
<td>LH/LCPD</td>
<td>A 11</td>
<td>1.58 to 1.83</td>
<td>1.70</td>
<td>0.079</td>
<td>0.104</td>
</tr>
<tr>
<td></td>
<td>B 15</td>
<td>1.38 to 1.70</td>
<td>1.52</td>
<td>0.103</td>
<td>0.027</td>
</tr>
<tr>
<td>LH/Dorsal spine</td>
<td>A 11</td>
<td>1.28 to 1.73</td>
<td>1.47</td>
<td>0.103</td>
<td>0.027</td>
</tr>
<tr>
<td></td>
<td>B 15</td>
<td>1.28 to 1.80</td>
<td>1.51</td>
<td>0.153</td>
<td>0.039</td>
</tr>
</tbody>
</table>
LEIOCASSIS CRASSILABRIS Günther

For synonymy see subspecies

KEY TO THE SUBSPECIES

1a. Diameter of eye 5.33 to 5.93 in head length; head length 3.68 to 3.93; body depth 4.47 to 4.81 in standard length.

**crassilabris**

1b. Diameter of eye 4.0 in head length; head length 3.7 to 5.2; body depth 3.8 to 4.8 in standard length.

**macrops**

LEIOCASSIS CRASSILABRIS CRASSILABRIS Günther

(Figure 46)

Leiocassis crassilabris Günther, Catalogue of the Fishes in the British Museum, V, p. 88, 1884 (type locality, "China").


Leiocassis (Rhinobagrus) crassilabris crassilabris Nichols, The Freshwater Fishes of China, IX, p. 44, 1943 (Hokow, Kiang-si, Kienning, Yening).

SPECIMEN STUDIED.- USNM 130573, Foochow, China, one specimen, 165 mm.

DESCRIPTION.- Body depth 4.71; head length 3.71; head width 5.5; 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 of head at an angle of about 30 degrees to main body axis. Occipital process subcutaneous, 3.0 times longer than width at its base and extending to the predorsal plate. Premaxillary band of teeth not produced laterally and 4.0 times as long as broad. Teeth on palate confined to vomer and 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, anterose teeth over posterior margin. Cheithral processes three-eighth pectoral spine length. Pelvic fin reaching anal fin origin. Longest anal ray not extending to caudal fin. Caudal fin deeply forked with pointed lobes. Lateral line straight. Axillary pores present.

Proportional measurements, not given in the description, are recorded in table 83, and counts in table 87.

COLOUR.- Uniformly dark-brown all over.
RELATIONSHIP.— This species is related to the east Indian L. poecilopterus differing in having smaller body depth, shorter head, more anal fin rays and smaller caudal peduncle depth.

DISTRIBUTION.— Foochow, Hokow, Kiang-si, Kiang-su, Kialin-Ho, Kienning, Tungting Hu, Yangtze Kiang, Yemping; China.

LEIOCASSIS CRASSILABRIS MACROPS Nichols


Leiocassis (Rhinobagrus) macrops Nichols, The Freshwater Fishes of China, IX, p. 45, fig. 6, 1945 (Chungan Hsien near Yemping, Hokow).

SPECIMEN STUDIED.— No specimen seen by me.

RELATIONSHIP.— This subspecies is related to L. crassilabris crassilabris differing in having larger eye and greater body depth.

DISTRIBUTION.— Chungan Hsien, Fu-kein, Hokow; China.

LEIOCASSIS MICROPS Rendahl

Leiocassis microps Rendahl, Ark. Zool., XXIV, no. 16, p. 93, 1933 (type locality, Chungking).


SPECIMEN STUDIED.— No specimen seen by me.
RELATIONSHIP.— This species is related to *L. crassilabris* differing in having smaller eye, smaller caudal peduncle depth, narrower head and shorter occipital process.

DISTRIBUTION.— Chungking, Foochow: China.

REMARKS.— Tchang & Shih (1934: 343) referred a specimen 205 mm. long to *crassilabris macrosp*., which has the eye 8.8 in head length and the body depth 5.8 in standard length. The small eye is diagnostic of *macrosp*., and therefore, I feel that the specimen has been wrongly identified.

**LEIOCASSIS CRASSIROSTRIS** Regan

(Figure 47)


SPECIMEN STUDIED.— USNM 27443, Suzhou, China, Oct.-Nov. 1924, D. G. Graham coll., one specimen, 127.5 mm.

DESCRIPTION.— Body depth 5.80; head length 7.59; head width 6.54; head depth 6.89; predorsal length 2.63; postdorsal length 1.57; propelvic distance 1.80; length of longest ray of anal fin 5.10, all in standard length. Eye 5.92 in head length; 1.75 in interorbital space width; 2.33 in snout length. Dorsal spine 1.61; pectoral spine 1.65 in head length. Adipose dorsal fin base longer than anal fin base. Least depth of caudal peduncle 2.96 in its length.
Dorsal profile of head at an angle of about 20 degrees to main body axis. Occipital process subcutaneous, 2.5 times longer than width at its base and extending to the predorsal plate. Premaxillary band of teeth slightly produced and 3.0 times as long as broad. Teeth on palate confined to vomer and in a slightly curved continuous band. Maxillary barbels reaching nearly operculum; 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 11 strong, antorose teeth over posterodorsal margin. Cheilothal processes three-fourth pectoral spine length. Pelvic fin reaching anal fin origin. Longest anal ray extending to caudal fin. Caudal fin forked. Lateral line straight.

Proportional measurements, not given in the description, are recorded in table 87, and counts in table 87.

COLOUR.—Uniformly dark-brown all over.

RELATIONSHIP.—This species is related to L. crassilabris crassilabris differing in having longer head, smaller body depth, longer barbels and greater caudal peduncle depth.

DISTRIBUTION.—Kiatian-foo, Suifu, Sze-Ohwan, "Canuax du Tschuang": China.

REMARKS.—Regan (1913: 552) described this species from two specimens 70 and 140 mm. long and differentiated it from crassilabris by the relative length and nature of dorsal spine. Rendahl (1928: 169, 1938: 90) doubted the individuality of crassirostris and treated it as a synonym of crassilabris.
his key (1928: 167). Besides the characters used by Regan, *crassirostris* is separable from *crassilabris* by characters cited under Relationship.

Sauvage & Thiersant (1874: 7) described *L. torosilabris* from the Yantze Kiang. Since in the description it is stated that there are movable labial teeth on the jaws, Regan (1913: 547) thought the species related to *Bagrichthys*. 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 of *L. torosilabris*. The holotype bears the number 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. Dr. Bertin furnished the following: Standard length 330 mm; head length 68 mm; body depth 56 mm; length of dorsal spine 45 mm; dorsal spine smooth.

The smooth dorsal spine and greater body depth indicate 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*. 
LEIOCASSIS TENUIFURCATUS Nichols


Leiocassis (Rhinobagrus) tenuifurcatus Nichols, Amer. Mus. Novit., no. 499, p. 5, Fig. 6, 1931a (figure of holotype). - Herre & Lin, Bull. Chekiang Fish Exp. Sta., II, p. 25, 1936 (River Taelen 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 (4.96 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 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 of head at an angle of about 20 degrees to main body axis. Occipital process exposed, 2.5 to 4.0 times longer than width at its base and extending to the predorsal plate. Premaxillary band of teeth slightly produced laterally and 5.0 or 6.0 times as long as broad. Teeth on palate confined to vomer and in a slightly curved, continuous band. 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, downward facing teeth over posterior margin. Pectoral spine with 15 to 18 strong, anterose teeth over posterior margin. Cheithral processes half pectoral spine length. Pelvic fin reaching anal fin origin. Longest anal ray just extending to caudal fin. Caudal fin deeply forked. Lateral line nearly straight.

Proportional measurements, not given in the description, are recorded in table 83, and counts in table 87.

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.— River Tsien Tang, Chungan Esien, Suzfu: China.


<table>
<thead>
<tr>
<th>Proportional Measurements</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dorsal line</td>
<td>Dorsal</td>
<td>Anal</td>
<td>Pelvic</td>
<td>Analfins</td>
<td>Lateral fin</td>
<td>Transverse fin</td>
<td>Tangent Dorsal</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>Mean</td>
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<tr>
<td>SL/Length of dorsal line</td>
<td>4.67 to 5.55</td>
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<td>7.65</td>
<td>7.75</td>
<td>6.663</td>
<td>1.14 to 1.41</td>
<td>1.24 to 1.49</td>
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<tr>
<td>SL/Length of anal fin base</td>
<td>5.76 to 6.16</td>
<td>6.060</td>
<td>6.67</td>
<td>6.99</td>
<td>7.20</td>
<td>6.310</td>
<td>1.14 to 1.41</td>
<td>1.24 to 1.49</td>
</tr>
<tr>
<td>L/Length of snout</td>
<td>2.74 to 3.14</td>
<td>3.140</td>
<td>5.96</td>
<td>6.99</td>
<td>7.20</td>
<td>6.310</td>
<td>1.14 to 1.41</td>
<td>1.24 to 1.49</td>
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<td>L/Width of interorb.</td>
<td>2.60 to 3.37</td>
<td>3.175</td>
<td>4.44</td>
<td>4.44</td>
<td>4.44</td>
<td>4.445</td>
<td>1.14 to 1.41</td>
<td>1.24 to 1.49</td>
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<td>L/Width of eye</td>
<td>2.33 to 2.45</td>
<td>2.400</td>
<td>3.88</td>
<td>3.88</td>
<td>3.88</td>
<td>3.885</td>
<td>1.14 to 1.41</td>
<td>1.24 to 1.49</td>
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<td>L/Width of mouth</td>
<td>2.12 to 2.49</td>
<td>2.395</td>
<td>3.42</td>
<td>3.42</td>
<td>3.42</td>
<td>3.425</td>
<td>1.14 to 1.41</td>
<td>1.24 to 1.49</td>
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<td>L/Length of max. barbel</td>
<td>2.74 to 3.91</td>
<td>3.645</td>
<td>5.14</td>
<td>5.14</td>
<td>5.14</td>
<td>5.145</td>
<td>1.14 to 1.41</td>
<td>1.24 to 1.49</td>
</tr>
<tr>
<td>L/Length of nasal barbel</td>
<td>4.70</td>
<td>6.45</td>
<td>6.45</td>
<td>6.45</td>
<td>6.45</td>
<td>6.455</td>
<td>1.14 to 1.41</td>
<td>1.24 to 1.49</td>
</tr>
<tr>
<td>L/Length of fin. anal.</td>
<td>2.76 to 4.14</td>
<td>3.225</td>
<td>6.45</td>
<td>6.45</td>
<td>6.45</td>
<td>6.455</td>
<td>1.14 to 1.41</td>
<td>1.24 to 1.49</td>
</tr>
<tr>
<td>L/Length of anal.</td>
<td>2.76 to 4.14</td>
<td>3.225</td>
<td>6.45</td>
<td>6.45</td>
<td>6.45</td>
<td>6.455</td>
<td>1.14 to 1.41</td>
<td>1.24 to 1.49</td>
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<tr>
<td>L/Length of dorsal fin</td>
<td>1.42 to 1.63</td>
<td>1.535</td>
<td>1.87</td>
<td>1.87</td>
<td>1.87</td>
<td>1.875</td>
<td>1.14 to 1.41</td>
<td>1.24 to 1.49</td>
</tr>
<tr>
<td>L/Length of dorsal fin base</td>
<td>1.75 to 1.86</td>
<td>1.835</td>
<td>2.53</td>
<td>2.53</td>
<td>2.53</td>
<td>2.535</td>
<td>1.14 to 1.41</td>
<td>1.24 to 1.49</td>
</tr>
<tr>
<td>L/Length of pectoral fin</td>
<td>1.43 to 1.70</td>
<td>1.615</td>
<td>2.08</td>
<td>2.08</td>
<td>2.08</td>
<td>2.085</td>
<td>1.14 to 1.41</td>
<td>1.24 to 1.49</td>
</tr>
<tr>
<td>L/Length of pelvic fin</td>
<td>1.78 to 2.00</td>
<td>1.890</td>
<td>2.30</td>
<td>2.30</td>
<td>2.30</td>
<td>2.305</td>
<td>1.14 to 1.41</td>
<td>1.24 to 1.49</td>
</tr>
<tr>
<td>L/Length of anal fin base</td>
<td>1.44 to 1.72</td>
<td>1.635</td>
<td>2.08</td>
<td>2.08</td>
<td>2.08</td>
<td>2.085</td>
<td>1.14 to 1.41</td>
<td>1.24 to 1.49</td>
</tr>
<tr>
<td>L/Length of anal. pector.</td>
<td>1.80 to 1.90</td>
<td>1.865</td>
<td>2.08</td>
<td>2.08</td>
<td>2.08</td>
<td>2.085</td>
<td>1.14 to 1.41</td>
<td>1.24 to 1.49</td>
</tr>
<tr>
<td>L/Length of anal. pelvic.</td>
<td>1.78 to 2.00</td>
<td>1.800</td>
<td>2.08</td>
<td>2.08</td>
<td>2.08</td>
<td>2.085</td>
<td>1.14 to 1.41</td>
<td>1.24 to 1.49</td>
</tr>
<tr>
<td>L/Length of anal. ventral.</td>
<td>1.80 to 2.00</td>
<td>1.865</td>
<td>2.08</td>
<td>2.08</td>
<td>2.08</td>
<td>2.085</td>
<td>1.14 to 1.41</td>
<td>1.24 to 1.49</td>
</tr>
</tbody>
</table>
Subgenus PSEUDOMYSTUS, nov.

Among the species referable to this subgenus there are two groups which I recognise as the stenomus complex and the leiacanthus complex of species. To the former belong the following species: *stenomus, vaillanti, incurvatus, subnakamensis, fuscus, moeschii*, and *brevicopa*. 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 eye, short anal fin and obtuse snout, whereas those in the *stenomus* complex differ in respect to these features and resemble the species in 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 genus *Mystus*.

**TABLE 84.** COMPARISON OF CERTAIN CHARACTERS OF THE *LEIACANTHUS* COMPLEX OF SPECIES WITH THE *STENOMUS* COMPLEX.

<table>
<thead>
<tr>
<th>Characters</th>
<th>leiacanthus complex</th>
<th>stenomus complex</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL/Body depth</td>
<td>3.50 to 5.02</td>
<td>4.50 to 7.00</td>
</tr>
<tr>
<td>SL/Head length</td>
<td>2.83 to 4.05</td>
<td>3.26 to 4.80</td>
</tr>
<tr>
<td>SL/Head depth</td>
<td>4.67 to 7.35</td>
<td>5.50 to 7.40</td>
</tr>
<tr>
<td>Characters</td>
<td>leiscanthus complex</td>
<td>stenodus complex</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>SL/Head width</td>
<td>3.89 to 6.37</td>
<td>4.30 to 6.50</td>
</tr>
<tr>
<td>LH/Eye</td>
<td>3.67 to 10.67</td>
<td>2.90 to 10.00</td>
</tr>
<tr>
<td>LH/Head width</td>
<td>2.35 to 3.20</td>
<td>1.90 to 3.33</td>
</tr>
<tr>
<td>LH/Int. Orb. Wdt.</td>
<td>2.50 to 3.56</td>
<td>1.96 to 3.60</td>
</tr>
<tr>
<td>LII/LCPD</td>
<td>1.27 to 2.00</td>
<td>1.16 to 2.03</td>
</tr>
<tr>
<td>LH/HCPD</td>
<td>1.91 to 2.82</td>
<td>1.56 to 3.08</td>
</tr>
</tbody>
</table>

**PROVISIONAL KEY TO THE SPECIES**

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

2a. Greatest depth of body 6.66 to 7.00 in standard length. Diameter of eye 7.90 to 9.00 in head length.

   iopromatus

2b. Greatest depth of body 6.00 in standard length. Diameter of eye 8.00 in head length.

   vaillanti

2c. Greatest depth of body 6.07 in standard length. Diameter of eye 7.7 in head length.

   mahakamensis

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

3a. Occipital process two to four times longer than width at its base.

4a. Cheithral processes one-fourth pectoral spine length.
5a. Diameter of eye 6.67 to 10.0 in head length. Least depth of caudal peduncle 1.44 in its length.

5b. Diameter of eye 4.38 to 4.66 in head length. Least depth of caudal peduncle 1.94 to 2.09 in its length.

4b. Cheithral processes half pectoral spine length.

6a. Occipital process 3.0 or 7.5 times longer than width at its base. Diameter of eye 5.75 to 7.14 in head length.

6b. Occipital process 2.0 or 3.0 times longer than width at its base. Diameter of eye 2.90 to 6.00 in head length.

3b. Occipital process equal to the width at its base.

7a. Length of head fewer than four times in standard length.

8a. Greatest depth of body 4.91 to 5.44 in standard length. Least depth of caudal peduncle 2.20 to 2.50 in its length.

8b. Greatest depth of body 3.50 to 4.75 in standard length. Least depth of caudal peduncle 1.09 to 1.60 in its length.

7b. Length of head more than four times in standard length.

9a. Length of head 4.40 to 4.80 in standard length. Diameter of eye 4.50 to 5.00 in head length. Least depth of caudal peduncle 2.0 in its length.

1. Occasionally the greatest body depth is 6.09 in standard
9b. Length of head 4.0 in standard length. Diameter of eye 8.0 in head length. Least depth of caudal peduncle 1.75 in its length.

RUGOSUS

LEIOCASSIS INORNATUS Boulenger

(Figure 48)


SPECIMEN STUDIED.— USNM 35718, Borneo, Hornaday coll., one specimen, 106.5 mm.

DESCRIPTION.— Body depth 6.66; head length 3.80; head width 6.26; head depth 7.74; predorsal length 2.54; postdorsal length 1.50; prepelvic distance 1.90, 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 of head at an angle of about 15 degrees to main body axis. Occipital process exposed, 1.5 times longer than width at its base and extending to the predorsal plate. Premaxillary band of teeth slightly produced laterally and 6.0 times as long as broad. Teeth on palate confined to vomer and 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, anterose teeth over posterior margin.
Cheithral processes three-fourth pectoral spine length.
Pelvic fin reaching anal fin origin. Longest anal ray not
extending to caudal fin. Caudal fin deeply forked. Lateral
line straight.

Proportional measurements, not given in the description,
are recorded in table 86, and counts in table 87.

COLOUR.— Uniformly dark-brown all over.

RELATIONSHIP.— This species connects the two subgenera and
is distantly related to *L. kararapensis*.

DISTRIBUTION.— Senah, Sarawak; north Borneo.

**LEIOCASSIDIS VAILLANTI** Regan

*Locassius moeschii* Vaillant (not Boulenger, 1893), Actes
de la Soc. Nat. de Paléont., XXXIV, p. 61, fig. 8, 1902
(type locality, River Ragoon).

*Locassius vaillanti* Regan, Ann. Nat. Hist., (5) XI,
p. 540, 1913 (new specific name, because
*moeschii* is preoccupied).

SPECIMEN STUDIED.— No specimen seen by me.

RELATIONSHIP.— This species is closely related to *L. inornatus*
differing in having a more deeply indent and shorter occipital
process.

DISTRIBUTION.— River Ragoon; North Borneo.

**LEIOCASSIDIS MOESCHII** Boulenger

(Figure 49)

(Sumatra).
SPECIMENS STUDIED.— RML 15859, Soekadana, Sumatra, June 1883, van Hasselt coll., two specimens, 68 and 61 mm.

RML 15860, Lampoeng B, Sumatra, Dec. 1881, van Hasselt coll., two specimens, 64 and 64 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 6.38); head depth 6.99 (6.80 to 7.11); predorsal length 2.55 (2.40 to 2.61); postdorsal length 1.54 (1.51 to 1.56); prepelvic distance 1.60 (1.56 to 1.79); length of longest ray of caudal fin 4.53 (3.70 to 4.23), all in standard length. Eye 6.47 (5.00 to 7.00) in head length; 1.93 (1.67 to 2.17) in interorbital space width; 1.85 (2.25 to 2.67) in snout length. Dorsal spine 1.57 (1.35 to 1.57); pectoral spine 1.25 (1.12 to 1.35) in head length. Adipose dorsal fin base longer than anal fin base. Least depth of caudal peduncle 2.36 (2.20 to 2.59) in its length.

Dorsal profile of head at an angle of about 20 degrees to main body axis. Occipital process exposed, equal to the width at its base and extending into the predorsal plate. Premaxillary band of teeth not produced laterally and 3.6 or 4.6 times as long as broad. Teeth on palate confined to vomer and in a semi-lunar, continuous band. Maxillary barbels reaching prenasalium; 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, antrorose teeth over posterior margin. Cheiural processes half pectoral spine length. Pelvic fin not reaching anal fin origin. Longest anal ray extending to caudal fin. Caudal fin deeply forked, with acutely pointed lobes. Lateral line straight.

Proportional measurements, not given in the description, are recorded in table 86, and counts in table 87.
COLOUR.— Uniformly brown above and on sides, lighter beneath.

RELATIONSHIP.— This species is related to *L. stenurus* differing in having narrower head, smaller eye, narrower interorbital space and smaller caudal peduncle depth.

DISTRIBUTION.— Deli, Lampoeng B, Soekadana; Sumatra.

REMARKS.— Three specimens were described under the specific name *Leiocassis moeschii* as follows: Boulenger in 1890, described a specimen 90 mm. long, from Sumatra, as a new species and named it, *L. moeschii*. In 1893, he obtained another specimen which he referred to this species. In 1907, 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


SPECIMEN STUDIED.— No specimen seen by me.
RELATIONSHIP. - This species is related to *L. moeschii* differing in having slightly shorter head, larger eye and greater caudal peduncle depth.

DISTRIBUTION. - Deli; Sumatra.

REMARKS. - Besides the characters cited above for differentiating this species from *moeschii*, the size of the supraclavicular plate and its extent of contact with the basal part of the cheithral processes are also useful.

**LEIOCASSIS RUGOSUS** Regan


SPECIMEN STUDIED. - No specimen seen by me.

RELATIONSHIP. - This species is related to *L. moeschii* differing in having slightly shorter head, smaller eye and greater caudal peduncle depth.

DISTRIBUTION. - Poeh: Sumatra.

REMARKS. - Regan (1915: 247) gave the type locality as Poeh, Sarawak, which should read Poeh: Sumatra.

**LEIOCASSIS STENOMUS** (Cuvier & Valenciennes)


SPECIMENS STUDIED.—USNM 109592, River Chantabun, Smith coll., one specimen, 62 mm.

HML 7554, Borneo, Niewenhuis coll., two specimens, 34 and 34.2 mm.

PML 6874, Y Bleeker’s coll., two specimens, 74 and 76 mm.

PML 7837, Sintang, Buttikofer coll., twelve specimens, 26 to 70 mm.

PML 15969, Krewang, Java, S. Muller coll., seven specimens, 29 to 40 mm.

ZSI F. 12099/1, River Sintang bari, 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 (2.73 to 2.86); postdorsal length 1.47 (1.41 to 1.54); propelvic distance 1.26 (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.
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.— This species is related to L. signatus differing in having smaller body depth, shorter occipital process, longer barbels, longer dorsal spine and different colouration.

DISTRIBUTION.— River Mahakam; Borneo.

1 LEIOCASSIS FUSCUS Popta

Leiocassis fuscus Popta, Notes Leyden Mus., XXIV, p. 158, 1904 (type locality, River Mahakam).

Leiocassis fuscus Hora & Gupta, Bull. Raffles Mus., no. 17, p. 25, 1941 (Johore).

SPECIMEN STUDIED.— RFM (Not numbered), swift stream in Mawai district, Johore, March 1928, H. W. F. Tweedie coll., one specimen, 37 mm.

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.

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1. 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.
Dorsal profile of head at an angle of about 20
degrees to main body axis. Occipital process subcutaneous,
2.0 times longer than width at its base and extending to the
predorsal plate. Premaxillary band of teeth not produced
laterally and 3.0 times as long as broad. Teeth on palate
confined to vomer, palatines and 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, anteriose teeth
over posterior margin. Cheilural processes one-fourth
pectoral spine length. Pelvic fin not reaching anal fin origin.
Longest anal ray not extending to caudal fin. Caudal fin
deeply forked. Lateral line straight.

Proportional measurements, not given in the description,
are recorded in table 86, and counts in table 87.

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

RELATIONSHIP.— This species is related to L. stenacanth differing
in having smaller eye and brighter coloration, besides a
spatulate ventral and non-filamentous caudal fin.


LETIOCASSIS LEIACANTHUS Weber & Beaufort

**LETIOCASSIS LEIACANTHUS** Weber & Beaufort in Alfred Maasz, "Durch
Zentral-Sumatra. II, Pische, p. 15, 1912 (type
Locality, River Kwantum).— Herre & Myers, Bull
Raffles Mus., no. 13, p. 69, 1977 (Johore, River
Plus).—Hora & Gupta, Bull. Raffles Mus., no
p. 26, 1941 (River Plus).
SPECIMENS STUDIED.—USNM 101263, Lake Chia Chia, Laishana, Jasin, March 26, 1934, one specimen, 75 mm.

specimen, 43 mm. ZMB 181.651, Pahoke, Sumatra, one

RPM (Not numbered), Kota Alor, Johore, Malaya, 1955, N. E. Toft coll., two specimens, 65.4 mm. 47.5 mm.

DESCRIPTION.—Body depth 4.27 (3.60 to 4.75); head length 3.31 (2.87 to 3.65); head width 1.01 (1.02 to 1.37); head depth 5.16 (4.67 to 5.52); predorsal length 4.5 (4.06 to 5.46); postdorsal length 1.50 (1.52 to 1.69); prepectoral distance 1.94 (1.84 to 2.07); length of longest ray of anal fin 2.26 (3.80 to 4.67), all in standard length. Eye 3.68 (3.67 to 10.67) in head length; 7.53 (1.71 to 7.75) in interorbital space width; 2.75 (1.56 to 7.67) in body length. Lateral spine 1.16 (1.57 to 4.29); pectoral spine 1.7 (1.87 to 1.60) in head length.

Adipose dorsal fin was longer than anal fin. Least depth of caudal peduncle 1.77 (1.60 to 1.60) in its length.

Dorsal profile of head at an angle of about 25 degrees to main body axis. Opercular process exposed, nearly equal to the width at its base and extending to the predorsal plate.

Premaxillary band of teeth slightly pronounced laterally and 3.0 or 4.0 times as long as broad. Teeth on palate confine to vomer and 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, anterose teeth over posterior margin. Opercral processes half pectoral,

Proportional measurements, not given in the description, are recorded in table 36, and counts in table 27.

COLOUR.- Brown above and on sides, with three or more white cross bands, lighter beneath. RFM specimens are light-brown.

RELATIONSHIP.- This species is related to L. stigmatica differing in having longer and broader head, testicles smaller eye.


LEIOCASSIS SIAMENSIS Regan


SPECIMENS STUDIED.- ZSI F. 737/2, Menam Kian, R. U. Deignan coll., two specimens, 105.5 and 11.0 mm.

95.5 mm. ZMA 101. 495, Pak Jong, Siam, one specimen, 95.5 mm.

USZ 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 1.5" (1.50 to 1.70); propulsive distance 1.85
(1.78 to 1.91); length of longest ray of caudal fin 1.51 (4.15
to 4.47), all in standard length. Eye 6.002 (5.25 to 7.14)
in head length; 1.39 (1.77 to 2.22) in interorbital space width;
2.18 (1.92 to 2.57) in snout length. Dorsal spine 1.5 (1.23 to
1.47) (N = 3); pectoral spine 1.23 (1.25 to 1.31) in head length.
Adipose dorsal fin base equal to anal fin base. Least depth of
caudal peduncle 1.73 (1.76 to 1.93) in its length.

Dorsal profile of head at an angle of about 45 degrees
to main body axis. Occipital process subcutaneous, 1.5 or 1.5
times longer than width at its base and extending to the predorsal
plate. Premaxillary band of teeth slightly produced and 3.0 or
4.0 times as long as broad. Teeth on palate confined to vomer
and in a deeply curved continuous band. Maxillary barbels reaching
operculum; others shorter. Orbital rim 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, antroso or vertical teeth over
posterior margin. Cheirural processes half pectoral spine length.
Pelvic fin not reaching anal fin origin. Longest anal ray not
extending to caudal fin. Caudal fin forked. Lateral line
straight.

Proportional measurements, not given in the description,
are recorded in table 86, and counts in table 87.

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 extend over the fine
A black spot on each lobe of the caudal is also present.

RELATIONSHIP.- This species is related to _L. leucasanthus_, differing in having narrower and smaller head depth, larger eye, somewhat smaller body depth and greater caudal peduncle depth.

DISTRIBUTION.- River Bangpakong, River Chantabun, Nom Chao Phya, Doi Angka, Nam Khan, Meklong, Mewang, Nam Mun, River Nontaburi, Pak Jong, Nam Talat, Nam Than, Trang, Siam.

REMARKS.- Regan (1917: 550) described this species from a single specimen taken from the River Bangpakong and sent to the British Museum by the Royal Siamese Museum in 1897. Since then, the species has been extensively recorded from Siam. Fowler (1926, 1929) described three species _Lelocassis albicollaris_, _L. bicolor_ and _L. albicollis_, all related to _siamensis_. Smith (1945: 779) 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_. The following table compares certain characters of the two species.
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<tr>
<th>Characters</th>
<th>siamensis</th>
<th>bicolor</th>
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<tr>
<td>Snout/Eye</td>
<td>1.97 to 2.57</td>
<td>1.63 to 1.75</td>
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**Leiocassis bicolor** Fowler


**SPECIMENS STUDIED.**—USNM 102107, Chiangmai, northern Siam, Dec. 1932, De Schauensee coll., one specimen, 73 mm.

USNM 102108, Chiangmai, northern Siam, Dec. 30, 1933, De Schauensee coll., two specimens, 56 and 62 mm.

**DESCRIPTION.**—Body depth 4.60 (4.17 to 4.96); head length 3.56 (3.29 to 3.84); head width 5.67 (5.49 to 5.90); head depth 6.21 (5.90 to 6.64); predorsal length 2.47 (2.43 to 2.56); postdorsal length 1.58 (1.52 to 1.65); prepelvic distance 1.86-
(1.32 to 1.89); length of longest ray of caudal fin 7.77
(3.61 to 3.95), all in standard length. Eye 1.87 (4.38 to
4.86) in head length; 1.65 (1.50 to 1.75) in interorbital
space width; 1.69 (1.63 to 1.75) in snout length. Dorsal
spine 1.20 (1.12 to 1.56); pectoral spine 1.76 (1.49 to 1.56)
in head length. Adipose dorsal fin base longer than anal
fin base. Least depth of caudal peduncle 7.61 (1.98 to 2.60)
in its length.

Dorsal profile of head at an angle of about 10
degrees to main body axis. Occipital process exposed, 7.6 or
4.0 times longer than width at its base and extending to the
protdorsal plate. Premaxillary band of teeth not produced
laterally and 3.5 to 4.5 times as long as broad. Teeth on
palate confined to vomer and in a slightly curved continuous
band. Maxillary barbel reaching preoperculum; others shorter.
Orbital rinc fused with eye. Longest ray of dorsal fin
extending to adipose fin when depressed. Dorsal spine with
feebler teeth over posterior margin. Pectoral spine with 10 to
13 strong, anterose teeth over posterior margin. Cheilotheral
processes one-fourth pectoral spine length. Pelvic fin not
reaching anal fin origin. Least anal ray not extending to

Proportional measurements, not given in the description,
are recorded in table 66, and counts in table 57.

COLOUR.—Light brown above and on sides, dull white beneath.
Four broad, vertical dark-brown bands present over body.
Caudal fin pale yellow.

RELATIONSHIP.—This species is related to L. aethiops dif-fer-
in having broader and deeper head and larger eye, besides less
prominent colouration.
DISTRIBUTION.— Bangkok, Chiangmai, Nepoon, Pitsanulok; Siam.

REMARKS.— I follow Smith (1945: 381) in considering Leiocassis albicollaris as a synonym of bicolor.
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<td>cressirostris</td>
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<td>stenomus</td>
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<td>leiacanthus</td>
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<td>siamensis</td>
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<td>bicolor</td>
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</table>
HETEROBAGRUS BOCOURTI Bleeker

(Figure 50)


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

USNM 109605, Menam Ping, Chiangmai, 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 1.50 (1.47 to 1.52); propelvic 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) 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 of head at an angle of about 30 degrees to main body axis. Occipital process exposed, 3.0 or 4.0 times longer than width at its base and extending to the predorsal plate. Premaxillary band of teeth produced laterally and 5.0 or 6.0 times as long as broad. Teeth on palate in a horse-shoe-shaped band, separated at the centre 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.

Cheithral processes one-fourth pectoral spine length. Pelvic fin not reaching anal fin origin. Longest anal ray not extending to caudal fin. Lateral line nearly straight.

Proportional measurements, not given in the description, are recorded in table 75, and counts in table 76 (suprapp.112).

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.—Bangkok, Khlong Ban Po, Menam Chao Phya, Chiangmai, Lopburi, Menam Mun, Paknampo, Menam Pasak, Menam Ping, Pitsanulok, Nakhon Rachasima, Menam Sak; Samut.

REMARKS.—Fowler (1934: 339) described *Mekhalsichthys rox* as differing from *Heterobagrus bocourti* in the count of the gill rakers, dentition and colour. In 1935 a (106), he considered his species as a synonym of *bocourti*, but in 1937 (152) reconsidered *rox* as valid. Smith (1945: 393) after examining three specimens taken at random from the Menam Lopburi found the contrasting characters of *rox* to be within the range of
individual variation of *bocourti*. *Prajadhipokia rex* is stated to have the gill rakers on the long arm 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 specimens of *bocourti* examined by me have the gill rakers as below.

<table>
<thead>
<tr>
<th>Standard length</th>
<th>Gill rakers</th>
</tr>
</thead>
<tbody>
<tr>
<td>100.5 mm</td>
<td>4+7</td>
</tr>
<tr>
<td>108.0 mm</td>
<td>4+9</td>
</tr>
<tr>
<td>117.0 mm</td>
<td>4+7</td>
</tr>
<tr>
<td>117.0 mm</td>
<td>4+7</td>
</tr>
<tr>
<td>129.5 mm</td>
<td>4+9</td>
</tr>
<tr>
<td>130.0 mm</td>
<td>4+10</td>
</tr>
</tbody>
</table>

It is clear from the above, 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 BACHIDINAE, nov.

(Figure 52)

Cranium elongated and completely ossified. Back of cranium deeply excavated. Lateral ethmoid facet for the articulation of the palatines strictly ventral and is seen only from below. Palatines edentate and firmly connected to the palato-quadrate bar. Maxillaries reduced. Vomer a median, large dentigerous bone. Ectopterygoid absent. Ectopterygoid fused with meta-pterygoid, which is firmly connected to the palato-quadrate bar. Post-temporal bones with a large expanded plate at their distal ends, and with the anterior faces perforated at the centre by a tubular socket. Supracleithrum articulating from a groove formed by the exoccipitals and post-temporal bones. Exoccipitals flattened distally. Parapophyses of fourth vertebra a vertical lamina, by which the air-bladder is excluded from contact the post-temporal bone. Parapophyses of fifth and sixth vertebra fused at their bases to form a subvertebral plate. Sixth vertebra the first to bear ribs. Vertebrae 39 to 42.

Nostrils simple; the posterior pair bears the nasal barbels. Pelvic fins with six rays. Air-bladder large, pyriform, free, thick walled, with an internal median longitudinal septum and an anterior transverse septum. Lateral or posterior caecum absent.
KEY TO THE GENERA

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

1b. 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


Body short and compressed. Dorsal profile strongly arched. Head small and compressed. Snout conical, but not produced. Jaws subequal. Lips thick and papillated. Mouth subterminal and narrow. Villiform teeth on premaxillaries and mandibular in bands; that on former not produced laterally, that on latter produced laterally, but with rounded ends; only molariform teeth on vomer (Figure 54). Eyes large, superior and in anterior part of head. Supraclepital covered with skin and with a backward extending process. Four pairs of barbels; one maxillary, two mandibular and one nasal. Mental procs conspicuous. Gill membranes united with each other, but free from isthms. Branchiostegals seven or eight.

Origin of rayed dorsal fin above three-fourth pectoral fin; with seven rays and a spine. Adipose dorsal fin long, high smooth and with the posterior margin free, but occasionally s—
also. Pectoral fins horizontally inserted and with a spine. Pelvic fins inserted on ventral surface, below first ray of dorsal fin. Anal fin with 17 to 18 rays. Caudal fin simply forked with non-filamentous lobes. Lateral line may be with a row of white fibrils.

Vertebræ 78, 16 precaudal and 16 caudal.

DISTRIBUTION.—Mainly found in Sumatra, Sumatra and Siam, with one species in China.

Bleeker (1851: 26) proposed the genus *Pseudobagrus* with *B. melapomus* as the type species. It was subsequently from the coast of all *Bagrus* Bleeker (1851) by the absence of labial teeth on the lower jaw, a well-developed vomerine band of teeth, by the long, slender anal fin, and the non-filamentous caudal fin. P. t. *Pseudobagrus*

Bleeker synonymy: *Bagrus* charchurus Bleeker (1851) with *B. pseudobagrus* in Bleeker's *Genus of Bagrus*.

*Pseudobagrus* is characterized by several unique characters, such as the lack of labial teeth on the lower jaw, a well-developed vomerine band of teeth, and a non-filamentous caudal fin. Moreover, the elongated anal fin with a spine and the rounded base of the pectoral fin are distinctive features of *Pseudobagrus* species. These characteristics set *Pseudobagrus* apart from the closely related *Bagrus* and *Hypoplectrus* species.
resembles Barcleides, in having no labial notch on the lower jaw and a single non-filiform tooth in each. Of the two characters, the latter is more decisive and in most instances serves to distinguish the common non-breeding individuals from the filiform prolusions. Likewise, the presence or absence of "dental teeth" is also a reliable character (Lund 1934, 1935). Thus, the characters shown by Barcleides affinis are like those of Barcleides affinis inerme. Therefore, I conclude that Barcleides affinis inerme is conspecific with Barcleides affinis Barcleides affinis.

Bagroids sp.

Locality: Sum. Soc. ind. litt., VI, no. 7, p. 147, 1887 (type locality, Bontabari).

Specimens Studied. - ZMA 101, 476, Palembang, Sumatra, one specimen, 72 mm.

ZMA 103, 118, Sumatra. Borneo, June 15, 1909, H. A. Lorenz, coll., two specimens, 77 and 76 mm.

ZMA 111, 146, Palembang, Sumatra, Feb. 1911, Salm coll., one specimen, 159 mm.

ZMA 141, 167, Indo-Austral. Archipelago, Bleeker’s collection, one specimen (with only one eye), 195 mm.

BML 3911, Sumatra, Borneo, Battikoffler coll., one specimen, 160 mm.

BML 3912, Sumatra, Borneo, Battikoffler coll., one specimen, 185 mm.

BML 3928, Borneo, Müller coll., two specimens, 173 and 174 mm.

BML 15185, locality unknown, Rotterdam Zoological Museum coll., one specimen, 170 mm.

BML 2970, Borneo, 1845, Schwanaer coll., one specimen, 168.5 mm.

251 F. 10556/1, Bontabari, Sum. Dr. & Mrs. Smith coll., two specimens, 75 and 85 mm.

Description. - Body depth 6.01 (5.97 to 6.09); head length 4.11 (3.63 to 4.47); head width 7.45 (6.53 to 8.62); head depth 6.73 (6.02 to 7.59); predorsal length 2.14 (2.12 to 2.81); postdorsal
length 1.55 (1.50 to 1.64); propulsive 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) in 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 (1.559 to 2.71) in its length.

Dorsal profile of head at an angle of about 40 degrees to main body axis. Occipital process subcutaneous, 3.0 or 4.0 times longer than width at its base and extending to the predorsal plate. Premaxillary band of teeth 1.25 times as long as broad. Teeth on palate confined to vomer and in a single undivided semicircular 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, entroverse teeth over posterior margin. Chiæthral processes three-fourth pectoral spine length. Pelvic fin reaching anal fin origin. Longest anal ray not extending to caudal fin. Lateral line straight.

Proportional measurements, not given in the description, are recorded in table 89, and counts in table 90.
B. melapterus was recorded by Sauvage (1887: 154) from Siam for the first time. Weber & Beaufort (1917: 346) and Smith (1945: 377) included the species as occurring in Siam on the strength of Sauvage's record. The two specimens collected by Smith are the second record from Siam.

ZMA 101. 361 and ZSI F. 10556/4 have an eye on their left side. In the case of the second specimen, a rudimentary subcutaneous eye is present, but in the case of the first no trace of an eye could be seen (Figure 55).

**BAGRIOIDES HIRSUTUS** (Herre)

(Figure 66)

Liocassis hirsutus Herre, Lingnan Sci. J., XII, p. 265, 1934s
(type locality, Wuchow).

**SPECIMEN STUDIED.** - ZMA 13985, 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.** - This species is related to B. melapterus differing by characters cited in the key.

**DISTRIBUTION.** - Wuchow, Kwang-si province; China.

**REMARKS.** - Herre (1934: 185) described two specimens 230 and 280 mm. long as *Liocassis hirsutus*. The description of the species states that the nape is noticeably bulging, vomerine teeth in broad masses, lateral line with a row of white fibrils, and epidermis hair-like. Since none of these features is common to the genera *Liocassis*, *Pseudobagrus*, *Palteobagrus* or *Mystus*, the generic assignment of the species seemed doubtful.
Through the courtesy of Prof. George S. Myers, of Stanford University, Stanford, the paratype of *Leiocassis hirsutus* preserved in the Stanford Natural History Museum, 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 *Leiocassis* where they are totally free.

*Bagroides* is generally found in Siam, Sumatra and Borneo. The occurrence of *hirsutus* far north in China is remarkable.
Genus BAGRICHTHYS Bleeker


PSEUDOBAGRICHTHYS Bleeker Atlas Ichthyologiae, II, p. 9, 1862. (Type species, Pseudobagrichthys macrostegus BLEEKER, by original designation).


Jaws subequal. Lips thick and papillated. Both mandibular and narrow. Posteriform teeth on premaxillaries, maxillaries and mandibles in bands; enlarged labial teeth may be additionally present on latter, and with the band produced laterally. Eyes large, superior one in anterior part of head. Supraoculars covered with skin and with a backward extension process. Four pairs of barbels; one maxillary, two mandibular and one nasal; mandibular pair occasionally branched in adults. Gill membranes united with each other, but free from isthmus. Branchiostegal seven or eight.

Origin of rays of dorsal fin above three-fourth of pectoral fin; with seven rays and a spine. Adipose dorsal fin long, high, smooth and with the posterior margin adnate to body. Pectoral fins horizontally inserted and with a spine. Pelvic fins inserted on ventral surface, below last ray of dorsal fin. Anal fin with 17 to 15 rays. Caudal fin forked, lobes occasionally produced into filaments. Lateral line simple.

Vertebrae 4, 28 caudal and 14 precaudal.

DISTRIBUTION.- Mainly found in East Indies and Siam.
Bagrichthys resembles Bagroides Bleeker, Heterobagrus Bleeker and Synodontis Cuvier in many external characters.

It resembles Synodontis in having the mandibular barbels branched, a compressed body, movable labial barbels and a filamentous caudal fin (in some species of Synodontis only).

It differs from it, in having a dentigerous alisie, four pairs of barbels (versus three pairs in Synodontis), all membranes free from the isthmus and in the absence of a cephalo-neckal shield. It is zoogeographically a remarkable fact that Bagrichthys resembles an African genus which is primitive. Bleeker (1859: 49) also commented on this noteworthy affinity. A comparison of certain characters of Bagrichthys with the other three genera cited in the beginning, is presented in Table 28.

KEY TO THE SPECIES

1a. Caudal peduncle length C.65; interorbital space width 3.20, in head length.

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

2a. Interorbital space width 3.33 to 3.50 in head length. Greatest depth of body 5.6 to 5.5 in standard length.

   macropterurus

2b. Interorbital space width 3.7 to 4.13 in head length. Greatest depth of body 3.7 to 4.50 in standard length.

   macrogenthus
<table>
<thead>
<tr>
<th>Characters</th>
<th>Bagroides</th>
<th>Bagrichthys</th>
<th>Heterobagrus</th>
<th>Symodentia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shape of body.</td>
<td>Short and compressed.</td>
<td>Rather long and much</td>
<td>Rather long and compressed.</td>
<td>Short or moderately</td>
</tr>
<tr>
<td></td>
<td>Nape not much elevated.</td>
<td>compressed.</td>
<td>Nape elevated.</td>
<td>long, slightly compressed</td>
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<tr>
<td>Orbital rims.</td>
<td>Fused with eye.</td>
<td>Fused with eye.</td>
<td>Free from eye.</td>
<td>Moderately narrow and crescentic.</td>
</tr>
<tr>
<td>Labial teeth on</td>
<td>Absent.</td>
<td>May be present.</td>
<td>Absent.</td>
<td>Free from eye.</td>
</tr>
<tr>
<td>lower jaw.</td>
<td>In a single semicircular patch.</td>
<td>In a semi-lunar or reniform band.</td>
<td>In a semi-lunar band separated at</td>
<td>Present, movable and slender.</td>
</tr>
<tr>
<td>Teeth on vomer.</td>
<td>Free from isthmus and united</td>
<td>Free from isthmus and united and</td>
<td>Free from isthmus and also from</td>
<td>Absent.</td>
</tr>
<tr>
<td></td>
<td>with each other.</td>
<td>with each other.</td>
<td>each other.</td>
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<tr>
<td>Mandibular barbels.</td>
<td></td>
<td></td>
<td></td>
<td>Always branched.</td>
</tr>
</tbody>
</table>
BAGRIGHTHYS MACRACANTHUS (Bleeker)

(Figure 57)


Pseudobagrighthys 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, ffigs. 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 2.79 (2.76 to 2.84) 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 of head at an angle of about 45 degrees to main body axis. Occipital process subcutaneous, 5.0 or 6.0 times longer than width at its base and extending to the predorsal plate. Premaxillary band of teeth not produced laterally and 2.25 times as long as head; a few teeth towards outer edge enlarged. Teeth on palate confined to vomer and in a single reniform band; a few teeth towards outer edge enlarged (Fig. 68). Maxillary processes reaching posterior margin of eye; others shorter. Lateral ray of dorsal fin extending to anal fin origin; dorsal spine with 20 or 22 well-developed teeth over posterior margin. Pectoral spine with 18 to 20 strong, vertical teeth over posterior margin. Cheirol processos one-fourth pectoral spine length. Pelvic fin not reaching anal fin margin. Lowest anal ray not extending to caudal fin. Lateral line nearly straight.

Proportional measurements, not given in the description, are recorded in Table 59, and counts in Table 96.

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

RELATIONSHIP.— This species is related to B. macrosternus differing in having broader interorbital space and smaller body depth.

DISTRIBUTION.— River Batang Reul, Djumbi, Djajara, River Enim, Indragiri, River Lematong, Palembang, Selten, River St Finasa; Sumatra. River Malakan: Borneo. Menam Chao Phya, Nakon Nayok, Yai Island: Siam.
REMARKS.- Weber & Beaufort (1913: 350) doubtfully synonymized Leiocassis macropterus with this species. Popen (1960: 288) assigned L. macropterus to Equoidae and proposed a substitute specific name vaillanti since macropterus is preoccupied. The species is undoubtedly Euphrictys as seen from the published description and figures. E. vaillanti differs from macracanthus in having shorter dorsal 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.

EUPHRICTYS MACRACANTHUS (Bleeker)


Pseudobrirchthesis macracanthus Bleeker, Atl. Ichthyol., II, p. 57, pl. xiv, fig. 2, 1867 (Muna Kompeh, Palembang).

Bagroides (Pseudobrirchthesis) macracanthus Suvatti, Index to Fishes of Siam, p. 77, 1926 (Bangpakong, Nakon Nayok).

SPECIMEN STUDIED.- USNM 10301, Bangpakong, Siam, E. K. Smith coll., two specimens, 137 and 190 mm.
DESCRIPTION.—Body depth 5.215 (5.26 to 5.27); head length 4.945 (4.89 to 5.00); head width 8.66 (8.77 to 9.07); head depth 7.977 (7.89 to 8.06); predorsal length 2.82 (2.89 to 2.83); postdorsal length 1.55 (1.48 to 1.66); prepelvic distance 2.11 (2.11 to 2.11); length of longest ray of caudal fin 7.075 (7.2 to 7.3); all in standard length. Eye 1.99 (5.60 to 6.00) in head length; 1.79 (1.76 to 1.80) in head-orbital space width; 7.16 (2.7 to 2.8) in head length. Dorsal spine 1.57 (1.61 to 1.66); pectoral spine 1.65 (1.66 to 1.66) in head length. Adipose dorsal fin extends to or beyond anal fin base. Least depth of caudal peduncle 1.89 (1.7 to 1.72) in its length.

Dorsal profile of head at an angle of about 70 degrees to main body axis. Occipital process subcylindrical, 1.0 or 1.0 times longer than thick at its base and extending to the predorsal plate. Premaxillary band of teeth not reduced laterally and 1.5 times as long as broad. Teeth on palate confined to vomer and to upper narrow, semi-lunar 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, anterose teeth over posterior margin. Cleithral processes three-fourth pectoral spine length. Pelvic fin not reaching anal fin origin. Longest anal ray not extending to caudal fin. Lateral line nearly straight.

Proportional measurements, not given in the description, are recorded in Table 89, and counts in Table 90.
COLOUR. - Deep brown above and on sides, yellow beneath. Cheithral processes and spines tinge of its given.

RELATIONSHIP. - This species is related to B. macrourus differing in having somewhat to a orbital spine and greater body depth.

DISTRIBUTION. - Borneo, Kalimantan, Celebes, Sumatra. Rivers Langkat, Melaka River, etc.


DESCRIPTION. - Body ellipsoid; standard length, 7.38; head length, 3.23; snout length, 1.01; pectoral fin 5.8; operculum 5.76; distance from snout to origin of caudal fin, 4.82, all in standard length. Eye 2.7.1 in snout length; 1.3 in snout length. Dorsal spine longer than head length. Pectoral spine 1.26 in head length.

Adipose dorsal fin base longer than anal fin base. Least depth of caudal peduncle 2.29 in its length.
Dorsal profile of head at an angle of about 25 degrees to main body axis. Occipital process subcubaneous, 2.0 times longer than high at its base and extending to the pre-dorsal plate. Premaxillary band of teeth slightly produced at the sides and 7.6 times as long as broad; a few teeth towards outer edge enlarged (Figure 89). Teeth on palate confined to upper end in a semi-linear band; a few teeth towards outer edge enlarged. Maxillary barbels reaching operculum; others shorter. Largest ray of dorsal fin extending to adipose fin when depressed. Dorsal spine with ten feeble, upward facing teeth over posterior end. Pectoral spine with 17 strong, submarginal teeth over posterior margin. Cheithral processes half pectoral spine length. Pelvic fin reaching anal fin origin. Longest anal ray extending to caudal fin. Lateral line nearly straight.

Proportion 1 measurement, not given in the description are recorded in tables 95 and 96. COLOUR.—Dark-brown (lighter in juveniles) above and on sides, lighter beneath. Lateral line a narrow white band. Fin tips tinged black.

RELATIONSHIP.—This species is related to B. ammophthalmus differing in having the caudal peduncle longer than head.

DISTRIBUTION.—River Kapuas, Sintang; Borneo. Djambi, Palembang, River Musi, River Rokan; Sumatra. River Solo; Java. The last locality is a new record.
<table>
<thead>
<tr>
<th>Proportional measurements</th>
<th>BAGROIDES helupterus</th>
<th>BAGROIDES macropterus</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL/Length of dorsal spine</td>
<td>2.98 to 5.00 (N = 14)</td>
<td>3.495 to 5.17 (N = 14)</td>
</tr>
<tr>
<td>SL/Length of anal fin</td>
<td>5.16 to 7.38 (N = 14)</td>
<td>6.60 to 7.77 (N = 14)</td>
</tr>
<tr>
<td>Lh/Length of snout</td>
<td>2.60 to 3.53 (N = 14)</td>
<td>2.63 to 3.27 (N = 14)</td>
</tr>
<tr>
<td>Lh/Width of int. orb. spe</td>
<td>2.76 to 4.78 (N = 14)</td>
<td>3.04 to 3.77 (N = 14)</td>
</tr>
<tr>
<td>Lh/Width of gap. of mouth</td>
<td>3.70 to 4.81 (N = 14)</td>
<td>4.11 to 4.77 (N = 14)</td>
</tr>
<tr>
<td>Lh/Length of max. barbel</td>
<td>1.00 to 1.75 (N = 14)</td>
<td>1.00 to 1.75 (N = 14)</td>
</tr>
<tr>
<td>Lh/Length of nasal barbel</td>
<td>1.57 to 4.17 (N = 14)</td>
<td>1.995 to 3.77 (N = 14)</td>
</tr>
<tr>
<td>Lh/Length of inn. mand. b.</td>
<td>3.00 to 4.72 (N = 14)</td>
<td>--- to --- (N = 14)</td>
</tr>
<tr>
<td>Lh/Length of out. mand. b.</td>
<td>1.97 to 3.86 (N = 14)</td>
<td>--- to --- (N = 14)</td>
</tr>
<tr>
<td>Lh/Length of dorsal fin</td>
<td>1.05 to 1.39 (N = 14)</td>
<td>0.72 to 1.06 (N = 14)</td>
</tr>
<tr>
<td>Lh/Length of dor. fin. base</td>
<td>1.50 to 1.87 (N = 12)</td>
<td>1.67 to 1.95 (N = 14)</td>
</tr>
<tr>
<td>Lh/Length of pectoral fin</td>
<td>1.00 to 1.56 (N = 14)</td>
<td>1.36 to 1.79 (N = 14)</td>
</tr>
<tr>
<td>Lh/Length of pelvic fin</td>
<td>1.48 to 1.74 (N = 14)</td>
<td>1.29 to 1.57 (N = 14)</td>
</tr>
<tr>
<td>Lh/Length of anal fin</td>
<td>1.30 to 1.95 (N = 14)</td>
<td>1.27 to 1.51 (N = 14)</td>
</tr>
<tr>
<td>Lh/Length of caud. ped.</td>
<td>1.16 to 1.52 (N = 14)</td>
<td>0.65 to 0.69 (N = 14)</td>
</tr>
<tr>
<td>Lh/Least depth of caud. ped.</td>
<td>2.00 to 2.71 (N = 14)</td>
<td>2.41 to 2.73 (N = 14)</td>
</tr>
<tr>
<td>Genera and Species</td>
<td>Level</td>
<td>Fin</td>
</tr>
<tr>
<td>--------------------</td>
<td>-------</td>
<td>-----</td>
</tr>
<tr>
<td>BAGROIDES melapterus</td>
<td>15</td>
<td>1 1 13 -</td>
</tr>
<tr>
<td>BAGRIGHTHYS macracanthus</td>
<td>3</td>
<td>1 1 1 -</td>
</tr>
<tr>
<td>macropterus</td>
<td>2</td>
<td>- - 2 -</td>
</tr>
<tr>
<td>hyposcopterus</td>
<td>1</td>
<td>- - 1 1</td>
</tr>
</tbody>
</table>
Subfamily AUCHENOGLANIDINAE, nov.
(Figure 69)

Craniun anteriorly conical, posteriorly broad and completely ossified. Back of cranium deeply excavated. Lateral ethmoid facet for the articulation of the palatines more lateral than ventral. Palatines rod-like, edentate and firmly connected to the palato-quadrate bar. Maxillaries large and hidden in the lip. Vomer a reduced, longitudinally disposed edentate bone, fused with the parasphenoid. Ectopterygoid absent. Ectopterygoid rudimentary and firmly connected to the palato-quadrate bar. Post-temporal bones with an expanded plate. Supraclithrum articulating from a groove presented by the exoccipitals and post-temporal bones. Exoccipitals without any modifications distally. Parapophyses of fourth vertebra with a stout ramus flattened antero-posteriorly and attached to the expanded outer face of the inferior limb of the post-temporal bones. Parapophyses of fifth to eighth vertebrae fused into a broad, expanded subvertebral plate. Ninth vertebra the first to bear ribs. Paired subvertebral processes present. Vertebrae 43 to 48.

Nostrils modified; posterior pair slit-like.

Pelvic fins with six rays. Air-bladder moderately large, free, thick-walled, with an internal median longitudinal septum and an anterior transverse septum. Lateral or posterior casuum absent.
KEY TO THE GENERA

1a. Dorsal fin rays six or seven. Adipose dorsal fin high and its origin far ahead from caudal fin base.

2a. Teeth on jaws in rudimentary patches. Lips thick and papillated.  

**Auchenoglanis**


**Parachenoglanis**

1b. Dorsal fin rays 12 to 20. Adipose dorsal fin low and its origin very near the caudal fin base.

3a. Dorsal fin rays 12 to 15. Pelvic fin inserted on ventral surface, below last quarter of dorsal fin from the anterior.  

**Notoplanidium**

3b. Dorsal fin rays 19 or 20. Pelvic fin inserted on ventral surface, below first quarter of dorsal fin from the anterior.  

**Ilauchenoglanis**

Genus **AUCHENOGLANIS** Günther


Origin of rayed dorsal fin above three-fourth pectoral fin; with six or seven rays and a spine. Adipose dorsal fin long, high, smooth and with the posterior margin free. Pectoral fins horizontally inserted and with a spine. Pelvic fins inserted on ventral surface, vertically below last ray of dorsal fin or slightly ahead. Anal fin with 10 to 16 rays. Lateral line simple.

Vertebrae 43 to 48, 25 to 27 precaudal and 18 to 21 caudal.

DISTRIBUTION. - French West Africa to Lake Tanganyika.

PROVISIONAL KEY TO THE SPECIES

1a. Occipital process extending to the predorsal plate.

2a. Occipital process large, rugose and nearly equal to the width at its base. 

2b. Occipital process small, smooth and longer than width at its base.

3a. Pelvic fin reaching anal fin origin.

4a. Length of snout 2.0 to 2.2 in head length. Anal fin rays, 15 to 17.
4b. Length of snout 1.83 to 2.0 in head length. Anal fin rays 10 or 11.

3b. Pelvic fin not reaching anal fin origin.

5a. Maxillary barbels generally not reaching beyond pectoral spine base.

6a. Greatest depth of body 4.0 to 4.46; head length 3.13 to 3.17, in standard length.

6b. Greatest depth of body 6.0; head length 2.6, in standard length.

5b. Maxillary barbels generally reaching beyond pectoral spine base.

7a. Least depth of caudal peduncle 0.59 to 0.62 in its length.

7b. Least depth of caudal peduncle 1.32 in its length.

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

8a. Longest anal fin ray extending to caudal fin base.

9a. Head width less than 1.5 (1.3 to 1.5) in head length.

10a. Length of snout two times; diameter of eye six times, in head length.

10b. Length of snout 3.38 to 3.46; diameter of eye 7.00 to 7.64, in head length.

9b. Head width more than 1.5 (1.5 to 2.0) in head length.
11a. Greatest depth of body 1.5 to 1.7 in standard length.  \textit{notogamei}

11b. Greatest depth of body six times in standard length.  \textit{lacunaris}

8b. Longest anal fin rays not extending to caudal fin base.

16a. Diameter of eye seven times in first orbital space width.

7b. Greatest depth of body 1.5 to 1.7 in standard length.  \textit{lacunaris}

16b. Greatest depth of body five to six times in standard length.  Head width 1.2 to 1.6 in head length.

17b. Diameter of eye five to six times in first orbital space width.

15b. Dorsal spines 1 to 1.7 in head length. Anal fin rays 10 to 11.  Dorsal fin rays 14 to 15.

16b. Head width 1.2 to 1.5 in head length. Anal fin rays 17 or 18, principal caudal fin rays 20 or 21.

\textbf{ACCELEROLATIS BISCUTATUS (Geoffroy St. Hilaire)}

For synonymy see subgenus.

\textbf{KEY TO THE SUBSPECIES}

1a. Adipose dorsal fin salidate in outline. Length of snout 1.54 to 1.60 in head length. Maxillary barbels 4.83 to 5.59 in standard length.  \textit{biscutatus}

1b. Adipose dorsal fin semi-lunar in outline. Length of snout 1.49 to 1.69 in head length. Maxillary barbels 3.20 to 9.89 in standard length.  \textit{occidentalis}

iv. One occasionally fewer than two times in head length
Auchenoglanis bicirratus bicirratus (Lacépède, 1801; St. Meller, 1824)

Pimelodus bicirratus Lacépède, St. Meller, Histoire

Auchenoglanis bicirratus bicirratus, Lacépède, 1801; St. Meller, 1824 (river Nile). - Novar crystal, Monticelli, 1801, St. Meller, 1824 (river Nile).


SPECIMENS STUDIED. - 25 F, 73 mm.; 1 male, 97 mm.; one specimen, 250 mm.

1892, W. L. E. J. H. L. 1, 17 mm.

1926, W. L. E. J. H. L. 1, 12 mm.

1972, W. L. E. J. H. L. 1, 15 mm.

DESCRIPTION. - Body about 1.1 (0.06 to 1.1); snout length 3.18 (0.24 to 3.23); head length 3.72 (0.24 to 1.1); body length 4.10 (4.66 to 5.21); standard length 2.13 (4.0 to 2.61); postorbital length 1.24 (1.78 to 1.77); preopercular distance 1.53 (1.76 to 1.91); length of longest ray of dorsal fin 4.18 (1.7 to 4.9), all in standard length. Eye 7.10 (1.50 to 6.70) in head length; 3.15 (1.44 to 2.80) in interorbital space width; 7.19 (5.50 to 4.30) in snout length. Dorsal spine 1.65 (1.46 to 1.69); pectoral spine 1.47 (1.76 to 1.61) in head length. All spine dorsal fin
base longer than anal fin base. Least depth of caudal peduncle 1.31 (1.20 to 1.58) in its length.

Dorsal profile of head at an angle of 45 to 50 degrees to main body axis. Occipital process exposed, nearly equal to the width at its base and extending to the preopercular plate. Premaxillary teeth in two oval or reniform patches. Mandibular teeth in two semicircular patches. Labial barbels reaching nearly operculum; outer mandibular barbels preopercular or sometimes opercular; oral is shorter. Cephalic rami free. Longest ray of dorsal fin extends to adipose fin when depressed. Dorsal spine with feeble teeth over anterior margin. Pectoral spine with 12 to 27 spines, anterior teeth over posterior margin, else to be feeble, retromere teeth over anterior margin else. Ichtiothorax processes half pectoral spine length. Pelvic fin not reaching anal fin origin. Longest anal ray extending to caudal fin. Caudal fin obliquely truncate or rounded. Lateral line straight.

Proportional measurements, not given in the description, are recorded in table 35, and counts in table 96.

COLOUR.— Bronze-brown above and on sides, light brown beneath.
Fins with large, round black spots. Caudal fin deep brown.
RELATIONSHIP.— This subspecies is related to A. b. occidentalis differing in having slightly shorter snout and longer barbels, besides a falcate adipose dorsal fin.

DISTRIBUTION.— Faskoche, River Nile; Egypt. River Atbara, Gondoro, Malek, Sudan.
AUCHENOGLANIS BISCUTATUS OCCIDENTALIS (Cuvier & Valenciennes)

Pimelodus occidentalis Cuvier & Valenciennes, Histoire naturelle des poissons, XV, p. 267, pl. 60 (type locality, River Nile).

Auchenaspis occidentalis (Lilljeborg) in Lilljeborg, Sallange et al., C. E. S., The Tanganyikan Problem, p. 164, 1967 (Kulamba Falls).


SPECIMENS STUDIED.—USNM 61307, Fashoda, E. G., Brit. Mus., two specimens, 128.5 and 173.0 mm.

USNM 61307, "Ioz-abu-Buna", Brit. Mus., one specimen, 128 mm.

USNM 61307, Lake Tanganyika, 1930, A. Leveridge coll., two specimens, 255 and 267 mm.

ZMB 11717, Lake Albert, Schubertz coll., one specimen, 173 mm. (spawning and swimming).

ZMB 21717, Lake Albert, Schubertz coll., three specimens, 134 to 179 mm.

ZMB 19807, Togo, Thierry coll., one specimen, 98 mm.

MRGB (Not numbered), Lake Kambamba, Mulongo, July 16, 1948, M. Poll coll., one specimen, 114 mm.
DESCRIPTION.- Body depth 4.43 (3.77 to 4.96); head length 3.04 (2.82 to 3.35); head width 4.27 (3.91 to 4.67); head depth 4.99 (4.65 to 5.48); postorbital length 1.14 (1.06 to 2.31); postdorsal length 1.86 (1.73 to 2.07); preopercle distance 1.80 (1.73 to 2.08); length of longest ray of caudal fin 2.22 (2.07 to 5.26), all in standard length. Eye 7.58 (.34 to 1.37) in head length; 2.10 (1.67 to 2.42) in interorbital space; 4.36 (2.56 to 7.12) in length of body. Dorsal rays 8, anal 11 (11 to 12); vertebrae 16; pectoral spine 1.65 (1.1 to 1.97) to head length. Least depth of caudal peduncle 1.58 (1.11 to 1.77) in head length.

Dorsal profile of head in about 25 degrees to main body axis. First branchial arches very narrow, nacreous teeth over posterior arches, 13 to 14 striae, circular teeth over anterior arches. Gill rakers 12, 10 to 11, variable. Branchial origin. Longest anal ray not exceeding 5 in standard length.

Proportional data given, not given in the description, are recorded in table 95, and charts in 6. Dr. Alston not described here are in Blicstrictus bleschni.

COLOUR.- Deep brown with a finely dark-brown or slightly black spots above and on sides, white beneath. The spots on the dorsal and caudal fins are larger than in the nominate form.

RELATIONSHIP.- This subspecies is related to A. b. bleschni differing in having slightly longer snout and shorter barbels, besides a semi-lunar adpressed dorsal fin (table 92).


**REMARKS.** - *Auchenoglanis biscutatus* and *A. occidentalis* are closely related. Bouro (1977: 55) separated *A. occidentalis* from *biscutatus* by its longer and more pointed snout, a wider axillary barbel, posteriorly deeper lips, a more fin and colouration. Boulanger & Veltenooster (1979: 24) pointed their similarity and considered *A. occidentalis* as different from *biscutatus* in the nasal profile of the nose being centilinear, interorbital space flattish, pectoral spine with fewer serrations and in the oesophageal processes being rhomboidal in shape instead of being pointed as in *biscutatus*. The main contrasting characters of the two species are as below.

**TABLE 91.** - **COMPARISON OF CERTAIN CHARACTERS OF AUCHENOGLANIS OCCIDENTALIS AND A. BISCU TATUS.**

<table>
<thead>
<tr>
<th>Characters</th>
<th>occidentalis</th>
<th>biscutatus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of snout</td>
<td>More than half head length</td>
<td>Half or slightly more than half head length</td>
</tr>
<tr>
<td>Snout/Eye</td>
<td>2.50 to 8.00</td>
<td>2.50 to 4.50</td>
</tr>
<tr>
<td>Shape of adipose fin</td>
<td>Semi-lunar</td>
<td>Falcate</td>
</tr>
<tr>
<td>Dark-brown or blackish round spots on body</td>
<td>Usually small</td>
<td>Usually large</td>
</tr>
<tr>
<td>Oesophageal processes</td>
<td>Rhomboidal</td>
<td>Pointed</td>
</tr>
</tbody>
</table>
I have examined five specimens (106 to 155 mm.) of biscutatus and eleven (98 to 267 mm.) of occidentalis. Of the five specimens of biscutatus, USNM 86597, the smallest of the lot, has the rounded spots on the body more prominently distributed than the others; USNM 52176 has all the features of biscutatus except that the axillary flecks are longer than the outer mandibular. In general the anal, dorsal, and fin outline and the coloration are of some value in setting these two species. But the species are sympatric and are found in the River Nile. However, occidentalis has been additionally recorded from the Lakes Albert, Edward, Kagera, and Tanganyika, unlike biscutatus which seems to be confined to the lower reach of the White Nile River system. If the distribution of the two species is thus restricted, it is preferable to retain occidentalis as an intra-specific form of biscutatus. Even Boulenger (1905) gave a specific rank, A. o. tanganikanus for the specimens from Lake Tanganyika, which he synonymized later (1911) with occidentalis. However, a biometric comparison of occidentalis and biscutatus (table 92) does not indicate any sub-specific distinction. Analysis of large samples of both the species may prove interesting.

Fearing this, I have considered occidentalis as a subspecies of biscutatus in view of their geographic distribution.

1. Boulenger's (1905) inclusion of Lake Chad as the habitat of biscutatus is likely to be a lapsus based on wrongly identified specimens, like his erroneous assignment (1901: 296) of a specimen 570 mm. long, from Lake Tanganyika to biscutatus instead of to occidentalis, which error he rectified in 1906a.
TABLE 92.- BIOMETRIC COMPARISON OF (A) A. OCCIDENTALIS AND (B) A. BISCUITATUS.

<table>
<thead>
<tr>
<th>Characters</th>
<th>Samples</th>
<th>Range</th>
<th>Mean</th>
<th>S</th>
<th>£</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lh/Snout</td>
<td>A</td>
<td>1.10 to 2.69</td>
<td>1.54</td>
<td>0.06</td>
<td>0.77</td>
<td>0.71 (greater than 0.1)</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>1.53 to 2.60</td>
<td>1.51</td>
<td>0.04</td>
<td>0.67</td>
<td>0.014</td>
</tr>
<tr>
<td>Sncut/Eye</td>
<td>A</td>
<td>1.09 to 1.17</td>
<td>1.15</td>
<td>0.07</td>
<td>0.71</td>
<td>0.04 (greater than 0.10)</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>1.52 to 1.59</td>
<td>1.53</td>
<td>0.04</td>
<td>0.69</td>
<td>0.018</td>
</tr>
<tr>
<td>Sl/Max. Bnd.A</td>
<td>A</td>
<td>1.74 to 6.28</td>
<td>3.37</td>
<td>0.14</td>
<td>0.78</td>
<td>0.006 (greater than 0.10)</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>1.67 to 5.82</td>
<td>3.37</td>
<td>0.14</td>
<td>0.78</td>
<td>0.006</td>
</tr>
<tr>
<td>Adipose</td>
<td>A</td>
<td>1.15 to 2.96</td>
<td>1.40</td>
<td>0.10</td>
<td>1.03 (greater than 0.10)</td>
<td></td>
</tr>
<tr>
<td>Dorsal Fin</td>
<td>A</td>
<td>4.75 to 10.75</td>
<td>7.47</td>
<td>0.75</td>
<td>0.10</td>
<td>0.10</td>
</tr>
<tr>
<td>Base/anal Fis.</td>
<td>A</td>
<td>1.53 to 7.31</td>
<td>3.71</td>
<td>0.34</td>
<td>0.16</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>1.53 to 7.31</td>
<td>3.71</td>
<td>0.34</td>
<td>0.16</td>
<td>0.10</td>
</tr>
</tbody>
</table>

Gilley (1936: 92) described A. wittal from three small specimens collected from the River Con. Poll (1938: 104) considered the species as juveniles of occidentalis. Causey (1954: 386) supported this view after studying ten specimens of occidentalis of 18 to 265 mm. long. Excepting the color pattern, all other characters of wittal are in agreement with the young specimens of occidentalis. Therefore, I follow Poll in considering wittal as a synonym of occidentalis.

SPECIMEN STUDIED.- No specimens seen by me.

RELATIONSHIP.- This species is related to A. angolensis differing in having an elongated anal fin, posterior dorsal fin rays.

DISTRIBUTION.- River Dje; from Eastern and Western Zaire. 

Auchenoglanis hoffi Boulenger


SPECIMENS STUDIED.- 2017, "Lochome", reach below, two specimens, 1, 1.50, 1.90 mm.

DESCRIPTION.- Body 3.35 to 6.56 (1.68 to 1.03); mouth 1.77; head 3.23 (1.68 to 1.03); predorsal length 2.41 (1.8 to 2.3); pectoral length 1.31 (1.2 to 1.9); 1.66); pelvic-fin distance 1.66 (1.1 to 1.7); length of longest ray of caudal fin 1.76, all in standard length. Eye 7.165 (7.0 to 7.23) in head length; 3.14 (1.5 to 2.3) in interorbital space width; 1.75 (1.4 to 1.9) in snout length. Dorsal spine 1.64 (1.57 to 1.7); pectoral spine 1.72 (1.5 to 1.87) in head length. Anal and dorsal fin base 1.16 (1.0 to 1.20) in anal fin base. Least depth of caudal peduncle 1.03 (0.9 to 1.14) in its length.
Dorsal profile of head at an angle of about 26 degrees to main body axis. Occipital processes straight, 1.5 times longer than sixth at its base and extending to the predorsal plate. Preaxillary teeth in a semiregular patch. Mandibular teeth in two rows anteriorly. Labial barbels reaching pectoral spine base or slightly beyond others shorter. Caudal fin rounded with c.e. Longest ray of dorsal fin extending to base of fin when depressed. Dorsal spine smooth. Pectoral spine with eight, strong, anterose teeth over posterior half. Posterior portion of pectoral spine length. Pectoral fin reach to anal fin origin. Longest anal ray extended to anal fin. Second anal rounded. Lateral line straight.

Approximate measurements, not given in the description, are recorded in Table 65, and quoted in Table 96.

COLOUR: Light brown, with six or seven transverse series of dark-brown spots above and on sides, white beneath.

RELATIONSHIP: This species links A. balayi with A. bicruratus, differing from the former in having longer cephalic process and longer barbels, besides the transverse series of dark-brown spots on the body.

DISTRIBUTION: Duale, "Lohgotaba": Cameroon.

AUCHENGLADIUS BALAYI (Sauvauge)

For synonymy see subspecies

KEY TO THE SUBSPECIES

1a. Body with irregular spots. Greatest depth of body 4.00 to 6.45 in standard length.
   *balayi*

1b. Body without any markings. Greatest depth of body 6.0 to 6.5 in standard length.
   *grandi*
AUCHENOLYSIS KALAYI MALAYI (Sauvage)


SPECIMENS STUDIED.— USNM 11478, River Kal'1, Cameroon, Apr. 20, 1911, G. Schultze coll., 1 spec. and 1 on. 67 mm.

USNM 11717, Village, Lobudor, Cameroon, Aug. 1 to 7, 1917, G. Schultze coll., 1 spec. 95 to 129 mm.

USNM 11716, River Illica, Cameroon, Aug. 1, 1917, G. Schultze coll., 5 spec. 101 to 167 mm.

DESCRIPTION.— Body depth 3.0% (3.4 to 7.4); head length 3.34 (3.22 to 3.49); head width 1.2% (1.15 to 1.46); head depth 6.70 (5.86 to 7.59); predorsal length 2.69 (2.51 to 3.17); postdorsal
length 1.65 (1.46 to 1.76); propulsive distance 1.77 (1.66 to 1.71),
all in standard length. Eye 7.57 (6.52 to 8.50) in head length;
2.06 (1.60 to 2.58) in interorbital distance; 1.59 (1.02 to
4.00) in snout length. Dorsal 1 for 1.77 (1.5 to 2.00);
pectoral spine 1.78 (1.50 to 2.00) in snout length. Anal fin
ancestral; caudal fin base. Least part of
caudal peduncle 1.77 (1.50 to 2.00) in

Dorsal profile of head slope upward 30 degrees to main body. Occipital prominence about two
equal to the width of the base. Anterior half of pre-
dorsal line from the eye to the base of the
Mandibular teeth in two to three rows. Filling vertebra
reaching pectoral fins. Supporting rays longer than centrum.
Ocular ray 3.5 for 2.5. Last ray in anal fin
extending to tail somewhat rounded. Dorsal spine smooth.
Pectoral spine with five to ten strong, innermost teeth over
posterior origin. Caudal processes one-third pectoral
spine length. Pelvic fin not reaching anal or origin.
Longest anal ray not extending to caudal fin. Both fin
rounded. Lateral line straight, but faded above pectoral fin
base.

Proportional measurements, not given in the description,
are recorded in table 95, and counts in table 96.

COLOUR.—Dark-brown, with irregularly distributed black spots
above and on sides, pale beneath.
RELATIONSHIP. - This species is distantly related to *A. bicollatus* differing in having smaller body depth, shorter head and smaller eye.


REMARKS. - Thomine (1906: 165) described *Auchenoglanis quirilli* as new, which Vaillant (1886: 77) rightly considered as only the adult form of *Auchenoglanis balayi*. Boulen (*op. cit.*) described *A. pulcher* from several specimens unto 100 mm. long, and referred its affinities to *ubamensis* and *bicollatus*; but in 1911 (373) he synonymized *pulcher* with *balayi*.


SPECIMEN STUDIED. - No specimen seen by me.

RELATIONSHIP. - This subspecies is related to *A. balayi balayi* differing in having smaller body depth, longer snout and slightly smaller eye, besides the body without any markings.

Auchenoglanis pietschmanni Kolly, S. B. Akau. Diss. Univ. XXXVI, p. 206, fig. 7, 1937 (type locality, River Mbaam).


SPECIMEN STUDIED—VNHM 2903, River Mbaam, Cameroon, Albertier coll., one specimen, 235 mm.

DESCRIPTION.—Body depth 4.26; head length 3.46; head width 4.55; head depth 6.38; preseral length 2.53;posteral length 1.72; prepelvic distance 1.82; length of longest ray of caudal fin 0.95, all in standard length. Eye 7.86 in head length; 0.21 in interorbital space width; 0.36 in snout length. Dorsal spine 1.58; pectoral spine 1.67 in total length. Anal postanal fin base longer than anal fin base. Least depth of caudal peduncle 0.69 in its length.

Dorsal profile a line at an angle of about 75 degrees to main body axis. Occipital process exposed, nearly equal to the width at its base and not extending to the preoral plate.


Proportional measurements, not given in the description, are recorded in table 95, and counts in table 96.
COLOUR.— Deep brown above, lighter on sides with seven large dark spots along the lateral line, pale beneath.

RELATIONSHIP.— This species is intermediate between A. bairi and A. ngamensis, more related to the former and differing in having more anal fin rays and a series of dark spots along the lateral line, besides smaller body depth, and narrower head. The colouration is diagnostic.


Auchenoglanis rhindis Fowler


SPECIMENS STUDIED.— 27: 19077, Doum, Gourcouna, S. S. Frayer coll., one specimen, 182 mm.

DESCRIPTION.— Body depth 1.36; head length 1.17; head width 3.91; head depth 5.11; predorsal length 2.56; pelviodorsal length 1.59; propelvic distance 2.00; length of longest ray of dorsal fin 3.38, all in standard length. Eye 7.78 in head length; 5.18 in interorbital space cloth; 2.66 in snout length. Dorsal spine 1.76 in head length. Pectoral spine broken. Adipose dorsal fin base longer than anal fin base. Least depth of caudal peduncle 1.18 in its length.

Dorsal profile of head at an angle of about 25 degrees to main body axis. Occipital process subcutaneous, 2.5 times longer than width at its base and extending to the predorsal plate. Premaxillary teeth in two oval patches. Mandibular teeth in two round patches. Maxillary barbels reaching eye, outer mandibular barbels operculum; others shorter. Orbital rima fused with eye. Longest ray of dorsal fin extending to adipose.

Proportional measurements, not given in the description, are recorded in table 95, and counts in table 96.

COLOUR.—Brown above with inconspicuous rows of vertical dark spots on sides, dull brown beneath.

RELATIONSHIP.—This species is related to A. balayi differing in having greater body depth, longer barbels and fewer anal fin rays.

DISTRIBUTION.—Duma; Belgian Congo. Nora; French Equatorial Africa.

REMARKS.—Fowler (1936: 312) described this species from a single specimen 155 mm. long and considered it related to A. ngamensis. A. grandis differs from ngamensis in having greater body depth (4.00 to 4.46 in standard length versus 5.50 to 6.11 in ngamensis); longer head (3.13 to 3.17 in standard length versus 3.50 to 3.87 in ngamensis), and fewer anal fin rays (11 versus 13 in ngamensis). The affinities of grandis are more with balayi than with ngamensis.

AUCHENOGLANIS NGAMENSIS Boulenger

Auchenoglanis ngamensis Boulenger, Catalogue of the freshwater fishes of Africa in the British Museum (Natural History), 11, p. 371, fig. 287, 1911 (type locality, River Okavango near Lake Ngami).

Boulenger, Trans. roy. Soc. Lond., XVI., 82, fig. 85, 1913 (Lake Ngami).

SPECIMENS STUDIED.— MCZ 194, 00, "New Kamertun", Bates coll., two specimens, 171 and 178 mm.

DESCRIPTION.— Body depth 6.08 (5.93 to 6.11); head length 3.835 (3.80 to 3.87); head width 4.79 (4.69 to 4.75); head depth 7.855 (7.57 to 8.14); predorsal length 2.815 (2.78 to 2.85); postdorsal length 1.58 (1.55 to 1.61); prepelvic distance 2.0 (1.99 to 2.09); length of longest ray of caudal fin n. 765 (4.14 to 4.39), all in standard length. Eye 7.585 (7.4 to 7.6) in head length; 2.67 (2.67 to 2.69) in interorbital space width; 4.03 (3.87 to 4.17) in snout length. Dorsal spine 1.7 (1.7 to 1.41); pectoral spine 1.7 (1.7 to 1.45) in head length. Anal and dorsal fin bases longer than caudal fin bases. Length of caudal peduncle 0.605 (0.59 to 0.67) in its length.

Dorsal profile of head at an angle of about 70 degrees to main body axis. Occipital process subterminal, nearly equal to the width at its base and extending to the predorsal plate. Premaxillary teeth in two elongate patches. Mandibular teeth in two elongate patches. Maxillary barbel's reaching slightly beyond pectoral spine; others shorter. Gillrakers fused with eye. Longest ray of dorsal fin extending to anal fin when depressed. Dorsal spine smooth. Pectoral spine with 10 to 12 strong, anterior teeth on posterior margin. Incidental processes one-fourth pectoral spine length. Pelvic fin not reaching anal fin origin. Longest anal rays not extending to caudal fin. Caudal fin rounded. Lateral line straight.

Proportional measurements, not given in the description, are recorded in table 95, and counts in table 96.
COLOUR.- Pale olive above with numerous dark coloured small spots, some forming vertical bars on sides, white beneath. Fins dotted.

RELATIONSHIP.- This species is related to A. balayi differing in having longer barbels and more oval fins rays. The pale olive colour of the body with the black spots on the sides is diagnostic.

This species may be in the genus A. balayi which is not found in the Lake Rovuma.

DISTRIBUTION.- River Chwango, Lake Rovuma; Benouabondzi.

AUS E.C. 13416 ITURI STEINDAEHLER


SPECIMEN STUDIED.- VM. 15476, River Ituri, S. Graver coll., one specimen (holotype), 197 cm.

DESCRIPTION.- Steindaeleher (1911, 1917) gave a good description of this species.

RELATIONSHIP.- This species is related to A. xenensis differing in having slightly greater body depth, larger eyes, longer barbels and lighter colouration. It connects the balayi complex of species with a great body depth and the xenensis complex of species with a moderately small body depth.

DISTRIBUTION.- River Ituri; Belgian Congo; River Dja, Fort Sihut; French Equatorial Africa.
REMARKS.- Steinacher (1911: 1185) described \textit{a. iturii} from three specimens 2.15 to 2.95 mm. long and considered it related to \textit{a. namensis}. In 1917 (p. 27) he gave the variations found in \textit{turii}. Fowler (1936: 109) described a specimen of \textit{iturii} which differs from the observed range of variation in respect to the eye size (0.4 in head length ranging 0.80 to 0.80; 3.0 in inter-orbital eyes width ranging 1.80 to 2.30; 0.4 in snout length ranging 0.7 to 1.7). The eye then is larger than hitherto recorded in this species, and therefore, the variations may be due to this difference in size.

Auchenoglanis punctatus Boulenger


SPECIMENS STUDIED.- No specimens seen by me.

RELATIONSHIP.- This species is related to \textit{A. namensis} differing in having greater body depth, shorter snout, larger eye and fewer anal fin rays.

DISTRIBUTION.- River Congo, River Ubangi; Belgian Congo.
SPECIMEN STUDIED.— No specimen seen by me.

RELATIONSHIP.— This species is related to *A. ubunkensis* differing in having slightly longer head, longer maxillary barbels, fewer anal fin rays and lighter colouration.

DISTRIBUTION.— Buta, sundial, Kapamu, River Karai, Aimungu, River Lindi, River Ubani, I. Selian Congo, River Lucle; Angola.

**Auchenonchilus Holli Holly**

*Auchenonchilus* *holli* Holly, S. E. A. Ann. Misc. 1924, (1) no. 229 (type locality, Bakoiko).

SPECIMEN STUDIED.— No specimen seen by me.

RELATIONSHIP.— This species is related to *A. maculatus* differing in having scolter eye, long dorsal spine and longer adipose dorsal fin.

DISTRIBUTION.— Bakoiko; Cameroon.

**Auchenonchilus Butukofe I Popka**

*Auchenonchilus* *butukofei* Popka, Notes Leiden Mus., XXXV, p. 207, 1937 (type locality, River Warri).

SPECIMEN STUDIED.— No specimen seen by me.

RELATIONSHIP.— This species is related to *A. maculatus* differing in having slightly longer head, shorter snout, larger eye and fewer anal fin rays.

DISTRIBUTION.— River Warri; Nigeria.

REMARKS.— Popka (1937: 237) described this species from a single specimen 84 mm. long, and considered it related to *A. monkei*. Comparison of the species with *monkei* however, indicates that—
differences are considerable and that buttikoferi is closer to maculosus than to monkei. The comparison of the three species is given below.

TABLE 93.- COMPARISON OF CERTAIN CHARACTERS IN THREE SPECIES OF AUCHENOLONGS.

<table>
<thead>
<tr>
<th>Characters</th>
<th>buttikoferi</th>
<th>monkei</th>
<th>maculosus</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL/ Body Depth</td>
<td>4.70 to 6.05</td>
<td>7.71</td>
<td>7.1 to 6.80</td>
</tr>
<tr>
<td>SL/Head Length</td>
<td>7.20</td>
<td>7.00 to 7.04</td>
<td>7.06 to 7.04</td>
</tr>
<tr>
<td>LH/ head width</td>
<td>1.50</td>
<td>1.17 to 1.20</td>
<td>1.17 to 1.58</td>
</tr>
<tr>
<td>LH/Eye</td>
<td>7.50</td>
<td>7.00 to 7.06</td>
<td>8.79 to 10.30</td>
</tr>
<tr>
<td>LH/Head length</td>
<td>1.50</td>
<td>1.85 to 2.00</td>
<td>1.80 to 1.93</td>
</tr>
<tr>
<td>Int. Orb. &amp; Eye</td>
<td>7.00</td>
<td>7.7 to 7.80</td>
<td>7.3 to 2.80</td>
</tr>
<tr>
<td>Anal fin rays</td>
<td>11 (11, 12)</td>
<td>11 or 12 (11, 12)</td>
<td>17 or 14 (11, 12 or 13)</td>
</tr>
</tbody>
</table>


SPECIMEN STUDIED.- No specimen seen by me.

RELATIONSHIP.- This species is intermediate between A. buttikoferi and A. maculosus, related to the latter to a greater extent than the former, and differing in having shorter and narrower head, shorter snout, larger eye, fewer anal fin rays and brighter colouration.

DISTRIBUTION.- River Nyong, Akomolina; French Equatorial Africa.
Auchenoglanis maculosus Kelly

Auchenoglanis maculosus Kelly, S. E. Afra. Wash. Misc., XXXVI, p. 211, pl. 4, 1877 (Type locality, Enronnas).

SPECIMEN STUDIED.-- No specimen seen by me.

RELATIONSHIP.-- This species is related to A. laniger, differing in having larger and shorter interorbital space, longer snout and more and thicker rays.

DISTRIBUTION.-- Guineas.

Auchenoglanis Pantherinus Pellew, 1884

Auchenoglanis Pantherinus Pellew, 1884, p. 107, 1884 (Type locality, Africa).

SPECIMEN STUDIED.-- No specimen seen by me.

RELATIONSHIP.-- This species is related to A. maculosus, differing in having larger eye, shorter interorbital space, fewer branched anal and caudal fins rays.

DISTRIBUTION.-- Native: French Equatorial Africa.

REMARKS.-- It is most surprising that Pellew (1884: 359) in listing the species of the Congo basin, omitted the new species as pterygopsis after the locality, but on p. 367 he named it as Pantherinus which has been published with a diagnosis, description, and indication. The former name, though earlier, is a nomen quixum.
Genus PARAUCHENOCLANIS Boulenger

Parauchenoclani Boulenger, Catalogue of the Fresh-water fishes of Africa in the British Museum (Natural History), II, p. 364, 1911. (Type species, Pimelodus mittatus Loomberg, by subsequent designation).

This genus differs from Auchenoclani in regard to the following chief characters.-

Head comparatively more depressed. Snout rounded. Villiform teeth on premaxillaries and mandibular in well-formed bands. Lips thin and plain. Eyes small and in anterior part of head. Supraoccipital covered with skin.

DISTRIBUTION. - French Equatorial Africa to Belgian Congo.

KEY TO THE SPECIES

1a. Diameter of eye fewer than 11.0 in head length. Pelvic fin not reaching anal fin origin.

2a. Maxillary barbels reaching middle of pectoral spine. Greatest depth of body 3.06 to 1.22 in standard length. Pimelodus mittatus

2b. Maxillary barbels reaching beyond tip of pectoral spine. Greatest depth of body 1.5 in standard length. Pimelodus macrostoma

1b. Diameter of eye 11.0 in head length. Pelvic fin reaching anal fin origin.


**SPECIMENS STUDIED.** - ZSI F. 2869/2, River Kribi, Cameroons, J. L. Bates coll., one specimen, 128 mm.

USNM 119192, Cameroons, Africa, S. Johnson coll., one specimen, 165 mm.

USNM 119197, Cameroons, Africa, O. Schwab coll., one specimen, 140 mm.

WDCB (Not numbered), Kribi, David coll., one specimen, 16.5 mm.

**DESCRIPTION.** - Body depth 1.6 (1.88 to 2.22); head length 3.15 (2.98 to 3.41); head width 1.02 (2.25 to 1.7); head depth 0.34 (0.41 to 0.57); predorsal length 2.30 (2.31 to 2.47); postdorsal length 1.75 (1.68 to 1.75); prepelvic distance 1.90 (1.64 to 1.94); length of longest ray of caudal fin 4.10 (4.1 to 4.22), all in standard length. Eye 2.06 (5.79 to 10.5) in head length; 2.69 (2.07 to 3.25) in interorbital space width; 3.89 (3.06 to 4.38) in snout length. Dorsal spine 2.45 (2.31 to 2.63); pectoral spine 2.0 (1.80 to 2.14) in head length. Adipose dorsal fin base longer than anal fin base. Least depth of caudal peduncle 1.04 (0.62 to 1.38) in its length.
Dorsal profile of head at an angle of about
20 degrees to main body axis. Occipital process subcortaneous,
1.0 or 1.5 times longer than width at its base and not extending
to the preocular plate. Premaxillary band of teeth produced
laterally, separated at the center by an edentate space and
2.0 or 2.5 times as long as broad. Mandibular band of teeth
produced laterally and separated at the center by an edentate
space. Maxillary barbels reaching middle of pectoral spine;
others shorter. Orbital ring fused with eye. Longest ray of
dorsal fin extending to adipose fin when depressed. Dorsal
spine smooth. Pectoral spine with six to eight strong, emarginate
teeth over posterior margin. Palatine processes one-fourth
pectoral spine length. Pelvic fin not reaching anal fin origin.
Longest anal ray extending to caudal fin. Caudal fin rounded.
Lateral line straight.

Proportional measurements, not given in the description,
are recorded in table 95, and counts in table 96.

COLOUR.— In large specimens, brown above, lighter on sides with
nine vertical rows of round, blackish spots at more or less equal
intervals, pale beneath. In young specimens (MRSB specimen),
body yellow-clive with seven broad, light brown vertical bands.
Head and fins are finely spotted.

RELATIONSHIP.— This species is related to *P. macrostoma* differens
in having smaller body depth, larger eye, shorter barbels and
brighter colouration.

DISTRIBUTION.— River Dja, River Kribi; French Equatorial Africa.
River Name: Nigeria. River Lui: Angola. Binga, Budjala; Belgium.
Parauchenoglanis macrostoma (Pellegrin)


SPECIMEN STUDIED.— No specimen seen by me.

RELATIONSHIP.— This species is related to P. guttatus differing in having greater body depth, smaller eye, longer barbels and lighter colouration.


Parauchenoglanis ansorgii Boulenger

Parauchenoglanis ansorgii Boulenger, Ann. Mus. Congo belge., (1) II, p. 20, pl. xxi, fig. 7, 1912a (type locality, N'kutu below Leangle Falls).

SPECIMEN STUDIED.— No specimen seen by me.

RELATIONSHIP.— This species is related to P. guttatus differing in having smaller body depth, smaller eye, slightly longer barbels and different colouration. It is somewhat intermediate between guttatus and macrostoma.

DISTRIBUTION.— N'kutu below Leangle Falls, Chiléongo: Belgian Congo.
**REMARKS.**—A comparison of the three known species of this genus is presented in the following table. It is concluded that *ansorgii* and *macrostoma* are not different from *muttatus* to any significant extent. They appear to be different colour forms of *muttatus*. Statistical comparison and analysis with large material would be interesting.

**TABLE 94.—COMPARISON OF CERTAIN CHARACTERS IN THREE SPECIES OF PARAUCHENOSLANIS.**

<table>
<thead>
<tr>
<th>Characters</th>
<th><em>ansorgii</em></th>
<th><em>muttatus</em></th>
<th><em>macrostoma</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>SL/Body depth</td>
<td>5.7</td>
<td>3.98 to 4.22</td>
<td>4.5</td>
</tr>
<tr>
<td>LH/Head width</td>
<td>1.7</td>
<td>1.3 to 1.5</td>
<td>1.3 to 1.5</td>
</tr>
<tr>
<td>LH/Eye</td>
<td>11.0</td>
<td>9.79 to 11.0</td>
<td>9.0</td>
</tr>
<tr>
<td>Adipose dorsal fin</td>
<td>Five times as long as deep</td>
<td>Four to six times as long as deep</td>
<td>Four times as long as deep</td>
</tr>
<tr>
<td>Anal fin rays</td>
<td>IV, 7</td>
<td>11,7 11,9</td>
<td>111,9</td>
</tr>
<tr>
<td>Colour</td>
<td>Brown above, with small dark spots and 7 transverse series of round black spots; whitish beneath.</td>
<td>Brown above, lighter on sides with nine vertical rows of round blackish spots, pale beneath.</td>
<td>Brown above, yellow beneath, with small dark spots and 5 transverse series of more or less confluent black spots on body.</td>
</tr>
</tbody>
</table>
Genus *NOTOGLANIDIUIM* Günther


Origin of rayed dorsal fin above half pectoral fin; with 12 to 15 rays and a spine. Adipose dorsal fin long, very low, smooth and with the posterior margin minute to back and separated from the fleshy upper margin of caudal fin by not more than an incomplete notch. Pectoral fins horizontally inserted and with a spine. Pelvic fins inserted on ventral surface, below last quarter of dorsal fin from the anterior. Anal fin with 9 to 12 rays. Caudal fin rounded. Lateral line simple.

DISTRIBUTION.—Gold Coast: French West Africa.
KEY TO THE SPECIES

1a. Diameter of eye nine times in head length.
   Dorsal fin with 14 or 15 closely placed rays.
   walkeri

1b. Diameter of eye eleven times in head length.
   Dorsal fin with 13 or 14 distantly placed rays.
   thomasi

NOTOGLANIDIDUM WALKERI Günther

pl. xvii, 1907 (type locality, River Ibbi).
- Boulen er, Ann. Mag. nat. Hist. (7) XVI, p. 49,
1906 (Gold Coast). - Boulen er, Catalogue of the
Freshwater fishes of Africa in the British Museum
(Natural History), II, p. 280, pl. 107, 1911
(Gold Coast).

SPECIMEN STUDIED.- No specimen seen by me.

RELATIONSHIP.- This species is related to N. thomasi differing
in having broader head, larger eye and fewer dorsal fin rays.

DISTRIBUTION.- River Ibbi; Gold Coast.

NOTOGLANIDIDUM THOMASI Boulen er

Notoglanidium thomasi Boulen er, Catalogue of the Freshwater fishes
of Africa in the British Museum (Natural History),
IV, p. 317, fig. 185, 1915 (type locality,
Victoria).

SPECIMEN STUDIED.- No specimen seen by me.

RELATIONSHIP.- This species is related to N. walkeri differing
in having narrower head, smaller eye and more dorsal fin rays
and smooth spines.

DISTRIBUTION.- Fumehun, Sierra Leone; Victoria; French West Africa.
Genus **Liauchenoglanis** Boulenger

**Liauchenoglanis** Boulenger, Catalogue of the freshwater fishes of Africa in the British Museum (Natural History), IV, p. 711, 1916. (Type species: **Liauchenoglanis maculatus** Boulenger, by monotypy).

This genus differs from **Notobobophorus** in regard to the following chief characters:-

- Lips concomitantly thin and plain. Snout obtusely rounded. Eyes comparatively much smaller. Preaxillary teeth in a rounded or cardiform notch. Fined dorsal fin with 19 or 20 rays. Pelvic fins inserted on ventral surface, below first quarter of dorsal fin from the anterior.

DISTRIBUTION.- Sierra Leone; French West Africa.

**Liauchenoglanis maculatus** Boulenger

**Liauchenoglanis maculatus** Boulenger, Catalogue of the freshwater fishes of Africa in the British Museum (Natural History), IV, p. 711, Fig. 161, 1916 (type locality, North Sherbo district, Sierra Leone).

SPECIMEN STUDIED.- No specimen seen by me.

RELATIONSHIP.- An unique species, apparently without any close relative.

DISTRIBUTION.- North Sherbo district, Sierra Leone; French West Africa.
<table>
<thead>
<tr>
<th>Proportional Measurements</th>
<th>Augenochlans</th>
<th>Parausenochlans</th>
<th>Bimaculatus</th>
<th>Quadrata</th>
<th>Splendid</th>
<th>Pictus</th>
<th>Helaxi</th>
<th>Pulcher</th>
<th>Arisan</th>
<th>Luteus</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL/Length of dorsal spine</td>
<td>4.86 to 5.58</td>
<td>5.05</td>
<td>4.67 to 5.13</td>
<td>5.16</td>
<td>5.56</td>
<td>5.71</td>
<td>5.89</td>
<td>6.71</td>
<td>5.95 to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SL/Length of anal fin base</td>
<td>2.84 to 3.53</td>
<td>3.44</td>
<td>2.82 to 3.42</td>
<td>3.19</td>
<td>3.35</td>
<td>3.24</td>
<td>3.19</td>
<td>3.24</td>
<td>3.19 to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ll/Length of snout</td>
<td>1.54 to 1.61</td>
<td>1.59</td>
<td>1.47 to 1.62</td>
<td>1.56</td>
<td>1.58</td>
<td>1.60</td>
<td>1.51</td>
<td>1.56</td>
<td>1.56 to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ll/Width of interorbital space</td>
<td>1.50 to 2.37</td>
<td>2.07</td>
<td>1.40 to 2.11</td>
<td>2.07</td>
<td>2.07</td>
<td>2.07</td>
<td>2.07</td>
<td>2.07</td>
<td>2.07 to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ll/Width of gape of mouth</td>
<td>2.50 to 3.03</td>
<td>2.74</td>
<td>2.21 to 2.74</td>
<td>2.50</td>
<td>2.50</td>
<td>2.50</td>
<td>2.50</td>
<td>2.50</td>
<td>2.50 to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ll/Length of max. barbel</td>
<td>1.17 to 1.67</td>
<td>1.47</td>
<td>1.13 to 1.29</td>
<td>1.27</td>
<td>1.29</td>
<td>1.27</td>
<td>1.27</td>
<td>1.27</td>
<td>1.27 to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ll/Length of inn. mandib.</td>
<td>3.08 to 3.09</td>
<td>3.08</td>
<td>2.65 to 2.86</td>
<td>2.71</td>
<td>2.65</td>
<td>2.71</td>
<td>2.71</td>
<td>2.71</td>
<td>2.71 to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ll/Length of outer mandib.</td>
<td>1.26 to 1.77</td>
<td>1.49</td>
<td>1.39 to 1.50</td>
<td>1.39</td>
<td>1.39</td>
<td>1.39</td>
<td>1.39</td>
<td>1.39</td>
<td>1.39 to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lh/Length of dorsal fin</td>
<td>1.64 to 1.79</td>
<td>1.67</td>
<td>1.37 to 1.48</td>
<td>1.44</td>
<td>1.44</td>
<td>1.44</td>
<td>1.44</td>
<td>1.44</td>
<td>1.44 to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lh/Length of anal fin base</td>
<td>3.65 to 4.31</td>
<td>4.10</td>
<td>3.21 to 3.65</td>
<td>3.65</td>
<td>3.65</td>
<td>3.65</td>
<td>3.65</td>
<td>3.65</td>
<td>3.65 to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lh/Length of pectoral fin</td>
<td>1.73 to 1.68</td>
<td>1.69</td>
<td>1.55 to 1.66</td>
<td>1.72</td>
<td>1.72</td>
<td>1.72</td>
<td>1.72</td>
<td>1.72</td>
<td>1.72 to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LH/Length of pelvic fin</td>
<td>1.27 to 1.80</td>
<td>1.57</td>
<td>1.53 to 2.00</td>
<td>1.76</td>
<td>1.76</td>
<td>1.76</td>
<td>1.76</td>
<td>1.76</td>
<td>1.76 to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LH/Length of anal fin</td>
<td>1.80 to 2.08</td>
<td>2.00</td>
<td>1.81 to 2.05</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00 to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LH/Length of caud. ped.</td>
<td>1.69 to 1.89</td>
<td>1.81</td>
<td>1.79 to 2.06</td>
<td>1.98</td>
<td>1.98</td>
<td>1.98</td>
<td>1.98</td>
<td>1.98</td>
<td>1.98 to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LH/Least depth of caud.ped.</td>
<td>2.02 to 2.68</td>
<td>2.39</td>
<td>2.46 to 3.59</td>
<td>2.52</td>
<td>2.52</td>
<td>2.52</td>
<td>2.52</td>
<td>2.52</td>
<td>2.52 to</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 96. - COUNTS RECORDED FOR CERTAIN SPECIES OF P. AUCHENOGLANIS AND PARAUCHENOGLANIS.

<table>
<thead>
<tr>
<th>Genera and Species</th>
<th>Pteridometra spp. (n. 1)</th>
<th>Number of Palatal S. (n. 1)</th>
<th>Number of Upper limb segments</th>
<th>Number of First arch segments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dorsal fin sh. fish.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auchenoglanis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hiacutatus</td>
<td>- 5 - 5 - 7 -</td>
<td>-</td>
<td>3 2 1</td>
<td>-</td>
</tr>
<tr>
<td>accidentalis</td>
<td>1 1 1 - 7 3  - 3</td>
<td>-</td>
<td>2 1  -</td>
<td>-</td>
</tr>
<tr>
<td>monkel</td>
<td>- 0 - 2 - 1 3 1 -</td>
<td>-</td>
<td>1 1 1 1 -</td>
<td>-</td>
</tr>
<tr>
<td>halayo</td>
<td>2 2 2 2 2 2 2 1 1</td>
<td>-</td>
<td>1 1 1 1 1 -</td>
<td>-</td>
</tr>
<tr>
<td>Metschnarini</td>
<td>1 2 1 1 - 1 1 -</td>
<td>-</td>
<td>1 1 1 1 -</td>
<td>-</td>
</tr>
<tr>
<td>grandin</td>
<td>- 1 - 2 - 1 1 -</td>
<td>-</td>
<td>1 1 1 1 -</td>
<td>-</td>
</tr>
<tr>
<td>neampoline</td>
<td>- 1 - 1 - 1 1 -</td>
<td>-</td>
<td>1 1 1 1 -</td>
<td>-</td>
</tr>
<tr>
<td>Parauchenoglanis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mittatus</td>
<td>- 1 - 3 3 3 - 3 -</td>
<td>-</td>
<td>1 1 1 1 -</td>
<td>-</td>
</tr>
</tbody>
</table>
EVOLUTION

The past history of the Bagridae is imperfectly known. In an earlier article (Jayaram, 1955: 121) the position of the fossil genera has been discussed. Three genera: Eaglesomia White, Homacrones White and Nigerium White are known only as fossils. Four living genera: Porcus Geoffroy St. Hilaire, Rita Bleeker, Mystus Scopoli and Heterobagrus Bleeker are known from the Eocene. All these genera are recorded from places within the present range of distribution of the family. Eaglesomia and Nigerium resemble Chrysichthys, whereas Homacrones is similar to Porcus- like fishes of Africa. These extinct genera are not highly different from the living ones.

EVOLUTION OF THE FAMILY

Although the Bagridae date back to Eocene times, this family has been considered as the basal stock from which other families have evolved. Regan (1911) in his classification of the siluroidea considered the Diplomystidae with its toothed maxillaries and the simple attachment of the fifth vertebra to the complex as the first and most primitive; the Neotropical siluroida beginning with the Pimelodidae after Bagridae, and the specialised Loricariidae as the last and most advanced. Some of the characters by which
specialisation of the families is rated are as below:

1. Maxillaries edentate and reduced, or absent.
2. Parietals, Opisthotic, Symplectic and Suboperculum absent.
3. Palatines rod-like and freed from the meta-pterygoids, but retain their attachment with the maxillae.
4. The meta-pterygoid has moved forwards over the top of quadrate and usurped the place of ento-pterygoid.
5. Ento-pterygoid reduced, or absent.
6. Post-temporal bones annexed to skull.
7. Roof of skull widened out into a sort of cephalic shield formed by the supraoccipital, sphenotics, pterotics and post-temporal plates.
9. Reduced air-bladder, enclosed in bony capsule.
10. Rayed dorsal fin more anteriorly placed and with fewer rays.

Judged by these characters, the African genera are more primitive than the Oriental ones, because of their possession of enlarged maxillaries, dentigerous palatines and ento-pterygoids, simple attachment of the post-temporal bones to the skull, and a large air-bladder. Of the African genera, Chrysichthys is the most primitive. Rita, found in India, resembles Chrysichthys in many features such as the nostrils structure, simple attachment of the fifth vertebra to the cranium, absence of a post-temporal plate, presence of

1. Drawn up in the light of classifications done by Bhimachar (1933), Boulenger (1904), Gosline (1947), Regan (1904a, 1909, 1911), Schultz (1957), and Starks (1926).
pterygoids etc. Both are recorded as Eocene Sivalik fossils in India, and of the two, Rita is more primitive than Chrysopthyas, in view of its having an enlarged vomer, pelvic fin with more number of rays and pterygoids larger.

Of the two dozen siluroid families roughly known, the Pimelodidae of South America alone resemble the Bagridae in most of their morphological and anatomical features. Regan (1922) stated that "most if not all the African and Indian families, other than the Bagridae may be regarded as derived from that family, which appears to be nearly related to the South American Pimelodidae". Geographically the only siluroid family common to South America, Africa and India is the semi-marine cosmopolitan Ariidae. Taxonomically the only siluroid family older than Bagridae and Pimelodidae and nearly resembling them is Ictaluridae ( = Ameiuridae). Whether the Bagridae originated from either the Ariidae or the Pimelodidae is discussed below.

Rita resembles Tachysurus ( = Arius) in having an enlarged vomer, molariform teeth on palate, and posterior nostril provided with a flap. Although species of Bagridae are in general primary freshwater forms (Myers, 1938), certain species, such as Mystus gulio are caught from tidal and even from inshore waters. Gosline (1944: 215) suggested that to investigate the marine origin of the Cyprinophysiine fishes, a comparison of the Weberian apparatus, breeding habits and excretory system should be made between the freshwater and marine families. So far as the Bagridae is concerned, Bridge & Haddon (1893), Regan (1911), and Bhimachar (1933) have not dealt with the Weberian apparatus of Ariidae to enable us to compare it with Rita. The
breeding habits of *Mystus vittatus*, *fulio*, *aor*, *gopshala* and *Rita rita* have been studied by Raj (1916), Day (1877), Willey (1910), Eggert (1930), Mookerjee *et al.* (1940), Raj (1940), and Dewanesan & Chidambaram (1948). Of these species, females of *M. fulio*, *aor* and *gopshala* are believed to carry their eggs in folds on the ventral surface on the analogy of *Platystomus* of South America. Regarding the eye structure nothing is known. The evidences adduced above are insufficient to suggest the evolution of *Rita* from *Tachysurus*-like ancestors, or in other words a marine origin for the Bagridae.

Of the freshwater families, the Ictaluridae of the Neotropical region resemble the Pimelodidae and Bagridae in many of their features. The osteological features of Ictaluridae (Kindred, 1919) are not vastly different from the basic bagrid pattern. Without factual evidence, it is hard to emphasize that the Bagridae evolved from Ictaluridae-like ancestors; but this seems to be one of those lines of research, which appears promising in attempting to answer the difficult question of the origin of the Bagridae. A detailed osteological study of the South American catfishes, particularly of Pimelodidae, and a comparison with the Bagridae may throw further light on this problem.