

MISCELLANEOUS PUBLICATION
OCCASIONAL PAPER No. 37

Records of the Zoological Survey of India

**Aid to the Identification of the Siluroid Fishes
of India, Burma, Sri Lanka, Pakistan
and Bangladesh**

5. Ariidae and Plotosidae

**By
K. C. Jayaram**

**Issued by the Director
Zoological Survey of India, Calcutta**

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OF INDIA, BURMA, SRI LANKA, PAKISTAN
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5. ARIIDAE AND PLOTOSIDAE

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CONTENTS

	PAGE
INTRODUCTION	1
ACKNOWLEDGEMENTS	1
Family ARIIDAE	1
Genus <i>Batrachocephalus</i> Bleeker	4
Genus <i>Osteogeneiosus</i> Bleeker	6
Genus <i>Arius</i> Valenciennes	7
Genus <i>Ketengus</i> Bleeker	33
Genus <i>Hemipimelodus</i> Bleeker	35
Family PLOTOSIDAE	36
Genus <i>Plotosus</i> Lacépède	37
REFERENCES	40

INTRODUCTION

This paper is the last and final in the series "Aid to the identification of Siluroids". Part 1 (Jayaram, 1977) contained keys to the genera and species of the family Bagridae, besides a general key to all the families of Siluriformes. Part 2 (Jayaram, 1977a) dealt with the families, genera and species of Siluridae, Schilbeidae, Pangasiidae, Amblycipitidae and Akysidae. Part 3 (Jayaram, 1979) covered the Sisoridae and Part 4 (Jayaram, 1980) Clariidae, Heteropneustidae, Chacidae and Olyridae. The general arrangement is the same as adopted in the earlier parts. As far as possible key characters are illustrated. Under descriptions of genera and diagnosis of species, further characters which will help in identification are printed in italics.

Abbreviations :

In text-figures.—a.d. = adipose dorsal fin ; adh. app. = adhesive apparatus ; Bb.df. = Basal bone of dorsal fin ; c.pd. = Caudal peduncle ; fng. proc. = finger-like process ; g.m. = gill membrane ; g.o. = gill opening ; m.b = mandibular barbels ; oc.p. = occipital process ; pe.f. = pectoral fin ; pc.sp. = pectoral spine ; post lab.gr = post-labial groove ; tblc. = tubercles.

In text.—BM(N.H.) = British Museum (Natural History), London ; GCM(NH) = Govt. College Museum Natural History, Lahore ; TF = Text-figure ; ZMA = Zoological Museum, Amsterdam ; ZSD = Zoological Survey Department, Karachi ; ZSI = Zoological Survey of India, Calcutta.

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I am thankful to Sri Parimal Biswas, Senior Artist, Zoological Survey of India, Calcutta, for the illustrations. I am also obliged to Dr P. K. Talwar, Superintending Zoologist and Dr J. R. Dhanze, Zoological Assistant, Fish Division for their suggestions. I am grateful to the Director, Zoological Survey of India, for facilities.

Family ARIIDAE

(Also called Tachysuridae and sometimes Bagridae in literature)

Medium to very large sized catfishes. Snout and head rounded to depressed, mouth terminal to inferior. Teeth in jaws villiform, those on palate confined to vomer and/or palatines, villiform, granular or

molar-like, uniformly of one type or mixed, of varying size and shapes in one or three patches of different contours on each side. One to three pairs of barbels, *nasal barbels absent*, usually a pair of maxillary (absent in *Batrachocephalus*); usually two pairs of mandibular (absent in *Osteogeneiosus*, rarely a single pair in *Batrachocephalus*). *Two pairs of nostrils closely approximated on each side, the posterior pair partly covered by a flap of skin which separates the two nostrils of each side.* Head covered by a bony shield, often rugose, granulated, mostly visible beneath

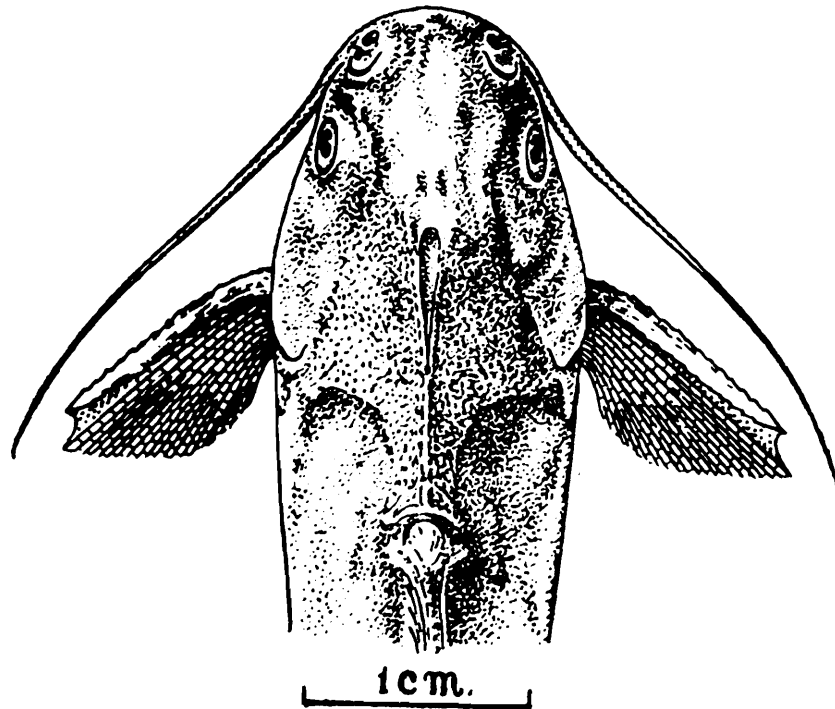


Fig. 1. Dorsal view of head of *Arius caelatus* Valenciennes to show closely placed nostrils, flap of skin partly covering the posterior nostril and bony shield covering the head.

the thin skin in many species, the supraoccipital process extends posteriorly as a part of this shield in a median line to meet the basal bone of the dorsal fin or predorsal plate. Gill membranes fused with each other and attached to isthmus, with almost a narrow fine posterior flap; gill rakers present, *numbering 7 to 17* on first arch*, also on posterior faces of first and second arches (may be completely absent in some species).

Rayed dorsal fin, short, inserted in the anterior half of body, in advance of pelvics, with a spine. Adipose dorsal fin smooth, and free, paired fins inserted horizontally and plain. Pectoral fins with a sharp, serrated spine. Anal fin short. Caudal fin forked or bifurcate. Lateral line present, complete.

*For species dealt with in this paper only.

Air-bladder large with thick walls in abdominal cavity not enclosed in bone, some species may have a posterior chamber.

Palatines rod-like. Sphenotics and pterotics provide facet for articulation of hyomandibular. Endopterygoid present. Ectopterygoid lies anterior to metapterygoid and endopterygoid. Metapterygoids articulate suturally with quadrate and hyomandibular. Preopercle reduced, may be dentigerous. Post-temporals connected to skull suturally. Inferior limb of post-temporals stout, united suturally with basioccipital. Epiotic lamellae produced posteriorly. Mesocoracoid in pectoral girdle absent. Vertebrae 48 to 58.

Distribution.—Abundantly caught in the east and west coasts of India, besides the seas surrounding Sri Lanka, Pakistan, Bangladesh, Burma, and the Malay Archipelago. In general these sea catfishes are found in the tropical Indo-Pacific, the Atlantic and East Pacific regions.

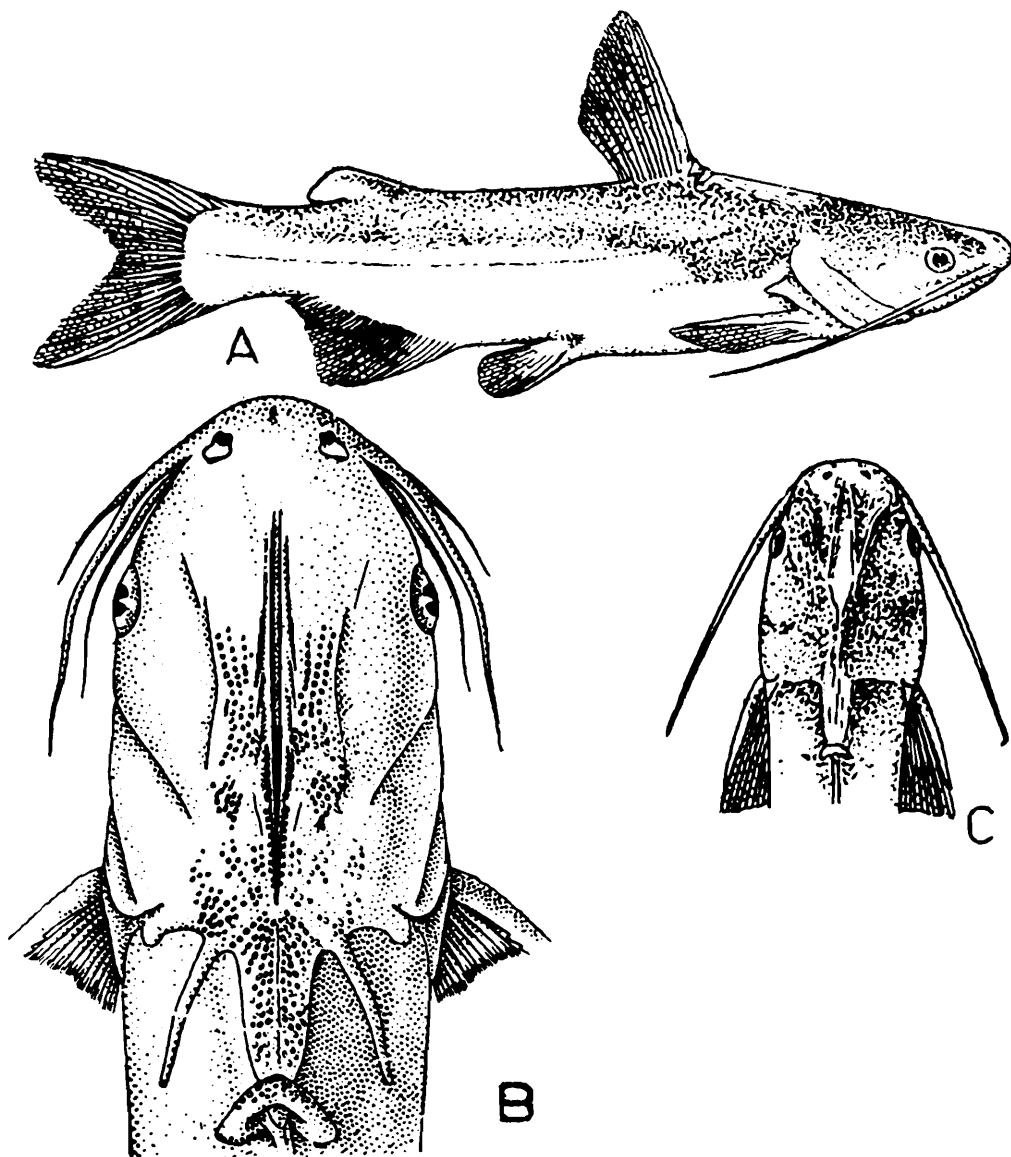


Fig. 2. A. Lateral view of *Osteogeneiosus militaris* (Linnaeus)
 B. Dorsal view of *A. tenuispinis* Day to show three pairs of barbels.
 C. Dorsal view of *O. militaris* to show stiff, semiosseous maxillary barbels.

Type-genus.—*Arius Valenciennes*.

Remarks.—Mostly marine, some species enter estuaries, a few are confined to brackish and/or freshwaters. Some of the species attain a large size and are fished from coastlines up to 50 m depth. These form an important constituent in the marine fisheries of our country.

A total of five genera are known, all are dealt with here.

KEY TO THE GENERA

- | | | |
|--|-----|---------------------------------|
| 1. Only one or two pairs of barbels. | ... | 2 |
| Three pairs of barbels, one pair maxillary and two pairs of mandibular. (Fig. 2B). | ... | 3 |
| 2. Maxillary barbels stiff and semi-osseous. (Fig. 2A, C) | ... | <i>Osteogeneiosus</i> Bleeker |
| Mandibular barbels present. Maxillary barbels absent. (Fig. 3A). | ... | <i>Batrachocephalus</i> Bleeker |
| 3. Teeth on palate absent | ... | 4 |
| Teeth on palate present. | ... | <i>Arius Valenciennes</i> |
| 4. Mouth opening wide, cleft extending behind orbit. Jaws with a single row of incisor-like teeth. | ... | <i>Ketengus</i> Bleeker |
| Mouth opening narrow, cleft not extending to orbit. Jaws with a band of villiform teeth. | ... | <i>Hemipimelodus</i> Bleeker |

Genus *Batrachocephalus* Bleeker

Batrachocephalus Bleeker, 1846, *Nat. Geneesk. Arch. Ned. Ind.*, (2) 3, pp. 147, 176 (type species, *Batrachocephalus ageniosus* Bleeker).—Smith, 1945, *Bull. U. S. nat. Mus.*, 188, p. 404.—Misra, 1976, *Fauna of India*, 3, p. 13.

Description.—Dorsal profile arched. *Head large*, broad, depressed, *frog-like* with head-shields exposed; snout bluntly rounded; jaws subequal, *lower jaw prominent*; *lips thin*. *Mouth terminal, widely cleft, reaching to midorbit*. Teeth conical in bands on jaws and palate; premaxillary band in upper jaw with conical teeth, in 4 or 5 series, palate teeth also conical in a broad longitudinal band. Eyes large, dorso-lateral, in anterior half of head and above angle of mouth. *One pair of small barbels, mandibular only*; *indications of inner pair seen, but not conspicuous*; *maxillary pair absent*. Gill membranes with a free posterior margin, without a notch, but united with isthmus. Branchiostegals 5.

Rayed dorsal fin with 7 rays and a strong spine. Adipose dorsal short, posteriorly free. Pectoral fins with 7 to 9 rays and a strong spine

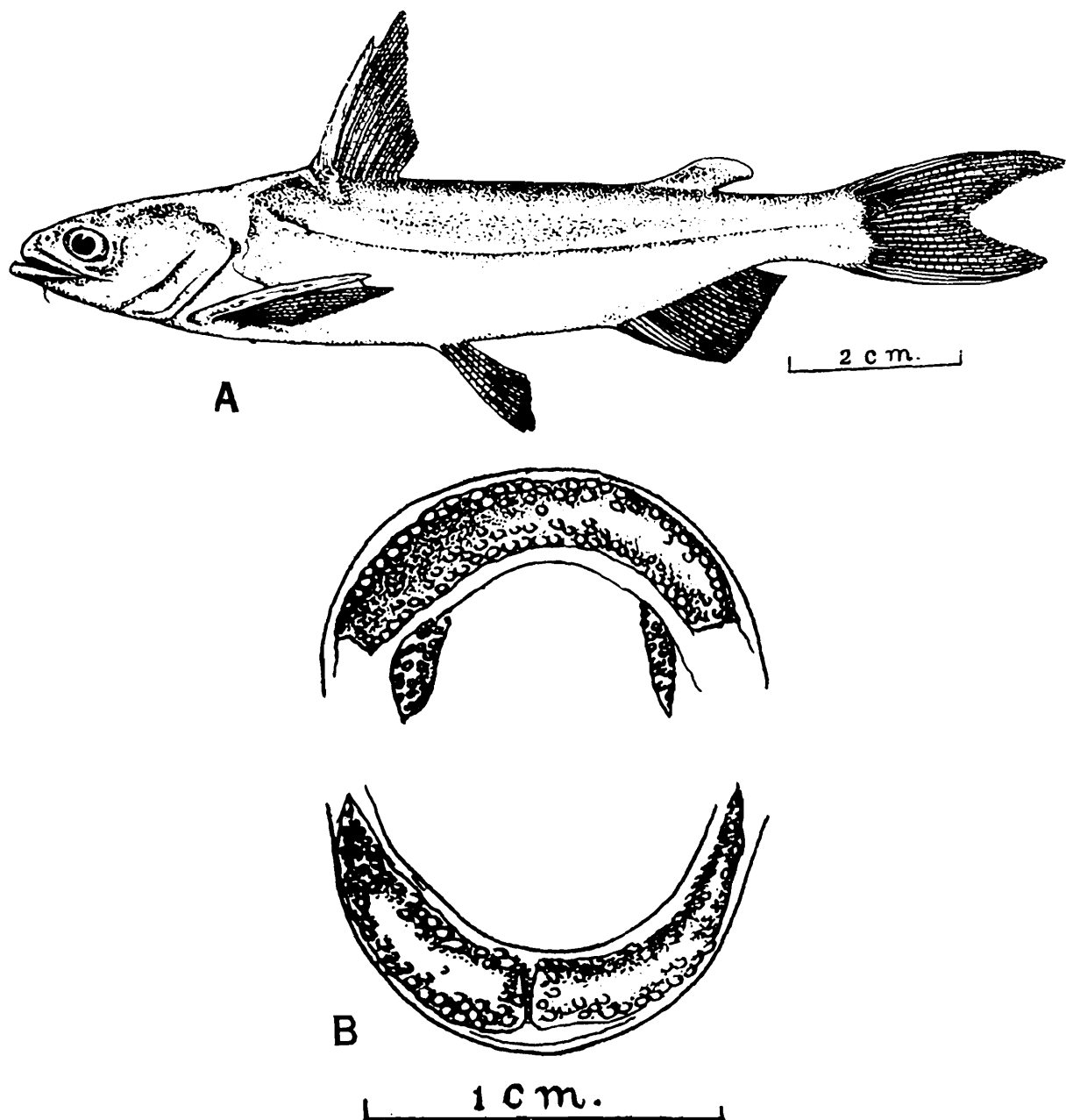


Fig. 3. A. Lateral view of *Batrachocephalus mino* (Hamilton). B. Dentition.

serrated along both margins. Pelvic fins with 6 rays. Anal fin moderate with 19 to 21 rays. Caudal fin forked. Lateral line complete, simple. Air-bladder free, not enclosed in bone.

Distribution.—Seas, estuaries of India, Pakistan, Sri Lanka, Burma, Bangladesh, Thailand, Java, Borneo and Sumatra.

A single species.

***Batrachocephalus mino* (Hamilton)**

Ageniosus mino : Hamilton, 1822, *Fish. Ganges*, p. 159 (type locality, Ganges).

Batrachocephalus mino : Smith 1945, *Bull. U. S. nat. Mus.* 188, p. 404, fig. 90 (Thailand).—Misra, 1976, *Fauna of India*, 3, p. 14.

D. I, 7 ; P. I, 7-9 ; V. i, 5 ; A. 19-21 ; C. 15.

Diagnostic characters.—As in the genus.

Colour.—Silvery or light brown depending upon state of preservation, darkest along back and upper lobe of caudal fin. Head-shields rough, corrugated, forming a cross over occiput.

Distribution.—India. Pakistan. Burma. Bangladesh. Sri Lanka. Thailand. Sumatra. Java. Borneo. Rare in Thailand.

Size.—Maximum size 250 mm. TL.

Fishery value.—A curious fish, not common and held in no esteem as food.

Type-specimens.—Not known.

Genus *Osteogeneiosus* Bleeker

Osteogeneiosus Bleeker, 1846, *Nat. Geneesk. Arch. Ned. Ind.*, (2) 3, 146, 173 (type species, *Osteogeneiosus macrocephalus* Bleeker).—Smith, 1945, *Bull. U. S. nat. Mus.*, 188, p. 405,—Misra, 1976, *Fauna of India*, 3, p. 20.

Description.—Dorsal profile gently rising to dorsal fin base, thereafter gently dropping. Head large, strongly depressed, covered by thin skin; snout obtuse; jaws subequal, upper jaw projecting before mouth; lips thick. Mouth subterminal, arcuate, wide. Teeth villiform in bands on jaws and granular on palate in two widely separated but posteriorly converging semioval patch on each side. Eyes moderate, lateral, in anterior half of head, above angle of mouth. *Barbels only one pair, a pair of semiosseous stiff maxillary barbels, no mandibular barbels.* Gill membranes posteriorly united with isthmus. Branchiostegals 5.

Rayed dorsal fin with seven rays and a pungent spine. Adipose dorsal short, posteriorly free. Pectoral fins with 10 or 11 rays and a strong serrated spine. Pelvic fins with 6 rays. Anal fin moderately long with 19 or 22 rays. Caudal fin forked. Lateral line complete, simple.

Air-bladder free, not enclosed in bone.

Distribution.—India. Pakistan. Sri Lanka. Burma. Bangladesh. Thailand. Malaya. Java. Sumatra. Borneo. Malacca. Found in seas, estuaries and tidal rivers.

A single species.

Remarks.—Day (1889) included his species *O. sthenocephalus* from Burma as a second species of this genus. The characters distinguishing *sthenocephalus* from *O. militaris* fall within the range of variation of the latter and as such, it is synonymised here.

Osteogeneiosus militaris (Linnaeus)

Silurus militaris Linnaeus, 1758, *Syst. Nat.*, ed. 10, p. 305 (type locality, Asia).

Osteogeneiosus militaris: Smith, 1945, *Bull. U. S. nat. Mus.*, 188, p. 405 (Thailand).—Misra, 1976, *Fauna of India*, 3, p. 21.

D. I, 7 ; P. I, 10-11 ; V. i, 5 ; A. iv-v, 15-17 ; C. 17.

Diagnostic characters.—As in the genus.

Colour.—Bluish along back, light below. Distal part of dorsal and adipose fin dark blue. Upper surface of head almost or quite smooth with a few granulations generally present between the posterior end of median longitudinal groove and base of occipital process ; belly sparingly dotted with black spots.

Distribution.—INDIA : east and west coast. Pakistan. Bangladesh. Sri Lanka. Burma. Thailand. Malaya. Java. Sumatra. Borneo.

Size.—Maximum size 350 mm. TL.

Fishery value.—A very common fish eaten by the poorer classes with little repute as food, but cheaper than others. A coarse isinglass is made from the air-bladder. Oral incubation is common in this species. The egg laying and egg hatching season may be prolonged, extending over the entire year. Large variations due to sexual dimorphism are common. Eggs are large sized, 12 to 14 mm diameter, obtained in September in Sri Lanka.

Type-specimens.—Not known.

Genus **Arius** Valenciennes

Tachysurus Lacépède, 1803, *Hist. nat. Poiss.* 5, p. 150 (type species, *Tachysurus sinensis* Lacépède, based on a painting, unidentifiable, hence inadmissible).

—Chandy, 1954, *Rec. Indian Mus.*, 51 (1), pp. 1-18 (synopsis of species, key).

—Misra, 1976, *Fauna of India*, 3, p. 24.

Arius Valenciennes, 1840, IN : Cuvier & Valenciennes, *Hist. nat. Poiss.*, 15, p. 53 (type species, *Pimelodus arius* Hamilton, by tautonymy).

Description.—Dorsal profile arched. *Head* large, subconical, depressed, exposed, *with more or less granular or rugose osseous shields on dorsal surface*, or covered with thin skin ; snout conical or pointed obtusely : jaws subequal, upper jaw slightly longer in most species, projecting in some, lips thin. Mouth subterminal, inferior in some, moderate or large, transverse or bowshaped. *Teeth* villiform on jaws, granular, globular or molar-like on palate *arranged in one to three patches of varying size and shape on each side*. Eyes lateral or slightly directed upwards with

free orbital margins. *Barbels three pairs ; one pair maxillary, two of mandibular.* Gill membranes united, connected with isthmus but with a free posterior margin. Branchiostegals 5 to 9.

Rayed dorsal fin with 7 rays and a pungent strong spine. Adipose dorsal short or of moderate length, posteriorly free. Pectoral fins with 9 to 13 rays and a strong serrated spine. Pelvic fins with 6 rays. Anal fin short with 14 to 25 rays. Caudal fin forked with rounded or acute lobes. Lateral line prominent, complete, simple.

Air-bladder large, heart-shaped, free, not enclosed in bone, divided into anterior and posterior chambers.

Distribution.—Seas and estuaries of Tropical Regions ascending to within tidal influence and entering freshwater.

Many species are known, 18 are dealt with here.

Remarks.—Chandy (1954) gave a synopsis of the Indian and Burmese species of this genus. Jayaram and Dhanze (1979) gave a review of the genera of the family.

There is much controversy regarding the use of the name *Tachysurus* Lacépède in place of *Arius* Valenciennes. Though the former name has priority, the fact that *Tachysurus sinensis* Lacépède, is based on a poor painting, and has not been so far properly identified, renders its usage rather unacceptable. In the interest of stability the name *Arius* is widely used which is followed here.

KEY TO SPECIES

- | | | |
|--|-----|----------------------|
| 1. Teeth on palate in three patches on each side closely set, triangular in shape. (Fig. 4C). | ... | <i>A thalassinus</i> |
| Teeth on palate in one or two patches on each side. | ... | 2 |
| 2. Teeth on palate as a single patch on each side. (Fig. 4B). | ... | 3 |
| Teeth on palate as two patches on each side. (Fig. 4A). | ... | 15 |
| 3. Teeth on palate as a single large patch, ovate or elongated in shape. | ... | 4 |
| Teeth on palate as a single patch not very large as above and not ovate or elongated but roughly triangular or conical in shape. | ... | 7 |

4. Pectoral spine longer than dorsal spine.
 Least height of caudal peduncle 1.8 to 2.09
 in its length. Anal fin with 14-16 rays. ... *A. jella*
 Pectoral spine shorter or equal to dorsal
 spine. ... 5

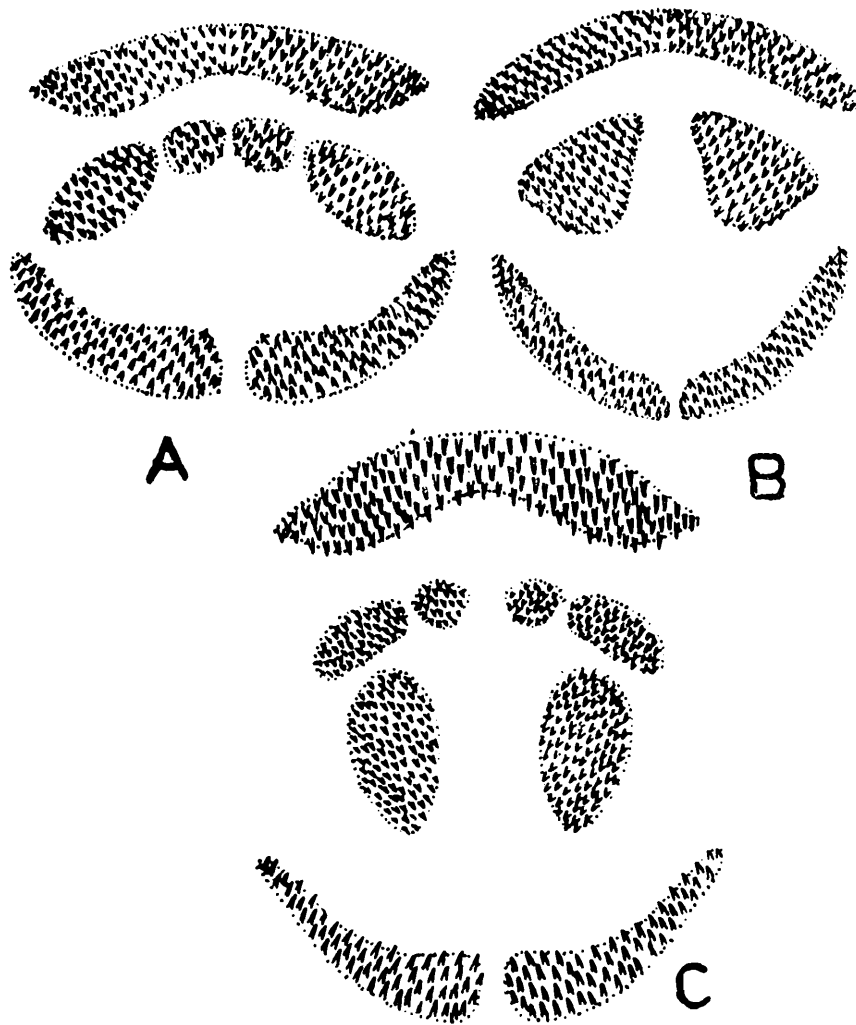


Fig. 4. Palate dentition of A. *Arius sagor* (Ham.), B. *A. macronotacanthus* Bleeker and C. *A. thalassinus* (Rüppell) to show single, double and triple patches of teeth.

5. Palate teeth patch more or less uniformly
 ovate in shape with a straight inner
 border. Teeth densely packed. Eye
 diameter 2.5 in inter-orbital width, 2.0 in
 snout length. (Fig. 5A) ... *A. maculatus*
 Palate teeth patch irregularly ovate in
 shape with a conical horn like projection
 either anteriorly or posteriorly. Teeth
 loosely packed. ... 6
6. Anal fin with 20-21 rays. Horn like conical
 projection of palate teeth patch present
 anteriorly. (Fig. 5C) Dorsal fin with a
 filamentous prolongation. (Fig. 12) Eye
 diameter 3 in interorbital width, 2 in snout
 length. ... *A. arius*

Anal fin with 19 rays. Horn like conical projection of palate teeth present posteriorly. (Fig. 5B) Dorsal fin without any filamentous prolongation. Eye diameter 3.5 in .interorbital width, 3 in snout length.

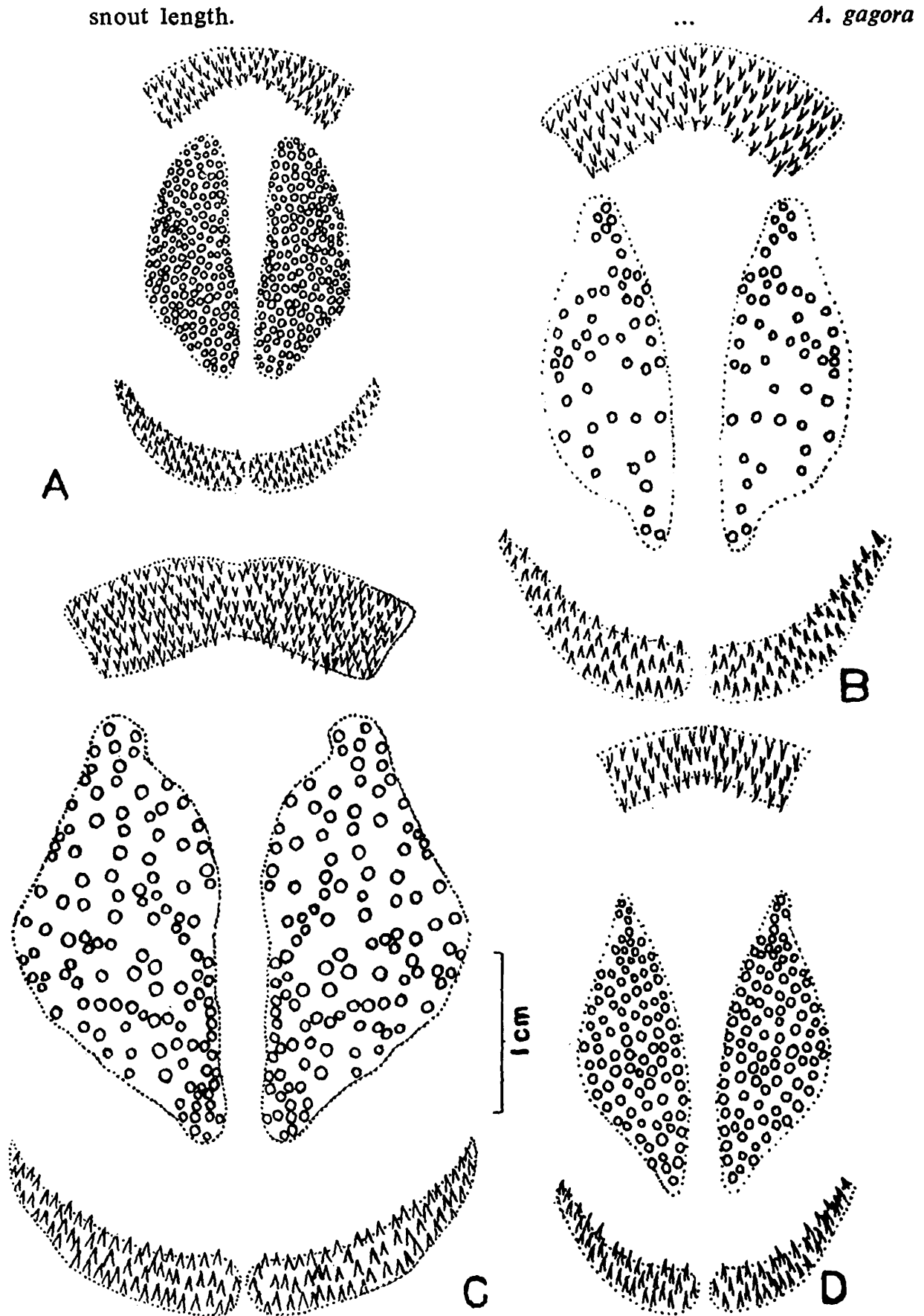


Fig. 5. Palate dentition of A. *A. maculatus* (Thunberg), B. *A. gadora* (Ham.)
C. *A. arius* (Ham.), D. *A. jella* Day.

- | | | | |
|--|-----|-----|------------------------|
| 7. Snout elongated, acute. Mouth distinctly inferior. | ... | ... | <i>A. acutirostris</i> |
| Snout spatulate or rounded. Mouth subterminal, narrow. | ... | ... | 8 |

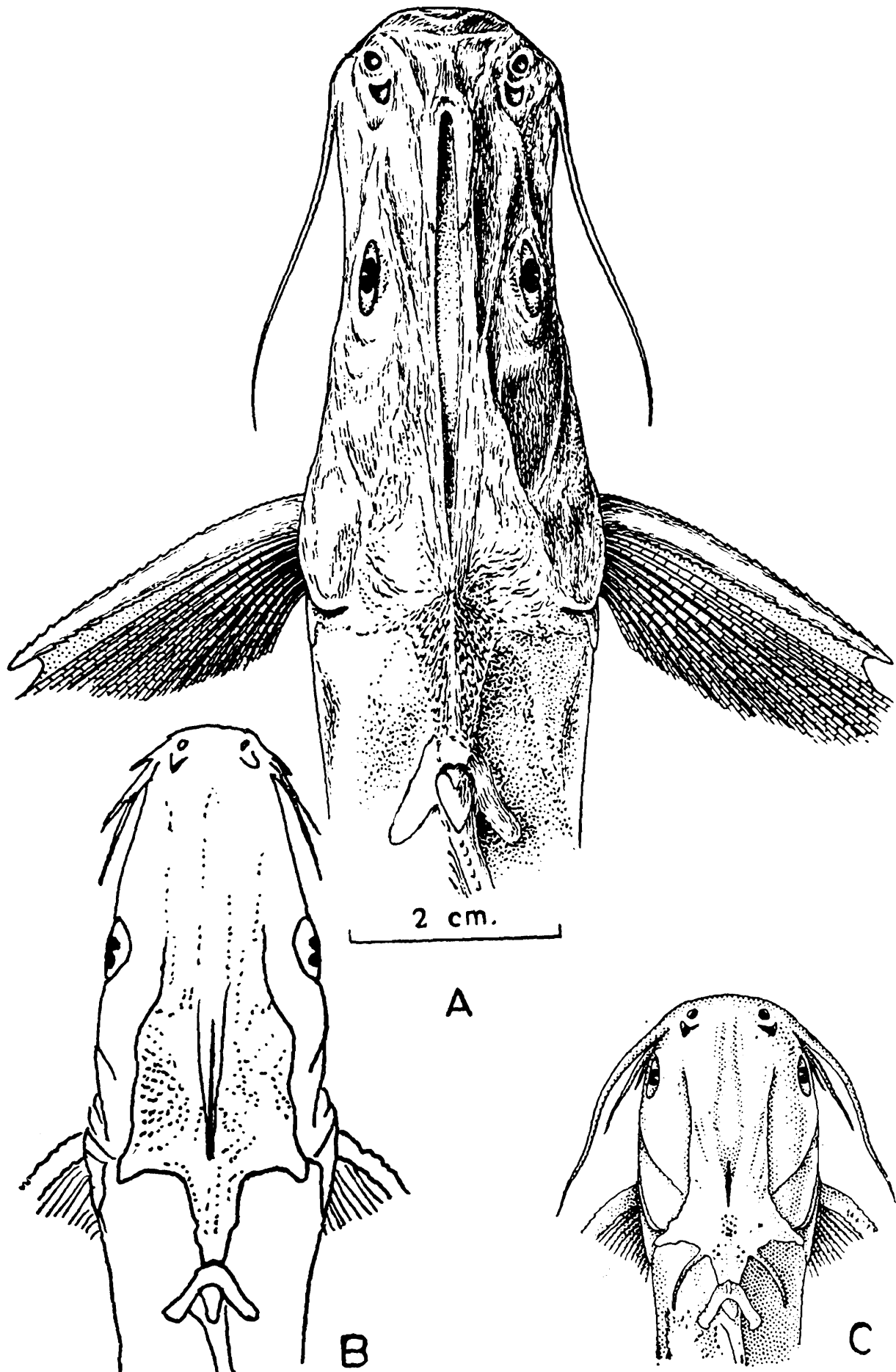


Fig. 6. Dorsal view of head and anterior portion of body of A. *A. burmanicus* Day, B. *A. subrostratus* Valenciennes, and C. *A. platysthinus* Day to show shape of snout, and extent of barbels.

8.	Snout long, spatulate.	9
	Snout short, obtusely rounded or duck-bill shaped.	10
9.	Maxillary barbels do not reach eye (India). (Fig. 6B).	<i>A. subrostratus</i>
	Maxillary barbels reach beyond eye (Burma) (Fig. 6A).	<i>A. burmanicus</i>
10.	Snout duck-bill shaped. Barbels thick and fleshy. (Fig. 6C).	<i>A. platystomus</i>
	Snout obtusely rounded. Barbels thin and not fleshy.	11
11.	Teeth patch on palate pear shaped or triangular, placed anteriorly.	12
	Teeth patch on palate ovoid or elliptical, placed deep in the buccal cavity. (Fig. 7B).	<i>A. tenuispinis</i>

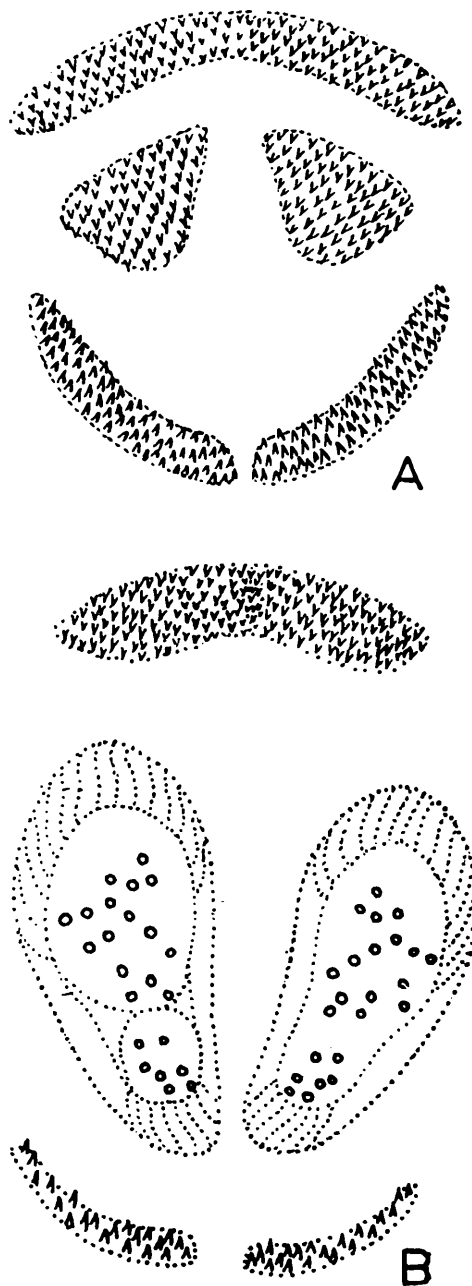


Fig. 7. Palate dentition of A. *A. macronotacanthus* Bleeker and B. *A. tenuispinis* Day.

12. Teeth on palate globular.	...	...	<i>A. macronotacanthus</i>
Teeth on palate villiform.	...	...	13
13. Teeth patch distinctly pear shaped.			
Maxillary and outer mandibular barbels nearly of same length.	...	...	<i>A. parvipinnis</i>
Teeth patch conical or triangular in shape.			
Maxillary and outer mandibular barbels are of different length.	...	...	14
14. Dorsal fin insertion equidistant between snout end and adipose dorsal origin.			
Dorsal spine equal to head length.	...	...	<i>A. caelatus</i>

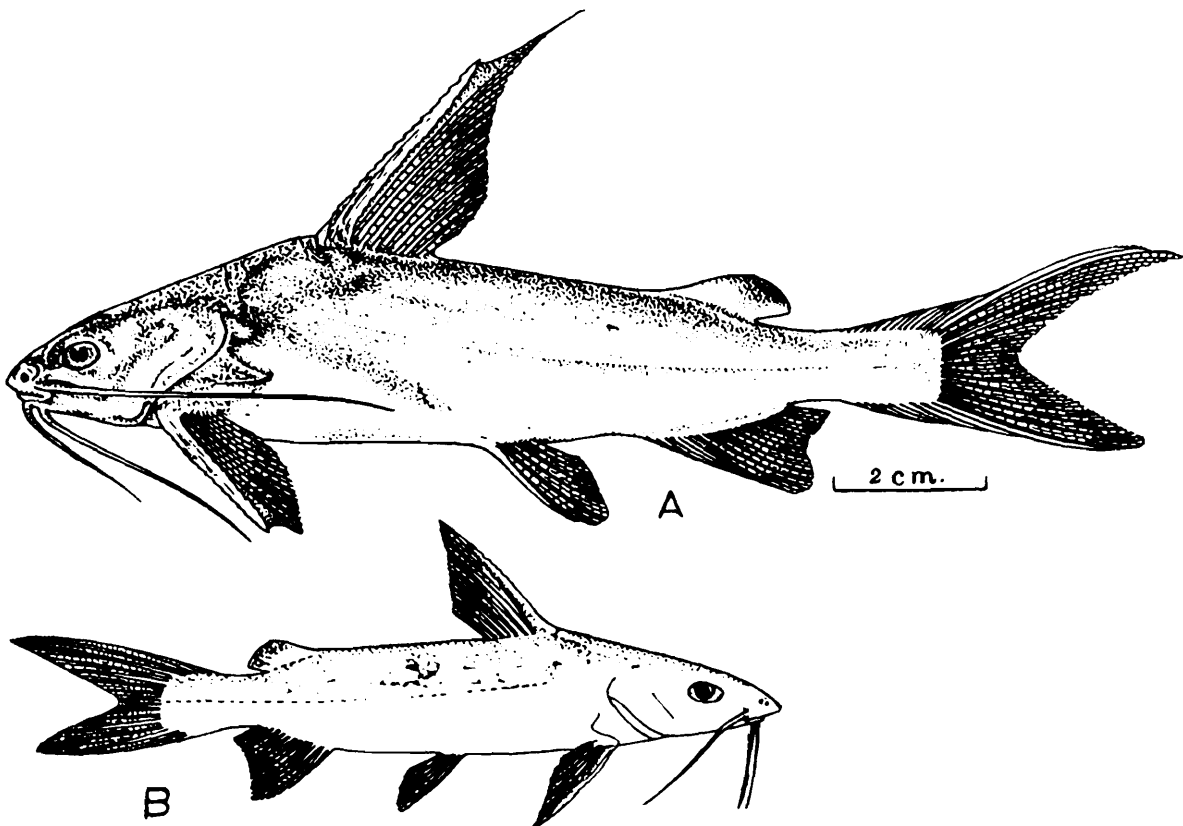


Fig. 8. Lateral view of A. *A. caelatus* Valenciennes and B. *A. sumatranus* (Bennett) to show insertion of dorsal fin and length of dorsal spine.

Dorsal fin insertion nearer to snout end than to adipose dorsal origin. Dorsal spine as long as head behind angle of mouth.	...	...	<i>A. sumatranus</i>
15. Teeth patches placed one below the other	...	...	16
Teeth patches placed side by side laterally	...	...	17
16. Posterior patch of teeth long, irregularly oval or elliptical. A prominent protuberance of the supraethmoid bone on either side of the eye present. (Fig. 10A).	...	...	<i>A. dussumieri</i>

Posterior patch of teeth pear-shaped converging posteriorly. (Fig. 10B). Teeth globular or molariform. No such protuberance present. *A. crossocheilus*

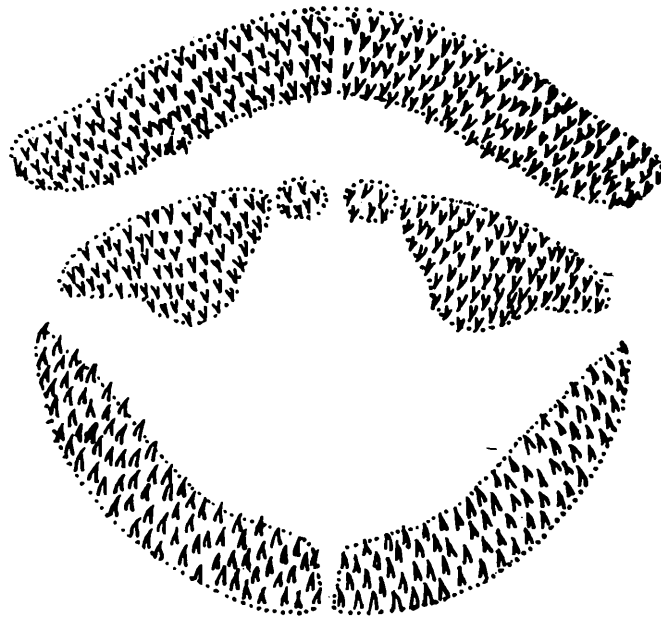


Fig. 9. Palate dentition of *A. A. sona* (Hamilton) to show arrangement of teeth with the patches being placed side by side.

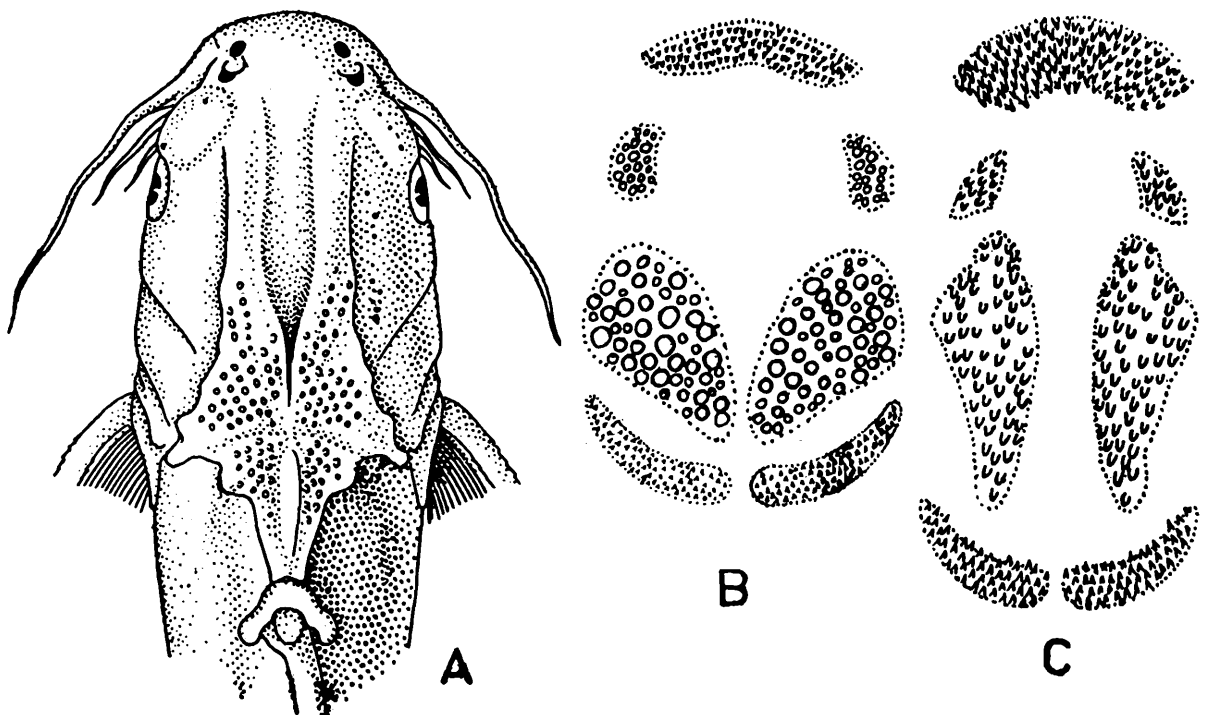


Fig. 10. A. Dorsal view of head and anterior portion of body of *A. dussumieri* (Val.) to show the lateral ethmoid protuberance. B. Palate dentition in *A. crossocheilus* Bleeker and C. *A. dussumieri* (Val.).

- | | | |
|--|-----|-----------------|
| 17. Basal bone of dorsal fin butterfly shaped. ... | ... | <i>A. sagor</i> |
| Basal bone of dorsal fin not as above. ... | ... | <i>A. sona</i> |

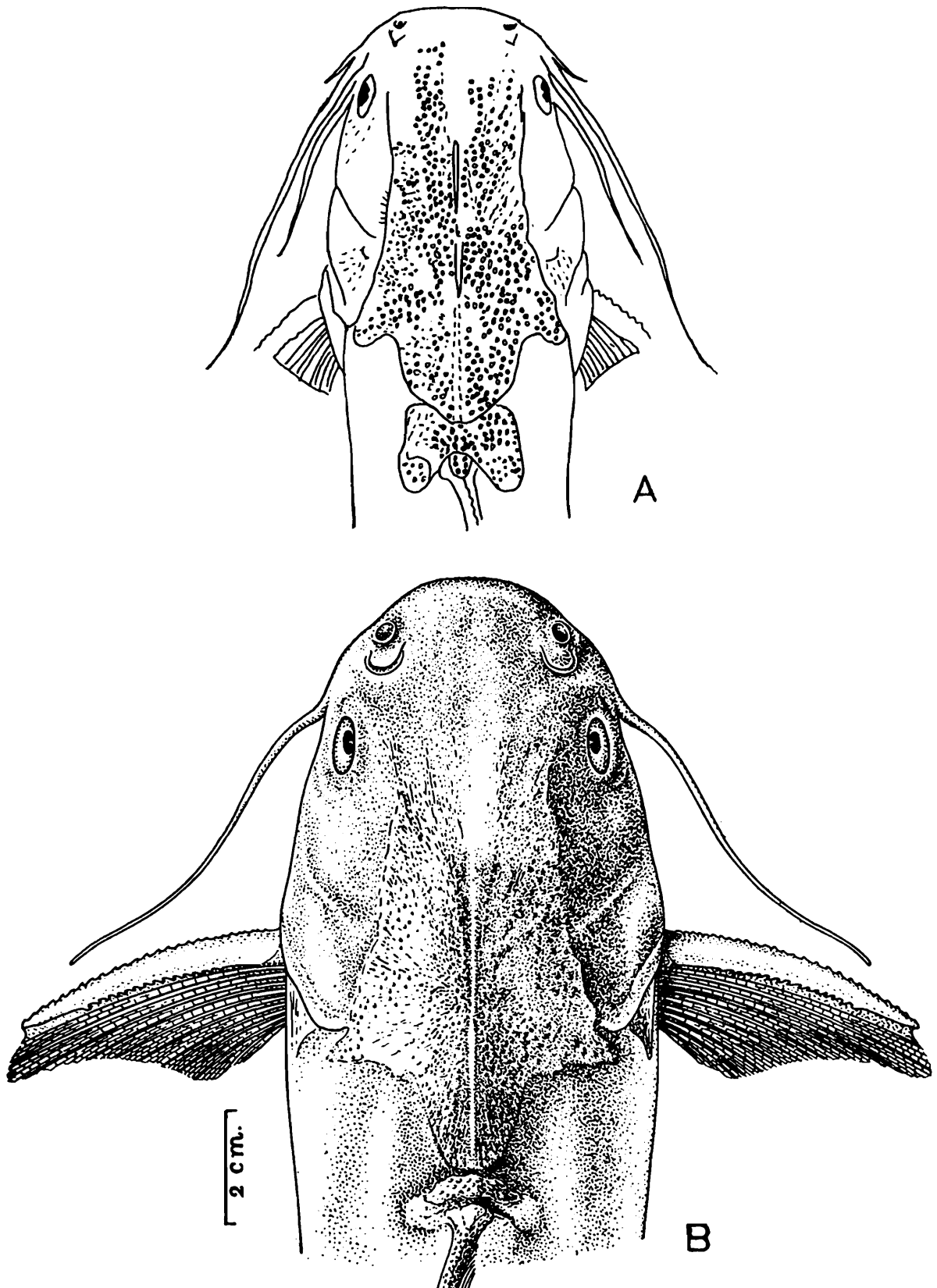


Fig. 11. Dorsal view of head and anterior portion of body of A. *A. sagor* (Hamilton) and B. *A. sona* (Hamilton) to show the butterfly shaped basal bone of dorsal fin in the former and the normal shape in the latter.

Arius acutirostris Day

Arius acutirostris Day, 1877, *Fish India*, p. 459, pl. 107, fig. 1 (type locality, Salween river, Moulmein, Burma).

Tachysurus acutirostris: Chandy, 1954, *Rec. Indian Mus.*, 51, p. 3 (diagnosis).—Misra, 1976, *Fauna of India*, 3, p. 31.

D. I, 7 ; P. I, 10 ; V. 1,5 : A. v, 14 ; C. 17.

Diagnostic characters.—*Snout fleshy, elongated, acute, extending beyond the mouth. Mouth inferior. Teeth on palate as a single somewhat oblique patch on each side converging anteriorly. Median longitudinal groove on head not reaching base of occipital process. Maxillary pair of barbels reaching beyond hind edge of eye and shorter than head length.*

Colour.—Upper portion of rayed dorsal and upper two thirds of adipose dorsal black tinged ; pectorals, pelvics, and anal stained grey. Upper surface of head granulated or with roughened lines.

Distribution.—BURMA : Salween river.

Size.—Maximum size 304 mm TL.

Fishery value.—A very common fish and of good value.

Type-specimens.—Syntypes, No. 454 (1 ex.), Cat. 569 (13 exs.), in ZSI, Calcutta.

Arius arius (Hamilton)

Pimelodus arius Hamilton, 1822, *Fish. Ganges*, pp. 170, 376 (type locality, estuaries of Bengal).

Arius buchanani Day, 1877, *Fish. India*, p. 463, pl. 105, fig. 6 (type locality, Hooghly at Calcutta).

Tachysurus arius: Chandy, 1954, *Rec. Indian Mus.*, 51, p. 4, pl. 1, fig. 5 (variations, synonymy ; dorsal view of head illustrated).—Misra, 1976, *Fauna of India*, 3, p. 32.

D. I, 7 ; P. I, 10 ; V. i, 5 ; A. v-vi, 14-16 ; C. 17.

Diagnostic characters.—*A prominent dorsal filament present. Teeth on palate globular, in a single large elliptical patch on each side as large as eye, with a horn-like conical projection anteriorly. A well defined black spot on adipose dorsal.*

Colour.—Silvery along back, lighter on sides and below ; pectoral and dorsal edged posteriorly with black, *adipose dorsal with a well defined black spot*. Upper surface of head lined in roughened lines, rather closely on occipital process. In fresh condition, upper half of body dark, dorsal filament and fin tips edged black.

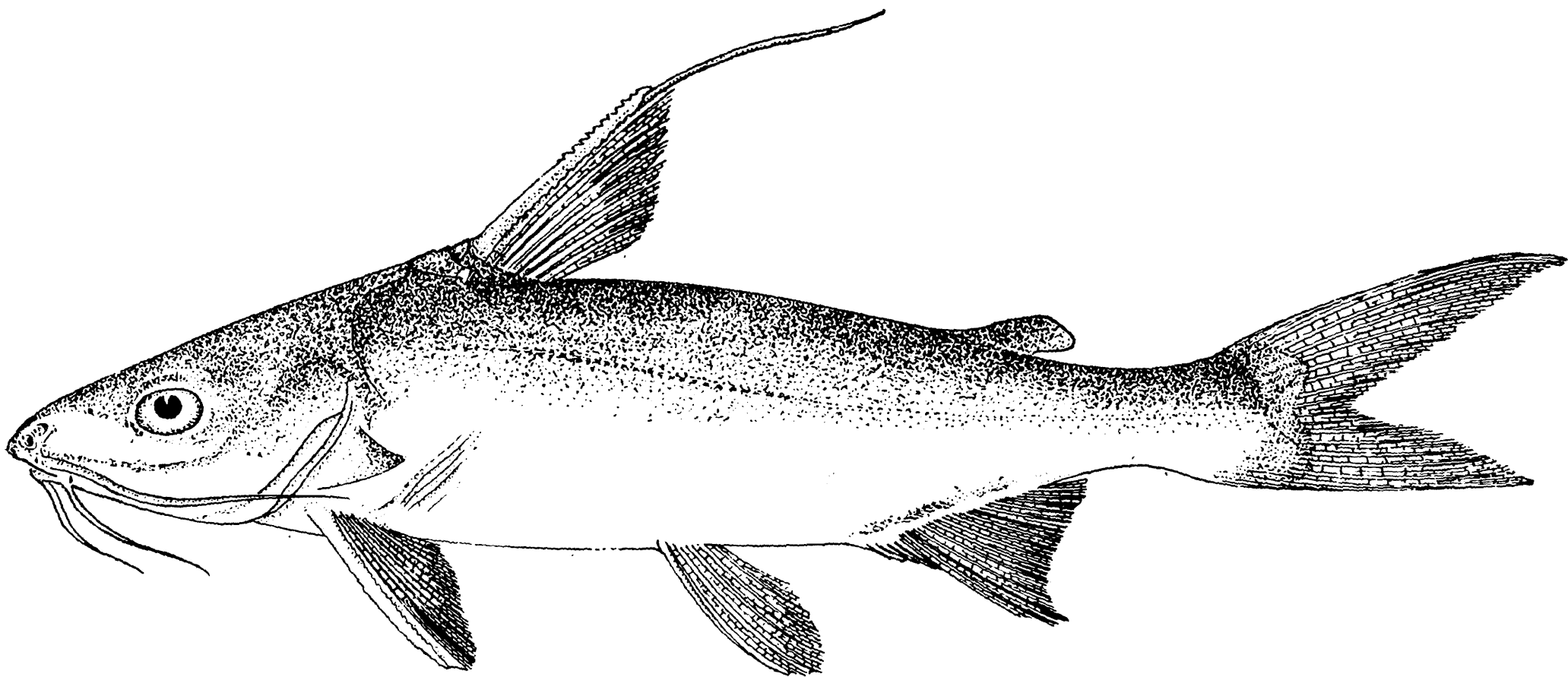


Fig. 12. Lateral view of *A. arius* (Hamilton) to show prolonged dorsal filament.

Distribution.—INDIA : W. Bengal, Orissa, Tamil Nadu, Kerala. Pakistan. Bangladesh. Burma. Very common in Chilka lake, Orissa.

Size.—Maximum size 465 mm. TL.

Fishery value.—An estuarine species occurring in considerable numbers in its range. Grows to a medium size and is of good commercial value.

Type-specimens.—Not known.

Arius burmanicus Day

Arius burmanicus Day, 1877, *Fish India*, p. 458 (type locality, Moulmein, Burma).

Tachysurus burmanicus : Chandy, 1954, *Rec. Indian Mus.*, 51, p. 5 (material in ZSI listed).—Misra, 1976, *Fauna of India*, 3, p. 34.

D. I, 7 ; P. I, 10 ; V. i, 5 ; A. iv-vi, 15-16 ; C. 15.

Diagnostic characters.—*Snout elongated, spatulate, duck-bill shaped. Teeth on palate in two small oval, obliquely set patches, equal to or smaller than eye-diameter, diverging posteriorly. All barbels shorter than head length.*

Colour.—Purplish dashed with copper, becoming dull white on sides and beneath. Rayed dorsal and adipose fin stained with black externally. Upper surface of head with roughened lines which are closest together at base of occiput and also on occipital process.

Distribution.—Burma, in tidal and freshwater.

Size.—Maximum size 304 mm. TL.

Fishery value.—Common in the tidal rivers, it is of good commercial value as it grows to a large size.

Type-specimens.—Syntypes : 1 ex., No. 456, original of Plate 105, fig. 4 in *Fish. India* ; 8 exs., Cat. 568, in ZSI, Calcutta.

Arius caelatus Valenciennes

Arius caelatus Valenciennes, 1840, IN : Cuvier & Valenciennes, *Hist. nat. Poiss.*, 15, p. 66 (type locality, Bombay).

Tachysurus caelatus : Chandy, 1954, *Rec. Indian Mus.*, 51, p. 5, pl. 1, fig. 7 ; pl. 3, fig. 4 (synonymy, material in ZSI ; dorsal view of head and dentition illustrated).—Misra, 1976, *Fauna of India*, 3, p. 35.

D. I, 7 ; P. I, 9 ; V. i, 5 ; A. v-vi ; 15-17 ; C. 15.

Diagnostic characters.—*Adipose dorsal black or with a blackish spot. Head shield rugose, granulated posterior to orbit and especially on the supraoccipital region. Teeth on palate villiform in a single triangular small patch on each side. Dorsal spine with an elongated black filament,*

Colour.—Bluish black above, dark grey below, with a metallic blue lustre on body. Adipose fin black, may be with a spot, at least distal part of fin blackish. Freshly caught specimens may be yellowish, fins scarlet. Eyes shot with golden yellow. All barbels black tipped.

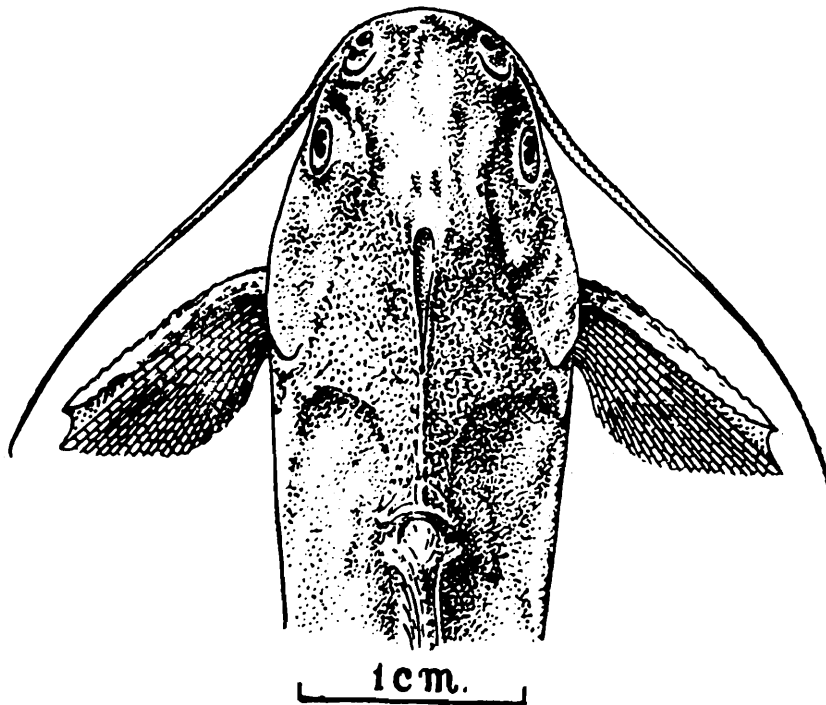


Fig. 13. *A. caelatus* Valenciennes. Dorsal view of head and anterior portion of body.

Distribution.—INDIA : W. Bengal, Orissa, Andhra, Coromandel, Maharashtra coasts. Pakistan. Bangladesh. Sri Lanka. Burma. Thailand. Java. Sumatra. Borneo. Enters brackishwater and rivers within tidal influence. Common in the east coast of India.

Size.—Maximum size 450 mm TL.

Fishery value.—A common and commercially important fish of the Indian coast. Attains a large size and fetches a good price.

Type-specimens.—Holotype, B. 589, Batavia, Coll. Quoy at Gainard, 320 mm. SL., Paratypes, 2 exs., B. 614, Bombay, Coll. Dussumier, Paris Museum, 380 mm.

***Arius crossocheilus* Bleeker**

Arius crossocheilus Bleeker, 1846, *Nat. Geneesk. Arch. Ned. India*, (2) 3, p. 137 (type locality, Batavia).

Tachysurus crossocheilus: Chandy, 1854, *Rec. Indian Mus.*, 51, p. 6, text-fig. 2a (synonymy, diagnosis; recorded from Bombay market; dentition illustrated).

—Misra, 1976, *Fauna of India*, 3, p. 38.

D. I, 7; P. I, ii; v. i, 5; A. v, 13; C. 17.

Diagnostic characters.—Snout abruptly conical, sharply differentiated from anterior portion of eye. Teeth on palate globular, of irregular size

in two oval discontinuous patches on each side, placed one below the other, anterior patch smaller than posterior. Pectoral spine serrated along both edges.

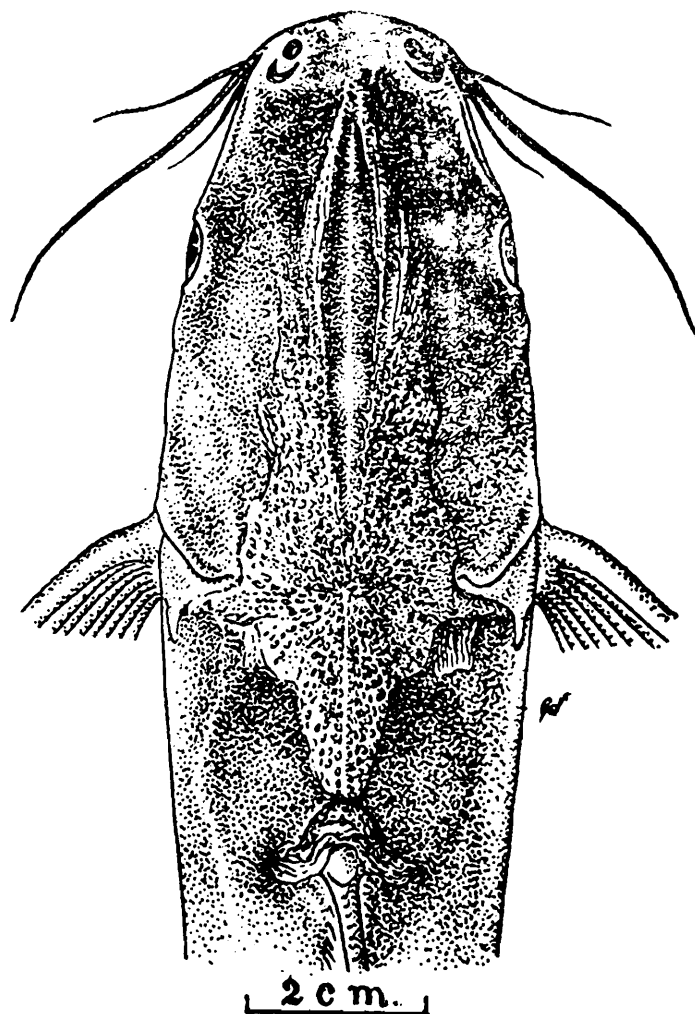


Fig. 14. Dorsal view of head and anterior portion of *A. crossocheilus* Bleeker to show shape of snout.

Colour.—Bluish brown above, silvery white below and sides, fins yellowish with more or less distinct dusky margins. Head-shields and occipital process with radiating roughened or granulated lines. Adipose fin with a black tinge.

Distribution.—INDIA : Bombay coast. Pakistan. Indo-Pacific seas. Malaya. Java. Sumatra. Banka. Celebes. Philippines, Singapore. Also recorded from East coast of India (Dhanze & Jayaram, 1979).

Size.—Maximum size 375 mm TL.

Fishery value.—Not very common. It is marine and attains a large size.

Type-specimens.—Syntypes, 3 exs., RMNH 6894, Batavia fish market, Coll. P. Bleeker, Leiden Mus.

Arius dussumieri Valenciennes

Arius dussumieri Valenciennes, 1840 IN : Cuvier & Valenciennes, *Hist. nat. Poiss.* 15, p. 84 (type locality, Malabar).

Tachysurus dussumieri : Chandy, 1954, *Rec. Indian Mus.*, 51, p. 6, pl. 2, fig. 1, (material in ZSI ; dorsal view of head, dentition illustrated).—Misra, 1976, *Fauna of India*, 3, p. 39.

D. I, 7 ; P. I, 12 ; V. i., 5 ; A. iv, v, 10-11 ; C. 15.

Diagnostic characters.—Head shield not much granulated or rugose excepting occiput and occipital process. *An oval protuberance of lateral ethmoid above and anterior of eye distinctly seen.* Median longitudinal groove short, distinct in posterior half of head reaching supraoccipital process. Teeth on palate molariform in two ovate elongate separate patches on each side placed one below other, anterior patch small, *posterior patch large, elliptical, foot shaped.*

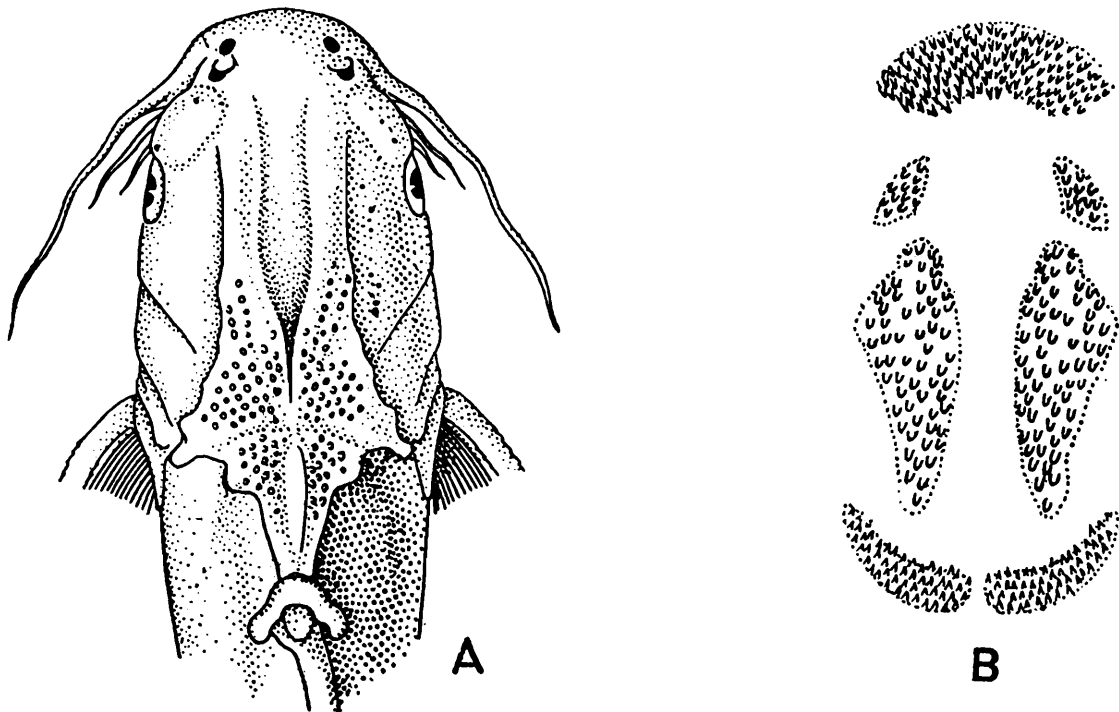


Fig. 15. A. Dorsal view of head and anterior portion of body of *A. dussumieri* (Val.) to show the lateral ethmoid protuberance. and B. Palate dentition.

Colour.—Bluish grey along back, becoming lighter on sides and below ; fins blackish externally.

Distribution.—INDIA : Malabar coast. Bombay. Madras. PAKISTAN : Karachi. Burma. Bangladesh, Sri Lanka.

Size.—Maximum size 560 mm TL.

Fishery value.—Common along Bombay and Madras coasts and is of good value.

Type-specimens.—Holotype, A 940, "Cote de Malabar", Coll. Dussumier, 620 mm SL. Paris Museum.

Arius gagora (Hamilton)

Pimelodus gagora Hamilton, 1822, *Fish Ganges*, pp. 167, 376 (type locality, estuaries of Bengal).

Arius macracanthus Günther, 1864, *Cat. Fish. Brit. Mus.*, 5, p. 167, 2 figs. (type locality Thailand).

Tachysurus gagora, Chandy, 1954, *Rec. Indian Mus.*, 51, pp. 7, 16, pl. i, fig. 12, pl. 3, fig. 10 (synonymy, material in ZSI; dorsal view of head and dentition illustrated).—Misra, 1976, *Fauna of India*, 3, p. 40.

D. I, 7 ; P. I, 10 ; V. i, 5 ; A. v-vi, 12-13 ; C. 17.

Diagnostic characters.—Teeth on palate globular, sparse, in two large semioval patches, dorsal spine without any filamentous prolongation. Median longitudinal groove lanceolate, shallow. Pectoral spine equals dorsal spine length.

Colour.—Dull brown superiorly, becoming dull white beneath, fins externally stained with grey or black and with a blackish spot on adipose dorsal.

Distribution.—INDIA : W. Bengal, Orissa. Bangladesh. Thailand. Often enters estuaries.

Size.—Maximum size 912 mm. TL. Common size 280 to 300 mm.

Fishery value.—A species of common occurrence inhabiting estuaries and tidal rivers. It is commercially valuable as it attains a marketable size.

Type-specimens.—Not known.

Arius jella Day

Arius jella Day, 1877, *Fish. India*, p. 467, pl. 106, fig. 3 (type-locality, Madras).

Tachysurus jella : Chandy, 1954, *Rec. Indian Mus.*, 51, p. 7, pl. 1, fig. 9, pl. 3, fig. 11 (material in ZSI listed; dorsal view of head and dentition illustrated).—Misra, 1976, *Fauna of India*, 3, p. 42.

D. I, 7 ; P. I, 10 ; V. i, 5 ; A. iv-v, 13 ; C. 19.

Diagnostic characters.—Pectoral spine longer than the dorsal spine. Palate teeth as a single elliptical patch, converging posteriorly.

Colour.—Greyish silvery becoming white on sides and below. Fins stained grey with a white outer edge to anal. Adipose dorsal with a black blotch. Occiput and occipital process granulated.

Distribution.—INDIA : East coast. Burma. Sri Lanka.

Size.—Maximum size 310 mm. TL.

Fishery value.—Common in the Bay of Bengal and contributes to the marine catfish industry of the east coast.

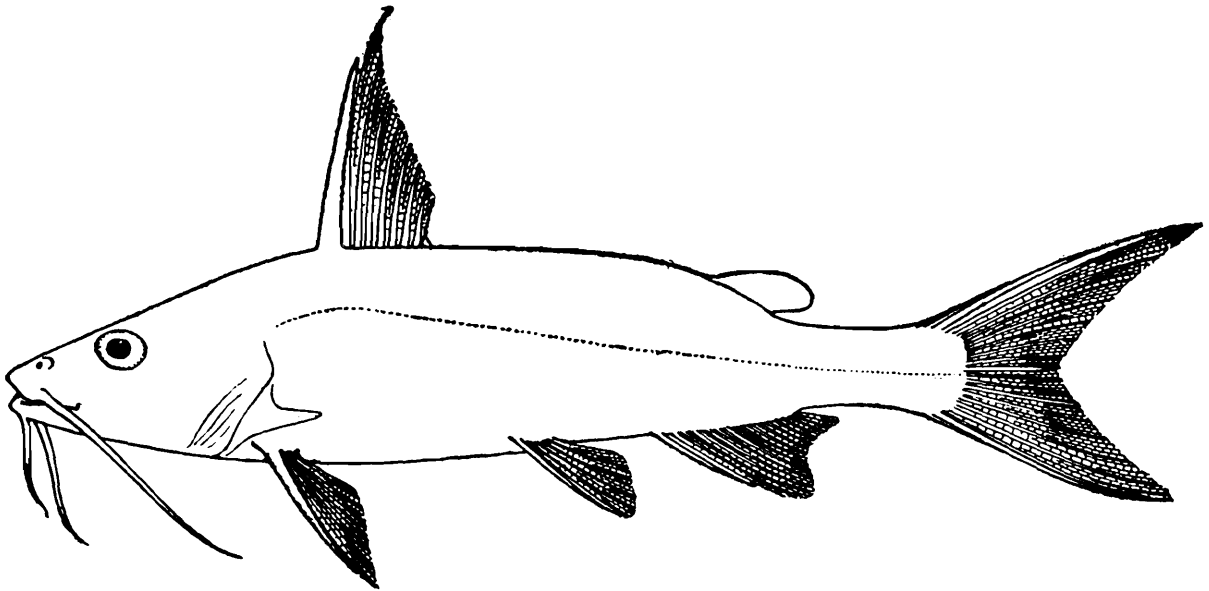


Fig. 16. Lateral view of *A. jella* Day

Type-specimens.—Syntype, 1 ex., No. 1304, original of pl. 106, fig. 3 in *Fish. India* in ZSI, Calcutta.

***Arius maculatus* (Thunberg)**

Silurus maculatus Thunberg, 1792, *Kongl. Vetensk. Akad. Nya. Handling.*, 13, p. 31, pl. 1, fig. 2 (type locality, Japan).

Arius falcarius Richardson, 1844, *Voy. Sulphur. Ichth.*, p. 134, pl. 62, figs. 7-9.

Arius maculatus : Weber & Beaufort, 1913, *Fish. Indo-Austral. Archipel.*, 2, p. 284, fig. 113.—Misra, 1976, *Fauna of India*, 3, p. 45.

D. I, 7 ; P. I, 10-11 ; V. i, 5 ; A. 19-22.

Diagnostic characters.—Dorsal spine with a long filamentous prolongation. *Teeth on palate dense in a single large foot-shaped or semioval patch on each side*, separated from each other broadly at anterior end, narrowly at posterior end, *with granular or molar like teeth*.

Colour.—Brown to bluish brown above, belly and underside of head whitish. Fins yellowish, adipose fin with a large black spot. Head shields granular, rugose, occipital process carinate and granulated. All fins black tipped.

Distribution.—INDIA : W. Coast, Arabian Sea, E. Coast, Bay of Bengal. Pakistan : Sind coast. Sri Lanka. Thailand. Malaya. Java, Borneo, Sumatra. Philippines. China, Taiwan,

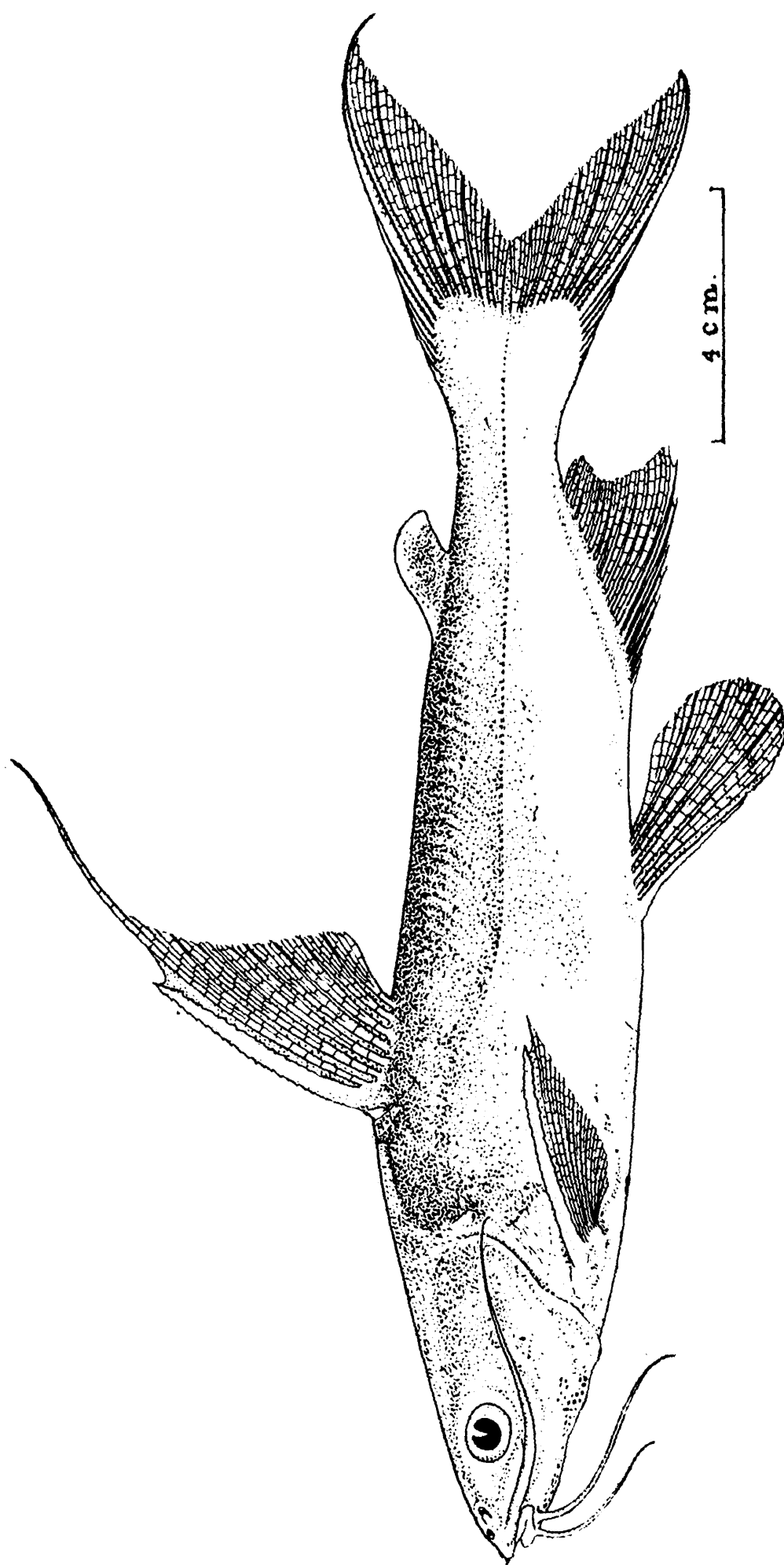


Fig. 17. Lateral view of *Arius maculatus* (Thunberg)

Size.—Maximum size about 600 mm TL.

Fishery value.—Abundant in Thailand. Full maturity is attained in both males and females at 160 length.

Type-specimens.—This species has been included by Chandy (1954) under the name *T. falcarius* (Richardson).

Arius macronotacanthus Bleeker

Arius macronotacanthus Bleeker, 1862, *Atlas Ichthyol. Indici. Prodr. Siluri*, 2, p. 32, pl. 3, fig. 9 (synonymy, material in ZSI; dorsal view of head and dentition illustrated).

Tachysurus macronotacanthus, Chandy, 1954, *Rec. Indian Mus.*, 51, p. 8, pl. 2, fig. 3, pl. 3, fig. 9.—Misra, 1976, *Fauna of India*, 3, p. 43.

D. I, 7 ; P. I, 9 ; V. i, 5 ; A. vi-vii, 12-13 ; C. 15.

Diagnostic characters.—*Dorsal spine shorter than head length*, with a filamentous prolongation. *Teeth globular on palate in two separate pear-shaped patches*. Maxillary barbels reaching end of humeral process or slightly beyond.

Colour.—Dark bluish above, whitish below. Adipose dorsal with a large black spot. Upper surface of head granulated in groups, occipital process densely in lines.

Distribution.—INDIA : Andaman seas. Thailand. Java. Sumatra. Singapore. Malaya.

Size.—Maximum size 300 mm TL.

Fishery value.—Found in the seas and rivers. Not very common.

Type-specimens.—Holotype, RMNH 6901, Batavia fish market, Ca 1845, Coll. P. Bleeker, 235 mm SL, Leiden Museum.

Arius parvipinnis Day

Arius parvipinnis Day, 1877, *Fish India*, p. 460, pl. 110 (type locality, Coromandel coast).

Tachysurus parvipinnis : Chandy, 1954, *Rec. Indian Mus.*, 51, p. 11, pl. 2, fig. 7, text-fig. 2b (material in ZSI; dorsal view of head, dentition illustrated).—Misra, *Fauna of India*, 3, p. 52.

D. I, 7 ; P. I, 10 ; V. i, 5 ; A. v, 14 ; C. 18.

Diagnostic characters.—Similar to *A. caelatus*, differing from it in having the *teeth patch on palate in two separate small pear-shaped patches on each side*. Maxillary barbels reach pectoral end.

Colour.—Dark above, whitish along sides and below. Adipose dorsal fin with a black blotch. Pectoral and pelvic and outer half of anal fins

dark. Upper surface of head and occipital process studded with coarse granulations.

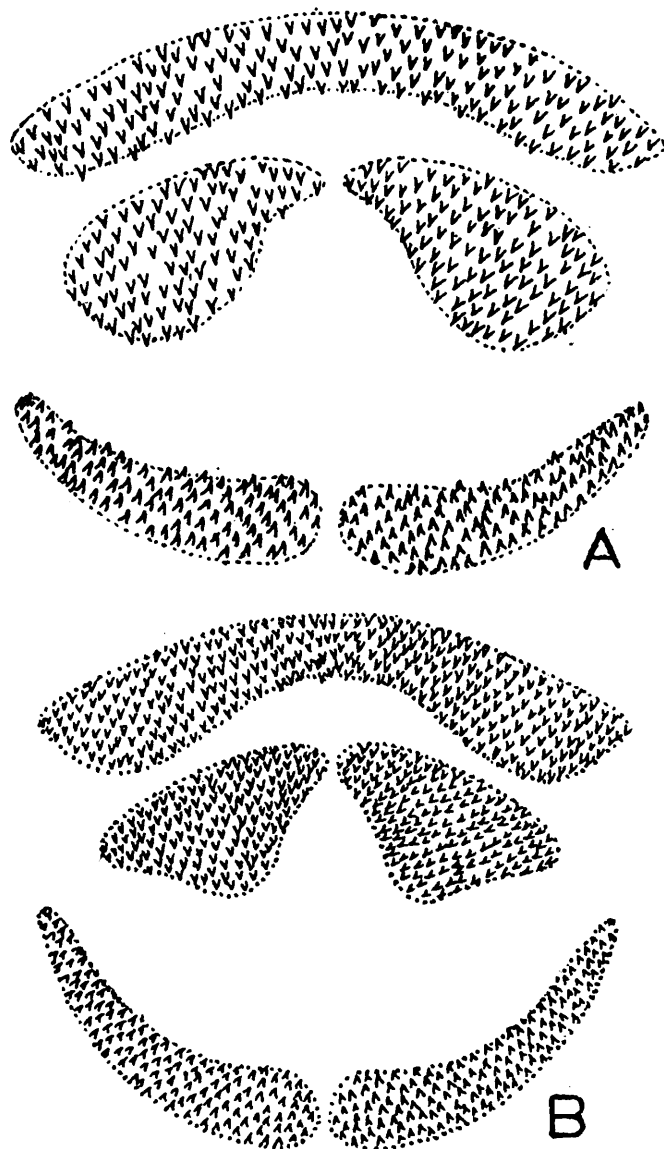


Fig. 18. Palate dentition of A. *A. parvipinnis* Day, B. *A. caelatus* Valenciennes

Distribution.—INDIA : Orissa and to Coromandel coast.

Size.—Maximum size 160 mm TL.

Fishery value.—Not very common and hence this is of some local value only.

Type-specimens.—Syntype, 1 ex., in ZSI, Calcutta.

Arius platystomus Day

Arius platystomus Day, 1877, *Fish. India*, p. 464, pl. 105, fig. 3 (type locality, Kanara, Malabar).

Tachysurus platysomus : Chandy, 1954, *Rec. Indian Mus.*, 51, p. 11, pl. 2, fig. 2, text-fig. 1 (material in ZSI ; distribution, dorsal view of head, dentition illustrated).

—Misra, 1976, *Fauna of India*, 3, p. 54.

D. I, 7 ; P. I, 10 ; V i, 5 ; A. v, 14 ; C. 15,

Diagnostic characters.—Median longitudinal groove on head short, narrow, not reaching base of occipital process. *Snout broad, duck-shaped. Barbels flat and fleshy.* Teeth on palate as two large pyriform patches, anteriorly broad and posteriorly narrow.

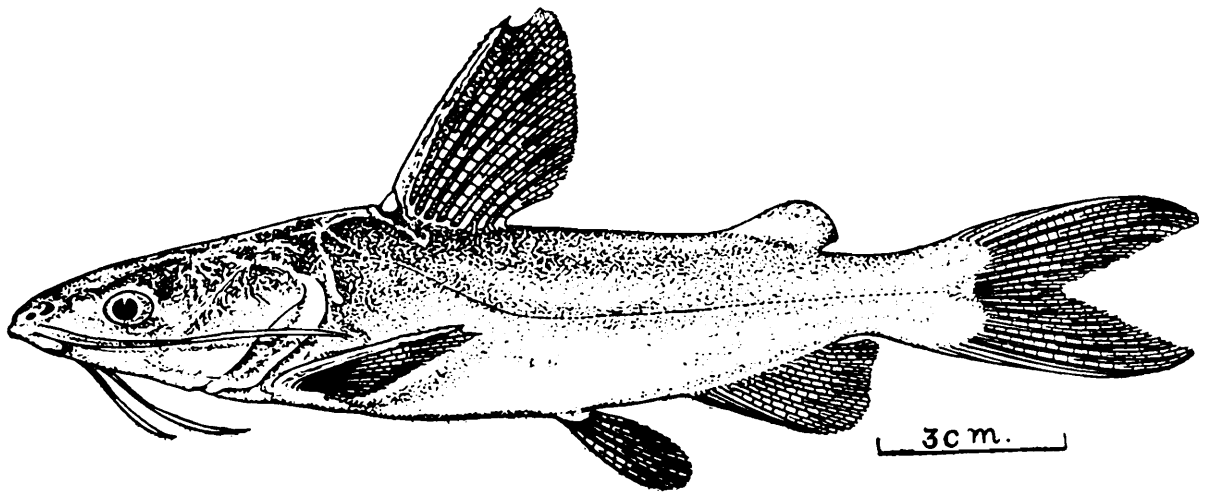


Fig. 19. *A. platystomus* Day. Lateral view to show the flat fleshy barbels.

Colour.—Bluish along back, becoming lighter on the sides and beneath ; dorsal, pectoral and pelvic fins with a slight tinge of green. Posterior half of head and occipital process with a few scattered granulations.

Distribution.—INDIA : Kanara, Malabar, Konkan coasts, Hooghly river at its mouth.

Size.—Maximum size 304 mm. TL.

Fishery value.—One of the main commercial species of the Bombay coast, it is obtained in good quantity and fetches a good price. Comparatively rare in the eastern coast.

Type-specimens.—Holotype No. 1306, in ZSI, Calcutta.

Arius sagor (Hamilton)

Pimelodus sagor Hamilton, 1822, *Fish Ganges*, pp. 169, 378 (type locality, estuaries of Bengal).

Tachysurus sagor : Chandy, 1954 *Rec. Indian Mus.*, 51, p. 11, pl. 2, fig. 5, pl. 3, fig. 8 (synonymy, material in ZSI).—Misra, 1976, *Fauna of India*, 3, p. 56.

D. I, 7 ; P. I, 11 ; V. i, 5 ; A. iii-iv, 14-15 ; C. 15.

Diagnostic characters.—Head shield strongly granulated and rugose up to anterior margin of orbit. Tips of dorsal and pectoral spines with a filamentous prolongation. *Basal bone of dorsal fin butterfly shaped, distinctly large.* Head depressed, broad. Occipital process large, sub-circular. Palate teeth in two ovate patches, placed side by side on

each side, vomerine patch in the centre being smaller than the palatine patch towards the outer.

Colour.—Greenish brown, becoming lighter on abdomen with scattered dusky spots. Some specimens with narrow, vertical bands or spots on body. Fins tinged black.

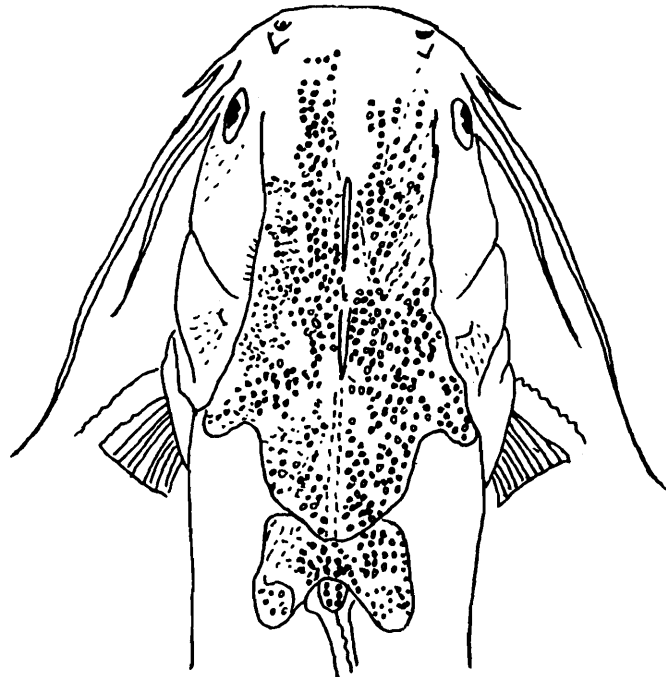


Fig. 20. Dorsal view of head and anterior portion of body of *A. sagor* to show the butterfly shaped basal bone of dorsal fin.

Distribution.—INDIA : Bombay coast, Bay of Bengal. Pakistan. Burma. Thailand. Malaya. Java. Sumatra. Singapore. Banka. Borneo. Found around river estuaries.

Size.—Maximum size 450 mm TL.

Fishery value.—This is a common species, largely consumed. As it grows to a large size, it is commercially valuable, fetching good price.

Type-specimens.—Not known.

Remarks.—Oral incubation reaches a climax in this species. Specimens 350 mm. long are known to have harboured as many as 48 eggs measuring 11 or 12 mm. in diameter and even a second hatch of eggs, before all the young of previous batch had left the mouth. Consequently the shape of the head considerably changes and is very variable.

***Arius sona* (Hamilton)**

Pimelodus sona Hamilton, 1822, *Fish. Ganges*, pp. 172, 376 (type locality, estuaries of Bengal).

Tachysurus sona : Chandy, 1954, *Rec. Indian Mus.*, 51, p. 12.—Misra, 1976, *Fauna of India*, 3, p. 62.

D. I, ; P. 12 ; V. i, 5 ; A. vi, 11 ; C. 17.

Diagnostic characters.—Distance between the inner mandibular barbels of each side is greater than the distance between the outer and inner mandibular barbel of each side. Teeth on palate villiform, in two oval patches placed side by side, vomerine patch smaller than the palatine patch. Maxillary barbels extend to first third of pectoral fin.

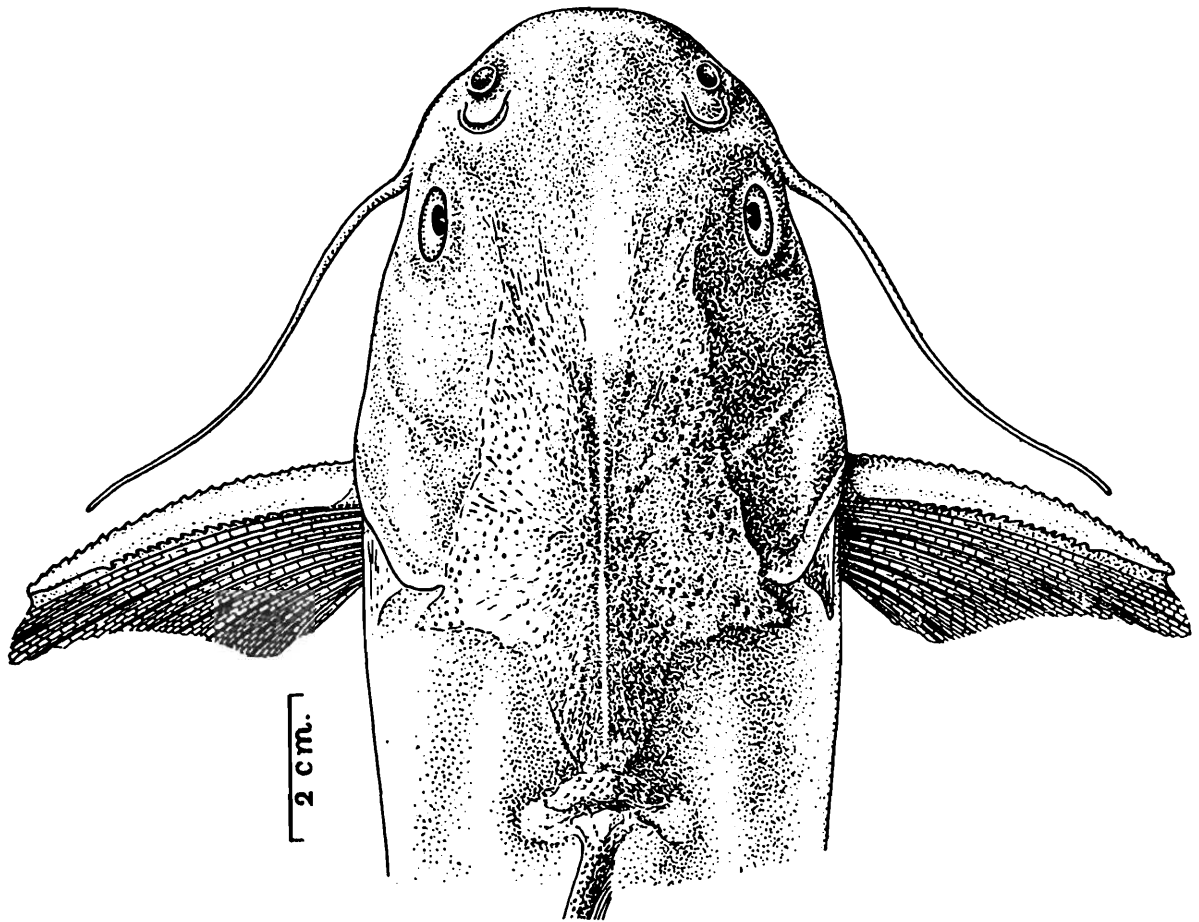


Fig. 21. Dorsal view of head and anterior portion of body of *A. sona* (Hamilton) to show the normal shape of basal bone of dorsal fin.

Colour.—Brownish above, bluish on sides where it is glossed with gold, and dull white beneath. Fins with a bluish black tinge. Young specimens are of brownish colour, superiorly glossed with purplish and yellow; fins nearly black. Crown of head from behind eyes and occipital process granulated in the form of radiating lines.

Distribution.—INDIA : West and east coast. PAKISTAN : Sind. Bangladesh. MALAYA : Penang. Sri Lanka. East Indies. Polynesia.

Size.—Maximum size 920 mm. TL.

Fishery value.—One of the most common catfish caught in large numbers and sold extensively. Its large size and easy availability fetches a good prize. This is extensively salted and dried in the West coast of India.

Type-specimens.—Not known.

Arius subrostratus Valenciennes

Arius subrostratus Valenciennes, 1840, *Hist. nat. Poiss.*, 15, p. 62 (type-locality, Malabar).

Tachysurus subrostratus: Chandy, 1954, *Rec. Indian Mus.*, 51, p. 12, pl. 1, fig. 10 text-fig. ic (material in ZSI; dorsal view of head and dentition illustrated).—Misra, 1976, *Fauna of India*, 3, p. 65.

D. I, 7 ; P. I, 9 ; V. i, 5 ; A. v-vi, 12-14 ; C. 15.

Diagnostic characters.—Snout elongated, narrow. Dorsal profile as a steep slope to rayed dorsal fin base. Pelvic fins reach anal fin. Eye in the middle of head. All barbels shorter than head length, maxillary pair not reaching eye. Teeth on palate in a single small oval patch on each side, each patch as long as eye diameter.

Colour.—Bluish or bluish green above becoming lighter on sides and beneath. Fins edged grey.

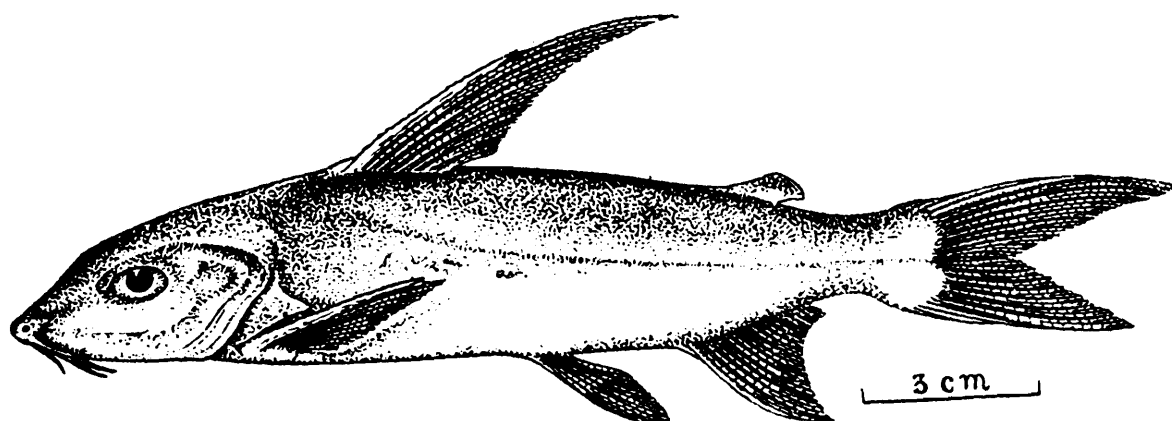


Fig. 22. Lateral view of *A. subrostratus* Valenciennes to show all barbels shorter than head length.

Distribution.—INDIA: east and west coast. Pakistan. Sri Lanka. Thailand. Singapore. Sumatra. Java. Borneo. Madura. Banka. Philippines.

Size.—Maximum size 320 mm TL.

Fishery value.—Common in the Malabar coast, but not obtained in large quantities. It has a limited value.

Type-specimens.—Holotype, 1190, "Cote de Malabar" Coll. Belanger, 300 mm SL. Paris Museum not in good condition.

Arius sumatranus (Bennett)

Bagrus sumatranus Bennett, 1830, *Life of Sir S. Raffles*, p. 691 (type-locality, Sumatra).
Arius venosus Valenciennes, 1840, *Hist. Nat. Poiss.*, 15, p. 69 (type-locality, Manila).

Tachysurus sumatranus: Chandy, 1954, *Rec. Indian Mus.*, 51, p. 13, pl. 1, fig. 1, pl. 3, fig. 7 (synonymy, material in ZSI; dorsal view of head and dentition illustrated).—Misra, 1976, *Fauna of India*, 3, p. 66.

D. I, 7 ; P. I, 10 ; V. i, 5 ; A. v. 13-14 ; C. 17.

Diagnostic characters.—Teeth on palate in a patch as large as eye. *Dorsal spine as long as head behind posterior nostril.*

Colour.—Bluish green above, lighter on sides and beneath ; edges of fins stained grey, adipose dorsal greyish. Upper surface of head with scattered granulations, lineated on occipital process.

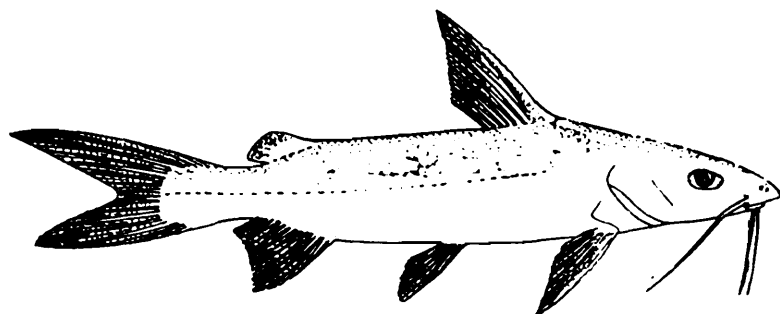


Fig. 23. *A. sumatranus* (Bennett) to show insertion of dorsal fin and length of dorsal spine.

Distribution.—INDIA : east and west coast. Pakistan. Sri Lanka. Singapore. Sumatra. Java. Borneo. Madura. Banka. Philippines.

Size.—Maximum size 320 mm TL.

Fishery value.—A common species in its range. Specimens 210 to 220 mm long were mature males.

Type-specimens.—Holotype, No. 1855. 12. 26. 485 from Sumatra presented by Raffles, in BMNH, London.

Remarks.—Chandy (1954) showed that dentition on the palate in this species as egg-shaped (pl. 3, fig. 7) whereas Day (1889, p. 176) stated the shape as triangular, which fact can be seen from the illustration of Weber & Beaufort (1913, p. 315) also.

Arius tenuispinis Day

Arius tenuispinis Day, 1877, *Fish. India*, p. 466, fig. 5 (type locality, Bombay).

Tachysurus tenuispinis : Chandy, 1954, *Rec. Indian Mus.*, 51, p. 13, pl. 2, fig. 8, text-fig. 1b (description ; dorsal view of head and dentition illustrated).

Hemipimelodus tenuispinis, Misra, 1976, *Fauna of India*, 3, p. 18.

D. I, 7 ; P. I, 10 ; V. i, 5 ; A. v. 13 ; C. 15.

Diagnostic characters.—*Dorsal and pectoral spines attenuated.* Barbels shorter than head. Median longitudinal groove long, narrow, deep, running on to supraoccipital process. *Teeth on palate, in a single shoe-shaped large patch on each side with villiform teeth along outer margins, globular teeth in inner margin teeth very sparse, patches placed deep in buccal cavity.*

Colour.—Dark grey above and sides, merging to silvery grey below ; tips of dorsal, pectoral and caudal fin are dark. Dorsal surface of head and occipital process with a few granulations.

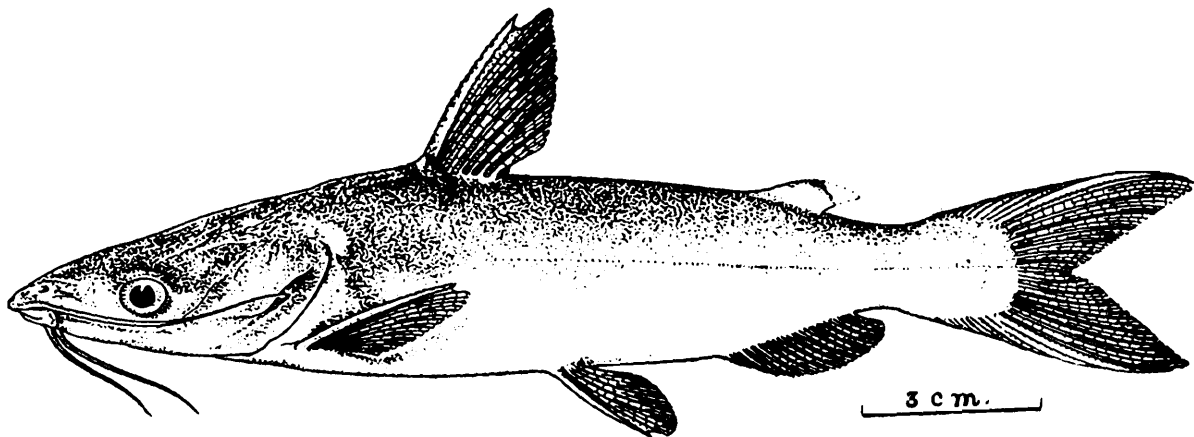


Fig. 24. Lateral view of *A. tenuispinis* Day.

Distribution.—INDIA : West and east coast. Also east african coast.
Size.—Maximum size 360 mm. TL.

Fishery value.—Being of large size, and occurring in good quantity, specially in the Bombay coast, it is commercially valuable.

Type-specimens.—Holotype No. 482, in ZSI, Calcutta.

Remarks.—Misra (1976) considered this species as belonging to the genus *Hemipimelodus* Bleeker. Day's original specimen is in a "very bad state of preservation" and his description of the dentition has caused much confusion. Chandy (1954) on the basis of fresh material clarified the exact systematic position of this species.

Arius thalassinus (Rüppell)

Bagrus thalassinus Rüppell, 1835, *Neue Wirbelth Fische* p. 75, pl. xx, fig. 2 (type locality, Massaua, Red Sea).

Tachysurus thalassinus : Chandy, 1954, *Rec. Indian Mus.*, 51, p. 15, pl. 1, fig. 4 text-fig. 1a (synonymy, material in ZSI ; dorsal view of head and dentition illustrated).—Misra, 1976, *Fauna of India*, 3, p. 68.

D. I, 7 ; P. I, 12 ; V. i, 5 ; A. iii-v, 12-13 ; C. 17

Diagnostic characters.—Teeth on palate in three closely placed triangular patches on side.

Colour.—Dark brown to bluish grey above, densely pigmented. Numerous narrow, parallel transverse cross-bands present. In some specimens dorsal surface may be rich brown and each granule on head appearing as if tipped with gold. Live specimens may be reddish brown, with numerous narrow parallel, transverse iridescent cross bands, Occipital process granulated;

Distribution.—INDIA : West and east coasts. Pakistan. Thailand. Malaya. Sri Lanka. Red Sea. Aden. Zanzibar. Burma. Singapore. Philippines. China. Japan. N. Australia. Queensland. Java. N. S. Wales. Polynesia. Sumatra.



Fig. 25. Palate dentition of *A. thalassinus* (Ruppell) to show triple patches of teeth.

Size.—Maximum size 1 meter TL.

Fishery value.—It is a marine species, rarely entering freshwater but often approaching their mouth. It enjoys a wide distribution and is a common form. As it attains a large size it is commercially very important.

Type-specimens.—Not known.

Genus *Ketengus* Bleeker

Ketengus Bleeker, 1847, *Nat. Geneesk. Arch. Ned.—Ind.*, (4) 2, p. 167 (type species, *Ketengus typus* Bleeker, by original indication).—Smith, 1945, *Bull. U. S. nat. Mus.*, 188, p. 414.—Jayaram, 1974, *Proc. zool. Soc. Calcutta*, 25(2) [1972], p. 136 (revision).—Misra, 1976, *Fauna of India*, 3, p. 18.

Description.—Dorsal profile arched, steeply rising up to dorsal fin. Head large, very broad, not depressed, head-shields exposed, rugose ; snout obtuse, slightly overhanging mouth ; jaws subequal, upper jaw the longer ; lips thin. *Mouth* subterminal, wide, arcuate, reaching behind eyes. *Teeth* closely set, small, incisor-like in a single series, obtusely tricuspid or subtruncated on jaws, palate edentate. Eyes lateral, in anterior half of head, above angle of mouth and of moderate size. *Three pairs of barbels ; one pair maxillary, two of mandibular.* Gill membranes posteriorly free with a notch, united with isthmus. Branchiostegals 5.

Rayed dorsal fin short with seven rays and a spine. Adipose dorsal short, posteriorly free. Pectoral fins with 7 or 8 rays and with a strong

serrated spine. Pelvic fins with 6 rays. Anal fin moderately long, with 19 or 20 rays. Caudal fin forked. Lateral line complete, simple.

Air-bladder free, not enclosed in bone.

Distribution.—India. Java. Sumatra. Borneo. Malaya. Thailand.
A single species.

Ketengus typus Bleeker

Ketengus typus Bleeker, 1847, *Verh. Bat. Gen.*, 21 (1), p. 9 (type locality, Java).

—Smith, 1945, *Bull. U.S. nat. Mus.*, 188, p. 414 (Thailand).—Jayaram, 1974, *Proc. zool. Soc. Calcutta*, 25 (2) [1972], p. 136.—Misra, 1976, *Fauna of India*, 3, p. 19.

D. I, 7 ; P. I, 7-8 ; V. i, 5 ; A. v-vi, 14 ; C. 15.

Diagnostic characters.—As in the genus.

Colour.—Dark above, silvery white below and with a metallic hue all over. Fins dull yellow. Upper surface of head, occipital process and basal bone of dorsal fin densely granulated.

Distribution.—INDIA : Andaman Islands, Thailand. Malaysia. Java. Sumatra. Borneo.

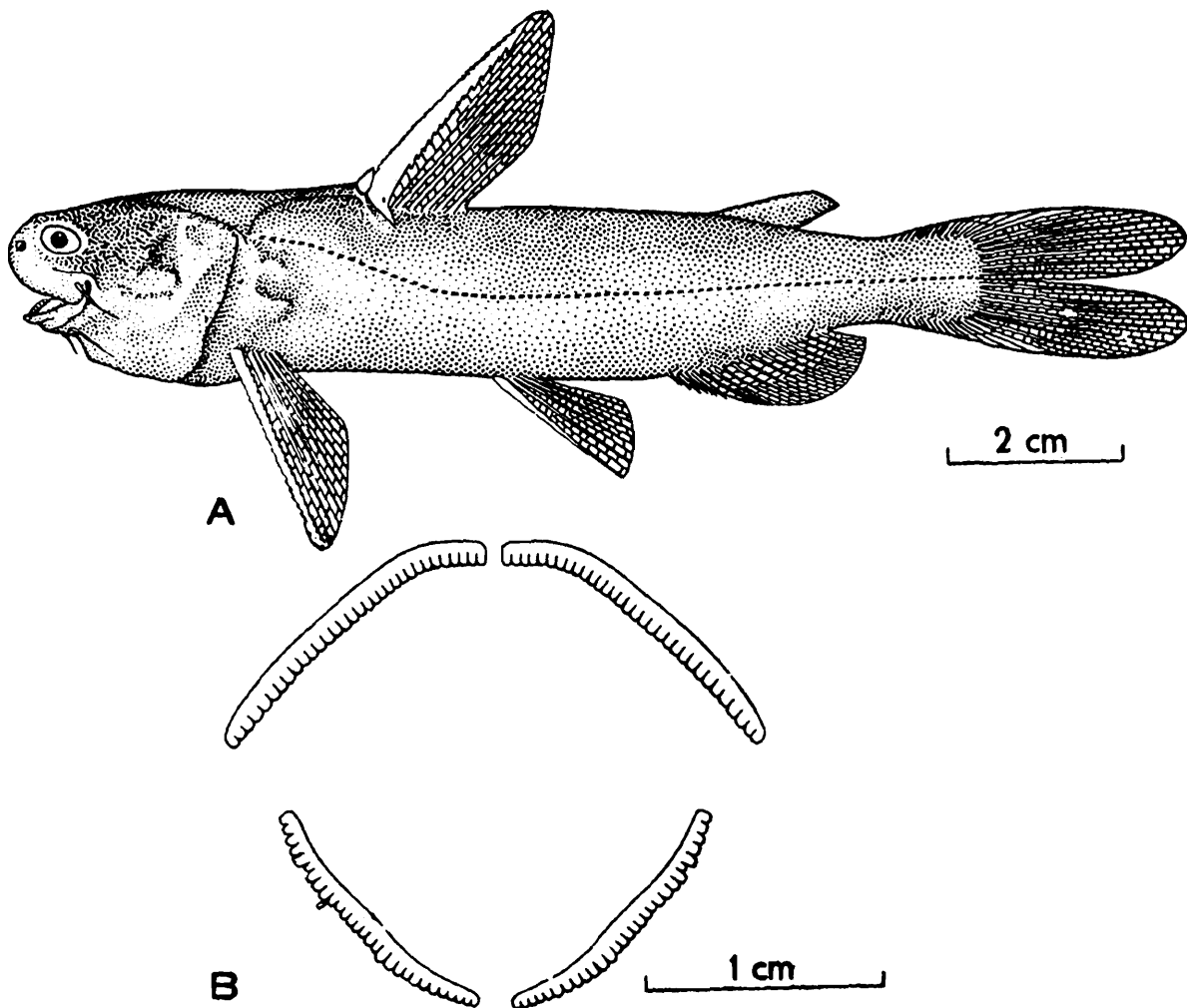


Fig. 26. Lateral view of A. *Ketengus typus* Bleeker. B. Dentition.

Size.—Maximum size 250 mm TL.

Fishery value.—Found in tidal rivers and in brackish waters near the shore, it is a common fish in the Andaman waters.

Type-specimens.—Syntypes, 10 exs., RMNH 6905, Bangkallang (Madura), in straits, Madura Ca, 1845, Coll. P. Bleeker, Leiden Museum.

Genus *Hemipimelodus* Bleeker

Hemipimelodus Bleeker, 1858, *Acta Soc. Sci. Ind-Neerl.*, 4, p. 236 (type species, *Pimelodus borneensis* Bleeker, by original designation).—Smith, 1945, *Bull. U.S. nat. Mus.*, 188, p. 415 (Thailand).—Misra, 1976, *Fauna of India*, 3, p. 15.

Description.—Dorsal profile arched. Head large, more or less depressed, head-shields exposed or covered by thin skin; snout bluntly rounded; Jaws subequal, upper jaw slightly longer; lips thin. Mouth subterminal, narrow, transverse, not extending to eyes. Teeth villiform in bands on jaws; *palate edentate*. Eyes lateral, in anterior half of head, above angle of mouth, moderate. *Barbels three pairs; one pair maxillary and two of mandibular*. *Gill membranes* united with each other, *free only along a narrow posterior margin, and united with isthmus*. Branchiostegals 5 or 6.

Rayed dorsal fin with seven rays and a spine. Pectoral fins with 10 rays and a strong serrated spine. Pelvic fins with 6 rays. Anal fin short with 18 rays. Caudal fin deeply forked. Lateral line complete, simple. Air-bladder free, not enclosed in bone.

Distribution.—India. Pakistan. Burma. Thailand. Malaya. Java. Borneo. Sumatra. A total of seven species is known; only one is dealt with here.

Hemipimelodus jatius (Hamilton)

Pimelodus jatius Hamilton, 1822, *Fish. Ganges*, pp. 171, 376 (type locality, estuaries of Bengal).

Hemipimelodus jatius: Misra, 1959, *Rec. Indian Mus.*, 57, p. 176, text-fig. 93.—Misra, 1976, *Fauna of India*, 3, p. 16.

Diagnostic characters.—*Teeth absent on palate*, other characters as in the genus.

Colour.—Dark bluish along back, lighter on sides and beneath. Fins yellowish, lower half of dorsal stained with grey, upper edge deep black. A deep black spot on upper half of adipose dorsal. Caudal edged with black and anal with a dark spot on its edge near the middle. Occiput sparingly and occipital process heavily granulated.

Distribution.—INDIA : W. Bengal, Orissa. Bangladesh. Burma. Sri Lanka.

Size.—Maximum size 304 mm TL.

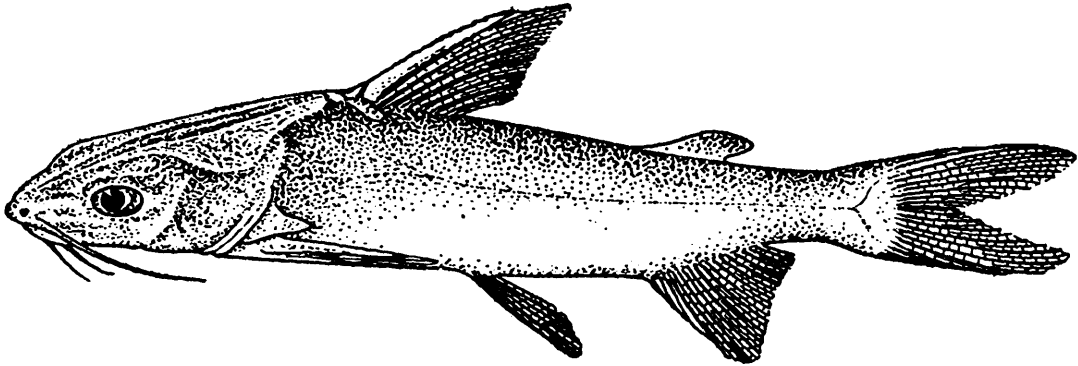


Fig. 27. Lateral view of *Hemipimelodus jatus* (Ham.).

Fishery value.—A common species found in estuaries and rivers, ascending far above tidal reach. Oral incubation may be practised by members of this specimens.

Type-specimens.—Not known.

Family PLOTOSIDAE

Small to moderately large elongate fishes with a compressed body and tapering tail. Teeth on premaxillaries, mandible and prevomer. Nostrils widely separated, anterior tubular, posterior slit-like. Barbels eight, well developed, one pair nasal, two mandibular and one pair maxillary ; occasionally labial folds at angle of mouth produced into short barbels. Gill membranes free from each other and from the isthmus except anteriorly.

Two rayed dorsal fins, first small, above or behind origin of pectoral fin, with a serrated spine ; second very long, confluent with caudal (procurrent caudal fin). No adipose dorsal fin. Pectoral fins laterally inserted with a strong serrated spine. Pelvic fins inserted horizontally. Anal fin many rayed, confluent with caudal fin. *A well developed dendritic organ between vent and anal fin present.* Caudal fin pointed. Lateral line conspicuous, represented by distant pores.

Air-bladder fairly large, in proportion to body size, free, not enclosed in bone.

Palatines rod-like, $\frac{3}{5}$ th of autosphenotics provide facet for articulation of hyomandibular. Endopterygoid absent. Ectopterygoid small, toothless, suturally articulated to the long, flat metapterygoid. Metapterygoid suturally connected with hyomandibular. Post-temporals

connected to skull by ligament. Inferior limb of post-temporal well developed, attached to basioccipital. Mesocoracoid in shoulder girdle present. Vertebrae 49 to 80.

Distribution.—Indo-Pacific Ocean, mainly marine, entering rivers and with some permanently fluviatile species.

Type-genus.—*Plotosus* Lacépède.

Remarks.—Of six genera known, only one, *Plotosus* is found in the Indian region.

Genus *Plotosus* Lacépède

Plotosus Lacépède, 1803, *Hist. nat. Poiss.*, 4, p. 129 (type species, *Platystacus anguillaris* Bloch=*Silurus anguillaris* Forskal, by monotypy).—Jayaram & Majumdar, 1968, *Proc. zool. Soc. Calcutta*, 20, p. 137 (review, see for synonymy).—Misra, 1967, *Fauna of India*, 3, p. 147.

Description.—Dorsal profile nearly straight from tip of snout to dorsal fin origin. Head broad, moderately depressed, covered with thin skin; snout broadly rounded; jaws subequal; *lips thick, papillated or with small laminated folds, upper lip prominent.* Mouth wide, transverse, rounded in front, slightly overhung by snout. *Teeth pluriserial, conical on upper jaw, molariform on lower jaw, molar-like on palate.* Eyes dorsally situated, small. Four pairs of barbels; one pair each of maxillary and nasal, two of mandibular. Gill membranes free from with each other, may be totally or partly united with isthmus or free from it. Branchiostegals 11 or 12.

Two rayed dorsal fins; first small, with a smooth or serrated spine and 4 to 6 rays, second very long, continuous with the procurrent caudal. No adipose dorsal. Pectoral fins with 9-13 rays and a weak or strong spine, serrated. Pelvic fins with 10 or 16 rays. Anal fin confluent with caudal with 58 to 131. *A well developed dendritic organ between anus and anal fin present.* Caudal fin pointed. *Lateral line complete, conspicuous by distant pores.*

Air bladder of normal type, fairly large in proportion to body size, free not enclosed in bone.

Distribution.—From the east coast of Africa through the seas and estuaries of India, Pakistan, Burma, Bangladesh, Sri Lanka to Polynesia and Japan to Australia.

Four species* are known, three are dealt with here.

KEY TO SPECIES

- | | | |
|---|-----|--------------------|
| 1. Head and body with two or three pale stripes | ... | <i>P. lineatus</i> |
| Head and body plain without any stripes. | ... | 2 |

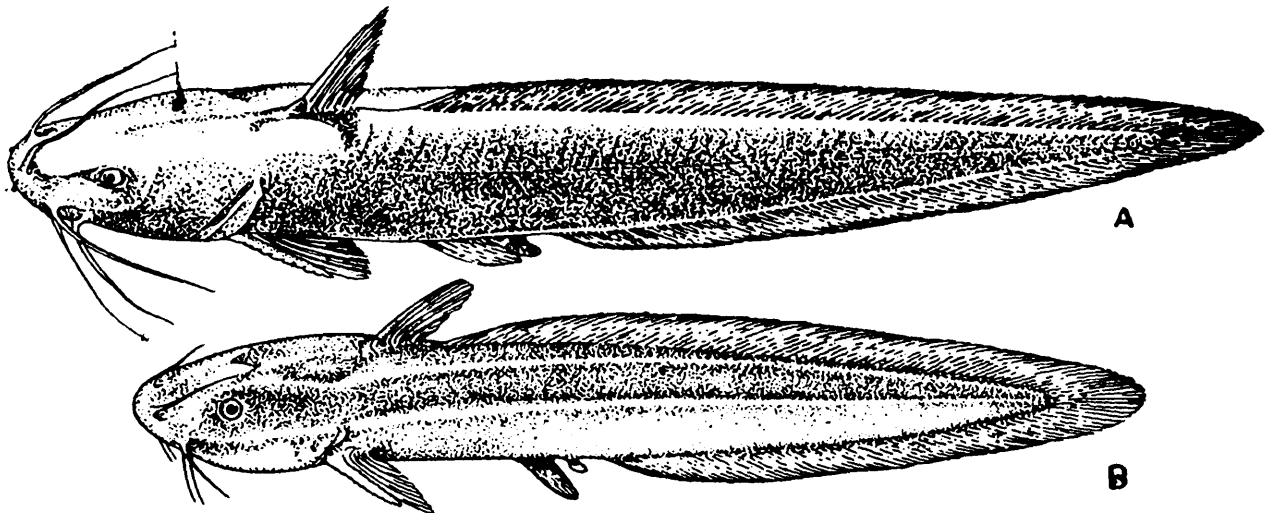


Fig. 28. Lateral view of A. *Plotosus lineatus* (Thunberg) and B. *Plotosus canius* Hamilton to show presence or absence of body stripes.

- | | | | |
|--|-----|-----|--------------------|
| 2. Nasal barbels extending considerably beyond eyes. Eyes small. | ... | ... | <i>P. canius</i> |
| Nasal barbels extending only as far as posterior border of eyes. Eyes large. | ... | ... | <i>P. limbatus</i> |

Plotosus canius Hamilton

Plotosus canius Hamilton, 1822, *Fish. Ganges* pp. 142, 374, pl. 15, fig. 44 (type locality, rivers of lower Bengal).—Jayaram & Majumdar, 1968, *Proc. zool. Soc. Calcutta*, 20, p. 142 (see for synonymy, revision).—Misra, 1976, *Fauna of India*, 3, p. 150.

D. I, iii, 1 ; P. I, ii, 11 ; V.ii, 13 ; D₂ + A + C 117 + 124 + 15.

Diagnostic characters.—Generally olive green in colour *without any stripes on body*. Fins rarely with dark edges. Nasal barbels extending considerably beyond eyes. Mandibular teeth in 3 to 5 rows.

Colour.—Dark olive brown over head and body, lighter ventrally. Dendritic organ may be of dull crimson hue. *Fin tips usually plain*.

Distribution.—India. Pakistan. Sri Lanka. Burma. Bangladesh. Thailand. Malaya. Andaman Isls. Java. Madura. Borneo. Celebes. Aru Is., N. Guinea.

*The fourth species is being described by Mrs J. R. Gomon, U. S. National Museum, Washington.

Size.—Maximum size 1500 mm. TL.

Fishery value.—Found in seas, brackish waters, rivers and common in lagoons and estuaries. Feeds on molluscs, crustaceans and debris. Eggs are greenish brown in colour, breeding is known to be between June-July. The flesh is delicate and is of good demand in areas where this fish is available in plenty.

Type-specimens.—Not known.

Plotosus lineatus (Thunberg)

Silurus d., Forskal, 1775, *Descriptions animalium avium*.—xvi (Arab name “Boa vel Baja” given after the word “arab”, not used as a specific name, but only to denote the arabic name of his fourth species).

Silurus lineatus Thunberg, 1791, *K. Vetensk. Akad. Nya Handl.*, 12, p. 190 (type locality, Indian Ocean).

Platystacus anguillaris Bloch, 1794, *Naturgesch. Ausland. Fische.*, 8, p. 61, pl. 373, fig. 1 (type locality, not given).

Plotosus anguillaris : Jayaram & Majumdar, 1968, *Proc. zool. Soc.*, Calcutta, 20, p. 139 (see for synonymy, revision).—Jayaram, 1970, *J. zool. Soc. India*, 21(1), pp. 129-132. (nomenclature discussed).

D. I, 4 ; P. I, ii, 11 ; V. ii, 13 ; $D_2 + A + C$ 95 + 86 + 15.

Diagnostic characters.—*Body lighter in colour with 2 or 3 pale stripes. Nasal barbels not extending farther than hind border of eyes. Mandibular teeth in 2 or 3 rows.*

Colour.—Whitish brown on head, and dorsal side of body with ventral portion pale. Dendritic organs yellowish brown, occasionally two or three white stripes on body present.

Distribution.—Red Sea, East Coast of Africa, Madagascar through the seas of India including Andaman Isls., Bangladesh, Pakistan, Sri Lanka, Thailand, Malaya, Malay Archipelago to Japan, Philippines, Formosa, China and Polynesia, East Indies, Aru Isls., New Guinea.

Size.—Maximum size 912 mm.

Fishery value.—Mostly caught in traps, these are poisonous and as such fishermen dread handling them. This species is gregarious in habits and move in shoals. The flesh of this fish is believed to have emenagogue properties.

Type-specimens.—Not known.

Plotosus limbatus Valenciennes

Plotosus limbatus Valenciennes, 1840, IN : Cuvier & Valenciennes, *Hist. Nat. Poiss.*, 15, p. 422.

D. I, iii, 1 ; P. I, 14. V. 14. $D_2 + A + C$ 113 + 99 + 9.

Diagnostic characters.—Nasal barbels extending to middle or slightly beyond eyes. Eyes moderate or large, 4 or 5 times in head length. Body dark brown or light brown, fins with a black border.

Colour.—Body plain without any stripes, light to deep dark brown, fins dark and black edged.

Distribution.—South east and south west coast of India. Sri Lanka. Found in estuaries also.

Size.—400 mm. TL

Fishery value.—Since the juveniles are known to form shoals they are fished extensively and are of value.

Type-specimens.—Natural History Museum, Paris.

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