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**MARINE CATFISH
RESOURCES OF INDIA**

EXPLOITATION AND PROSPECTS

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CHAPTER TWO

TAXONOMIC CONSIDERATIONS AND GENERAL DISTRIBUTION OF COMMERCIALY IMPORTANT CATFISHES

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The taxonomy of our commercially important marine catfishes is still in a state of uncertainty. The nomenclature has suffered a lot of changes brought about by various taxonomists. When some authors have used the genus name *Tachysurus*, and hence the family name Tachysuridae, others preferred the name *Arius* and the family name Ariidae. Valenciennes (1840), Bleeker (1847), Gunther (1864), Day (1878), Weber and Beaufort (1913), Herre (1953), Jordan (1963), Fischer and Whithead (1974) and Fischer and Bianchi (1984) all have used the name *Arius* Val. 1840, whereas Fowler (1941), Chandy (1953), Munro (1955), Tilak (1965), Jayaram and Dhanze (1978 a, 1978 b) and Menon (1979) replaced the name *Arius* Val. 1840 by *Tachysurus* Lacepede 1803. Though

all taxonomists agree with the characters by which the genus is identified, the controversy still remains as to the name. As the generic name *Tachysurus* was proposed first by Lacepede in 1803, this name is supposed to have precedence over *Arius* Val. and so Jayaram and Dhanze (1978 a) regarded *Tachysurus* as a valid generic name. However, later, in the preparation of FAO's Species Identification sheets for western Indian ocean (Fischer and Bianchi, 1984), Jayaram has changed the generic name over to *Arius* without giving any reason whatsoever.

The accepted family characters of Tachysuridae are: (1) elongate body without scales; (2) lateral line complete; (3) depressed head

covered by conspicuous bony shields, comprising frontal, supraoccipital, sphenotic and other otic bones, often rugose granulate; (4) presence of an adipose dorsal fin and serrated pungent spines in dorsal and pectoral fins; (5) dorsal fin with seven, ventrals with six and pectorals with seventeen to nineteen rays and anal with fourteen to twenty-six rays; (6) adipose dorsal opposite to anal; (7) caudal fin deeply forked; (8) eyes usually with free lids; (9) mouth transverse or crescentic, usually terminally inferior; (10) jaws with maxillary, mandibular and mental barbels, sometimes only with maxillary or mandibular and rarely only with rudiments of mandibular; (11) one or more rows of villiform, conic or granular teeth on jaws; (12) palate with or without conic, villiform or granular teeth — if present, present in one to several patches; (13) closely placed nostrils, posterior one with valve and without barbels; (14) united gill membrane joined with isthmus or free, with low folds on the ventral side; (15) branchiostegal rays five to seven; (16) vertebrae 48 to 58, of which 27 to 33 caudal; (17) air bladder large, connected with stomach by a narrow duct.

The major characters which can be easily used in differentiating the genera of the family Tachysuridae are the dentition and the number of maxillary and mandibular barbels. The genus *Tachysurus* is characterized by a single pair of maxillary and two pairs of mandibular barbels and the teeth in palate, which are either conic, villiform or granular. Only one pair of stiff osseous maxillary barbels present besides the granular teeth in palate in the genus *Osteogeneiosus*. There is only a pair of minute rudimentary mandibular barbel inserted at the chin and granular teeth in the palate in the genus *Batrachocephalus*.

On the basis of size and shape of the teeth in patches on the palate, Day (1878) had classified the genus *Arius* (= *Tachysurus*) mainly into two groups, one with villiform teeth and the other with conic teeth on the palate. These two groups were subdivided to various species on the basis of the number of palatine patches. Chandy (1953) used the number and shape of the toothed palatine plates to distinguish the species of the genus

Tachysurus. In addition to the number and shape of the toothed palatine plates, Tilak (1965) used osteological characters as well, such as the number and arrangement of branchiostegal rays on the hyoid arch, the forms of operculum and interoperculum, the anterior and posterior fontanella on the roof of the cranium and the pattern of diagonal ridges on the pars sustentaculum, for the diagnosis of the genera and species of the family Tachysuridae. Munro (1955), following Fowler (1941), classified the genus *Tachysurus* into subgenera, and placed all the species of *Tachysurus* having a single set of conic teeth on the palate under a subgenus *Tachysurus* Lacepede; those having two groups of conic teeth on each side of the palate in a transverse row under a subgenus *Hexanemati-chthys* Bleeker; those with three sets of conic teeth on each side under a subgenus *Netuma* Bleeker; those with one set of granular teeth on each side of the palate in a subgenus *Pseudarius* Bleeker; and those with two sets of granular teeth on each side of the palate under a subgenus *Ariodes* Muller and Troschel. But, Tilak (1955), stating that the differences in many of the characters noticed within the genus *Tachysurus* were only of specific value, did not support the generic status being assigned to any of these species. Moreover, the magnitude of differences among the species of the genus *Tachysurus* is not of the same degree as that among the genera themselves, namely *Tachysurus*, *Osteogeneiosus* and *Batrachocephalus*.

A key to the identification of the three Indian genera as well as 21 species of *Tachysurus* and one species each of *Osteogeneiosus* and *Batrachocephalus* is given below. In the present study, the type of teeth, the shape and number of patches of palatine teeth and their disposition on the roof of the buccal cavity and the proportions of different morphometric characters are taken into account for distinguishing species of the genus *Tachysurus*. The distribution of this family along the Indo-Pacific region is shown in Fig. 1. Since the descriptions of the species agree well with earlier accounts, only the distribution of commercially important species is given.

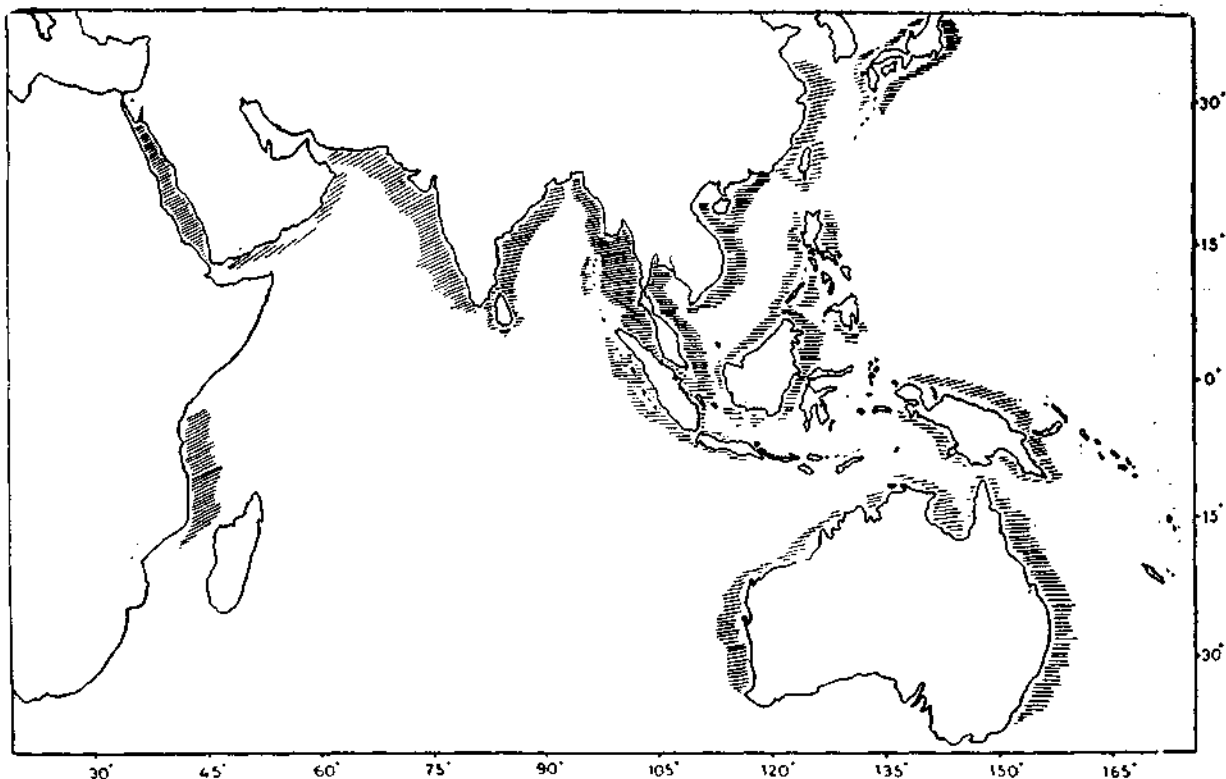


Fig. 1 Distribution of tachysurid catfishes along Indo-Pacific region.

**KEY TO THE IDENTIFICATION OF THE
INDIAN GENERA AND THE SPECIES OF THE
FAMILY TACHYSURIDAE**

- I. Maxillary and mandibular barbels present- *Tachysurus*
 - A. Teeth on palate villiform, conic or pointed.
 - 1. Teeth in one group on each side of palate.
 - a. Head shield highly granulated; pectoral spine shorter than dorsal; eye diameter 7 in head and 4 apart..... *T. caelatus*
 - b. Head shield granulated; pectoral spine equal to dorsal; eye diameter 5.5 in head and 4 apart..... *T. nenga*
 - c. Premaxillary band of teeth short; barbels short; snout depressed, elongate and spatulate; elongate dorsal filament reaching the adipose fin *T. subrostratus*
 - d. premaxillary band of teeth arcuate and long; palatine patches close together reaching in middle; maxillary and outer mandibular barbels nearly of the same length.....*T. parvipinnis*
 - e. Premaxillary widely separate; snout duck-billed *T. burmanicus*
 - f. Palatine patches widely separate; snout blunt*T. sumatranus*
 - g. Palatine patches oval and separate from the jaw by a space not more than the width of premaxillary band of teeth, snout elongate and acute.... *T. acutirostris*
 - 2. Teeth in two groups on each side of palate in a transverse row.
 - a. Outer palatine groups rounded or oval, larger than the inner groups, generally distinct; occipital process hemispherically rounded *T. sagor*
 - b. Outer palatine groups triangular, with emarginate hind edge, generally united with the small groups; occipital process triangular..... *T. sona*.

3. Teeth in three groups on each side of palate.
 - a. Inner vomerine patches of both sides contiguous; maxillary barbels reach the outer border of operculum; dorsal spine as long as head; snout blunt *T. thalassinus*
 - b. Inner vomerine patches of both sides separated by a smooth mesial space; maxillary barbels reach the base of pectoral fin; dorsal spine shorter than head; snout conical *T. serratus*
- B. Teeth on palate granular
- I. Teeth in one group on each side of palate.
 - a. Maxillary and outer mandibular barbels shorter than head, thick and fleshy; palatine patches pear-shaped, diverging posteriorly; dorsal and pectoral spines strong..... *T. platystomus*
 - b. Maxillary barbels slender, shorter than head; palatine patches pear-shaped, placed far back in the buccal cavity; dorsal and pectoral spines weak *T. tenuispinis*
 - c. Maxillary barbels extend beyond the head; palatine patches long-triangular; pectoral spine shorter than head..... *T. gagora*
 - d. Maxillary barbels as long as head; palatine patches convex, oblong-ovate, convergent behind..... *T. jella*.
 - e. Maxillary barbels as long as head, black, palatine patches elongated oval, placed far forwards, convergent posteriorly *T. malabaricus*
 - f. Maxillary barbels reach pectoral base; large equilateral triangular palatine patches, parallel; dorsal spine strong, shorter than head, with a filamentous prolongation reaching the base of adipose dorsal..... *T. maculatus*
 - g. Maxillary barbels reach middle of pectoral spine; pyriform band of teeth on palate, placed well forward, widely divergent posteriorly; dorsal spine as long as head..... *T. macronotacanthus*

2. Teeth in two groups on each side of palate.
 - a. Posterior palatine patches elliptical and diverging posteriorly... *T. dussumieri*
 - b. Posterior palatine patches pear-shaped and converging posteriorly *T. crossocheilus*
 - c. Posterior palatine patches elongated and with a few globular teeth .. *T. nella*
- II Maxillary barbels alone present, which are stiff, and osseous..... *Osteogeneiosus*
 - a. Barbels longer than head; crescentic patches of palatine with granular teeth *O. militaris*
- III Two rudimentary barbels inserted at the chin..... *Batrachocephalus*
 - a. Mouth wide, lower jaw longer; two rudimentary barbels inserted at the chin; teeth in jaws conical; a broad band of granular teeth on palate *B. mino*

DISTRIBUTION OF COMMERCIALY IMPORTANT SPECIES

1. *Tachysurus caelatus* (Val.) Fig. 2; Pl. IA

All along the shallow coastal waters of India, Sri Lanka, Pakistan, Bangladesh, Burma, Thailand, East Indies, Sumatra, Java and Borneo. Essentially marine and forms large shoals; often moves along column and surface waters. The species is particularly abundant along the southeast and northwest coasts of India and grows to about 60 cm. It forms a fishery of substantial importance in the Palk Bay.

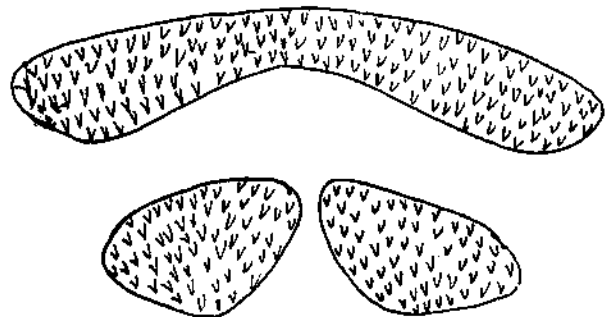


Fig. 2 Palatine teeth pattern of *Tachysurus caelatus*

2. *Tachysurus subrostratus* (Cuv. and Val.)

Fig. 3; Pl. 1B

This species is distributed along the coastal waters, estuaries and more commonly in tidal rivers of the southwest coast of India; Pakistan, Singapore, Java, Indonesia, Malaya, Sri Lanka. It is purely demersal, scavenging on animal remains at the bottom, and grows to 40 cm.

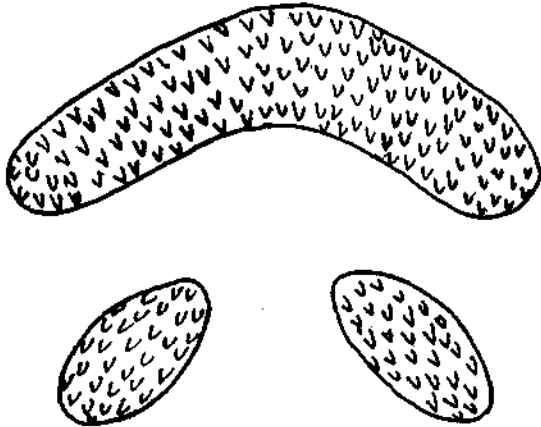


Fig. 3 Palatine teeth pattern of *T. subrostratus*

3. *Tachysurus sona* (Buchanan-Hamilton)

Fig. 4

Along the coasts of India, Pakistan, Sri Lanka, Bangladesh, East Indies and Polynesia. This species is abundant along the northwest coast of India and forms a substantial fishery off Bombay; stray occurrence along the Palk Bay and estuaries of Bengal. It reaches up to a size of 100 cm and never forms large shoals.

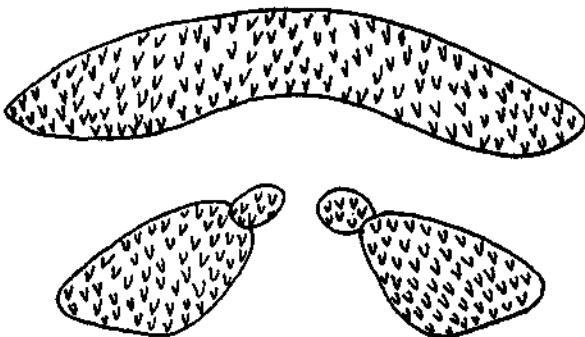


Fig. 4 Palatine teeth pattern of *T. sona*

4. *Tachysurus thalassinus* (Ruppell)

Fig. 5; Pl. 1C

The species is widely distributed all along the Indo-Pacific region, in the Red sea, and Arabian Gulf, and along Zanzibar, India, Andamans, Burma, Singapore, East Indies, Philippines, China, Japan, Australia, Queensland and New Calidonia coasts. Never forms large shoals, demersal, marine and estuarine and tolerates low levels of salinity. Youngones are strictly demersal, where as larger ones ascend colum waters. Commonly occurs at depth ranges of 30 to 60 metres and grow to more than 80cm.

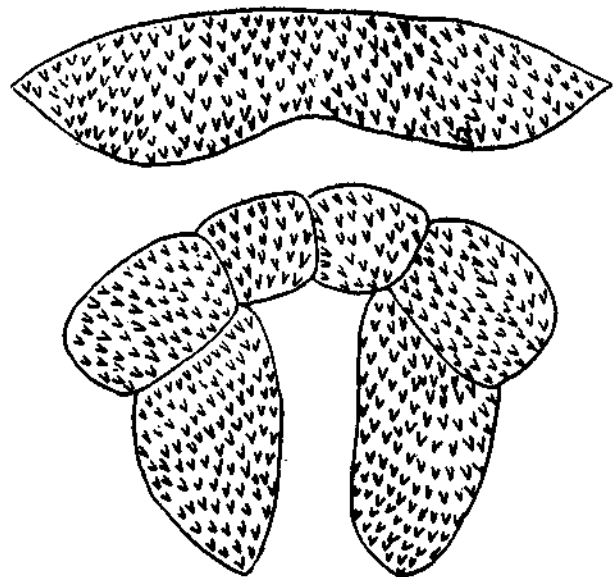


Fig. 5 Palatine teeth pattern of *T. thalassinus*

5. *Tachysurus serratus* (Day)

Fig. 6; Pl. 1D

Jayaram and Dhanze (1978 b) considered *Tachysurus serratus* to be a juvenile form of *T. thalassinus* mainly based on the shape and disposition of palatine tooth patches. They maintained that some of the palatine patches get fused as the fish grow. An extensive study on these two species from various parts of the country showed that the palatine patches remain constant with regard to their shape and disposition during growth, though perhaps not the size. The toothed palatine plates are formed even in the larval stages, as has been observed in *T. thalassinus*, and maintain their shape and character throughout the life

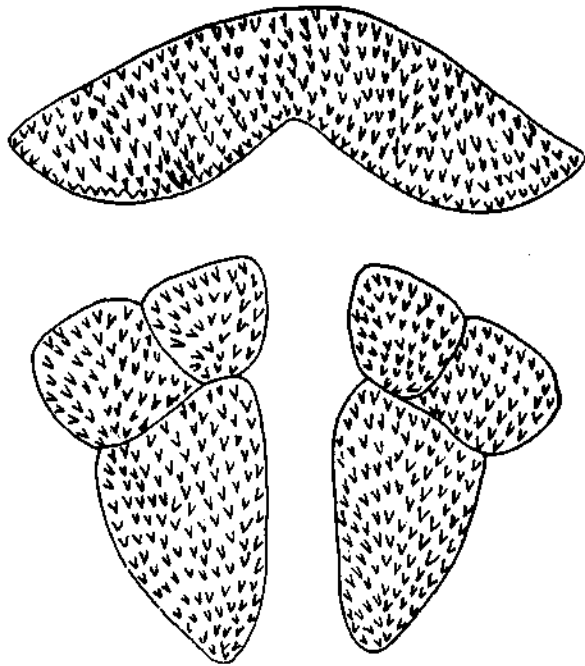


Fig. 6 Palatine teeth pattern of *T. serratus*

in both sexes (Menon, 1979). The species *T. serratus* is clearly different from *T. thalassinus* with definite specific characters like the shape and disposition of palatine toothed plates and some morphometric proportions such as length of snout, pre-dorsal length, etc.

This species is distributed along the coasts of Arab Gulf, Pakistan, India, Sri Lanka and Bangladesh. Essentially demersal and occurs at depth ranging from 4 to 120 m. It approaches shore for breeding during monsoon months. It is the largest among marine catfishes of India and grows to about 135 cm.

6. *Tachysurus platystomus* (Day)
Fig. 7; Pl. IE

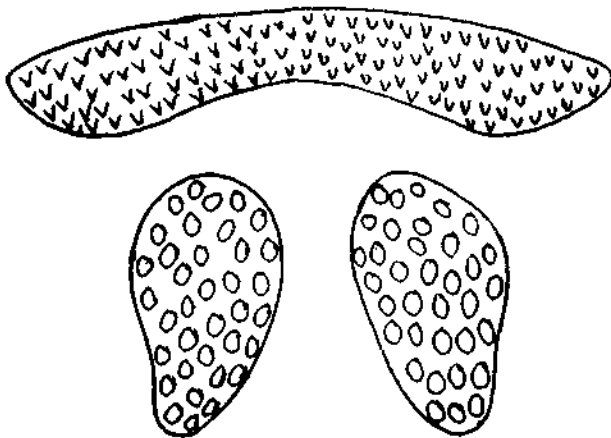


Fig. 7 Palatine teeth pattern of *T. platystomus*

Along the coasts of India, with particular abundance in the Gulf of Mannar, and along Sri Lanka. The species is purely demersal and never forms large shoals. It is found up to a depth of 90 m and grows to about 50 cm. This species forms a fishery along the Gulf of Mannar during November-February period.

7. *Tachysurus tenuispinis* (Day)
Fig. 8; Pl. IF

The species is distributed along both the coasts of India and appears in large shoals, moving along column and surface waters in the southwest coast. It attains a size of 60 cm and is found up to a depth of 80 m, but common at the depth range of 30-60 m.



Fig. 8 Palatine teeth pattern of *T. tenuispinis*

8. *Tachysurus jella* (Russell)
Fig. 9

T. jella is distributed along the coast of India, Sri Lanka, and Burma, marine and estuarine. Grows up to 35 cm.

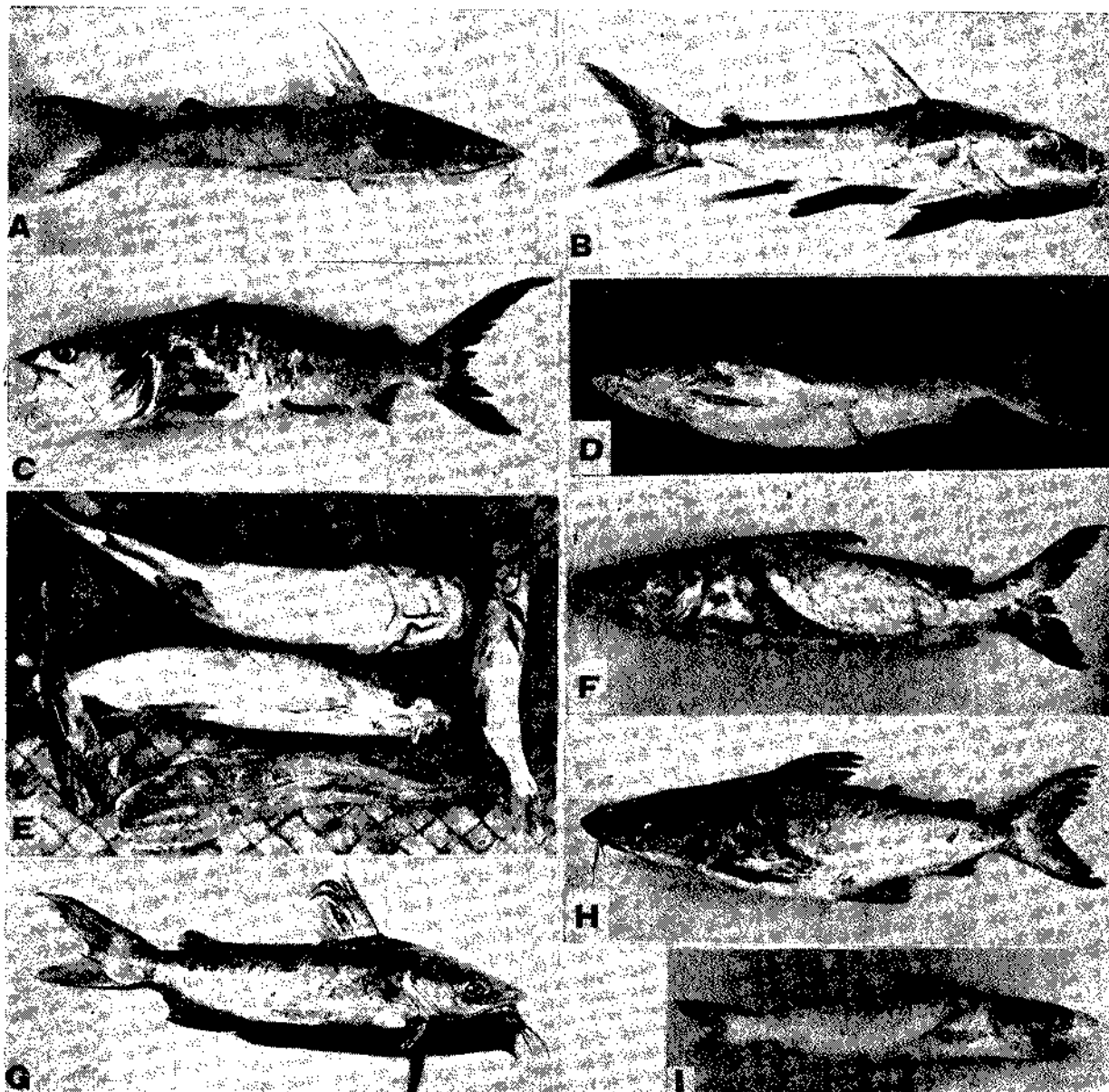
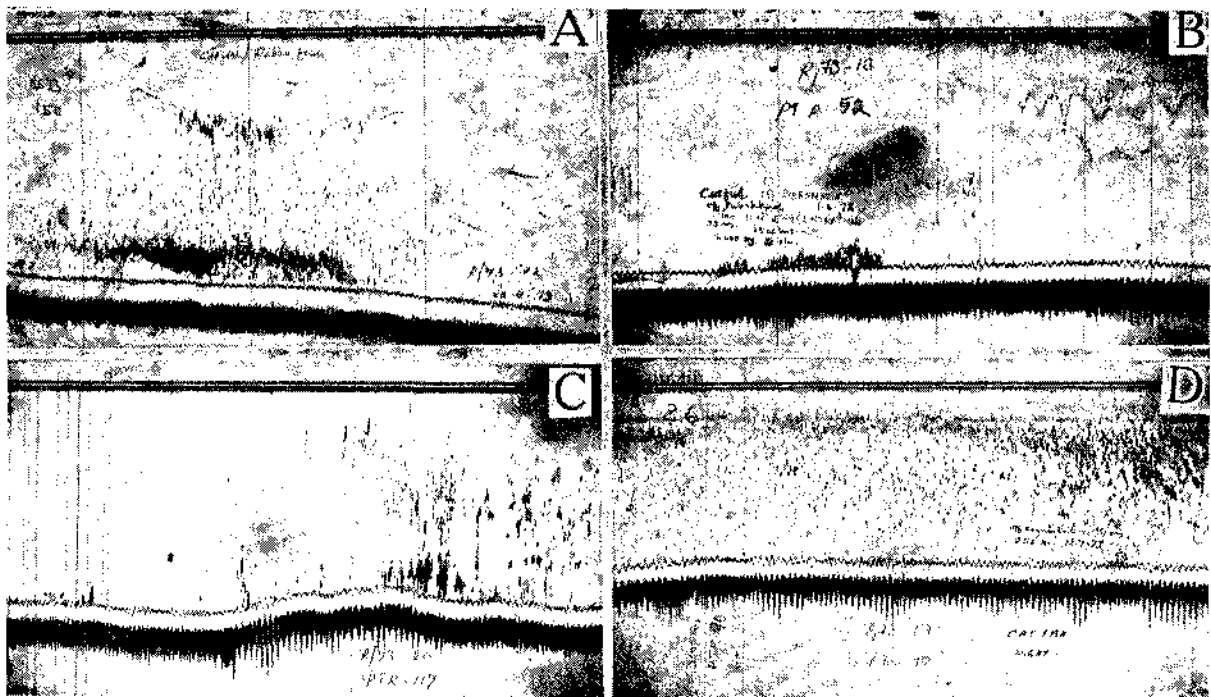


Fig (A) *Tachysurus caelatus*
 (C) *T. thalassinus*
 (E) *T. platystomus*
 (G) *T. maculatus*
 (I) *Osteogeneiosus militaris*

(B) *T. subrostratus*
 (D) *T. serratus*
 (F) *T. tenuispinis*
 (H) *T. dussumieri*



Echograms of catfish

- A) Early morning in the process of descending to the bottom
- B) Dense bottom concentrations during noon
- C) Late evening in the process of dispersing in the water column
- D) Dispersed recordings during night.

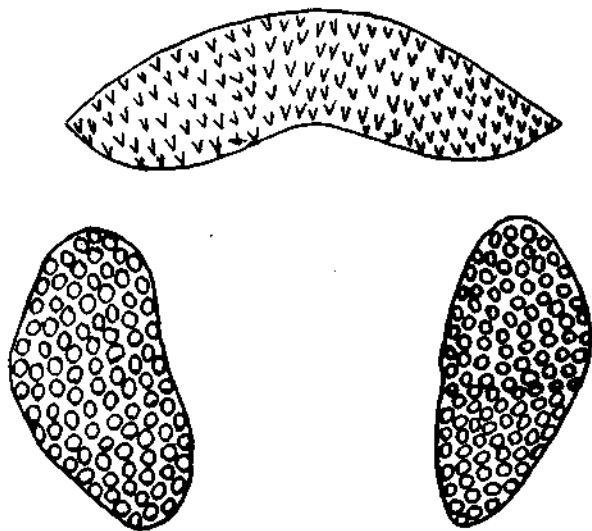


Fig. 9 Palatine teeth pattern of *T. jella*

9. *Tachysurus maculatus* (Thunberg)

Fig. 10; Pl. 1G

Distributed along the seas, estuaries and tidal rivers of Pakistan, India, Bangladesh, Burma, Thailand, Malaysia, China, Formosa and Japan. It attains a size of 50 cm and occurs

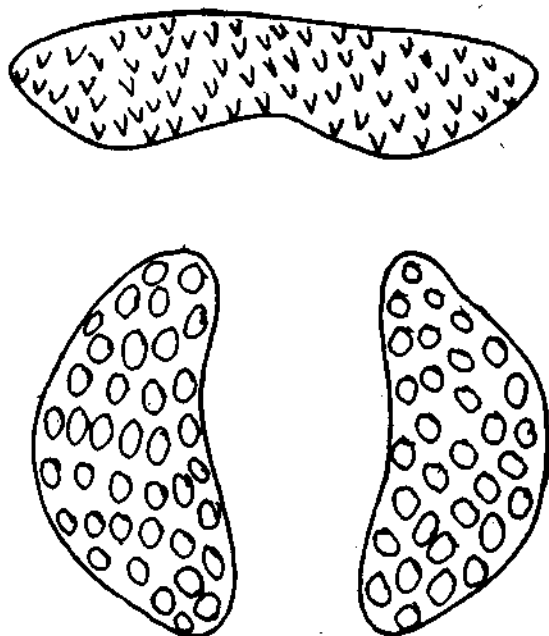


Fig. 10 Palatine teeth pattern of *T. maculatus*

up to a depth of 20 m. Forms large shoals along the coastal belt near river mouths, scavenging the bottom for foods.

10. *Tachysurus dussumieri* (Val.)

Fig. 11; Pl. 1H

Distributed along the east coast of Africa, the Arab Gulf, Pakistan, west and east coasts of India, Sri Lanka, Bangladesh and Burma. The species is purely marine and forms large shoals and moves along column and surface waters. It is common at the depth range 30-60 m. Attains a size of 90 cm.

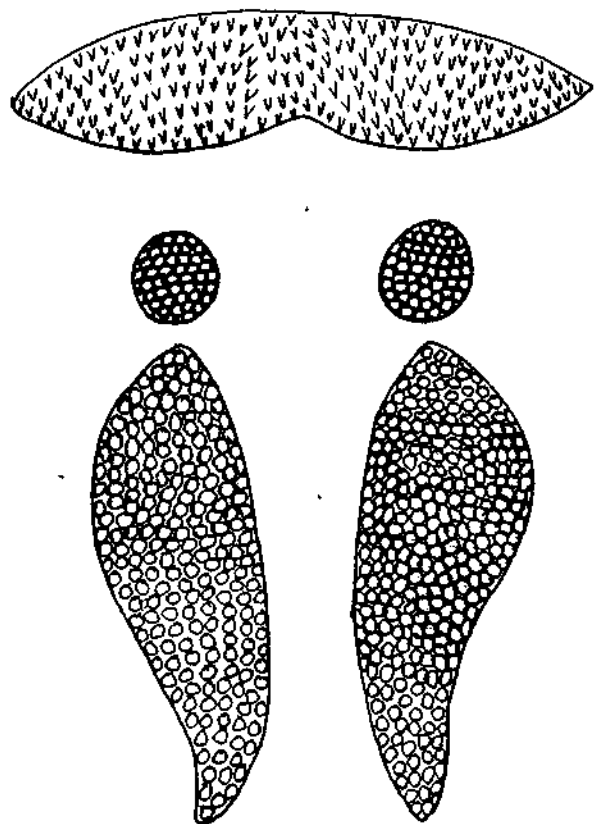


Fig. 11 Palatine teeth pattern of *T. dussumieri*

11. *Osteogeneiosus militaris* (Lin.)

Pl. 11

Along the coasts of Seychelles, India, Sri Lanka, Bangladesh, Burma, Malayan peninsula and East Indies. Marine and estuarine. Grows up to 50 cm.

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