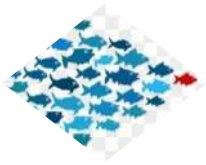
CHAPTER 48

Taxonomy of family Hemiramphidae



Introduction

The fisheries sector has been recognized as a powerful income and employment generator, as it stimulates growth of number of subsidiary industries and as a source of high quality and nutritious food. occupies an important place in the socio-economic development of the country. India is very rich in marine natural resources, with a coastline of about 8129 km and 2.02 million sq. km of exclusive economic zone (EEZ).The potential of fish from the coastal waters of India is exploited to the maximum and hence; there is need for finding an alternate resource to increase production. Exploitation of Beloniformes resources is identified as one of the thrust area for increasing fish production and export of Indian marine products.

Order Beloniformes

The order Beloniformes is a large order of marine and freshwater epipelagic fishes represented worldwide by six families and 285 species, including:Rice and Duck-billed Fishes (Adrianichthyidae), Needle Fishes (Belonidae), Sauries (Scomberesocidae),Halfbeaks (Hemiramphidae), Flyingfishes (Exocoetidae) and Viviparous halfbeak (Zenarchopteridae). A total of 19 species (representing four families) have been reported from European waters and the Mediterranean Sea, including at least four species from Irish waters (Quigley, 2017).

Several authors reported the distribution of Beloniformes from Indian waters. 50 species belonging to 17 genera under three families along the Indian coast (Gopi and Mishra, 2015). Laxmappa and Bakshi (2016) reported four species belonging to three genera under three families from Telangana State. Venkataraman *et al*. (2014) reported nine species of Beloniform fishes belonging to 7 genera under three families along Digha coast in West Bengal. Joshi *et al*

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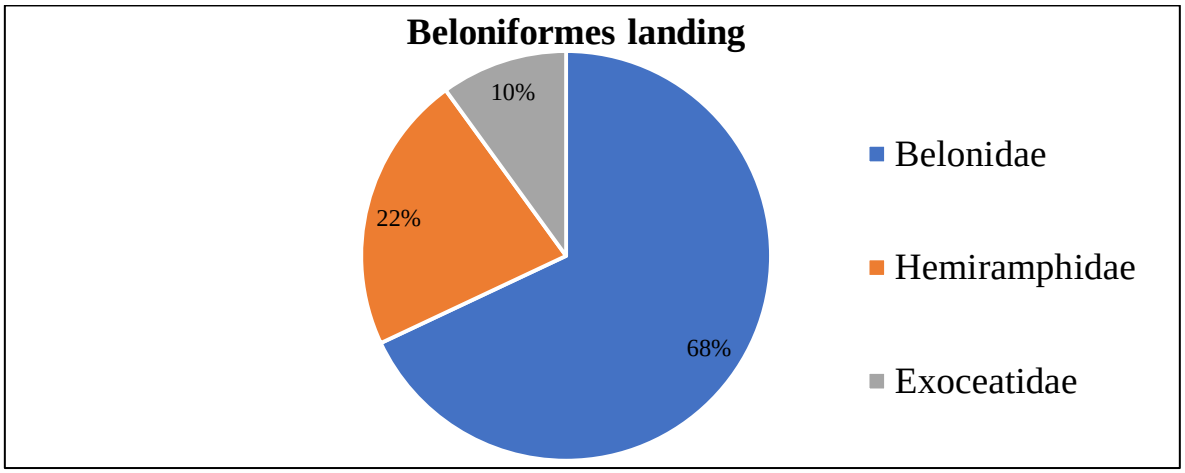
(*2016*) reported nine species of Hemiramphidae from the Gulf of Mannar. Shaji and Easa (2001) reported two species of Hemiramphidae from the rivers of the Western Ghats.



Family Hemiramphidae

Family *Hemiramphidae*, commonly called halfbeaks, is a fast growing, epipelagic, coastal fish with economic importance to commercial fisheries throughout its worldwide distribution in tropical and sub-tropical waters. It is the sister-group of the Exocoetidae, the flying fishes, forming the superfamily Exocoetoidea (Collette et al., 1986).

The family Hemiramphidae is having 62 valid species comprise of eight genera, namely *Arrhamphus*, *Chriodorus*, *Euleptorhamphus*, *Hemiramphus*, *Hyporhamphus*, *Melapedalion*, *Oxyporhamphus* and *Rhynchorhamphus*.

The halfbeaks are elongate, streamlined fish adapted to living in open water. Halfbeaks can grow to over 40 centimetres (16 in) SL in the case of *Euleptorhampus viridis*. The scales are relatively large, cycloid (smooth), and easily detached. There are no spines in the fins.A distinguishing characteristic is that the third pair of upper pharyngeal bones are fused into a plate. Halfbeaks are one of several fish families that lack a stomach, all of which possess a pharyngeal jaw apparatus . Most species have an extended lower jaw, at least as juveniles, though this feature may be lost as the fish mature, as with *Chriodorus*, for example.

As is typical for surface dwelling, open water fish, most species are silvery, darker above and lighter below, an example of countershading. The tip of the lower jaw is bright red or orange in most species.Halfbeaks carry several adaptations to feeding at the water surface. The eyes and nostrils are at the top of the head and the upper jaw is mobile, but not the lower jaw. Combined

with their streamlined shape and the concentration of fins towards the back, these adaptations allow halfbeaks to locate, catch, and swallow food items very effectively.

Halfbeaks inhabit warm seas, predominantly at the surface, in the Atlantic, Indian, and Pacific oceans. A small number of species are found in the estuaries. Most species of marine halfbeaks are known from continental coastlines, but some extend into the western and central Pacific. *Hemiramphus* is a worldwide marine genus.

Marine halfbeaks are omnivores feeding on algae; marine plants such as seagrasses; plankton; invertebrates such as pteropods and crustaceans; and smaller fishes. For some subtropical species at least, juveniles are more predatory than adults. Some tropical species feed on animals during the day and plants at night, while other species alternate between carnivory in the summer and herbivory in the winter. They are in turn eaten by many ecologically and commercially important fish, such as billfish, mackerel, and sharks, and so are a key link between trophic levels.

Marine halfbeaks are typically pelagic schooling forage fish. Some marine halfbeaks, including *Euleptorhamphus velox* and *Euleptorhamphus viridis*, are known for their ability to jump out of the water and glide over the surface for considerable distances, and have consequently sometimes been called flying halfbeaks.

Hemiramphidae species are all external fertilizers. They are usually egg-layers and often produce relatively small numbers of fairly large eggs for fish of their size.

Relatively little is known about the ecology of juvenile marine halfbeaks, though estuarine habitats seem to be favoured by at least some species.

Halfbeaks are not a major target for commercial fisheries, though small fisheries for them exist in some places are caught by a variety of methods including seines and pelagic trawls, dip-netting under lights at night, and with haul nets.

They are utilized fresh, dried, smoked, or salted, and they are considered good eating. However, even where halfbeaks are targeted by fisheries, they tend to be of secondary importance compared with other edible fish species.In some localities significant bait fisheries exist to supply sport fishermen.

Halfbeaks forms a commercial fishery in southern coast of India, especially along the Kerala and Tamil Nadu coast. Information on the taxonomy, biology and fishery dynamics of the species is very limited

Scientific Classification

Kingdom : Animalia

Phylum : Chordata

Sub phylum : Vertebrata

Class : Actinopterygii

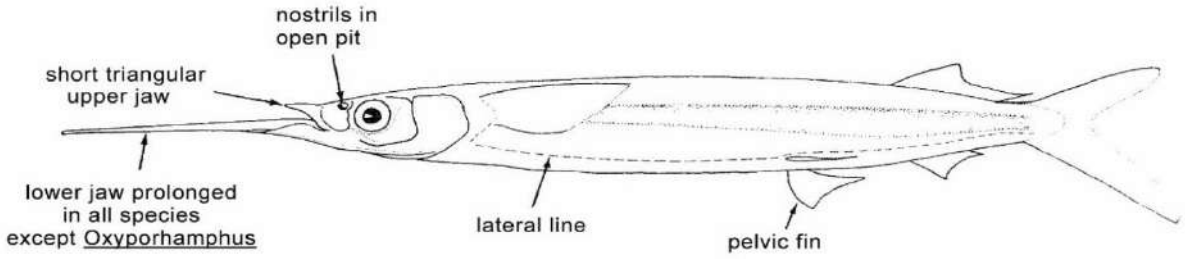
Sub class : Teleostei

Order : Beloniformes

Superfamily : Exocoetiodea

Family : Hemiramphidae

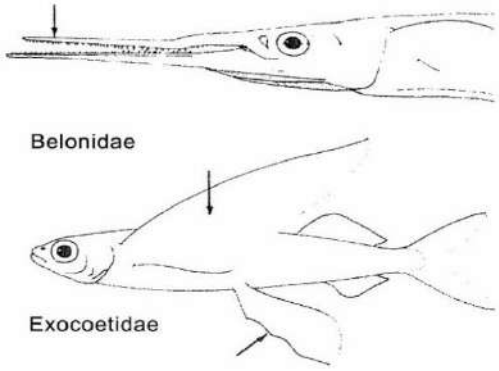
(TN gill, 1859)



SIMILAR FAMILIES OCCURRING IN THE AREA:

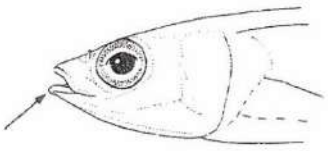
Belonidae (needlefishes): both upper and lower jaws elongated and armed with needle-sharp teeth.

Exocoetidae (flyingfishes): lack the prolonged lower jaw characteristic of most halfbeaks; pectoral fins or both pectoral and pelvic fins enlarged and used for aerial gliding.



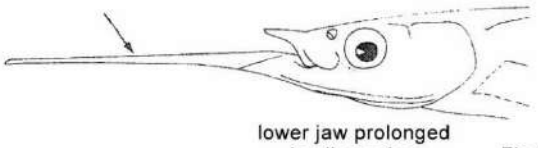
KEY TO GENERA OCCURRING IN THE AREA:

1a. Lower jaw not noticeably elongate (Fig.1); pectoral fins 30 to 35% of standard length ..... Oxyporhamphus



Oxyporhamphus Fig.1

1b. Lower jaw distinctly elongate (Fig.2); pectoral fins less than 30% of standard length



lower jaw prolonged in all species except Oxyporhamphus Fig.2

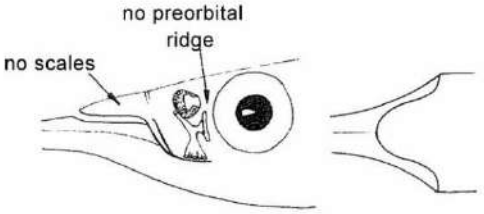
2a. Dorsal fin rays 20 to 25; anal fin rays 20 to 25 (Fig.3a); pectoral fins long, 25 to 28% of standard length; pectoral fin rays usually 7 to 9 ..... Euleptorhamphus

2b. Dorsal fin rays 12 to 18; anal fin rays 10 to 19 (Fig.3b); pectoral fins short, less than 20% of standard length; pectoral fin rays 9 to 13

a) Euleptorhamphus b) Hemiramphus Fig.3

3a. Scales absent on snout; preorbital ridge absent (Fig.4a) ..... Hemiramphus

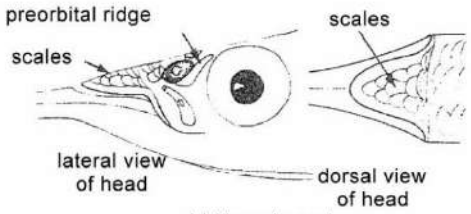
3b. Scales present on snout; preorbital ridge well developed (Fig.4b)



a) Hemiramphus

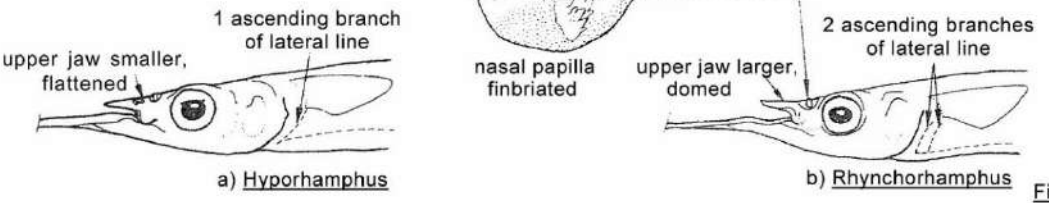
4a. Nasal papillae not fimbriate; upper jaw flat or nearly flat; gillrakers on first arch 19 to 47; lateral line with 1 branch ascending toward pectoral fin origin (Fig.5a).. Hyporhamphus

4b. Nasal papillae fimbriate; upper jaw arched; gillrakers on first arch 47 to 78; lateral line with 2 branches ascending behind opercle and pectoral fin origin (Fig.5b) ..... Rhynchorhamphus



b) Hyporharnphus

Fig.4



a) Hyporhamphus b) Rhynchorhamphus Fig.5

1. Genus *Hemiramphus*

Hemiramphus far (Forsskål, 1775)

Common name: Black-barred halfbeak

Dorsal spines and anal spines absent, Dorsal soft rays : 12-15, Anal soft rays: 10 – 12, Greatly prolonged, beak-like lower jaw, upper jaw short, triangular and without scales, preorbital ridge absent, total number of gill rakers on first gill arch 25-36, pectoral fins short, not reaching past nasal pit when folded forward, with 3-9 vertical bars on the sides, Color bluish dorsally, silvery on sides, 36-41 predorsal scales, Lower lobe of caudal fin longer than upper lobe, Dorsal and anal fins located posteriorly

Hemiramphus archipelagicus Collette & Parin, 1978

Common name: Jumping halfbeak

Dorsal spines and anal spines are absent, Dorsal soft rays : 12-15, Anal soft rays: 10 – 13, Greatly prolonged, beak-like lower jaw, upper jaw short, triangular and without scales, preorbital ridge absent, total number of gill rakers on first gill arch 25-32, dorsal fin without well-developed anterior lobe, pectoral fins short, not reaching past nasal pit when folded forward, no vertical bars on sides.

Hemiramphus lutkei (Valenciennes, 1847)

Common name: Lutke's halfbeak

Dorsal spines and anal spines are absent, Dorsal soft rays (total): 12-15, Anal soft rays: 10 – 13, Vertebrae: 52 – 57, Greatly prolonged, beak-like lower jaw, upper jaw short, triangular and without scales, preorbital ridge absent, total number of gill rakers on first gill arch 33-46, pectoral fins long, reaching beyond anterior margin of nasal pit when folded forward, no spots or vertical bars on sides.

2. Genus Hyporamphus

Hyporhamphus affinis (Günther, 1866)

Common name: Tropical halfbeak

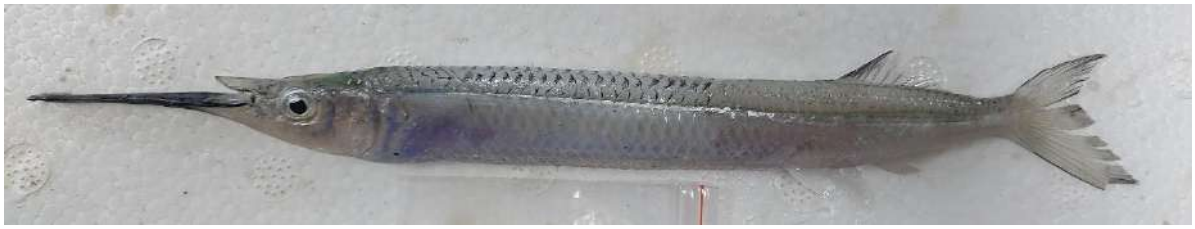
Dorsal spines and anal spines are absent, Dorsal soft rays: 14-17, Anal soft rays: 15 - 19
Vertebrae: 54 – 59, Body deep blue above, silvery stripe on side, silvery white below, caudal fin bluish, other fins unpigmented, tip and distal half of underside of lower jaw bright carmine red.

Hyporhamphus quoyi (Valenciennes, 1847)

Common name: Quoy's garfish

Dorsal spines and anal spines are absent, Dorsal soft rays : 14-17, Anal soft rays: 13 – 17
Vertebrae: 51 – 56, Prolonged, beak-like lower jaw, shorter than head length, its length contained in 4.7-8.6 times in SL and 1.2-2.0 times in head length, upper jaw short, scaly, blunt and rounded, its width contained in 0.5-0.6 times in its length, preorbital bone 1.75-2.15 times in diameter of orbit and 0.9-1.15 times in length of upper jaw, preorbital ridge present; posterior branch to preorbital lateral line canal present, Total number of gill rakers on first arch 26-39;Caudal fin forked, with lower lobe longer than upper.

Hyporhamphus xanthopterus (Valenciennes, 1847)



Common name: Red-tipped halfbeak/ vembanad halfbeak

Dorsal and anal spines are absent, Anal fin rays 14 - 16, Dorsal fin rays 13 - 15, A halfbeak with rounded nasal papilla, 41–53 gill rakers on first arch, upper jaw short, triangular and scaly, its width 0.8–1.0 times in its length, lateral line with one branch ascending towards pectoral fin base, fleshy tip of beak red, fins yellowish.

3. Genus Rhynchorhamphus

Rhynchorhamphus georgii (Valenciennes, 1847)

Common name: Long billed half beak

Dorsal spines and anal spines are absent, Dorsal soft rays : 13-17, Anal soft rays: 13 – 16, Vertebrae: 54 – 59, Very strongly pronounced domed upper jaw which is the longest and most arched of the four species of *Rhynchorhamphus*.

4. Genus Euleptorhamphus

Euleptorhamphus viridis (van Hasselt, 1823)

Common name: Ribbon halfbeak

Dorsal spines and dorsal spines are absent, Dorsal soft rays : 21-25, Anal soft rays: 20 – 25, Vertebrae: 70 – 75, Body very elongate; lower jaw very prolonged, upper jaw short, triangular,

and scaly, teeth present on vomer and tongue, pectoral fins long, with 8 or 9 rays, back iridescent blue green, belly silvery, Fins unpigmented.

5. Genus Oxyporhamphus

Oxyporhamphus micropterus (Valenciennes, 1847)

Common name: Big wing halfbeak

Dorsal spines and anal spines are absent, Dorsal soft rays:13-15, Anal soft rays: 13 – 16, Vertebrae: 47 – 50, Adults with a single large chamber to the swim bladder, Average number of gill rakers on the first arch, 24 - 28, Branchiostegal rays: 11-14.

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