

ORIGINAL RESEARCH ARTICLE

Branchiostoma malayanum* - A Newly Recorded Amphioxus in Indian Coast*A. Babu, P. Sampathkumar, D. Varadharajan and T. Balasubramanian***Faculty of Marine Sciences, Annamalai University, Parangipettai – 608 502, Tamil Nadu, India*

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ABSTRACT

Biodiversity is important to science because it helps us understand species diversity, abundance and functions. It also provides an understanding of all the species as an integral part of their ecosystem due to functions and often to human survival as well. New species are invented often and a lot of those that have been invented have not yet been classified. The marine ecosystems are the richest source of species biodiversity. Before studied and clearly indicated a lot of species on functions and life cycle in the ecosystem of marine, but nobody not care and study about the biodiversity of amphioxus. Many of these organisms are difficult to study, there are significantly very important for the model organisms and to research development of vertebrates. In the present study clearly indicate that the true diversity data are very much useful for the developmental and model research studies. Cephalochordata are commonly represented by the Amphioxus. There are 2.5-3.5 inches and live on seashores. It appears similar to a fish, but it lacks complex organs and due to other bony structure. It is having on primary feeding structures are concentrated at the anterior end. The information of amphioxus is essential in the sense of biodiversity of marine environments. While an amphioxus *B. malayanum* of Branchiostomidae species for the first time discovered in Chennai coastal waters along Indian coast.

Key words: Amphioxus, Branchiostomidae, *B. malayanum*, first record, Indian coast.**INTRODUCTION**

Cephalochordates, commonly called amphioxus or lancelets and is marine invertebrate chordates. Lancelets play an important role in studying the origin and evolution of vertebrates^[1]. Thus, the taxonomy of these ancient, widely distributed animals should be clearly understood^[2, 3, 4]. The subphylum Cephalochordata of the phylum Chordata, family Branchiostomidae, genus *Branchiostoma* contains 24 species that represent valid taxa, order of the species viz., *B. africana* Hubbs (1927), *B. arabia* Webb (1957), *B. bazarutense* Gilchrist (1923), *B. belcheri* Gray (1847), *B. bennetti* Boschung & Gunter (1966), *B. bermudae* Hubbs (1922), *B. californiense* Andrews (1893), *B. capense* Gilchrist (1902), *B. caribaeum* Sundevall (1853), *B. elongatum* Sundevall (1852), *B. floridae* Hubbs (1922), *B. gambiense* Webb (1958), *B. indicum* Willey (1901), *B. lanceolatum* Pallas (1774), *B. leonense* Webb (1956), *B. longirostrum* Boschung (1983), *B. malayanum* Webb (1956), *B. minucauda* Whitley (1932), *B. mortonense* Kelly (1966), *B. nigeriense* Webb (1955), *B. platae* Hubbs (1922), *B. senegalense*

Webb (1955), *B. tattersalli* Hubbs (1922), *B. virginiae* Hubbs (1922). Studies of Branchiostomidae species communities in Indian coastal waters are limited. However, no work has been done on the amphioxus distribution in the coastal waters of India. The present study concerns about the diversity of amphioxus in Indian coastal waters, from this study are helping the first time for invented of new species in *B. malayanum*.

STUDY AREA

Chennai (12° 9' 13.9"E; 80° 12' 80' 19" N) is located on the Coromandel Coast off the Bay of Bengal. Total coastal line of the district 19 km and 44 fishing villages. The area is a vast coastal plain characterized by several strandlines, lagoon, mangroves, salt marsh, estuaries, creek, barred dunes, spits, beach terraces etc. Biggest port is there used by fishing boats and trawlers. The coastal regions are mixed by two languid streams, the Cooum and the Adyar and freshwater river a lying between Pennar river of Nellore and

the Pennar river of Cuddalore. The coastal areas are primarily sandy, unlike the short and rocky formations. The sandy beach with beach sands rises slightly higher in the stretch. It was formed as a result of arresting the littoral drift by the port's breakwater. The area of the beach is increasing 40 sq m every year due to progradation. Muttukadu is located in Kanchipuram District, Tamil Nadu (Lat. 12°48' 24"N); (Long. 80° 15' 27"E) along the South East coast of India. The specimens were collected from Muttukadu is situated at a distance of 36 km from Chennai and is an excellent picnic spot for the residents of the city as well as tourists. The backwaters at Muttukadu have been developed by Tamil Nadu Tourism Development Corporation. This place is to provide a fun filled spot offering water sports for the entertainment of the people. This has positively affected the travel and tourism prospects of the area. The main attraction of Muttukadu is the windsurfing regatta, which is organized in February every year.

Species collected:

29 males and 31 females in Chennai coast (12°48' 24" N; 80° 15' 27"E), 23th in April 2008.

Taxonomy hierarchy

Branchiostoma malayanum (Webb, 1956)

Kingdom: Animalia

Phylum: Chordata

Class: Cephalochordata

Family: Branchiostomidae

Genus: Branchiostoma

Species: malayanum

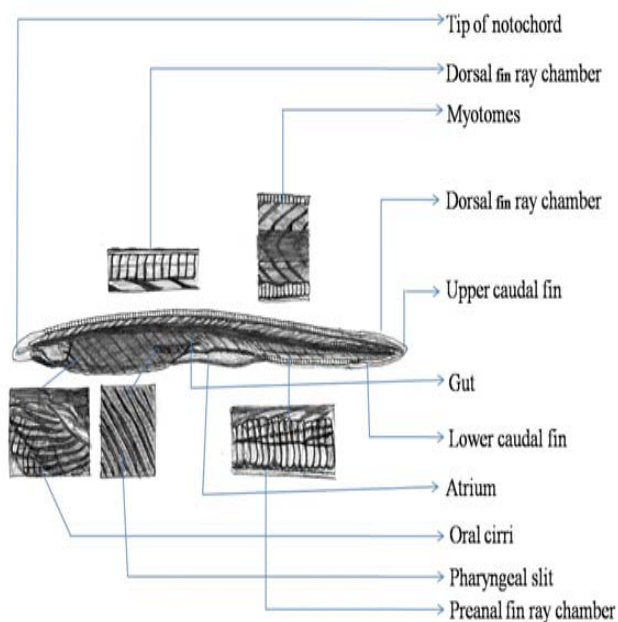


Fig 1: A lateral view of a whole mount slide of a young specimen *B. malayanum*

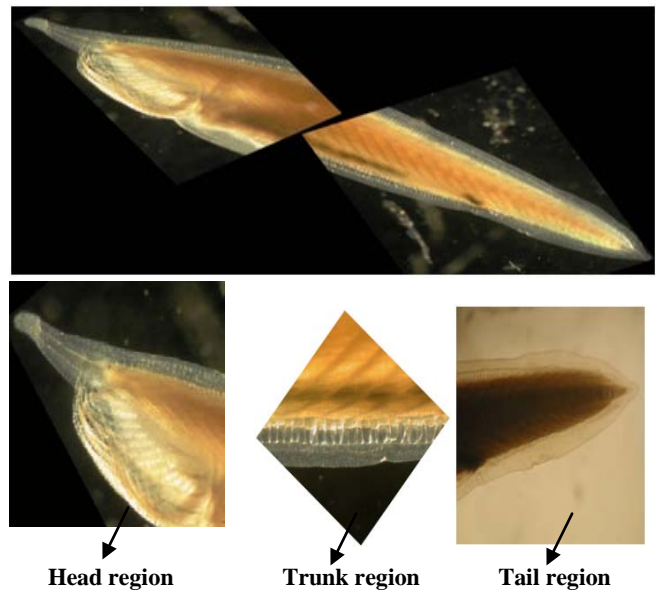


Fig 2: Lateral view of the external features of *B. malayanum*

Distinctive Characters:

Myotome Formula: preatriopore 29.4 (28-31) + atriopore-anal 13.1 (12-14) + postanal 8.9 (8-11) = total 51.4 (49-53). Dorsal fin-chambers 215.7 (181-245). Preanal fin-chambers 57.5 (42-72). Ratio of tallest dorsal fin-chamber height to width 2.3. Ratio of tallest preanal fin-chamber height to width 2.8. Ratio of postatriopore length to preatriopore length 0.54 (0.4-0.64). Ratio of body length to body depth 9.7 (7.6-11.1). Notochord extends well forward of the preoral hood and forms an extremely well developed rostral process. Caudal fin distinctly expanded. Anus anterior to centre of ventral lobe of caudal fin (Fig 1 & 2).

Colour:

White in colour and transparent.

Habitat and Morphology:

In habits with benthic mode of life particularly in sand with broken shells at the average depth of 15 meter in the coastal waters. Maximum number of gonads was presented 22. It is filter feeder, mainly consider feed on phytoplankton.

Size:

Maximum size 37 mm.

Distribution:

Distribution in the world South China Sea, Singapore, Gulf of Thailand, and the Solomon Islands, recently it's were collected from Chennai and Pondicherry in Indian coastal areas.

CONCLUSION

A cephalochordate is commonly known as a lancelet. Cephalochordata is a small taxon of 30 species in only two genera, Branchiostoma and Epigonichthyes. Order Amphioxiformes of Branchiostoma is one of the few

living genera of lancelets. As is well known, the amphioxus is the closest living invertebrate relative of vertebrates. Because of this position in the phylogenetic tree, they have attracted the attention of comparative and evolutionary biologists. Owing to morphological similarities, amphioxus used to be classified as the sister group of the vertebrates, whereas tunicates were considered to be the sister group of the clade comprising amphioxus plus the vertebrates. The vertebrate-like body plan and the close phylogenetic relationship to vertebrates already quantifies amphioxus as the best-available model for the proximate ancestor of the vertebrates and as a remarkable animal model for studying the evolution of developmental mechanisms^[5].^[6] first differentiated species on the basis of the number of dorsal and preanal fin ray chambers. The extent and shape of the notochord is another proposed diagnostic characteristic. Some species, such as *B. indicum* and *B. longirostrum*, have a notochord extending well forward of the preoral hood and forming an extremely well-developed rostral process. In most other species, the anterior-most myotome attaches closer to its anterior tip of the notochord. The shape of the caudal fin has been widely used in diagnosis of different species^[2,4], and it has been shown to be markedly variable in some species^[7,8]. Taxonomic study of amphioxus was also reported in Japanese waters on the species *B. belcheri*^[9] and *E. lucayanus*^[10], and in Chinese waters on the species *B. belcheri*^[11], *B. japonicum*^[12] and Taiwan coastal waters on the species *E. maldivensis*^[13].^[14] analyzed the meristic characters of 1,724 amphioxus specimens in a database, and ascertained 29 specific names to be valid, including 22 *Branchiostoma* species and 7 *Epigonichthys* species. The *B. malayanum* is an important cephalochordate is the first time for record in Indian coastal waters. Therefore availability of amphioxus is having a favorable conditions such as suitable climate, sandy sediment and suitable food supply in the water column, these larvae have survived and developed into a significant population. Availability of extensive information on the amphioxus is an essential prerequisite before planning for their proper management and for rational exploitation of these resources^[15].

This study will provide baseline information of the new species data in amphioxus, if it is necessary; to establish protective measures for these important marine animals in Indian waters because in this stations are important tourist spot

in the east coast, hence there may be chances to destroy amphioxus species diversity. Therefore, the baseline information for amphioxus in that area and such regions are significantly important for invented new species and also need for conservation and related research.

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