

PHYLUM HEMICHORDATA

Hemichordates are worm-like animals living in tubes in the bottom mud or among rocks or masses of plant material. At one time they were considered to belong to the same phylum as we belong (Phylum Chordata), but now have a phylum of their own. Their casts, left exposed at low tide, are a familiar sight in the tropics. Their common name is acorn worms and their tornaria larvae can occur in plankton samples. The larvae are usually between 0.5 and 1 mm long and have obvious bands of cilia.



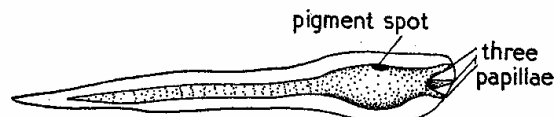
Example of tornaria larvae (From Wickstead, 1965)

PHYLUM UROCHORDATA

Urochordates do not have a backbone but share our phylum, because during a stage in their life cycle they have a primitive notochord. They are represented in the plankton by three main classes.

CLASS ASCIDIACEA

A common ascidacean is the sea squirt, which is typically found on the seabed or attached to the bottom of ships. It has a larval stage called an ascidian tadpole (as it superficially resembles a frog tadpole) which often occurs in plankton samples.



Ascidian tadpole larvae (from Wickstead, 1965).

CLASS LARVACEA

Larvaceans, also known as appendicularia, have an elongated, flat paper-like body of varying width. They have a “head” which usually appears to be very loosely attached to the body and is often broken off in samples. They secrete a jelly-like “house” inside which they live, but the house and animal are generally sampled separately when they are caught in the plankton net.

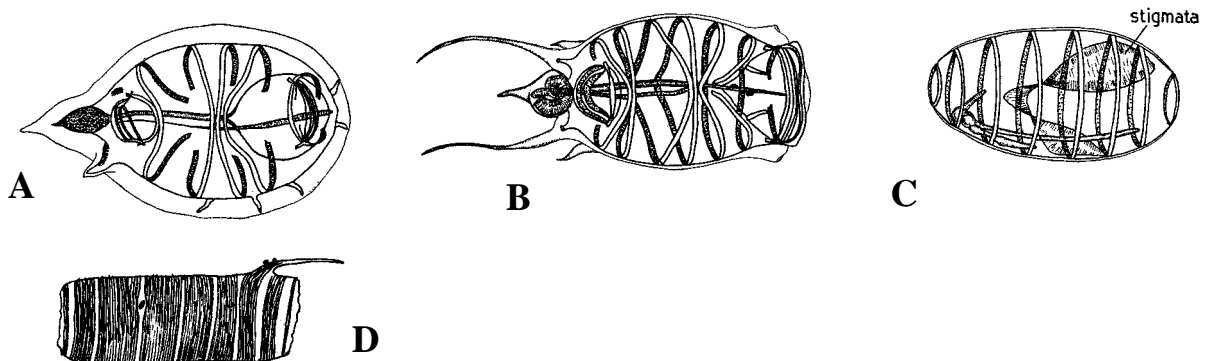


Examples of appendicularia (From Wickstead, 1965).

CLASS THALIACEA

There are two main groups of thaliaceans. The doliolids are barrel-shaped and have complete and separate circles of muscle-bands around the body e.g. *Doliolum*. They have a complex life history involving three stages, apart from the larvae. One of the stages is sometimes found in a disintegrating form (old nurse), where the individual becomes very flabby and the muscle bands widen till they can become continuous in some species.

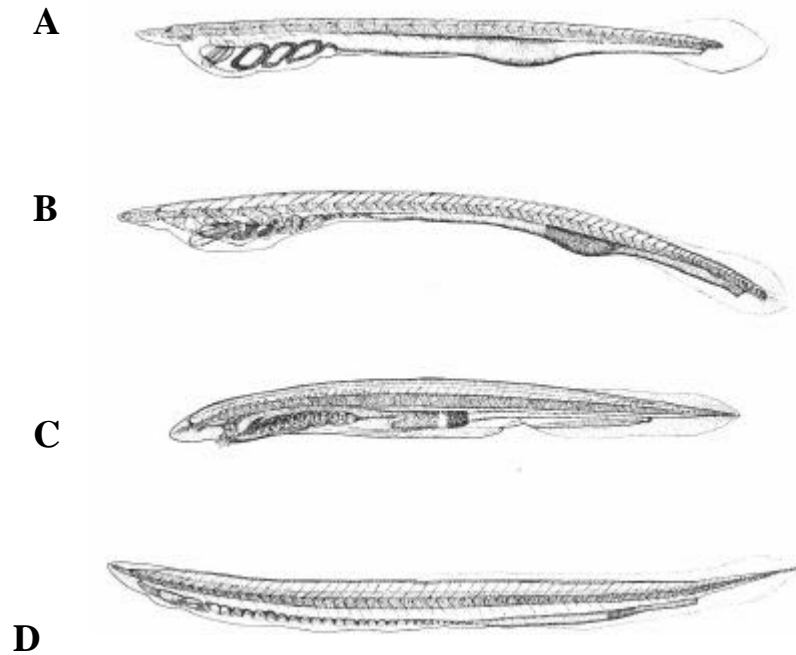
The second group, the salps, are generally larger than doliolids and have more jelly in their bodies. In salps, some of the muscle bands join together at certain points and do not go completely round the body e.g. *Thalia*. They have a less complex life cycle than doliolids. The asexual individuals live singly and are called solitary. They bud off sexual individuals in a chain, which stick together for some time, so are called the aggregate phase.



Examples of thaliaceans (A-C From Wickstead, 1965). A: *Thalia democratica*, aggregate form; B: *Thalia democratica*, solitary form; C: *Doliolum* sp. D: *Doliolum* sp. old nurse stage (From Fraser, 1947).

SUBPHYLUM CEPHALOCHORDATA

The only members of this group are the lancets, which were once called *Amphioxus*. A common genus is *Branchiostoma*. They are rigid slender organisms, flattened side to side, with segmented muscle bands and gill slits. They have a nerve cord along the whole body. They generally live in sandy bottoms but often emerge into the plankton, especially the juveniles.



Examples of cephalochordate larvae A: *Branchiostoma* sp. larva (1.5 mm); B: *Branchiostoma* sp. larva (2.8 mm); C: *Branchiostoma* sp. young adult (5 mm); D: *Amphioxides* sp. adult (9 mm). (From Wickstead, 1967).