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Abstract

Polychaetes belongs to the phylum Annelida. It comprises of segmented worms. Currently, there are about 10000 known valid species. Their habitats are marine environments reaching from coastal sands to the deep-sea. Being a part of the marine zooplankton (mainly larval stages), they play an important role in the nutrition of many aquatic animals. Benthic adult stages are a natural food item of many flatfish and the cod in the North Sea (Beesley et al. 2000). They occur in high densities and species like Nereis diversicolor, Nereis virens and Arenicola *marina* are also preved upon by migrating birds in intertidal mudflats. They also play an important role as decomposers in the ecosystem. Polychaetes have proven to be e useful for human purposes. Besides the use as fish bait the high content of polyunsaturated fatty acids (PUFAs) within their body tissues makes them an ideal food item in the nutrition of fish and shellfish. Further the ability of inducing sexual maturation is well known and widely used in the aquaculture industry.

Polychaeta worms

Polychaetas are known by many names: lugworms, clam worms, bristle worms, fire worms, palolo worms, sea mice, feather duster worms, etc., but all possess an array of bristles on their many leg-like parapodia -- the name polychaeta, in fact, means "many bristles". The many common names reflect the wide array of body forms found in this group, unlike the earthworms and leeches which all have the same general appearance. They are the large and extremely diverse group. Around 10,000 species have been described. Most are marine. Some, such as feather duster worms, are sedentary, living in tubes buried in sand or mud, and feed by trapping food particles in mucus or by ciliary action. he delicate beauty of many polychaetes make them a favored subject for photography, and several are named after nymphs and goddesses of Greek myth, such as Nereis (the common "clam worm") and Aphrodite (the "sea mouse").

Habitat

Polychaetes as a class are robust and widespread, with species that live in the coldest ocean temperatures of the abyssal plain, to forms which tolerate the extremely high temperatures near hydrothermal vents. Polychaetes occur throughout the Earth's oceans at all depths, from forms that live as plankton near the surface, to a 2- to 3-cm Volume 4 - Issue 6 - June,2024

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specimen (still unclassified) observed by the robot ocean probe *Nereus* at the bottom of the Challenger Deep, the deepest known spot in the Earth's oceans. Only 168 species (less than 2% of all polychaetes) are known from fresh waters.

Morphology of polychaeta

It has well developed, paired, paddle-like appendages (parapodia), well developed sense organs, and numerous setae (usually on the parapodia; "polychaete" means "many hairs"). Polychaetes usually have a well-developed head, often complete with well-developed eyes, antennae, and sensory palps. They lack any permanent sex organs (in contrast to other kinds of annelids); gonads appear as swellings during the breeding season

Food and feeding

Filter feeding, also known as suspension feeding, is a feeding strategy that involves extracting small food particles, such as phytoplankton, detritus, and zooplankton, from the surrounding water column. Polychaetes that employ filter feeding have evolved specialized structures and behaviors to facilitate efficient food capture and ingestion.

Reproduction

Most polychaetes have separate sexes, rather than being hermaphroditic. The most primitive species have a pair of gonads in every segment, but most species exhibit some degree of specialisation. The gonads shed immature gametes directly into the body cavity, where they complete their development. Once mature, the gametes are shed into the surrounding water through ducts or openings that vary between species, or in some cases by the complete rupture of the body wall (and subsequent death of the adult). A few species copulate, but most fertilize their eggs externally.

The fertilized eggs typically hatch into trochophore larvae, which float among the plankton, and eventually metamorphose into the adult form by adding segments. A few species have no larval form, with the egg hatching into a form resembling the adult, and in many that do have larvae, the trochophore never feeds, surviving off the yolk that remains from the egg. However, polychaetes some exhibit remarkable reproductive strategies. Some species reproduce by epitoky. For much of the year, these worms look like any other burrow-dwelling polychaete, but as the breeding season approaches, the worm undergoes a remarkable transformation as new, specialized segments begin to grow from its rear end until the worm can be clearly divided into two halves.

The front half, the atoke, is asexual. The new rear half, responsible for breeding, is known as the epitoke. Each of the epitoke segments is packed with eggs and sperm and features a single eyespot on its surface. The beginning of the last lunar quarter is the cue for these animals to breed, and the epitokes break free from the atokes and float to the surface. The eye spots sense when the epitoke reaches the surface and the segments from millions of worms burst, releasing their eggs and sperm into the water

An indispensable feed in shrimp hatcheries

The inclusion of live SPF polychaetes in the diet of shrimp broodstock can have several impacts

• Nutritional Value: Live SPF polychaetes are rich in essential nutrients, such as proteins, lipids, vitamins, and minerals. They provide a highly nutritious and natural food source for shrimp broodstock, supporting their overall An International Multidisciplinary e-Magazine

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health and reproductive performance. The nutritional composition of live SPF polychaetes contribute can to improved maturation, spawning success, and egg quality in shrimp broodstock.

- Induction of Maturation: Live SPF polychaetes can act as a natural stimulant for shrimp broodstock maturation. The movement and sensory cues provided by the live feed can trigger the reproductive behavior and physiological changes necessary for the maturation and spawning of broodstock. The presence of live SPF polychaetes can simulate the natural feeding conditions of shrimp, promoting their readiness for reproduction.
- Enhanced Gonadal **Development:** The consumption of live SPF polychaetes by shrimp broodstock can lead to improved gonadal development. The highquality nutrition provided by these live organisms supports the growth and maturation of the reproductive organs in the broodstock. This, in turn, increases the production and quality of eggs and enhances the potential reproductive of the broodstock.
- Hormonal Balance and Gamete Production: Live SPF polychaetes contain essential fatty acids and other nutrients that play a crucial role in maintaining hormonal balance in shrimp broodstock. The consumption of live these organisms influence the can endocrine system of the broodstock, promoting the production and release of reproductive hormones.

This hormonal regulation contributes to the maturation of gonads and the production of viable

gametes (eggs and sperm) in the

- broodstock. **Behavioral** Stimulation: The presence of live SPF polychaetes in the broodstock tanks can stimulate natural feeding and foraging behavior in shrimp. This active feeding behavior is not only beneficial for nutrient intake but also helps maintain the overall and activity health of the
- broodstock. Increased activity and feeding can positively impact the reproductive performance and overall well-being of the broodstock.



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