Plankton function and benefits in Aquaculture

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Abstract

As the most important producer of food for aquatic organisms, plankton is vital for aquaculture.Aquatic animals are beneficial for the fishing industry and the aquatic ecosystem since they consume live plankton. Aquatic larvae predominantly consume phytoplankton as food. Aquatic species consume both phytoplankton and zooplankton during the larval stage of their life cycles. Small fish and prawn larvae consume phytoplankton, which also provides oxygen to aquatic life. Zooplankton consumes phytoplankton and plays a role in the recirculation of nutrients in ponds. Farmers grow into more sustainable in their production as a result of using more plankton in aquaculture.

Introduction

Aquaculture organisms have to obtain all of t heir nutritional requirements, with the except ion of a portion of their mineral requirements , from the food they consume.

Most organisms in nature subsist on live foo d, which consists of plants and animals obtai ned from the environment,but some do ingest and maybe utilise detritus along with associa ted organisms. Phytoplankton is the first source of food for many larval organisms. This is most likely related to the size of the larvae when they hatch**.** Most species' larvae can be fed exclusively on zooplankton or a combination of plant and animal matter after a particular period of time. Planktons are extremely sensitive to their environment and any change in the environment causes changes in plankton communities in terms of tolerance, abundance, diversity, and dominance in the habitat (Mathivonam, 2007). Plankton in the aquatic ecosystem not only converts plant food to animal food but also serves as a food source for their organisms (Rajasekar *et.al.*2013). The term plankton is derived from the Greek Word 'Planktons' which means "Drifting organisms" Victor Henson, a scientist coined the phrase in 1887. Planktology is the study of plankton, and a planktonic individual is known as a plankter. From tiny bacteria to large organisms like jellyfish, plankton can range in size from 0.2 m to more than 20 cm. This study provides students, academics, and aqua farmers with basic and critical informat ion about qualitative and quantitative varietie s and their role in aquaculture.

What is Plankton?

Planktons are aquatic organisms that include both marine and freshwater organisms. Algae, protozoans, bacteria, mollusks, and coelenterates are some examples. They feed small fish and whales in the oceans. Plankton is commonly thought to live in water, but there are also airborne versions, known as aeroplankton, that spend part of their lives drifting in the atmosphere. Plant spores, pollen, and wind-scattered seeds are examples, as are microorganisms swept into the air by terrestrial dust storms and oceanic plankton swept into the air by sea spray.

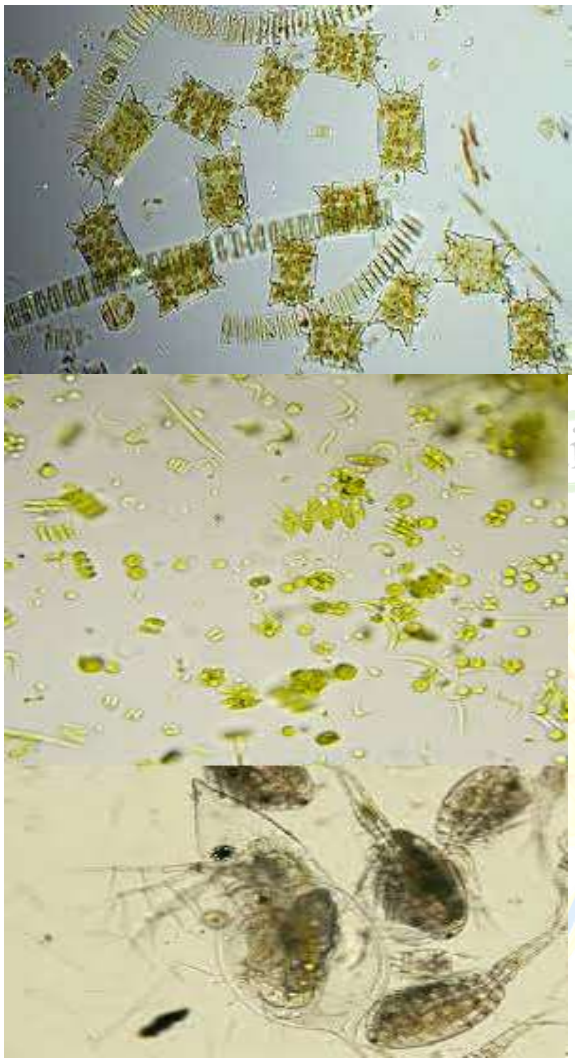

Fig:1 Phytoplankton and Zooplankton under microscopic view

Plankton Classification:

Planktons are classified according to their lif ecycle, size, and trophic level.

They are as follows:

Based on the Lifecycle:

Holoplankton is organisms that live throughout their lives in the planktonic state. For example, algae, Jellyfish

Meroplanktons

are organisms that can only live as planktons for a portion of their life cycle.

For example, larvae of starfish, worms, sea u rchins, fish, and so on.

Phytoplankton

They are autotrophs that belong to the planktonic community. Consequently, they obtain their energy from the process of photosynthesis. This phytoplankton lives in the photic zone of lakes and oceans. Cyanobacteria, Diatoms, and dinoflagellates are some groups of phytoplankton .Phytoplanktons are found in all types of aquatic ecosystems and are a food source for many zooplanktons. They are one of the forefront basal organisms in the aquatic food chain. Phytoplanktons are considered to be a rich source of food, biofertilizers, biofuel and feed. They also play a vital role as indicators in monitoring water quality.

The following are the roles of phytoplankton:

• **Nutritional source:** Phytoplankton is a primary source of food for shrimp in the early stages of their life cycle. They are a good source of protein, fats, and carbohydrates, which help shrimp, grow.

• **Water quality management:** Phytoplankton improves water quality by absorbing excess nutrients such as ammonia and nitrate from the pond, which affects shrimp health. They also provide oxygen to the shrimp.

• **Live feed production**: In pond culture, phytoplankton is used as live feed, where it is cultivated and fed to shrimp. It is a primary source of food for the pond's shrimp.

Zooplankton:

Zooplanktons are very important in the food web of open-water ecosystems, in both marine and freshwaters (Ekelemu, 2010). Zooplanktons are microscopic animals that feed on phytoplankton, and they serve as a link in the food chain between primary production and higher trophic levels. It includes primary consumers such as small protozoans, prawn larvae, and other animals that feed on other plankton. Copepods, Artemia, and Rotifers are examples of zooplankton species.

The following are zooplankton's roles:-

Intermediate food source:

Zooplankton serves as a link in the food chai n between phytoplankton and shrimp larvae.

Nutrient cycling: Zooplankton recycles nutrients in the pond by consuming phytoplankton which is then consumed by shrimp larvae. Its supports in the maintenance of a balanced ecosystem in the pond

Supplement live feed: In shrimp farming, zooplanktons are fed to shrimp larvae as live feed. It improves the health of shrimp as they are a good source of nutrients

Fig : 2 Plankton growth in a pond

Advantages of Plankton

- Phytoplankton is natural source of food for zooplankton and helps in maintaining a balanced food chain for shrimp in the pond.
- Phytoplankton helps in maintaining water quality of the pond by removing excess nutrients from water and by supplying oxygen.
- Zooplankton converts phytoplankton into easily digestible form for the shrimp larvae.
- Plankton has probiotics that help in maintaining microbial balance in the water.
- Phytoplankton continuously gives oxygen supply through photosynthesis.
- Phytoplankton protects shrimp from sunlight and reduces cannibalism.
- Culturing plankton in the pond reduces the cost of feed.
- Zooplankton has nutrients that support in rapidly and bouncing growth in the larval stages of shrimp.
- It stays prorogated in the water column for a significant period (suspendability/ water stability).
- It doesn't contaminate the water system.
- It is desirable to fish as food because of its attractability.
- There's no chance of a rapid microbial decline because it is sufficient, palatable, and has a low BOD.
- It has a detectable shelf life.
- It's cheap for cultivation/ rapid propagation.

Conclusion

Phytoplankton, zooplankton and different natural food organisms contribute significantly to fish nutrition. Plankton is the natural food of aquatic organisms. They

boost the immunity of aquatic organisms (shellfish and finfish). The presence of plankton has a large impact on the water quality of submarine ponds. As a result, aqua growers regularly cover the presence of plankton in submarine ponds because they play an important part in the survival, growth, cost of product, and eventuality of the water body.

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