Natural Fish Food Organism

- A variety of natural fish food organisms are found in a water body, which depends on the productivity of the water body.
- Some of the fish natural food organisms include phytoplankton, zooplankton, annelids, worms, insects, molluscs etc.
- The natural food provides the constituents of a complete and balanced diet.
- The demand of natural food varies from species to species and between age group of individuals. For example catla prefers zooplankton and silver carp prefers phytoplankton.
- At a younger stage; the fish may feed on plankton, and the same fish may prefer animal food.
- Natural feeds have high protein and fat content, which promote the growth of fish. Hence, it is necessary to increase the live food in the aquatic ecosystem to improve the growth of fish.

Plankton

- Plankton may be increased in a water body via application of organic manure and chemical fertilizers.
- Fish production in a water body is either directly or indirectly dependant on the abundance of plankton.
- The physico-chemical properties of water determines the quality and quantity of plankton.
- Plankton is most essential for many fishes as food.
- The growth of plankton feeding fishes mostly depends on plankton dynamics of the water body.

The plankton is further divided into two main categories - phytoplankton and zooplankton

Phytoplankton :

- Fish consume the phytoplankton, which is found abundantly in well managed ponds.
- Phytoplankton gives green colour to the water due to the presence of chlorophyll.
- Phytoplanktons are generally made up of mostly unicellular algae which are either solitary or colonial.
- Phytoplanktons are autotrophy, i.e., they fix solar energy by photosynthesis using CO_2, nutrients and water.
- Phytoplankton occupies the base of the food chain and produces the primary food material on which other organisms in the ecosystem sustain themselves.
- The phytoplanktons drift about at the mercy of the wind and water movements.

Phytoplankton may be grouped in to three major classes

1. **Chlorophyceae:**

- These are called Green Algae due to the presence of chlorophyll.
- These organisms are distributed all over the pond.
- The chlorophyceae members that are useful as fish food are *Chlamydomonas. Volvox, Eudorina, Pandorina, Chlorella*. Filamentous algae like *Ulothrix, Oedogonium, Spirogyra, Pediastrum, Microspora, Cladophora, Clostredium, Scenedesmus, Cosmarium*. etc.

2. Cyanophyceae:

- These are also called as Myxophyceae and are commonly known as blue Green Algae.
- This colour is due to the varying proportions of chlorophyll a. carotenoids and biliproteins.
- The product of photosynthesis is cyanophycean starch, present in granular form.
- The cell wall lacks cellulose and instead comprises mainly of amino acids and amino sugars.
- Many cyanophycean members are consumed by fishes. These are *Nostoc, Oscillotoria, Anabaena, Microcystis, Spirulinaa. Merismopedia, Arthrospira,* etc.

3. Bacillariophyceae

- These are called Diatoms. They are unicellular organisms with different shapes and sizes.
- These may be yellow or golden brown or olive green in colour.
- Golden brown pigment is present in diatoms. The reserve food materials are fat or volutin.
- The diatoms consumed by fish are *Diatoma, Navicula, Cocconies, Synedra, Tabellaria, Meridian, Fragilaria, Nitzschia, Pleurosigma, Amphifileura, Rhizosolenia, Cyclotella, Amphora, Melosira, Aclwanthes,* etc.

Zooplankton

- Plankton that constitutes animals is called Zooplankton and these are abundant in the shallow areas of a water body.
- The zooplankton is distributed horizontally and vertically in an ecosystem.
- They undergo diurnal vertical migrations.
- The zooplankton forms an important group as it occupies an intermediate position in the food web, many of them feeding on algae and bacteria and in turn being fed upon by fishes.

The most common organisms in zooplankton are

1. Protozoa:

- Protozoans are most primitive, unicellular and microscopic animals.
- These organisms are provided with locomotory organelles like pseudopodia, flagella and cilia and these are found abundantly in fish ponds and are useful as natural fish food.
- Protozoans are dominate communities in the zooplankton.

- The protozoans belonging to the classes sarcodina, flagellate and ciliata are useful as food items to fishes.

2. Crustaceans

- The aquatic animals with 19 pairs of appendages and branchial respiration are included in the class Crustacea.
- The crustaceans vary from microscopic to large animals.
- Crustaceans form a major component of zooplankton.
- In zooplankton, the micro-crustaceans are useful as food to fish and prawns.
- The important micro-crustaceans are copepodes and cladocerans.
- The crustacean nauplii also constitute a good food material for many fishes and prawns. For example, nauplii *of Artemia* are used in prawn hatcheries.

1. Copepod

- These are animals with 5 pairs of thoracic appendages, abdomen without appendages, forked telson, two pairs of antennae and body with head, thorax, and abdomen.
- The copepodes inhabit many of the freshwater habitats such as lakes, reservoirs, ponds, etc. Many of the copepodes are pelagic and are so abundant in the plankton of both limnetic as well as littoral regions of the water. Only the harpacticoids are mostly benthic or bottom living.
- The size of the body of the copepods is 0.3 to 3.5 mm.
- Copepods such as *Cyclops, Mesocyclops, Diaptomus, Canthocamptus,* etc. are useful as fish food organisms.

b) Cladocera

- The animals which are bivalved, shield shaped with or without shell, flattened trunk appendages and leaf-like caudal styles which may be unjointed or jointed are included in cladocera.
- The greatest abundance of cladocerans is found near the vegetation in lakes, ponds, etc. The size of these shelled crustaceans varies from 0.2 to 3.0 mm.
- The cladocerans like *Daphnia, Ceriodaphnia, Moina, Sinocephalus, Scapholebris, Sida, Eurycents, Chydorus, Daphniosoma, Polyphemus, Macroihrix. Leydigia, etc.* are useful as fish food organisms.

c) Ostracoda

- The animals with bivalved carapace, which encloses the entire body, 4-6 trunk appendages and reduced trunk are included in ostracoda.
- These forms are well represented in both the standing and running waters.

- These are exclusively planktonic forms. Occasionally the ostracods like *Cypris, Stenocypris,* etc. are consumed by fish.

d. Rotifera

- Rotifers are readily identifiable from other planktonic materials by the presence of their anterior ciliated wheel-like structure called corona and hence they are called wheel animalcules.
- Rotifers live in a variety of aquatic habitats. They are microscopic, ranging from
- 40 microns to 2.5 mm in size.
- Usually rotifers like, *Keratella, Phlodina, Rotaria. Hexanhra, Filinia, Brachionus Epiphanes,* etc., are useful as food organisms.

Rotifers Offer Several Advantages as Fish Feed Organisms

- They reproduce quickly. It is estimated that a population under favourable conditions can double every one to five days.
- Rotifers are small and therefore are accepted as food by some organisms that cannot ingest larger zooplankton: thus they are an important first food for many fishes and prawns.
- They are nutritious and their actual nutritional value can be improved, as can be done for other zooplankton, by packing the rotifers with specific strains of algae or other feed.

3. Annelids

- Animals with metameric segmentation, eucoel, nephridia and setae are included in the phylum annelida.
- The animals which belong to classes polychaeta and oligochaeta are useful as fish food organisms.
- These are found at the bottom of the water body and are generally consumed by bottom-dwelling fish, common carp, catfishes, murrels, etc.
- *Tubiflex, Glycera* and earthworms are the common fish food oligochaetes.

4. Insecta

- Animals with 3 pairs of legs, 2pairs of wings, jointed appendages and a chitinous body wall are included in class insecta.
- Hemiptera, diptera, coleoptera, ephemeroptera and plecoptera insects dominate as fish food among the insects.
- Belostomatidae and notonectidae and nymphs of odonata are good fish food organisms.

5. Mollusca

- The animals with a soft body, shell and foot are included in the phylum mollusca.

- The molluscans are found at the bottom of water body. Hence, only bottom-dwelling fish consume them.