

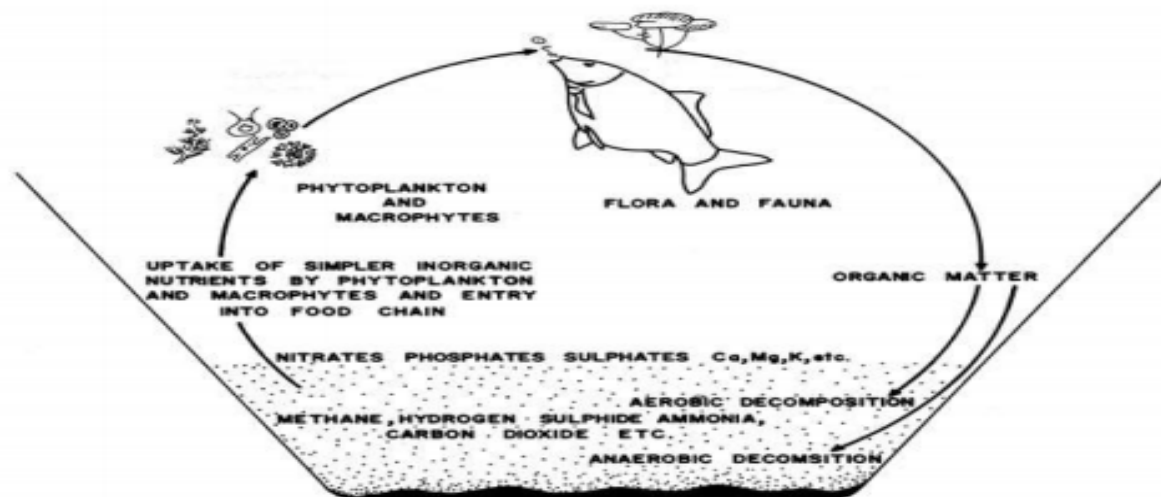
# Role of microbes in sedimentation and mineralization process

- Microorganisms have major roles in pond culture, particularly in the:
  - ✓ Productivity
  - ✓ Nutrient cycling
  - ✓ Water quality
  - ✓ Disease control
  - ✓ Environmental effluent management.
- It is the most important to differentiate ecology of microbes from microecology.
- Ecology of microbes means microbial population, communities, diversity biomass and their interrelationship with the impact of environment.

- It occupies an important place in ecology in water and sediments.
- whereas beneficial microorganisms degrade pollutants inhibit or kill harmful microbes by antagonism, purify water bodies and reach eco equilibrium in water.

## MICROBIAL PROCESSES

- ❑ The food webs in ponds is complex with feed pellet input and sediment water interaction affecting the algal bloom development, water quality and ultimately fish/prawn growth rate.
- ❑ Heterotrophic bacteria: Consume oxygen and release carbon dioxide while oxidizing organic matter.
- ❑ Autotrophic bacteria: Consume oxygen and carbon dioxide while oxidizing ammonia, nitrite or sulphide.

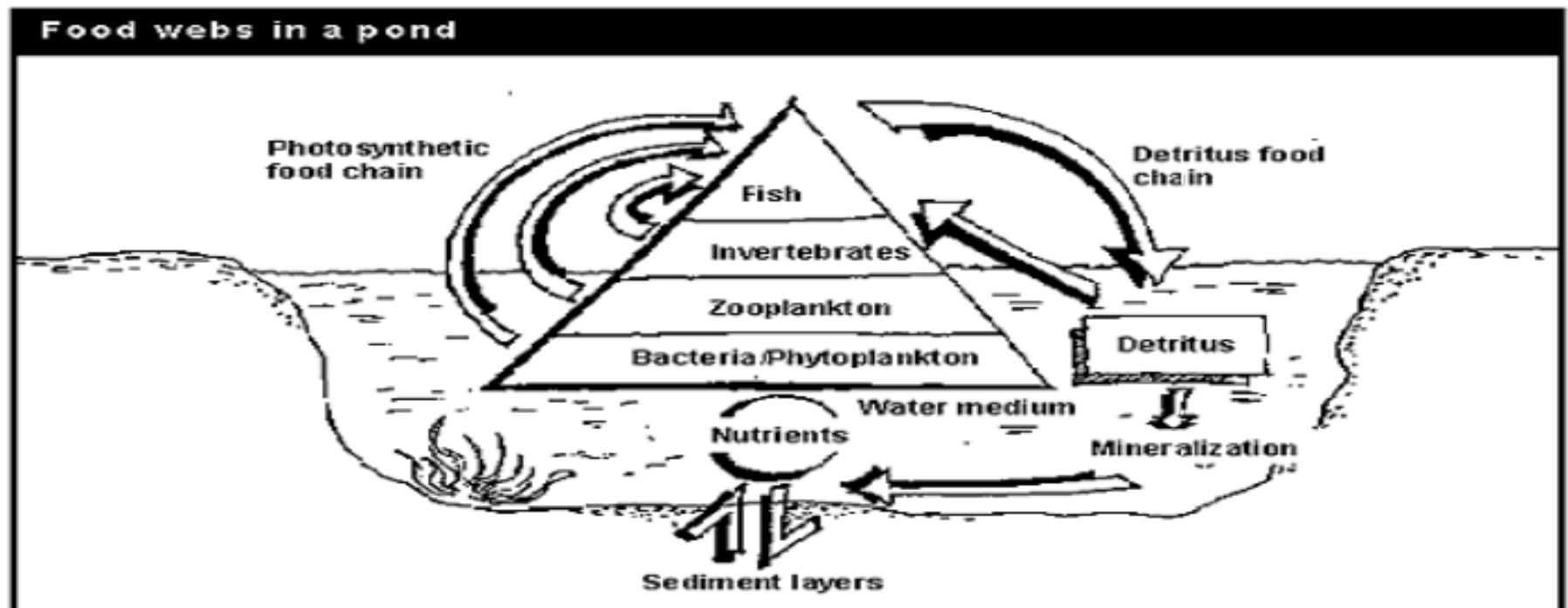


# Role of beneficial microorganism in aquatic ecosystem

- Microbes include microalgae, bacteria, fungi and virus.
- **Microalgae:**
- Its mainly photosynthesize to absorb carbon dioxide and to supply oxygen in aquatic animal.
- **Bacteria and fungi:**
- To decompose organic matter and keep the water clean.
- Microbes are the predominant photosynthetic organism in most aquatic environment.
- In aerobic condition algae, diatoms and cyanobacteria predominant.
- In anaerobic conditions other photosynthetic bacteria are dominant.

# FUNCTIONS OF BENEFICIAL MICROORGANISMS

- ❑ Now a days, beneficial microorganisms are applied in aquaculture and mariculture mainly in the form of single strain, multiple strain with some synergists.
- ❑ The beneficial microorganism perform their function on two aspects:
  - To raise the health level of host
  - To promote the proliferation of beneficial microorganism and their metabolic product in microecology



# In soil quality management

- During pond preparation nutrients added to pond in the form of fertilizer manures and feeds cause phytoplankton bloom that increase the concentration of suspended organic particles.
- Organic matter settles to the bottom and is decomposed by microorganisms.
- Metabolic products of aerobic decomposition are Carbon dioxide, water, ammonia and other nutrients.
- In anaerobic sediment some microorganisms decompose organic matter by fermentation reactions that produce alcohols, ketones, aldehydes.

# BIOREMEDIATION

- ❑ Bioremediation has been recognised as an inexpensive, effective and eco-friendly, safe technology that offers new and innovative ways to clean up hazardous waste.
- ❑ This is a tool that can be used for the abatement of pollution resulting from a variety of compounds, biodegradable as well as recalcitrant.
- ❑ Though bacteria and other microbes are natural source of bioremediations tools.
- ❑ The most applicable one could be phytoremediations, especially with reference to aquatic pollution abatement.
- ❑ Phytoremediation work best at sites with low to medium amount of pollution and at sites contaminated with metals and nutrients.

