



STUDY OF ZOOPLANKTON HETEROGENEITY IN AMARJA RESERVOIR AT KALABURAGI DISTRICT

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ABSTRACT

The research has been conducted on Amarja Reservoir and it was mainly focused on the study of Zooplankton diversity. The Amarja Reservoir is situated in the Kalaburagi district and it is one of the most historic reservoirs in the district. The research reflected that zooplankton plays an essential role in the maintenance of aquatic ecosystems and serves as a major component of the food chain. The research showed that the zooplankton is an essential element in maintaining proper equilibrium in the ecosystem, hence the research is mainly focused on the identification and evaluation of the diversity and importance of the aquatic ecosystem of the Amarja Reservoir. The research has been conducted for a year from December 2014 to November 2015. The research showed that zooplankton has been provided in 5 different groups for Amarja Reservoir and 19 different species were identified through the research.

KEYWORDS: Zooplankton, Amarja Reservoir, ecosystem, Biodiversity.

INTRODUCTION

Biodiversity is a scientific term that refers to the variety of life on Earth. It is defined as the varieties of plants, animals, and microorganisms (microfauna) in an ecosystem or region. Biodiversity includes genetic diversity and species diversity, both important components of biodiversity. Zooplankton is found at all levels of the water column from surface waters to deep-

sea environments (Blanco-Bercial 2020). Zooplankton is the tiny animals that live in the water and feed on phytoplankton. They are very important for the growth of marine life because they help to remove carbon dioxide from the atmosphere. Zooplankton produces half of all oxygen consumed by humans and other animals, so we must study their diversity.

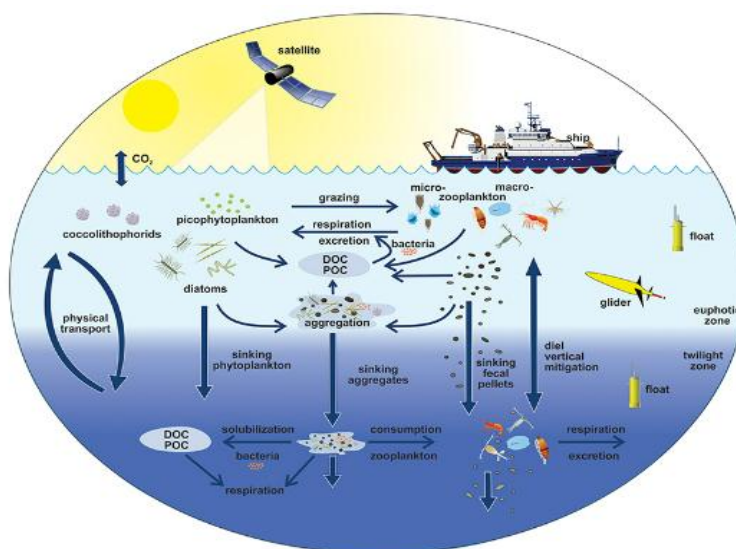


Figure 1: Food Web
(Source: wikipedia.org)

They are important as food for many aquatic organisms including fish and other marine mammals, birds, turtles, and whales. Zooplankton plays a vital role in marine ecosystems by grazing on algae growing on rocks, reefs, and seagrass beds. As per Hayat *et al.* (2020), this process of grazers feeding on algae is important because it helps maintain healthy coral reefs and seagrass beds which help filter out pollutants from the water. They include many species of crustaceans, mollusks, and annelids. Zooplankton is found in the water column (surface ocean). Some zooplankton groups are filter feeders: they feed by filtering food particles out of the water with their bodies or feet. Other types of

zooplankton may be planktivores: they eat other organisms such as algae and bacteria.

The aquatic ecosystem is an essential research subject for many researchers and the ecosystem and zooplankton life cycle and the natural cycle has been very important for Amarja Reservoir. Zooplankton is split into two categories: pelagic zooplankton (those that live at depth) and benthic zooplankton. Both are crucial for the ecosystem and play a significant role in the food chain. In this context, it is also to be added that Zooplankton plays a crucial role in ecology as a source of food for numerous fish and other creatures. Zooplankton is sometimes referred to as phytoplankton, microzooplankton, or planktic for short.

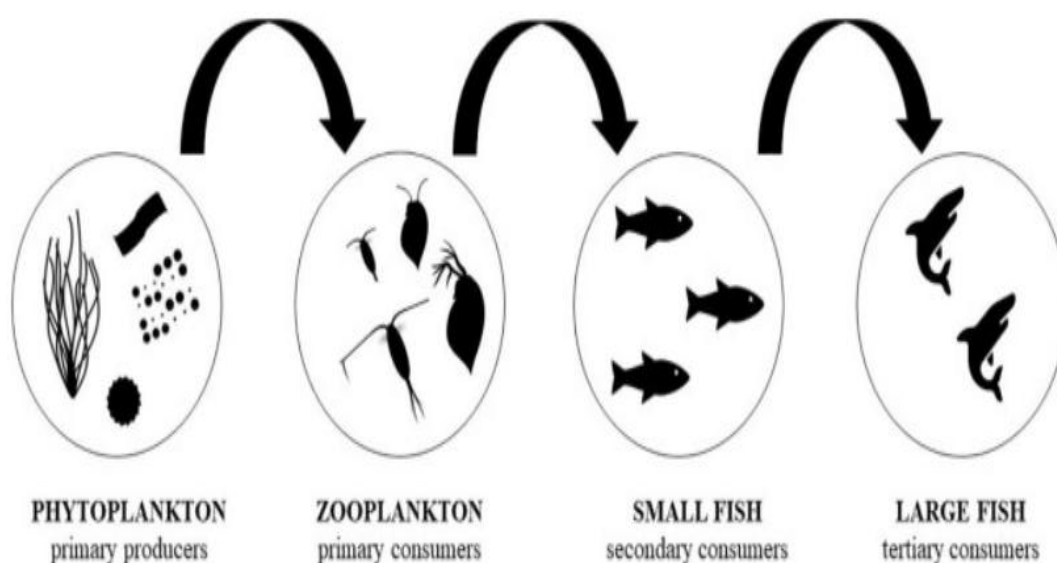


Figure 2: Role of Zooplankton in the Aquatic Food Chain
(Source: sciencedirect.com)

The primary function of zooplankton is to provide fish and other organisms with food. There are two categories of zooplankton: those with a hard shell or coating and those without one. They serve as a biological indicator of the purity of the water. If zooplankton numbers are declining in the water, there may be pollution issues or other ecosystem changes that could have an impact on the human life cycle (Singh and Sharma 2020). As a result of their role in removing carbon dioxide from the atmosphere, they are crucial for the development of marine life. The research must be focused on these as they create the diversity of zooplankton since they produce half of the oxygen that is consumed by people and other creatures. Zooplankton plays a key role in marine ecosystems by grazing on algae growing on rocks, reefs, and seagrass beds. This process of grazers eating algae is crucial because it keeps seagrass beds and coral reefs healthy, both of which are critical for filtering pollutants from the water (Verma and Prakash 2020).

There are several species of mollusks, annelids, and crustaceans among them.

MATERIALS AND METHODS

Amarja Reservoir, also known as Amarjani or Amarjeela is a reservoir located in the Kalaburagi district of Karnataka state in India. It was constructed during British rule and completed in 1879. The dam has a height of 65 m and an area of 5 km². It is built over the Bhima River. The dam creates a lake with a capacity of 2,500-acre feet (3,400,000 m³) and supports irrigation for an area of 1,068 acres (4 km²). According to Rizvi *et al.* (2019), Amarja Reservoir is a lake in the northwestern part of Gubarga. The total area of Amarja Reservoir is about 462 square miles (1,200 square kilometers). The average depth of this reservoir is around 20 feet (6 meters) and its surface elevation above sea level is approximately 903 feet (275 meters) (Sarker *et al.* 2018).

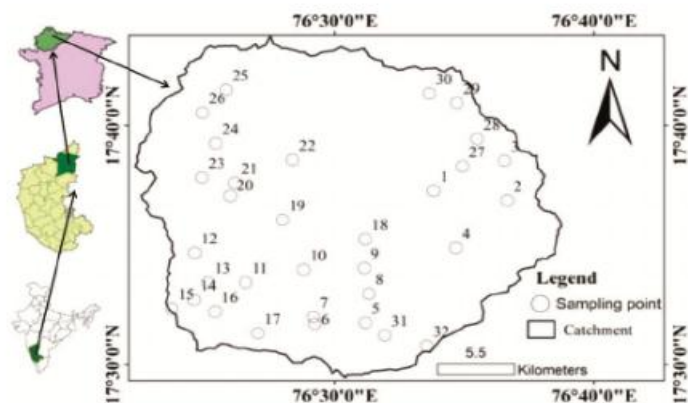


Figure 3: Sampling Location
(Source: researchgate.net, 2019)

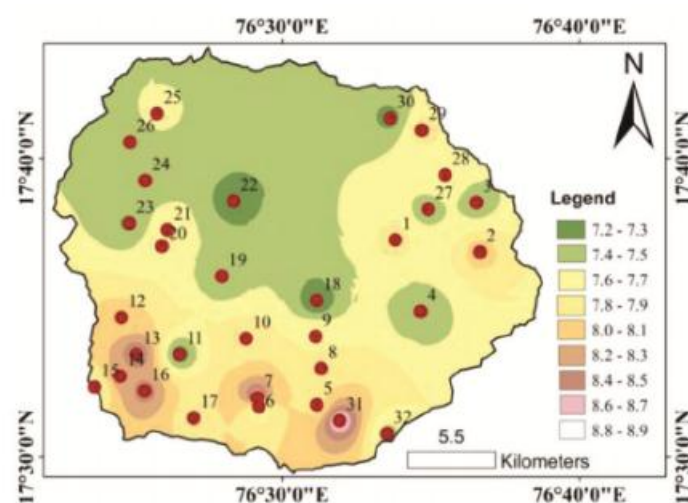


Figure 4: pH concentration in Amarja Reservoir
(Source: researchgate.net, 2019)

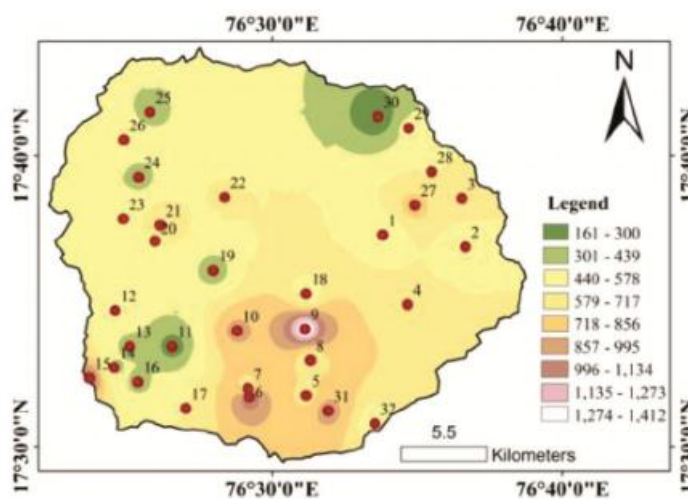


Figure 5: Electrical conductivity in Amarja Reservoir
(Source: researchgate.net, 2019)

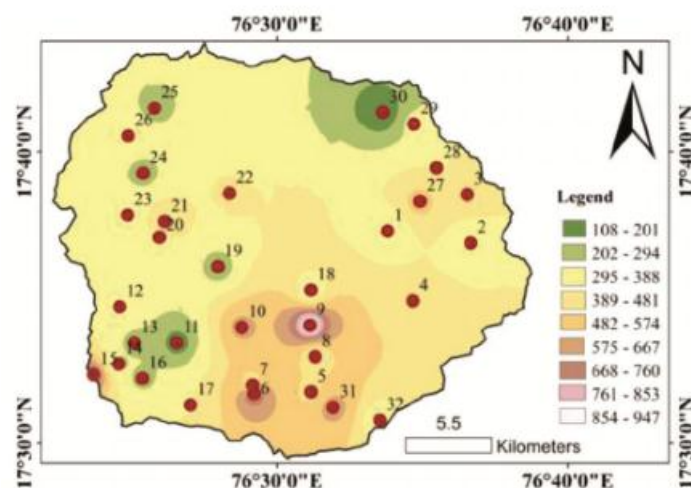


Figure 6: Total dissolved solids in Amarja Reservoir
(Source: researchgate.net, 2019)

The team uses a water bottle to collect the water samples for this project work and they collect the samples monthly basis over the year. Water samples were collected from the reservoir for various water quality parameters like total dissolved solids, pH, electrical conductivity, and chlorides. These parameters are being measured to check the overall health of water bodies (Gutierrez *et al.* 2020). The samples are collected from different river basins and sent to a lab for analysis. Zooplankton is found at depths between 50 and 1,000 meters deep. There are over a million species of zooplankton around the globe. Zooplankton includes many different kinds of organisms such as crustaceans, worms, mollusks, and other small creatures that help to keep marine ecosystems healthy by eating algae growing on rocks or coral reefs.

DISCUSSION

Zooplankton is a group of animals that exist in the water column and feeds on phytoplankton, zooplankton is also known as small planktivorous organisms. As per the view of Xiong *et al.* (2020), they are essential for the ecosystem and they play an important role in the food chain, Zooplankton is divided into two categories namely, pelagic zooplankton (those that live at depth) and benthic zooplanktons (those that live on or near the bottom). Zooplankton respire through gills, which are small organs located on either side of its body just behind its mouth. The gill opens into a chamber called the branchial cavity where it takes in oxygen from water and releases carbon dioxide to help keep its body's pH stable (Antony *et al.* 2020).

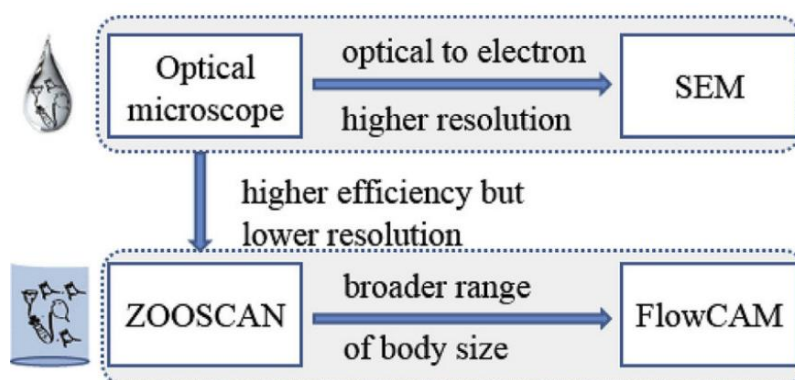


Figure 7: Zooplankton Biodiversity Monitoring.
(Source: researchgate.net, 2020)

This study identifies the total zooplankton including all species and their abundance number per unit volume. Zooplankton is very important to the ecosystem because they are food for many fish and other animals. Total zooplankton can be determined by collecting water samples at different depths and taking water samples from the surface layer. As per the view of Becker *et al.* (2020), the main purpose of zooplankton is to serve as a

food source for fish and other organisms. zooplankton can be divided into two different groups; one has a shell or hard covering and another without it (called cyprinids). They are used as a biological indicator of water quality. When zooplankton populations decline in the water, it indicates pollution problems or other changes in the ecosystem which could affect human health and well-being.

The Zooplankton biodiversity monitoring method is used to identify the number and types of zooplankton species present in an area to determine changes in the ecosystem. Zooplankton is microscopic animals that live in water, such as copepods (small crustaceans), krill (tiny shrimp-like creatures), and other small animals. Their numbers help to measure how healthy an ecosystem is.

Key findings

The key findings of the research reflect that the Amarja Reservoir aquatic ecosystem is highly influenced by the roleplay of the Zooplankton these supply oxygen, reduce carbon footprints, and also serve as a primary food chain for the aquatic creatures. Also, theatre quality is highly maintained through the services and enhancements of the Zooplankton.

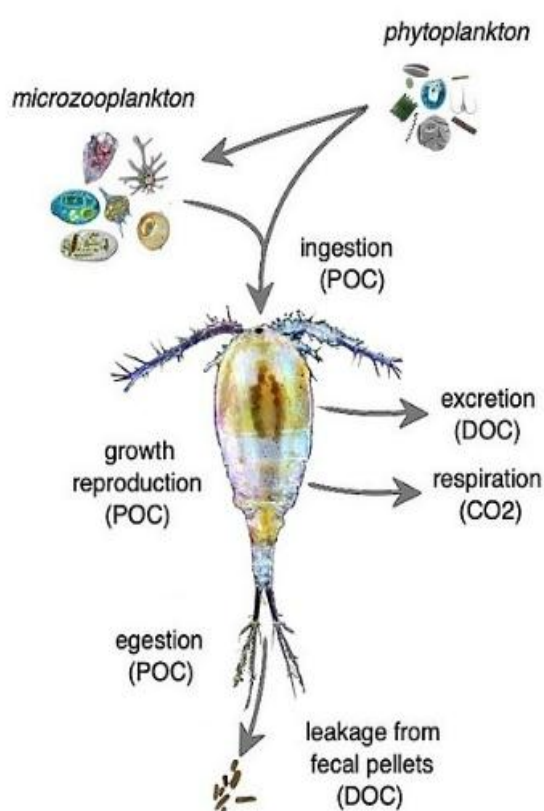


Figure 8: Sloppy feeding of Zooplankton
(Source: wikipedia.org)

Some zooplankton groups are filter feeders: they feed by filtering food particles out of the water with their bodies or feet (Ayub *et al.* 2018). They eat other organisms such as algae and bacteria, which play an essential role in maintaining the aquatic life cycle of the Amarja Reservoir. Zooplankton feeds on microscopic plants and animals in the water. They are usually very active and form a food chain, which is important for keeping the marine environment healthy. The zooplankton includes tiny crustaceans like copepods, amphipods, and krill as well as larvae of fish species such as herring, sardine, mackerel, sprat, and anchovy. These tiny organisms are eaten by larger predators such as cod (*Gadus morhua*), sea bass (*Dicentrarchus labrax*), or salmon (*Salmo salar*).

CONCLUSION

According to the research, zooplankton is an important part of the food chain and is crucial for maintaining aquatic ecosystems. The study revealed that zooplankton is a crucial component in keeping the ecosystem in proper balance, thus the research is primarily directed at identifying and assessing the diversity and significance of the aquatic environment of the Amarja Reservoir.

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