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VARIEGATION OF ZOOPLANKTON 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 toward 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 identified through the research.

KEYWORDS: Aquatic organisms, filter feeders, zooplankton, ecology.

INTRODUCTION
Amarja Dam is located in Aland town near the city of Gulbarga in the Gulbarga district of Karnataka. The Amarja Dam is built across the river Amarja that flows through the Krishna basin in the Southern part of India. The dam was constructed in the year 1998.

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 it is important that we study their diversity. 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.

Aquatic ecosystem is an essential research subject for many researchers and the ecosystem and zooplankton life cycle and natural cycle has been very important for Amarja Reservoir. Zooplankton is split into two categories: pelagic zooplankton (those that live at depth) and benthic zooplanktons. 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 the ecology as a source of food for numerous fish and other creatures. Zooplankton is sometimes referred to as phytoplankton, microzooplankton, or planktic for short (Grossowicz *et al.* 2021). 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. It is crucial that the research has been focused on these as they create diversity of zooplankton since they produce half of the oxygen that is consumed by people and other creatures. Zooplankton play 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.

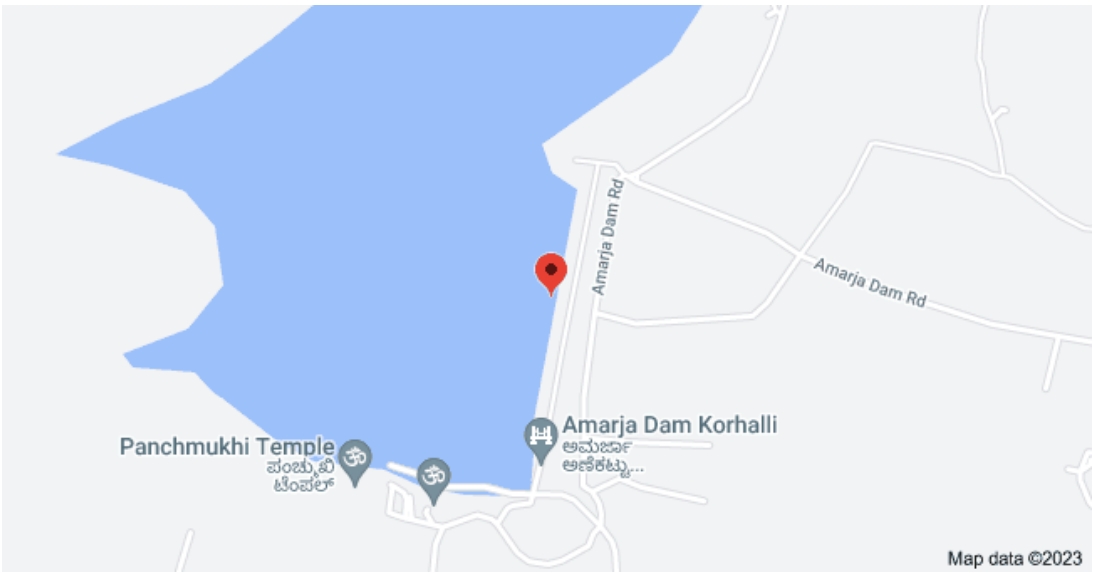
METHODOLOGY

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 (Karuthapandi and Jaiswal 2021). 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 Gujarat. The total area of Amarja Reservoir is about 462 square miles (1,200 square kilometers).

Amarja Dam is located in Aland town near the city of Gulbarga in the Gulbarga district of Karnataka. The Amarja Dam is built across the river Amarja that flows through the Krishna basin in the Southern part of India. The dam was constructed in the year 1998. This is a multi-purpose dam. The reservoir is used for irrigation of the surrounding areas, for providing water supply and for solving the problem of drinking water in the area. The dam is 960 meter long and 31.85 meter high from the foundation. It covers a catchment area of 53.095 Th ha. The design flood of the dam is 2837 cumec. The dam has Ogee type of spillway and 5 spillway gates. The maximum water level of the dam is 461.5 meters.

The Amarja Dam attracts visitors due to its calm and quite surrounding. The serene water of the dam is a beautiful sight that fascinates visitors. Amarja is considered a holy river and hence, people flock to the dam to enjoy the beauty of the holy river.

Built on River Amarja Type Earthen + Gravity Dam, Length- 960 meters, Height 31.85 meters above its deepest foundation Catchment area-53.095 Th ha. Full Reservoir Level (FRL) 461.5 meters Maximum Water Level-461.5 meters Gross storage capacity 44.01 mcm Live storage capacity 40.07 mcm Purpose Irrigation and Drinking / Water supply Design Flood 2837 cumec Length of Spillway 77 meters Number of Spillway gates 5 Size of spillway gates 13m Minimum Draw Down Level (MDDL) 449 meters x 9m Type of Spillway Ogee Type of Spillway gates Radialt Projects-Irrigation Project.



Source; https://www.google.co.in/search?q=amarja+dam&source.

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).

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 locations in the river basin and sent to a lab for analysis.

Sampling and sample processing Zooplankton sampling: type I shallow plankton net (length is 145 cm, net internal diameter is 50 cm, net area 0.2 m2) trawls from

the sea bottom to the sea surface vertically. The samples were put into sample bottles, and then they are fixed and preserved with 5% formalin solution (Dai et al., 2017). After that, they are brought back to the laboratory for identification and analysis. Eleven environmental parameters such as water temperature (WT), salinity (SAL), transparency (T), dissolved oxygen (DO), chemical oxygen demand (CODMn), orthophosphate (PO3- 4) where investigated simultaneously at each monitoring station. All operations were in accordance with the marine monitoring specification (GB17378-2007). Using the Wanshen AlgaeC type zooplankton and algae intelligent identification counter for plankton identification. Sample analysis the transparency of water samples collected from Amarja measured by the method of Secchi disc (Hou et al., 2017). The chemical oxygen demand, chlorophyll a, total nitrogen and total phosphorus were determined in laboratory. The determination method refers to the monitoring and analysis method of water and wastewater (State Environmental Protection Administration, 2002). The plankton samples were identified and counted by microscope. Olympus microscope was adopted.The protozoa and rotifers were counted by 10×20 times microscope. The branch angle and copepoda were counted in full by 10×10 times microscope (Li and Jin, 2017). Genus was identified by qualitative analysis. The amount of zooplankton per litre of water should be calculated.

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 respires 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). 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 Bonecker *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.

Key findings

The key findings of the research reflects that the Amarja Reservoir aquatic ecosystem is highly influenced by the roleplay of the Zooplankton these supplies oxygen, reduces carbon footprints and also serves a primary food chain for the aquatic creatures. Also, theatre quality is highly maintained through the services and enhancements of the Zooplankton. 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 and these play an essential role in maintaining the aquatic life cycle of the Amarja Reservoir.

The composition and distribution characteristics of zooplankton are related to the ecological factors such as water temperature, salinity, dissolved oxygen, chlorophyll a, pH and nutrient content, in which temperature and salinity are the most important factors affecting zooplankton distribution. Different zooplanktons have different tolerance to the change of temperature and salinity, and their species composition and distribution will be different with the change of temperature and salinity. The temperature directly affects the body temperature of organisms, and the body temperature determines the intensity of the metabolism process of zooplankton and affects the growth, development and reproduction of zooplankton.

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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