



Diversity And Abundance Of Molluscan Species In Siddhewadi And Morna Tanks, Western Maharashtra, India

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Abstract: In western Maharashtra, manmade tanks, reservoirs, ancient ponds, and river Krishna and their tributaries are sources of water for drinking and irrigation. The majority of these water resources are polluted due to manmade activities, industrialization, and agricultural runoff. Maintaining these resources are clean, and safe for living organisms and human consumption is essential. In the present paper, efforts are taken to check water quality in Siddhewadi and Morna tanks using macroinvertebrates such as molluscs. Molluscan species were collected by simple hand-picking method, with the help of forceps and containers from all along the marginal area. The kick net having 900 µm mesh size was used for collection. Molluscs are the second largest group of phylum in invertebrates. Due to their broad range, longevity, sensitivity to environmental changes, and capacity to accumulate pollutants, molluscs are important bioindicators. The result reveals a total 10 species of Molluscs belonging to 2 classes 4 families were observed. *Filopaludina bengalensis*, *Idopoma dissimilis*, *Lamellidens marginalis*, *Lymnaea luteola*, *Melanoides tuberculata*, *Terbia lineata*, *Thiara scabra* likewise from August 2022 to July 2023. The *Thiara scabra* was widely distributed in all study sites *Radix rufescens* was rare. The gastropods species are observed more numbers during the study period.

Key Words: Diversity, Mollusca, Morna, Siddhewadi, Western Maharashtra

Introduction:

In Western Maharashtra, belongs 8 districts and nearby 89 talukas. The district sangli satara and Kolhapur are belonging pachim Maharashtra. In pachim Maharashtra River Krishna and tributaries are main source for drinking and irrigation purpose, in addition to that several MI tank, manmade ponds, reservoirs and lakes are built for irrigation and drinking purposes. Tasgoan taluka is west part of pachim Maharashtra, its agricultural land suitable for grape cultivation therefore huge number of grape garden, the grape is major

cash crop in this area. Water is present throughout year in Siddhewadi tank therefore Siddhewadi tank is major source of water for irrigation and drinking purposes. Shirala taluka is eastern part of pachim Maharashtra in this taluka river Morna is tributaries of river Krishna. In 1985 Morna tank was constructed on Morna River for irrigation and drinking purposes. The nearby communities are depending upon this water for drinking purpose. All biological life depends mostly on water for survival and growth. Life on earth would not exist without water. For human to survive, water is vital since human welfare is closely correlated with water quality it is of utmost importance to humanity. Inland fishing industrial uses, residential use and agricultural purposes are all made possible by water. Water quality has become major concern due to human anthropogenic activities.

Water is analyzed by using physical, chemical, and biological parameters. Physical and chemical parameters are expensive, time-consuming, and tedious as compared to biological analyses. In biological analysis, the analysis is carried through Zooplankton, phytoplankton, and benthic macroinvertebrates. In benthic macroinvertebrates, Molluscs are the dominant phyla.

In aquatic ecosystem, some freshwater Molluscs are edible and important food sources for fishes, water birds and human. The taxonomic study of Indian freshwater Mollusca has been done by Zoological Survey of India (Surya Rao et al., 2002). Kumar Prabhakar and Roy (2009) reported 20 species of Gastropod, 10 species of Pelecypoda from Kosi region of North Bihar. Verma and Saksena (2010) studied the sewage pollution impact on water quality and micro zoo benthic fauna from Kalpi River, Gwalior, and Madhya Pradesh. Molluscs are the environment as well as bio-indicator and they play a very important role in maintaining aquatic ecosystem by recycling nutrients and surviving as nutrition for certain aquatic organism (Markad and Pillai (2021).

The Siddhewadi tank and Morna tank are important aquatic environments that support a variety of Mollusca groups. The varied phylum Mollusca, which includes Gastropods, Bivalves, and Cephalopods, is important to ecosystem function and a good indicator of environmental health. Therefore, the present work is undertaken to study the diversity of Molluscs in Siddhewadi and Morna tank.

Material and Method

Study Area: Morna Tank and Siddhewadi Tank, two prominent tanks in the Sangli district have different morphometric features. Morna is earthen tank situated in Shirala village and is located at latitude 16.9897° N and longitude 74.1030° E. With a dead storage capacity of 4.64 cubic millimeters and a living storage capacity of 16.64 cubic millimeters, its catchment area is 85.5 square kilometers. This tank can hold up to 597.5 meters of water, giving it a gross storage capacity of 21160.00 cubic kilometers. The tank was finished in 1985 and has a total length of 1115 meters.

Conversely, Siddhewadi Tank, another earthen tank, is located in the Sangli district's Siddhewadi hamlet and is located at 17.1644° N and 74.7732° longitude. Its catchment area is greater at 166.40 square kilometers, and its dead storage capacity is 87.617 million cubic feet (mcf) whereas its live storage capacity

Fig.2. Map of Siddhewadi tank

Fig.2. Map of Siddhewadi tank

The Molluscans was collected during 9 am to 12 noon each month from Morna and Siddhewadi tanks. The collected specimens were sorted according to size and fixed in 70% alcohol. The convenience of study 4 sampling stations of each tank were finalized according to the anthropogenic activity of agricultural runoff and industrial, village waste mix in water. Molluscans species were collected by simple hand-picking method, with the help of forceps and containers from all along the marginal area. The kick net having 900 µm mesh size was used for collection. All the species were carried out to the laboratory for identification and photography. The identification was done with the help of standard literature, key (**Subba Rao** 1989) Fauna of British India, and The identification was further confirmed with help of the Zoological Survey of India Pune.

Result and Discussion

A total of 302 individuals of Molluscans including 10 species, 2 classes, and 4 families were observed in both Siddhewadi and Morna tanks. The study identified five orders Architaenoglossa, Unionida, Hygrophila, Mesogastropoda, and Coenogastropoda across four families: Viviparidae, Unionidae, Lymnaeidae, and Thiaridae. Among these, the Thiaridae family exhibited the highest number of individuals and the greatest species diversity, making it the most dominant family in the study. The most common species was *Thiara scabra*, with 35 individuals found in Siddhewadi and 30 in Shirala. Following this was *Meiniplotia scabra*, with 30 individuals in Siddhewadi and 25 in Shirala. In contrast, *Radix rufescens* was the least common species, with only one specimen recorded in Siddhewadi and none in Shirala. (Table 1). When comparing the population numbers, Siddhewadi had a larger population of 169 people, while Shirala had 127 people. However, the Thiaridae family was consistently present in both locations, indicating similar patterns in species dominance. For example, species such as *Terbia lineata* and *Melanoides tuberculata* also exhibited relatively high populations, with numbers in Siddhewadi being slightly greater than those in Shirala..

In contrast, species from the Unionidae family, such as *Lamellidens generosus* and *Lamellidens marginalis*, were less prevalent. Notably, *Lamellidens generosus* was completely absent in Shirala, with only two individuals found in Siddhewadi. Additionally, *Radix rufescens* and other species from the Lymnaeidae family also exhibited extremely low populations, particularly in Shirala.

Overall, Siddhewadi displayed greater species diversity and abundance compared to Shirala. This difference may be attributed to the biological or environmental factors that favor higher biodiversity in Siddhewadi. Due to moderate amount of water temperature and availability of micro and macro vegetation and decomposers, rich productivity (Harney 2023). In Morna Tank least abundant Molluscans species due to human interference and pollution levels (Sarwade et al., 2015).

(Table 2,3) distribution of molluscan species across the study stations. An open circle [°] indicates species was not found, a black circle indicates [●] species was rare, an open square [□] indicates common, and a black square [■] indicates that species is uncommon. Among the gastropods *Thiara scabra* and *Meiniplotia scabra* have the highest abundance in both Morna nad Siddhewadi tank. The Molluscans were dominant and diverse benthic fauna both from lentic and lotic regions, which were mainly represented by the two major classes namely Gastropods and Pelecypods (Patil, 2003). Kamble and Rao (2009) studied molluscan diversity from Ujani wetland region. Kamble and Kamble (2010) have reported the biodiversity of aquatic animals including some molluscs from Ruti reservoir near Asthi, district Beed (Maharashtra), and identified two orders and three genera of Mollusca studied the diversity of freshwater molluscs from Chincholi tank near Sangola and reported 12 species of molluscs. (Sarwade et al., 2015) studied molluscan diversity in Khanderajuri and Mhaishal Lake. They have reported 10 species ,7 families belonging to class Gastropoda and Bivalvia. Parikh and Prajapati (2020) studied Pindhariya lake, Depal Lake, Deliyu lake they reported total number of 71 specimen belonging to 6 order,11 families,23 species. (V.E Susilo et al., 2020)

studied the diversity of gastropods in Grati Lake District Pasruan east Jawa. They found 118 individual gastropods consisting of 5 families and six species.

(Joytish sonwal et al.,2021) studied the diversity of fresh water molluscs from upper Brahmaputra basin, Assam, India. They were reported altogether 18 gastropods and 27 bivalve species representing 9 families from 17 sampling stations. (Ani Bikashvili et al.,2021) studied species diversity of freshwater molluscs of jawakheti highland (Republic of Gorgia). They were collect total of 22 species from 42 sampling localities including different fresh water habitat among 22 species 12 species were recorded.

Harney (2023) studied checklist of the diversity of Molluscans fauna from Gilbili lake of Chandrapur district. (Paulo Ricardo Silva Coelho et al.,2024) studied the diversity of freshwater mollusca from lake Pampulha Municipality of Belo Horizonte, Minas Geranis, Brazil. They were reported 1538 species of molluscs and additionally examined the presence of trematode larvae they were identified 12 species of fresh water bivalves and gastropods.

Table No. 1: List of Molluscans Species of Siddhewadi tank and Morna Tank Observed during August 2022 to July 2023.

Order	Family	Species	Siddhewadi Tank	Morna Tank
Architaenoglossa	Viviparidae	Filopaludina bengalensis	25	14
Architaenoglossa	Viviparidae	Idopoma dissimilis	20	9
Unionida	Unionidae	Lamellidens marginalis	15	13
Unionida	Unionidae	Lamellidens generosus	2	0
Hygrophila	Lymnaeidae	Lymnaea luteola	8	6
Hygrophila	Lymnaeidae	Radix rufescens	1	0
Mesogastropoda	Thiaridae	Melanoides tuberculata	22	20
Mesogastropoda	Thiaridae	Terbia lineata	11	10
Unassigned	Thiaridae	Thiara scabra	35	30
Coenogastropoda	Thiaridae	Meiniplotia scabra	30	25

Table No. 2: Macroinvertebrates taxa collected from Four Station of Siddhewadi tank from August 2022 to July 2023.

Sr.No	Species	Siddhewa di 1	Siddhewadi 2	Dahiwadi	Wyphale
1	Filopaludina bengalensis	▪	▪	▪	▪
2	Idopoma dissimilis	•	•	▪	•
3	Lamellidens marginalis	•	•	•	•
4	Lamellidens generosus	•	•	◦	◦
5	Lymnaea luteola	•	•	•	•
6	Radix rufescens	◦	◦	◦	•
7	Melanoides tuberculata	▪	▪	▪	•
8	Terbia lineata	•	•	•	•
9	Thiara scabra	•	◻	•	◻
10	Meiniphotia scabra	▪	▪	▪	•

Table No. : Macroinvertebrates taxa collected from Four Station of Morna tank from August 2022 to July 2023.

Sr.No	Species	Shirala	Padali	Antri	Kadamwadi
1	Filopaludina bengalensis	•	•	•	•
2	Idopoma dissimilis	•	•	•	•
3	Lamellidens marginalis	•	•	•	•
4	Lamellidens generosus	◦	◦	◦	•
5	Lymnaea luteola	•	•	•	•
6	Radix rufescens	◦	◦	◦	•
7	Melanoides tuberculata	•	▪	▪	•
8	Terbia lineata	•	•	•	•
9	Thiara scabra	▪	◻	•	◻
10	Meiniphotia sabra	▪	▪	▪	•

◦: None •:1-5 ▪ : 6-10 ◻ :11-15

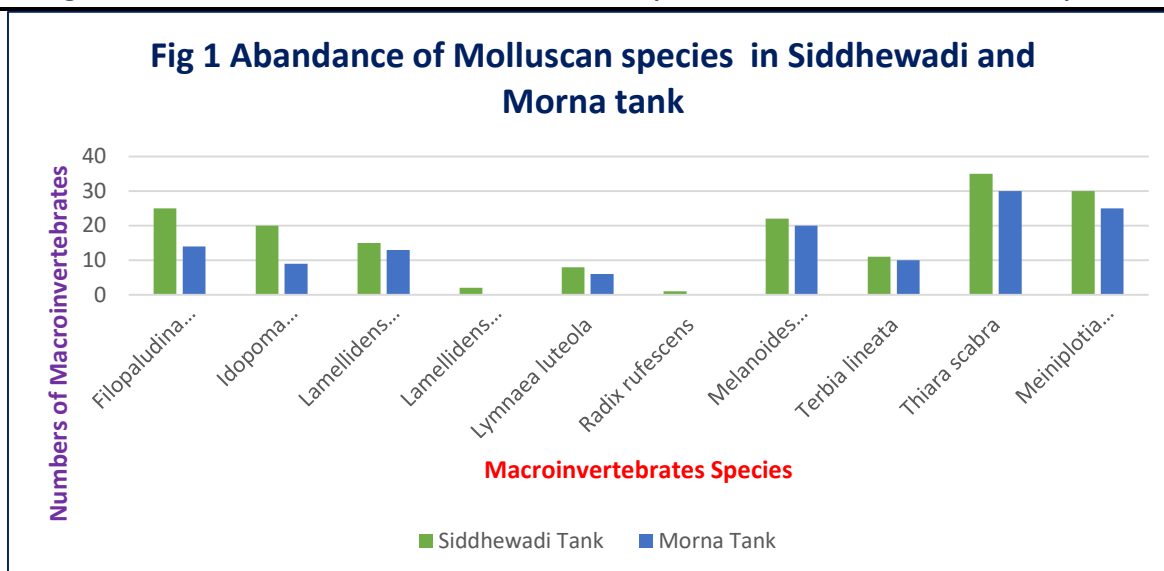


Figure:1 Abundance of molluscan species in Siddhewadi and Morna tank

Conclusion

The study highlights the distribution and biodiversity of aquatic organisms in the Siddhewadi and Shirala tanks. Among the five orders and four families identified, the Thiaridae family dominated both tanks in terms of species richness and population. Overall, the abundance of aquatic organisms was higher in Siddhewadi, with 169 individuals compared to 127 in Shirala. This suggests that Siddhewadi offers more favourable ecological conditions for aquatic life. The greater number and variety of species in Siddhewadi may indicate more stable ecological circumstances or higher habitat quality. As the study emphasizes, it is crucial to implement conservation measures to preserve aquatic biodiversity and maintain ecological balance in these bodies of water. Furthermore, additional research on habitat characteristics and water quality may provide more insights into the factors influencing species abundance and distribution.

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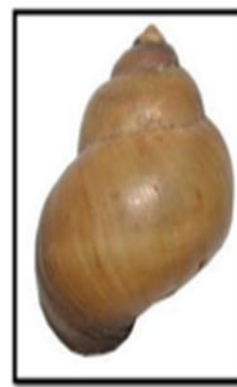
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Photo Plates

*Radix Rufescens**Lamilldens generosus**Maniplotia scabra**Lymnaea luteola**Filopaludina bengalensis**Thiara scabra**Terbia lineata**Melanoides tuberculata**Lamelidense marginilis**Idopoma dissimilis*