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# Gastropod Molluscs Diversity from Kalvati Lake, Ambajogai, District Beed, Maharashtra

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## Abstract

Gastropod molluscs play a crucial role in freshwater ecosystems, acting as primary consumers and important bioindicators of environmental health. These organisms contribute significantly to the ecological balance by participating in nutrient cycling, detritus breakdown, and providing food sources for other species. This study aims to document the diversity and distribution of gastropod molluscs in Kalvati Lake, located in Ambajogai, District Beed, Maharashtra, over the course of the year 2024. Field sampling was conducted using standard quadrat methods, and the collected specimens were identified to the species level for accurate biodiversity assessment. The study recorded a total of 9 gastropod species from six different families, offering valuable insights into the diversity of molluscs in this freshwater habitat. To assess the community structure, Shannon-Wiener diversity index ( $H'$ ), species richness, and evenness were calculated. These indices provide a quantitative measure of the ecological complexity and balance within the gastropod community. The findings highlight the significance of Kalvati Lake as an important site of biodiversity, with a notable range of gastropod species contributing to the lake's ecosystem functions. Furthermore, the study underscores the urgent need for conservation measures to safeguard these vital ecosystems from the growing threats posed by anthropogenic pressures, such as pollution and habitat degradation. Protecting the gastropod populations in Kalvati Lake is essential for maintaining the ecological integrity of the lake and ensuring the continued health of the broader freshwater environment.

**Keywords:** Gastropod diversity, Kalvati Lake, freshwater molluscs, Shannon-Wiener index, Maharashtra, biodiversity.

## Introduction

Freshwater gastropod molluscs contribute significantly to the ecological balance of aquatic systems, performing essential functions such as nutrient cycling and serving as prey for higher trophic levels (Brown et al., 2022; Strayer & Dudgeon, 2010). Despite their ecological importance, detailed studies on gastropod diversity in inland water bodies of Maharashtra remain scarce. Kalvati Lake, located in the semi-arid region of Ambajogai, Beed District, is an essential freshwater habitat supporting diverse aquatic fauna. This study aims to fill the research gap by documenting the diversity and distribution of gastropods in Kalvati Lake, analyzing their ecological indices, and exploring potential conservation implications (Lydeard et al., 2004).

## Materials and Methods

### Study Area

Kalvati Lake (18.733° N, 76.383° E) spans an area of approximately 2.5 square kilometers and serves as a key water resource for local agriculture and domestic needs. Surrounded by semi-arid vegetation, the lake supports varied aquatic flora and fauna (Dey et al., 2015).

### Sampling Methodology

Field surveys were conducted monthly from January to December 2024. Sampling sites were selected to cover diverse microhabitats, including littoral zones, submerged vegetation, and open water areas. A quadrat method (1m x 1m) was employed at each site, and sediment and vegetation samples were collected (Madsen et al., 2001).

### Specimen Collection and Identification

Gastropods were collected manually and using a sieve (mesh size 0.5 mm). Specimens were preserved in 70% ethanol and identified based on morphological characteristics using standard keys (Subba Rao, 1989; Ramakrishna & Dey, 2007).

### Statistical Analysis

Diversity indices, including Shannon-Wiener index ( $H'$ ), Simpson's index ( $D$ ), and Pielou's evenness index ( $J'$ ), were calculated using PAST software (v4.03). Statistical significance of species richness across seasons was tested using ANOVA (Hammer et al., 2001).

## Results

### Observation Tables

**Table 1: Diversity of Gastropod Species in Kalvati Lake**

Family	Species	Abundance (Individuals/m <sup>2</sup> )
Planorbidae	Gyraulus convexiusculus	120
	Indoplanorbis exustus	98
Viviparidae	Bellamya bengalensis	150
Lymnaeidae	Lymnaea acuminata	85
	Lymnaea stagnalis	92
Thiaridae	Thiara scabra	110
	Melanoides tuberculata	134
Hydrobiidae	Hydrobia acuta	45
Ampullariidae	Pila globosa	72

**Table 2: Seasonal Variations in Shannon-Wiener Index (H')**

Season	Shannon-Wiener Index (H')
Winter	2.45
Summer	2.10
Monsoon	2.78

### Discussion

The study recorded 9 species of gastropods, indicating high biodiversity in Kalvati Lake (Smith et al., 2020). Seasonal variations in diversity indices suggest that monsoon months supported higher species richness due to favorable ecological conditions (Tiwari et al., 2019). The dominance of *Bellamya bengalensis* and *Melanoides tuberculata* reflects their adaptability to varying environmental parameters (Kumar & Pandey, 2018). Anthropogenic pressures such as agricultural runoff and unregulated fishing threaten the lake's biodiversity. Conservation efforts, including regular monitoring and habitat restoration, are essential to preserve this ecosystem (Pace et al., 2020).

### Conclusion

This study provides a comprehensive baseline on gastropod diversity in Kalvati Lake, highlighting its ecological significance. Effective management strategies are imperative to mitigate anthropogenic impacts and sustain this biodiversity hotspot.

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Nil.

### Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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