STUDIES ON DIVERSITY OF FRESHWATER PRAWN SPECIES FROM MUDKHED REGION (MS) INDIA

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Abstract
The present study was undertaken to investigate the diversity and relative abundance of freshwater prawns in different water bodies of Mudkhed region which located in the Nanded district of Maharashtra. Freshwater prawns play important role in aquatic ecosystem as indicators of water quality and as a source of livelihood for local communities. Survey were conducted from December, 2024 to June, 2025 across three freshwater habitats: Site A – Seeta River, Site B :Tirkaswadi Lake and Site C : Qasim peer lake in Mudkhed region. Morphological identification revealed the occurrence of three prawn species namely Macrobrachium rosenbergii, Macrobrachium malcomsonii and Palaemon adspersus. In total, two species of prawn belonging to the genus Macrobrachium and one species from genus Palaemon. The study recorded the presence of Macrobrachium rosenbergii was dominant and more common species present in all surveyed three sites. Among these, M. rosenbergii emerged as the most dominant species with a mean relative abundance of 52.04%, followed by M. malcomsonii (30.02%), while P. adspersus was least represented (17.91%). Species composition varied across sites, with Site C showing a higher dominance of M. rosenbergii (71.83%). The observed differences in prawn diversity and abundance indicate that anthropogenic pressures, ecological conditions, and habitat variations strongly influence species distribution in the region. Finding highlight, the necessity for implementing specific management and conservation strategies at site C to mitigate population decline and ensure long term sustainability of the species.
Keywords: *Prawns, Diversity, Macrobrachium malcomsonii, Palaemon adspersus*

Introduction:

Reservoirs are the sleeping giants of Indian fisheries and aquaculture practices. Reservoirs in India have huge, yet underutilized potential for fishes and other non-fish living organism production. Development in reservoir fisheries also brings with it many economic and social advantages, they form an important source for increasing fish and prawn production. Although India has vast freshwater resources, they are not fully exploited except in a limited scale for carp culture. Freshwater prawns are in important component of aquatic ecosystems, contributing both ecologically and economically. They play a vital role as bio indicators of water quality, form a key link in food webs, and provide livelihood support to local fishing communities. Freshwater prawn culture and fish culture technology have become popular for use in large number of artificial tanks and pools. However, most reservoirs are underutilized for this purpose in Maharashtra. India, with its diverse freshwater habitats such as rivers, reservoirs, tanks, dams, ponds and streams, harbours a rich variety of prawn species, many of which remain under-documented at regional levels.

Fresh water prawn is called as 'Zinga' in local Marathi language in Maharashtra. Because of its universal appeal, unique and low fat content, prawns are fast becoming a popular food item among the young and olds, especially in Japan, UK, US and Singapore and several other countries (New and Valenti, 2000). India is the second largest contributor of freshwater prawns to the world market (Balamurgan et al, 2004). Japan and US have the biggest frozen prawn market and these two places alone account for about eighty percent of the total world prawn consumption (Kutty, 2005; Nair et al, 2007) Therefore, a world aquaculture race for prawn culture has been initiated (Upadhyay et al, 2006; Nair et al, 2007).

The basic method of prawn culture is almost similar in every country, the only difference being the variety of prawn each country tends to produce. Prawn farming is profitable side business with net worth of more than Rs. 1.5 lakh/ha/year in India. Macrobrachium *rosenbergii*, M. *malcomsonni*, and Palaemon are commercially important species (Kanaujia, 2003; Nair et al, 2007). The study suggests that enhancing the understanding of species-specific needs could improve aquaculture

outcomes and biodiversity conservation efforts (Taguemount, 2025).

All farmed freshwater prawns today belong to the genus Macrobrachium. Out of many genera freshwater Macrobranchium diversity indicates significant difference in body shape, size, walking legs, exoskeleton etc. Macrobrachium *rosenbergii* production in India was about 80% with production. It is suitable for aquaculture because of high growth rate, omnivorous in feeding, good for polyculture resistant for certain diseases. It is attaining an adult size varies from 30 to 35 cm with 300-450 grams in weight. Freshwater prawn species are compatible with Indian major carps, facilitates best utilisation of water body like river, lakes and ponds. Above mentioned three species require freshwater for their growth. These are freshwater prawn species and found only in freshwater bodies. Species of the freshwater prawn's genus Macrobrachium are distributed throughout the tropical and subtropical zones of world. Freshwater prawn culture has attracted more attention in recent years due to its export potential and increasing demand as luxury protein. Variations in habitat types (ponds, streams) also affected species distribution, with certain species preferring specific environments (Wangda et al., 2023).

Conservation of aquatic biodiversity especially freshwater diversity is one of the important matters of concern as it is exhausting at an accelerated rate due to various factors like human activity, competition from exotic species, loss of habitat, over harvesting, competition for food, water pollution, increase in the number of predatory animals and other abiotic and biotic factors.

Materials and Methods - Study Area

Satellite Map Photo: Site A, Site B and Site C

The study was conducted in various freshwater bodies located in and around Mudkhed region, Nanded district, Maharashtra (India). The present investigation carried out in following three sites, which was selected based on ecological variation and anthropogenic influence.

Site A: Sita River (Mudkhed)

A perennial river system with seasonal flow variation with moderate eutrophication. Plenty of aquatic vegetation found along the margin of river. It functioning as a natural breeding habitat for aquatic fauna.

Site B: Tirkaswadi Lake

A rural lake with comparatively low anthropogenic interference, functioning as a natural breeding habitat fishes and prawn.

Site C: Qasim peer lake

A semi-natural lake used for domestic and fishing activities, with moderate eutrophication.

- **Sampling Period:** Specimen collection was carried out monthly from December 2024 to June 2025, covering both winter and pre-monsoon seasons to capture variations in species occurrence. The present study was conducted for a period of six months.
- **Collection of Specimens:** Freshwater prawns were collected with the help of local fisherman using a combination of cast nets and drag nets having 5mm × 5mm mesh sizes to maximize catch efficiency. Local fishermen were also consulted to identify active prawn habitats. The live specimens were immediately transferred to aerated containers filled with water from the same habitat to minimize stress during transport. The collected samples were brought

to the Department of Zoology, Rajiv Gandhi Mahavidyalaya, Mudkhed.

- **Identification:** The identification of the prawn specimens was done following Paul (1991), Cai and Ng (2002), Sharma and Subba (2005) and Thomas (2011). Morphological identification and classification was carried out using standard taxonomic keys and reference literature. Collected prawn were examined using hand lenses. Diagnostic characters such as rostrum shape, number of rostral teeth, body proportions, and cheliped morphology were carefully studied under a stereomicroscope. Photographs of different body parts and intact prawns were taken in the laboratory.
- **Preservation:** Fragile specimens of prawn were narcotized using clove oil solution of (0.05 %) prior to fixation. Specimens were preserved in 70% ethyl alcohol for morphological studies. While voucher specimens were preserved in 4% formalin for further examination.
- **Diversity Analysis:** Relative abundance of prawn species means the proportion (%) of individuals of a particular prawn species compared to the total number of prawns collected in the study area. R.A. shows how common or dominant one species is in relation to others. R.A. of prawn species were calculated by the following formula.

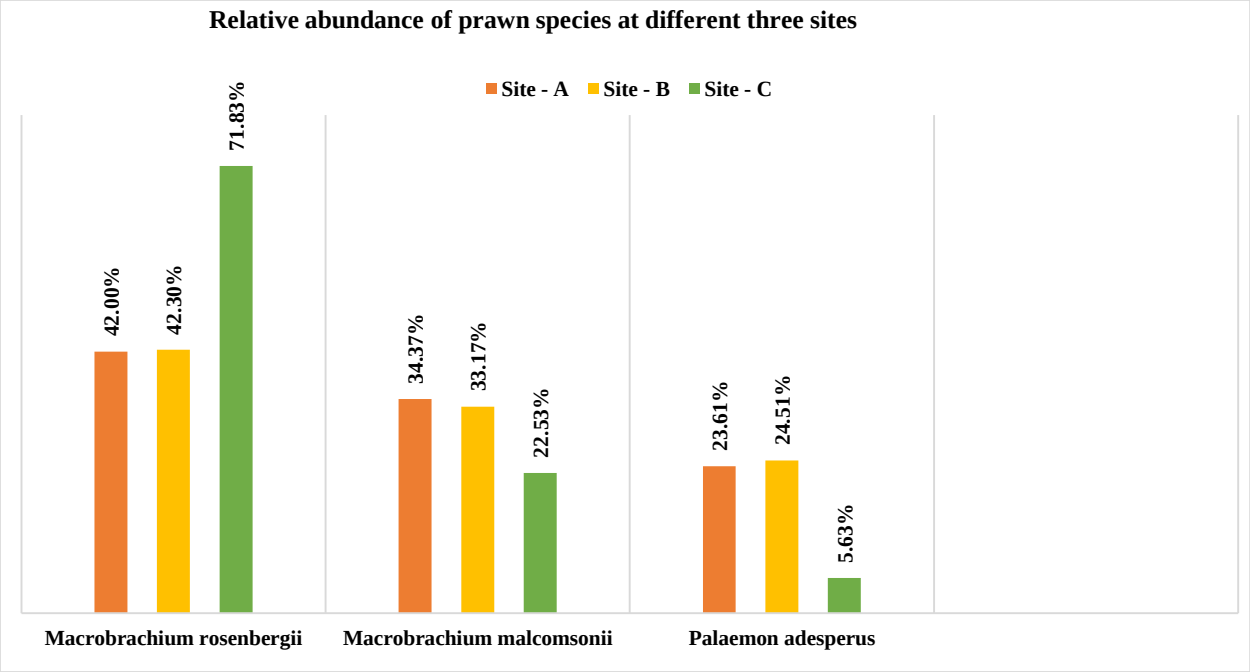
$$\textbf{Relative abundance } (\%) = \frac{\textbf{Number of individuals of a species}}{\textbf{Total number of individuals of all species}} \times \mathbf{100}$$

Result & Discussion:

Morphological identification of the specimen showed the presence of three species of prawn from the three investigation sites of Mudkhed region. All the specimens were identified up to species level.

Relative abundance of prawn species at different three sites:

SN	Prawn Species	Relative Abundance in %			Mean R.A. in %
		Site - A	Site - B	Site - C	
1	Macrobrachium *rosenbergii*	42.00%	42.30%	71.83%	52.04 %
2	Macrobrachium *malcomsonii*	34.37%	33.17%	22.53%	30.02 %
3	Palaemon *adesperus*	23.61%	24.51%	5.63%	17.91 %



Changes in climate are a significant factor contributing to the decline of freshwater prawn diversity. Competition from invasive species negatively impacts native prawn species. Commercial activity and industrial project disrupt habitats and reduce prawn diversity. The Mudkhed region of Nanded district in Maharashtra represents a landscape with a mosaic of water bodies ranging from perennial rivers to seasonal ponds. Despite its ecological potential, limited information is

available on the diversity and distribution of freshwater prawns from this area. Baseline data on species composition is crucial for developing sustainable fishery practices, ensuring biodiversity conservation, and evaluating the ecological health of these water systems.

The present investigation was undertaken to systematically document the prawn diversity and relative abundance of freshwater prawns from three sites in the Mudkhed region. By recording species occurrence and abundance across different habitats, this study provides valuable insights into the role of freshwater prawns in the aquatic environment and their relevance to local communities. A total of three species were identified, namely Macrobrachium *rosenbergii*, Macrobrachium *malcomsonii*, and Palaemon *adesperus*. Among them, M. *rosenbergii* was the most dominant species, contributing a mean relative abundance of 52.04%, followed by M. *malcomsonii* (30.02%), while P. *adspersus* was least represented with 17.91%. The results indicate that prawn diversity and distribution varied across the sites, with site C showing higher dominance of M. *rosenbergii*, whereas Sites A and B showed relatively balanced representation of all three species. In comparison to site A, B and C, site C indicates least presence of species Palaemon *adspersus*. This variation in species composition may be influenced by ecological conditions and anthropogenic pressures acting on these freshwater habitats. The study suggests that proper conservation and management strategies are essential for maintaining prawn diversity in the Mudkhed region. Protecting natural habitats and minimizing human-induced disturbances will help sustain prawn populations and prevent further decline of less abundant species such as P. *adesperus*. This baseline data will be useful for future research, conservation strategies and promotion of prawn culture based rural development.

Conclusion:

The current investigation provides fundamental data on freshwater prawn diversity across three sites in the Mudkhed area. Variation in relative abundance demonstrate that anthropogenic disturbances exert considerable effects on the prawn population. Finding highlight, the necessity for implementing specific management and conservation strategies at site C to mitigate population decline and ensure long term sustainability of the species.

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