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Research Paper

A Brief Note on Molluscan Diversity from Krishna River in Sangli District, Maharashtra, India

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A B S T R A C T

Molluscan are good bio-indicators of water quality or pollution on the basis of their tolerance power against extremes of physico-chemical components of water. Present study revealed, the diversity of molluscans fauna from Krishna River during June 2018 to December 2019. The collected 7 mollusks are belonging to 4 order and 5 families. The Simpson diversity index is 2.7. The dominant species *Tarebia lineate* with (45.73%) followed by *Parreysia* (*Radiatula*) *caerulea and Parreysia* (*parreysia*) *corrugate* (15.20%), *Melanoides tuberculata* (12.40%) *Bellamya bengalensis* (9.30%), *Lymnaea* (Pseudosuccinea) *acuminate* (1.55%), *Corbicula striatella* (0.7%) This study shows that the potential and importance of such habitats to diverse molluscan species and support many more species. It is a preliminary study on the molluscan diversity. Further studies are needed for detailed exploration of the molluscan fauna, its habitat and threats being experienced by these animals.

***Key words*:** Krishna river, Molluscan, Maharashtra, Sangli

The Phylum Mollusca is a second largest phylum in invertebrate. Molluscan are soft bodied animals with or without calcareous shell adapted to almost all habitats with varied ecology. Molluscs are divided into freshwater, marine and terrestrial forms. It includes snails, slugs, clams, oysters, mussels, scallops, cuttlefish, squid and octopus. All the molluscan comprises in three groups, Gastropods, Bivalves and Cephalopods. Gastropoda is extremely diverse group in Mollusca and adapted to all habitats, includes snails and slugs. Bivalves as a group have no head and it characterized by a shell that is divided from front to back into left and right valves. They include clams, oysters, mussels and number of families that live in freshwater [1-3]. Benthic macro invertebrates are common inhabitants of fresh water bodies as they transfer energy through food webs [4]. Among invertebrate diversity a molluscan constitutes the second largest phylum next to arthropods. Many molluscan species are also good bio-indicators for water quality or pollution on the basis of their tolerance power against extremes of physico - chemical components of water [5]. Molluscan are found to be important economically, medicinally and ecologically [6]. Freshwater molluscan forms relationship between other organisms and environment. They play an important role in aquatic ecosystems, providing food for many fish species and vertebrates. They may be used to understand the response, adaptation and recovery of an ecosystem and its inhabitants to both natural and anthropogenic disturbances. Molluscan fauna can be investigated from several perspectives, i.e. zoological diversity, biogeographical distribution, palaeontology, veterinary, agricultural plagues, invasive exotic species, conservation, as an alimentary resource (fishing and malacoculture), as bio-indicators of environmental quality and, last but not least, as a health hazard (as vectors or transmitters of human parasitic diseases). Molluscan are also found economically important as some of them are edible. The soft bodies of molluscan are used as a medium for fishing in the form of bait, hard shells are used for making various items such as buttons, decoration of door curtains, knife handles, ornaments etc. also used in the form of poultry food [7]. Mollscans showed appropriate position among local invertebrate biodiversity [8].

The Krishna River is one of the major perennial rivers, which originates at Mahabaleshwar Hills (17058'N & 73043'E) in the Western Ghats of Maharashtra, at about 1337m above sea level and flows as the Krishna River system across the whole width of the peninsula from west to east for a length of about 1400km through the states of Maharashtra, Karnataka and Andhra Pradesh. It is a boon for all these three states and has made possible remarkable agricultural and industrial development. Moreover, it provides food and shelter to a large number of aquatic fauna. In Maharashtra, the major tributaries of Krishna River are Koyna, Yerla, Urmodi, Warna, Panchaganga, and Dudhganga. The present study is undertaking the diversity and bio-indicator role of Molluscan in river Krishna. The available lecture shows that diversity of

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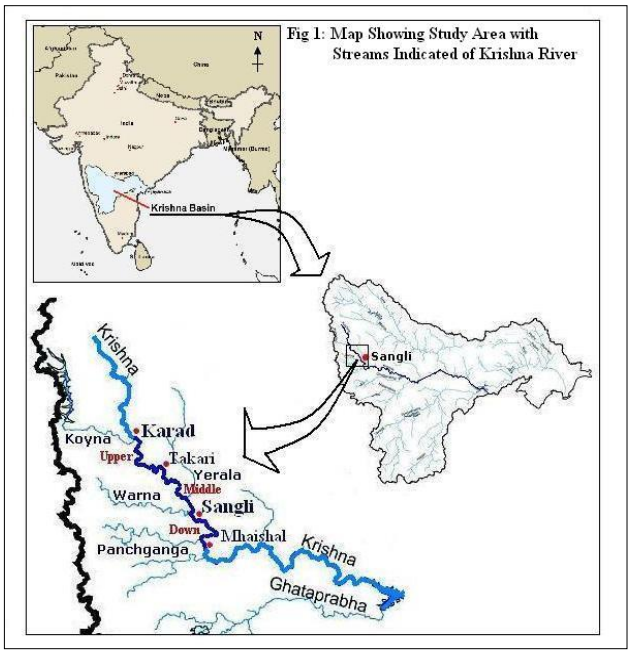
Molluscan but no one study as bio-indicator role of Molluscan therefore present problem is undertaken.

MATERIALS AND METHODS

The Molluscans were collected at Krishna River from Bahe to Sangli approximately distance 85 km in length. The study area divided from three stream for convenience i.e. Upper, Middle, Downstream, and 8 collection sites i.e. Pundi, Bhilwadi, Audumber,Bahe, Borgoan, Bramnal, Digraj, Sangli. With interpoint distance 8 to 9 Km. Upper stream starts Bahe, Borgoan, Pundi followed by middle stream include Audumber, Bhilwadi then followed by downstream Bramnal, Digraj, Sangli.



Sampling of molluscan

Molluscs species were collected by simple hand-picking method, with the help of forceps and containers from all along the marginal area. Samplings were carried out up to depth of 1 to 2 meters from water level. Stratified random quadrate sampling method was applied for quantitative assessment of molluscan fauna at selected sampling stations [9]. However, five replicates at each sampling stations were performed to overcome the problem of random sampling. All the species were carried to laboratory, cleaned neatly and used for identification. Identification of animal was done by using standard keys of Zoological survey of India.

Statistical analysis

Statistical analysis of quantified data was carried out by calculating Simpson Index to interpret species richness, species abundance [10]. All the variables were statistically analyzed and graphically interpreted.

RESULTS AND DISCUSSION

In the present study considerable changes in molluscan diversity was observed in the different sites of Sangli district. The impact of physicochemical parameters on the diversity was observed. Total Seven species of Molluscan belonging to class Gastropoda and Bivalve are recorded during the study period. The collected 7 molluscans are belonging to 4 order and 5 families (Table 1). Variations in abundance of various groups are given in (Table 2). Amongst the Gastropoda group *Tarebia lineate* belonging to family Thiaridae was dominant 59 species followed by *Melanoides tuberculata* 16 species. one species i.e., *Corbicula striatella* belonging to family Corbiculidae, class bivalve was observed. Family Unioniidae found 2 species *Parreysia (Radiatula) caerulea, Parreysia (parreysia) corrugate.* Family Viviparidae 12 species *Bellamya bengalensis,* family Lymnaeidae found 2 species *Lymnaea* (Pseudosuccinea) *acuminate.* Molluscan diversity of Krishna river, selected 8 sites was noted Simpson index as 2.7 respectively.Percent composition of molluscan diversity throughout the study period showed that as dominant species *Tarebia lineate* with (45.73%) followed by *Parreysia (Radiatula) caerulea and Parreysia (parreysia) corrugate* (15.20%), *Melanoides tuberculata* (12.40%) *Bellamya bengalensis* (9.30%), *Lymnaea* (Pseudosuccinea) *acuminate* (1.55%), *Corbicula striatella* (0.7%) among the total molluscan population. The Molluscan populations are good indicators of localized condition, indicating water quality. A bio indicator can be defined as a species or group of species that readily reflects the abiotic or biotic state of an environment represents the impact of environmental change on a habit, community or ecosystem or is indicative of the diversity of subset of taxa. Bioindicator can tell us about the cumulative effects of different pollutants in the ecosystem.

Fresh water macroinvertebrates, the most extensive (temporally and spatially) long-term data have been collected for mosquitoes (Culicidae) and black flies (Simuliidae) as part of pest and disease control programmes. Most of these data remain unpublished, but the published studies have contributed to our understanding of predator/prey interactions, local and regional impacts of weather on population dynamics and spatial variability in population dynamics [11-14]. Most freshwater macroinvertebrates are not economically or medically important and their distribution and abundance have not been commonly measured as part of fisheries or pest management programmes. In addition, because macroinvertebrate communities include many species that can experience rapid and dramatic changes in abundance, relative to longer lived species such as fish, it can be laborious to generate samples that are temporally representative for long-term analyses [15]. As a result, the temporal perspective in our understanding of freshwater macroinvertebrate ecology is often short [16].

Bellamya bengalensis

Corbicula striatella

Lymnaea (Pseudosuccinea) *acuminate*

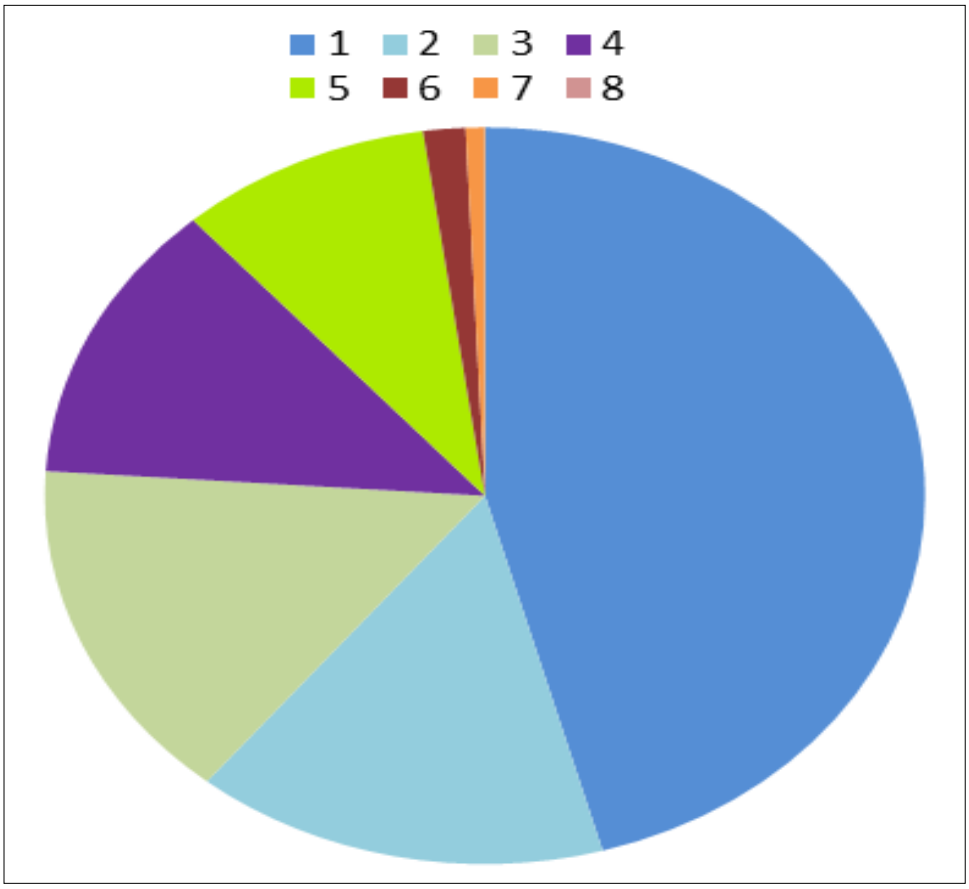
Melanoides tuberculata

Parreysia (Radiatula) caerulea

Parreysia (parreysia) corrugate (Mueller)

Tarebia lineate

The impounded estuary had the highest species richness probably due to hard waters. This factor most likely contributes to its high species richness because hard waters are ideal for the development of freshwater molluscs [17]. Aquatic macro invertebrates are an integral part of the food chain in lotic environments and they are sensitivity to changes in the environment through degrees of sensitivity differ among various groups. Aquatic macroinvertebrates are used to assess aquatic ecosystem condition, because of their great diversity of form and habits [18]. The molluscan population is good indicator of localized condition, indicating water quality. They are important roles in the ecosystem structure and biodiversity [19]. A correlation between molluscan diversity with physicochemical parameter with effect of water from Ramsagar reservoir [20]. Gastropods usually play a dominant role in the ecology of fresh-waters by providing food for many animals and by grazing on vast amounts of algae and detritus [21].



1. *Parreysia (Radiatula) caerulea*, 2. *Parreysia (parreysia) corrugate* (15.20%), 3. *Tarebia lineate* (45.73%), 4. *Melanoides tuberculata* (12.40%), 5. *Bellamya bengalensis* (9.30%), 6. *Lymnaea* (Pseudosuccinea) *acuminate* (1.55%), 7. *Corbicula striatella* (0.7%)

Fig 2 Total percentage (%) and population density of molluscan species from Krishna river Sangli District during June 2018 to Dec 2019

Table 1 List of Mollusca species collected from the Krishna River, Sangli District during June 2018 to Dec. 2019.

Order	Family	Species	No. of Specimens
Trigoinoida	Unioniidae	*Parreysia (Radiatula) caerulea* (Lea)	20
Trigoinoida	Unioniidae	*Parreysia (parreysia) corrugate*(Mueller)	20
Mesogastropoda	Thiaridae	*Tarebia lineate*(Gray)	59
Mesogastropoda	Thiaridae	*Melanoides tuberculata* (Mueller)	16
Mesogastropoda	Viviparidae	*Bellamya bengalensis* (Lamarck)	12
Basommastophora	Lymnaeidae	*Lymnaea* (Pseudosuccinea) *acuminate* Lamarck	2
Veneroida	Corbiculidae	*Corbicula striatella* Deshayes	1

Table 2 Macroinvertebrate taxa collected at Eight sampling stations in the Krishna River in during June 2018 to Dec. 2019

Species	Bahe	Borgoan	Pundi	Audumber	Bhilwadi	Bramnal	Digraj	Sangli
Parreysia (Radiatula) caerulea (Lea)	+	+	-	+	-	-	-	-
Parreysia (parreysia) corrugate (Mueller)	-	+	-	+	-	-	-	+
Tarebia lineate (Gray)	+	+	+	+	+	+	+	+
Melanoides tuberculata (Mueller)	+	+	-	+	-	-	-	+
Bellamya bengalensis (Lamarck)	-	-	-	+	+	-	-	-
Lymnaea (Pseudosuccinea) *acuminate* Lamarck	-	-	-	-	-	+	+	-
Corbicula striatella Deshayes	-	-	-	-	-	-	-	+

+ Present; – absent

CONCLUSION

The Molluscan taxa are richness and abundance varied among sampling sites. *Tarebia lineate* species usually abundant in river found all collection sites. Molluscan good Bioindicators will be used for the detection of pollution into the Krishna river and its surroundings.

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