

# Diversity of Mollusca and Fish in Gondoor and Nakane Lakes in Dhulia, Northwest Maharashtra, India

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Article Info	Abstract
<b>Article History</b> <i>Received</i> : 18-04-2011 <i>Revised</i> : 21-05-2011 <i>Accepted</i> : 21-05-2011	<p>Molluscan and fish diversity of the lake Gondoor and Nakane in northwest Maharashtra have been studied during June 2008 to May 2010. A total of 17 species of molluscs and 18 fish species were recorded from both lakes. The dominant class Gastropoda of Mollusca was dominated by 14 species including <i>Pila globosa</i>, <i>Thiara scabra</i>, <i>Melanoides tuberculata</i>, <i>Bellamyia bengalensis</i>, <i>Lymnaea accuminata</i>, <i>Lymnaea lutiola</i>, <i>Indoplanarbis exustus</i>, <i>Zoeteucus insularis</i>, <i>Tarebia lineate</i> <i>Cerastua maussonianus</i> <i>Filicaulis alte</i>, <i>Laevicaulis alte</i>, <i>Senperula maculata</i> and <i>Rachis punctatus</i>. Pelecypoda is another class of mollusc represented by 3 species including <i>Perryisia caerulea</i>, <i>Lemellidens corianus</i> and <i>Corbicula striatella</i>. Ichthyofauna of Gondoor and Nakane lakes were dominated by major carps with 10 members belonging to cypriniformes including <i>Labeo rohita</i>, <i>Catla catla</i>, <i>Cyprinus carpeo</i>, <i>Cirrhinus marigala</i>, <i>Labeo calbasu</i>, <i>Labeo bata</i>, <i>Labeo fimbriatus</i>, <i>Puntius sarana</i> followed by 6 members of family siluriformes including <i>Clarius batrachus</i>, <i>Mystus bleekeri</i>, <i>Mystus vittatus</i>, <i>Ompak bimaculatus</i>, <i>Wallago attu</i>, <i>Heteropnoustes fossilis</i>, <i>Amblypharyngodon mola</i>, <i>Puntius sophore</i> and one genera with two species of family channiformes represented by <i>Channa punctatus</i> and <i>Channa striatus</i>. Both lakes are precious aquatic ecosystem playing significant role in supplying drinking water to Dhule as well as sustain a rich molluscan and fish fauna.</p>
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**Key Words:** Mollusca, Fish, Gondoor, Nakane lake

## Introduction

Molluscs constitute the second largest invertebrate and most successful group next only to insects [1 and 6]. It has been here for over 500 millions years. With reference to molluscan diversity all over the world, maximum number of species occur in the marine ecosystem (31,463) followed by terrestrial ecosystem (24,503) and freshwater ecosystem (8,765). Out of 8,765 freshwater species estimated available in the world, 284 species (56 genera) are reported from India and adjacent countries. Among 284 species, 171 species of molluscs are gastropods [21]. In spite of great diversity, the freshwater molluscs did not receive much attention till recently.

Freshwater molluscs and fish are interesting from the standpoint of zoogeography. Mollusca occur in various habitats and are divided into freshwater, marine and terrestrial forms. The fresh water molluscs play a significant role in aquatic ecosystems and some of them are edible. Species like *Bellamyia bengalensis*, *Pila globosa* and *Lamellidens marginalis* are proven food for many aquatic animals and man; some such as *Lamellidens marginalis* and *Lamellidens corrianus* have also been used to produce pearls in some parts of India [24]. Some information is available for the land snails of Pune and neighboring areas [18, 25, 27 and 28] studied freshwater bivalves found in Pusad of Yawatmal District in Maharashtra. Patil and Talmale [19] studied land and freshwater mollusca of Maharashtra state and listed altogether 142 species of molluscs with all forms and varieties belonging

to 48 genera, under 23 families. Kulkarni and Nagabhushanam [13] have studied endocrine control of reproduction in the slug from Marathwada region. Bhagde and Mane [5] studied biodiversity of the edible bivalve shellfishes inhabiting Ratnagiri coast of Maharashtra state. They found that topography, physiography, pollution, over fishing and other man activities in and around the wetlands severely affected the distribution of bivalves. Pawar et al. [20] recorded fish diversity in Sirur dam near Mukhed in Nanded district of Maharashtra. Much of the work in relation to study of ichthyofauna diversity of Tapi river in northwest Maharashtra was carried out by Karamchandani and Pisolkar [14], Pisolkar [17] and Lohar and Borse [15]. There is paucity of research in relation to diversity of molluscan and fish species in lakes of northwest Maharashtra. Extensive survey of lakes in this region will undoubtedly reveal the existence of many more molluscan and fish species. Pertaining to available literature, it is worth to acquire the knowledge about the present status of molluscan and fish species in Gondoor and Nakane lakes, which were unexploited for assessing their biodiversity.

## Materials and Methods

Gondoor lake (20° 52' 59.37"N and 74° 44' 32.82"E) and Nakane lake (20° 52' 56.27"N and 74° 43' 31.82"E) are located in vicinity of Dhulia city in northwest Maharashtra. Both lakes are basically utilised for supply of drinking water to Dhulia city

and fisheries. The collections of molluscan specimens were carried out seasonally during June 2008 to May 2010 from the profundal zone by using Ekman dredge and from littoral zone by using scoop net. Molluscan samples were also collected from the grass land and rocky shore in the vicinity of both lakes. Similarly, fish were also collected seasonally during June 2008 to May 2010 from water of Gondoor and Nakane lakes using casting nets. Molluscan specimen and fish were collected and preserved in 3% formalin and brought to the laboratory. The intact animals were washed thoroughly in running tap water and slightly decalcified in aqueous acidic medium to find out growth rings on the molluscan shell. The observation in relation to their color pattern, coiling of shell, size and number of tentacles, eyes, shape of foot, and aperture of the molluscan shell carefully noted. Labels indicating serial number, exact locality, date and time of collection were tagged to each specimen. On the basis of standard identification keys for molluscan specimen [2, 4 and 25] and for fish [11, 12 and 26] information collected from local fishermen and extended cooperation from Western Region Office of Zoological Survey of India, Pune, and every molluscan specimen was characterized, identified with its

class, subclass, family, genus and species. The collected specimens were submitted in the museum of the Department of Zoology, MGSM's ASC College, Chopda Dist. Jalgaon (M.S.).

**Results and Discussion**

The marked seasonal variations in number of molluscan species were observed in Gondoor and Nakane lakes during June 2008- May 2010. It was come to notice that molluscan specimens were represented in both lakes by only two classes as Gastropoda and the Pelecypoda. The dominating class Gastropoda of mollusca included snails which was represented by 14 species including *Pila globosa*, *Thiara scabra*, *Melanoides tuberculata*, *Bellamya bengalensis*, *Lymnaea accuminata*, *Lymnaea lutiola*, *Indoplanarbis exustus*, *Zootecus insularis*, *Tarebia lineate* *Cerastua maussonianus*, *Fillicaulis alte*, *Laevicaulis alte*, *Senperula maculata* and *Rachis punctatus*, followed by the Pelecypoda, another class of mollusca that includes bivalves or clams, which was represented by 3 species including *Perrysia caerulea*, *Lemellidens corianus* and *Corbicula striatella*. The systematic classification of mollusca found in both lakes are given table 1.

Table 1. Systematic classification of molluscan species observed in Gondoor and Nakane lakes during June 2008-May 2010

Class	Order	Family	Genus and species		
Gastropoda	Pectinibranchiata	Pilidae	<i>Pila globosa</i> (Swainson)		
		Mesogastropoda	<i>Thiara scabra</i> (Muller)		
	Stylommatophora	Viviparidae		<i>Melanoides tuberculata</i> (Muller)	
				<i>Tarebia lineate</i> (Benson)	
				<i>Bellamya bengalensis</i> (Lamark)	
		Cerastuidae		<i>Cerastua maussonianus</i> (Petit) *	
			Veronicellidae		<i>Laevicaulis alte</i> (Ferrussac) *
					<i>Senperula maculate</i> (Templeton) *
			Subulinidae		<i>Zootecus insularis</i> (Pfieffer)
	Enidae			<i>Rachis punctatus</i> (Anton) *	
		Lymnaeidae			<i>Lymnaea accuminata</i> (Gray)
	Basommatophora			<i>Lymnaea lutiola</i> (Gray)	
			Planorbidae	<i>Indoplanarbis exustus</i> (Deshayes)	
	Pelecypoda	Soleolifera	Veronicellidae	<i>Fillicaulis alte</i> (Ferrussaca) *	
Schizodonta		Amblemidae	<i>Perrysia caerulea</i> (Lea)		
Eulamellibranchiata		Unionidae	<i>Lemellidens corianus</i> (Lea)		
Veneroidea		Corbiculidae	<i>Corbicula striatella</i> (Deshayes)		

\* Not directly found in water but on grass, moist soil and under rocks near lakes.

During the period of study, the density of Gastropoda in Gondoor lake ranged between 95 organisms/m<sup>2</sup> (in winter) to 203 organisms/m<sup>2</sup> (in summer), whereas in Nakane lake Gastropoda density fluctuated between 107 organisms/m<sup>2</sup> (in winter) to 253 organism/m<sup>2</sup> (in summer). Minimum density of Gastropoda was recorded in monsoon season (58 and 64 organisms/m<sup>2</sup> in Gondoor and Nakane lakes respectively). Class Pelecypoda had its minimum population (13 organism/m<sup>2</sup> in Gondoor and 17 organism/m<sup>2</sup> in Nakane lake) in winter and maximum population (58 organism/m<sup>2</sup> in Gondoor and 62 organism/m<sup>2</sup> in Nakane lake) in summer (Table 2). Few species of molluscs were found dead on the shore in large numbers during summer [29].

Mollusca perform key role in functioning the aquatic ecosystems. The availability of maximum molluscs during summer months could be related to two important ecological phenomenon. (a) The maximum abundance of decomposers settled organic matter and macrophytes on the bottom of water body and, (b) increased water temperature, activating the process of decomposition of these organic sediments. The results also indicated that lake Nakane had higher potential to harbor diverse population of mollusca than that of Gondoor lake and that could be related to greater size, depth, availability of the nutrients and higher alkalinity of Nakane lake [3 and 9]. Sakhre and Joshi [22] also supported this point of view by observing the greater molluscan population in alkaline lakes as compared to acidic-lakes.

Table 2. Seasonal fluctuations of molluscan fauna (organisms/m<sup>2</sup>) recorded in Gondoor and Nakane lakes during 2008-09 and 2009-10

Class	Genus species	Gondoor lake			Nakane lake		
		M	W	S	M	W	S
Gastropoda (14 species of snails )	<i>Pila globosa</i>	7	10	21	8	12	24
	<i>Thiara scabra</i>	8	11	23	6	14	20
	<i>Melanoides tuberculata</i>	7	7	18	8	10	22
	<i>Bellamyia bengalensis</i>	5	6	17	7	9	26
	<i>Cerastua maussonianus</i>	0	3	9	3	4	8
	<i>Lymnaea accuminata</i>	7	12	19	8	9	35
	<i>Lymnaea lutiola</i>	6	10	18	7	11	27
	<i>Filicaulis alte</i>	2	3	6	0	4	7
	<i>Tarebia lineate</i>	5	11	20	6	12	26
	<i>Laevicaulis alte</i>	0	4	10	0	3	11
	<i>Senperula maculata</i>	2	3	6	2	3	8
	<i>Zootecus insularis</i>	5	6	15	6	7	18
	<i>Rachis punctatus</i>	0	2	6	0	4	7
	<i>Indoplanarbis exustus</i>	4	7	15	3	5	14
Pelecypoda (3 species of bivalve or clams)	<i>Perrysia caerulea</i>	3	9	14	4	10	21
	<i>Lemellidens corianus</i>	6	14	27	7	12	25
	<i>Corbicula striatella</i>	4	8	17	6	9	16

Figures are an average number of observed specimens during three seasons of two successive years.

In relation to diversity of ichthyofauna, the fish catches in Gondoor and Nakane lakes during 2008-09 and 2009-10 were dominated by major carps and catfish belonging to the subclass: teleostei, family: cyprinidae, siluridae, claridae, ophiocephalidae, mestacembelidae, and notopteridae. There were 18 fish species inhabiting both lakes during study period of two years. Of which, order cypriniformis included *Labeo rohita*, *Calla calla*, *Cyprinus carpeo*, *Cirrhinus marigala* as major carps and *Labeo calbasu*, *Labeo bata*, *Labeo fimbriatus* and *Puntius sarana* as minor

carps and *Amblypharyngodon mola* and *Puntius sophore* as trash fish. An order siluriformes *Clarius batrachus*, *Mystus bleekeri*, *Mystus vittatus*, *Ompak bimaculatus*, *Wallago attu* and *Heteropnoustes fossilis* as cat fishes. An order Channiformis included *Channa punctatus* and *C. striatus* as murels. The major carps and catfishes were abundantly present during study period in both the lakes while *Labeo bata*, *Labeo fimbriatus* and *Amblypharyngodon mola* were rarely shown their presence in Gondoor lake during June 2008 to May 2010 (Table 3).

Table 3. Ichthyofauna of Gondoor and Nakane lake recorded during 2008-09 and 2009-10 with status of individual fish species.

Common Name/ Variety	Order	Scientific Name	Status of fish species	
			Nakane lake	Gondoor Lake
Major carps (4 species)	Cypriniformis	<i>Labeo rohita</i> (Ham.)	+++	+++
		<i>Calla calla</i> (Ham.)	+++	+++
		<i>Cyprinus carpeo</i> (Linn.)	+++	+++
		<i>Cirrhinus marigala</i> (Ham.)	++	+
Minor carps (4 species)	Cypriniformis	<i>Labeo calbasu</i> (Ham.)	++	+
		<i>Labeo bata</i> (Ham.)	+	-
		<i>Labeo fimbriatus</i> (Bloch.)	+	-
		<i>Puntius sarana</i> (Ham.)	+	+
Cat Fishes (6 species)	Siluriformis	<i>Clarius batrachus</i> (Linn.)	++	++
		<i>Mystus bleekeri</i> (Day.)	++	++
		<i>Mystus vittatus</i> (Ham.)	+	+
		<i>Ompak bimaculatus</i> (Bloch.)	+	++
		<i>Wallago attu</i> (Schn.)	++	++
		<i>Heteropnoustes fossilis</i> (Jayram)	++	++
Murels (2 species)	Channiformis	<i>Channa punctatus</i> (Bloch.)	++	++
		<i>Channa striatus</i> (Bloch.)	+	+
Trash Fishes (2 species)	Cypriniformis	<i>Amblypharyngodon mola</i> (Ham.)	+	-
		<i>Puntius sophore</i> (Ham.)	++	++

+++ Most abundant, ++ Abundant, + Less abundant, - Rare.

The composition, abundance and distribution of benthic organisms over a period of time provide an index of the ecosystem. In recent years, there is a greater emphasis world

over for better understanding of benthic environment, its communities and productivity and this has led to increased exploitation of many inland water bodies. Clarke [7] and

Choubisa [8] attempted to show the utility of molluscs in primary classification of the lakes in their various trophic status stages. Harman [10] and Pisolkar [17] pointed out that molluscs and fish are bio-indicators of freshwater pollution. Since molluscs and fish have food value because of their protein content playing indispensable role in human diet and hence they are subjected to anthropogenic activities in Gondoor and Nakane lakes. As a result, the existing genetic variability among the molluscan and fish species is feared to be under threat. Fresh water molluscs and fish deserve special attention for conservation, inventorying and monitoring apart from known or unknown groups of organisms present in wetlands of this region [16 and 23]. There is still need for detailed study of malacology and ichthyology of wetlands, their phylogenetic and ecological relationship and the conservative strategies to stabilize the fauna in the freshwater ecosystems of northwest Maharashtra.

#### Conclusion

Nakane and Gondoor lakes near Dhulia city were assessed for the diversity of molluscan and fish species during June 2008 - May 2010. It was noticed that 14 gastropod and 3 pelecypod species as molluscan and 18 fish species inhabited in both lakes during study period. Both lakes were vulnerable to anthropogenic activities because of food, finance, cosmetics and medicinal importance of mollusca and fish. The conservation and management of molluscan and fish fauna on the line of national heritage of aquatic ecosystem should be done along with the food chain relationship with the economically important wild life resources.

#### Acknowledgment

The authors are grateful to Adv. Sandeep S. Patil, The President Mahatma Gandhi Sikshan Mandal Chopda, Jalgaon district and Hon'ble Dagisaheb Rohidas Patil, Babasaheb Kunal Patil, Chairman, Bhaiya Saheb Utkarsha Patil, Secretary, Dr. S.N. Nandan Principal, S.S.V.P's Late Karmaveer Dr. P.R.Ghogarey Science College, Dhule (M.S), India for their continuous encouragement and to Principal, A.S.C. College, for providing necessary laboratory facilities to carry out the project.

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