



Research Paper

**MOLLUSCAN DIVERSITY WITH PARTICULAR EMPHASIS TO SNAILS IN
DISTRICT GAUTAM BUDH NAGAR (U.P.)**

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Abstract

Present investigation reveals molluscan diversity of the 4 selected sites viz., Tilpata Karanbas, Manhcha, Latifpur and Atta Gujran in the vicinity of district Gautam Budh Nagar (U.P.) between March 2012 – February 2014. As many as 22 species of molluscs under 9 families were collected. There were 19 species of snails viz., *Bellamya bengalensis* (Lamarck, 1882); *B. dissimilis* Mueller, 1774; *B. crassa* (Benson, 1836); *Lymnaea* (*Pseudosuccinea*) *acuminata* f. *hians* Sowerby 1837; *L. luteola* f. *ovalis* Gray 1822; *L. acuminata* f. *patula* Troschel 1837; *L. (Radix) auricularia*, Linnaeus, 1758; *L. (Lymnaea) stagnalis* (Linnaeus, 1758); *L. acuminata* f. *gracilior* Martins 1881; *Pila globosa* Swainson 1822; *Indoplanorbis exustus* (Deshayes, 1834); *Gyraulus convexiculus* (Hutton, 1849); *G. pankongensis* (von Martens 1882); *Planorbis planorbis* var. *tangitarenensis* Germain 1918; *Hydrobioides nassa* Theobald 1865; *Thiara* (*Melanoides*) *tuberculata* (Mueller, 1774); *Thiara* (*Thiara*) *scabra* (Mueller, 1774); *T. (M.) trigrina* Ray 1947 and *Brotia* (*Antimelania*) *costula* Rafinesque 1833 under 6 families. The other molluscs were *Parreysia* (*Parreysia*) *favidens* (Benson, 1862), *Corbicula striatella* Deshayes, 1854 and *Lamellidens marginalis* (Lamarck, 1819). There has been a marked variation in the composition of molluscan species collected from different habitats.

Key words: Molluscan diversity, snails, Gautam Budh Nagar, U.P.

INTRODUCTION

Over 90,000 species of gastropods have been recorded worldwide, both in the water and on land. Although molluscs are common components of the benthic communities, their role in the dynamics of the aquatic ecosystem and their contribution to biomass production is not well known. Freshwater gastropods are either herbivores or detritivores, or they may passively consume small invertebrates associated with periphyton [1].

Many species spend their entire lives in a few square meters of habitat, making them extremely vulnerable to localized environmental habitat degradation. Although most species prefer clean, stable and river bottoms, some prefer the soft substrates, more common to ponds and lakes. Besides this, a few wide-ranging snail species can easily survive in polluted habitats.

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Our knowledge on Indian freshwater molluscs is based on the contributions made by several earlier workers [2] in the monograph "Freshwater molluscs of India" mentioned in brief about the general aspects like habitat distribution, Zoogeographical significance, importance of malacological studies, their role in medical veterinary, public health, aqua culture, *etc.* Some considerable work on faunal diversity of snails of Uttaranchal (now Uttarakhand) region has been worked out in the past [3,4,5,6,7,8]. It is evident from the available literature that almost no work has been carried out on faunal diversity of snails from Gautam Budh Nagar, henceforth, the present effort is on molluscan diversity of the area so as to add additional information in the existing knowledge.

METHODOLOGY:

(A) Collection of the snails:

The snails were collected twice a month from March 2012 to February 2014 using the articles such as hand or water scoop net, polythene bags, specimen's bottles, gloves and forceps. A standardized data-sheet was prepared pertaining to the snails. In each collection two persons were involved and one-hour time was spent in the collection of snails. The samples so collected were brought to the laboratory in the polythene bags and separated species wise. The snails were fixed in the Bouin's fluid for further studies.

(B) Identification of the snail's species:

The snails were narcotized by providing a few drops of 70 % alcohol. Sometimes the chemical like $MnSO_4$, Chloral hydrate, *etc.* were also used as narcotizing agents. The body of these animals was removed from the shell with the help of forceps and then the empty shells were boiled in water so as to remove any soft part if sticks inside the shell. Thereafter, the shell was dried in the air under sunlight and kept in small specimen's tube depending upon the size of the snail's sample. Relevant information such as the size, and date and time of collection was also provided with each sample. The genera of the snails were identified in the laboratory with the help of the Keys for identification of snails as given in Fauna of British India [9] Freshwater molluscs of India [10] and Handbook on Indian Freshwater Molluscs [11]. In case any confusion exists in the identification of the collected snails, the samples were sent to the Zoological Survey of India, Kolkata for confirmation of species. Further studies were continued only after getting the confirmation of the species from the concerned agency.

RESULTS:

Survey work towards the molluscan diversity of the 4 selected sites viz., Tilpata Karanbas (L-1), Manhcha (L-2), Latifpur (L-3) and Atta Gujran (L-4) in the vicinity of district Gautam Budh Nagar (U.P.) between March 2012 – February 2014 revealed the occurrence of 22 species of molluscs under 9 families (Table 1 and Figs. 1) Of these, there were the following 19 species of snails viz., *Bellamya bengalensis* (Lamarck, 1882); *B. dissimilis* Mueller, 1774; *B. crassa* (Benson, 1836); *Lymnaea* (*Pseudosuccinea*) *acuminata* f. *hians* Sowerby 1837; *L. luteola* f. *ovalis* Gray 1822; *L. acuminata* f. *patula* Troschel 1837; *L. (Radix) auricularia*, Linnaeus, 1758; *L. (Lymnaea) stagnalis* (Linnaeus, 1758); *L. acuminata* f. *gracilior* Martins 1881; *Pila globosa* Swainson 1822; *Indoplanorbis exustus* (Deshayes, 1834); *Gyraulus convexus* (Hutton, 1849); *G. pankongensis* (von Martens 1882); *Planorbis planorbis* var. *tangitarensis* Germain 1918; *Hydrobioides nassa* Theobald 1865; *Thiara (Melanoides) tuberculata* (Mueller, 1774); *Thiara (Thiara) scabra* (Mueller, 1774); *T. (M.) trigrina* Ray 1947 and *Brotia*

(*Antimelania*) *costula* Rafinesque 1833 under 6 families. The other molluscs were *Parreysia* (*Parreysia*) *favidens* (Benson, 1862), *Corbicula striatella* Deshayes, 1854 and *Lamellidens marginalis* (Lamarck, 1819). Further, the commonly occurring snails were *Bellamya bengalensis*, *L. luteola* f. *ovalis*, *L. acuminata* f. *patula*, *Pila globosa*, *Indoplanorbis exustus*, *Gyraulus convexus*, *Planorbis planorbis* var. *tangitarenis* and *Thiara* (*Melanoides*) *tuberculata*. The following 3 species viz., *L. (Lymnaea) stagnalis*, *B. crassa* and *Brotia* (*Antimelania*) *costula* have been recorded from Mahncha (L-2) locality.. However, the species like *G. pankongensis*, has been recorded from L-3 locality. Among other molluscs, most commonly occurring species was *Lamellidens marginalis* followed by *Parreysia* (*Parreysia*) *favidens* and *Corbicula striatella* in succession.

There were 21 species of molluscs collected from Manhcha (L-2) locality while from the other 3 localities, the number was 18, 17 and 15 species, respectively from Latifpur (L-3), Atta Gujran (L-4) and Tilpata Karanbas (L-1). There has been a marked variation in the composition of molluscan species collected from different habitats. The details about the faunal diversity of molluscs along with the habitats in each locality have been presented separately.

a) Tilpata Karanbas (L-1) locality

At this locality as many as 15 species of molluscs under 7 families have been recorded from 5 different habitats like streams, river beds, ponds, rice fields and tanks during 2012-2013. The maximum number of specimens of molluscs was recorded from river streams while the species diversity was comparatively more in the river beds. Less number of specimens was recorded from tanks. Rice fields also contributed to the molluscan diversity to a great extent. Commonly occurring snail's species were *Bellamya bengalensis*, *Lymnaea* (*Pseudosuccinea*) *acuminata* f. *hians*, *L. luteola* f. *ovalis*, *L. acuminata* f. *patula*, *L. (Radix) auricularia*, *Indoplanorbis exustus* and *Planorbis planorbis* var. *tangitarenis*. Further, *L. acuminata* f. *gracilior* has been recorded from river beds and rice fields. Similarly, *Lamellidens marginalis* has been found in river beds. Almost the same kind of pattern about the number of species, their occurrence in various habitats has been recorded in the year 2013-2014 (Table-1)

b) Manhcha (L-2) locality

During 2013-2014, at Manhcha locality as many as 21 species of molluscs under 9 families have been recorded from 5 different habitats like streams, river beds, ponds, rice fields and tanks. The maximum number of specimens of molluscs was recorded from rice fields followed by river beds, and ponds in succession. Further, the species diversity was comparatively more in the rice fields. Less number of specimens was recorded from tanks. River beds contributed to the molluscan diversity to a great extent. Commonly occurring snail's species were *Bellamya bengalensis*, *Lymnaea* (*Pseudosuccinea*) *acuminata* f. *hians*, *L. luteola* f. *ovalis*, *L. acuminata* f. *patula*, *L. (Radix) auricularia*, *Indoplanorbis exustus*, *Thiara* (*Melanoides*) *tuberculata* and *Planorbis planorbis* var. *tangitarenis*. Further, *Hydrobioides nassa* has been recorded from rice fields. *Corbicula striatella* and *Lamellidens marginalis* have been found in river beds, streams and rice fields. Almost the same kind of pattern about the number of species, their occurrence in various habitats has been recorded in the year 2013-2014. However, the population of molluscs was comparatively more in 2013-14 than 2012-13 (Table-1)& Fig-1)

c) Latifpur (L-3) locality

As many as 18 species of molluscs under 9 families have been recorded from the 5 different habitats i.e., marshy land, ponds, streams, rice fields and tanks during 2012-

2014. The maximum number of specimens of molluscs was recorded from rice fields. Further, species diversity was comparatively more in the rice fields followed by streams / marshy land, ponds and tanks in succession during 2012-2013. Like L-1 and L-2 localities, less number of specimens was recorded from tanks. Commonly occurring snail's species from L-3 locality were *Bellamya bengalensis*, *Lymnaea* (*Pseudosuccinea*) *acuminata* f. *hians*, *L. luteola* f. *ovalis*, *L. acuminata* f. *patula*, *L. (Radix) auricularia*, *Indoplanorbis exustus*, *Planorbis planorbis* var. *tangitarenensis*, *Thiara* (*Melanoides*) *tuberculata* and *Corbicula striatella*. Further, *T. (M.) trigrina* has been recorded from marshy land and rice fields. Similarly, *B. dissimilis* and *Hydrobioides nassa* have been found in rice fields and streams while *Gyraulus convexiculus* has been recorded from rice fields. Although almost the same kind of pattern about the number of species, their occurrence in various habitats has been recorded in the year 2013-2014. In fact, the population of molluscs was more in 2013-14 (Table-1 & Fig-1)

d) Atta Gujran (L-4) locality

During 2013-2014, at Atta Gujran locality as many as 17 species of molluscs under 9 families have been recorded from 4 different habitats like, marshy land, ponds, rice fields and tanks. The maximum number of specimens of molluscs was recorded from rice fields followed by streams / ponds and marshy land in succession. Further, the species diversity was comparatively less in the tanks. Commonly occurring snail's species were *Bellamya bengalensis*, *Lymnaea* (*Pseudosuccinea*) *acuminata* f. *hians*, *L. luteola* f. *ovalis*, *L. acuminata* f. *patula*, *L. (Radix) auricularia*, *Indoplanorbis exustus*, *Thiara* (*Melanoides*) *tuberculata*, *G. pankongensis* and *Planorbis planorbis* var. *tangitarenensis*. Further, *L. acuminata* f. *gracilior* has been recorded from rice fields and streams. *Corbicula striatella* and *Lamellidens marginalis* have been found to occur in almost all the habitats. *Hydrobioides nassa* has been recorded from ponds, streams and rice fields. Almost the same kind of pattern about the number of species, their occurrence in various habitats has been recorded in the year 2013-2014 (Table-1 & Fig-1).

Table 1: Molluscan diversity in selected localities of district Gautam Budh Nagar (U.P.) March 2012 to February 2014.

Sl. No.	Family	Molluscan species	Locality			
			Tilpata Kambas (L-1)	Manhcha (L-2)	Latifpur (L-3)	Atta Gujran (L-4)
1	Viviparidae	<i>Bellamyia bengalensis</i> (Lamarck, 1882)	+	+	+	+
2		<i>B. dissimilis</i> Mueller, 1774	-	+	+	-
3		<i>B. crassa</i> (Benson, 1836)	-	+	-	-
4	Lymnaeidae	<i>Lymnaea</i> (<i>Pseudosuccinea</i>) <i>acuminata</i> f. <i>hians</i> Sowerby 1837	+	+	+	+
5		<i>L. luteola</i> f. <i>ovalis</i> Gray 1822	+	+	+	+
6		<i>L. acuminata</i> f. <i>patula</i> Troschel 1837	+	+	+	+
7		<i>L. (Radix) auricularia</i> , Linnaeus, 1758	+	+	+	+
8		<i>L. (Lymnaea) stagnalis</i> (Linnaeus, 1758)	-	+	-	-
9		<i>L. acuminata</i> f. <i>gracilior</i> Martins 1881	+	+	+	+
10	Pilidae	<i>Pila globosa</i> Swainson 1822	+	+	+	+
11	Planorbidae	<i>Indoplanorbis exustus</i> (Deshayes, 1834)	+	+	+	+
12		<i>Gyraulus convexiculus</i> (Hutton, 1849)	+	+	+	+
13		<i>G. pankongensis</i> (von Martens 1882)	-	-	+	+
14		<i>Planorbis planorbis</i> var. <i>tangitarenensis</i> , Germain 1918	+	+	+	+
15	Bithyniidae	<i>Hydrobioides nassa</i> Theobald 1865	-	+	+	+
16	Thiaridae	<i>Thiara</i> (<i>Melanoides</i>) <i>tuberculata</i> (Mueller, 1774)	+	+	+	+
17		<i>Thiara</i> (<i>Thiara</i>) <i>scabra</i> (Mueller, 1774)	+	+	-	-
18		<i>T. (M.) trigrina</i> Ray 1947	+	+	+	+
19		<i>Brotia</i> (<i>Antimelania</i>) <i>costula</i> Rafinesque 1833	-	+	-	-
20	Amblemididae	<i>Parreysia</i> (<i>Parreysia</i>) <i>favidens</i> (Benson, 1862)	+	+	+	+
21	Corbicullidae	<i>Corbicula striatella</i> Deshayes, 1854	-	+	+	+
22	Unionidae	<i>Lamellidens marginalis</i> (Lamarck, 1819)	+	+	+	+

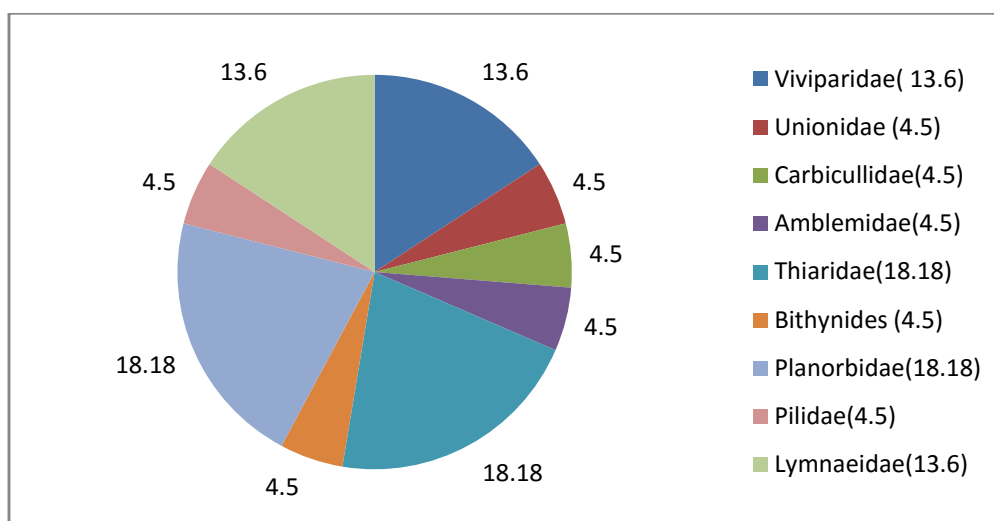


Fig.1: Composition of Molluscan families in selected localities of district Gautam Budh Nagar during the study period (2012-2014)

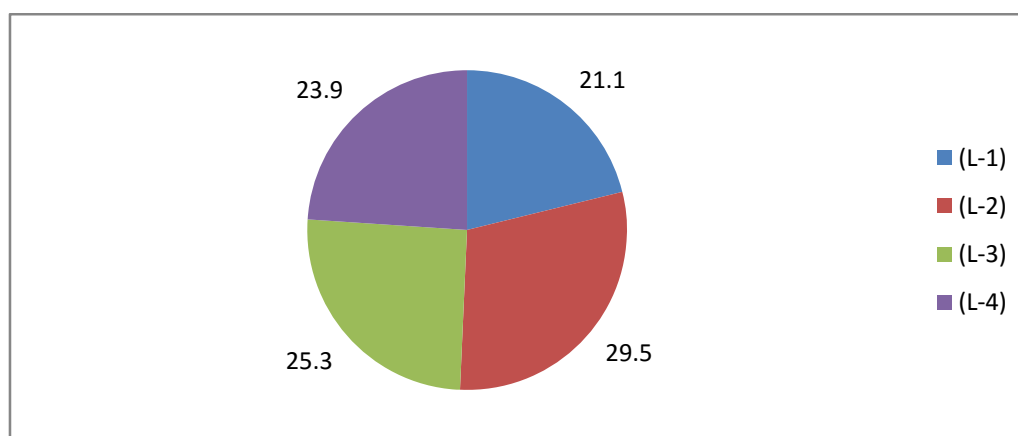


Fig. 2: Species composition of collected molluscs at selected localities of district Gautam Budh Nagar during the study period (2012-2014) .

DISCUSSION:

The present findings reveal occurrence of 22 species of molluscs under 9 families. Of these, there were 19 species of snails viz., *Bellamya bengalensis* (Lamarck, 1882); *B. dissimilis* Mueller, 1774; *B. crassa* (Benson, 1836); *Lymnaea (Pseudosuccinea) acuminata* f. *hians* Sowerby 1837; *L. luteola* f. *ovalis* Gray 1822; *L. acuminata* f. *patula* Troschel 1837; *L. (Radix) auricularia*, Linnaeus, 1758; *L. (Lymnaea) stagnalis* (Linnaeus, 1758); *L. acuminata* f. *gracilior* Martins 1881; *Pila globosa* Swainson 1822; *Indoplanorbis exustus* (Deshayes, 1834); *Gyraulus convexisculus* (Hutton, 1849); *G. pankongensis* (von Martens 1882); *Planorbis planorbis* var. *tangitarensis* Germain 1918; *Hydrobioides nassa* Theobald 1865; *Thiara (Melanoides) tuberculata* (Mueller, 1774); *Thiara (Thiara) scabra* (Mueller, 1774); *T. (M.) trigrina* Ray 1947 and *Brotia (Antimelania) costula* Rafinesque 1833 under 6 families. There are a number of workers who conducted conducted studies on molluscan faunal diversity from different parts of India and almost similar findings were reported[8,12 ,13,14,15,16,17,18,19, 20,21)

The occurrence of *Bellamya bengalensis* (Lamarck), *Melanoides tuberculatus*, *M. scabra* (Mueller), *Lymnaea acuminata* (Lamarck), *L. luteola*, *Indoplanorbis exustus* and *Pila* sp.

during the present is directly supported by the findings of [15] and [22] but they also reported one or more species of molluscs.

From Gwalior (M.P.), a brief account on 9 species of freshwater snails including *Indoplanorbis exustus*, *Lymnaea* (*Pseudosuccinea*) *luteola*, *L. (P.) acuminata* f. *rufescens* and *Vivipara bengalensis* together with notes on their habitats and a list of trematode larvae was furnished [6]. There is a difference with in respect of both the species of snails and the trematode larvae.

The present findings also differ with Pandey and Mehta [15] who reported 14 species of Gastropods and Bivalves from the irrigated area of Surat district (Gujarat). Pokhriyal et al [6] made a study on the molluscan diversity of Asan river system in Doon Valley with special reference to vectors of trematode parasites and collected 18 species of molluscs comprising 13 species of gastropods grouped under 5 different families. The results of the present study are in accordance with Pokhriyal et al [6] in respect of occurrence of certain common forms like *Bellamya bengalensis*, *L. luteola* f. *ovalis*, *L. acuminata* f. *patula*, *Pila globosa*, *Indoplanorbis exustus*, *Gyraulus convexisculus*, *Planorbis planorbis* var. *tangitarenensis* and *Thiara* (*Melanoides*) *tuberculata*.

Agrawal and Gupta [22] A study on the molluscan fauna of Narmada Sagar and collected eleven species of molluscs collected out of which 8 species comprises of *Rachis bengalensis*, *R. punctatus*, *Bellamya bengalensis*, *Melanoides tuberculatus*, *M. scabra*, *Lymnaea acuminata*, *L. luteola* and *Indoplanorbis exustus*. The species of mollusks as gathered in the present study were quite different as reported by Agrawal and Gupta (1994).

A study on the molluscan diversity of Saipung Wildlife Sanctuary, Meghalaya revealed 13 species of molluscs, out of which 12 species were identified as gastropods and one species of Bivalve [23]. The freshwater gastropod species comprises *Bellamya bengalensis* f. *annadalei*, *Pila theobaldi*, *Thiara* (*lareba*) *lineata*, *Brotia* (*Antimelania*) *costula*, *Paludomus* (*Paludomus*) *conica*, *P. (P.) regulata*, *P. (P.) stephanus* and *Indoplanorbis exustus*. There is a difference between the findings of present study and the investigations made by Hatter et al [23].

Keeping in view the above statement, it is clear that diversity exists in the species of the snails. This may be due to different reasons in the fluctuating pattern of the diversity. Further, either a single factor alone or a combination of factors is responsible for such variation.

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