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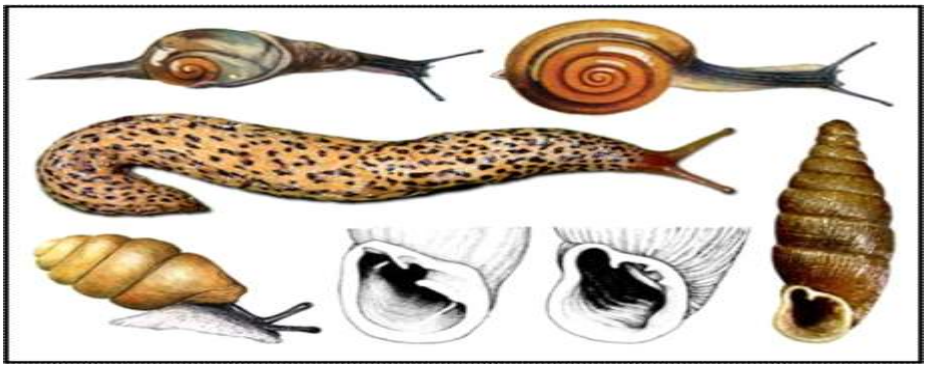

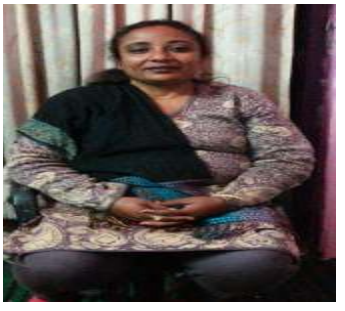

Anupma Mehrotra

STUDIES ON MORPHOMETRY AND DIVERSITY OF MOLLUSCA FROM NAKANA LAKE, DHULE (MS) INDIA.

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ABSTRACT

The aim of present investigation is to study morphometry and diversity of mollusca from Nakana lake. The survey was conducted after every fortnight, during the period June 2013 to May 2014. We reported total 13 species of molluscs, out of which 10 species of Gastropods and 3 species of Pelecypods. Gastropods belong to 3 orders, 7 families and 9 genera while Pelecypods belongs to an order, 3 families and 3 genera (species). The family Thiaridae was found to be dominant. We also report the morphometry of these species, i.e. shape and size. From Gastropods, the shells of 7 species were conical while 3 species were discoidal. The size of the all shell will measure with two parameters i.e. Shell height (SH) and Shell width (SW), in centimeter. In Gastropoda the maximum SH was found in *Melanoide tuberculata* while minimum in *Gyraulus convexiusculus*. The maximum SW was record in Bellamya bengalensis while minimum in *Zootecus insularis*. In Pelecypoda the maximum SH was reported in Corbicula striatella while minimum in *Lemellidens consobrinus*. The maximum SW was found in *Parresiya shurtleffiana* while minimum in Corbicula striatella. We also reported one of the rare species, Thiara requeti, it was previously reported in Mumbai presidency, Maharashtra.

KEYWORDS : Molluscan diversity, Morphometry, Gastropoda, Pelecypoda Shell height, Shell width.

INTRODUCTION

Molluscs are extremely important communities among other ecological communities. They constitute the second largest invertebrate and most successful group next only to insects, Abbott

(1989) bouchet (1992). They prove immensely beneficial both economically and medicinally (Wosu, 2003). They have been important to humans as a source of food, jewelry, tools and even pets. Freshwater molluscs play significant role in public and veterinary health (Supian and Ikhwanuddin (2002). Their existence is highly necessary because they constitute food for many aquatic organisms, Subba (2003), Begum and Narayana (2006). It has been here for over 500 million years. With reference to molluscan diversity all over the world, maximum number of species occur in the marine ecosystem (31463) followed by terrestrial ecosystem (24503) and fresh water ecosystem (8765). Out of these freshwater, 248 species (56 genera) were reported from India and adjacent countries. These includes, 171 are Gastropods (Punithavelu and Raghunathan, 2005).

In India, there is no active culture practice in freshwater reservoirs as far as the molluscan culture is concern, apart from commercial lining to conserve such important group. Only few works has been performed in our country about the morphometric analysis of freshwater snails. Therefore, more studies are needed for taxonomical identification of this valuable resource Mohan *et al*., (2013). Hence, in present piece of research work an attempt is made to document the molluscan diversity and morphometry from Nakana lake, Dhule (M.S.).

MATERIAL AND METHODS

Study area:

The study area is one of the man-made Lake situated on the Panzara River, 6 km away from Dhule city. The geographical location of the lake has 20° 52' 56.27" N and 74° 43' 31.82" E. This is earthen lake having catchment area is of 945 m and maximum height of lake is 18.41 m. This lake also receives water from Haranmall Lake. The water of the lake is used for drinking, irrigation and aquaculture.

Sampling and preservation Method:

For taxonomic and morphometric study Molluscan fauna were collected by using Ekman dredge and Scoop net. The empty shells also collected from the periphery of the lake during night and early morning to get more number of varieties. Collection was carried to the laboratory. The samples have been washed with tap water and soft brush in order to reveal the sculpture of shell. To remove the debris for cleaning the deposited minerals, shells were putting them in diluted solution in oxalic acid for few minutes, after cleaning shells were dried at room temperature and submitted to the photographs each with the dorsal and ventral views for various morphological and morphometric features, Barth (1962), Thomson (2004). Small or medium sized snails were identified with the help of dissecting binocular microscope. Identification was done on the basis of standard keys and monographs of Preston (1915), Subba Rao and Mitra (1979), Tonapi (1980). Shells, which are not identified, are sent to the ZSI (Zoological survey of India), Pune.

Morphometric analysis of molluscs:

The measurements about the morphometry of molluscan shells were taken with the help of Vernier caliper. The shell height, width of the shell, umbilicus diameter, number of whorls, aperture size and other morphometric parameters of shells were taken in consideration.

RESULTS AND DISCUSSION

The result of present investigation is shown in table-1. It shows the molluscan record of snails

collected from study area. It includes 10 species of Gastropods and 3 species of Pelecypods. Class Gastropoda possesses 3 orders i.e. Basommatophora, Mesogastropoda and stylommatophora, from these Basommatophora with 3 families; Bullinidae, Lymnaeidae and Planorbidae have single species of each. Mesogastropoda includes two families; Thiaridae and Viviparidae, the family Thaiaridae, includes 4 species and Viviparidae have single species. Stylommatophra have two Family; Subulinidae and Helicidae, include 2 species. In Class Pelecypoda, an order Palacoheterodenta having 3 families; Uninoidae, Amblemidae and Corbiculidae each with single species.

Our findings are collaborated with some earlier researchers. Contreras-Arequieta (1998) reported among all Molluscans, the family Thiaridae is found to be dominant. Because the members of family Thiaridae are quick colonizers, tolerant to habitat diversity and variability due to a very strong and thick shell. Many forms are parthenogenetic females, capable of multiplication in a short time. Flores and Zaffaralla (2012) also cited Thiaridae as the most persistent and abundant macro-invertebrate family.

Among the 10 of *Gastropogds Indoplanarbis exustus, Lymnaea luteola, Melanoide tuberculata, Gyraulus convexiusculus, Tarebia lineata, Thiara requeti, Thiara scabra, Bellamya bengalensis, Lemellidens consobrinus, Parreysia shurtleffiana and Corbicula striatella* are aquatic snails while 2 species i.e. Zootecus insularis and Theba pisana, are land snail, found on grass and moist soil near lake.

As far as study on morphology i.e. shape and size has been an important aspect in many biological fields, such as anatomy, ecology, systematic and phylogeny, Madan et al., (2015). Some worker has carried out their studies on various species of snails from different part of the country. The present investigation resemble with the observations made by earlier workers on the occurrence of molluscan diversity in various water bodies (Goswami, et al., 2010, Rao Pakash et al., 2013).

The collected specimen of gastropod shows various morphometric characters about shape and size of shell. From 10 species, the shell of *L. luteola, M. tuberculata, T. lineata, T. scabra, T. requeti, B. bengalensis and Z. insularis* were conical where as the shell of *I. exustus, G. convexiusculus* and *T. pisana* were discoidal. The size of the shell of Gastropods was measured with two parameters i.e. Shell height (SH) and Shell width (SW) in centimeter. The maximum and minimum SH were found in M. tuberculata and *G. convexiusculus* respectively. Similarly the maximum and minimum SW was reported in B. bengalensis and *Z. insularis* respectively. In pelecypoda the maximum SH was found in *C. striatella* while minimum in *L. consobrinus.* The maximum SW was recorded in P. shurtleffiana while minimum in *C. striatella*. The distribution and morphological characteristics of snails is given as below.

1. Indoplanarbis exustus: Fig.-1. Widely distributed, SH-1.1 to 1.5 cm and SW- 0.6 to 1.3 cm, large shell, discoidal, sinistral, rounded at periphery, aperture ear-shape, sutures deeply impressed.
2. Lymnaea luteola: Fig.-2. Cosmopolitan in distribution, found in clean fresh water bodies, in moist marshy places and also on rotten wooden logs, SH-0.8 to 1.4 cm and SW-0.6 to 1.2 cm, shell with well developed and broader spire, shell showing minute decussated along with many longitudinal striae and conical in shape.
3. Gyraulus convexiusculus: Fig.-3. Most common species occurring in all fresh water reservoirs, SH-0.6 to 1.3cm and SW-0.5 to 1.1cm, minute shells, discoidal, 4 to 5 depressed whorls with minimum 5 mm in diameter with umbilicus wide and transparent.
4. Melanoide tuberculata: Fig.-4. Widely distributed throughout India except Kashmir, SH-2.5 to 3.5 cm and SW-0.8 to 1.3 cm, shell conical with large body whorl with a high spire, it has 10 to 12 whorls, moderately convex, evenly rounded, dark red-brown dots and flames, Sculptured with vertical ribs and

spiral striation.

5. Tarebia lineata: Fig.-5. Distributed in India: Andhra Pradesh: Cuddapah, Khammam, Prakasam, Assam, Bihar, Jharkhand, Madhya Pradesh, Maharashtra. West Bengal: Kolkata, Hugli, Nadia, SH-1.9 to 3.3 cm and SW-0.6 to 1.4 cm, shell elongates conical, rows of nodules less distinct, dark spiral lines distinct, apex acute.

6. Thiara requeti: Fig.-6. Found in India, Kerala, Cochin, Quilon and Trivendram; Maharashtra: Mumbai (Subba Rao 1989), SH-0.9 to 2.6 cm and SW-0.6 to 1.2 cm, shell is small elongated, conical, total whorls are eight, regularly increasing, suture distinct; shell with undulating axial and spiral ridges, axial ridges are dominant above the periphery and spiral ridges below it on the body whorl. There is no record except Mumbai in Maharashtra, Hence authors. documented this species as a newly recorded at Nakana lake, district- Dhule.

7. Thiara (Thiara) scabra: Fig.-7. Found in India: Jharkhand, Kerala, Madhya Pradesh, and Maharashtra. West Bengal: Kolkata, Hugli, Midnapore, occur in slow, fast moving as well as stagnant water. SH-0.9 to 1.9 cm, and SW- 0.5 to 1.2 cm, the shell elongated and conical in shape, whorls increasing in size, sutures distinct, sculpture with vertical ribs.

8. Bellamya bengalensis (f. typica): Fig.-8. Observe throughout India, SH-2.2 to 3.5 cm and SW-1.3 to 2.4 cm, shell conical, thin, smooth with three or more dark color bands, body whorl evenly convex and almost equal in height, umbilicus narrow; aperture sub circular with black margin, sutures shallow.

9. Zootecus insularis: Fig.-9. It is widely spread species of land snail, SH-1.2 to 1.5 cm and SW-0.2 to 0.6 cm, shell is thick and white in color, apical whorls broad and conical in shape, axial sculpture shows irregular spire grooves, umbilicus opened.

10. Theba pisana: Fig.-10. This land snail is native Mediterranean in region and many other countries worldwide, SH-1.2 to 1.6 cm and SW-1.4 to 1.6 cm, the color of shell varies from white to yellowish brown with light brown spiral markings; shape discoidal, Umbilicus is narrow and half covered by reflected columnar region.

11. Lemellidens consobrinus: Fig.-11. Distributed in Andhra Pradesh, Maharashtra, Pondicherry, Tamil Nadu. Shell thick rhomboidal, SH-3.8 to 4.5 cm and SW-2.2 to 1.2 cm, umbones more flatted, dorsal margin curved and obliquely truncate, anterior side rounded and posterior obtusely angled.

12. Parreysia shurtleffiana: Fig.-12. Distribute in India: Bihar, Madhya Pradesh, Maharashtra; Ahmednagar, Orissa, Uttar Pradesh, SH-5.4 to 6.3 cm and SW-2.5 to 3.4 cm, typical sculpture on umbonal region and also on anterior slop, shell is small, thin and smooth.

13. Corbicula striatella: Fig.-13. Common Indian species, SH-1.6 to 2.1 and SW- 0.6 to 1.2 cm, shell is large, thick, tumid, triangular ovate to ovate, umbone prominent; periostracum shining pale yellow to dark brown from young once to adult, striae regular.

To the best of our knowledge the information available on morphometric relationship of molluscan species in India are not in focused. Due to insufficient information about malacofaunal check list. On other hand considerable work has been done from Abroad (Tood and Gary, 1990; Afshan *et al.*,2013; Ruano, 1997). The Molluscan shell growth, shape and size are influenced by biotic (Physiological) as well as abiotic (Environmental) factors. The present findings resemble with the observation made by earlier workers on occurrence of marphometric analysis of Gastropods and Pelecypods, Madan et al. (2015), and Miguel et al., (2002).

Above findings are useful in commercial aquaculture industries for Ekman dredge selectivity as sorting equipment and obviously for conservation of Molluscs.

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Fig.-1. ***I. exustus***

Fig.-2. ***L. luteola***

Fig.-3. ***G. Convexiusculs***

Fig.-4. ***M. tuberculata***

Fig.-5. ***T. lineata***

Fig.-*6. T. requeti*

Fig.-*7. T. scabra*

Fig.-*8. B. bengalensis*

Fig.-9. ***Z. insularis***

Fig.-10. ***T. pisana***

Fig.-11. ***L. consobrinus***

Table No. 1: Check list of mollusca recorded at Nakana Lake, Dhule (MS) India, during June 2013-May14.

Class	Sub Class	Order	Family	Species (Scientific Name)	Species Account	Type locality
GASTROPODA	PAMLONATA	Basommatophora	Bullinidae	1. *Indoplanarbis exustus* (Deshyes,1834)	1834, Planorbis exustus Deshyes in Belanger, vou. Indes.orientalis: 147, pl.1.figs.11-13	Malabar coast
			Lymnaeidae	2. *Lymnaea luteola* (Lamarck, 1822)	1822, Lymnaea luteola Lamarck, Hist. Nat. Anim. Sans. Vert. 6 (2):160.	Bengal
			Planorbidae	3. *Gyraulus Convexiusculus* (Hutton, 1849)	1849Planorbis Convexiusculus Hutton, J. Asiat. Soc. Beng., 18(2):657.	Afaganistan
	PROSOBRANCHIA	Mesogastropoda	Thaiaridae	4. *Melanoide tuberculata* (Müeller, 1774)	1774, *Nerita tuberculata* Mueller, Hist. Verm. Terr.Flev. 2:191.	Coromandel coast
				5. *Tarebia lineata* (Grey, 1828)	1828, Helix Liniata Gray, in Wood's index Text. Suppt.,24,fig.68	Ganges
				6. *Thiara requeti* (Grateloup, 1840)	1840. *Melania requeti* Grateloup, Act. Soc. Linn. Bordaeux., 11; 433, pl.3, fig. 28.	Mumbai
				7. *Thiara (Thiara) scabra* (Müeller, 1774)	1774, Buccinum scabrum Mueller,Hist. Verm. Terr.Flev. 2:136.	Tranquebar
			Viviparidae	8. *Bellamya bengalensis (f, typicall)* (Lamarck,1822)	1822. Patudina bengalensis Lamarck, Hist. Nat. Anim. Sans. Vert. 6 (2):174	Museum D'Histroire Naturelle, Geneva.
		Stylommatophora	Subulinidae	9. *Zootecus insularis* (Ehrenberg, 1831)	1831, *Pupa insularis* Ehrenerg, Sym. Phy. Ani. Ever. Ex. Insect, PP1-135 Berolini (Mittler)	Saharo-Sindian region
			Helicidae	10. *Theba pisana* (Mead, 1971)	1771, Mead AR., Hel.land Mol. Intro.- Nor. Amer. Bio. 53:104-111.	Not Known
BIVALVIA	PALACO HETERO DENTA	Uninoida	Uninoidae	11. *Lemellidens consobrinus* (Lea, 1859)	1859, Unio consobrinus Lea, proc. Acad. Nat. sci. philad., 3:331	Chiana
			Amblemidae	12. *Parreysia shurtleffiana* (Lea, 1856)	1856. Unio shurtleffiana Lea, Proc. Acad. Nat. Sci. Philad., 8:94	Not known
			Corbiculidae	13. *Corbicula striatella* (Deshayes, 1854)	Corbicula striatella Deshayes, Proc. Zool. Soc.Lond.,22:344	Pondicherry

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