

Freshwater Molluscan Diversity At Selected Sites Of Visnagar(Pindhariya Lake, Deliyu Lake & Depal Lake)

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ABSTRACT: Mollusca is the second-largest phylum of invertebrate creatures after the arthropoda. The members are known as molluscs or mollusks. Around 85,000 existing species of molluscs are accredited. The number of fossil species is assent among 60,000 and 100,000 additional species. This study was done in Visnagar which is geographically located at 23.7° N 72.55° E at an average front elevation of 117 metres. Three sites were selected to study. 1. Deliyu Lake is natural freshwater body having 19 hector zone & round in shape. It is geographical located between latitude 23° 41' 60'' N longitude 72° 32' 60'' E. 2. Pindhariya Lake is natural fresh water body having 8 hector regions. The geographical location is between Latitude: 23°41'60 N, Longitude: 72°32'60 E. 3. Depal lake is located near the jaleshwer mahadev temple. The geographical location at latitude 23°68'69 N and Longitude 72°55'73 E. Total number of 71 Specimen belonging to 6 order, 11 families, 23 genus and 35 species are recorded in starting month on September, 2019 to end of February, 2020. The Class Gastropoda had 5 Order viz., Stylommatopher, Littorinimorpha, Sorbeoconcha, Basommatophora, Systellommatophora and class Bivalvia had 1 Order viz., Unionida.

Keywords: Mollusc, Pindhariya, Deliyu, Depal, lake, Visnagar

I. INTRODUCTION:

Molluscs, a group of most diverse and dominant benthic fauna in water bodies, perform a key role in the functioning of aquatic ecosystem. Molluscans are of great significance because they form the food of fishes and their productivity play an important link in the food chain. Molluscans communities are good indicators of localized conditions, indicating the water quality.

Mollusca is the second-largest phylum of invertebrate creatures after the Arthropoda. The members are known as mollusks or molluscs.

Around 85,000 existing species of molluscs are accredited (Taylor and Lewis, 2005). The number of fossil species is assent among 60,000 and 100,000 additional species (Kershaw *et al.*, 2002). The assets of undescribed species is very high. Many taxa inhabit poorly studied. Mollusca are the largest marine phylum, including about 23% of all the labeled marine living thing mollusks are the most varied phylum in sand bar systems (Bouchet *et al.*, 2002) and they have an optimal fossil record (Taylor *et al.*, 1980). Numerous mollusks even alive in soft water and earthbound habitats. They are highly different, but not just in size and anatomical formation, even in behavior and habitation. The phylum is typically classify into 8 or 9 taxonomic classes, of which two are completely extinction (Lineata and Wood, 1815).

The freshwater ecosystems in India harbor a rich diversity of molluscs. Presenting 71 species were recorded, 11 families from shore of the lake and around the lake region areas (Rao *et al.*, 1993). The Gastropoda are 36 specimens, Slugs are 20 specimen and Bivalvia are 15 clams specimen recorded in selected site of Visnagar city.

This Globe is annexation of two Greek words: 'Gastir' which means stomach and 'pod' which means foot. So Gastropods can be called "Stomach-Footed" mollusks. As the term propose these have a well growth muscular foot, occasionally all large that is used for creeping (Runnegar and Pojeta, 1974). There is a head with well growth eyes and tentacles. Without the slugs all gastropods generated external shell which is spirally strike. They alive on land, soft water and ocean.

Bi means "two and such the name propose these mollusks dominate tow shells. They are even known as Pelecypoda meaning hatchet-footed Bivalve" (McGraw *et al.*, 2012). They are bilaterally symmetrical and display uncountortion (Nikkeshietal., 2015; Kurimoto *et al.*, 2015; Daikiet al., 2015; Ushimaru *et al.*, 2015; Arushiet al., 2015). The head is appreciably reduced,

untentacles but have a foot that can frequent be seen to hit out of the valves (Edmondson *et al.*, 1962). The two valves are connected by hinges and other pattern that aid the valves to open and close, refer to example for portion of the shell. They are completely aquatic.

Here is some mainly very important ecological impact and Damagers mollusca biodiversity, Food source for humans: Clams, Oyster and Mollusca etc. Humans can eat poisoned by eaten Mollusca contaminated with toxic protists --> cause "Red tide" (Duvalius genus Coleoptera, Carabidae, Trechinae) cave dwelling beetles "Les Duvalius *etal.*, leur com). Bivalve used to check pollution level – " Environmental Monitors ". Range of lifestyle: Predators, Scavenge, Filter feeders etc. Crop damage - Slug, Snails on land. Ship damage - Shipworm in water (Parisi *et al.*, 1974; Gandolfi *et al.*, 1974; Gutierrez *etal.*, 2003). In the sunlight molluscan are unable to record. Cause of the Snails have faulty eyesight, but an marvelous sense of scent (Dillon and Robert, 2000). They are cold blooded, so require a definite temperature to act. Notable contributions to our knowledge of molluscan fauna have been made by several authors. Total number of 71 Specimen belonging to 6 order, 11 families, 23 genus and 35 species are recorded in starting month on September, 2019 to end of February, 2020.

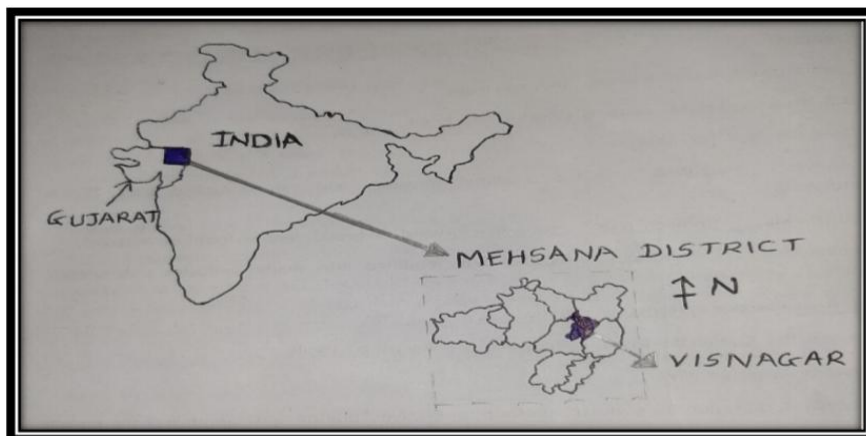
The gastropod species were grouped under 9 different families (Achatinidae, Achatinellidae, Partulidae, Geomitridae, Pomatiopsidae, Thiaridae, Lymnaeida, Planorbidae and Veronicellidae) and the family Achatinidae and Veronicellidae was the most dominant group representing 50% of the total gastropod

population. Five species of bivalve were classed under 2 different families namely Unionidae and Pisidiidae. A total number of 35 species belonging to 6 order, 11 families and 23 genus are recorded from three different sites in Visnagar. The Subulina Octona (Bruguie, 1789) and Rumina Decollata (Linnaeus, 1758) are mostly found in Shore of the Lake.

Among Gastropoda Melanoides tuberculata (Muller, 1944) and Tarebia granifera (Lamarck, 1819) were most dominant species recorded. In Bivalvia Lamellidens corrianus (Lea, 1834) were found nearly at all stations. It was recorded to be highest meanwhile months of November, 2019 and lowest during February, 2020. Meanwhile the 6 month survey duration, In Pindhariya Lake specimen, Deliyu Lake 11 specimen and Depal Lake 9 specimen are recorded in natural habitation of freshwater molluscan. Average of 17 number of individuals per 0.17m².

II. MATERIAL & METHODS

Study Area: For the study of molluscan diversity at selected three sampling sites. Site: 1: Deliyu Lake: This site located between latitude 23°41'60''N longitudes 72°32'60''E, an area of approx. 2 lac sq. meter. Site: 2: Pindhariya Lake: This site located between Latitude 23°41'60N and Longitude 72°32'60E, Site: 3: Depal Lake: This site located between latitude 23.6869811 and Longitude 72.5573044. The freshwater molluscan were captured on a 200 - 500 metre transect along each sites of three Waterbody in Local areas of around Visnagar taluka stream while molluscs from captured in a 1-metre transect at each site



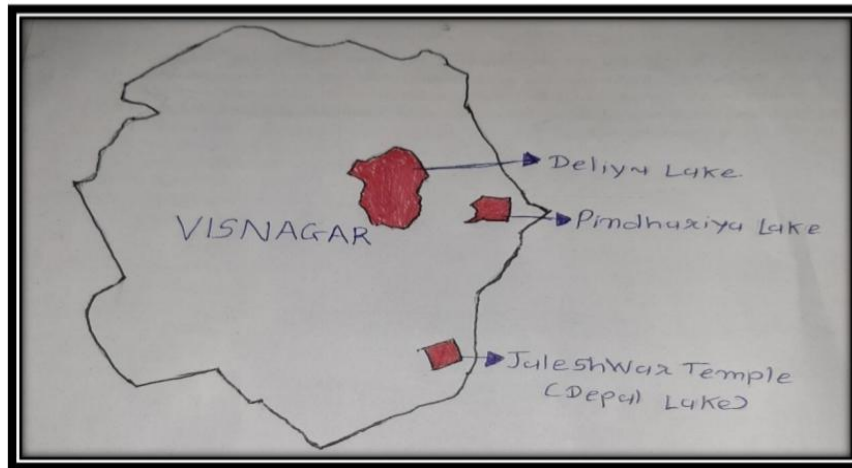


Fig. 1:- a, b; Map of Mahesana District and Selected Sites of Visnagar

Collection and identification: Molluscs were Random sampling collected by the method described in the Guide of Control of Species visible to the naked eye were collected by with the help of gloves in hand, forcep, test tube brushe, scalpels. Shells were also hand-picked from the shore of the lake too. The Random sampling was done at suitable sites like gardens, fields, forests, rocky and shady places etc. The soil samples were brought to the laboratory, cleaned using brushes and stored after drying. Natural colour, habits and habitats were duely noted during the time of collection. If the specimens is alive, then click a photograph in SAMSUNG A-50. The recognize of mollusc species was carried out both at the study areas and in the laboratory. The identification was done on the basis of morphological characters by following the keys given by Rao *et al.*, 1989; Ramakrishna *et al.*, 2005; Dey *et al.*, 2005; Dey *et al.*, 2007. This easy and inexpensive method requires no special equipment and has been used by several authors. For another habitats (grassland and plantations) dead Mollusca are collected and identification in laboratory of M. N. COLLEGE, Visnagar.

III. RESULT AND DISCUSSION

A total number of 35 species were three lake and the aggregation specimens of gastropods were categories based on booklet and specialist from ZSI and they are presented. The Gastropoda are 36 specimens, Slugs are 20 specimen and Bivalvia are 15 clams specimen recorded in selected site of Visnagar city. Total number of 71 Specimen belonging to 6 order, 11 families, 23 genus and 35 species are recorded in starting month on September, 2019 to end of February, 2020. In studies clearly Suggest that the freshwater molluscs Subulina Octona and Rumina

Decollata are mostly found in shore of the lake. Veronicell Cubensis, Laevicaulis Alte, Parreysia Favidens, Lamellidens Corrianus and Lamellidens Marginalis are very much involved with the tradition and economy of lake. Mainly freshwater molluscan species are available in surface areas of near shore of the lake region.

Meanwhile the 6 month survey duration, In Pindhariya lake 15 specimen, Deliyu lake 11 specimen and Depal lake 9 specimen are recorded in natural habitation of freshwater molluscan. Average of 17number of individuals per 0.17m². It was recorded to be highest meanwhile months of November and lowest during February. In the pre result first month 3 hours in a day is very hard to discover 5 species and 6 species are alive. Second months 8 species are found quickly and dead species are maintained in plastic bag. For Third month are most numbers of species is 12. Fourth and fifth months 5 and 3 species. And last month mere 2 species are recorded in morning time duration. In the sunlight molluscan are unable to record. Cause of the Snails have faulty eyesight, but a marvelous sense of scent (Dillon and Robert, 2000). They are cold blooded, so require a definite temperature to act.

This is showing the first list of freshwater and land molluscs from shore of the lake and upper and middle layer in selected site of Mahesana district. The present study provides the base line information for the molluscan variation. Further long condition research is required to discover the variation of molluscan species estimate, its habitats, seasonal diverse and stages being experiences by these creatures. In the freshwater ecosystem, molluscs are vital category and their plenitude plays pivotal role in Soft water ecosystem functioning (Vaughn *et al.*, 2004). Fresh water molluscs are Ordinary in ponds, lakes, tranquil

water pools and flowing waters as lower level division of perpetual rivers, canals etc. Freshwater gastropods are commonly found appended to drown aquatic plants, sticks, rock, small cinders mixed with sand and cement etc, but bivalves alive partly buried in the sludge. Identical to the gastropods the bivalves display different in shell characteristics be depend on the ecology of the species and may yield eco-phenotypes (Subba Rao *et al.*, 1989).

The Molluscs sort a vital constituent of biotic monitoring in condition of rating the Softwater quality and status of aquatic systems (Strong *et al.*, 2008). Base on their incident, molluscs are differentiate into two preliminary and secondary freshwater species. The preliminary freshwater molluscs are limited especially to the freshwater habitations, whereas secondary freshwater species are localities both in estuarine and sandy, muddy, quatic habitation. There are estimated 5,000 freshwater molluscs in the world for which valid descriptions exists besides 10,000 undescribed species (Balian *et al.*, 2008)

Meanwhile, significant data has been cumulative on freshwater molluscs of India. A numerous of anew species, new data on their biology, range distribution etc. have been added to the list of Preston and Subba Rao. The fact that not all protected regions display population of freshwater molluscs' probability two main elements:

a) Most of the protected site are establish in natural resources of Visnagar.

b) Data of freshwater snails are frequent available. Availability of data is normally the result of the present of monitoring of these species and hard facility to the localities in which are found by me.

The mollusc richness did not differ importantly existent among aquatic bed and emergent marsh in the studied; the lowland humid clay, the formation was diverse among them. The plurality of the taxa observed displayed formerly few relationship with aquatic vegetation (Pereira *et al.*, 2000a,b; Kotzianet *al.*, 2006; Simoeset *al.*, 2006). Pomatias elegans, Rumina paivae, Melanoides tuberculata, Subulina striatella, Subulina octona, which is an exotic species, is even known newly from India.

Preface that have been forthwith connected with human beings activities are usually associated for cleaned the environment of around the lakes. Many species of freshwater snails usually found in mushy, sandy and around Lake Region. These species are anticipated not mere to be local,

but even other introduced and locally occurring species in the around their available of food habitats. Freshwater mollusca availability on plants leaves, vegetables, fruits and quatic plants nearby the lake region. The snail and shell are slowly movement and available to saw in morning, because of these eyesight is weak, some species are active in night time and afraid from humans in my opinion.

A key Species and Populace Study was carried out. Plenitude is much vital as a portion of mass dynamics and it is also environmental biological factor that is liable to detect the strength of the household in local surround nature. At localities the family plenitude was observed to be much creepy as differentiate to other species. Plenitude of freshwater molluscs Achatinidae and Veronicellidae both families are display numerous than the other families.

The small percentage of endemism of freshwater molluscs may have its cause in the number of introduced species in Depal lake, which are highly harmful for the freshwater molluscs cause for the temple region and whole lake are covered by quatic plants and that way they not able to movement in separately. Local species occurring in the region but not considered such invasive, have possibly been introduced such a result of the plant for aquariums. This species has a wide distribution series and ecological irrisistance to environmental factors (Perera *et al.*, 1996)

The surveys it is clearest observation of 18% families suitable to diversity of Subulina and Decollata are habituated to feed curries to prepare with the flesh of the freshwater molluscs. Higher Decollata 30 - 90% families belonged to diversification Castes. This may be due to unavailability of these snails in one hand and several attainability like better snail species on the other hand. The freshwater molluscs in most of the not fully develope and developing poultry industry concept the scientific use of freshwater hopeful feasibility of development of animal husbandry and successful consequence in all cases. Appears that there exist a Cochicella acuta facing any malady of poultry birds giving even been obtained facing malady of poultry birds. Use of higher (97%) than that remarkably for man. The efficacy of 'Mollusc-medicine' is much more in curing the malady of domestic creature like cattle and It is vital to the efficacy of such freshwater molluscs increasing in huge numbers. There is not record of causalty for the use of the shell of Lamellidens marginalia to cut the navel cord of per essentiality.

Table 1

Check List of Molluscan Species identified at Pindhariya Lake;

SN.	FAMILY	COMMON NAME	SCIENTIFIC NAME
1.	Achatinidae	Thumbnail awlsnail	<i>Subulina octona</i> (Brugueie, 1789)
	Achatinidae		<i>Subulina striatella</i> (Rang, 1831)
		Decollate snail	<i>Rumina paivae</i> (Lowe, 1860)
		Dwarf awlsnail	<i>Opeas hannense</i> (Rang, 1831)
		Spike awlsnail	<i>Allopeas clavulinum</i> (Potiez & MichAcaud, 1838)
2.	Achatinellidae	O'ahu tree snail	<i>Achatinella casta</i> (Newcomb, 1853)
			<i>Achatinella pulcherrima</i> (Swainson, 1828)
3.	Geomitridae	Pointed helicellid's shell	<i>Cochicella conoidea</i> (Muller, 1774)
4.	Pomatiopsidae	Round-mouthed snail	<i>Oncomelania hupensis</i> (Gredler, 1881)
5.	Thiaridae	Quilted melania	<i>Tarebia Lineata</i> (Gray, 1828)
6.	Lymnaeidae	Melantho snails	<i>Lymnaes acuminata</i> (Lamarck, 1822)
7.	Veronicellidae	Tropical leaf slug	<i>Laevicaulis atle</i> (Ferussac, 1822)
		Leatherleaf slug	<i>Veronicell spp</i> (Ferussac, 1822)
8.	Unionidea	Freshwater mussels	<i>Lamellidens corrianus</i> (Lea, 1834)
9.	Pisidiidae	Fingernails clams	<i>Sphaerium indicum</i> (Deshayes, 1854)

Figures:



(1). a, b: *Subulina octona* - Ventral & Dorsal View



(2). *Subulina striatella* - Dorsal View



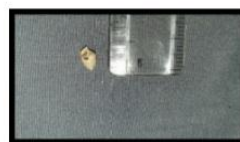
(3). *Rumina paivae* - Ventral View



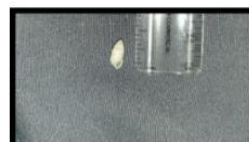
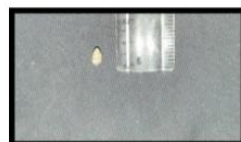
(4). *Allopeas clavulinum* - Ventral View



(5). a,b: *Opeas hannense* - Dorsal View



(6). a,b: *Achatinella casta* - Ventral & Dorsal View



(7). a,b: *Achatinella pulcherrima* - Ventral & Dorsal View

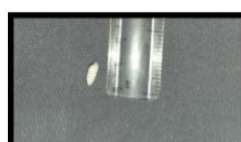




Table 2

Check List of Molluscan species identified at Deliyu Lake;

SN.	FAMILY	COMMON NAME	SCIENTIFIC NAME
1.	Achatinidae	Decollate snail	<i>Rumina Saharica</i> (Lowe,1860)
			<i>Rumina decollata</i> (linnae,1758)
2. 3.	Geomitridae	Pointed helicellid's snail	<i>Cochicella acuta</i> (Muller,1774)
	Achatinellidae	O'ahu tree snail	<i>Achatinella taeniolata</i> (Pfeiffer, 1846)
4.	Partulidae	Fat guam partula	<i>Partula gibba</i> (ferussac,1821)
			<i>Partula radiolata</i> (ferussac,1821)
5.	Unionidae	Fresh water mussel	<i>Lamellidens marginalis</i> (Lea, 1834)

		Unio favidens Benson	<i>Parreysia favidens</i> (Benson, 1862)
6.	Pisidiidae	Pill clams	<i>Pisidium spp</i> (Pfeiffer, 1821)
		Fingernails clams	<i>Sphaerium indicum</i> (Deshayes, 1854)

Figures:

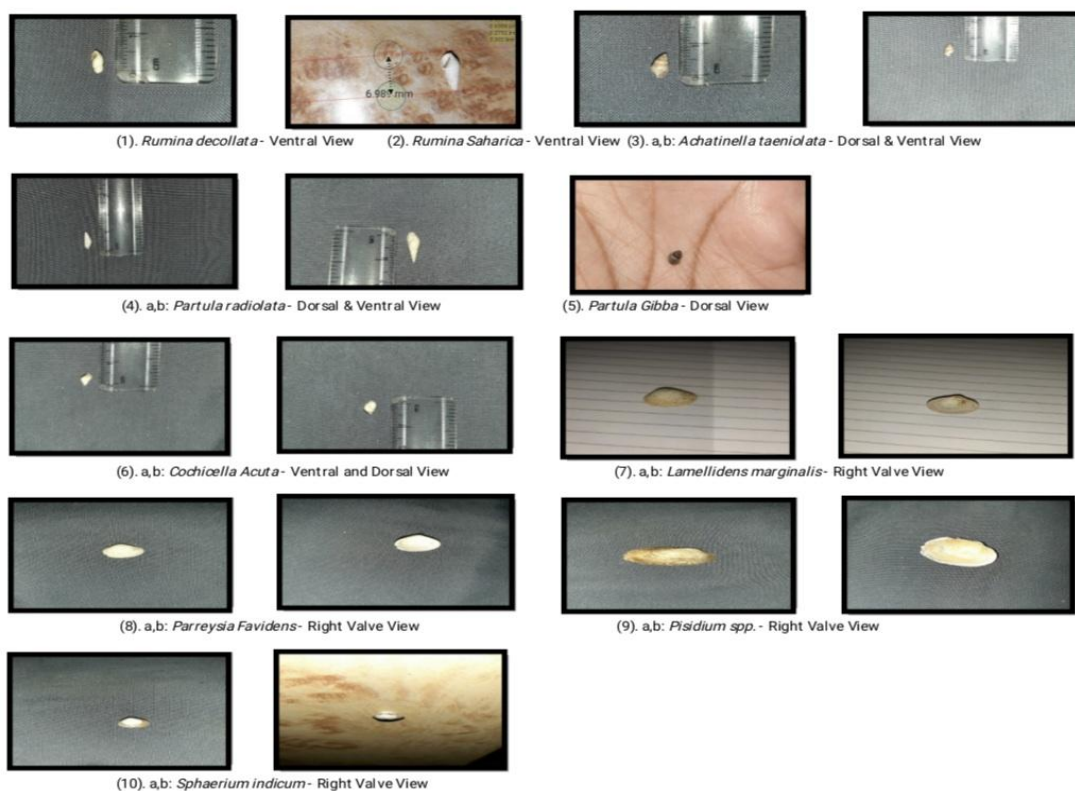


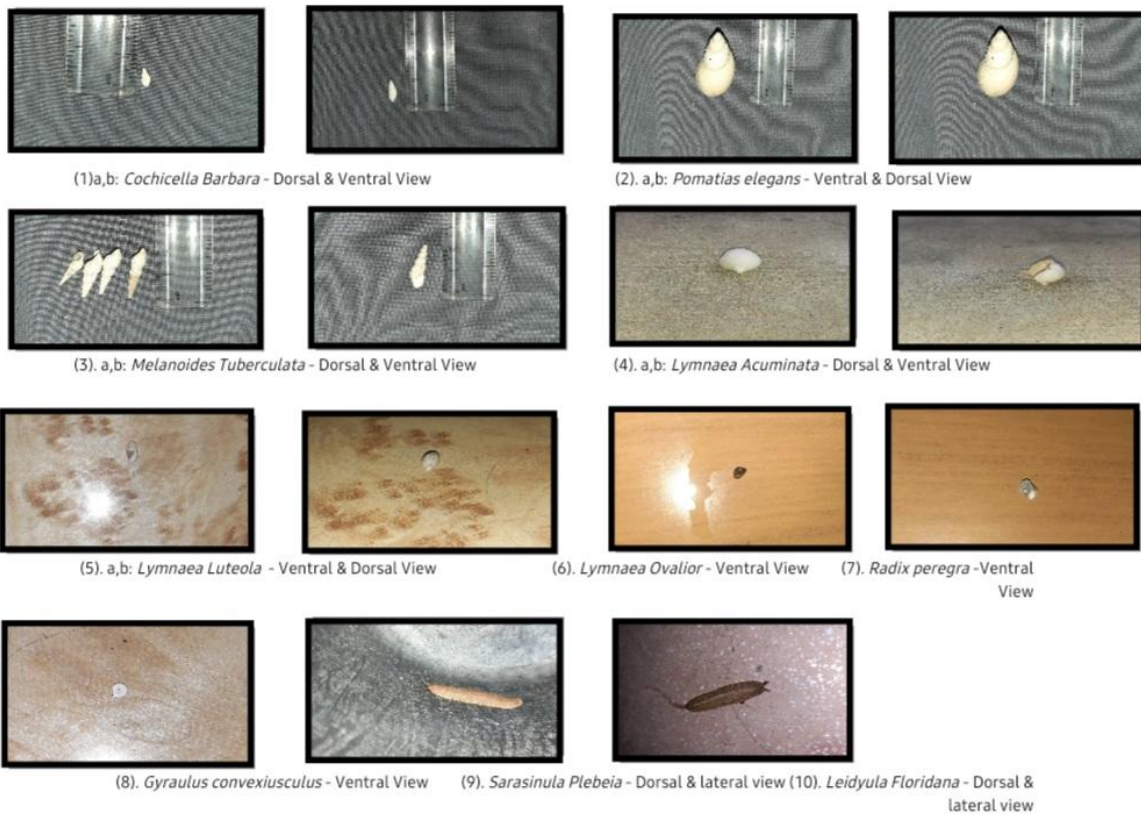
Table 3

Check List of Molluscan Species identified at Depal Lake;

SN.	FAMILY	COMMON NAME	SCIENTIFIC NAME
1.	Geomitridae	Scrub Snail	<i>Cochicella Barbara</i> (Linnaeus, 1758)
2.	Pomatiopsidae	Round-mouthed snail	<i>Pomatias elegans</i> (Muller, 1774)
3.	Thiaridae	Red rimmed melania	<i>Melanoides tuberculata</i> (O.F.Muller, 1774)
4.	Lymnaeida	Radix luteola	<i>Lymnaes ovalior</i> (Annandale & Prashad, 1921)
			<i>Lymnaes teola</i> (Lamarck, 1822)
		Melantho snails	<i>Lymnaes acuminata</i> (Lamarck, 1822)
5.	Planorbidae	Wandering pondsnail	<i>Radix peregra</i> (Muller, 1774)
		Ram's horn snail	<i>Gyraulus convexiusculus</i> (Hutton, 1849)

6.	Veronicellidae	Bean slug	<i>Sarasinula Plebeia</i> (Fischer, 1871)
		Florida leatherleaf	<i>Leidyula floridana</i> (Leidy & BinneyinBinney, 1851)

Figures:



IV. CONCLUSION

Pomatias elegans, *Rumina paivae*, *Melanoides tuberculata*, *Subulina striatella*, *Subulina octona*, which is an exotic species, is even known newly from India. They have happens a perilous pest and cause a major damage to crops and vegetation. In recently three other foreign species by *Tarebia Lineata*, *Opeashannense*, *Parreysia favidens* have been introduced into freshwater bodies of Gujarat. The threats from them on native species are either hard to find and if they are uneradicated in time, they may alter the ecological niche of native species, eradicating them from their natural habitats.

Freshwater molluscs species viz., *Rumina spp*, *Parreysia spp*, *Lamellidens spp*, *Corbicula spp* are extensively used as food and sold by low income groups for whom freshwater resources are often vital importance in sustaining livelihood and food security. The surveys it is clearest observation of 18% families suitable to diversity of *Subulina* and *Decollata* are habituated to feed curries to prepare with the flesh of the freshwater molluscs. Higher *Decollata* 30 - 90% families belonged to diversification Castes.

V. ACKNOWLEDGEMENT

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