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Comparison Of Mollusc Fauna Of Desert Area Bikaner (Rajasthan)

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ABSTRACT-

The desert region of Bikaner is known for arid climate and harsh environmental condition. Despite sparse water resources and challenging environmental conditions, this region supports enough macrobenthic fauna of freshwater including mollusc population. Molluscs are crucial component of aquatic ecosystem as they add productivity and decay organic matter of aquatic ecosystem. This study aims to give an overview of the diversity of molluscs species of different water bodies of Bikaner. Molluscs of class gastropoda of different families were observed during study.

Keywords- Aquatic ecosystem, molluscs, diversity, gastropoda.

INTRODUCTION

Bikaner district occupies the north western part of Rajasthan, with an area of 30247.90 sq. km. The climate of this region is arid and it becomes extremely arid in western region. Ground water report of Bikaner area suggests mean annual rainfall of 277.55mm and south west monsoon is responsible for maximum annual rainfall. District being in desert area experience extreme heat in summer (temp. above 49°C) and extreme cold in winter (temp. below 1°C). Sparse water resources, including lakes and ponds and some of them are ephemeral. Despite absence of any river system in this area, IGNP covers the largest area for water supply.

Molluscs are soft bodied animals, the second largest invertebrate animal phylum next to arthropoda, with over 100000 species. Well known animals of this phylum are snails, octopuses, squids, clams and mussels in freshwater as well as on land. During the course of evolution, they have shown high adaptability and live in almost all available habitats (Ponder and Lindberg, 2008.) Molluscs are bilaterally symmetrical and their tissue covering body wall is known as mantle /pallium (Brusca and Brusca, 2003). This mantle helps to secrete calcium carbonate shell. Their body is divided into three different functional region- head, foot, and visceral mass. The diverse group of mollusca is distributed in three major categories: gastropods (Stomach footed) having snails, slugs and limpets, bivalves (oysters, mussels, clams) and cephalopods (head footed) octopuses, squids, and nautilus (Haszprunar2000). Conventional malacofaunal study was started by W.H Benson (British Naturalist) in 19th century and a detailed work on land and fresh water snail was published by Godwin –Austen (1897-1914). Researchers like (Abbot 1989, Seddon 2000, Lydeard et al.2004; Strong et al 2008) estimated 30,000 fresh water mollusc species from which 23-24000 are terrestrial and 7000 are fresh water species. In India 1140 land species and 217 species of fresh water molluscs have been suggested by (Ramakrishna and Dey 2007). According to literature Preston (1915) is regarded as revolutionary scientist for documenting freshwater molluscs in India for the first time. He acknowledged 370 species of freshwater

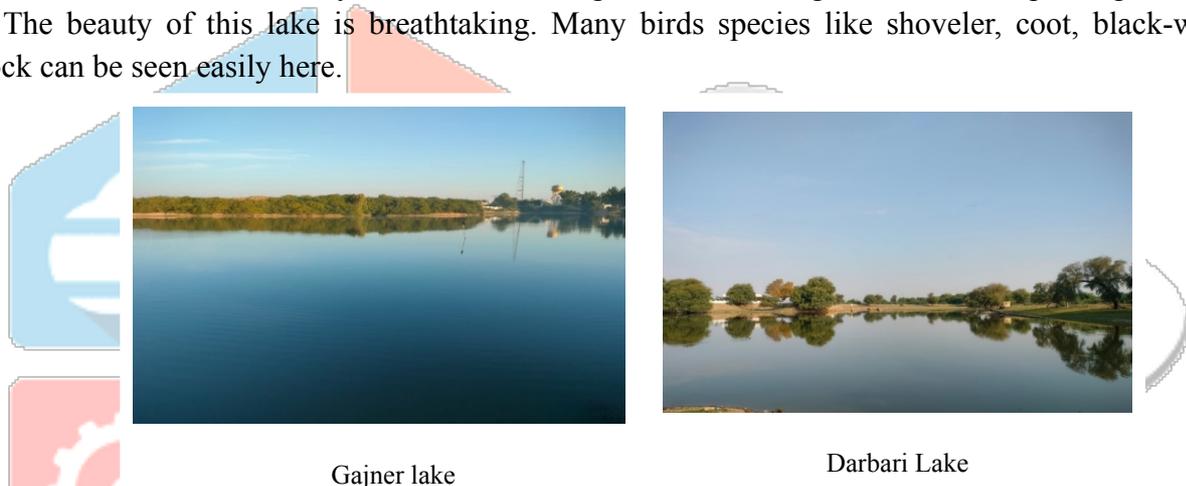
gastropods and pelecypods from the Indo-Burma region. Molluscs add productivity in aquatic ecosystem with their abundance (Padghane et al.2017) and Vaughn (2017). Systematic freshwater malacofaunal study in desert region is done by Saxena (1956), Subba Rao (1996), Kumar et al (1998), Singh and Saxena (2006), khatri (2008), Khanam and Singh (2012).

STUDY AREA

To conduct malacofaunal study four water bodies of Bikaner district were selected. The study was conducted for a period of 12 months from April 2022 to march 2023 at Gajner lake, Darbari lake, Kodamdesar pond and Harsholav pond.

Gajner lake- situated in southwest of Bikaner district and 32 km away from Bikaner, covers an area of 400mm x200mm. It is an artificial rainfed permanent lake. It is part of Gajner wild life sanctuary and known as ‘Chundasagar’. Lake view is attractive and serene. It is one of the favourite spots of bird lovers. Many migratory birds can be seen here during winter season Birds like cormorant and egrets are permanent resident here. Additionally turtles, fishes, molluscs, insects and other organisms can be observed easily.

Darbari lake – This lake is 28 km away from Bikaner, covers an area of 2500m². This lake has aesthetic value. The area is surrounded by trees, shrubs and grasses. Browsing cattle like sheep and goats drink water here. The beauty of this lake is breathtaking. Many birds species like shoveler, coot, black-winged stilt, peacock can be seen easily here.



Gajner lake

Darbari Lake

Harsholav pond –This pond is situated in Nehru nagar of old city of Bikaner. It receives rainwater and appears greenish in colour due to abundance of wolffia. This place has religious value as people perform ‘Anushthan’ here during month of ‘shravan’. Lord Shiva’s temple is present near pond area. This pond water harbours wide range of living microbiota like paramecium, vorticella, stentor, stenocypris and many more. Frogs can be easily observed during rainy season.

Kodamdesar pond – this pond is situated in Akasar village of Bikaner, which is around 24 km away from Bikaner in the west. Kodamdesar is sacred renowned place due to Bhairu ji temple. A large number of pilgrims visit this temple during Bhadrapad fair. Pond is situated behind this temple in 5500m²area. Birds like painted stork, pond herons and many more visit this pond for water. Fishes and some benthos can be observed here.



Harsholav pond



Kodamdesar pond

Methodology-

Investigation was conducted in mentioned water bodies (Gajner, Darbari, Harsholav, Kodamdesar) during different seasons for a period of 12 months from April 2022 to march 2023. To collect the molluscs, some specimens were handpicked from littoral zone and other specimens were collected by using quadrat method suggested by Saxena (2001), in this method mud sample from the pond site were collected by using quadrat of known size 20cm x 25cm. These mud samples then transferred to labelled poly bags and carried to laboratory for further investigation. Mud sample was poured in enamel tray and separated by adding water in it. individual specimen was put in petri dish and viewed under stereomicroscope and bull lens. Specimen identification was done by using standard key. (Ray and Mukherjee (1963) and (Tonapi, 1980).

Result and discussion-

In present study total 7 mollusc species were found out of which two species dominating in three lakes as compare to other group of molluscs. The study on molluscan fauna has been carried out by number of workers, in different region of India and Rajasthan. Earlier khatri (2008) also reported these species from the same region of the Rajasthan. All four water bodies receive rainy water from its catchment area, which run off during the rainy season, and carry several nutrients for the enrichment of aquatic ecosystem, these nutrients are necessary for the growth of molluscan fauna. Molluscs are the benthos as well as bioindicators and they play a very important role in maintaining aquatic ecosystem by recycling nutrients and serving as nutrition for certain aquatic organisms. Molluscs also play a major role for household animal husbandry, as it works as an intermediate host for the cercaria larvae, and affects the population of cattle (sheep). Molluscs inhabiting bottom part of the lake and plays an important role in converting organic matter together with the benthos in to a biomass. This in turn consumed by fishes, thus helps in the secondary productivity and forms an important component of the food web of aquatic ecosystem. Present study shows *Bellamya*, *Lymnaea*, *Gyraulus*, *Indoplanorbis*, *Gabbia*, and *Digoniostoma* are chiefly present in four water bodies.

The study was carried out from April 2022 to march 2023 and the findings are present in table 1-4.

1. *Gyraulus* reported only in Gajner lake and were noticed during 3 months of the investigation period.
2. *Digoniostoma* was noticed in Harsholav, kodamdesar and Darbari village pond while absent in remaining one pond.
3. *Gabbia* was noted in kodamdesar and Harsholav pond.
4. *Lymnaea* reported in three lakes viz. Darbari, Gajner, Kodamdesar and didn't reported in Harsholav.
5. *Bellamya* was present in Gajner and Darbari village pond.
6. *Indoplanorbis* and *Lymnaea* both were present in three village ponds as *Lymnaea* was absent in Harsholav while *Indoplanorbis* was absent in Gajner.
7. *Thiara tuberculata* noticed in harsholav pond during the rainy season of observation.
8. In compare to remaining Gajner lake shows less diversity as only three species of molluscs were noticed.

Table-1 Gajner mollusc fauna

Gastropods	April22	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan23	Feb	March
<i>1.Bellamya bengalensis</i>	12	14	12	10	10	16	16	12	10	8	8	23

2. <i>Indoplanorbis Exustus</i>	-	-	-	-	-	-	-	-	-	-	-	-
3. <i>Lymnaea acuminata</i>	-	-	-	-	-	-	-	-	-	8	25	9
4. <i>Gyraulus rotula</i>	-	-	-	-	-	-	-	-	-	12	30	7
5. <i>Gabbia Orcula</i>	-	-	-	-	-	-	-	-	-	-	-	-
6. <i>Digoniostoma Pulchella</i>	-	-	-	-	-	-	-	-	-	-	-	-
7. <i>Thiara (Melanoides) tuberculata crebra lea</i>	-	-	-	-	-	-	-	-	-	-	-	-
Total	12	14	12	10	10	16	16	12	10	28	63	39

Table-2 Darbari mollusc fauna

Gastropods	April22	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan23	Feb	March
1. <i>Bellamya bengalensis</i>	10	6	9	7	8	15	7	6	9	15	10	9
2. <i>Indoplanorbis Exustus</i>	6	6	0	12	0	13	6	6	9	7	8	12
3. <i>Lymnaea acuminata</i>	4	2	10	10	8	6	-	4	8	0	10	8
4. <i>Gyraulus rotula</i>	-	-	-	-	-	-	-	-	-	-	-	-
5. <i>Gabbia Orcula</i>	-	-	-	-	-	-	-	-	-	-	-	-
6. <i>Digoniostoma Pulchella</i>	12	0	0	10	8	10	8	-	8	10	6	10
7. <i>Thiara (Melanoides) tuberculata crebra lea</i>	-	-	-	-	-	-	-	-	-	-	-	-
Total	32	14	19	39	24	44	21	16	34	32	34	39

Table-3 Harsholav mollusc fauna

Gastropods	April22	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan23	Feb	March
1. <i>Bellamya Bengalensis</i>	-	-	-	-	-	-	-	-	-	-	-	-
2. <i>Indoplanorbis Exustus</i>	8	0	2	14	26	18	40	3	2	1	2	2
3. <i>Lymnaea acuminata</i>	-	-	-	-	-	-	-	-	-	-	-	-
4. <i>Gyraulus Rotula</i>	-	-	-	-	-	-	-	-	-	-	-	-
5. <i>Gabbia Orcula</i>	97	99	65	86	140	2010	380	70	70	45	110	150
6. <i>Digoniostoma Pulchella</i>	17	17	10	10	29	64	18	11	10	12	18	23
7. <i>Thiara (Melanoides) tuberculata crebra lea</i>	-	-	-	5	10	8	3	1	-	-	-	-

Total	122	116	77	115	205	2100	441	85	82	58	130	175
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Table- 4 :- Kodamdesar mollusc fauna

Gastropods	April22	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan23	Feb	March
1. <i>Bellamya bengalensis</i>	-	-	-	-	-	-	-	-	-	-	-	-
2. <i>Indoplanorbis exustus</i>	18	17	16	28	18	30	34	40	30	13	15	16
3. <i>Lymnaea acuminata</i>	14	13	12	72	32	26	48	20	10	0	0	13
4. <i>Gyraulus Rotula</i>	-	-	-	-	-	-	-	-	-	-	-	-
5. <i>Gabbia orcula</i>	15	14	13	48	28	16	16	12	13	13	14	16
6. <i>Digoniostoma Pulchella</i>	4	2	2	6	8	2	8	2	10	3	4	6
7. <i>Thiara (Melanoides) tuberculata crebra lea</i>	-	-	-	-	-	-	-	-	-	-	-	-
Total	51	46	43	154	86	74	106	74	63	29	33	51

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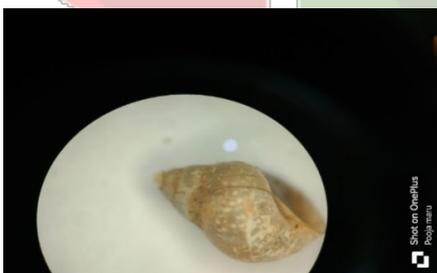
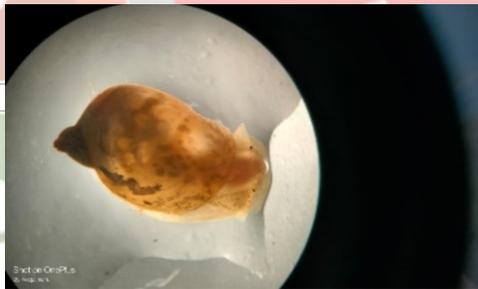


Diagram- *Indoplanorbis exustus*, *Gyraulus rotula*, *Bellamya bengalensis*, *Thiara tuberculata*, *Gabbia orcula*, *Lymnaea acuminata*, *Digoniostoma pulchella*.