

Diversity of bivalve and gastropod molluscans at lower manair dam from Karimnagar district, Telangana State

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Abstract

Diversity of bivalve and gastropod molluscans from Lower Manair Dam freshwater habitat was studied during the study period June 2017 to May 2019. A total of 22 species of molluscan communities were represented by two classes, 3 orders under 8 families. The represented class Gastropoda contributed to highest with 66.67% and Bivalvia lowest with 33.33% in the total orders. The class Gastropoda represented to highest with 68.18% species and order Bivalvia with 31.82% species in the population. Order Mesogastropoda contribute to highest with 50.00% species, followed by Unionida with 31.19% species and Basommatophora with 18.18% species in the population. The identified species classified into Class, Order, Family, Scientific name and IUCN (2020-2) were recorded during study period.

Keywords: molluscans, gastropoda, bivalvia, species, community, IUCN (2020-2)

Introduction

Molluscs are a part of the invertebrate microfauna of freshwater habitats throughout the world. Identification of freshwater snails is of value to zoologists, malacologists and conchologists because of their role as intermediate hosts of the larvae of a variety of trematode parasites. About 100 species of freshwater gastropods are reported to act as intermediate hosts for the diagnostic trematode parasites. (Subba Rao, 1993)^[1].

Freshwater molluscs have been known to play significant roles in the public and veterinary health and thus need to be scientifically exploring more extensively (Supian and Ikhwanuddin, 2002)^[2]. Freshwater bivalves are a key component of the ecology of aquatic ecosystems.

As sedentary suspension feeders, they have a direct impact on suspended material in the water column and potentially exert bottom-up control on phytoplankton blooms (Allen 2011)^[3]. The two major classes of molluscs have representatives in freshwater: as Gastropoda snails and the Bivalve freshwater mussels and clams. A few species of freshwater molluscs are among the most notorious invasive species. In contrast, numerous others have become threatened or have become extinct in the face of anthropogenic change. The aim of present study revealed about distribution of molluscan community and there are no earlier records in the Lower Manair Dam.

Materials and Methods

Lower Manair Dam (LMD) is situated in Karimnagar District of Telangana state. This is a large new impoundment of Godavari basin with medium productive potential. The Lower Manair Dam is built across the Manair River, a tributary of the Godavari River. The Lower Manair Dam is situated at Kakatiya Canal about 146.00 km to 234 kms. The maximum height of the dam is around 27 m and the catchment area of river 6,475 sq.km. Reservoir full level is 280.416 mt. Water spread area is 81.024 sq. km. The total area of the reservoir is about 8,103 hectare and maximum depth is 21.9m. The samples were collected from Manair River, Chintakunta, Yeswada and Gopalpur stations during the dry and wet seasons of the year 2017- 2019 (Fig 1). Molluscan samples were taken at random from the periphery of the Dam, banks as well as water body by using scoop net and hand picking methods. The snails were taken to the laboratory, washed with clean water to remove the debris and detail of fresh specimen was recorded. The specimens were put in 96% alcohol for 24 hours before removing the soft parts. The shells, deeply covered with mineral deposit and alga, were cleaned by putting them in dilute solution of oxalic acid for few minutes, before being scrubbed with a softbrush and washed in water in order to reveal the sculpture of shell^[4, 5]. The shells were dried at room temperature and preserved for future studies. Key to identify the classification is followed^[6, 7, 8, 9, 10, 11].

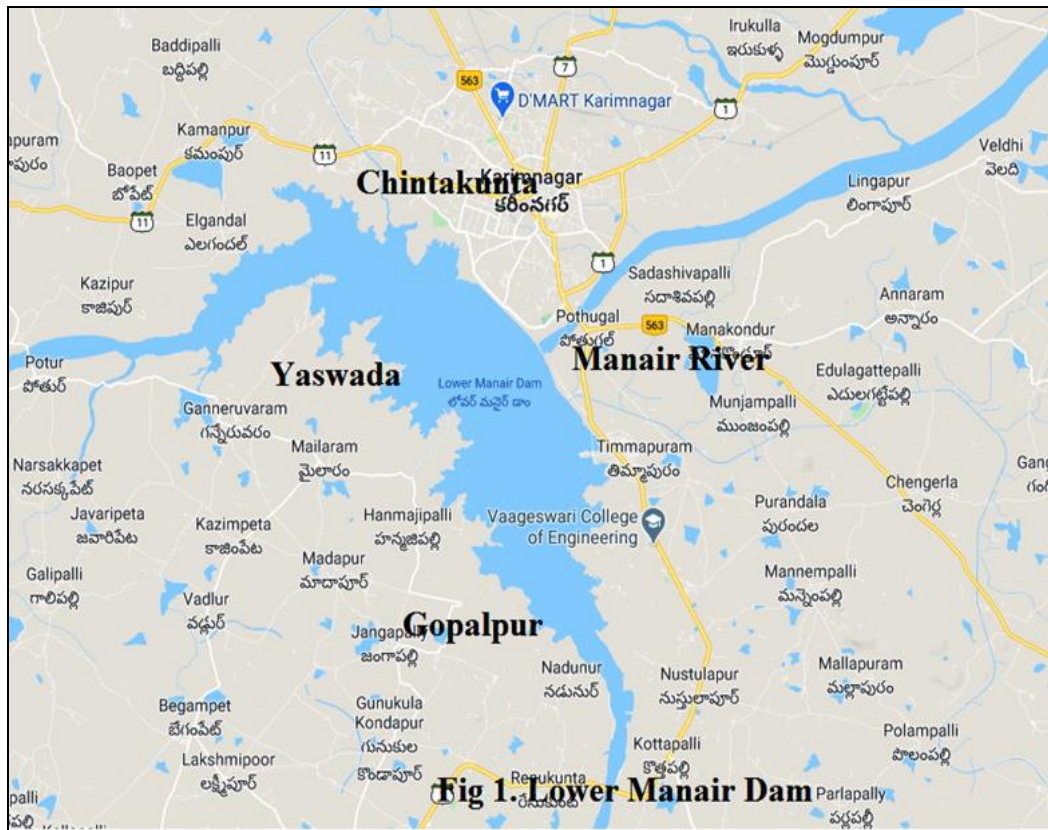


Fig 1: Lower Manair dam

Results

A total of 22 species were recorded from all sampling sites during the study period from 2017- 2019 in Lower Manair Dam. The molluscan community was represented by two classes, 3orders, 8 families and 22 species were noted in Table 1; Fig 2. The represented class Gastropoda contributed to highest with 66.67% and Bivalvia lowest with 33.33% in the total orders. The class Gastropoda represented to highest with 15 species (68.18%) and order Bivalvia with 7 species (31.82%) in the population (Table 2; Fig 3). Class Gastropod also had seven families, ten genera and fifteen species and class Bivalvia also had one family, two genera and seven species. The represented species of Class Gastropod was noted to two orders Mesogastropoda and Basommatophora and Bivalvia noted to one order i.e., Unionida. Order Mesogastropoda contribute to highest with 57.14% families, followed by Basommatophora with

42.86% families and Unionida 14.29% families in the total population. Order Mesogastropoda contribute to highest with 11 species (50.00%), followed by Unionida with 7 species (31.19%) and Basommatophora with 4 species (18.18%) (Table 3; Fig 4). The result of present study revealed that the freshwater molusca fauna was more abundant in monsoon season as compared to postmonsoon period. The species belong to genus *Bellamya*, *Pila*, and *Lymnaea* were predominant during summer rainy season. The early stages of class Gastropoda belong to genus *Thiara*, *Indoplanorbis*, *Bellamya* species were harbouring to hydrophytes and adults are observed at periferal regions in the reservoir. *Lamellidens*, *Parreysia* species under bivalvia class was frequently observed shallow muddy waters in various seasons.

Tables and Figures

Table 1: Checklist of Class, Order, Family, Scientific name and IUCN data

| Phylum: Mollusca (Linnaeus, 1758) | | | | | |
|-----------------------------------|----------------|---------------|--|---|---------------|
| Class | Order | Family | S.No | Scientific name | IUCN (2020-2) |
| Gastropoda | Mesogastropoda | Ampullariidae | 1. | <i>Pila virens</i> (Lamarck, 1822) | LC |
| | | Bithynidae | 2. | <i>Bithynia cerameopoma</i> (Bens'on, 1830) | LC |
| | | | 3. | <i>Bithynia pulchella</i> (Bens'on, 1836) | LC |
| | | | 4. | <i>Gabbia travancorica</i> (Benson, 1860) | LC |
| | | | 5. | <i>Thiara lineata</i> (Gray, 1828). | LC |
| | | Thiaridae | 6. | <i>Melanoides tuberculatus</i> (Mueller, 1774) | LC |
| | | | 7. | <i>Tarebia granifera</i> (Lamarck, 1822) | LC |
| | | | 8. | <i>Tarebia lineata</i> (Gray, 1828). | LC |
| | | | 9. | <i>Bellamya bengalensis</i> | LC |
| | | Viviparidae | 10. | <i>Bellamya crassa</i> (Benson., 1836) | LC |
| | | | 11. | <i>Bellamya dissimilis</i> (Mueller, 1774) | LC |
| | 12. | | <i>Indoplanorbis exustus</i> (Desbayes, 1834). | LC | |
| | Basommatophora | Bullinidae | 13. | <i>Lymnaea (Pseudosuccinea) acuminata</i> (Lamarck, 1822) | LC |
| | | Planorbidae | 14. | <i>Gyraulus labiatus</i> (Benson, 1850) | LC |

| | | | | | |
|----------|----------|-----------|-----|---|----|
| | | | 15. | <i>Gyraulus convexiusculus</i> (Hutton, 1849) | LC |
| Bivalvia | Unionida | Unionidae | 16. | <i>Lamellidens consobrinus</i> (Lea, 1859) | LC |
| | | | 17. | <i>Lamellidens corrianus</i> (Lea, 1834) | LC |
| | | | 18. | <i>Lamellidens marginalis</i> (Lamarck, 1819) | LC |
| | | | 19. | <i>Parreysia corrugata</i> (Benson, 1862) | LC |
| | | | 20. | <i>Parreysia favidens</i> (Benson, 1862) | LC |
| | | | 21. | <i>Parreysia (Radiatula) caerulea</i> var. <i>Gaudichaudi</i> (Eydoux 1838) | LC |
| | | | 22. | <i>Parreysia (Radiatula) pachysoma</i> (Benson, 1862) | LC |



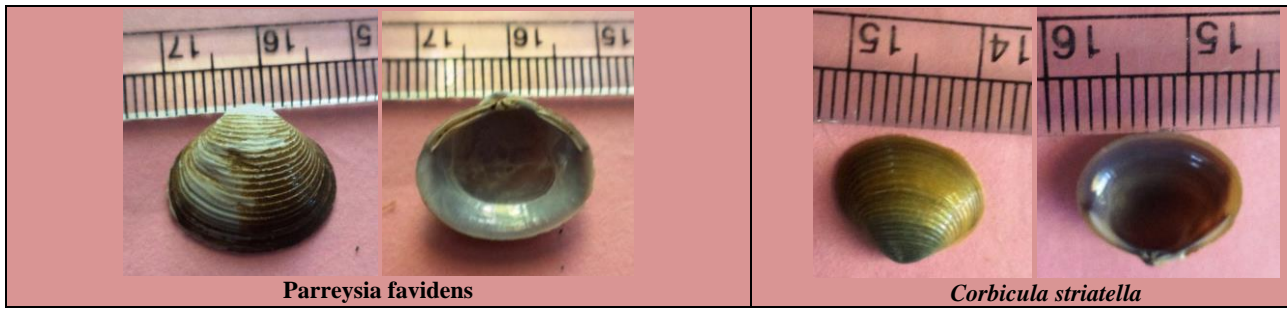


Fig 2: Shells of Molluscs

Table 2: Percentage composition of order and species in various classes

| Class | % of Orders | % of Species |
|------------|-------------|--------------|
| Gastropoda | 66.67 | 68.18 |
| Bivalvia | 33.33 | 31.82 |

Table 3: Percentage composition of families and species in various orders

| Order | % of Families | % of Species |
|----------------|---------------|--------------|
| Mesogastropoda | 57.14 | 50.00 |
| Basommatophora | 42.86 | 18.18 |
| Unionida | 14.29 | 31.19 |

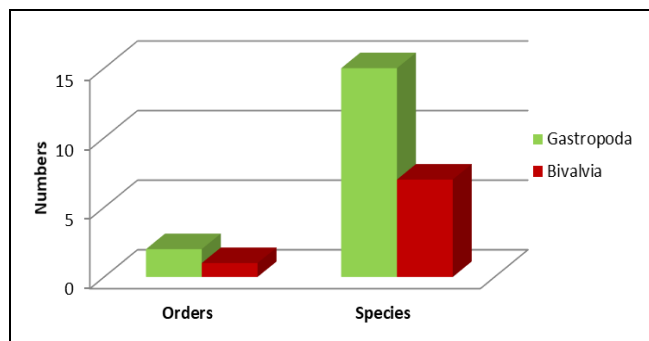


Fig 3: Percentage of Classes

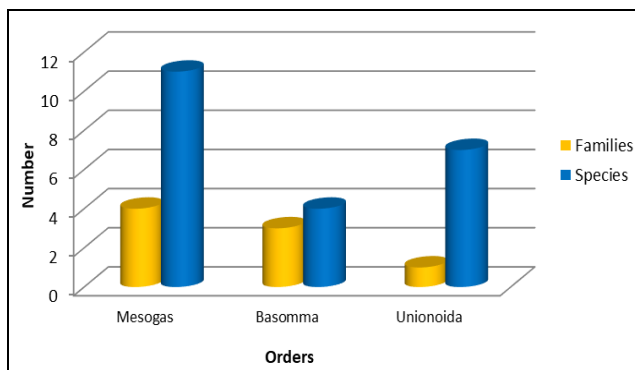


Fig 4: Percentage of Orders

Discussion

A similar study was conducted on molluscan community of the Bharathapuzha river in Kerala and thirteen species of molluscs belonging to five orders, eight families and ten genera were reported [12, 13]. A total of 25 species identified including forms under 13 genera and 10 families of both gastropoda and bivalves are listed from the Wyr Lake [14]. A total of 16 molluscan taxa belonging to 2 classes, viz., Gastropoda and Bivalvia, 4 orders, 5 families and 9 genera were recorded from 12 different sites on Barak and its tributaries [15]. Of the 16 species, 5 gastropods and 2

bivalves were recorded in a few sites only and appeared to be sensitive to anthropogenic disturbances. 13 gastropod and 6 bivalve species were recorded in River Narmada [16]. Among gastropoda *Thiara tuberculata* and *Tarebia granifera* were most dominant species recorded from all stations and in bivalvia *Parreysia occata* and *Corbicula striatella* were found at sixteen sites.

Rumeet Kour reported molluscan faunal assemblage in the river Narmada near water intake point and shown their dominance by contributing, nine species from gastropoda and two species from bivalves [17]. A total of 25 species includes 13 species from land snail and 12 species from freshwater molluscs were identified [18]. The observed species from land snail belonged to 2 order and 6 families and freshwater molluscs belonged to 5 order and 8 families in from Andhra Pradesh and Telangana states. The highest number of species recorded belonging to family Thiaridae followed by Viviparidae, Lymnaeidae, Arioplantidae, Bullinidae, Achatinidae, Veronicellidae, Cerastuidae from gastropods and nine species reported belonging to family unionidae and only one species from corbiculidae of bivalves. Amongst the freshwater gastropods *Bellamyia bengalensis* and *Melanoides tuberculata* were found more dominant, widely distributed and survival in varied aquatic habitats [19]. The significant results were encountered in Lower Manair Dam during the study period.

Conclusion

A total of 22 freshwater molluscan species were reported in 3orders, 8 families from Lower Manair Dam. Highest species diversity was found in all sampling sites, due to the presence of higher nutrient organic matter and vegetation. Chintakunta, Yeswada and Gopalpur sites contain rich Hydrophytes vegetation. The total number and type of molluscs probably is influenced by their habitat and soil condition. Further long term research is needed to explore the diversity of molluscan, population estimation, habitat, seasonal variations and threats. The present study provides the base line data for the molluscan diversity in Lower Manair dam.

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References

1. Subba-Rao NV. "Freshwater Molluscs of India," In: Roa K.S. (Ed.). Recent Advances in Freshwater Biology. New Delhi. Animal Publication. 1993; 2:187-202.
2. Supian Z, AM Ikhwanuddin. "Population dynamics of

- freshwater molluscs (Gastropod: *Melanoides tuberculata*) in Crocker Range Park, Sabah,” ASEAN Review of Biodiversity and Environmental Conservation (ARBEC), 2002.
3. Allen DC, Vaughn CC. “Density-dependent biodiversity effects on physical habitat modification by freshwater bivalves,” *Ecology*. 2011; 95:1013-1019.
 4. Mandahl-Barth G. “Key to the identification of East and Central African freshwater snails of medical and veterinary importance,” *Bull. Wld. Hlth. Or.* 1962; 27:135-150.
 5. Thompson FG. “The freshwater snails of Florida: a manual for identification” University of Florida Press, 2004.
 6. Vaught KC. “A classification of the living mollusks,” ed. R.T. Abbott and K.J. Boss. *American Malacologists, U.S.A.*, 1959, 1-189.
 7. Subba Rao NV. “Handbook, Freshwater Molluscs of India,” *Zoological Survey of India*, 1- xxiii +. 1959; 289:1-642.
 8. Surya Rao KV, Mitra SC. “Mollusca: In: Fauna of Ujaini, Wetland Ecosystem Series,” *Zoological Survey of India*. 2002; 3:133-142.
 9. Rama Krishna Anirudha Dey. “Mollusca Zoological Survey of India,” *Kolkata, AICOPTAX-*, 2007.
 10. Mitra SCA. Dyd and Ramakrishna. “Land and Freshwater Molluscs. In fauna of Andhra Pradesh. – State,” *Fauna sere Zoological Survey of India*. 2005; 5(5):175-258.
 11. Surya Rao KV. “Mollusca: In: Fauna of Po char am Lake, Andhra Pradesh,” *Wetland Ecosystem, Zoological Survey of India*, 2010, 1-181.
 12. Mary B, Seddon Ümit Kebapçı, Manuel Lopes-Lima, Dirk van Damme, Kevin G Smith. “Freshwater mollusks. <https://www.researchgate.net/publication/271488032>, 2004.
 13. Bijukumar AS, Sushama, Biswas T. “Molluscs collected from the Bharathapuzha River, Kerala,” *J. Inland Fish. Soc. India*. 2001; 33:2:68-69.
 14. Amaravathi D, Raja Sekhar PS, Rama Rao K. “Diversity of Molluscan communities in Kondakarla Freshwater Lake, Visakhapatnam, Andhra Pradesh,” *SSR Inst. Int. J. Life. Sci.* 2019; 05(1):2140-214.
 15. Surya Rao KV, Venkitesan R, Rao CAN. “Freshwater molluscs. Faunistic studies and limnological studies on wyra lake,” *wetland ecosystem series*. 2013; 16:75-96,
 16. Seba Roy, Abhik Gupta. “Molluscan Diversity in River Barak and its Tributaries, Assam, India. Assam University,” *Journal of Science & Technology: Biological and Environmental Sciences*. 2010; 5(I):109-113.
 17. Ankit Kumar, Vipin Vyas. “Diversity of Molluscan communities in River Narmada, India. *Journal of Chemical,* Biological and Physical Sciences, 2012; Vol. 2 (3): 1407-1412.
 18. Rumeet Kour Raina, Vipin Vyas, Abha Swarup, Parul Gurjar. “Molluscan Diversity in River Sip- A Tributary of River Narmada in Central India, *Int. J. Pure App. Biosci.* 2016; 4(5):108-113.
 19. Sajan SK, Basudev Tripathy, Tulika Biswas, Varadaraju. “Species inventory of land and freshwater Molluscs from Andhra Pradesh and Telangana states of India,” *Rec. zool. Surv. India*. 2018; 118(2):141-155.
 20. Gajanan A Wagh, Qureshi HA, SR Patil. “A brief note on Molluscan Diversity from water bodies of Amravati MS India,” *Biosci. Biotech. Res. Comm.* 2019; 12(3):814-819.