ORIGINAL RESEARCH PAPER
Volume - 14 | Issue - 02 | February - 2025 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

ASSESSMENT OF MOLLUSCAN SPECIES DIVERSITY IN GULBARGA UNIVERSITY CAMPUS, KARNATAKA, INDIA.

Zoology

Parshuram Kamble Department Of Zoology, Gulbarga University, Kalaburagi.
Syeda Qasim Fatima Department Of Zoology, Gulbarga University, Kalaburagi.
K. Vijaykumar Department Of Zoology, Gulbarga University, Kalaburagi.

ABSTRACT

The present study aimed to assess the diversity and distribution of molluscan species on the Gulbarga University Campus, highlighting the potential ecological significance of these species within the campus ecosystem. A comprehensive survey was conducted across various habitats within the campus to document Mollusca species richness, abundance, and their association with specific microhabitats. A total of 78 sampling points were established, including natural areas, gardens, and water bodies, to ensure a representative sampling sites. Molluscas were collected using visual surveys, hand collection, and quadrat sampling techniques.

KEYWORDS

INTRODUCTION:

Mollusca is one of the largest and most diverse phyla in the animal kingdom, encompassing an estimated 85,000 to 100,000 known species across terrestrial, freshwater, and marine environments. This paper provides a comprehensive overview of molluscan species, focusing on their classification, diversity, and ecological importance.
The classification of molluscan species is based on their morphology, anatomy, and genetic characteristics. This phylum is categorized into seven major classes: Gastropoda, Bivalvia, Cephalopoda, Polyplacophora, Scaphopoda, Monoplacophora, and Aplacophora. Each class exhibits distinct characteristics and includes numerous families, genera, and species. Gastropoda, for instance, is the largest class within Mollusca, encompassing snails and slugs, while Cephalopoda includes octopuses, squids, and nautiluses.

Molluscan species exhibit an astounding range of morphological features, adapting to various ecological niches and lifestyles. Gastropods demonstrate an incredible array of shell shapes, sizes, and patterns, allowing them to inhabit diverse habitats, including marine, freshwater, and terrestrial environments. Bivalves often possess hinged shells and are known for their filter-feeding capabilities, playing significant roles in aquatic ecosystems. Cephalopods, on the other hand, exhibit highly developed nervous systems, complex behaviors, and remarkable camouflaging abilities, making them formidable predators.

In addition to their remarkable diversity, molluscan species play vital ecological roles in their respective habitats. Bivalves contribute to nutrient cycling and water filtration, influencing water quality and maintaining ecosystem health. Some gastropods serve as herbivores, controlling algae growth and maintaining balance in aquatic ecosystems. Cephalopods, with their predatory behavior and high metabolic rates, regulate the population dynamics of their prey and contribute to energy transfer within marine food webs.

Molluscas also hold immense economic importance. Bivalves such as clams, oysters, and mussels are commercial sources of food and contribute to aquaculture industries worldwide. Pearls, valuable gemstones produced by certain bivalves and gastropods, have significant cultural and economic value. Additionally, cephalopods, particularly squids and octopuses, are harvested as a delicacy and contribute to the culinary industry.

Despite their ecological and economic importance, Molluscas face numerous threats, including habitat destruction, pollution, overfishing, and invasive species. These factors often result in the decline or extinction of certain molluscan species, disrupting ecosystem functioning and biodiversity.

The ecological importance of these molluscan species within the Gulbarga University campus ecosystem was evident. Gastropods played a crucial role in seed dispersal and decomposition, contributing to nutrient cycling and maintaining soil fertility. Bivalves acted as bioindicators of water quality, influencing aquatic ecosystem health. Cephalopods, although limited in number, provided valuable insight into the marine influences on the coastal areas of the campus and their ecological connectivity to adjacent marine habitats.

MATERIALS AND METHODS:

Study Area: Kalaburagi, Karnataka

Area -191,791 sq.km. Eighth biggest state in India. There are 31 districts in Karnataka and comes under four divisions. It is situated on western edge of the Deccan. Peninsular region of India.

Geography Of Kalaburagi: It is one of the biggest district in Karnataka Area: - 10,951 sq km.

Lolcation:- Latitude 17.34 N Longitude 76.84 E Population is 5,43,000 as per 2011 census**.**

Gulbarga University Campus

- Gulbarga University is a public University located in Gulbarga, Karnataka, India. It's jurisdiction is Kalaburagi. It has more than 37 teaching departments, 4 research Centers & also acts as an affiliating university. Gulbarga University comprises of 860 Acres of land. It is established in 1980. Gulbarga University Campus is located on the North-Eastern part of the Karnataka.
- Geographically it lies between 17°04' 7742' longitude & 16 12 – 17 46` latitude & placed 45 meters above the mean sea lend. Gulbarga possesses a typical climate of South Indian peninsula I with semi arid conditions, temperature between 14°C in winters 45°C in Summer & The average rainfall being 70 9 mm. The main Campus is located 10 kilometers (6.2 km) from the Gulbarga city centre if situated 860 acres of land. We also searched the different parts of the Gulbarga city like Roads, Construction works, water bodies.

RESULT:

4 species have been collected and identified. They are Ariophanta

semirugata, Bulimulus guadalupensis (Bruguiere 1789), Rachis punctatus (Anton 1839), Zooticus insularis (Ehrenberg 1839) of phylum Mollusca in the different parts of the Gulbarga University Campus region has been identified.

Table 1: Checklist of molluscan species of Gulbarga University Campus.

Class	Order	Family	Genus	Species
Gastropoda	Stylammotophora	Ariophantidae	Ariophanta	semirugata
		Orthalicidae	Bulimulus	guadalupensis
		Cerastidae	Rachis	punctatus
		Subulinidae	Zootecus	insularis

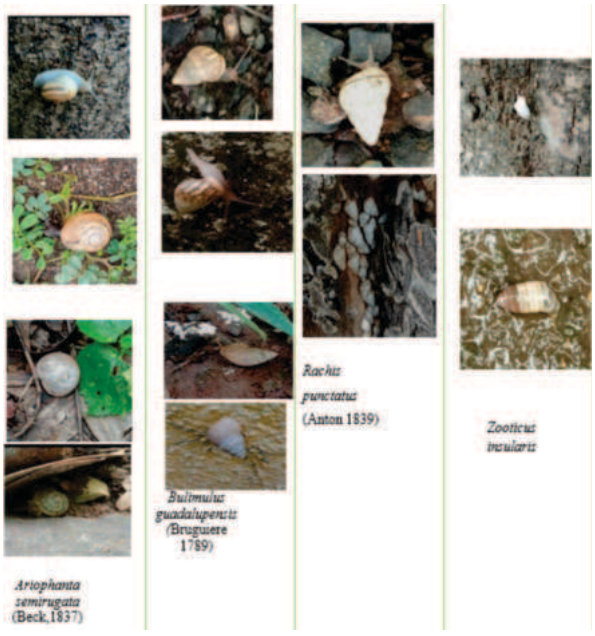

Plate 1: : Showing collected specimens at study area.

DISCUSSION:

In the present study we found 4 terrestrial molluscan species were identified as Ariophanta semirugata, Bulimulus guadalupensis, Rachis punctatus and Zooticus insularis. Freshwater and land snails belong to order pulmonate of class Gastropoda (Blandford and Godwin Austen, 1908). However the order pulmonate now is considered to be an informal group according to Bouchet and Rocroi (2005). The suborder Stylomatophora was identified on the basis of the two pair of tentacles and is in conformity. The snail specimens have perforated shells with sub globosely depressed shape with thin, fine striations and are decussated on the dorsal surface, on the ventral side there are spiral lines impressed with polished surface. They are pale horny in colour, enriched by two furous lines with a whitish band between them, the upper line continued insides the suture. The shells are spirally low to nearly flat or 4-5 convex whorl. The aperture is large with lunately ovulate shapes. The peristome is thin with the columellar margin slightly reflected is identified as Ariophanta semirugata. However the shell of the form present in the South India is pale in its colour (Blandford and Goldwin Austen, 1908).

The specimens have sub-globosely depressed perforate shell, which is thicker with smooth striations. The colour is white in mostly specimens with bluish tinge, being washed with bluish tinge, being washed with the brownish shade on the last whorl with narrow, spiral rufous band inside the sutures. There are numerous small brownish spots that are distributed irregularly along with traces of other bands. The spire is low or flatly convex above. The last whorl is slightly swollen form the ventral surface at periphery. The aperture is roundly lunate. The peristome is thin and columellar margin slightly reflected(Blandford and Austen,1908).

Bulimulus guadalupensis is a thick, opaque shell of this species does not exceeds 24 mm in height. The apex of the shell is off-white to brown in colour. There may also be a thin, white, spiral stripes. The upper whorl is broad, descends into conical shape commonly called as west Indian Bulimulus.

Rachis punctatus is a air breathing terrestrial snail from the class Gastropoda of phylum mollusca. Thick white shell with apical whorl broad conical shape, that consists of black line, teleoconch whorls are cylindrical in shape and the protoconch shows more irreguiar wrinkles. The whorls show decreased size fasion till tip. It is common snail in dry parts of Karnataka. The shell shows polymorphism and can easily confused as other species. Types of damage and symptoms: Extensive chewing of blossoms, leaves and shoots stunts the growth of young trees and trees that have been top worked. The land snail can especially be a problem following wet winters and springs. Land snail feeding is not problem in mature grooves. Thick, dry leaf mulch suppresses snail numbers and large trees tolerate any modest chewing. The characteristic symptom of the infestation was that the snails were feeding on the bark of the stem.

The shells of Zootecus insularis snails belonging go this species are thick and white in colour. The shells are turned with conical and broad shape of the apical whorls. The teleoconch whorls are nearly cylindrical in shape with very fine axial riblets, arched subsuturally. However irregular wrinkles are present on the protoconch. The axial sculpture may be interrupted by the irregular apical grooves. The peristome is thick. The shell aperture is subquadrate. The shell has an open umbilicus however due to the reflection of the peristome near columellar rim, it may be covered partially. The size of the specimens ranges from 11-15x3.5-6mm approximately. In many specimens there is a connection between the peristomial rims through a thick parietal callosity(Schultes, 2010).

These species are seasonal during rainy from the month of June to October. The month of October onwords the older snails of the species Ariophanta semirugata buried in soil along with shell, we found these terrestrial snails during rainy season of next season. This study shows occurance of species diversity in the specific study area of the Gulbarga University Main Campus, Kalaburagi.

The specimens have sub-globosely depressed perforate shell, which is thicker with smooth striations. The colour is white in mostly specimens with bluish tinge, being washed with the brownish shade on the last whorl with narrow, spiral rufous band inside the sutures. There are numerous small brownish spots that are distributed irregularly along with traces of other bands. The spire is low or flatly convex above. The last whorl is slightly swollen from the ventral surface at periphery. The aperture is roundly lunate. The Peristome is thin and columellar margin slightly reflected (Blandford and Godwin Austen, 1908).

In the present study molluscan population showed significant positive correlation with Atmospheric Temperature, Total Alkalinity, Total hardness at $P<0.05$ level and Water temperature, Carbon dioxide, Calcium Hardness and Chloride at $P<0.01$ level. Conservation of biological diversity is considered to be one of the major goals for sustainable management of marine renewable resource. The diversity of mollusks is mainly dependent on availability of suitable substrata, food and the degree of stress effect due to strong waves, tides, currents and anthropogenic pressure. The following are some of the steps recommend for the conservation of the molluscan diversity. Over exploitation by harvesting should be prevented and exploitation of juveniles should be curbed entirely. For controlling adverse impacts, study and field visits by students and public should be under the supervision of forest officials. Local, national and international laws governing species and habitats should be strictly implemented in the interest of conservation. Species in reproductive stage (egg laying, breeding and developing stages) should not be collected. Empty and washed shells should be preferred for collection purpose. Since the mollusks are important resources as food, medicine and ornamental items, at present it is under intense anthropogenic pressure.

REFERENCES:

1. J. Espinosa, E. F. García, J.Ortea, and M. Reguero. 2009. Mollusca: Introduction, Pp. 559– 564 in Felder, D.L. and D.K. Camp (eds.), Gulf of Mexico–Origins, Waters, and Biota. Biodiversity. Texas A&M University Press, College Station, Texas.
2. Jassim A. AL-KHAYAT*.2008 "First record of five terrestrial snails in the State of Qatar"
3. Shashikanth H Majagi, Anitha S. M, Jayadeva Naik, Dhanajaya S. G. and Somshekar, (2021) "Diversity and Population Density of Molluscans in Two Water Bodies Karnataka, India"
4. Cantanhêde, G., Hahn, N. S., Gubiani, É. A., Fugi, R. (2008) 'Invasive molluscs in the diet of Pterodoras granulosus (Valenciennes, 1821) (Pisces, Doradidae) in the Upper Paraná River floodplain, Brazil', Ecology of Freshwater Fish, vol 17, pp47–53.
5. Cataldo, D. and Boltovskoy, D. (1999) 'Population dynamics of Corbicula fluminea (Bivalvia) in the Paraná river delta (Argentina)', Hydrobiologia, vol 380, pp153–163.
6. Javaria Altaf, Naureen Aziz Qureshi, Muhammed Javed Iqbal Siddiqui (2017) Taxonomic studies on the occurrence of the snails (Mollusca: Gastropoda) in the agro

ecosystem"
7. Rafel Araujoi, Ignacio Gomez and Annie machordom, 2004 "The Identity And Biology Of Unio Mancus Lamarck, 1819(¼ U. Elongatulus) (Bivalvia: Unionidae) In The Iberian Peninsula".
8. Madhav V, Upadhye and Ujwala Jadhav "Evolution of genetic diversity of pearly mussel, Parreysia corrugata by randomly amplified polymorphic DNA (RAPD).
9. E.R.Trueman, M.R.Clark "The Mollusca, Volume 10 Evolution"
10. Shettigar Maalathi and Seetaramaiah Tippeswamy 2011 "Morphometry, Length-Weight and condition in Parreysia corrugata (Muller 1774) (Bivalvia: Unionidae)from the river malthi in western Ghats of India"
11. Abhishek Nigudgi, B.G. Mahendra (2018) "Diurnal variation of Dissolved oxygen in Appa Lake"
12. S.G Patil and S.S Talmale. (2005) "A Checklist of land and Freshwater Mollusca of Maharashtra State"
13. Kamble, V. S. (2018). Study of Diversity of Fresh Water Mol-Luscs from Drought Prone Region Sangola, District Sholapur (Ms), India. Journal of Emerging Technologies and Innovative Research. 5(8), 639-642.
14. Kumar, R, Maansi & Wats, M. (2019). Molluscan Biodiversity and Its Seasonal Fluctuations Inteekar Taal, Haryana. India. Inter-National Journal of Research – Granthalayah 7(1),