

A Collection of Non Marine Gastropods from Mangalore, Karnataka

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ABSTRACT

Diversity of freshwater and terrestrial gastropod molluscs from Mangalore region has studied. 12 specimens were identified up to species level except *Glessula* from two sites, Kadri and Jeppu Kudupady located in Mangalore. Among these 13 specimens, 3 were freshwater gastropods and 10 were terrestrial gastropods. There is always a threat to molluscs because of the rapid urbanization in Mangalore. Therefore, conservation of these species should be done to avoid the fragmentation of their habitat and not to become extinct species.

Keywords: Molluscs, Gastropod, Extinction, Mangalore.

INTRODUCTION

Molluscs constitute second largest invertebrates and are most successful group next to insects [1]. It has been in the world for over 5000 million years and includes forms like oysters, clams, squids, octopuses and snails. These are soft body, coelomate animals usually covered with hard calcareous shell. The gastropods (snails) are the second largest class of molluscs. They also are the most successful class in terms of evolution. They are diverse in feeding their habits and include herbivores, carnivores and parasites as well as scavengers and filter feeders. Non marine gastropods include terrestrial and freshwater gastropods. The world's freshwater gastropod fauna faces unprecedented threats from degradation and habitat loss and introduced fishes and other pests [12]. In the review article of land snail, till date 1,129 species of land snails were reported from Indian Territory [8]. Recent findings suggest that the tropics are losing biodiversity at an alarming rate [11]. Land snails are considered as an indicator of ecological conditions and they are very sensitive to the changes in climatic and ecological conditions [2, 9, 10]. Taxonomy of non marine molluscs has been studied rarely in last years. About 100 years ago three British scientists had identified 350 species of molluscs in the Western Ghats. The Western Ghats along with Sri Lanka form one of the 25 hot spots of the world [5]. There are many few reports on freshwater fauna and in particular on molluscs available locally. Some of the useful contributions include the work of Rao (1989). Recently, Mavinkurve *et al.* (2004) updated the information on the non marine molluscs of Western Ghats. This study is intended to produce the distribution of non marine gastropod molluscs in some areas located in Mangalore during south west monsoon period.

MATERIALS AND METHODS

Our work was undertaken in two sites of Mangalore-Kadri and Jeppu Kudupady. Semi evergreen forest of Kadri constitutes a very good home for land gastropods. Jeppu Kudupady is a place of plantation where we can see arecanut farm, plantain farm and paddy fields which again constitute a good habitat for these species. So we focussed on collection of non marine gastropods for our study.

Land gastropods were collected from semi evergreen forest of Kadri region having vegetation like *Mangifera indica*, *Cocos nucifera*, *Caryota urens*, *Jasminum* sp., *Carrisa carandus*, *Chromolena odorata*, *Macaranga peltata*, *Hollrrhena antydisentirica* etc. In Jeppu Kudupady land gastropods were collected from arecanut farm, plantain farm and freshwater species were collected from paddy fields. All the gastropods were collected for a period of three months (June, July and August) in 2005. All molluscan specimens were identified with the help of standard identification keys of Rao and Mitra (1979), Tonapi (1980) and Adoni (1985).

RESULTS

Thirteen specimens were collected from two sites, Kadri and Jeppu Kudupady located in Mangalore. Among these 13 specimens, 3 were freshwater gastropods and 10 were terrestrial gastropods. All these specimens were identified upto species level except *Glessula* (Table 1). Majority of the species are found from litters and all these species belong to Kadri (Fig. 1). Table 2 shows that the separation of freshwater and terrestrial gastropods based on our collection during the study period. All three freshwater gastropods, *Pila globosa*, *Bellamya bengalensis* and *Indoplanorbis exustus* are found in the paddy fields of Jeppu Kudupady, but freshwater gastropods were not found in Kadri since there are no paddy fields. In all the months (June, July and August), all the gastropods are present except *Euplecta indica*, *Glessula* sp. and *Alycaeus expatriatus* that did not occur in June (Table 1).

Table 1. Habitat distribution of non marine gastropods in Mangalore

Name of the species	Site of collection	Habitat	Month		
			June	July	August
<i>Pila globosa</i>	Jeppu Kudupady	Paddy field	+	+	+
<i>Bellamya bengalensis</i>	Jeppu Kudupady	Paddy field	+	+	+
<i>Indoplanorbis exustus</i>	Jeppu Kudupady	Paddy field	+	+	+
<i>Mariaella dussumeri</i>	Jeppu Kudupady	Arecanut farm	+	+	+
<i>Succinia baconi</i>	Jeppu Kudupady	Plantain farm	+	+	+
<i>Filicaulis frauenfeldi</i>	Jeppu Kudupady	Coconut tree	+	+	+
<i>Opeas garcile</i>	Jeppu Kudupady	Litters	+	+	+
<i>Machrochlamys woodiana</i>	Jeppu Kudupady	Potted plants	+	+	+
<i>Machrochlamys perrotteti</i>	Jeppu Kudupady	Potted plants	+	+	+
<i>Euplecta indica</i>	Kadri	Litters	-	+	+
<i>Glessula</i> sp.	Kadri	Litters	-	+	+
<i>Mychopoma seticinatum</i>	Kadri	Litters	+	+	+
<i>Alycaeus expatriatus</i>	Kadri	Litters	-	+	+

+ present; - absent

DISCUSSION

Molluscs are widely distributed species and they are present in both land and water. Land gastropods prefer damp habitat rich in humus and decaying plants since these materials give both food supply and excellent hiding places. Mobility of land mollusks enhances their chances of survival and these animals can venture into inhospitable places on hunting trips when food is in short supply and return again to their resting habitat. Ecology of freshwater snails has been studied in brief [7]. The physiological requirement and ecology of freshwater snails are very broad and hence they have capacity to overcome unfavorable conditions. These animals are available even in temporary water

ponds with aquatic vegetation and can survive for sometimes by burying themselves under mud and dead weeds. The freshwater gastropods were found from the paddy fields in our study. Climatic condition including water and soil played a major role for the survival of freshwater gastropods during our survey.

Pila globosa was found to be well adapted in the paddy fields and observed to be dominant when compared to other species. *Mariaella dussumeri*, *Filicaulis frauenfeldi* and *Succuinia baconi* are found in farms specially on decaying plant materials which form a good food source for these species. Many of the species were found on litters which are again a good hiding place for these species (Table 1). Some species mentioned in Table 1 are comparable with the findings of Mumbreakar and Madhyastha (2006). The gastropods, *B. bengalensis* and *I. exustus* found in the study area, Jeppu Kudupady are also reported by Sharma *et al.* (2013) from Gho-Manhasan stream located in Jammu recently.

Mangalore has varied habitat and rich in vegetation like *Areca catechu*, *Musa* spp. *Cocos nucifera*, *Mangifera indica* etc., semi green forest, paddy fields and plantations like arecanut, coconut etc. have added to the greenery of this region. This has contributed widely for the survival of gastropods in this region. But there is always a threat to these species because of the rapid urbanization in this area and no measures are taken to conserve these species. Increased urbanization has caused the fragmentation of the habitat. The destruction of the habitat is a main cause for the extinction of these species.

Table 2. Terrestrial and freshwater gastropods collected in Kadri and Jeppu Kudupady

Order	Family	Scientific name	Distribution
Terrestrial gastropods			
Stylommatophora	Ariophantidae	<i>Euplecta indica</i>	Across Western Ghats, Sri Lanka & Maldives
Stylommatophora	Ariophantidae	<i>Machrochlamys woodiana</i>	S. India & Sri Lanka
Stylommatophora	Ariophantidae	<i>Machrochlamys perrotteti</i>	W. Ghats
Stylommatophora	Ariophantidae	<i>Mariaella dussumeri</i>	Endemic to S. India & Sri Lanka
Stylommatophora	Subelinidae	<i>Opeas garcile</i>	Native of India, distributed world wide
Stylommatophora	Subelinidae	<i>Glessula</i> sp.	India, Sri Lanka, S. W. China, E & W Africa
Stylommatophora	Subelinidae	<i>Succinia baconi</i>	Endemic to W. Ghats
Soleolifera	Veronicellidae	<i>Filicaulis frauenfeldi</i>	Subtrophics & humid tropics
Mesogastropoda	Cyclophoridae	<i>Mychopoma seticinctum</i>	Western Ghats
Mesogastropoda	Cyclophoridae	<i>Alycaeus expatriatus</i>	Nilgiris, S. Canara, Shevroy hills
Freshwater gastropods			
Mesogastropoda	Ampullariidae	<i>Pila globosa</i>	Asia, Africa, Madagascar
Mesogastropoda	Viviparidae	<i>Bellamyia bengalensis</i>	South Asia, Africa
Mesogastropoda	Bullimidae	<i>Indoplanorbis exustus</i>	India, Pakistan, Sri Lanka, Myanmar, Iran, Malaysia

Extinction of molluscs can cause great loss to man because it is considered as natural treasures within our arm reach. Freshwater gastropods are eaten in different parts of the country. The demand for these has increased gradually nowadays and there is a need for anticipatory research programme to develop cultural technique for some of the common molluscs. For example, if developed properly the apple

snail, *Pila globosa* can be turned out into foreign exchange for India. *P. globosa* was reported by Rao *et al.* (2013) from Chittoor district of Andhra Pradesh recently. Land species are considered very good decomposers in the forest region. Extinction of molluscs can cause imbalance in ecosystem. It is necessary to educate the people about these species which are on the edge of extinction and new measures of conservation have to be set up. The above species mentioned will be helpful a little for the researchers who work on the ecology of the gastropods in Karnataka.

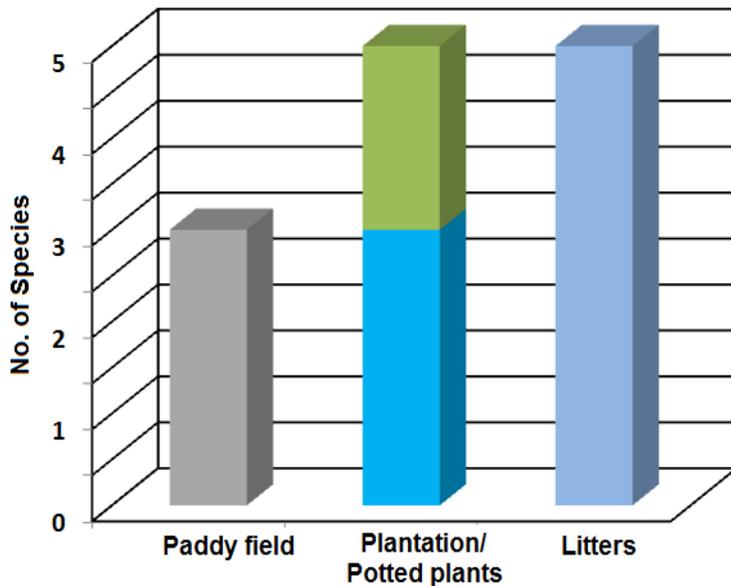


Fig. 1. Graphical representation of habitat distribution of non marine gastropods in Mangalore

CONCLUSION

Gastropods have important ecological roles in the study areas, but their habitats shows deterioration due to anthropogenic activities. Economical importance of edible gastropods should be monitored for human consumption and looked after their habitats for sustainable management.

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REFERENCES

- [1] Bouchet, P. 1992. Extinction and preservation of species in tropical world: what future for Molluscs? *American Conchologist* 20: 20-24.
- [2] Čejka, T. and L. Hamerlík. 2009. Land snails as indicators of soil humidity in Danubian woodland (SW Slovakia). *Polish Journal of Ecology* 57: 741-747.
- [3] Mavinkurve, R. G., S. P. Shanbhag and N. A. Madhyastha. 2004. Non marine molluscs of Western Ghats: a status review. *Zoos' Print Journal* 19: 1708-1711.
- [4] Mumbrekar, K. D. and N. A. Madhyastha. 2006. Land molluscs of Pillarkan sacred grove. *Zoos' Print Journal* 21: 2295.
- [5] Myers, N., R. A. Mittermeier, C. G. Mittermeier, G. A. B. da Fonseca and J. Kent. 2000. Biodiversity hotspots for conservation priorities. *Nature* 403: 853-858.
- [6] Rao, N. V. S. 1989. *Handbook of Freshwater Molluscs of India*, Zoological Survey of India,

Calcutta.

- [7] Rao, N. V. S and S. C. Mitra. 1989. Systematics and ecology of freshwater gastropod gastropods of parasitological importance. In: S. Jairajpuri (Ed.), Snail, Flukes and Man. Calcutta: Zool. Surv. India, pp. 47-64.
- [8] Sen, S., G. Ravikanth and N. A. Aravind. 2012. Land snails (Mollusca: Gastropoda) of India: status, threats and conservation strategies. *Journal of Threatened Taxa* 4: 3029-3037.
- [9] Shimek, B. 1930. Land Snails as Indicators of Ecological Conditions. *Ecology* 11: 673-686.
- [10] Simone, L. R. L. 1999. Mollusca Terrestres. In: C. R. Brandão and E. M. Canello, (Eds.), Biodiversidade do Estado de São Paulo, Brasil: síntese do conhecimento ao final do século XX: Invertebrados Terrestres. São Paulo: FAPESP Editora, pp. 3-8.
- [11] Sodhi, N. S. 2008. Tropical biodiversity loss and people-a brief review. *Basic and Applied Ecology* 9: 93-99.
- [12] Strong, E. E., O. Gargominy, W. F. Ponder and P. Bouchet. 2008. Global diversity of gastropods (Gastropoda; Mollusca) in freshwater. *Hydrobiologia* 595: 149-166.
- [13] Rao, N. V. S. and S. C. Mitra. 1979. On the land and freshwater mollusc of Pune District, Maharashtra. *Records of Zoological Survey of India* 75: 1-37.
- [14] Tonapi, G. T. 1980. Freshwater animals of India. An ecological approach, Oxford and IBH Publishing Co., New Delhi.
- [15] Adoni, A. D. 1985. Work Book on Limnology, Bandna Printing Service, New Delhi.
- [16] Rao, Y. P., N. L. N. Murthy and S. Kishore. 2013. Diversity of molluscs in Chittoor district of Andhra Pradesh with special reference to Tirumala hills, India. *International Journal of Advanced Scientific and Technical Research* 2: 573-581.
- [17] Sharma, K. K., K. Bangotra and M. Saini. 2013. Diversity and distribution of mollusca in relation to the physico-chemical profile of Gho-Manhasan stream, Jammu (J and K). *International Journal of Biodiversity and Conservation* 5: 240-249.