



Prevalence of snails in north eastern and hilly zones of Tamil Nadu, India

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Abstract

Snails act as an intermediate host for trematode infection. A total of 989 snails were collected from 2 agro-climatic zones of Tamil Nadu viz., northeastern (Kancheepuram and Vellore) and hilly zone (The Nilgiris) from 2012 to 2015. Collected snails were identified as aquatic (*Radix auricularia*, *R. luteola*, *Indoplanorbis exustus*, *I. difference*, *Gyraulus convexiusculus*, *Melanoides tuberculatus*, *M. crabra*, *Bithynia* sp., *B. pulchella*, *B. dissimilis*, *Bellamyia crassispinalis*, *B. dissimilis*, *Bellamyia b. halophila*, *Bellamyia b. eburnea*, *B. bengalensis race doliaris*, *B. bengalensis form typica*, *B. b. anandeli*, *Vivipara*, *Terebia ranifera*, *Gabbia stenothyroides*, *G. arcula*, *Paludomas tranchauricus*, *P. regulata*, *Stenothyra blanfordiana*), amphibious snails (*Pila globosa*, *P. virians* and *Pila* sp.) and land snails (*Cryptozonia semirugata*, *C. madarasapatinum*, *C. bistrialis*, *C. ligulata*, *Achatina fulica*). Highest percentage of snails was observed in plains (north eastern zone) than the hilly regions (78.16 % vs 21.84 %). In the plains, aquatic snails (90.70 %) were more than the amphibious (7.38 %) and land snails (1.92 %). In the plain, aquatic snails like genus *Bithynia* snails (29.99 %) were more followed by *Bellamyia* (12.37 %), *Radix* (10.48 %), *Melanoides* (9.92 %) and *Indoplanorbis* (8.36 %) and other snails whereas genus *Pila* and *Cryptozonia* and *Achatina* were of the amphibious and land snails respectively. In the hills, only *R. auricularia*, *R. luteola* and *S. blanfordiana* was recorded. Out of these, *R. auricularia* was found more (83.33 %) than the *R. luteola* (13.89 %) and *S. blanfordiana* (2.78 %).

Keywords: snails, prevalence, northeastern and hilly zone, Tamil Nadu

1. Introduction

Snails are present in pond, river, lake, paddy field and on the land. Snails act as first or also as second intermediate host for majority of the trematode infection in ruminants (Esch *et al.* 2001) [1]. Snails are present either in freshwater or stagnated water or in muddy water. Lymnaeid snails are freshwater snails and act as intermediate host for *Fasciola* sp. (Soundararajan *et al.*, 2000 [2]; Bargues and Mas-Coma, 2005 [3]; Mas-Coma *et al.* 2009 [4]). *Bithynia* snails are important hosts of the human liver fluke, *Opisthorchis viverrini* (Kiatsopit *et al.* 2013 [5]). *Indoplanorbis exustus* is responsible for spreading snail borne diseases namely, amphistomiasis schistosomiasis and stregeoids in domestic animals, humans, aquatic birds and fish-eating vertebrates (Biswas 1991 [6]). In Tamil Nadu, only a few reports available on the occurrence of snails (Ammanullah and Shahul Hameed, 1996 [7]; Raman *et al.*, 2012 [8]). This paper reports on the prevalence of snails in north eastern and hilly zones of Tamil Nadu.

2. Materials and Methods

A total of 989 snails were collected from 2 agro-climatic zones of Tamil Nadu viz., northeastern (Kancheepuram and Vellore) and hilly zone (The Nilgiris) from 2012 to 2015. Snails were collected in the water bodies such as lake, pond and streams by using snail scoop and in vegetations by hand

picking (Plate 1a-e). Snails were also collected on the land and tree (Plate 1f). Snails were counted and identified based on the morphological features of shell described by Rao, (1989) [9] and Soundararajan and Latha, (2014) [10].

3. Results and discussion

A total of 14 genus and 31 species of the snails were collected from north eastern and hilly zones of Tamil Nadu. In this study, collected snails were identified as aquatic (*Radix auricularia*, *R. luteola*, *Indoplanorbis exustus*, *I. difference*, *Gyraulus convexiusculus*, *Melanoides tuberculatus*, *M. crabra*, *Bithynia* sp., *B. pulchella*, *B. dissimilis*, *Bellamyia crassispinalis*, *B. dissimilis*, *Bellamyia b. halophila*, *Bellamyia b. eburnea*, *B. bengalensis race doliaris*, *B. bengalensis form typica*, *B. b. anandeli*, *Vivipara*, *Terebia ranifera*, *Gabbia stenothyroides*, *G. arcula*, *Paludomas tranchauricus*, *P. regulata*, *Stenothyra blanfordiana*), amphibious snails (*Pila globosa*, *P. virians* and *Pila* sp.) and land snails (*Cryptozonia semirugata*, *C. madarasapatinum*, *C. bistrialis*, *C. ligulata*, *Achatina fulica*) (Plate 2-6). Among the land snails, *A. fulica* was collected from both land and tree. Devkota *et al.*, (2011) [11] screened nine freshwater snail species for shedding cercariae such as *Bellamyia bengalensis*, *Gabbia orcula*, *Gyraulus euphraticus*, *Indoplanorbis exustus*, *Lymnaea luteola*, *Melanoides tuberculata*, *Pila globosa*, *Thiara*

granifera and *Thiara lineate*. El-Shazly *et al.*, (2012) [12] observed 64 *L. natalensis* followed by 16 *L. truncatula*, 12 *L. stagnalis* and 3 *L. columella* in Egypt.

Raman *et al.* (2012) [8] collected *R. luteola* and *R. auricularia* in the high altitude (Ooty and plain northeastern (Vellore) zones in Tamil Nadu. Similarly, *R. auricularia rufescens* were reported in Lucknow and Bareilly, Uttar Pradesh (Prasad, 1989) [13] and *R. auricularia* (sensu stricto) in Bareilly, Uttar Pradesh and in Kashmir (Sharma *et al.*, 1989) [14]. Tigga *et al.* (2014) [15] reported *Indoplanorbis* sp., *Lymnaea* sp. and *Gyraulus* sp. were common snails found positive for trematode cercariae in and around Ranchi district, Jharkhand, India.

Highest percentage of snails was observed in plains (north eastern zone) than the hilly regions (78.16 % vs 21.84 %) (Plate 7a). In the plains, aquatic snails (90.70 %) were more than the amphibious (7.38 %) and land snails (1.92 %) (Plate 7b). In the plains, aquatic snails (90.70 %) were found to be more than the amphibious (7.38 %) and land snails (1.92 %). In the plain, aquatic snails like genus *Bithynia* snails (29.99 %) were more followed by *Bellamyia* (12.37 %), *Radix* (10.48 %), *Melanoides* (9.92 %) and *Indoplanorbis* (8.36 %) and other snails whereas genus *Pila* and *Cryptozonia* and *Achatina* were of the amphibious and land snails respectively (Plate 7c).

In the hills, only *Radix auricularia*, *R. luteola* and *Stenothyra blanfordiana* was recorded. Out of these, *R. auricularia* was more (83.33 %) than the *R. luteola* (13.89 %) and *S. blanfordiana* (2.78 %) (Plate 7d). Soldanova *et al.* (2010) [16] reported abundant *R. auricularia* in a reservoir system of Ruhr river.

In Thailand, the distribution of *Bithynia* varies depending on geographical location, *B. funiculata* in the north, *B. s. goniomphalos* in the northeast and *B. s. siamensis* in central part of the country (Chitramvong, 1992) [17]. Duwa, (2017) [18] observed 54.5% of *Bulinus* species and 45.5% of *Lymnaea* species in Jakara dam and in Nigeria. Duggan (2002) [19] also reported that *M. tuberculata* found on slow flowing or standing waters. Highest abundances of *M. tuberculata* are commonly recorded in lakes, where they prefer mud and silt substrates (Dudgeon 1989 [20]; Gutierrez *et al.* 1997 [21]).

From this study, it was concluded that aquatic snails were found to be more than that of amphibious and land snails. Among the aquatic snails *Radix* and *Indoplanorbis* found to be more which are responsible for causing fasciolosis, paramphostomosis and schistosomosis in ruminants. Hence, further study is needed to study the trematode parasitic stages in the snail to forecast trematode infection and thereby to control in animals.



Fig 1

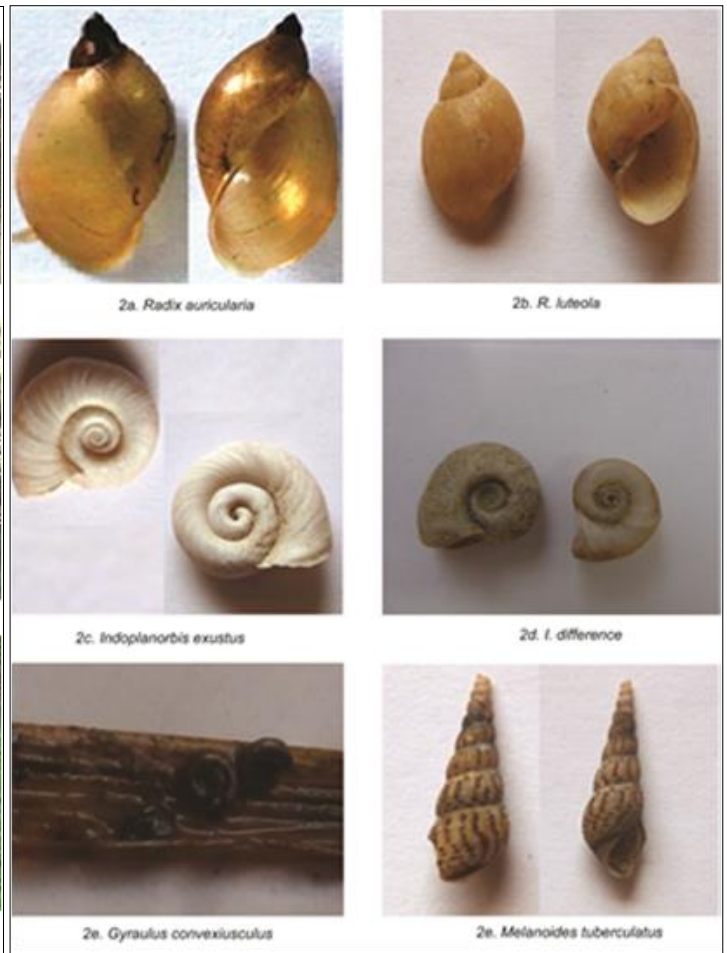


Fig 2

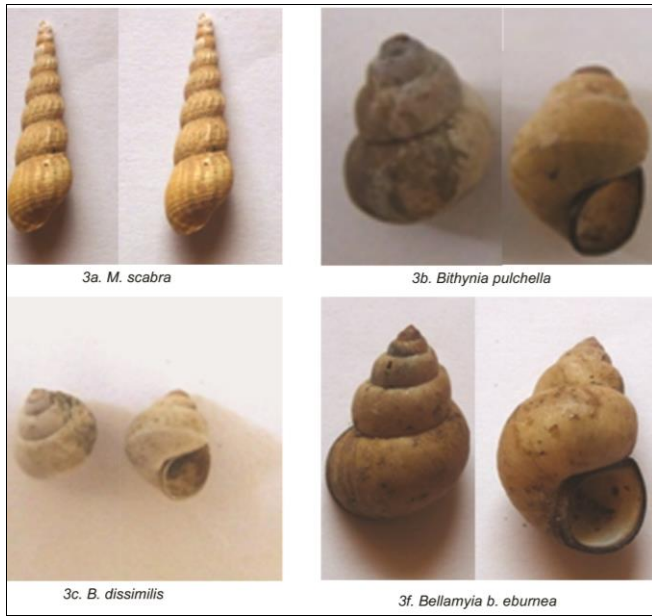


Fig 3

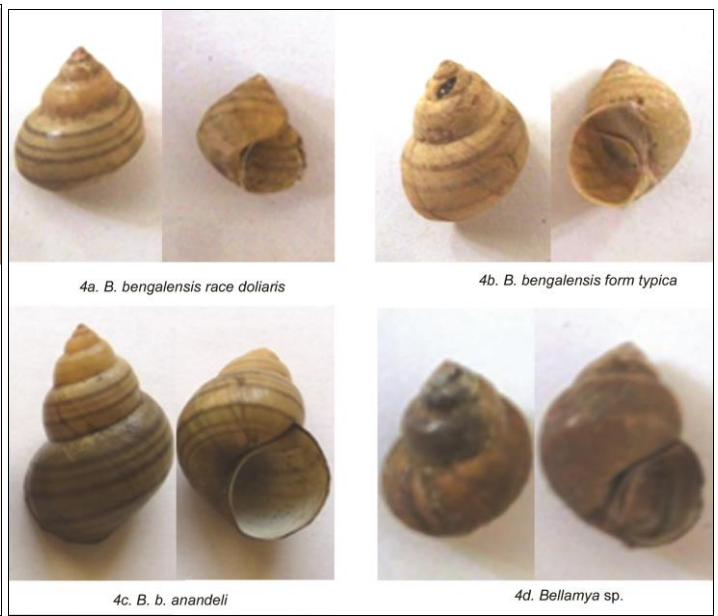


Fig 4



Fig 5

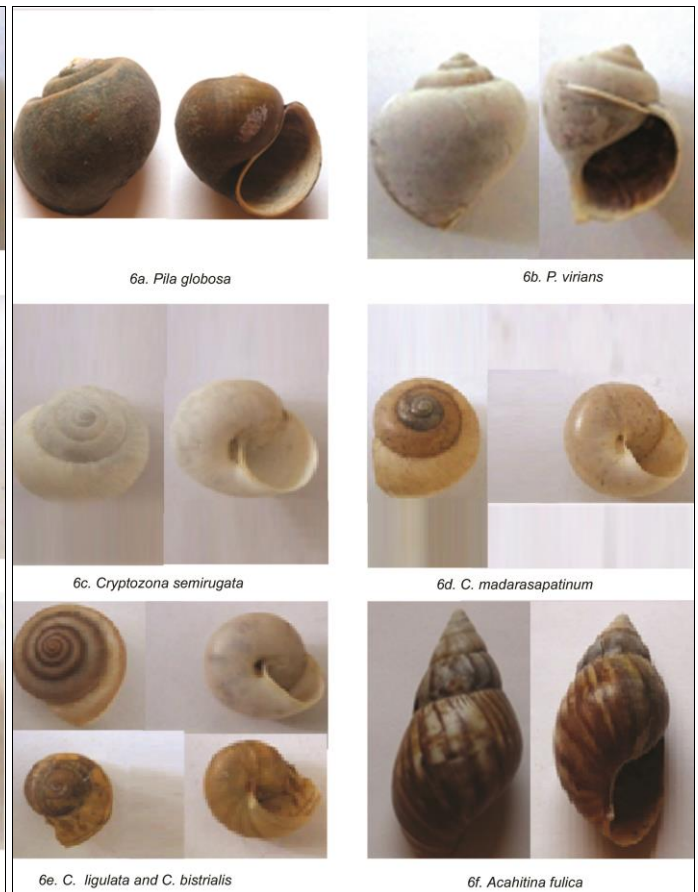


Fig 6

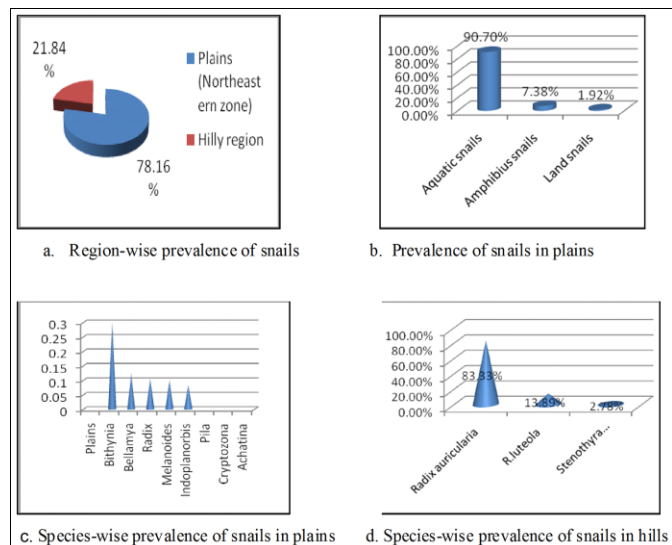


Fig 7

4. Conflict of interest

The authors declare that there are no conflicts of interest.

5. References

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