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Study of seasonal prevalence of snails in Kanchipuram District of Tamil Nadu

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Abstract

Seasonal prevalence of aquatic snails in four zones of Kancheepuram district viz., Melkadirpur, Kalianur, Enjambakkam and Vedal villages were carried out during the period from March 2016 to February 2017. The collected snails were identified as *Radix luteola*, *Indoplanorbis exustus*, *Gyraulus convexiusculus*, *Melanooides tuberculatus*, *Bellamyia* sp., *Stenothyra blanfordiana*, *Paludomas tranchauricus* and *Pila globosa*. Snails were found to be more in northeast monsoon (32.31%) followed by winter (25.09%), summer (21.50%) and southwest monsoon (21.08%). Among the snails, more number of *R. luteola* *G. convexiusculus* *Bellamyia* sp., and *P. tranchauricus* found in summer, whereas *I. exustus* and *P. globosa* were found more number during northeast and southwest monsoon respectively. Highest number of *M. tuberculatus* and *S. blanfordiana* occurs mostly during winter.

Keywords: Snail, aquatic, seasonal prevalence, Kancheepuram, Tamil Nadu

1. Introduction

Snails belong to a large and highly diverse group of invertebrate known as the phylum, *Mollusca*, Class – *Gastropoda* and order- *Stylommatophra*. Snails act as intermediate hosts of different trematode parasites, in which several developing larval stages such as sporocysts, rediae and cercariae [1]. The proportion of snails that release cercariae (prevalence of infection) and the number of cercariae released from each infected snail (intensity of infection) play important roles in the transmission of trematodes from the snail host. Only *Lymnaea* group of snails is involved in establishing of life cycle in at least 71 species of trematodes [2]. Other species of snails also transmit various trematode parasites of livestock and birds. For example, *Indoplanorbis exustus* is responsible for the transmission of *Schistosoma nasale*, *Schistosoma spindale* and *Schistosoma indicum* as well as other trematodes such as *Echinostoma* spp. and some spirorchids [3]. Age and size of the snails, light conditions, temperature ranges, depth of water are some of the factors that appear to affect the prevalence and intensity of digenetic trematode infections in the snail intermediate hosts [4, 5].

Digenetic trematode have complicated life cycles in which molluscs play the key role as intermediate hosts for part of their developmental stages. In this regard, freshwater snail's in particular those from the order Basomatophora, have substantial contribution to development and transmission of parasitic flukes. For instance, some 20 species of cercariae have been isolated from the lymnaeid snails of *Lymnaea peregra* [6]. Snail mediated diseases are among the major groups of helminthic diseases caused by trematode parasites. However, the main snail species involving in the transmission of flukes vary in different geographical regions.

Different snails have been reported to be involved in the transmission of schistosomiasis in human and domestic animals in different areas of the world. The increase in the population of snails ultimately increased the prevalence of schistosomiasis [7]. In Pakistan, Hussain *et al.* [8] reported that snails are more important factors in transmission of parasitic diseases. Control of snails is regarded as one of the best preventive measures in controlling schistosomiasis [9].

2. Aim and objectives

- The aim of this study is to see the seasonal prevalence of snails in Kanchipuram District, Tamil Nadu.
- The seasonal prevalence of snails can be carried out in four different areas (Melkadirpur, Kalianur, Enjambakkam and Vedal villeges) of Kanchipuram District, Tamil Nadu.

3. Materials and Methods

Seasonal prevalence of aquatic snails in four zones of Kancheepuram district viz., Melkadirpur, Kalianur, Enjambakkam and Vedal villages were carried out during the period from March 2016 to February 2017. The snails were collected from lake, paddy field, stagnated water and pond at different places mentioned above. The snails were picked up using blunt forceps and were transferred to clean polythene bags containing habitat water along with some vegetation. The bags were partially closed with thread and transported to the PG and Research Department of Zoology, Arignar Anna Government Arts College, Cheyyar for identification eight different varieties of snails then the snails are sent to Department of Veterinary Parasitology, Madras Veterinary College, Chennai, Tamil Nadu for further identification and conformation [10].

The handful of snails was collected (Fig 3) in polythene bags from each place separately and washed in dechlorinated water. The shells of the dead snails were also collected from these areas. Snails were kept in different Petri dishes with dechlorinated water and subjected for identification following the keys of Rao [11] and Soundararajan and Latha [12]. The dead snail's shells were stored in different plastic containers and labeled after identification. Meteorological data were also collected from the Meteorological department, Nungambakkam, Chennai, Tamil Nadu.

4. Results and Discussion

The collected snails were identified as *Radix luteola*, *Indoplanorbis exustus*, *Gyraulus convexiusculus*, *Melanoides tuberculatus*, *Bellamyia* sp., *Stenothyra blanfordiana*, *Paludomas tranchauricus* and *Pila globosa*. (Fig.4). Chaudhri *et al.*, [13] and Gupta *et al.*, [14] also reported more number *Indoplanorbis exustus*, *Lymnaea luteola*, *L. acuminata* and *L. auricularia* in Haryana state (India). Raman *et al.* [15] 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, Bareilly and Uttar Pradesh [16] and *R. auricularia* (sensu stricto) in Bareilly, Uttar Pradesh and in Kashmir [17]. Tigga *et al.* [18] earlier also reported that *Indoplanorbis* sp., *Lymnaea* sp. and *G. yraulus* sp. were common snails found positive for trematode cercariae in and around Ranchi district, Jharkhand, India. Soundararajan *et al.*, [19] reported 23 aquatic and 5 land snails in northeastern areas of Kancheepuram and Vellore districts and hilly zone (The Nilgiris). In this study,

Aquatic snails (92.74%) were found to be more than the amphibious snails (7.26%). which are similar to that of Soundararajan *et al.* (2016) who aquatic snails (90.70 %) were more than the amphibious (7.38 %) and land snails (1.92 %). Among the seasons, snails were found to be more in northeast monsoon (32.31%) followed by winter (25.09%), summer (21.50%) and southwest monsoon (21.08%). Among the snails, more number of *R. luteola*, *G. convexiusculus*, *Bellamyia* sp., and *P. tranchauricus* found in summer, whereas *I. exustus* and *P. globosa* were found more number during northeast and southwest monsoon respectively. Highest number of *M. tuberculatus* and *S. blanfordiana* occurs mostly during winter (Table 1, Fig 1 and Fig 2). Soundararajan *et al.* [19] reported highest prevalence of *Radix auricularia* during summer months (42.74 per cent) followed by winter (31.05 per cent), north-east monsoon (20.51 per cent) and south-west monsoon (5.70 per cent).

The mean average of minimum temperature, maximum temperature, relative humidity and rain fall from March 2016 to February 2017 is presented in Table 2. The maximum of temperature of 35.28°C and minimum temperature of 20.74°C was observed during April 2016 and January 2017 respectively. The relative humidity was lowest during April 2016 (50.42%) and highest during January 2017 (62.81%). Highest rainfall was observed during July 2016 (1.91mm) and there was no rainfall from April, May 2016 and January, February 2017. Among the season, maximum temperature was observed during summer (33.98°C) followed by Southwest Monsoon (33.31°C), Northeast Monsoon (31.54°C) and winter (28.42°C). The relative humidity was highest during winter (60.90%) followed by southwest monsoon (60.33%), northeast monsoon (59.43%) and summer (53.96%). Highest rainfall was observed during southwest monsoon (1.56mm) followed by summer (0.63mm), northeast monsoon (0.54mm) and winter (0.34mm).

In this study, snails were found to be more in northeast monsoon (32.31%) with minimum temperature of 25.43°C, maximum temperature of 31.54°C, relative humidity of 59.43% and rainfall of 0.54mm respectively, the results are given in Table 3. This indicated that maximum temperature with highest relative humidity and rainfall is essential for the snail population, by winter (25.09%), summer (21.50%) and southwest monsoon (21.08%). Sangwan *et al.* (20) also reported *Indoplanorbis* and *Lymanea* snails were found more between 400 and 600mm rainfall annually at Hissar, India.

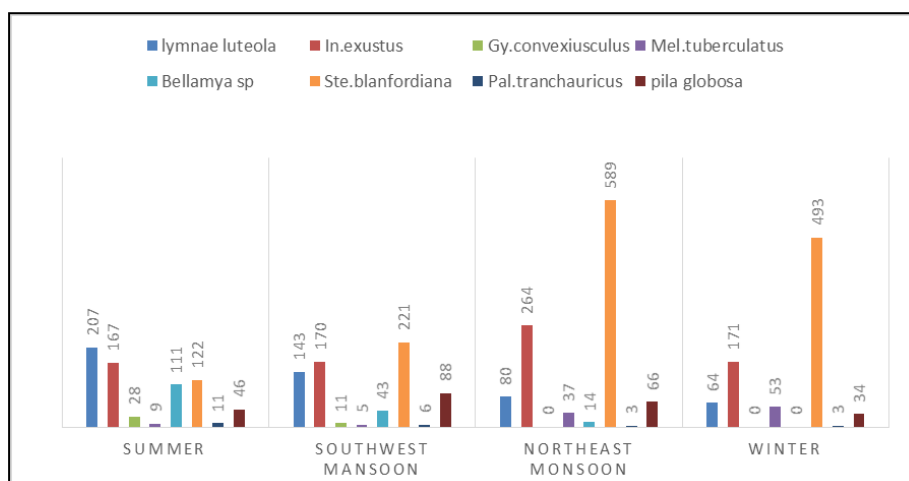


Fig 1: Meteorological data shows the Seasonal prevalence of snails from March 2016 to February 2017 Kancheepuram district, Tamil Nadu.

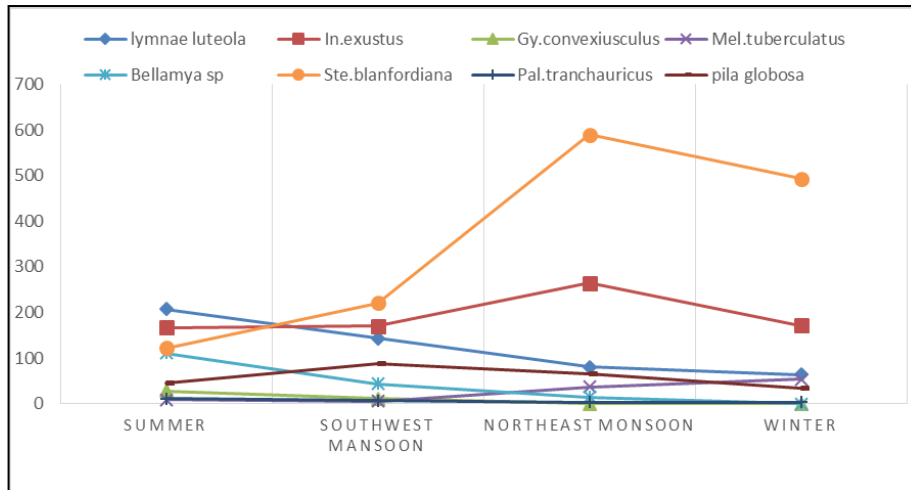


Fig 2: Meterological data shows the Seasonal prevalence of snails from March 2016 to February 2017 Kancheepuram district, Tamil Nadu.

Table 1: Meterological data shows the Seasonal prevalence of snails from March 2016 to February 2017 Kancheepuram district, Tamil Nadu.

Month	Temperature		Relative Humidity (%)	Rainfall (mm)
	Minimum (°C)	Maximum (°C)		
March - 2016	24.31	32.41	55.37	0
April - 2016	28.42	35.28	50.42	0
May - 2016	27.95	34.25	56.08	1.9
June - 2016	27.04	33.66	60.52	1.55
July - 2016	27.09	32.70	62.11	191
August - 2016	27.92	33.58	58.37	1.22
September -2016	27.28	32.54	60.15	0.61
October - 2016	26.32	32.36	58.81	0.61
November - 2016	22.68	29.71	59.33	0.39
December - 2016	21.06	27.84	62.68	1.01
January - 2017	20.74	27.90	62.81	0
February - 2017	21.80	29.51	57.22	0

Table 2: Mean average of temperature, relative humidity and rainfall of Kancheepuram district, Tamil Nadu from March 2016 to February 2017

Season	Temperature		Relative humidity (%)	Rainfall (mm)
	Minimum(°C)	Maximum (°C)		
Summer (Mar –16 to May-16)	26.89	33.98	53.96	0.63
Southwest monsoon (Jun-16 to Aug16)	27.35	33.31	60.33	1.56
Northeast monsoon (Sep 16 to Nov 16)	25.43	31.54	59.43	0.54
Winter (Dec 16 to Feb 17)	21.20	28.42	60.90	0.34

Table 3: Season-wise mean average of temperature, relative humidity and rainfall of Kancheepuram district, Tamil Nadu from March 2016 to February 2017

Season/ Species name	Lymnae luteola		Indoplanorbis Exustus		Gyraulus convexiusculus		Melanoides tuberculatus		Bellamys sp.		Stenothyra Blanfordiana		Paludomas tranchauricus		Pilo globosa		Total/ Overall %	
	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%
Summer	207	41.90	167	21.63	28	71.90	9	8.65	111	66.07	122	8.56	11	47.83	46	19.66	701	21.50
Southwest Monsoon	143	28.95	170	22.02	11	28.21	5	4.81	43	25.59	221	15.51	6	26.09	88	37.61	687	21.08
Northeast Monsoon	80	16.19	264	34.20	0	0	37	35.38	14	8.33	589	41.33	3	13.04	66	28.21	1053	32.31
Winter	64	12.96	171	22.15	0	0	53	50.96	0	0	493	34.59	3	13.04	34	14.53	818	25.09
Total	494	15.16	772	23.69	39	1.19	104	3.19	168	5.16	1425	43.73	23	0.70	234	7.18	3259	100

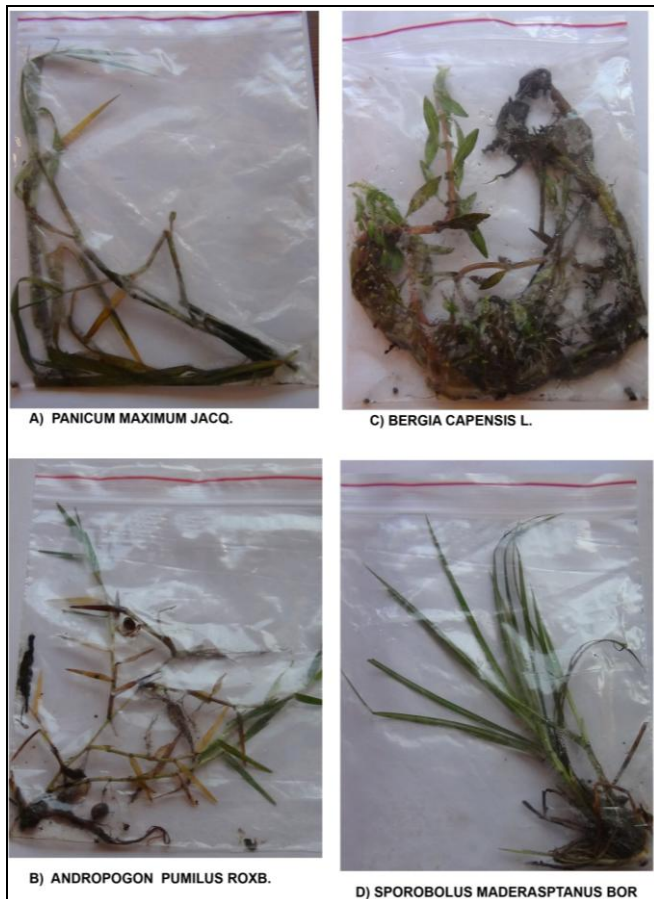


Fig 3: Shows the plants with snails in polythene bags

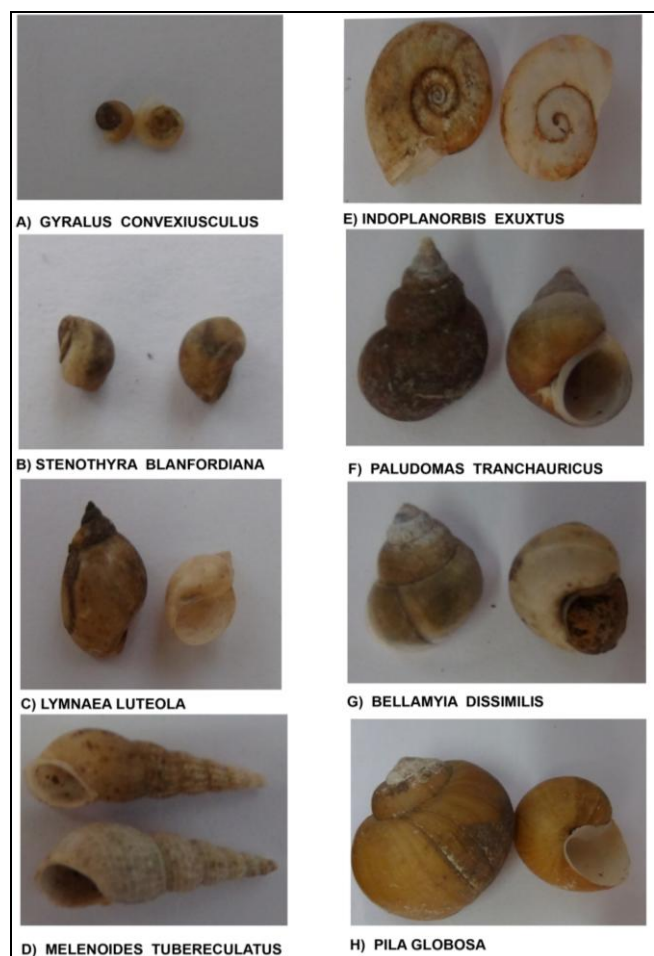


Fig 2: Shows the different types of snails collected

5. Conclusion

The research work concluded that the snails were found to be more in northeast monsoon when compare to other seasons like summer, southwest monsoon and winter with temperature, relative humidity and rain fall. This indicated that maximum temperature with relative humidity and rain fall is essential for snail population.

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