RESEARCH ARTICLE
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Journal of Veterinary and Animal Sciences
ISSN (Print): 0971-0701, (Online): 2582-0605

A study on echinostome infection in snail intermediate hosts in different habitats of palakkad district, Kerala*

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Citation: Anbarasu, K., Rajagopal, A., Lakshmanan, B., Vinod Kumar, K., Devada K. and Thamil Bharathi L. M. 2020. A study on echinostome infection in snail intermediate hosts in different habitats of Palakkad district, Kerala. *J. Vet. Anim. Sci.* **51**(1): 52-55.

Received : 06.08.2019 *Accepted : 03.09.2019* *Published : 01-01-2020*

Abstract

A total of 80 snails collected from three habitats viz., uncultivated paddy fields, permanent water bodies and catchment area of dams in Palakkad district of Kerala were screened for presence of echinostome infection. The collected snails were identified morphologically as Indoplanorbis exustus and Lymnaea luteola. Indoplanorbis exustus was found to be the most predominant snail species followed by L. luteola with a prevalence rate of 57.5 and 42.5 per cent, respectively. The prevalence rate of snails was higher in uncultivated paddy fields followed by permanent water bodies and catchment area of dams. Overall prevalence of echinostome infection in snails was found to be 11.2 per cent. Prevalence of infection in I. exustus constituted 13 per cent while that in L. luteola was nine per cent. Dissection of positive snails revealed intra molluscan stages like sporocyst.

Keywords: *Snail, echinostome, cercariae*

Echinostomes are a group of digenetic trematodes characterised by the presence of well-developed head collar with spines surrounding their oral sucker. They parasitize mostly reptiles, birds and mammals, but they have also been reported from fishes. Kerala, with its tropical climate, evergreen vegetation, heavy annual rainfall and various aquatic bodies, is well-known for the richness and diversity of vertebrate and molluscan fauna. Freshwater snails inhabit a variety of habitats, ranging from small temporary ponds and streams to large lakes and rivers, reflecting the wide-ranging biology of many different species (Ramitha and Vasandakumar, 2015). Preliminary studies revealed that vertebrates and molluscs act as hosts for a number of adult and larval echinostomes. The present investigation has been undertaken with a view on throwing more light on the larval echinostomes and their molluscan intermediate hosts in Palakkad, Kerala.

** Part of the MVSc thesis submitted by the first author to Kerala Veterinary and Animal Sciences University, Pookode, Wayanad, Kerala*

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Materials and Methods

The snails were collected randomly from the three habitats *viz*., uncultivated paddy fields, permanent water bodies and catchment area of dams by handpicking method during the period from June 2018 to August 2018. The collected snails were brought to the laboratory in polythene bags and washed with dechlorinated water. The snails were identified based on the shell characters like colour, shape, size, coiling and number of whorls as per Subba Rao (1989).

The snails were screened initially by placing 10 of them in 200 mL plastic jars containing dechlorinated water. The water was changed frequently and the snails were fed with dried lettuce leaves. The jars containing snails were exposed to sunlight for 6 to 8h to facilitate shedding of cercariae and the water was examined frequently for the presence of cercariae. Snails found positive for cercariae were placed individually in test tubes of size 20cm (length) and 3cm (diameter) to observe the number of snails positive for larval stages. Snails which were negative for cercarial shedding were continuously monitored up to 11 days. The positive snails were crushed by placing them in between the slides by applying gentle pressure on them. After removal of shell the snail tissues were teased on the slide and observed under compound microscope for the presence of intra molluscan stages. Cercariae were morphologically identified as per Frandsen and Christensen (1984) and stored in 70 per cent alcohol.

Fig. 1 *Indoplanorbis exustus* attached with vegetation (arrows)

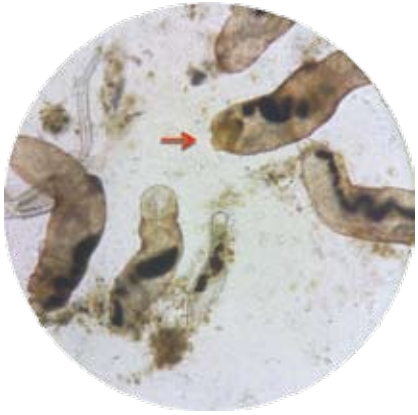

Fig. 2 Sporocyst containing numerous cercariae (arrows)

Fig. 3 Echinostome cercariae with sporocyst (arrows)

Fig. 4 Echinostome cercariae having collar of spines around the oral sucker (arrows)

Table 1. Echinostome infection in snails collected from different habitats in Palakkad district

Habitat	No. of snails collected			No .of snails infected		
	I. exustus	*L. luteola*	Total	*I. exustus*	*L. luteola*	Total
Permanent water bodies	19	4	23	0	0	0
Uncultivated paddy fields	18	22	40	5	1	6
Catchment area of dams	9	8	17	1	2	3
Total	**80**	**34**	**80**	**6**	**3**	**9**

Results and Discussion

A total of 80 snails were collected from the three habitats (Table 1). The collected snails were identified as *Indoplanorbis exustus* (Fig. 1) and *Lymnaea luteola.* The shell of *I. exustus* was discoid, sinistral and concavely depressed on both the sides. The whorls were 3 to 5 in number. The body whorl was comparatively larger and strongly inflated. The spire was in the same plane, flattened and depressed below the body whorl. The colour of the shell was greenish brown or blackish brown. In *L. luteola,* the shell was thin, broadly ovate with a large inflated body whorl and the shell was much broader in proportion to its height and the spire was gradual. The whorls of the spire were few in number and distinctly inflated. The apex was sharp and pointed. The shell was smooth and semi-translucent with a slight, pale horny yellow tinge*. I. exustus* and *L. luteola* were reported to be the predominant species of snails in India by previous researches (Devi *et al*., 2006; Devkota *et al*., 2011 and Bauri *et al*., 2015).

Indoplanorbis exustus were found to be most predominant snail species with a prevalence rate of 57.5 per cent followed by *L. luteola* (42.5 %). In a previous study in Thrissur district Sarmah (1982) had reported *I. exustus as* the predominant snail species followed by *L. luteola*.

Echinostome cercariae was identified in both *I. exustus* and *L. luteola* species of snails. The morphological characters of echinostome cercariae were unforked tail, oral sucker surrounded by a spiny collar, ventral sucker located on mid-ventral surface of body, numerous cystogenous glands and absence of eyespots (Fig. 2 and Fig. 3). The cercarial morphology agreed with the reports of Dung *et al*. (2010), Jayawardena *et al*. (2010) and Dhar *et al*. (2017). Intra molluscan stages were obtained by careful teasing of the tissues of infected snail digestive gland. The sporocyst was elongated with sac like body and contained numerous developing cercariae (Fig. 4). Out of the 80 snails screened for trematode infection, 11.2 per cent were found infected with echinostome cercariae. Ramitha and Vasandakumar (2015) had reported 27 per cent of freshwater snails collected in Malabar region of Kerala to be positive for echinostome infection. They also observed *I. exustus* to be the most preferred host for trematode infections. Prevalence of echinostome infection in *I. exustus* was 13 per cent and that in *L luteola was nine* per cent. Prevalence of echinostome infection was high in uncultivated paddy fields followed by catchment areas of dam while prevalence was not detected in permanent water bodies. The prevalence of infection with larval echinostomes in snails in these habitats might be attributed to the access of migratory and residential birds.

Acknowledgements

This study has been carried out as part of Master Research program and the financial support provided by Kerala Veterinary and Animal Sciences University, Pookode is acknowledged.

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