

PREVALENCE OF FASCIOLA CERCARIAE IN LYMNAEID SNAILS IN BANGLADESH

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Summary

A total of 4149 *Lymnaea auricularia* var *rufescens* and 401 *L. luteola* snails were collected and examined in six periods from May, 1989 to April, 1990 at Savar, Dhaka, Bangladesh. *Fasciola cercariae* (Gymnocephalous cercariae) was found in 13 (0.31%) *L. auricularia* var *rufescens*, but was absent in all *L. luteola* examined. Prevalence of *Fasciola cercariae* in the snails varied significantly ($p < 0.05$) in different periods (months) of the year with higher prevalence in July-August (0.77%), followed by September-October (0.52%) and May-June (0.45%). Cercariae did not appear in the snails from November to April.

(Key Words: Prevalence, *Fasciola*, Cercaria, *Lymnaea*)

Introduction

Fascioliasis (caused by *Fasciola gigantica*) is one of the most economically important parasitic diseases producing substantial loss to Bangladesh annually. The cercariae of *Fasciola gigantica* belong to the Gymnocephalous group. *Lymnaea auricularia* var *rufescens* acts as an intermediate host of *F. gigantica* in Pakistan (including present Bangladesh) (Kendall, 1954). Incidence of *Fasciola cercariae* (Gymnocephalous cercariae) in *L. auricularia* var *rufescens* has been reported in Bangladesh by Qadir (1982), and in nearby countries by Mathur (1986) and Morel and Mahato (1987). No information is available about the same cercarial infestation in *L. luteola* which is considered to be another vector of *F. gigantica* in Bangladesh. The present paper describes the prevalence of *Fasciola cercariae* (Gymnocephalous cercariae) in *L. auricularia* var *rufescens* and *L. luteola* in the period from May, 1989 to April, 1990 at Savar, Dhaka, Bangladesh.

Materials and Methods

Snails (*L. auricularia* var *rufescens* and *L. luteola*) were collected from different pools of water

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in villages near Savar every two months from May, 1989 to April, 1990. They were hand-picked, brought to the laboratory and washed in running tap water. The snails were placed individually in test tubes containing water and exposed to artificial light to cause emergence of the cercariae (Rees, 1948). Large numbers of cercariae (larval parasites) were discharged from infected snails during or immediately after exposure to light. Snails from which no cercaria emerged were crushed and their entire alimentary system and associated glands were dissected to detect cercarial infection (Shaikh and Rahman, 1968). The observations were first made under a dissecting microscope and cercariae were studied morphologically under a microscope with high power after adding a drop of 1% methylene blue to the motile cercariae. Cercarial classification of Luhe (1909, cited by Dawes, 1968) was followed for the differentiation of cercariae. Comparative study of various types of cercariae described by Cable (1950) was also followed. Temperature, humidity and rainfall data for the Dhaka area during the study period were obtained from the Dhaka Meteorological Department. The difference in the prevalence of *Fasciola cercariae* in different periods (months) was determined by Chi-square (χ^2) test as described by Gupta (1983).

Results and Discussion

Prevalence of *Fasciola cercariae* in *Lymnaea auricularia* var *rufescens* in different periods (months) is presented in table I. A total of 4,149 *L.*

auricularia snails were examined in the six periods, of which 13 (0.31%) snails were found to be positive for *Fasciola cercariae* (Gymnocephalous cercariae). This frequency of infestation is lower than that recorded by Mathur (1986) and much lower than the report of Qadir (1982). Mathur (1986) examined 4,063 *L. auricularia* var *rufescens* snails and Qadir (1982) examined only 730 of the same snails (in 12 months) and they recorded the same cercarial infestations in these snails at the rate of 0.64% and 3.70% respectively. The variation of infestation rates in *L. auricularia* among the findings of different investigators was thought to be due to variation in the number of snails examined, the level of *Fasciola* infestation in host animals (that later transmitted to snails), the environmental and ecological factors that govern the breeding, life span, infestation of snails and development of larval stages in the snails.

In this study, a total of 401 *Lymnaea luteola* were also examined in six periods, but none was found to be positive for *Fasciola* cercariae though these cercarial infestations in this species of snail was recorded in other country by Morel and Mahato (1987). This may be attributed to the fact that this species of snail was found in very small in number in the pools of water and as a result very small numbers of this species of snail were examined in different periods and so cercariae might not be present in these small numbers of the snail.

Prevalence of *Fasciola* cercariae in the *L. auricularia* snails varied significantly ($p < 0.05$) in different periods (months) of the year. Cercariae started to appear in the snails from May, reached

a peak in July-August (0.77%), then declined in September-October. From November to April the cercariae was not present in the snails collected. This observation confirms closely the findings of Qadir (1982) and Morel and Mahato (1987). However, Qadir (1982) in Bangladesh found too much higher incidence of Gymnocephalous cercariae (*Fasciola* cercariae) in *L. auricularia* snails in different periods (months) except in the months of November and January to March during which he did not find the cercariae in the snails. For snails to contain cercariae in May, they must have been infested with larval *Fasciola* from about the middle of February. This could have occurred because the water in the 'beel' areas of the villages was low from February onward. Thus, large numbers of ruminants (cattle, sheep and goats) grazed these low watery 'beel' areas and *Fasciola* infested ruminants could have passed large numbers of *Fasciola* eggs in their faeces. There was favourable temperatures and rainfall from February onward (table 1) for the development and hatching of *Fasciola* eggs and development of larval *Fasciola* in the snails. The development and hatching of *Fasciola gigantica* eggs takes 16-30 days at 20°C, 11-25 days at 25°C and 12-24 days at 30°C (Gosh, 1985) and development of larval *F. gigantica* in the snails takes 75 days (Soulsby, 1982). Thus, cercarial infestation in the snails began to increase from May-June and continued until October due to warm, wet and humid conditions (table 1). Snails infested during the period when conditions were favourable for infestation to develop may have died by November and new snails had not become infested. During the postmonsoon and winter

TABLE 1. PREVALENCE OF *FASCIOLA* CERCARIAE IN *Lymnaea auricularia* VAR *rufescens* AND METEOROLOGICAL DATA IN DIFFERENT PERIODS (MONTHS)

Months	No. of snails examined	No. and percentage of snails infested*	Temperature (°C)	Humidity (%)	Rainfall (mm)
May-June	661	3 (0.45%)	29.3	80.5	547
July-Aug.	778	6 (0.77%)	29.2	82.5	406
Sept.-Oct.	763	4 (0.52%)	27.9	84.0	545
Nov.-Dec.	714	—	21.5	73.5	12
Jan.-Feb.	651	—	20.8	74.0	36
Mar.-Apr.	582	—	25.5	75.0	305
Total	4,149	13 (0.31%)			

* Varied significantly ($p < 0.05$) in different periods (months).

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months (November to January) development and hatching of eggs ceased or took a long time due to low temperatures (table 1). Thus, snails were not infested during this period and cercariae did not appear in the snails by April.

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Literature Cited

- Cable, R. M. 1950. An Illustrated Laboratory Manual of Parasitology. Burgess Publishing Co., Minneapolis 15, Minnesota.
- Dawes, B. 1968. The Trematoda. Cambridge University Press. pp. 419-21.
- Gosh, S. K. 1985. Development and hatching of eggs of *Fasciola gigantica* Cobbold, 1855. M. Sc. (Vet. Sc.) Thesis, F. V. S., Bangladesh Agricultural University, Mymensingh, Bangladesh.
- Gupta, S. P. 1983. Statistical Methods (19th Ed.) Sultan Chand and Sons Publishers, 23 Daryaganj, New Delhi 110002.
- Kendall, S. H. 1954. Fascioliasis in Pakistan. Ann. Trop. Med. Parasitol. 48(3):307-13.
- Mathur, P. B. 1986. A note on fascioliasis in sheep in Himachal Pradesh. Indian J. Vet. Med. 6(2):120-1.
- Morel, A. M. and S. N. Mahato. 1987. Epidemiology of Fascioliasis in the Koshi Hills of Nepal. Trop. Anim. Hlth. Prod. 19(1):33-8.
- Qadir, A. N. M. A. 1982. Incidence of *Gymnocephalous* cercaria in *Lymnaea auricularia* snails. Bangladesh Vet. J. 16(1-4):23-6.
- Rees, G. 1948. A study of the effect of light, temperature and salinity on the emergence of *Cercaria purpurae* Lebour from *Nucella lapillus* (L.). Parasitology. 38 (4):228-42.
- Shaikh, H. and A. S. M. JI. Rahman. 1968. Studies on the cercariae of digenetic trematods in the snails *Thiara tuberculata* (Muller.) Syn: *Melancoides tuberculata* prevalent in East Pakistan. Pak J. Vet. Sc. 2(3):147-50.
- Soulsby, E. J. L. 1982. Helminths, Arthropods and Protozoa of Domesticated Animals. (7th Ed.) Bailliere Tindall, London. p. 51.