



Snail-borne trematode infection in Cattle

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Kerala is a state with large number of fresh water ponds, streams and water-logged paddy fields. *Indoplanorbis* spp. and *Lymnaea* spp. of snails are found in abundance in such localities. They form the specific vectors, which aid in the transmission of trematode infections among cattle and buffaloes.

Schistosomosis and amphistomosis are the predominant trematode diseases prevailing in Kerala. Schistosomosis is due to two causative agents viz., *Schistosoma nasale* and *S. spindale*, whereas amphistomosis is produced collectively by a group of amphistomes viz., *Gastrothylax*, *Fischoderius*, *Paramphistomum*, *Cotylphoron*, *Gigantocotyle*, *Ceylonocotyle*, *Calicophoron* and *Olueria*.

Schistosomes, commonly called as blood flukes occur in equal proportions in cattle and buffaloes. Fresh water snails like *Indoplanorbis excustus* act as vectors carrying the intramolluscan stages of the parasite like the miracidium, sporocyst and cercaria. There are no redial and metacercarial stages. Active penetration of the furcocercous cercaria through nasal mucosa or skin during wallow-

ing or drinking water from ponds results in patent infections. The development of the intramolluscar stages takes almost one month and the post-cercarian development over three months. Hence the pre-patent period is said to be five to six months.

Schistosomosis is less common in animals below one year, even though a few cases have been reported. The low prevalence is not because of age resistance but can be attributed to stall feeding that protects these young animals from acquiring the infection.

Schistosoma nasale: Cattle are the prime hosts for *S. nasale*, as in many localities, it is the only host species to be affected, manifesting the typical clinical syndrome. Buffaloes also harbour *S. nasale* but without exhibiting much signs of the disease, proving that the parasite passes its life cycle more easily in buffaloes than in cattle.

Adult *S. nasale* worms are usually located in the nasal veins. The eggs released enter the mucous glands forming miliary abscesses. Repeated formation of abscesses leads to granulation tissue and ultimately cauliflower like appearance of the lesions. The growth obstructs the nasal passage and produces a snoring sound.

In buffaloes, the reaction is very mild; cauliflower like growths are not formed; neither any kind of snoring nor any visible lesions inside the nostrils except for a few pinhead-sized eruptions on the nasal mucosa could be noticed.

The infection could be easily detected from the symptoms and lesions manifested and confirmed by laboratory examination of nasal discharge.

Endemicity of the area, typical snoring sound and dyspnoea help in diagnosis of nasal schistosomosis.

A typical *S. nasale* egg is boomerang shaped with one end blunt and the other end spiny. Laboratory diagnosis is done by examination of the nasal mucus after treating it with a dilute alkali (5 to 10 per cent KOH or NaOH) under the microscope. It is seen that nasal scrapings contained five times more eggs than the nasal discharges and therefore considered more reliable in diagnosing the infection.

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Since the incidence of nasal schistosomosis in cattle is reported only in buffalo-rearing areas, it is assumed that infection in cattle is possible only in places where the infection is maintained in buffaloes.

Schistosoma spindale: Scientific work on *S. spindale* causing the intestinal form is scarce in Kerala, despite the tremendous prevalence of the disease. Located in the mesenteric or portal veins, the pathogenesis produced is more or else similar to that of *S. nasale*. Ulcers and abscesses formed in the intestinal mucosa result in severe diarrhoea with mucus production and much bleeding. Progressive anaemia and emaciation are noted in affected animals. The distribution of the parasite is uniform in cattle and buffaloes in localities where you find swamps and waterlogged paddy fields.

Intestinal schistosomosis is readily diagnosed by observing symptoms like profuse diarrhoea with fresh blood and mucus. Parasitic eggs are demonstrated by treating the blood tinged or mucous portion of dung with a dilute alkali and examining microscopically. They are typically spindle shaped with a blunt point at one end and a terminal spine at the other, with a live miracidium inside. Since diagnosis of bovine schistosomosis is easy by observing the clinical signs and detection of eggs, little effort has been made to develop immunodiagnostic tests. However, cercarian hüllen reaction (CHR), circum oval precipitation (COP) and miracidial immobilisation test (MIT) are a few methods developed based on serology, with applications to research in the laboratories.

Schistosomosis is easily cured by the following treatment regime.

- a) Tartar emetic (sodium antimony tartrate)
1.5-2 mg per kg body weight i/v
3 injections on alternate days in 10% glucose saline
- b) Anthiomaline (Lithium antimony thiomalate)
10-20 ml i/m
3 injections on alternate days
- c) Praziquantel - 20 mg per kg body weight (single dose)

Amphistomes:

There are 17 species of amphistomes belonging to 8 different genera. *Gastrothylax crumenifer* and *Gigantocotyle explanatum* are the two most commonly encountered species in cattle and buffaloes. The dis-

ease is found more in rainy seasons especially during southwest monsoons and the extent of infection is the same in cattle and buffaloes.

The intramolluscar stages of the parasite found in the intermediate hosts like *Indoplanorbis* and *Lymnaea* consist of miracidia, sporocyst, redia and cercaria. Metacercaria encysted on the grass blade form the infective stage and host infection is by ingestion of grasses carrying the encysted cercaria.

The adult flukes located in the rumen are relatively harmless, whereas the immature ones present in the abomasum and intestine cause grave disease characterized by general weakness, reduced feed intake, bottle jaw, reduced milk production, enteritis and diarrhoea with blood and mucus.

Amphistome eggs are large and clear with an operculum at one end and large embryonic cells in side.

Research works carried at the Department of Veterinary Parasitology, College of Veterinary and Animal Sciences, Mannuthy, to assess the feasibility of a test based on copro antigens revealed that coproantigen detection by ELISA is effective for the diagnosis of gastrothylacosis in bovines. The test is feasible and can be applied effectively to the detection of amphistomosis in the field conditions.

Amphistomosis in cattle and buffaloes is treated by the following drugs:

- a) Oxytocanide - 10 mg per kg body weight
- b) Albendazole - 15-20 mg per kg body weight

Control measures: Besides chemotherapy against trematode infections, efficacy of certain molluscicides has been assessed against *Indoplanorbis exustus*.

- a) Chemical control
 - (i) Bayluscide (Niclosamide) - 1 ppm of water
 - (ii) Copper sulphate - 1-5 ppm of water (1 to 2 per cent Solution)
- (iii) Sodium pentachloro phenate - 10 ppm of 30 per cent solution or 5 kg per acre.

CuSO₄ powder can be mixed with sand in the ratio of 1:5 and applied @ 5-15 kg per acre. Animals should not be allowed to graze until rain has fallen.

- (iv) Lime - 1 in 100 solution
- b) Biological control: Guppies (*Poecilia reticulata*) are capable of devouring 94 per cent of *S. nasale* cer-



caria and 50 per cent of miracidia within an hour. Predation of *I. exustus* by flesh fly larvae (*Sarcophaga misera*) has also been worked upon. Rearing frogs and ducks in ponds also contribute to the control of snails.

Majority of the cattle population in the state is managed under semi-intensive system with freedom to graze in the paddy fields and riverbanks where snail colonies are abundant. In the studies made, it is seen that the extent of trematode infections is greater during monsoons. Hence, farmers should be made aware of the need of snail control to reduce the fluke burden in animals. This will definitely ensure reduction in snail borne trematode diseases in the state.

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pronounced during summer.

Housing

Only simple housing is needed to protect the animal from direct sun. If the farmer has only one or two buffaloes, a simple shelter can be made along with his building

Different summer management practices to alleviate heat stress in buffaloes include.

1. Water splashing: Three times a day, during hottest hours is recommended:
2. Wallowing: Facilities for wallowing can be provided.
3. Mud bathing: Mud bathing using suitable soil like clay if available will provide evaporative cooling for a longer period of time.
4. Feeding during cooler hours of the day
5. Providing shade

6. Ad libitum water intake :

Winter management

During winter it is better to provide warmth. It has been reported that provision of comfort and warmth through bedding and jacketing improves the milk yield.

Health Management

Almost all the diseases of cattle affect buffaloes but degree of prevalence and clinico pathological pictures may vary. Higher degrees of resistance and tolerance have been observed against a few infectious diseases in buffaloes like Haemorrhagic Septicaemia, Buffalo pox, Lymphosarcoma.



Foot and mouth disease has been another cruel blow to the dairy industry just beginning to recover from BSE. The tourist trade – an important source of income has slumped, several major international events have been cancelled and a large number of agricultural shows and events have been postponed.

