



## Intestinal Schistosomiasis in cattle – An Overview

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### Introduction

Schistosomiasis is a snail borne trematode infection which affects domestic animals, man and wild animals in different parts of Asia and Africa. Intestinal schistosome is one of the major problems in different countries of the world. In cattle, intestinal schistosomes is caused by *Schistosoma spindale*, *S. bovis* and *S. japonicum*. A number of snails acts as an intermediate host among which *Indoplanorbis exustus* considered to be the most common.

### Taxonomy

Phylum	Platyhelminthes
Class	Trematoda
Sub class	Digenea
Order	Strigeidida
Family	Schistosomatidae
Genus	<i>Schistosoma</i>
Species	<i>Schistosoma spindale</i> <i>S. bovis</i> <i>S. japonicum</i>

### History

*Schistosoma spindale* - It was first identified in 1906 by Montgomery from cattle in Mukteswar, India (Montgomery, 1906).

## Species characteristics

Parasite	Final host	Intermediate host	Predilection site
<i>Schistosoma spindale</i>	Cattle, sheep, goat, sheep	<i>Indoplanorbis exustus</i>	Mesenteric vein
<i>Schistosoma bovis</i>	Cattle, Sheep, Goat	<i>Bulinus</i> spp.	Portal and Mesenteric vein
<i>Schistosoma japonicum</i>	Ruminants, equines, Human	<i>Oncomelania</i> sp.	Portal and mesenteric vein

### Characteristics of family: Schistosomatidae

- Elongate, cylindrical fluke, commonly called as “Blood fluke”
- Sexes are separate (Unisexual); Pharynx is absent
- Oral sucker and Ventral sucker are close to each other, suckers are not so strong
- Intestinal branches unite posteriorly to form a single tube which extends to hind end

### Morphology of male fluke:

- Lateral edge of body on ventral aspect of male schistosome curved inwards and forms a gutter like groove - Gynaecophoric canal
- During copulation female lodge in this groove termed as “Lady in lord’s lap”
- Genital pore opens posterior to Ventral sucker

### Morphology of female fluke:

- Slender & longer than males; Ovary situated in front of intestinal branches
- Vitelline occupies part behind ovary, after copulation flukes leave male & move away to lay eggs
- They lay eggs in small blood vessels of intestinal wall
- Egg – Napoleon hat shaped, not operculated, presence of terminal spines.

### Life cycle of *Schistosoma spindale*:

- Ovigerous female penetrate deeply into small vessels of mucosa or submucosa of intestine laying eggs in capillaries
- Eggs pass through intestinal wall into intestinal lumen and out in faeces. Eggs hatch after contact & dilution with water. Miracidia infect aquatic snails and 2 generation of sporocysts followed by



cercaria (Furcocercus type) occurs and cercaria actively emerge from snail and swim in water, they are non-feeding, short lived

- Infection of final host is through skin penetration which is assisted by secretion of cephalic glands which digest tissues
- Cercaria transform into schistosomula which are transported to lungs via circulation in 4-7 days and then carried to liver via blood stream from 8 d onwards, schistosomula found in portal vessels of liver
- Pairing of worms occur in portal veins before they leave liver to reach maturity in mesenteric veins. PP of *S. spindale* – 46days

## Pathogenesis

### Intestinal or visceral schistosomiasis

Main clinical syndromes seen in animals affected with intestinal schistosomes are

1. Acute intestinal syndrome
2. Chronic hepatic syndrome

### Intestinal syndrome

- Caused by *S. spindale* due to passage of large number of eggs through intestinal mucosa
- Occurs 7-9weeks of infection
- Pathological lesion includes severe hemorrhage in intestinal mucosa & ulcers covered with blood-stained mucosa
- Lesion is mainly seen in posterior small intestine and caecum. There is marked granulomatous response to eggs laid in submucosa & thickening of intestinal wall
- Adult parasites cause phlebitis in mesenteric veins and proliferation of tunica intima with partial or complete occlusion of lumen

### Hepatic syndrome

- Immunological disease resulting from host's cell mediated immune response against eggs in liver
- Leads to formation of avascular granuloma
- Heavy infection – development & healing of large number of egg granuloma causes massive fibrosis in portal triads of liver which resembles “clay pipe stem” fibrosis
- Periportal fibrosis called Symmer's fibrosis



## **Clinical signs**

### ***S. spindale*:**

- Acute heavy infection characterized by profuse diarrhoea, dehydration and anorexia
- Anemia, hypoalbuminaemia with edema sometimes
- Marked decrease in production, chronically infected animals are emaciated.

## **Diagnosis**

Demonstration of characteristic egg in faeces by faecal examination.

## **Treatment**

- Lithium antimony thiomalate (Anthiomaline) @ 20ml i/m on 1<sup>st</sup> day followed by 10ml for 2-3 occasions

## **Control**

- Snail control
- Treatment of infected animals

## **References**

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