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Research Article

A RARE TREMATODE SPOROCYST FROM FRESHWATER SNAIL, *MELANOIDES TUBERCULATUS* (MULLER 1774)

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ABSTRACT
A survey was conducted in 2012 on freshwater snails and their larval trematode parasites in southern Rajasthan, India. A total of 138 mature specimens of *Melanoides tuberculatus* snails were recovered from different lotic and lentic habitats. Of these snails, 86 (62.31%) were found to be infected with furcocercous, xiphidio, monostome and gymnocephalous cercariae. From these infected snails, 4.34% were infected with large sized elongated, creamish and annulated sporocysts. These sporocsyts contained numerous large sized active furcocercous cercariae and a few germ balls.

***Key Words*:** *Freshwater Snails, Melanoides tuberculatus, Sporocysts, Trematode Larvae*

INTRODUCTION

Digenetic trematode parasites are causative agents of several diseases in humans and many other vertebrates. They have a heteroxenous life cycle with freshwater snail as their first intermediate host and adult flukes are found in many vertebrate definitive hosts as amphibians, fishes, reptiles, aves and mammals. Many species of freshwater snails serve as an intermediate hosts for these digenean parasites. Consequently, the distribution of snails can be correlated with the occurrence of different trematodiasis in particular geographical areas (Choubisa, 2010). Sporocyst represents second generation of larval stage of digenetic trematode parasites found mostly in the hepatopancreas (digestive gland) of intermediate snail hosts and develops from first larval stage, miracidium. Through asexual reproduction sporocysts give rise to redial and /or cercarial generation (Cheng, 1964; Erasmus, 1972; Choubisa, 1985). Sporocyst larvae can be identified and differentiated from rediae by absence of organs or organ systems e.g. digestive, excretory, nervous and reproductive and circulatory systems (Erasmus, 1972). These larvae also lack locomotory organs, lappets. Morphologically sporocysts may be ovoid, slender, branched or highly ramified etc (Erasmus, 1972). This study led to the discovery of a rare sporocyst that had surface annulations and was filled with furcocercous cercariae. The structure of this rare sporocyst is discussed along with the exquisite photographs.

MATERIALS AND METHODS

During a survey (2012) of freshwater snail fauna and their larval trematode parasites of southern Rajasthan (Banswara, Chittorgarh, Dungarpur, Rajasamand, Sirohi, and Udaipur districts), India, specimens of a bottom dwelling snail species, *Melanoides tuberculatus* (Muller, 1774) (Thiaridae, Prosobranchia) were collected in the summer season from different lotic and lentic freshwater habitats. These snails were identified as earlier (Choubisa, 2008). They were brought to the departmental laboratory and maintained in separate aquaria containing fresh water and aquatic plants. The infected and uninfected snails were separated after screening (Choubisa, 2008) for cercarial emergence. The infected snails were anesthetized by immersion in a menthol-saturated solution (Horn *et al.*, 2005) and then the animals were dissected toobserve larval trematode infection (Choubisa and Sharma, 1986). The sporocysts were recovered from the hepatopancreas and stained in Gower's carmine, dehydrated in ascending alcohol concentrations, cleared in xylene and mounted in DPX.

RESULTS AND DISCUSSION

Out of 138 mature specimens of *M. tuberculatus* snail, 86 (62.31%) were found to be infected with different forms or types of cercariae chiefly furcocercous, xiphidiocecariae, and gymnocephalous. This snail species is known to harbor a wide variety of cercariae that include xiphidiocercariae, furcocercous cercariae and pleurolophocercous cercariae and, gymnocephalous cercariae (Yousif *et al.*, 2010). Of these infected snails, 4.34% were infected with large sized elongated, thread –like, creamish sporocyst larvae. The hepatopancreas was heavily infested with these sporocysts and it had completely lost its shape. The bunch of sporocysts was seen protruding from the digestive gland. The accumulation of sporocysts within the hepatopancreas is due to the regular circulation of haemolymph in this organ. Besides this, it provides these parthenitae with a good food supply that results in rapid growth of the sporocysts and developing parthenitae within it (Becker, 1970). Abundant food and haemolymph are the major requirements a parasite needs to grow and perpetuate in a snail host. The present sporocyst larvae have elongated large sized body which requires much more nutrients for their growth as well as for developing cercariae. As the sporocyst lack a nervous system and therefore, their movement is creepy, sluggish and non-directional, so once it reaches the digestive gland the possibility of leaving is strongly reduced. It is well known fact that in the restricted ecological niche the larval parasite inevitably relies on the host as its food source and living space.

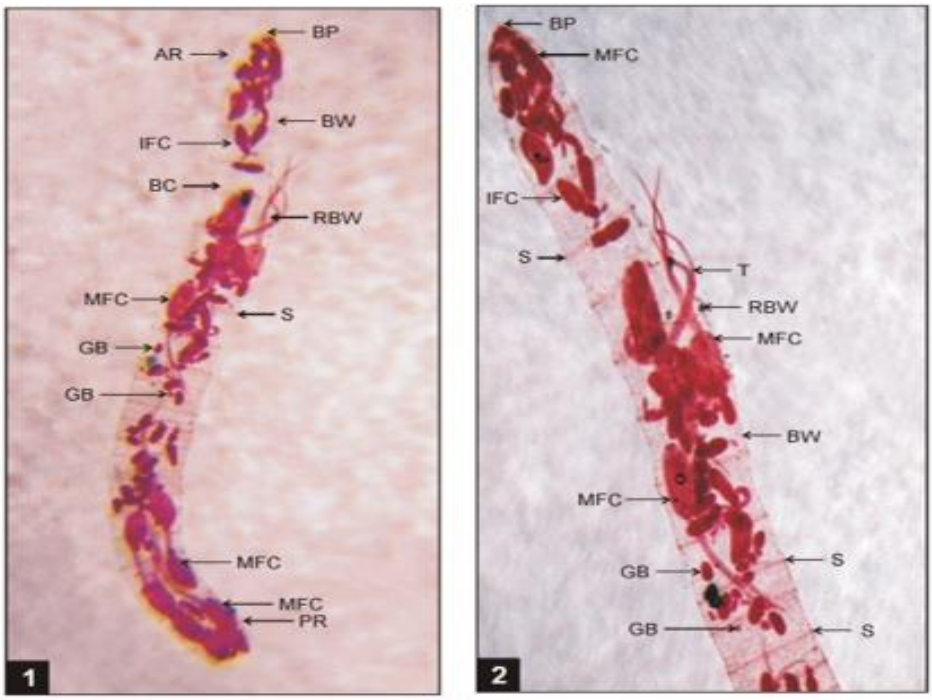

Figure 1: A complete trematode sporocyst stained with Gower's carmine showing germ balls, mature and immature furcocercous cercariae in the brood chamber (40 x).
Figure 2: A portion of sporocyst body enlarged showing surface annulations on the body and birth pore at the tip of anterior region (100 x).

Abbreviations
AR, Anterior region; BC, Brood chamber; BP, Birth pore; BW, Body wall; GB, Germ balls; IFC, Immature furcocercous cercaria; MFC, Mature furcocercous cercaria; PR, Posterior region; RBW, Ruptured body wall; S, Surface annulation; T, Tail

Morphology of sporocyst stained with Gower's carmine revealed that these larvae are large in size with elongated body, slightly conical anterior end while the posterior end was blunt or rounded (Figure 1). At the anterior end a minute birth pore was also found. Interestingly, the body of these sporocysts was found to be divided regularly from anterior to posterior end by surface annulations (Figure 2). Due to these annuli sporocyst body appeared as if it were segmented, but in the brood chamber of sporocyst movement of mature furcocercous cercariae from anterior to posterior region or vice -versa was also observed which possibly help in the movement of sporocyst. In these larvae digestive and excretory (flame cells) systems were not found. Brood chamber of these sporocysts contained few germ balls and mature and immature cercariae. A single sporocyst in this case contained a large number of cercariae in different developmental stages. The birth pore at the anterior end probably is meant for release of developed cercariae but mature cercariae had relatively long furci (longifurcate) that had even caused the body wall to rupture due to the constant movement of cercariae within the brood chamber. Except cercarial larvae no other larvae such as rediae were found in brood chambers of these sporocysts. The present study describes for the first time a rarely reported sporocyst larvae extracted from the fresh water snail *M. tuberculatus* (Figure 3), from southern Rajasthan, India. This study adds more information to the trematode fauna in southern Rajasthan and represents a step in the study of life cycle of the heteroxenous trematode parasites.

Figure 3: Freshwater snail *Melanoides tuberculatus* (Muller 1774)

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