



Morphology of *Echinostoma paraensei* Lie & Basch, 1967 (Trematoda) cercariae

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The family Echinostomatidae is the most numerous within the class Trematoda, *Echinostoma paraensei* Lie & Basch, 1967 is a widely distributed member of this family, with a typical life cycle with six larval stages, many of them studied by some authors (Kanev et al., 2000; Kostadinova and Gibson, 2000; Pinheiro et al., 2004, 2005; Toledo et al., 2007). The taxonomic features of the *Echinostoma* genus are complex, so are those of *E. paraensei*, described as a synonymy with *E. caproni* by Kanev (1985) and Christensen et al. (1990).

The *E. paraensei* cercariae were obtained from 'Laboratório de Biologia e Parasitologia de Mamíferos e Reservatório', IOC, FIOCRUZ, Rio de Janeiro state.

The specimens were observed using a Quanta 250 scanning electron microscope at 12.50 kV.

The cercariae present elongated body, with muscular striations all over it, which probably accompany the musculature. For *E. paraensei*, the fin-fold pattern is demonstrated in Figure 1, with two dorsal, two ventral, and two lateral folds. Fin folds present a different striation

pattern, lengthwise, differing from the body muscular striation.

The body of *E. paraensei* cercariae presents a well developed, detached collar spine that partially surrounds the oral sucker, as indicated in Figure 2. This sucker is not prominent off the body as the ventral fin fold, which is protuberant. The tail is long with a thicker tip that narrows at the end.

The perioral region presents a sequence of papillae, forming a circle around this region (Figure 3). The papilla emerges from a pore situated in a bulbous protuberance (Figure 3B). These papillae are uniciliated and are also present in the collar, surrounding it and completing a full circle in the ventral region. There are more of them distributed in the tegument of the ventral and dorsal regions; they decrease in number along the cercarial body and completely disappear at the acetabulum region. The position and structure of these papillae suggest their sensorial role.

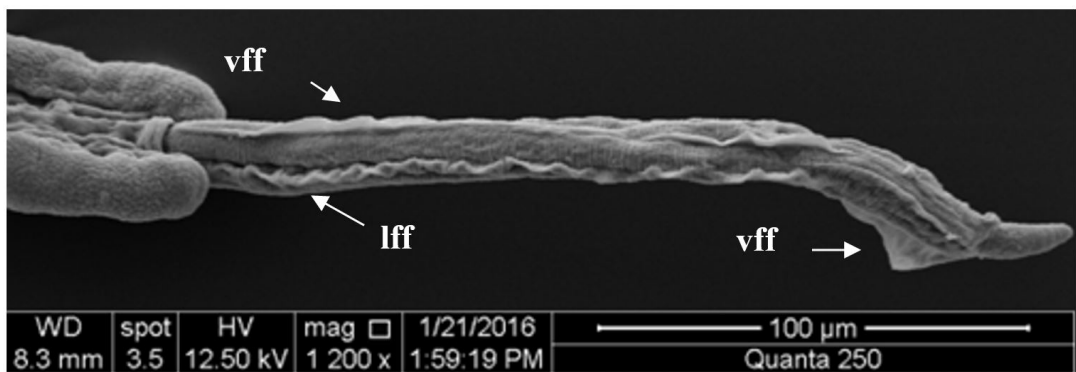


Figure 1. SEM of *Echinostoma paraensei* cercaria detailing the six fin folds. The main image shows the ventral fin folds (vff), the lateral fin folds (lff), and the dorsal fin folds (dff).

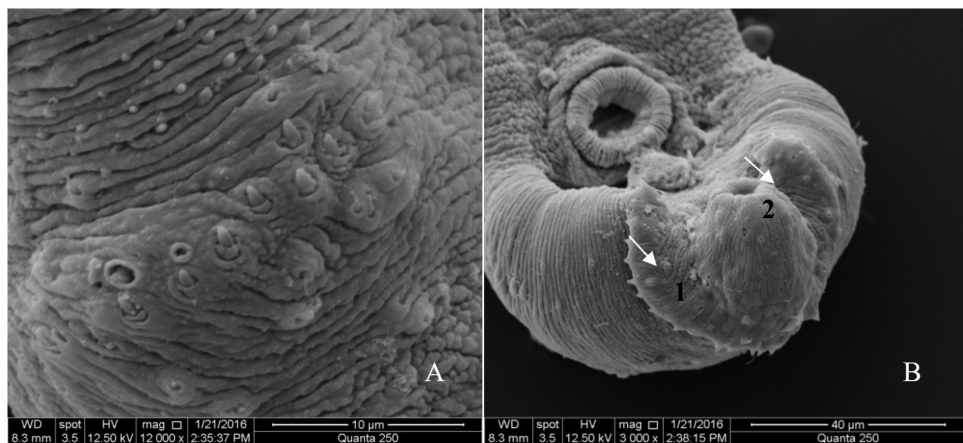


Figure 2. The collar spine of *Echinostoma paraensei*. (A) shows that the collar ends at the ventro-lateral region of the cercaria body; (B) a view of the spine collar, completely detached from the body and around the oral sucker.

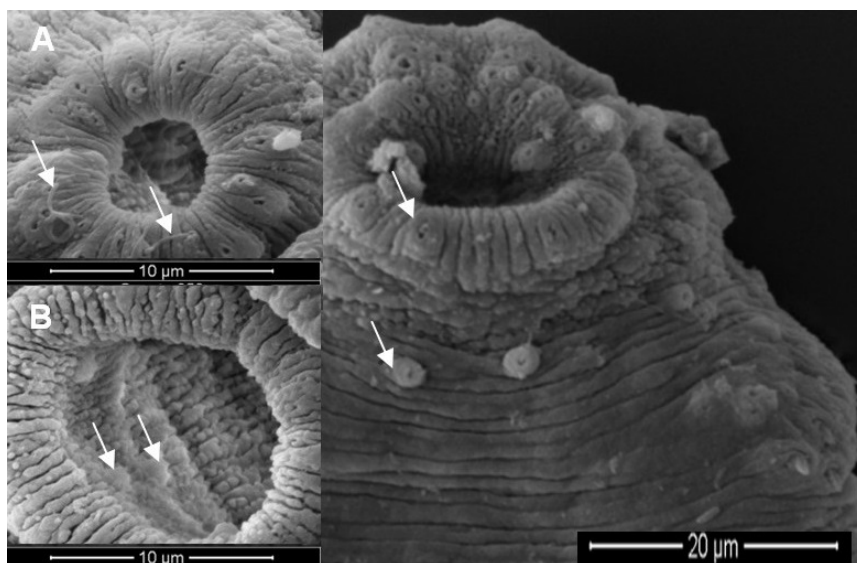


Figure 3. Details of the papillae of the oral and ventral suckers. The main image shows unciliated papillae. (A) detail of the unciliated papillae of the oral sucker, surrounding it; (B) the papillae of the ventral sucker. These papillae do not present any cilia, forming bulbous protrusions in the internal region of the sucker.

Internally, in the acetabulum, a range of papillae can be observed as bulbous projections surrounding the inner edge of the sucker, as shown in Figure 2. These papillae do not present any cilia, but a small round projection. The differences between the papillae of these regions may be related to the function they hold in each of them: in the anterior region, they have a sensory function because they are used to explore the environment in search for food; whereas in the acetabular portion, their function may be associated with recognition of the site of helminth infection and fixation, because the frontal part must be more involved in perception and orientation in order to find the second intermediate host.

The presence of a tegumentary fold on the tail of *E. revolutum* was also observed by Lie and Basch (1967), being used as a taxonomic criteria in the description of this species. According to Kanev et al. (1993), *Echinostoma revolutum* (Froelich, 1802) cercariae have been described with different numbers and arrangement of fin folds. These data also speculate that the large dorso-ventral fin folds are associated with swimming, and the small ventro-lateral and single papila-like folds are probably sensorial.

The sheath that surrounds the basis of the spine is probably involved in the retraction of the spines. Maldonado Júnior et al. (2001) also described a protrusion around the spine in the adult worm. This characteristic may represent a way to avoid the loss of spines, considering

that contraction can protect the spines from the attrition on rough surfaces. It can also protect them from the flow of food that occurs in the intestine of the host.

There was a lack of morphological studies on the cercaria of *E. paraensei*, as well as on descriptions of their external ensorial structures. This work shows and describes these features for the first time, complementing the studies on the Echinostomatidae family.

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