Mode of Infection of *Sarasinula marginata* (Mollusca) with Larvae of *Angiostrongylus costaricensis* (Nematoda)

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The mode in which molluscs become infected with first-stage larvae of angiostrongylids other than *Angiostrongylus costaricensis* Morera & Céspedes, 1971, has received considerable attention. It was observed by CS Richards (1963 *J Parasitol 49*: 46- 47) and by CS Richards and JW Merritt (1967 *J Parasitol 53*: 382-388) that *Biomphalaria glabrata* (Say, 1818) becomes infected with first-stage larvae of *Angiostrongylus cantonensis* (Chen, 1935) via digestive tract. However, M Mackerras and DF Sanders (1955 *Austr J Zool 3*: 1-25), TC Cheng and JE Alicata (1965 *Malacologia 2*: 267-274), J Courdurier et al. (1967 *Bull Soc Path Exot 60*: 165-173), KR Harris and TC Cheng (1975 *Int J Parasit 5*: 521-528) and F Yousif and G Lämmler (1977 *Z Parasitenk 53*: 247-250) stated that infection of molluscs with this nematode occurs by oral route as well as by penetration of the larvae through the body wall.

In *Angiostrongylus vasorum* (Baillet, 1866) these two modes of infection were also observed by J Guilhon and A Afghahi (1969 *C R Acad Sci Paris 268*: 434-436) in some species of terrestrial molluscs. Conversely, with regard to *A. costaricensis*, P Morera (1973 *Am J Trop Med Hyg 32*: 613-621), observed that molluscs become infected by ingestion of first-stage larvae.

In this paper, the mode in which *Sarasinula marginata* (Semper, 1885) becomes infected with larvae of *A. costaricensis* is presented.

Strains of *A. costaricensis* and *S. marginata* used in this work were isolated from Crissiumal, State of Rio Grande do Sul (27.30S 54.07W) and Rio de Janeiro city (22.54S 43.15W), respectively. Feces of infected Swiss albino mice were left overnight in Baerman funnels and sediments collected were centrifuged to provide suspension of first-stage larvae. The possibility of active penetration of the larvae through the mollusc body wall was investigated as follows: two small specimens of *S. marginata* (about 1g) were firmly hanged by their anterior ends with a forceps to exclude possibility of oral infection and to allow that only the posterior region of the slug touched the larvae suspension in the Petri dish (40 min for one and for 60 min for the other). To avoid contraction during fixation, they were compressed individually with a glass slide against the bottom of a Petri dish while Railliet-Henry fixative was gently put in the dish. After 48 hr the specimens were embedded in paraffin, sectioned serially and stained with hematoxylin-eosin for microanatomic observation. Two other specimens of *S. marginata*, which were allowed to feed on lettuce and feces containing first-stage larvae, were fixed 1 hr after exposure and processed as the first.

After histological investigations, it was observed that infection of the molluscs with *A. costaricensis*, as with other congeneric species, occurs via digestive tract as well as by penetration through the body epithelium. Larvae were observed in the esophagus as well as in the fibromuscular tissue (Fig.1), just below epithelium and in other sites, in the specimens that fed on contaminated food. With regard to those in which ingestion was excluded, larvae were observed at the moment of penetration into the body epithelium (Fig.2) and entirely embedded in the fibromuscular tissue, showing a coiled shape as in Fig.1.
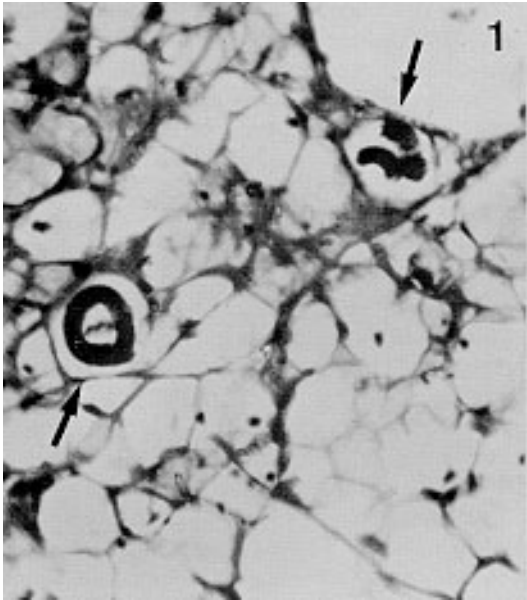
Fig. 1: first-stage larvae of *Angiostrongylus costaricensis* in the fibromuscular tissue of the body wall of *Sarasinula marginata* fixed 1 hr after exposure to contaminated food. X100.
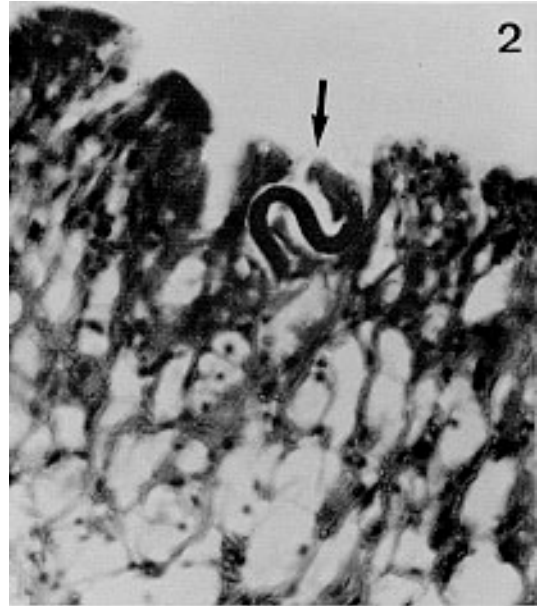

Fig. 2: first-stage larva of *Angiostrongylus costaricensis* at the moment of penetration in the body wall of *Sarasinula marginata.* X100.