

# The Host-parasite Interface—A SEM Study of *Lytocestus indicus*, a Caryophyllidean Cestode of Cat-fish

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## Introduction

Amongst the cestodes the majority of the studies carried out so far on surface topography pertains to the numbers of Pseudophyllidea and Cyclophyllidea [1]. All cestode species examined so far possess microtriches in the larval as well as in the adult stage and these structures seem to be a universal feature of the group [2-7]. Studies on some species of pseudophyllidean tapeworms indicate that there are differences in shape and density of microtriches between larvae and adult worms [7-9] and between different species [10].

The tegument of monozoic cestodes has been less intensively studied than that of strobilating species, the available accounts being restricted to some caryophyllaeids like *Hunterella nodulosa* [11] and *Glaridacris catastomi* and *G. laruei* [12] and *Caryophyllaeus laticeps* [13-16].

The present communication dealing with the surface fine topography of *Lytocestus indicus*, a most commonly occurring caryophyllidean cestode of the edible cat-fish, *Clarias batrachus*, adds to the details of the host-parasite interface.

## Materials and Methods

Live specimens of *L. indicus* were obtained from the intestine of *Clarias batrachus*. After thorough washing, the worms were fixed in 10% buffered formalin and preserved in 70% alcohol until further processing. They were dehydrated in a graded series of ethanalamyl acetate mixture to pure amyl acetate. Thereafter, the specimens were critical point dried using liquid carbon-dioxide, metal coated with gold palladium, and finally observed in a stereoscan Phillips 500 at 25 to 6000x magnification at electron accelerating voltages ranging from 15 to 20 KV.

## Observations and Discussion

The monozoic cestode *Lytocestus indicus* (Fig. 1) is divided into a body

proper, a short neck and a distinct holdfast with which it remains firmly attached to the host's intestinal wall tissue. The tegument exhibits deep wrinkles and folds in the pre- and post-neck region. A zone of finely wrinkled tegument delimits the holdfast from the relatively smooth neck region (Fig. 2). However, the holdfast is without any introvert (Fig. 3) unlike the scolices in pseudophyllidean and cyclophyllidean cestodes.

The whole body surface of the worm is revealed as carpeted with fine microtriches under higher resolution. These microtriches appear to be uniform throughout the body without showing any regional differentiation in their morphology, but the density of distribution is less in the neck region compared to the holdfast and the post neck region (Fig. 4-6).

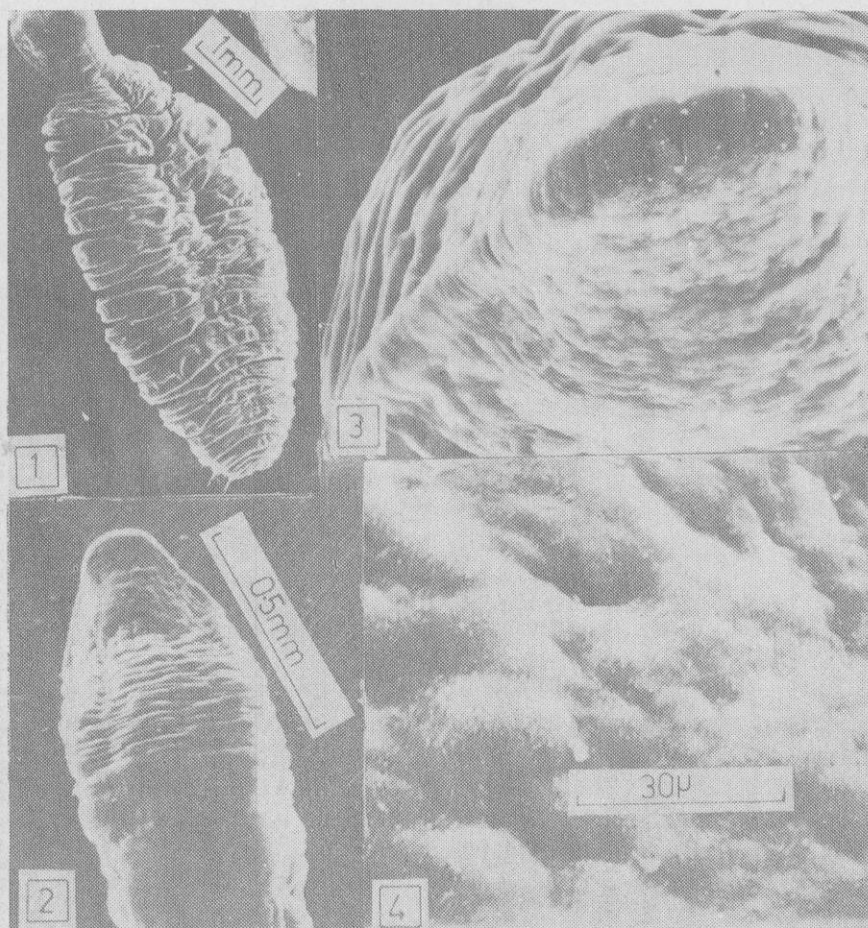


Fig. 1-4 Scanning electron microscopy of *Lyrocestus indicus*. 1. Entire worm. 2. Holdfast end; the smooth neck region is distinct from the finely wrinkled tegument of the distal end of holdfast. 3. Holdfast tip showing deep wrinkles. 4. The same under higher resolution revealing the cover of microtriches.

However, in other caryophyllidean cestodes viz. *Hunterella nodulosa* and *Caryophyllaeus laticeps* [11-16] the microtriches showed distinct regional differentiation along the length of the worm. Three types of microtriches were described from the tegument of *Hunterella nodulosa*: typical ones with well developed spines, those with short filaments and the third type with 10 spines. Microtriches with spines were found only on the anterior part of the worm. Those on the posterior part had no spines and between these two regions, in the transitional zone, all the three types of microtriches were found. In *Caryophyllaeus laticeps*, the holdfast syncytium differs from that of the mid and posterior body surface in the morphology of the microtriches.

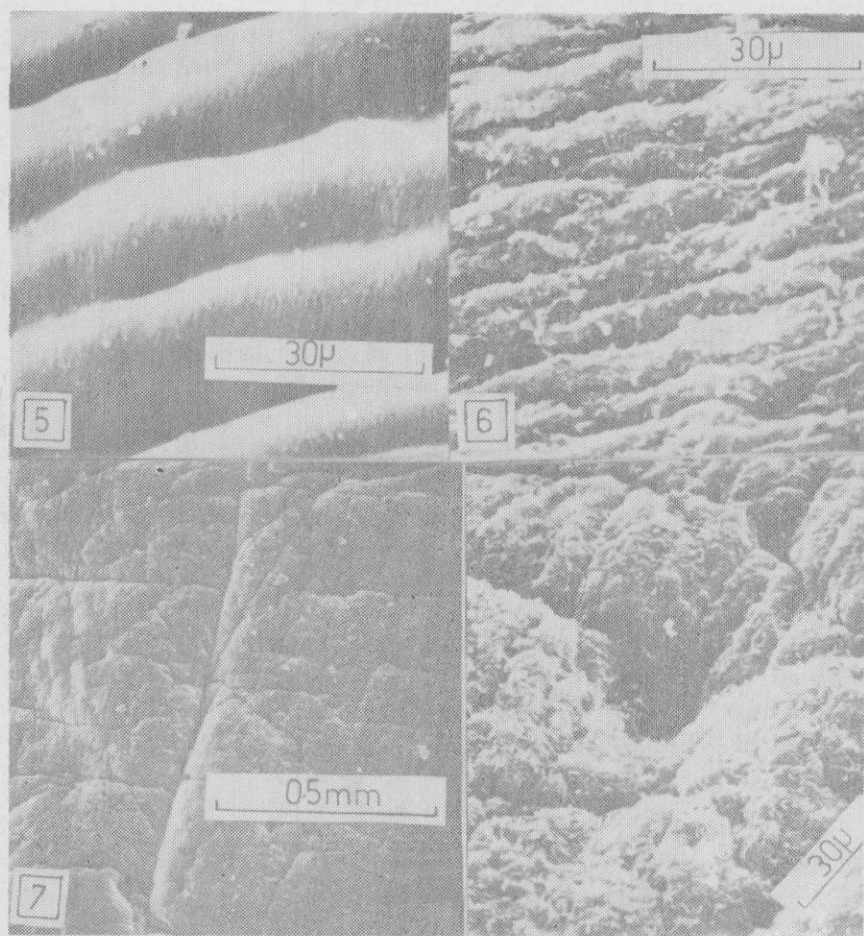


Fig. 5-8 Scanning electron microscopy of *Lytocestus indicus*. 5. Microtriches on the general tegument of the body. 6. Tegument of the neck region, coarsely distributed pits ( ) occur in this zone. 7. Tegument in the post-neck region. Note the conspicuous pits ( ) and crackles. 8. A closer view of the surface pit.

The surface topography of pseudophyllidean and cyclophyllidean cestodes also reveal a variety of microtrich form. Along the length of *Hymenolepis* spp. and on the surface of adult *Taenia hydatigena* polymorphism of microtriches was observed [17, 18]. While in the larvae of *Diphyllobothrium ditremum* and *D. dendriticum* regional differentiation of microtrich occurs, the same is not apparent in the adult worms [19].

Throughout the extent of the body in *L. indicus*, the tegument does not reveal any papillate or dome-shaped structures, but it is interrupted by irregularly scattered pits (Fig. 7, 8). These pits, however, show a resemblance to the openings of the pore canals of some diphyllbothriid cestodes [20]. However, the functional significance of these pits could only be elucidated after the ultrastructural studies of the tegument in this species or caryophyllids have been carried out.

The dense distribution of microtriches all over the general tegument in *L. indicus* is suggestive of the well accepted functional attributes of microtriches, i.e., absorption, secretion and anchorage to the hosts tissue, for other groups of cestodes [5, 6], [21-23].

### Summary

The surface fine topographical features of *Lytocestus indicus* (Moghe, 1925), a common caryophyllidean cestode parasitizing the edible cat-fish, *Clarias batrachus*, is studied by scanning electron microscopy at electron accelerating voltages of 15 to 20 KV and magnifications ranging from 25 to 6000x.

The tegument exhibits deep wrinkles and folds in the post neck region. A zone of finely wrinkled tegument delimits the holdfast from relatively smooth neck region. The holdfast is without any introvert. The whole body surface is carpeted with fine microtriches that become evident only at higher resolution and do not show any regional differences in their morphology. Throughout the extent of the body, the tegument does not reveal any papillate or dome-shaped putative sensory structures but is interrupted by irregularly scattered pits; the latter show a resemblance to the openings of the pore canals of some diphyllbothriid cestodes.

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