Acta Parasitologica, 1994, 39(3), 150–152
ISSN 1230-2821

SEM study of head and cuticular armature of *Gnathostoma doloresi* (Nematoda, Gnathostomatidae)

Arun K. Yadav[1] and Veena Tandon[2]

[1]Regional Medical Research Centre, N.E. Region, Indian Council of Medical Research, P.B. 105, Dibrugarh 786001; [2]Department of Zoology, North-Eastern Hill University, Shillong 793014, India

Abstract. The surface ultrastructure of the nematode, *Gnathostoma doloresi*, parasitic in the stomach wall of domestic pigs, has been studied by means of scanning electron microscopy. *Gnathostoma doloresi* differs from the two other related species, namely, *G. hispidum* and *G. spinigerum*, in the shape, size and density of the cuticular spines present at the anterior extremity of the body. Whereas, the ultrastructure of the cephalic bulb revealed no major characters suitable for the differentiation of *G. doloresi* from other congeners.

Introduction

Nematodes of the genus *Gnathostoma* Owen, 1836, namely, *G. hispidum* Fedtschenko, 1883 and *G. doloresi* Tubangui, 1925 are among important parasites of domestic pigs in several regions of the world (Soulsby 1982). These exhibit relatively narrow morphological diversity and on several occasions, particularly in the case of multiple infections, have been confused with each other by previous investigators (Scholz and Ditrich 1990). The aim of this paper was to describe through scanning electron microscopy (SEM) the surface ultrastructure of *G. doloresi*, which might be useful in differentiating this species from other congeners.

Material and methods

Adult *G. doloresi* were collected from pigs necropsied at local abattoirs and were fixed in 5% buffered formalin. Five to 10 mm long pieces of their body were obtained and processed for SEM as described elsewhere (Tandon and Yadav 1991). The specimens were then examined with JEOL-JSM 35 CF scanning electron microscope, operated at 15 kV.

Results

The anterior end of *G. doloresi* is provided with a subglobular cephalic bulb (Fig. 1a), armed with 8–9 transverse rows of posteriorly directed cuticular spines. The

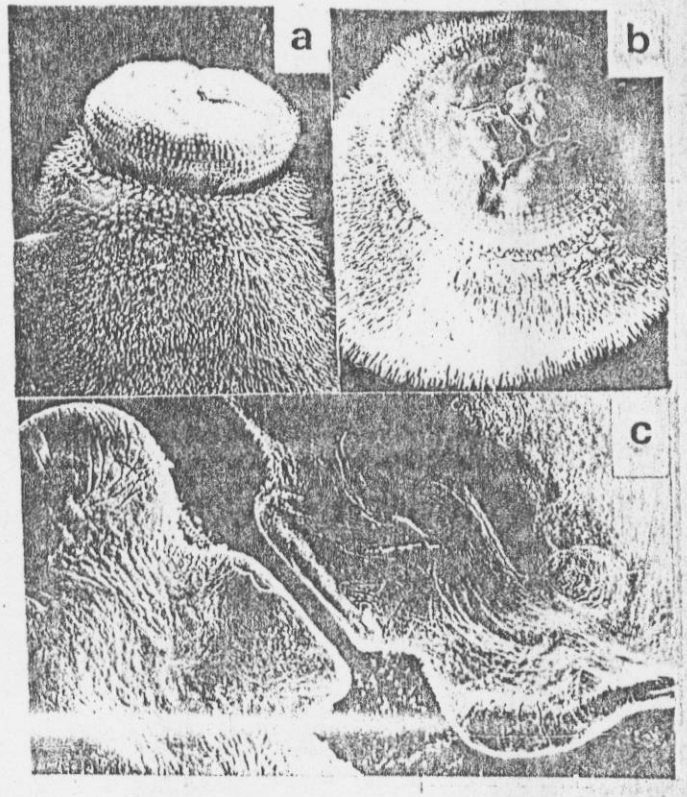
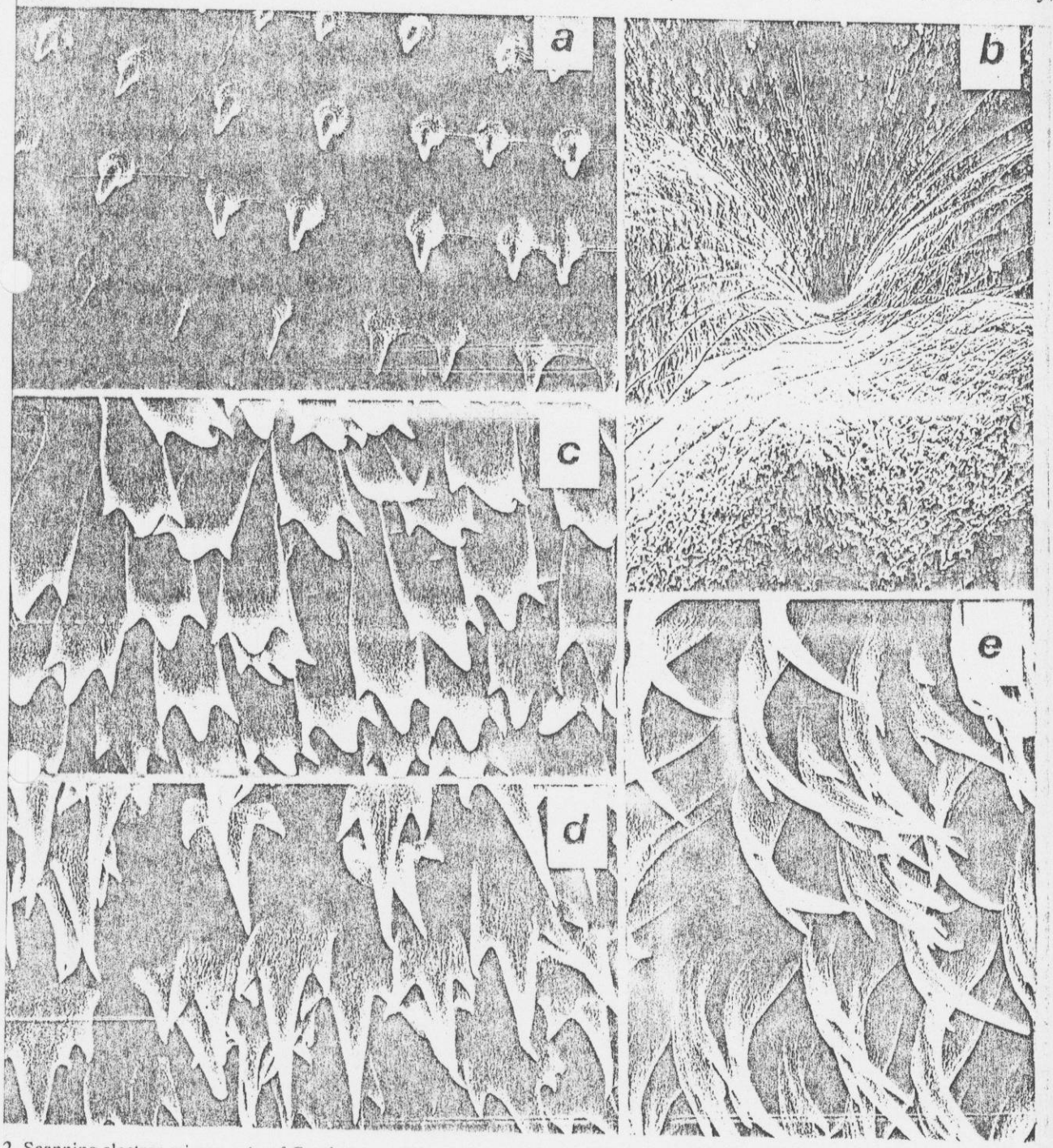


Fig. 1. SEM micrographs of *Gnathostoma doloresi*. **a–c** – anterior extremity: **a** – cephalic bulb and body covered densely with cuticular spines, × 48; **b** – trilobed pseudolips, submedian cephalic papillae and a pair of lateral amphids, × 100; **c** – the lip's edges and cephalic papillae, × 420

s emerge from a globular circular base and the le in between two spines shows transverse fine kles (Fig. 2a). The mouth is guarded by two prom- pseudolips (Fig. 1b). Each lip on its inner facet is ened and modified into a tooth-like ridge, which s its counterpart to form a macerating surface (Fig. The pseudolips are provided with a pair of stout iedian cephalic papillae (Fig. 1b) and lateral am- (Figs. 1b and 2b); in addition, a minute pore-like opening is noticeable at the base of each lip (Fig. 1b). The body is separated off from the cephalic bulb by a narrow neck (Fig. 1a) and is provided with cuticular spines of various shapes, size and density (Fig. 2c-e). The spines of the cervical region are relatively wide, scale like and 3-pronged and have a densely overlapping pattern (Fig. 2c). The median one of the 3 prongs is slightly longer and bent posteriorly, while the lateral prongs are shorter and have pointed terminations (Fig. 2c and d). Posteriorly,



2. Scanning electron micrographs of *Gnathostoma doloresi*: **a** – spination of the cephalic bulb, × 720; **b** – minute pore-like opening, 0; **c** – three-pronged spines, densely distributed on the anterior region of the body, × 720; **d** – spination on the mid-body region, × 720; pination on the posterior region of the body, × 720

e spines retain their trident shape, but appear more ender and elongated, with the median prongs distinctly nger than the lateral ones (Fig. 2e).

iscussion

he microphotographic features of *G. doloresi* elucidated through the present SEM study are in agreement ith the light microscopic [illegible] previously y Tubangui 1923 and also provide some new, additional ata pertaining to the topography of the pseudolips, ephalic papillae, amphids, minute pore-like openings nd the distribution of cuticular spines at different reions of the body. The cuticular spines, however, appear o be the only character which could be used to distinguish *G. doloresi* from other species of the genus. *Gnathostoma doloresi* may be differentiated from *G. spinigerum* by the number of rows of spines (8–9 against 10) on the cephalic bulb (Scholz and Ditrich 1990). The nature of the cuticular spines is also different in the two species; *G. spinigerum* possesses non-denticulated, sparsely distributed spines at the middle and the posterior third regions of the body, and short, densely arranged conical spines around the anal region of the body (Kondo et al. 1984). Further, in *G. doloresi* the cuticular spines of the anterior region have two long bent teeth, which is not so in the other two species. Ishii 1971 reported the number of rows of spines of the cephalic bulb in *G. doloresi* to vary between 8–10, while, in the specimens in the present study, only 8–9 rows were observed. In another member of the family Gnathostomatidae, namely, *Tanqua tiara* the cephalic bulb consists of 4 separate lobes and its surface is provided with sharp-edged transverse cuticular ridges; further the pseudolips in *T. tiara* get interlocked in a key and lock-like manner (Gibbons 1986).

Acknowledgements. Award of a research grant to VT under the Himalayan Eco-development Programme of Department of Environment, Govt. of India, and a Senior Research Fellowship to AKY by the Council of Scientific and Industrial Research, New Delhi is thankfully acknowledged.

References

Gibbons L. M. 1986. SEM guide to the morphology of nematode parasites of vertebrates. Commonwealth Institute of Parasitology, Farnham Royal, Bucks, England.

Ishii Y. 1971. Scanning electron microscopy of helminths. (1) Adult *Gnathostoma*. *Igaku no Ayumi*, 77, 181–182.

Kondo K., Akao N., Takakura Y., Ohnishi Y., Konishi Y., Yoshimura H. 1984. [Scanning electron microscopy (SEM) of larvae and adult worms of *Gnathostoma hispidum*]. *Japanese Journal of Parasitology*, 33, 577–586 [in Japanese].

Scholtz T., Ditrich O. 1990. Scanning electron microscopy of the cuticular armature of the nematode *Gnathostoma spinigerum* Owen, 1836 from cats in Laos. *Journal of Helminthology*, 64, 255–262.

Soulsby E. J. L. 1982. Helminths, arthropods and protozoa of domesticated animals. Bailliere Tindall, London.

Tandon V., Yadav A. K. 1991. SEM observations on swine kidney worm *Stephanurus dentatus* (Nematoda: Syngamidae). *Indian Journal of Animal Health*, 30, 105–107.

Tubangui M. A. 1923. Metazoan parasites of Philippines domesticated animals. *Philippine Journal of Science*, 28, 11–37.

(Accepted January 20, 1994)