

## SEM study of cephalic region of *Tanqua tiara* and *Tanqua anomala* (Nematoda: Gnathostomatidae) from Asansol coal-field area (W.B.) India

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### ABSTRACT

From the Asansol region of district Paschim Bardhaman of West Bengal, India two parasitic nematodes belonging to same genus, *Tanqua tiara* from the stomach of Water monitor lizard, *Varanus flavescens* and *Tanqua anomala* from the intestine of Asiatic water snake, *Xenochropis piscator* were recovered. The Surface structures of head region of both nematodes have been examined with Scanning electron microscope. The mouth region of both species is characterised by presence of two large pseudolabia followed by cephalic bulb. Each pseudolabium bears a pair of submedian cephalic papillae and a lateral amphid. *T. tiara* has four large cephalic bulbs whereas *T. anomala* has two large cephalic bulbs. Asansol industrial region is recorded as new geographical area for this parasite.

Figure : 01

References : 11

Table : 00

KEY WORDS : Nematode, *T. anomala*, *Tanqua tiara*, *Varanus flavescens*, West Bengal, *Xenochropis piscator*.

### Introduction

*Varanus flavescens*, commonly known as yellow or golden monitor is a species of monitor lizard found in Asia. Naturally they prefer wet areas and remain active near the fresh water lakes, ponds and river area<sup>5</sup>. The checkered keelback *Xenochropis piscator* on the other hand, commonly called as Asiatic water snake are also acting as common species of nonpoisonous snake in West Bengal. They are diurnal also nocturnal in habit and as preferred habitat they like freshwater lake or river<sup>4,7,11</sup>. It should be mentioned that though some informations are available in literatures, still works on reptilian nematodes are rare<sup>1,8,9,10</sup>.

### Materials and Methods

During a rainy day from the highway near Asansol

town, one died *V. flavescens* and one living *X. piscator* were collected and brought to the laboratory for examination of nematode infection. With dissection of the host, the nematodes were collected from the stomach and intestine of their respective hosts and freed from debris by shaking them in 0.67% NaCl solution before further processing. Light microscope has been used for identification of parasites. The nematodes found were fixed in steaming 70% alcohol and after observation they were directly transferred from 70% alcohol to lactophenol on a glass slide and mounted temporarily with a cover glass. After clear observations, the lactophenol treated specimens were washed thoroughly in 70% alcohol, subsequently transferred to fresh 70% alcohol and subjected for storage. Further for SEM studies, the following steps were conducted very carefully. At first

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isolated nematodes after washing thoroughly in physiological saline (0.67% NaCl) were fixed in primary fixative *i.e.* 2.5% glutaraldehyde in 0.2 M sodium cacodylate buffer (pH-7.2), subsequently post fixed in secondary fixative *i.e.* 2% osmium tetroxide (OsO<sub>4</sub>) in the same buffer system, dehydrated in ascending series of ethanol and finally transferred to 100% isoamyl acetate through the mixtures of ethanol and isoamyl acetate. Then the specimens were dried in a Hitachi HPC-2 (Japan) CPD, mounted on aluminium stubs and coated with gold by an IB2 ion coater. All the observations were analyzed with A Hitachi S-530 (Japan) SEM at a resolution of 50  $\mu$  and operating at an accelerating voltage of 15 kV. The microphotographs were taken very carefully. The recovered nematodes have been deposited at the Parasitology Laboratory (Helminthological division-Registration No. BUPL-171) of Burdwan University, East Burdwan, W.B., India. Unless otherwise stated here all the measurements are noted in millimetres.

### Observation

After a series of careful observations, the nematodes isolated were identified as *Tanqua tiara* (from *V. flavescens*) and *T. anomala* (from *X. piscator*). The purpose of the said article was to represent a detailed analysis of cephalic region of both species of nematodes with Scanning electron microscopy (SEM).

### Results

#### *Tanqua tiara* Fig. 1 (a–d)

Morphologically the worms are elongated and stout. Prominent transverse striations were noticed at the surface of the body of nematode specimen. The anterior end of parasite is provided with two large lateral pseudolabia followed by massive cephalic bulb. The inner face of pseudolabium is slightly folded into a five rounded tooth-like structures which fit into corresponding folds on the adjacent pseudolabium. A pair of large dome-shaped submedian cephalic papillae found in each pseudolabium representing a double papilla, and also a lateral amphid. A groove has separated the cephalic bulb from the pseudolabia and it is further divided by four longitudinal grooves into four submedian swellings. In its anterior surface, each segment of the cephalic bulb is smooth and at the posterior surface it is transversely ridged. The anterior cervical region is deeply invaginated forming a cervical collar just behind the cephalic bulb.

#### *Tanqua anomala* Fig. 1 (e–f)

From morphological point of view the worms are stout and slender. At the anterior end, the two lateral

pseudolabia followed by a large cephalic bulb are noticed. The inner surface of each large pseudolabium is folded into three finger-like projections that actually fit into corresponding folds on adjacent pseudolabium. The middle finger like projection is larger among the rest. Two submedian cephalic papillae and a single lateral amphid are present on each pseudolabium. Large cephalic bulb is divided by two longitudinal lateral grooves and represented as a dorsal and a ventral one. A fold of invaginated cuticle surrounds the base of the cephalic bulb; subsequently the fold forms a groove between cephalic bulb and the rest of the body that forms a collar at its anterior end. Prominent transverse striae are found on each lobe of the cephalic bulb.

### Discussion

Workers<sup>6</sup> during SEM study of *T. tiara* reported that their study did not reveal the presence of denticerous ridge in pseudolabia but the presence of individual teeth on the distal margins of the pseudolabia. This present piece of SEM study confirms the earlier description<sup>2</sup>. Moreover, our study reveals that unlike previous description the triangular area posterior to the cephalic papillae and amphid in each pseudolabium is smooth and bears no pore<sup>6</sup>. The present SEM study also analyzed (Fig. 1a-1d) that the cephalic papillae are double in nature. The exact nature of the cervical papillae and cuticular formations has been reported in our present study.

Scanning electron microscopic studies of the present nematode *T. anomala* revealed (Fig. 1e-1f) that there are two large pseudolabia showing interlocking fashion and separated by cephalic bulb. A single lateral amphid and a pair of large dome-shaped cephalic papillae are found on each pseudolabium. The cephalic bulbs are large and divided into two longitudinal grooves into two submedians swellings. Transverse ridges are noticed on the surfaces of the submedian swelling. Just below the cephalic bulb a well-developed cuticular collar is present. Present SEM studies confirm earlier descriptions<sup>3</sup>, however, each pseudolabium bears five tooth like structures. Present SEM study indicates that there are only three tooth like structures in each pseudolabium, the medial one being larger.

Considering the differences of the present material from earlier descriptions of *T. tiara* and *T. anomala* clears it as intraspecific variation. *T. tiara* has been recorded for the first time from *Varanus flavescens* and *T. anomala* has been recorded in Asansol coal-field area, Paschim Bardhaman district of West Bengal. Asansol coal-field area is recorded as new geographical locality for those nematodes.

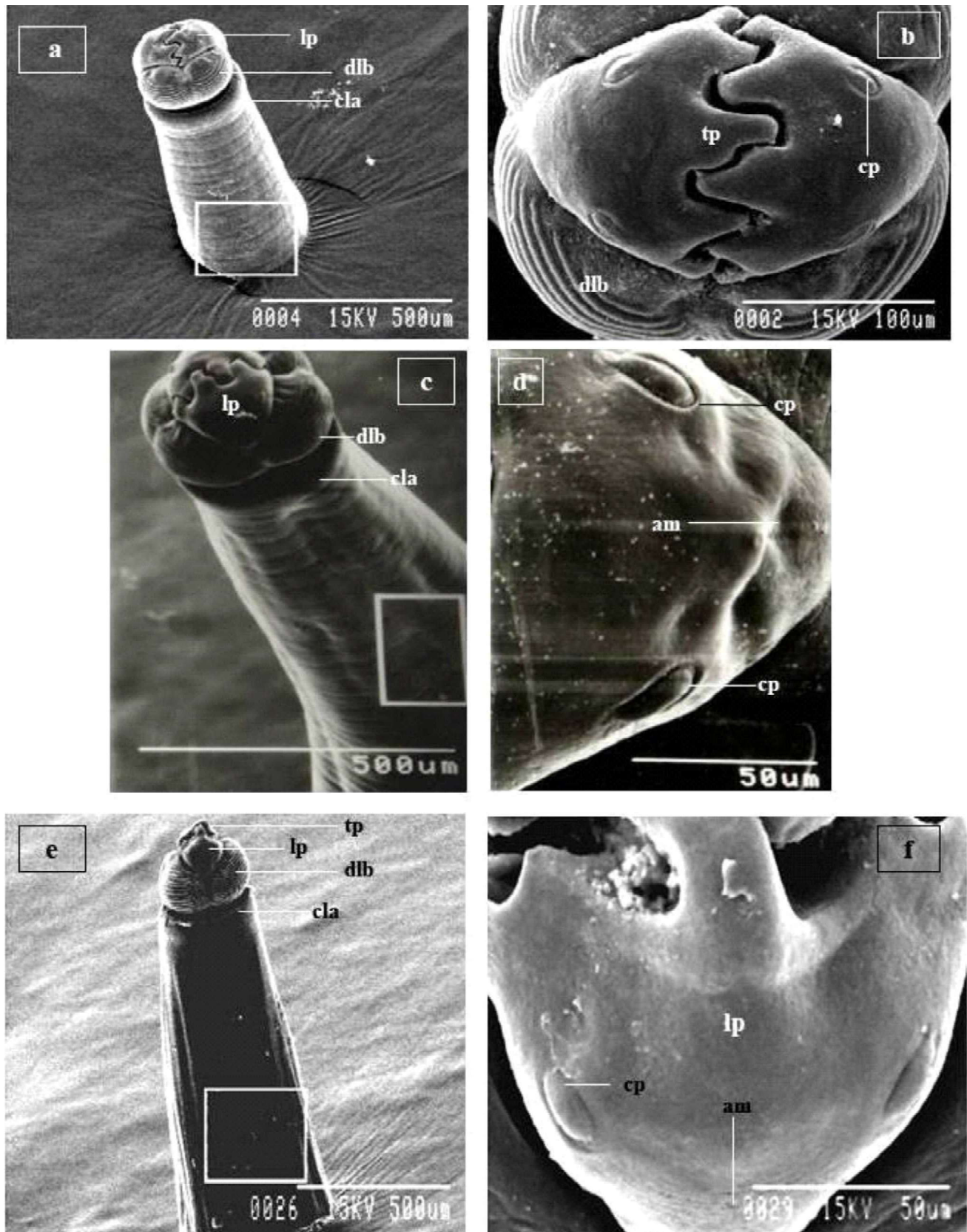


Fig. 1 (a–d) : SEM micrographs of *Tanqua tiara* a) Anterior end of male, lateral view (box surrounding cervical papilla). b) Enface view of male. c) Anterior end of male, ventro-lateral view (box surrounding cervical papilla). d) Basal region of pseudolabium. Fig. 1e–f. SEM micrographs of *Tanqua anomala* e) Anterior end of female, lateral view. f) Basal region of pseudolabium. (am-amphid, cla-collar, cp-cephalic papilla, dlb-dorsal lobes of cephalic bulb, lp-lateral pseudolabia, tp-tooth like structures).

## References

1. Banerjee S, Sou SK. Description of a new species of *Cosmocerca* Diesing, 1861 (Nematoda: Cosmocercidae) in *Hoplobatrachus crassus* (Jerdon, 1853) (Anura: Dicroglossidae) from Asansol coal-field area, West Bengal, India. *Zootaxa*. 2020; **4859** (2): 293–299.
2. Baylis HA, Lane C. A revision of the nematode family- Gnathostomidae. *Proceedings of Zoological Society, London*. 1920; (18-21): 245-310.
3. Dewi K, Jones H, Hamidy A. The status of *Tanqua anomala* (von Linstow, 1904) (Nematoda: Gnathostomatoidea). *Transactions of the Royal Society of South Australia*. 2008; **132** (1): 7-13.
4. Das I. *A Photographic Guide to Snakes and other Reptiles of India*. Sanibel Island, Florida: Ralph Curtis Books. 2002; 144 pp.
5. Ghimire HR, Shah KB. Status and habitat ecology of the Yellow Monitor, *Varanus flavescens*, in the Southeastern part of Kanchanpur District, Nepal. *Herpetological Conservation and Biology*. 2014; **9** (2): 387–393.
6. Gibbons LM, Keymer IF. Redescription of *Tanqua tiara* (Nematoda: Gnathostomidae), and associated lesions in the stomach of the Nile monitor lizard (*Varanus niloticus*). *Zoologica Scripta*. 1991; **20**: 7-14.
7. Purkayastha J, Das M, Sengupta S, Dutta SK. Notes on *Xenochrophis schnurrenbergeri* Kramer, 1977 (Serpentes: Colubridae) from Assam, India with some comments on its morphology and distribution. *Herpetology Notes*. 2010; **3**:175-180.
8. Sou SK. Redescription of *Tanqua tiara* (von Linstow, 1879) Blanchard, 1904 (Nematoda: Gnathostomatidae) from *Varanus flavescens* (Hardwicke and Gray, 1827) (Reptilia: Varanidae) from Birbhum district, West Bengal, India. *Journal of Parasitic Diseases*. 2020; **44** (2): 381–387.
9. Sou SK, Banerjee S. Redescription of *Tanqua anomala* (von Linstow, 1904) Baylis, 1916 (Nematoda, Gnathostomidae) recovered in the Alimentary canal of *Xenchropis piscator* (Schneider, 1799) from West Bengal. *Journal of Xidian University*. 2020; **14** (5) : 5717-5726.
10. Sou SK, Sow KK, Nandi AP. *Camallanides prashadi* Baylis and Daubney, 1922 (Nematoda, Camallanidae) in *Xenchropis piscator* (Schneider, 1799) (Reptilia, Squamata) and discussion on the synonymy of *Camallanides piscatori* Khera, 1954 from West Bengal, India. *Journal of Parasitic Diseases*. 2018; **42** (3): 365–371.
11. Vogel G, David P. A revision of the species group of *Xenochrophis piscator* (Schneider, 1799) (Squamata: Natricidae). *Zootaxa*. 2012; **3473** : 1–60.