MORPHOLOGICAL STUDY OF *SETARIA JAVENSIS* VEVERS, 1922 (FILARIOIDEOA: NEMATODA) RECOVERED FROM *TRAGULUS KANCHIL*

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ABSTRACT: Setaria worms recovered from mouse-deer, *Tragulus* species, was studied by the light and scanning electron microscope (SEM). The characteristic morphological feature of this species could be illustrated more clearly by the SEM pictures. In this study the bosses were observed on the cuticle and the post-deirid was detected also in the female as in the male worm. Fine cuticular appearance and deirids as well as post-deirid are well visualized in the SEM picture.

INTRODUCTION

The filarioid worms were found by one of us (N. O.) from the peritoneal and thoracic cavity of a mouse-deer which was studied carefully by him. The worms were examined microscopically and determined as *Setaria javensis* VEVERS, 1922 and one male of them was examined by the scanning electron microscope (Hitachi HHS-2R), that resulted in elucidating some morphological features more in detail than ever.

*Setaria javensis* was reported by VEVERS (1922) from *Tragulus* species, and SANDOSHAM (1953) and YEH (1959) dealt later with it.

IDENTITY OF HOST

The mouse-deer arriving from Indonesia at Tokyo International Airport on 28—9—1969 by air was dissected on the following day at the quarantine station. Since the exact origin of the specimen was not known to us beyond Indonesia, the careful morphological study was made for finding out its identity. Young adult male mouse-deer; body weight, 1,460 g; head and body length, 365 mm; shoulder height, 227 mm;
and skull greater length, 88 mm. By the coat and body measurements, especially on skull and bones of the legs, it was identified as a specimen of the kanchil group of *Tragulus javanicus* Osbeck, 1765. According to the classification by ELLERMANN & MORRISON-SCOTT (1965) and FRECHKOP (1955) this group is separated as an independent species, *Tragulus kanchil* RAFFLES, 1821. Thus, the present host specimen was diagnosed as *Tragulus kanchil*.

[The specimen is preserved at the Department of Anatomy, Faculty of Veterinary Medicine, Hokkaido University (Protocol No. 5132).]

**Light microscopy and SEM:** Microscopic examination of the worm material was made in a thin film of lactophenol. For SEM the preparation was as follows: washing in water, dehydration in a series of ethyl alcohol, treatment with isoamyl acetate, drying in a critical point apparatus, and finally coating with platinumpalladium. The specimen was observed with Hitachi (HHS-2R) scanning electron microscope, operated at 20 kV at the distance of 15mm.

**SETARIA JAVENSIS Vevers, 1922**

**Material:** 2 males and 4 females (and fragments of 2 females)

**Host:** *Tragulus kanchil* (Java)

**Parasitic location:** The peritoneal and thoracic cavity.

**Description:** White thin thread-like worm, tapering posteriorly. The mouth is surrounded by oval peribuccal chitinous ring, its dorso-ventral diameter being greater than lateral. Each four submedian papillae and spiny papillae are distributed just below the anterior end.

**Male:** [all numbers in mm and those of the second male in ( )]

- Length, 34.0 (35.3), and maximum width, 0.17 (0.19).
- The oesophagus is 2.62 (2.39) long; the anterior portion being 0.66 (0.75) and the posterior portion being 1.98 (1.62).
- The nerve ring and the deirids are situated at 0.24 (0.27) and 0.44 (0.51) (a bit asymmetrically) respectively from the anterior end. The tail is 0.12 (0.12) in length.

There are ventrally a single median precloacal papilla, and eight paired papillae; four pre-cloacally and four post-cloacally. Along the mid-line, anterior to the level with caudal papillae, there is an area with a large number of minute bosses on the cuticle. The left spicule is 0.18 (0.19) long and the right spicule measures 0.06 (0.06) in length. The post-deirid is bifurcated and is situated dorso-laterally only left at 0.34 (0.41) from the tail end. A pair of deirids is with a spiny formation.

**Female:** (range numbers of four specimens in mm)

- Length, 49.8–72.5, and maximum width, 0.31–0.33.
- The oesophagus is 2.97–3.09 long; the anterior portion being 0.56–0.60 and the posterior portion being 2.97–3.09.
- The nerve ring and a pair of deirids are situated at 0.27–0.31 and 0.45–0.47 (a bit asymmetrically) respectively from the anterior end. The tail is 0.24–0.39 in length and tapers gradually, ending in a knob after slight constriction (recognizable as a ring under microscope). Sometimes this terminal knob is divided into several spiny formations. The post-deirid is situated dorso-laterally only left at 1.19–1.98 from the caudal extremity, and this distance may correspond to a length of about four to five times of the tail length. A pair of deirids is with a single spiny end, while the post-deirid is bifurcated as in the male. The lateral appendages are small and 0.04–0.06 from the extreme end. The vulva is situated at 0.49–0.52 from the anterior end. The embryos (microfilariae), taken out from the uterus, are apparently without sheath and 0.28–0.32 in length.

**Discussion:** Vevers (1922) erected *Setaria javensis* on four females recovered as co-parasite of *Papillosetaria* Vevers, 1922 from the peritoneal cavity of *Tragulus stanleyanus*, originally from Java and dying in London Zoo.

Sandosham (1953) found the measurement of the oesophagus by Vevers too long at examining his own female specimens and added the description of the male worm. His material was found in the
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The thoracic cavity of *T. javanicus*, dying in captivity at Kuala Lumpur.

Reexamining the material of VEVERS and examining more specimens from *T. stantleyanus* dying in London Zoo, as well as the fresh specimens, 1 female and 3 males, sent from Malaya, YEH (1959) described his *Artionema javensis*.

Our present specimens were from the peritoneal and thoracic cavity of *T. kanchil*, as determined by one of us (N.O.). The morphological features of them, especially of the peribuccal chitinous ring, assure us that they are *Setaria javensis* VEVERS, 1922, and they were found without being mixed with *Papillosetaria* at both parasitic locations. Our finding on the cuticular bosses at the specimens of both sexes could scarcely be made by light microscopy alone. The fine structure of the female tail end could be seen at the sketches by VEVERS, SANDOSHAM and YEH, but the presence of fine constriction just before the tail end evaded the attention of the workers at the description. *Setaria* species with the tail of such formation was first reported by RAJEWSKY (1928 & 1929) at *S. tundra*. BOHM and SUPPERER (1955) found the same in their *S. tundra* from Capreolus capreolus of Austria, and emphasized its characteristic structure. In fact there are only few *Setaria* spp., at which such structure of the female tail end are demonstrable, for example, at *S. tundra*, *S. capreola* and *S. bernardi*, so far examined by us.

Regarding the bosses on the cuticle of this species they are much smaller in size (microscopically hardly detectable) and uniform in shape, compared with the bosses of *Papillosetaria malayi* n. sp., which has been recently described by BAIN & SHOHO (1978) and interpreted as its being an ancestral form of *Setaria* spp. Whether this aspect of bosses on the cuticle of *S. javensis* may reflect an advanced stage of development awaits further comparative study on specimens of other *Setaria* spp.

The post-deirid, usually reported only in the male and unilaterally left (ANDERSON (1959) and SHOHO (1976)), could be demonstrated also in the female by one of us (J.A.) at the present examination. The presence of the post-deirid in the female of other *Setaria* spp. has already been confirmed in other *Setaria* species.

The oval and equally high peribuccal chitinous ring of *S. javensis* reminds us of that of *S. congolensis* RAILLiet et HENRY, 1911 and of *S. thomasi* SANDOSHAM, 1953, the validity of the latter was approached sceptically by YEH (1959), but affirmed recently by BAIN & SHOHO (1978). This oval form of the peribuccal ring could probably serve as an indication on the more primitive morphological distinctions among genus *Setaria* and *S. javensis* at *Tragulus* sp. could harmonize well with the taxonomic position of the host, *Tragulus*, among the ungulate.

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REFERENCES

4) ELLERMANN, J. L. and MORRISON-SCOTT, T.
EXPLANATION OF PLATES

1: Host animal, Tragulus kanchil, of the present study.

2-5: Setaria javensis. 2 & 3; the ventral view of the anterior part of the female, 4; the lateral view of the posterior part of the female, and 5; the lateral view of the posterior part of the male.

6 & 7: The light microscopic photos of the tail end of the female. 6; the ventral view of the specimen, and 7; the lateral view of another specimen, showing clearly the constriction.

8-13: The scanning electron microscopic pictures of the male. 8; the anterior end (submedian papillae and amphid of one side are visible and the tips of the spiny papillae damaged), 9; the posterior part (the ventral part is damaged, yet the area with growth of bosses is well illustrated), 10; a deirid (cervical papilla) of one side, 11; the post-deirid, 12; thick growth of bosses at the ventral side of the posterior part (see Fig. 9), and 13; the bosses distributing on the cuticle of nearly entire body (here at the level, a little posterior to that of deirids).