

# *Trophotylenchulus piperis* n. sp. parasitic on *Piper nigrum* L. in Kerala, India (Nemata : Tylenchulidae) <sup>(1)</sup>

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### SUMMARY

*Trophotylenchulus piperis* n. sp. parasitising roots of pepper plant, *Piper nigrum* L., from Kerala, India is described. This species is most closely related to *T. floridensis* Raski, 1957 differing by smaller size of females, males and juveniles, and by juveniles having a larger depressed area in the circumoral plate and an indented, digitate tail. Dark brown cases encircling the female, juveniles and eggs, were collected from the soil for the first time.

### RÉSUMÉ

*Trophotylenchulus piperis* n. sp. parasite de *Piper nigrum* L. au Kerala, Inde (Nemata : Tylenchulidae)

*Trophotylenchulus piperis* n. sp., parasite des racines du poivrier, *Piper nigrum* L., au Kerala, Inde, est décrit. Cette espèce, très proche de *T. floridensis* Raski, 1957, en diffère par la plus petite taille des femelles, des mâles et des juvéniles, et chez les juvéniles par la présence d'une large zone déprimée sur la plaque circumorale et par la forme de la queue digitée et indentée. Des capsules brun-noir entourant femelles, juvéniles et œufs ont été, pour la première fois, récoltées dans le sol.

In the process of surveying for nematodes in Kerala, India specimens of *Trophotylenchulus* Raski, 1957 were found widely distributed in Calicut District on pepper plant, *Piper nigrum* L. In a preliminary report by Mohandas and Ramana (1982) these were identified as *Trophotylenchulus floridensis* Raski, 1957 but more detailed studies since then have revealed morphological differences which are judged significant setting this off as a new species separate and distinct from *T. floridensis*. A description of the new species follows.

coated with a 200 Å gold layer. Examination and photography was done on an I.S.I. model 35-130 DS scanning electron microscope at 10 KV.

### *Trophotylenchulus piperis* n. sp.

= *T. floridensis* apud Mohandas & Ramana, 1982 (Fig. 1, 2, 3)

### Materials and methods

Specimens wet sieved from the soil were killed in hot water, preserved and stored in 2.5 % formalin, and later transferred to F.A.A. and dehydrated to glycerin following Cobb's slow method.

Specimens for scanning electron microscopy were transferred from F.A.A. into a graded series of ethanol (E.T.O.H.) to absolute E.T.O.H., then taken through a graded series of amyl acetate-absolute E.T.O.H. to absolute amyl acetate; a 15-60 second sonication was applied in absolute amyl acetate. After critical point drying with CO<sub>2</sub>, specimens were mounted on stubs and

### DIMENSIONS

*Females* (n = 7) : L = 0.293 mm (0.254-0.325); a = 6.0 (4.5-7.9); b = 2.8 (2.5-3.1); c = 13 (12-15); c' = 2.6 (2.2-4.6); V = 76 (72-80); spear = 13-14 µm; cone = 7 µm; oesophagus = 107 µm (102-115); tail = 24 µm (18-32).

*Males* (n = 4) : L = 0.349-0.392 mm; a = 26-44; b = 3.5-4.6; c = 4.0-8.4; c' = 4.0-6.4; stylet = 7-11 µm; oesophagus = 92-105 µm; tail = 47-99 µm; spicules = 13-16 µm; gubernaculum = 3-4 µm; T = 36-47 %.

*Second-stage juveniles* (n = 18) : L = 0.287 mm (0.260-0.329 S.D. = 0.020); a = 26 (21-32 S.D. = 2.9); b = 2.9 (2.3-3.1); c = 8.8 (6.4-13.5 S.D. = 2.1); c' =

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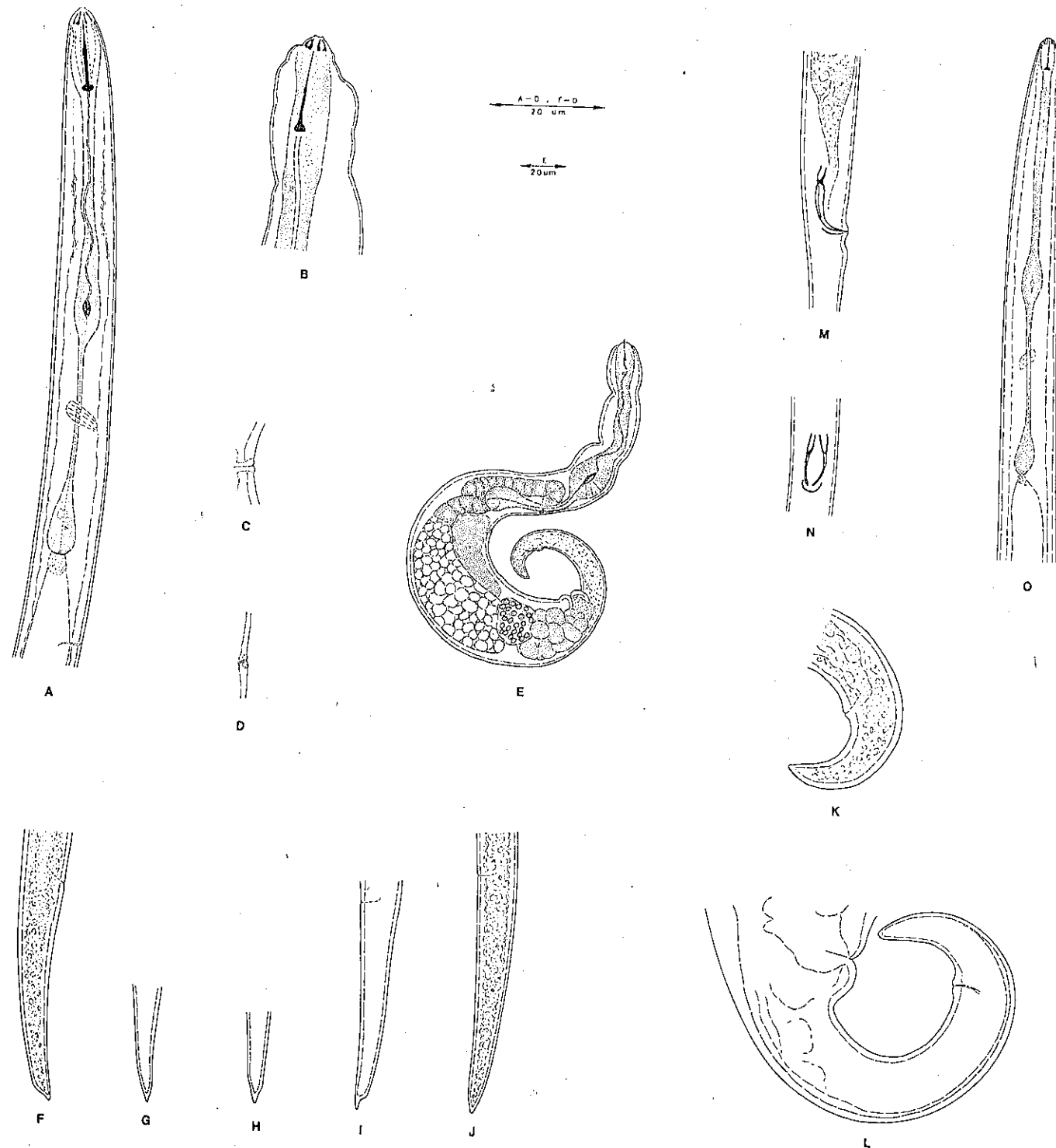


Fig. 1. *Trophotylenchulus piperis* n. sp. A-E, K-L. Female. A : oesophageal region; B : anterior end; C-D : two different aspects of excretory pore; E : full length; K-L : tail ends; F-J. Second stage juveniles, various tail shapes; M-O. Male. M : spicule region, lateral view; N : spicules and gubernaculum, ventral view; O : oesophageal region.

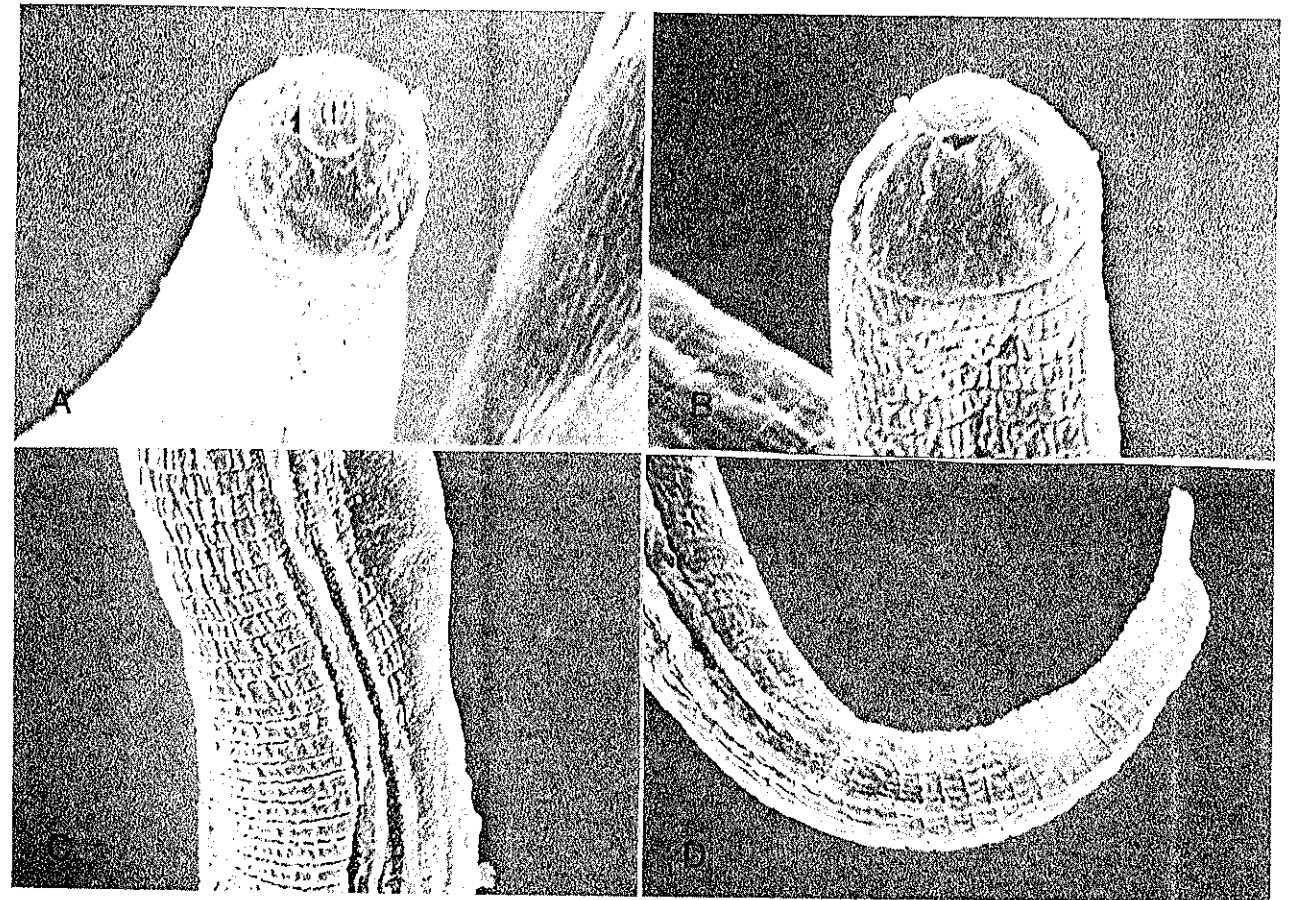


Fig. 2. *Trophotylenchulus piperis* n. sp., second-stage juveniles. Scanning electron microscope photographs. A, B : anterior end ( $\times 6,825$  and  $\times 8,625$ , respectively); C : transverse annules and longitudinal bands of lateral field about midbody ( $\times 5,290$ ); D : tail ( $\times 5,280$ ).

4.5-5.7; stylet =  $12.2 \mu\text{m}$  (12-13 S.D. = 0.6); dorsal gland orifice =  $4-5 \mu\text{m}$  from knobs; excretory pore =  $108-119 \mu\text{m}$ ; oesophagus =  $106 \mu\text{m}$  (93-128 S.D. = 11.5); tail =  $36 \mu\text{m}$  (22-46 S.D. = 7.8); developing gonad =  $6-13 \mu\text{m}$  long, about  $5 \mu\text{m}$  wide.

*Holotype* : (Female) : L =  $0.276 \text{ mm}$ ; a = 7.9; b = 2.7; c = 13.4; c' = 2.9; V = 75; stylet = ? oesophagus =  $102 \mu\text{m}$ ; excretory pore =  $110 \mu\text{m}$  (40%); tail =  $21 \mu\text{m}$ .

#### DESCRIPTION

*Female* : Body spirally coiled almost twice around, markedly swollen in midportion. Swelling starts anterior to median bulb; often with two (occasionally three) constrictions anterior to median bulb (only this portion is embedded in root). Lip region distinctly set off; rounded, dome-shaped, smooth without transverse striae; about  $5 \mu\text{m}$  across at base. Circumoral elevations

distinct as fine, rounded protrusions on each side projecting beyond margin of lip region outline. Cephalic sclerotization weak but visible as rounded finger-like arches. Stylet delicate, difficult to follow but has rounded knobs, backwardly directed; cone about equal in length to base plus knobs. Dorsal gland opening about  $9 \mu\text{m}$  from base of knobs. Lumen of oesophagus exceptionally wide. Procorpus about  $5 \mu\text{m}$  across; more or less cylindrical sometimes widening gradually to median bulb which is very large (range from  $12-19 \mu\text{m}$  wide  $\times 24-35 \mu\text{m}$  long), muscular with valve about  $7-10 \mu\text{m}$  long; isthmus slender then gradually widens into pyriform posterior bulb (ranges from  $10-15 \mu\text{m}$  wide  $\times 17-23 \mu\text{m}$  long). Presence or absence of oesophageal-intestinal valve not definitely established. Excretory pore slightly posterior to end of oesophagus  $110-134 \mu\text{m}$  from anterior end (35-42% of L), with well-sclerotized canal perpendicular to body wall or turns posteriad, leading to large gland located mostly ventrad to gonad immediately under excretory pore.

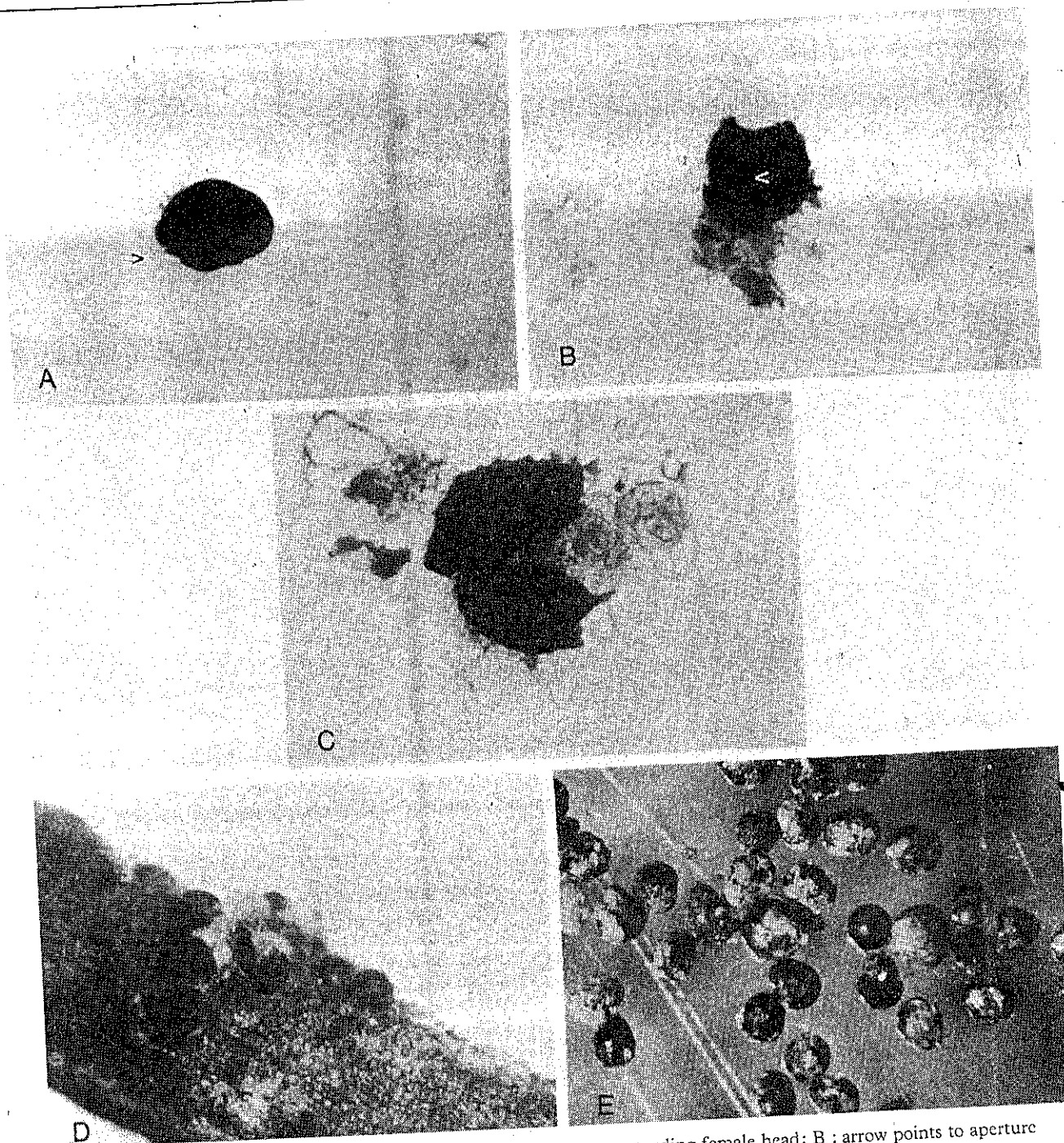


Fig. 3. *Trophotylenchulus piperis* n. sp. cases. A : arrow points to protruding female head; B : arrow points to aperture for female head; C : female, juveniles and eggs from broken case; D : cluster of cases on pepper plant roots; E : cases recovered from soil sievings.

Pore has slightly rounded margins. Gonad single, prodelphic usually extends to median bulb then by flexure turns posteriad 39-77  $\mu\text{m}$  flexure again turns anteriorly 33-64  $\mu\text{m}$ ; on one specimen a short double flexure was

present near posterior bulb of oesophagus then extended to median bulb. Egg in one female measured 30  $\times$  61  $\mu\text{m}$ . Spermatheca large rounded, apparently in-line (not off-set as a pouch) with large sperms (averaging

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