

# Two new species of the genus *Trichodorus* Cobb, 1913 (Nematoda : Dorylaimida) from India

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## SUMMARY

Two new species of *Trichodorus* are described and figured from the North-eastern states of India. *Trichodorus borai* n. sp. comes close to *T. californicus* Allen, 1957, *T. cottieri* Clark, 1963, *T. dilatatus* Rodriguez-M & Bell, 1978, *T. eburneus* De Waele & Carbonell, 1983, *T. elegans* Allen, 1957, *T. intermedius* Rodriguez-M & Bell, 1978 and *T. proximus* Allen, 1957 in having only one cervical papilla but differs from them in the position of this papilla and size of spicules. *T. complexus* n. sp. comes close to *T. borneoensis* Hooper, 1962, *T. taylori* De Waele, Mancini, Roca & Lamberti, 1982 and *T. orientalis* De Waele & Hashim, 1984 in having two cervical papillae and striated spicules. However, it differs from them in having a smaller onchiostyle, in the size and shape of spicules and vulval sclerotization.

## RÉSUMÉ

Deux nouvelles espèces du genre *Trichodorus* Cobb, 1913 (Nematoda : Dorylaimida) provenant de l'Inde

Deux nouvelles espèces de *Trichodorus* provenant des États du Nord-Est de l'Inde sont décrites et illustrées. *Trichodorus borai* n. sp. est proche de *T. californicus* Allen, 1957, *T. cottieri* Clark, 1963, *T. dilatatus* Rodriguez-M & Bell, 1978, *T. eburneus* De Waele & Carbonell, 1983, *T. elegans* Allen, 1957, *T. intermedius* Rodriguez M & Bell, 1978 et *T. proximus* Allen, 1957 par la présence d'une seule papille cervicale, mais diffère de ces espèces par la position de cette papille et la taille des spicules. *T. complexus* n. sp. est proche de *T. borneoensis* Hooper, 1962, *T. taylori* De Waele & Mancini, Roca & Lamberti, 1982 et *T. orientalis* De Waele & Hashim, 1984 par la présence de deux papilles cervicales et de spicules striés; cependant *T. complexus* diffère de ces espèces par un onchiostyle plus court, la taille et la forme des spicules, ainsi que par la sclérotisation vulvaire.

Soil samples collected from the North-eastern states of India yielded two new species of *Trichodorus* which are described below. The specimens were fixed in hot 4 % formalin and processed to anhydrous glycerine by the slow method.

### *Trichodorus borai*\*\* n. sp. (Fig. 1)

#### MEASUREMENTS

*Females* (paratypes; n = 7): L = 0.60 mm (0.54-0.63); a = 22 (21-24); b = 4.8 (4.1-5.3); c = 111 (91-122); V = 57 (56-58); G<sub>1</sub> = 20 (18-22); G<sub>2</sub> = 20 (18-22); onchiostyle = 49 µm (46-51); oesophagus = 124 µm (118-134).

\*\* After Dr. Prafulla Chandra Bora, Dean, Faculty of Agriculture, Assam Agricultural University, Jorhat, Assam, India.

*Males* (paratypes; n = 6): L = 0.56 mm (0.49-0.60); a = 22 (21-26); b = 4.5 (4.1-4.8); c = 54 (47-60); T = 64 (59-66); onchiostyle = 50 µm (48-51); oesophagus = 125 µm (112-129); spicules = 29 µm (27-33); gubernaculum = 14 µm (13-15).

*Holotype* (male): L = 0.61 mm; a = 22; b = 5.0; c = 67; T = 68; onchiostyle = 50 µm; oesophagus = 122 µm; spicules = 29 µm; gubernaculum = 14 µm.

#### DESCRIPTION

*Male*: Body upon fixation slightly ventrally curved with greater curvature in posterior part, tapering gradually from middle of oesophagus to anterior extremity. Cuticle in two layers, inner cuticle finely striated, 2-3 µm thick on mid-body and 5 µm on tail. Lateral chords about 1/3 of mid-body width. Lip region almost continuous with body contour, 8-9 µm or about 1/3 of body width wide and 4 µm or half of its own width high, labial papillae slightly raised. Amphids vase-shaped with ellip-

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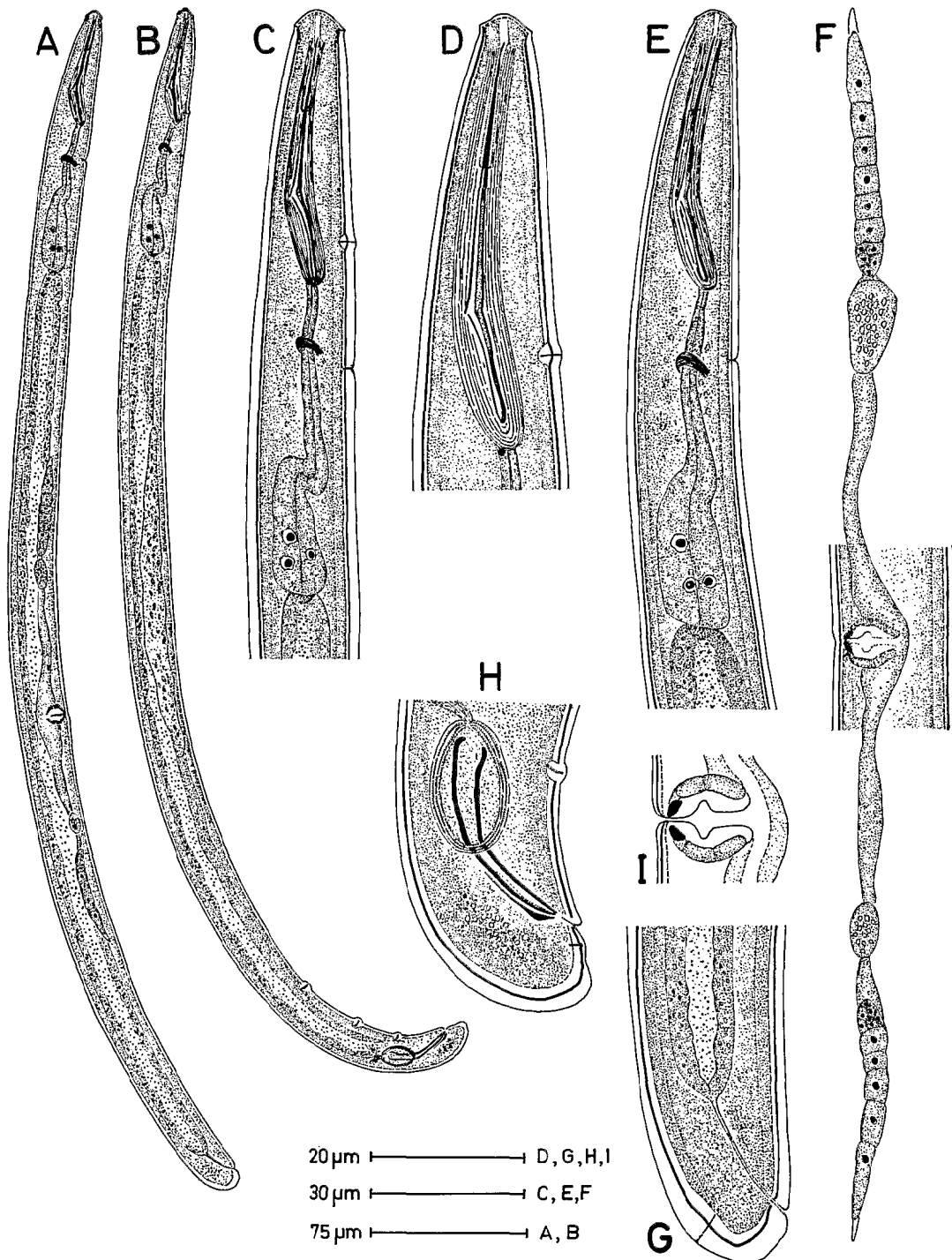


Fig. 1. *Trichodorus borai* n. sp. A : Entire female; B : Entire male; C : Oesophageal region of male; D : Anterior end of male; E : Oesophageal region of female; F : Female genital branches; G : Female posterior region; H : Male posterior region; I : Vulvar region.

soidal apertures 4-5  $\mu\text{m}$  across, sensillar pouches spindle-shaped, about 12  $\mu\text{m}$  behind amphid apertures. Stoma tubular, 18-20  $\mu\text{m}$  long. Onchiostyle slender, about six lip regions widths long, its anterior portion 18-21  $\mu\text{m}$  or as long as stoma. Oesophagus 2-3  $\mu\text{m}$  wide in front of nerve ring, its pyriform basal bulb 10-15  $\mu\text{m}$  wide and joins intestine without an overlap. Dorsal and second pair of ventrosublateral oesophageal gland nuclei prominent. First pair of ventrosublateral gland nuclei indistinct. Nerve ring 63-68  $\mu\text{m}$  from anterior end. A single ventromedian cervical papilla opposite posterior half of onchiostyle, 39-53  $\mu\text{m}$  from anterior end of body and 22-29  $\mu\text{m}$  anterior to excretory pore. A pair of lateral cervical pores present just behind base of onchiostyle. Excretory pore at level of nerve ring or slightly behind, 68-75  $\mu\text{m}$  from anterior extremity. Spicule arcuate, broadened anteriorly, gradually narrowing to a pointed posterior tip and is devoid of any constriction along its entire length; gubernaculum thin and long with a keel-like thickening at distal end. Distinct circular and longitudinal muscles attached to the head of spicules. Ventromedian supplements three, first at 19-24  $\mu\text{m}$  or 3.5-4.3 %, second at 37-45  $\mu\text{m}$  or 6.8-8.0 % and third at 69-81  $\mu\text{m}$  or 13.1-14.6 % of body length from cloacal opening. A pair of ventrosubmedian postanal papillae located just behind cloacal opening. Tail irregularly rounded.

*Female*: Similar to males except that papilla and cervical pore are absent in oesophageal region. Excretory pore 68-78  $\mu\text{m}$  from anterior end of body. Vulvar pores not visible. Vulva irregular pore-like. Two roughly ovoid sclerotized pieces present at vulva-vagina junction. The longitudinal axis of the sclerotized pieces oblique to body wall. Vagina about halfway across body appearing round in lateral view. Spermatheca oval, filled with round sperm. Rectum 15-18  $\mu\text{m}$  long, tail hemispherical, 0.35-0.45 anal body width long and with a pair of faintly visible caudal pores opening dorsally. Anal opening subterminal.

#### TYPE HABITAT AND LOCALITY

Soil around roots of bamboo (*Bambusa* sp.) from North Lakhimpur, Assam, India. Collected in June 1981.

#### TYPE MATERIAL

Holotype (male) and a paratype female on slide *Trichodorus borai* n. sp./1; paratype males and females on slides *Trichodorus borai* n. sp./2-6; deposited in the nematode collection of the Zoology Department, Aligarh Muslim University, Aligarh, India.

#### DIAGNOSIS

*Trichodorus borai* n. sp. resembles *T. californicus* Allen, 1957, *T. cottieri* Clark, 1963, *T. dilatatus* Rodri-

guez-M & Bell, 1978, *T. eburneus* De Waele & Carbone, 1983, *T. elegans* Allen, 1957, *T. intermedius* Rodriguez-M & Bell, 1978 and *T. proximus* Allen, 1957 in having only one cervical papilla but differs from them in having this papilla located in the onchiostyle region and smaller spicules.

### *Trichodorus complexus* n. sp.

(Fig. 2)

#### MEASUREMENTS

*Females*: (paratypes; n = 3): L = 0.70 mm (0.66-0.77); a = 22.4 (22-23); b = 4.8 (4.2-5.5); V = 54.5 (53-56); G<sub>1</sub> = 21 (20-22); G<sub>2</sub> = 22.4 (22-23); onchiostyle = 43.6  $\mu\text{m}$  (42-45); oesophagus = 147.6  $\mu\text{m}$  (140-158).

*Holotype* (male): L = 0.74 mm; a = 24.6; b = 3.8; c = 54.6; T = 40; onchiostyle = 45  $\mu\text{m}$ ; oesophagus = 191  $\mu\text{m}$ ; spicule = 43  $\mu\text{m}$ ; gubernaculum = 17  $\mu\text{m}$ .

#### DESCRIPTION

*Male*: Body upon fixation curved ventrally with greater curvature in posterior region, tapering gradually from middle of oesophagus to anterior extremity. Cuticle consists of three layers, a thin outer smooth layer, thicker middle layer and an inner finely striated layer, 4  $\mu\text{m}$  thick at mid-body, 5-6  $\mu\text{m}$  at tail terminus. Lateral chords about 1/3 of body width at middle. Lip region slightly offset, labial papillae raised. Amphid apertures ellipsoidal, 5  $\mu\text{m}$  wide. Stoma tubular about 20  $\mu\text{m}$  long. Onchiostyle slender, about five and a half lip region widths long, its anterior portion about 23  $\mu\text{m}$  or slightly longer than stoma length. Oesophagus about 3  $\mu\text{m}$  wide in front of nerve ring, 2  $\mu\text{m}$  at nerve ring, 6-8  $\mu\text{m}$  near middle, pyriform basal 12-15  $\mu\text{m}$  wide. No overlapping of oesophagus over intestine. A conoid cardia present at oesophago-intestinal junction. Oesophageal gland nuclei indistinct. Nerve ring 68  $\mu\text{m}$  from anterior end. Two ventromedian cervical papillae 14  $\mu\text{m}$  apart, situated anterior to excretory pore, first 70  $\mu\text{m}$  and second 84  $\mu\text{m}$  from anterior end of body. First and second ventromedian cervical papillae 20  $\mu\text{m}$  and 6  $\mu\text{m}$  respectively from excretory pore. Lateral cervical pores not seen. Excretory pore 90  $\mu\text{m}$  from anterior end of body. Spicules cylindrical, finely striated, distal half straight, proximal half dorsally convex. Gubernaculum thin and long with a slight thickening at distal end. Ventromedian supplements three, first 35  $\mu\text{m}$  or 4.7 %, second 65  $\mu\text{m}$  or 8.8 % and third 103  $\mu\text{m}$  or 13.9 % of body length from cloaca. A faint pair of post-cloacal papillae just behind cloacal opening and a pair of caudal pores at tail terminus. Tail uniformly rounded, dorsally convex, ventrally slightly concave.

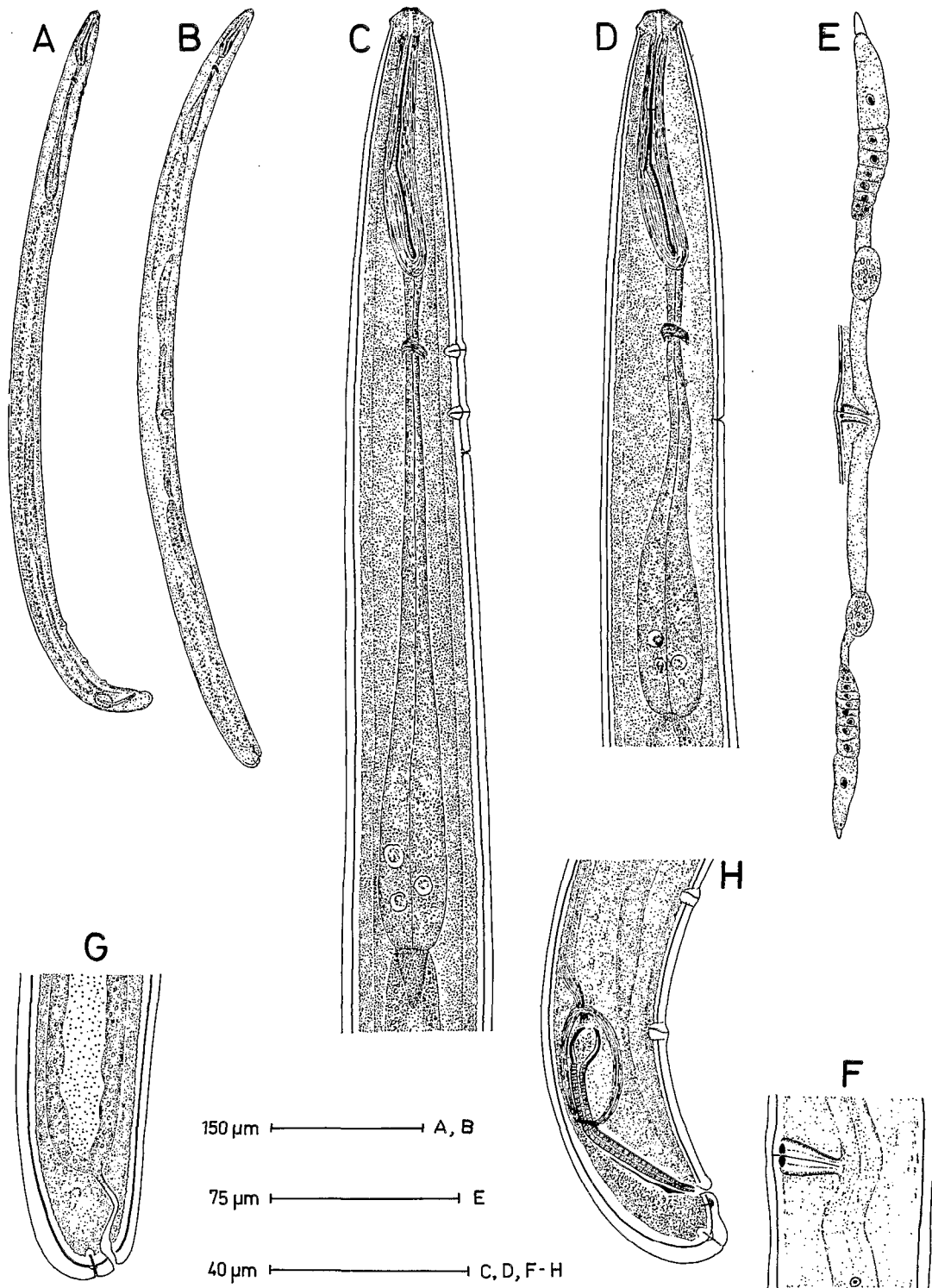


Fig. 2. *Trichodorus complexus* n. sp. A : Entire male; B : Entire female; C : Oesophageal region of male; D : Oesophageal region of female; E : Female genital branches; F : Vulvar region; G : Female posterior end; H : Male posterior end.

*Female* : Lip region, onchiostyle and oesophagus same as in male except that cervical papillae are absent. Nerve ring 68 µm and excretory pore 83 µm from anterior end of body. A pair of lateral body pores 20-27 µm or slightly less than one body width behind vulva. Vulva pore-like. Vagina extending less than halfway into body, conoid, widening towards vulva and narrow towards proximal end with somewhat triangular sclerotized pieces at vulva-vagina junction. Uteri long with irregular spermatheca filled with round sperm. Ovaries paired, reflexed, oocytes few. Rectum 18-20 µm long, anal opening sub-terminal. A pair of caudal pores present terminally.

#### TYPE HABITAT AND LOCALITY

Soil around roots of cane (*Calamus viminalis*) from Jumi, Upper Joyhing, Arunachal Pradesh, India. Collected in June 1981.

#### TYPE MATERIAL

Holotype (male) and a paratype female on slide *Trichodorus complexus* n. sp./1; other paratype females on slide *Trichodorus complexus* n. sp./2; deposited in the nematode collection of the Zoology Department, Aligarh Muslim University, Aligarh, India.

#### DIAGNOSIS

*Trichodorus complexus* n. sp. comes close to *T. borneoensis* Hooper, 1962, *T. taylori* De Waele, Mancini, Roca & Lamberti, 1982 and *T. orientalis* De Waele & Hashim, 1984 in having two cervical papillae and striated spicules. However, it differs from *T. borneoensis* in having differently shaped spicules, in the arrangement of ventromedian supplements, shape of sclerotized pieces at vulva-vagina junction (spicules almost straight but slightly bent in the anterior part, two ventromedian supplements situated within spicule range, sclerotized

pieces reniform or pyriform in *T. borneoensis*). From *T. taylori* it differs in having smaller onchiostyle, smaller and differently shaped spicules, larger gubernaculum, in the shape of the sclerotized pieces (onchiostyle 60-72 µm, spicules 57-65 µm long with head separated from shaft, gubernaculum 6-8 µm long, sclerotized pieces round and conspicuous in *T. taylori*). It differs from *T. orientalis* in the position of the anterior cervical papilla, in having differently shaped spicules and gubernaculum, in the shape of sclerotized pieces at vulva-vagina junction (anterior cervical papilla in the region of the base of onchiostyle, spicules with a median constriction, sclerotized pieces triangular with tips pointing towards vulva in *T. orientalis*).

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*Accepté pour publication le 11 mars 1985.*