

# Three new species of nematodes from sugarcane fields in Nigeria

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## SUMMARY

Three new species of plant nematodes belonging to the genus *Boleodorus* Thorne, 1941; *Paratylenchus* Micoletzky, 1922 and *Xiphinema* Cobb, 1913 are described from the sugarcane fields in Gengola state, North East, Nigeria. *Boleodorus acurvus* n.sp. is closely related to *B. clavicaudatus* Thorne, 1941 but differs in length of body and spear and in shape of lip region. The shifting of *B. clavicaudatus* to *Boleodoroides* Mathur *et al.*, 1966 is disputed. *Paratylenchus variatus* n.sp. differs from the closely related *P. leptus* Raski, 1975 in shape of lip region and in the size of spear, and from *P. colbrani* Raski, 1975 in having only two or three incisures in the lateral fields, in shape of tail and absence of males. *Xiphinema brevistylus* n.sp. differs from the closely related *X. tarjani* Luc, 1975 in absence of "blind canal" in tail, smaller odontostyle and odontophore and anteriorly located vulva, and from *X. vulgare* Tarjan, 1964 in smaller and differently shaped tail, smaller odontostyle and odontophore and posteriorly located vulva.

## RÉSUMÉ

Trois nouvelles espèces de nématodes provenant de champs de canne à sucre du Nigéria

Trois nouvelles espèces de nématodes phytoparasites appartenant aux genres *Boleodorus*, Thorne, 1941; *Paratylenchus* Micoletzky, 1922 et *Xiphinema* Cobb, 1913, provenant de champs de canne à sucre du Nigéria (Gengola St., North East Prov.) sont décrites et figurées. *Boleodorus acurvus* n.sp., proche de *B. clavicaudatus* Thorne, 1941, en diffère par la longueur du corps, celle du stylet et la forme de la région labiale. Le transfert de *B. clavicaudatus* au genre *Boleodoroides* Mathur, Khan & Prasad, 1966 est discuté. *Paratylenchus variatus* n.sp. diffère de l'espèce la plus proche, *P. leptus* Raski, 1975, par la forme de la région labiale et la longueur du stylet, et de *P. colbrani* Raski, 1975 par un champ latéral ne comportant que deux ou trois incisures, la forme de la queue et l'absence de mâles. *Xiphinema brevistylus* n.sp. voisin de *X. tarjani* Luc, 1975, s'en sépare par l'absence de « canal aveugle » à l'extrémité caudale, un odontostyle et un odontophore plus courts, ainsi que par la position antérieure de la vulve; cette nouvelle espèce diffère de *X. vulgare* Tarjan, 1964 par une queue plus courte et de forme différente, un odontostyle et un odontophore plus courts et la position postérieure de la vulve.

In June, 1981 some soil samples from around roots of sugarcane, *Saccharum officinarum* L., from the Savannah Sugar Company, Gengola State North East Nigeria were sent to the Commonwealth Institute of Helminthology for the isolation and identification of the nematodes. Three new species belonging to the genera, *Boleodorus* Thorne, 1941; *Paratylenchus* Micoletzky, 1922 and *Xiphinema* Cobb, 1913 obtained from these samples are described below. The nematodes were killed by gentle heat, fixed in TAF and then processed to glycerine, before mounting.

## *Boleodorus acurvus* n.sp.

(Fig. 1)

### DIMENSIONS

*Paratype females* (n = 3): L = 0.47-0.54 mm; a = 27-37; b = 4.2-4.7; c = 6-9; c' = 7-9; V = 60-63.

*Holotype female*: L = 0.48 mm; a = 33; b = 4.7; c = 9; c' = 8; V = 60.

*Fourth-stage juvenile female*: L = 0.37 mm; a = 27; b = 3.7; c = 5.5; c' = 7.

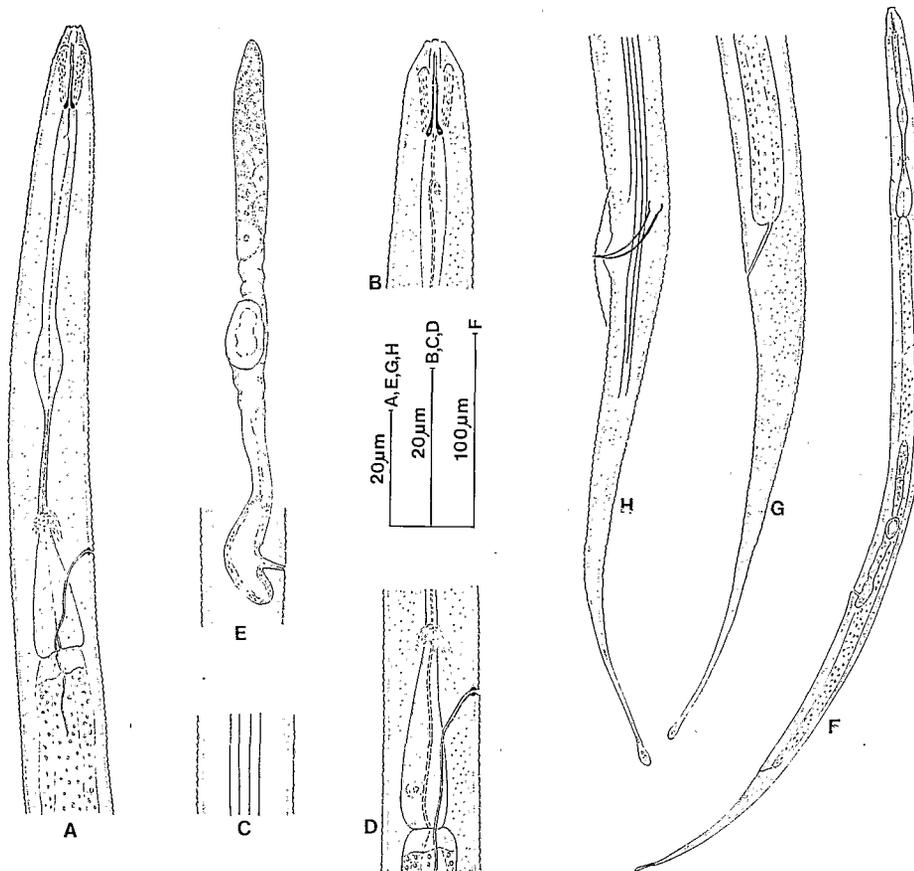


Fig. 1. *Boleodorus acurvus* n.sp. A : Oesophageal region ; B : Head end ; C : Lateral fields in midbody ; D : Basal oesophageal bulb region ; E : Female, reproductive system ; F : Female entire ; G : Female tail ; H : Male tail.

*Paratype male*: L = 0.46 mm ; a = 38 ; b = 4.2 ; c = 5 ; c' = 9.

DESCRIPTIONS

*Female*: Body almost straight, slender, tapering slightly anterior to base of oesophagus and posteriorly ending in a filiform tail with clavate terminus. Cuticle striations fine, about 1 µm apart at midbody. Lateral fields about one-third of body width, marked with four incisures, inner two usually faint. Lip region narrow and conical with slightly elevated perioral papillae. Spear delicate, 10-11 µm long, anterior conical part about one-third of spear length, posterior cylindrical part with sloping flange-like knobs. Spear lumen slightly widened in posterior third of spear giving knobs a bifurcated appearance. Orifice of dorsal oesophageal gland 4-6 µm from spear base.

Procorpus long and narrow, metacarpus oval without valvular apparatus, situated at about middle of oesophagus ; isthmus long and slender encircled by nerve ring in its hinder part ; basal bulb elongate pyriform. Excretory pore 80-90 µm from anterior extremity, posterior to nerve ring, opposite anterior end of basal bulb ; excretory duct strongly cuticularized, sinuous and extending to 30-40 µm. Hemizonid, deirids and phasmids not seen. Cardia absent ; intestinal cells immediately below the oesophagus are hyaline. Reproductive system pro-monodelphic with a small posterior uterine sac. Ovary short with oocytes in two rows. Spermatheca elongate, offset without sperms. Rectum about one anal body width long. Tail filiform with clavate terminus, 75-90 µm long.

*Fourth-Stage Juvenile Female*: Similar to female in general morphology. Spear 9 µm long. Future

vulva indicated at 63% of body length from anterior extremity. Tail 67  $\mu\text{m}$  long, similar to that of female.

*Male*: Similar to female in general morphology. Spicules slightly arcuate, cephalated, 16  $\mu\text{m}$  long medially. Gubernaculum absent. Bursa adanal. Tail 90  $\mu\text{m}$  long, similar in shape to that of female.

#### TYPE HABITAT AND LOCALITY

Soil around roots of sugarcane, *Saccharum officinarum* L., from Savannah Sugar Company, Gengola state, North East Nigeria.

#### TYPE SPECIMENS

Holotype female, two paratype females and paratype male deposited at the Commonwealth Institute of Parasitology; one paratype female and the fourth-stage juvenile female at Rothamsted Experimental Station, Harpenden, Herts., England.

#### DIFFERENTIAL DIAGNOSIS

*Boleodoros acurvus* n.sp. is closely related to *B. clavicaudatus* Thorne, 1941 but differs in having a shorter body, differently shaped lip region, smaller spear and a more posteriorly situated orifice of the dorsal oesophageal gland (body length 0.7 mm; lip region not elevated and narrow, spear 13  $\mu\text{m}$  long and dorsal oesophageal gland opens near spear base in *B. clavicaudatus*).

#### REMARKS

Mathur, Khan and Prasad (1966) proposed a new genus *Boleodoroides* for *B. oryzae* Mathur, Khan & Prasad, 1966 from paddy roots from Bikramgarh, district Arrah, Bihar State, India and transferred *Boleodoros clavicaudatus* Thorne, 1941 to this genus. *Boleodoroides* was differentiated mainly from *Boleodoros* because of its straight body posture upon death, the anterior position of the metacarpus and the tail with a clavate terminus. Khera (1970) considered *Boleodoroides* to be a subgenus of *Boleodoros* and also described a new species, *B. (Boleodoroides) brevistylus* quite similar to *Boleodoroides oryzae* from the banks of a freshwater dam at Kankroli, Udaipur, Rajasthan. Geraert (1971) while reviewing *Boleodoros* and *Boleodoroides* did not agree that *B. oryzae* and *Boleodoros clavicaudatus* are congeneric and accordingly he restored the latter

species to *Boleodoros* and regarded *Boleodoroides oryzae* as a member of Paurodontinae Thorne, 1941. The new species *Boleodoros acurvus* resembles *B. clavicaudatus* very closely but has its metacarpus almost in the middle of the oesophagus. Both *B. clavicaudatus* and *B. acurvus* are typical *Boleodoros* species in all characters except for the differences of body posture and tails with clavate terminus. To propose a new genus for these two species on these characters at this juncture may be premature. Perhaps in future when the relationship of *Boleodoros*, more particularly *B. clavicaudatus* and *B. acurvus*, to other genera like *Basiria* Siddiqi, 1959; *Clavilenchus* Jairajpuri, 1966 and *Basiroides* Thorne & Malek, 1968 is better understood, and when more species are added to this rather complex but closely related group, then it may be possible to delimit with some certainty the boundaries of the various genera. *Boleodoroides oryzae* and *Boleodoros (Boleodoroides) brevistylus* do not belong to the above group and need further study to determine their exact status. Until then, these two species and the genus *Boleodoroides* should be regarded as *incertae sedis*.

#### *Paratylenchus variatus* n.sp.

(Fig. 2)

#### DIMENSIONS

*Paratype females* (n = 28): L = 0.21-0.31 mm; a = 15-25; b = 3.6-4.3; c = 11-16; V = 78-81.

*Holotype female*: L = 0.24 mm; a = 17; b = 3.5; c = 12; V = 79.

#### DESCRIPTION

*Female*: Body curved ventrally in an open 'C' shape. Striae about 1  $\mu\text{m}$  apart, continuing up to tail tip. Lateral fields 1/7 to 1/6 body width usually appearing as a plain band but rarely an incisure in the middle is discernible. Lip region rounded, not set off and with slightly sloping sides defining a truncate end. A distinct depression present at the oral aperture. Annulations in lip region indistinct. Spear slender, 15-16  $\mu\text{m}$  long, conical part 9-10  $\mu\text{m}$  long, basal knobs with sloping anterior surfaces. Dorsal oesophageal gland orifice 4-6  $\mu\text{m}$  from basal knobs. Oesophagus typical of the genus. Excretory pore situated in the region of the basal bulb of the oesophagus, or rarely a little behind, 55-65  $\mu\text{m}$  from anterior extremity. Hemizonid usually at same level as excretory pore. Cardia small and rounded. The reproductive system consists of an outstretched ovary with 10-15 oocytes in a single row. Sperma-

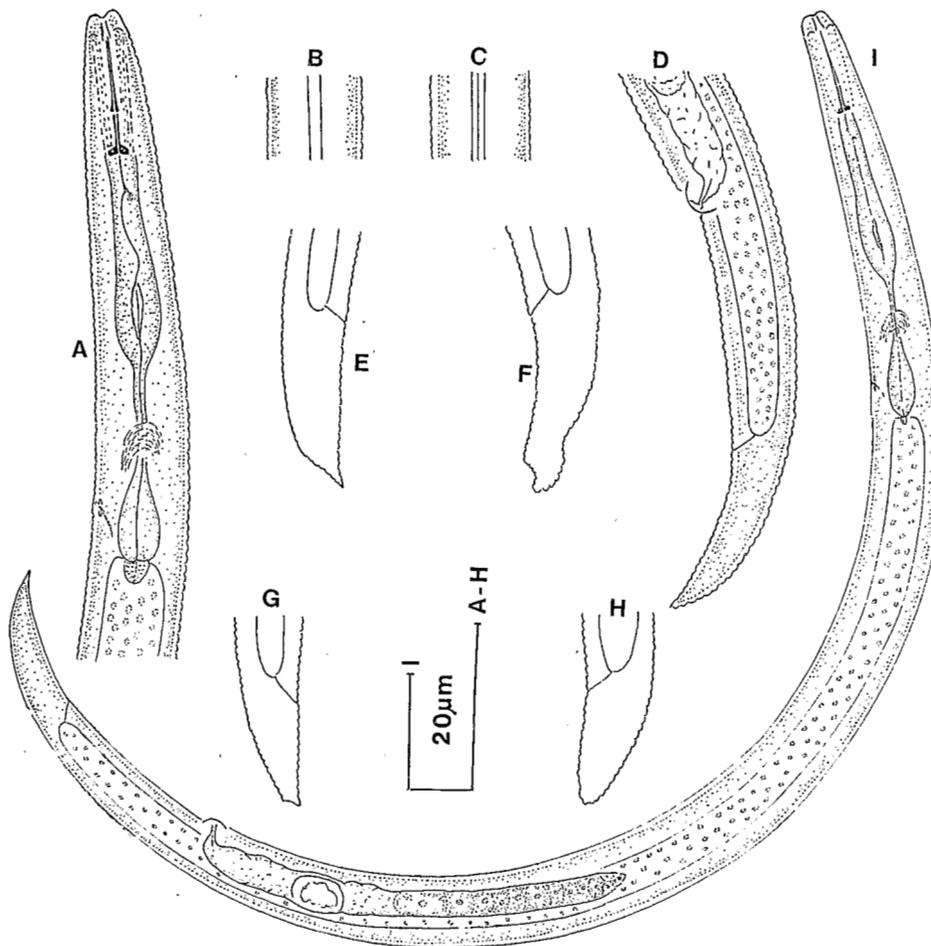


Fig. 2. *Paratylenchus variatus* n.sp. A : Oesophageal region ; B & C : Lateral fields in midbody ; D : Posterior end ; E-H : Tails ; I : Female entire.

theca large, rounded, empty. Vulva flap prominent, rounded. Vulva-anus distance about 1 1/2 times tail length or three to four times body width at vulva. Tail conoid, 2-4 anal body widths long, terminus variable in shape, often digitate or indented.

*Male*: Not found.

**TYPE HABITAT AND LOCALITY**

Same as for *Boleodorus acurvus* n.sp.

**TYPE SPECIMENS**

Holotype and nineteen paratypes at the Commonwealth Institute of Parasitology ; five paratypes

at Rothamsted Experimental Station, Harpenden and four females at Laboratoire des Vers, Muséum national d'Histoire naturelle, Paris, France.

**DIFFERENTIAL DIAGNOSIS**

*Paratylenchus variatus* n.sp. comes close to *P. leptus* Raski, 1975 and *P. colbrani* Raski, 1975. From the former it differs in the shape of the lip region and size of the spear (lip region without depression at oral aperture and spear 20-23 µm long in *P. leptus*). From *P. colbrani* it differs in having only two or three lines in the lateral fields, in the shape of tail and the absence of males (lateral fields marked with four lines, tail bluntly rounded and males present in *P. colbrani*).

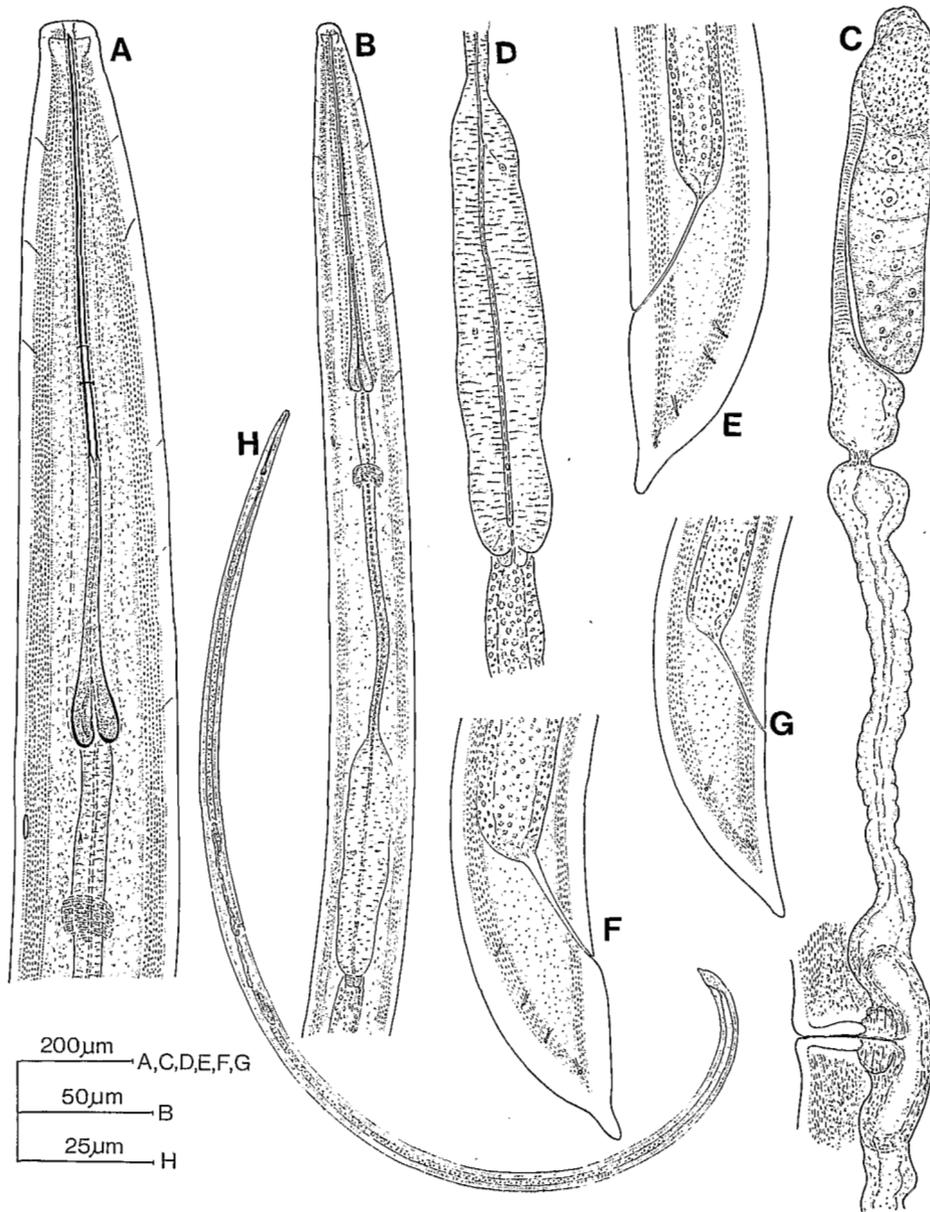


Fig. 3. *Xiphinema brevistylus* n.sp. A : Anterior extremity ; B : Oesophageal region ; C : Anterior reproductive system ; D : Basal oesophageal bulb ; E & F : Tails of adult females ; G : Tail of juvenile female ; H : Female entire.

***Xiphinema brevistylus* n.sp.**  
(Fig. 3)

DIMENSIONS

*Paratype females* (n = 2) : L = 2.30-2.40 mm ;  
a = 63-65 ; b = 6.7-8.0 ; c = 60-67 ; c' = 1.4-1.5 ;  
V = 41-43.

*Holotype female* : L = 2.33 mm ; a = 64 ; b =  
6.8 ; c = 63 ; c' = 1.4 ; V = 42.

*Fourth-stage juvenile females* (n = 2) : L = 1.75-  
2.00 mm ; a = 56-76 ; b = 6.0-7.2 ; c = 44-50 ;  
c' = 1.8-2.0.

DESCRIPTIONS

*Female* : Body long and slender, ventrally curved,  
more strongly in posterior region. Cuticle with fine

striations, 3-4  $\mu\text{m}$  thick near lip region, 2-3  $\mu\text{m}$  near midbody and 5-6  $\mu\text{m}$  on tail. Lip region knob-like, slightly marked off from the body; labial papillae not rising above contour. Lateral chords about one-fourth body width wide. Amphids stirrup-shaped with apertures 7-8  $\mu\text{m}$  wide or more than half the lip-region width. Odontostyle 77-81  $\mu\text{m}$  long, about eight times lip-region width. Odontophore 49-54  $\mu\text{m}$  long, about 2/3 of odontostyle length. Total stylet length 126-132  $\mu\text{m}$ . Stylet basal guiding ring 65-70  $\mu\text{m}$  from anterior extremity. Flanges on the base of odontophore 8-10  $\mu\text{m}$  wide. Nerve ring at 30-40  $\mu\text{m}$  or about one body width from the base of flanges. Hemizonid 15-25  $\mu\text{m}$  from the base of flanges or 150-154  $\mu\text{m}$  from the anterior extremity. A mucro (odontostyle tip) is present in the slender anterior part of the oesophagus, 16-21  $\mu\text{m}$  from the base of the flanges. Oesophagus typical of the genus with its basal bulb measuring 74-86  $\times$  13-17  $\mu\text{m}$ . Oesophageal gland nuclei and orifices as shown in Fig. 3 D. Cardia small, rounded. Vulva a transverse slit, pre-equatorial; vulval lips only slightly protruding. Vagina narrow and straight, about half body width long. Reproductive system amphidelphic, symmetrical and each sexual branch equally developed and reflexed. Ovary with 12-16 oocytes; oviduct and uterus clearly demarcated. Organ Z not present. Uterine chamber highly muscular and conspicuous, about one corresponding body-width long. Prerectum 325-350  $\mu\text{m}$  or 13-14 anal body width long, its cells not very different from intestinal cells. Rectum 25-26  $\mu\text{m}$  or about one anal body width long. Tail 35-36  $\mu\text{m}$  long, convex-conoid with greater curvature on the dorsal side, narrowing terminally to a digitate peg 8-9  $\mu\text{m}$  long. Hyaline part of tail 11-14  $\mu\text{m}$  long, « blind canal » not present. Caudal papillae four on either side.

*Fourth-stage Juvenile Female:* Similar to female in general appearance and body posture. Body smaller but tail comparatively longer and slightly differently shaped. Tail peg less clearly demarcated. Functional odontostyle 68-70  $\mu\text{m}$  long; odontophore 43-44  $\mu\text{m}$  long; total stylet length 111-114  $\mu\text{m}$ ; replacement odontostyle length 78-79  $\mu\text{m}$ .

*Male:* Not found.

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#### TYPE HABITAT AND LOCALITY

Same as for *Boleodorus acurvus* n.sp.

#### TYPE SPECIMENS

Holotype, one paratype female and one fourth-stage juvenile at the Commonwealth Institute of Parasitology; one paratype female and one fourth-stage juvenile at Rothamsted Experimental Station, Harpenden.

#### DIFFERENTIAL DIAGNOSIS

*Xiphinema brevistylus* n.sp. comes close to *X. vulgare* Tarjan, 1964 and *X. tarjani* Luc, 1975. From the former it differs in having a shorter and differently shaped tail, more posteriorly located vulva and a much smaller odontostyle and odontophore ( $c = 50.7-57.7$ ;  $c' = 1.8$ ;  $V = 37-40$ ; odontostyle = 104  $\mu\text{m}$  and odontophore = 73  $\mu\text{m}$  in *X. vulgare*). From *X. tarjani* it differs in the absence of a « blind canal » in the tail, in having a smaller odontostyle and odontophore and anteriorly located vulva (« blind canal » present; odontostyle = 111-135  $\mu\text{m}$  long; odontophore = 52-69  $\mu\text{m}$  and  $V = 49-54.5$ ).

#### REFERENCES

- GERAERT, E. (1971). Observations on the genera *Boleodorus* and *Boleodoroides* (Nematoda: Tylenchida). *Nematologica*, 17 : 263-276.
- KHERA, S. (1970). Nematodes from the banks of still and running waters. VIII. Order Tylenchida. *Proc. zool. Soc., Calcutta*, 23 : 53-65.
- MATHUR, V.K., KHAN, E. & PRASAD, S.K. (1966). *Boleodoroides oryzae* n.g., n.sp., (Nematoda: Boleodorinae) from Bihar, India. *Nematologica*, 12 : 448-452.