Fundam. appl. Nematol., 1992, 15 (5), 443-447

Mbanema nigeriense n. gen., n. sp. (Drilonematidae : Nematoda) from *Eudrilus eugeniae* (Eudrilidae : Oligochaeta) in Nigeria

Sergei E. SPIRIDONOV

Helminthological Laboratory of the USSR Academy of Sciences, Lenin av., 33, Moscow, 117071, USSR.

Accepted for publication 27 November 1991.

Summary — *Mbanema nigeriense* n. gen., n. sp. is described from the body cavity of the earthworm *Eudrilus eugeniae* from Nsukka, Nigeria. The new species resembles *Diceloides mirabilis* Timm, 1967 in having vesicular lateral sensory organs, but differs from this species by the number of these organs (two rows on each side of the body) and the presence of large amphids.

Résumé — Mbanema nigeriense *n. gen., n. sp. (Drilonematidae : Nematoda) parasite de* Eudrilus eugeniae *(Eudrilidae : Oligochaeta) au Nigeria — *Mbanema nigeriense* n. gen., n. sp. parasite du lombric *Eudrilus eugeniae* provenant de Nsukka, Nigeria, ressemble à *Diceloides mirabilis* Timm. 1967 par la présence de sensilles latérales vésiculaires, mais s'en distingue par le nombre de ces organes (deux séries sur chaque côté du corps) et la présence d'amphides de grande taille.

Key-words : Nematodes, *Mbanema*, earthworm.

Nematodes of the superfamily Drilonematoidea Chitwood, 1950 are parasites of the body cavity of earthworms. They are most abundant in tropics, although certain genera such as *Dicelis* or *Filiponema* can enter temperate regions (Dujardin, 1845). Impressive numbers of Drilonematoidea taxa were discovered in tropical Asia and America by R. W. Timm, whereas African fauna of these nematodes is studied in lesser scale (a complete list of Timm's contributions was compiled by Poinar, 1978*b*).

Ten individuals of the tropical earthworm *Eudrilus eugeniae* Kinberg were collected in Nsukka, Nigeria by Dr. Caroline C. Mba and kindly sent to us for examination. These oligochaets were found infected with *Mesidionema* (Mesidionematidae) larvae (Poinar, 1978*a*) and also unknown Drilonematidae; the latter are described below under *Mbanema* n. gen.

Formalin fixed earthworms were dissected and the gut contents examined under the dissecting microscope. The obtained nematodes were studied in glycerine mounts or under SEM (through conventional procedure of specimen preparation).

Mbanema n. gen.

DIAGNOSIS

Rhabditida, Drilonematoidea, Drilonematidae. Body surface smooth with thin cuticular envelope; large pocket-like amphids, four cephalic papillae; two rows of vesicular lateral sensory organs with elliptical opening on body surface; long bristle protrudes from this opening; buccal cavity reduced; oesophagus with glandular dorsal sector of corpus; basal bulb with enlarged nucleus; excretory pore, duct and large gland present. *Males* : two equal falcate spicules with large manubria; a broad gubernaculum embraces the spicules; bursa absent. *Females* : monodelphic with small rudiment of posterior uterus; spermatheca located on anterior bend of gonad, close to oesophagus; median vulva. Some dozen eggs in uterus; egg-shell smooth, without operculum.

TYPE AND ONLY SPECIES

Mbanema nigeriense n. sp.

Mbanema nigeriense n. sp.

(Figs 1-3)

MEASUREMENTS

Male (paratype, n = 1) : L = 673 µm; a = 7.1; b = 4.7; tail = ? (deformed under cover-glass); oesophagus = 142 µm; ant. end to nerve ring = 91 µm; ant. end to excret. pore = 97 µm; spicule = 52 µm; gubernaculum = 39 µm.

Female (paratypes, n = 30) : L = 1347 (906-1850) µm; a = 19.5 (15.0-30.8); b = 8.5 (6.2-12.3); oesophagus = 160 (140-182) µm; ant. end to nerve ring = 96 (88-105) µm; ant. end to excret. pore = 114 (98-130) µm; ant. end to spermatheca tip = 161 (118-200) µm; V = 56 (53-60) %; eggs 26-35 × 55-60 µm.

Holotype (male) : L = 967 µm; a = 11.4; b = 6.9; c = 12.6; oesophagus = 140 µm; tail 77 µm long; ant. end to nerve ring = 92 µm; ant. end to excret.

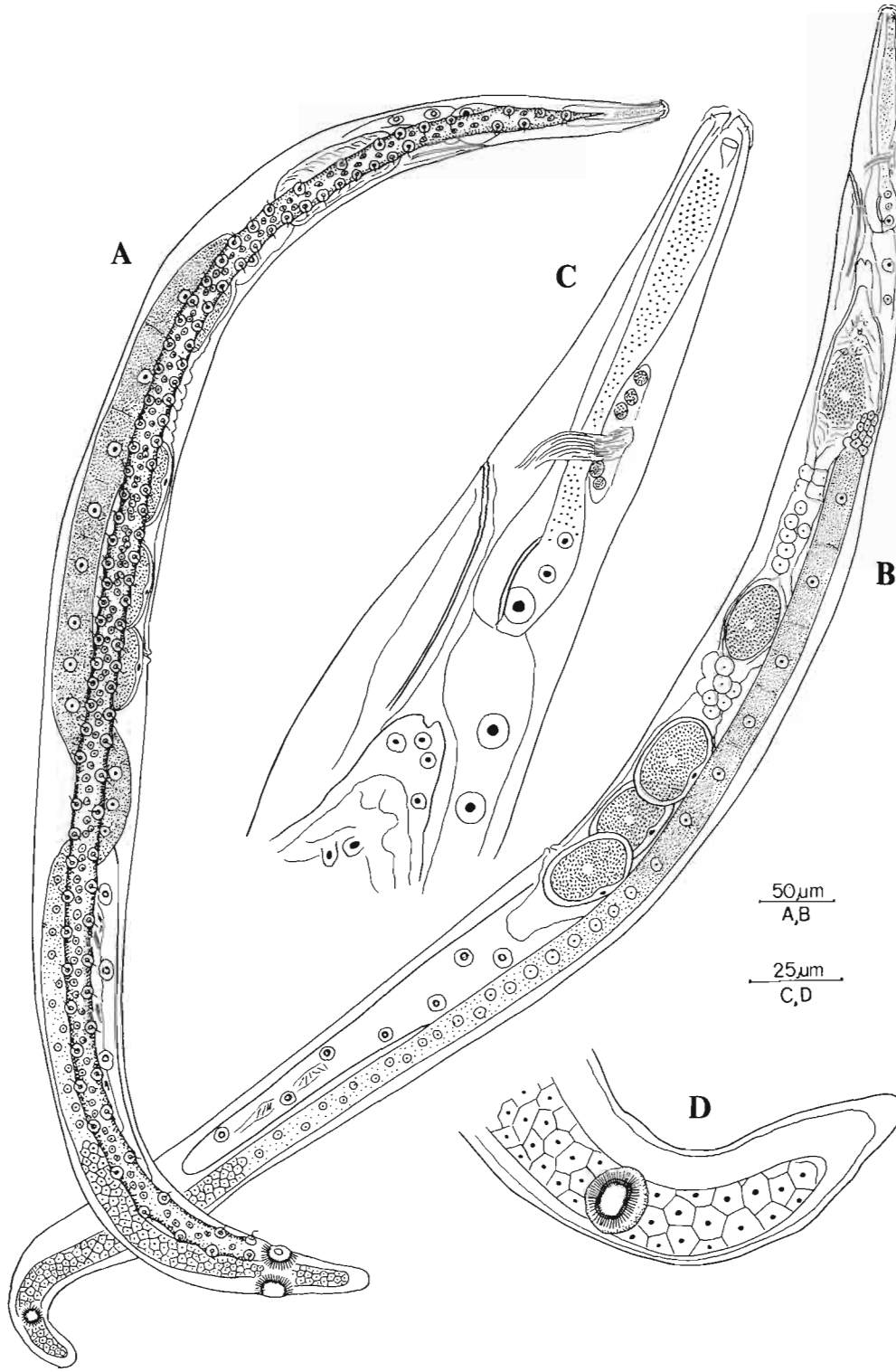

Fig. 1. *Mbanema nigeriense* n. sp., female. A : Total view (surface); B : Total view (inner structures); C : Oesophagus; D : Tail.

pore = 96 µm; spicule = 50 µm, gubernaculum = 39 µm.

DESCRIPTION

Female : Body gradually tapering to both ends; cuticle smooth with thin envelope clearly visible especially on anterior end. Lateral cuticle smooth although sometimes with a sole midlateral ridge. Buccal cavity reduced, 2-3 µm wide and 5 µm long; four cephalic papillae poorly visible in SEM due to cuticular envelope. Amphidial opening elliptical 3-3.5 µm wide. Interior pouch of amphid 5 µm wide and 5-6 µm long. Corpus of oesophagus 13-15 µm diameter. Nerve ring circles poorly differentiated isthmus. Rounded basal bulb 23-33 µm wide with large nucleus. Along lateral sides of body are two rows of vesicular sensory organs. Each of about 120 such organs consists of a spherical inner chamber of 8 µm diameter with a pore of 1.6-3 × 2-3 µm on the surface; pores elongated transversally near body extremities and longitudinally in the middle. Bristle-like 4.5-6 µm long sensilla protrudes from the pores. Excretory pore 2 µm in diameter, slightly corrugated duct up to 3 µm wide. Ovary tip cell near tail terminus. Short oviduct from four transversal rings of rounded cells. Large thick-walled spermatheca near oesophagus bulb with zygote, spermatozoa and sometimes unknown rod-like structures. No egg cleavage in uterus. Eggs with smooth shells, without visible sculpture or operculum. Intestine visible in postvulvar region and behind the bulb, with reduced lumen containing bundles of thin fibers (earthworm gonad products?) and crystal-like structures. No discernible anal opening. Caudal suckers elliptical. Total dimensions of central chamber and adjoining tissue of sucker 20 × 16-18 µm. Transversally elongated opening 5-6 × 3-4 µm. Refractile ring around the opening 11 × 7 µm encircled with radial striation. Tail terminus rounded.

Male : Total number of lateral vesicular organs about 80-90. Anteriormost organ inner chamber of 6 µm diameter, posterior ones of 8 µm. Caudal suckers with transversally elongated inner space of 11 µm wide. Fan of fibers (ducts?) anterior to sucker chamber. Spicules falcate with broad manubrium and thinner body. Gubernaculum broadens to distal end, with crurae embracing spicules. No genital papillae or bursa detected (separate sublateral sensilla-like structures in preanal region). Male tail always strongly coiled.

HOST

Five of ten *Eudrilus eugeniae* dissected were infected with 2 to 21 *Mbanema nigeriense* n. sp., which were localized mainly in the coelomic spaces of segments XII-XIV (before clitellum). Males were found simultaneously in one host. Nematodes are recognized by the host as foreign bodies since numerous coelomocytes of the earthworm were attached to the surface of *Mbanema nigeriense* n. sp.

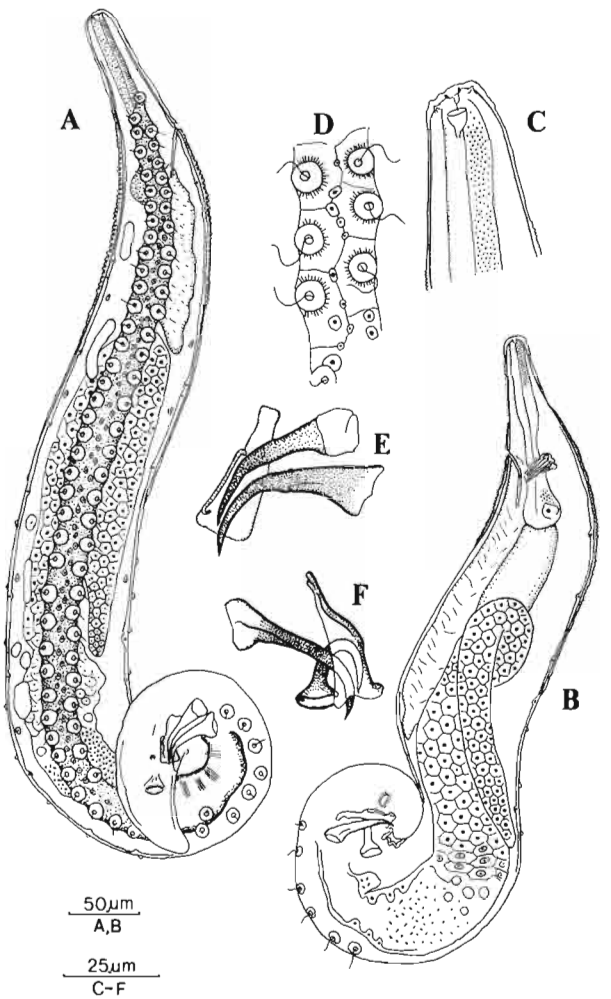

Fig. 2. *Mbanema nigeriense* n. sp., male. A : Total view (surface view of holotype); B : Total view (inner structures of paratype); C : Head; D : Lateral hypodermal cord organization; E : Copulatory apparatus (holotype); F : Copulatory apparatus (paratype).

TYPE MATERIAL

Holotype and one paratype (female) deposited in the collection of Moscow State University Zoological Museum No. Jc 360 and Jc 361 correspondingly); one paratype in the Nematode collection of Gent University (female, No. 3553); paratypes (male and female) were presented for deposition in Museum national d'Histoire naturelle, Paris.

Discussion

The lack of lateral sensory organs is the characteristic feature of Secernentea, though some scattered excep-

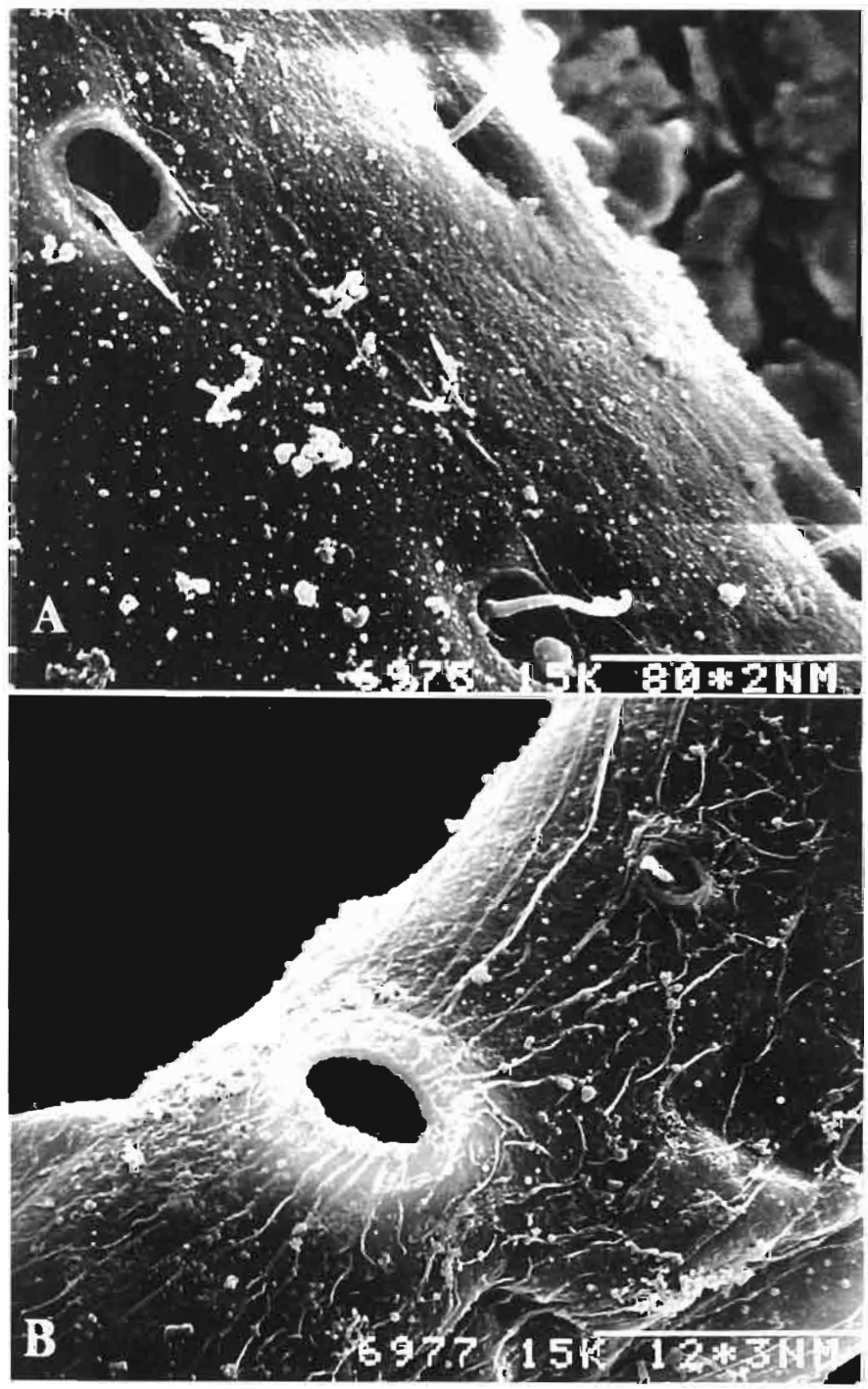

Fig. 3. *Mbanema nigeriense* n. sp. female. A : Pores of lateral vesicular sensory organs; B : Caudal sucker and posteriormost lateral vesicular sensory organ. *(Bars : A = 8* μm; B = 12 μm).

tions can be observed (e.g. *Heth* from the Ransomnematoidea). In Drilonematoidea *Diceloides mirabilis* Timm, 1967 has lateral organs very similar in structure to those of the new genus *Mbanema. D. mirabilis* lateral organs are stretched along the midlateral line in one row, although in the hypodermis numerous vacuolar structures with possible sensory functions were also found (Timm, 1967). No such vacuoles were detected in *Mbanema nigeriense* n. sp., only small nonsensory cells lie along the midlateral line (Fig. 2 D). *D. mirabilis* was described from Darien in Panama. The host is the earthworm *Thamnodriloides yunkeri* Gates of the Glossoscolecidae (Poinar, 1978*b*). Lateral organs have a different structure in *Mbanema* and *Diceloides.* The fine cuticular cover with its opening is quite flat in the former, whereas in the latter genus the opening is situated atop prominent elevations. The posterior end of the *D. mirabilis* single male was lost, nevertheless many differences from *Mbanema* occur. *Diceloides mirabilis* has an uniformly cylindrical oesophagus, strongly resembling that of *Dicelis* even in such rare features as position of the nerve ring around the intestine. Absence of discernible amphids, an excretory pore and duct in *D. mirabilis,* adanal position of the vulva — all these characteristics divide *Diceloides* from *Mbanema.* Up to one hundred eggs were observed in a *D. mirabilis* uterus, but only a dozen occur in *M. nigeriense* n. sp.

The description of *D. mirabilis* was accompanied with Dr. Timm's comments about another drilonematid genus with lateral sensory organs. The description of this nematode was prepared by N. A. Cobb, but postponed because of unsufficient material. This undescribed nematode from the body cavity of *Pheretima andersoni* from Burma has two to four rows of lateral sensory organs resembling those of *Diceloides,* but of smaller size (those *Mbanema* and *Diceloides* have close measurements — inner chamber diameter 8 *vs* 10 µm). It was also reported that these Burmese nematodes lack of copulatory apparatus in the male, thus they are clearly different from *Mbanema.*

In posessing large pocket-like amphids *Mbanema nigeriense* sp. n. resembles several Drilonematidae genera : *Plutellonema, Iponema* and *Tonoscolecinema.* In the latter two, a fan of fibers (ducts?) were drawn near the anterior edge of the caudal sucker (Timm, 1966*b;* 1967). All these genera have very special features separating them from *Mbanema :* clitellum and bursal alae in *Plutellonema,* long filiform tail in *Iponema;* bristles on the head and tubular preanal projections in *Tonoscolecinema.* Such genera as *Macramphida* and *Filiponema* (Timm, 1966*a, b*) have large circular amphids without an inner pouch, but about 15 flagellar lateral sensory organs were reported in *Filiponema* (Spiridonov *et al.,* 1989). Unlike *Mbanema,* these structures in *Filiponema* have no vesicular component.

Mbanema nigeriense n. sp. demonstrates a set of features (no hooks, spicules, caudal sucker with inner chamber) which places it in the Drilonematidae.

Acknowledgement

The author thanks Dr. Caroline C. Mba, Department of Soil Science, University of Nigeria in Nsukka for collecting the material studied.

References

DUJARDIN, F. (1845). *Histoire naturelle des Helminthes ou Vers intestinaux.* Paris, Librairie Encyclopédique de Roret, 654 p.

POINAR, G. O. Jr. (1978*a*). *Mesidionema praecomasculatis* gen. et sp. n.; Mesidionematidae fam. n. (Drilonematoidea : Rhabditida), a nematode parasite of earthworms. *Proc. helminth. Soc. Wash.,* 45 : 97-102.

POINAR, G. O. Jr. (1978*b*). Association between nematodes (Nematoda) and oligochaetes (Annelida). *Proc. helminth. Soc. Wash.,* 45 : 202-210.

SPIRIDONOV, S. E., KOZODOI, E. M. & KHRUSTALEV, A. V. (1989). [*Filiponema sarmathicus* sp. n. — the new species of nematodes from earthworms.] *Bull. MOIP, ser. Biol.,* 94 : 76-80.

TIMM, R. W. (1966*a*). Nematode parasites of the coelomic cavity of earthworms. VI. *Macramphida* and *Sucamphida,* two new genera with unusual amphids. *Proc. helminth. Soc. Wash.,* 33 : 67-71.

TIMM, R. W. (1966*b*). Nematode parasites of the coelomic cavity of earthworms. V. *Plutellonema, Iponema* and *Filiponema,* new genera (Drilonematidae). *Proc. helminth. Soc. Wash.,* 33 : 177-184.

TIMM, R. W. (1967). Nematode parasites of the coelomic cavity of earthworms. VII. Four new genera and thirteen new species of the family Drilonematidae. *Pak. J. biol. agr. Sc.,* 10 : 1-12.