

Description of *Trichodorus parorientalis* n. sp. (Nemata : Diphtherophoroidea) from South Africa

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Summary — *Trichodorus parorientalis* n. sp. is described. The new species closely resembles *Trichodorus orientalis* De Waele & Hashim, 1984. However, differences in the position of the excretory pore, the possession of a non-thickened terminal cuticle and spicules with a slight constriction at mid-calamus in male and small oval and oblique vaginal sclerotizations in female, make the species easy to recognize.

Résumé — Description de *Trichodorus parorientalis* sp. n. provenant d'Afrique du Sud — Description est donnée de *Trichodorus parorientalis* sp. n., proche de *Trichodorus orientalis* De Waele & Hashim, 1984. La nouvelle espèce se reconnaît toutefois grâce à des différences dans la position du pore excréteur, une cuticule terminale non épaissie et des spicules comportant une légère constriction en leur milieu (mâle) ainsi que par des sclérotisations vaginales petites, ovales et obliques (femelle).

Key-words : Nematodes, *Trichodorus*, South Africa.

So far, only five *Trichodorus* species have been described from South Africa : *T. petrusalberti* De Waele, 1988, *T. philipi* De Waele, Meyer & Van Mieghem, 1990, *T. rinae* Vermeulen & Heyns, 1986, *T. sanniae* Vermeulen & Heyns, 1986 and *T. vandenbergae* De Waele & Kilian, 1992. The known geographical distribution of these species is restricted to South Africa. During a survey in the Eastern Transvaal, South Africa, a new *Trichodorus* species was found in a soil sample collected from the rhizosphere of an unidentified grass.

The specimens were extracted from the soil using the sugar centrifugal-flotation method of Jenkins (1964), killed by heat, fixed and preserved in TAF and mounted in anhydrous glycerin on aluminium slides according to the slow method of Goodey (1957).

Trichodorus parorientalis n. sp. (Fig. 1 A-O)

MEASUREMENTS

See Table 1.

DESCRIPTION

Male : Posterior body region curved ventrally. Cuticle thin or little swollen upon fixation (2.9-5.8 μm). Up to four cuticular layers can be distinguished by light-microscopy : a thin outer layer, a thick second layer, a

thin third one and a middle thick inner layer; often only two layers visible, demarcated by three distinct lines, the inner one appearing annular. Onchiostyle 51-54 (52) μm long. Pharynx posteriorly gradually widening to a relative slender bulb with five gland nuclei. The large dorsal gland nucleus is situated in the posterior half or exceptionally halfway the pharyngeal bulb, usually just anterior to the posterior pair of large subventral gland nuclei. The small subventral gland nuclei are located in the anterior third of the bulb; they are usually difficult to observe. No dorsal intestinal overlap of the pharynx (except a minute one in one male specimen) or subventral pharyngeal overlaps of the intestine. Nerve ring about middle of neck region. In all specimens two conspicuous ventromedian cervical papillae (CP) present : one (CP1) anterior to the excretory pore (EP) and one (CP2) posterior to the EP. Excretory pore situated at 73-85 % of the neck region from anterior body end. The lateral cervical pores (one on each side) are not always on the same level; they occur usually near to the EP, exceptionally anterior to CP1 or posterior to CP2. Testis single, outstretched, with large sperm cells with a sausage-shaped nucleus. Spicules 37-44 (42) μm long, curved ventrally. Manubrium widened, narrowing at junction with calamus which is about equally wide, except for a slight to more pronounced narrowing halfway and a tapered distal end. The constriction of the calamus coincides with the distal part of the capsule of

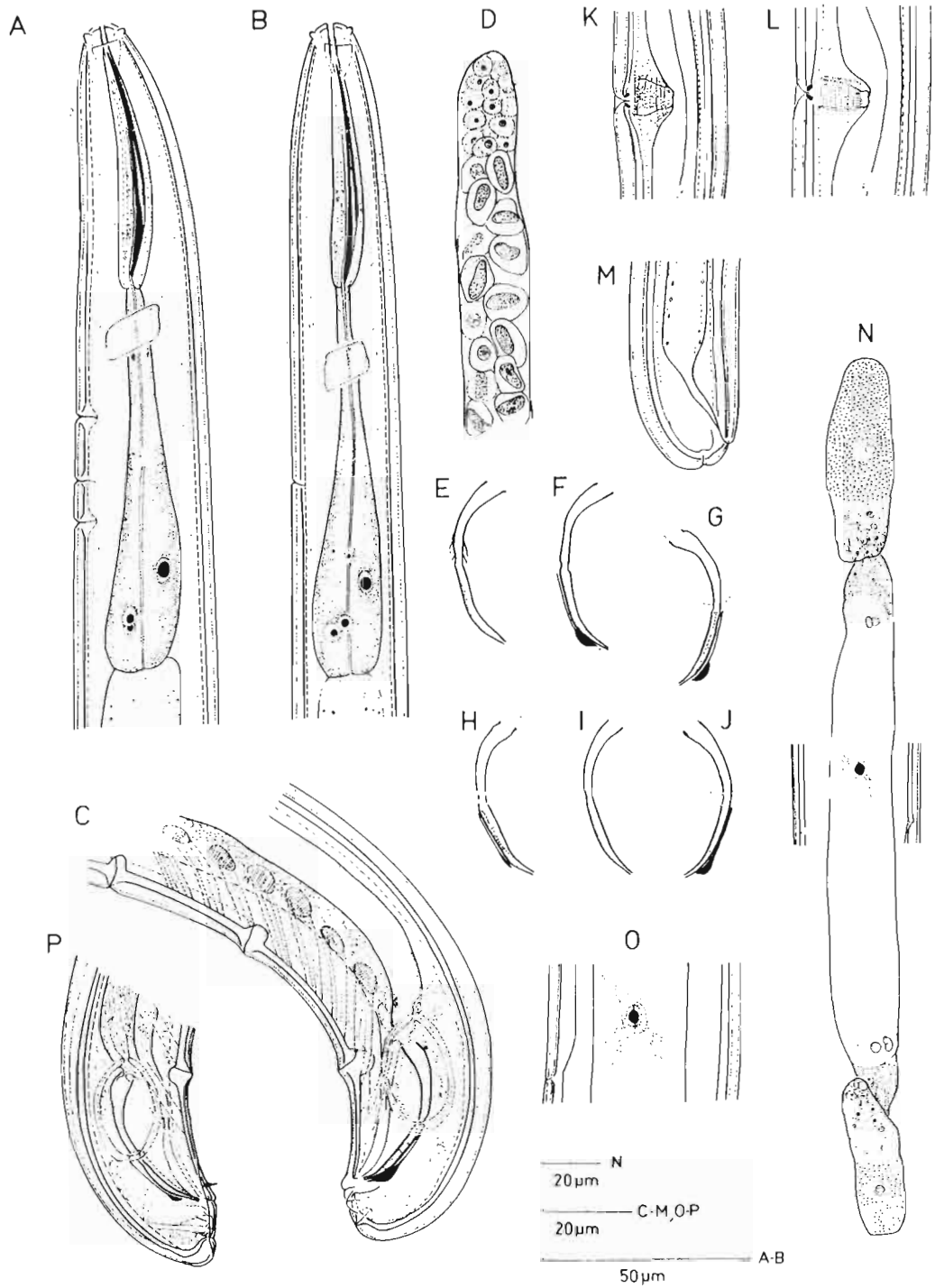


Fig. 1. *Trichodorus parorientalis* n. sp. A : Anterior body region (paratype male); B : Anterior body region (paratype female); C : Copulatory apparatus and tail (holotype male); D : Sperm cells (paratype male); E-J : Spicules (E : extruded right spicule and F retracted left spicule in the same specimen); K-L : Vagina (female paratypes); M : Tail region (female paratype); N : Female reproductive system in ventral view; O : Vulva/vagina in ventral view. — *Trichodorus orientalis* De Waele & Hashim, 1984; P : Copulatory apparatus and tail.

spicular suspensor muscles (similar to other species with a spicular constriction as e.g. in *T. orientalis* De Waele & Hashim, 1984, Fig. 1 P); at this level the spicule appears less sclerotized. Distal half of the spicules finely striated. In extruded spicules only, a setiform ornamentation is visible as two pairs of bristles (longitudinal optical section) just anterior to the constriction. Gubernaculum 16-21 μm long, distally with widened keel. Three medioventral precloacal supplements : the posterior one (SP1) situated at the level of the spicule head : 25-32 μm anterior to the cloacal aperture. The anterior-most supplement (SP3) is slightly smaller. One pair of postcloacal subventral papillae just posterior to the cloacal aperture. One pair of caudal pores subventrally to subterminally. Tail less than one anal body-width long, asymmetrical in lateral view; its cuticle not or hardly swollen terminally/subterminally.

Female : Body straight or only slightly curved ventrally upon fixation. Onchiostyle 50.5-55 (53) μm long. No dorsal intestinal overlap or subventral to ventral overlaps of the pharyngeal glands. Excretory pore at 1.7-2.4 times the onchiostyle length from anterior body end, i.e. at level of the anterior end of the pharyngeal bulb. Reproductive system didelphic-amphidelphic with reflexed ovaries; each branch with an oviduct consisting of two large finely granular cells, a spermatheca with sperm cells and a large uterine sac. Vulva a pore in ventral view situated at 51-56.5 % of total body length from anterior end. Vagina shape and length being influenced by fixation with TAF or physiological condition of the specimen, varying from mushroom-shaped to cylindrical and its length comprising 40-55 % of the corresponding body width. Vaginal sclerotizations small, in lateral view visible as oblique drop-like to oval pieces. Two pairs of lateral body pores : one advulvar pair, 14-31 (22) μm posterior to vulva, and one pair two to six vulvar body-widths anterior to vulva. Tail rounded. Anus subterminal. One pair of caudal pores subterminal to terminal.

Third-stage juvenile : Body almost straight, cuticle as in adult. A young female and a young male specimen were found. They appear to belong to the third stage based upon body length : 565 μm (juv. fem.), 595 μm (juv. male), onchiostyle length : 44 μm (juv. fem.), 48 μm (juv. male) with a 19 μm long replacement onchium and a reproductive system 34 μm (juv. fem.), 42 μm (juv. male) long consisting of several cells and with a clear spicular primordium in the juvenile male.

TYPE HABITAT AND LOCALITY

South Africa, Eastern Transvaal, 10 km southeast of Carolina on the R33 road, sandy soil (5 % clay, 5 % silt, 90 % sand) around the roots of an unidentified grass between rocks on the farm " Haarlem " of J. H. van der Welt (collected by M. Marais on 7th November 1990).

Table 1. Morphometric data of *Trichodorus parorientalis* n. sp. (all measurements are in μm).

	Holotype	Males	Females
n		9	11
L	720	722-806 (763 \pm 25.7)	634-768 (703 \pm 46.7)
Body width	39	28-41 (36 \pm 3.9)	27-44 (37.2 \pm 6)
Pharynx length	153	139-162 (153 \pm 7)	134-186 (157.4 \pm 14.7)
Onchiostyle length	52.5	51-54 (52.2 \pm 1.3)	50.5-55 (53 \pm 1.8)
Ant. end to excret. pore	112	112-128 (120 \pm 6.1)	94-122 (108.7 \pm 9.4)
Ant. end to CP1	95	95-115 (106.6 \pm 6.8)	
Ant. end to CP2	119	119-148 (132 \pm 9.1)	
Spicule length	42	37.5-44 (41.7 \pm 2.2)	
Gubernaculum length	17.5	16.5-21 (18.4 \pm 1.4)	
Anus to SP1	30.5	25-32 (28.4 \pm 2)	
SP1 to SP2	38	31.5-39 (34.9 \pm 2.6)	
SP2 to SP3	36	36-48 (44.2 \pm 3.8)	
Ant. genital branch (♀)			122-180 (151 \pm 17.2)
Post. genital branch (♀)			118-193 (148.9 \pm 25.9)
a	18.4	18.4-25.9 (21.2 \pm 2.3)	15.7-25.5 (19.3 \pm 3.6)
b	4.7	4.7-5.5 (5 \pm 0.3)	3.7-4.9 (4.5 \pm 0.4)
V			50.8-56.6 (54.2 \pm 2.9)
T	65.6	54.9-69.9 (66.5 \pm 4.9)	
G ₁			17.8-26.5 (21.5 \pm 2.6)
G ₂			18.3-28.9 (22.4 \pm 3.3)
Ant. end to EP/Pharynx length (%)	73.1	73-84.5 (78.1 \pm 4.1)	50.5-87.2 (70.2 \pm 11.2)
Onchiostyle length/Pharynx length (%)	34.3	32.6-36.8 (34.4 \pm 1.6)	29.6-37.3 (33.5 \pm 2.8)
Anus to SP1/Spicule length (%)	72.7	61.2-73 (68.1 \pm 3.7)	
Anus to SP2/Spicule length (%)	162.7	137.1-162.7 (151.9 \pm 8.2)	
Anus to SP3/Spicule length (%)	248.2	239.1-271.4 (258 \pm 12.6)	

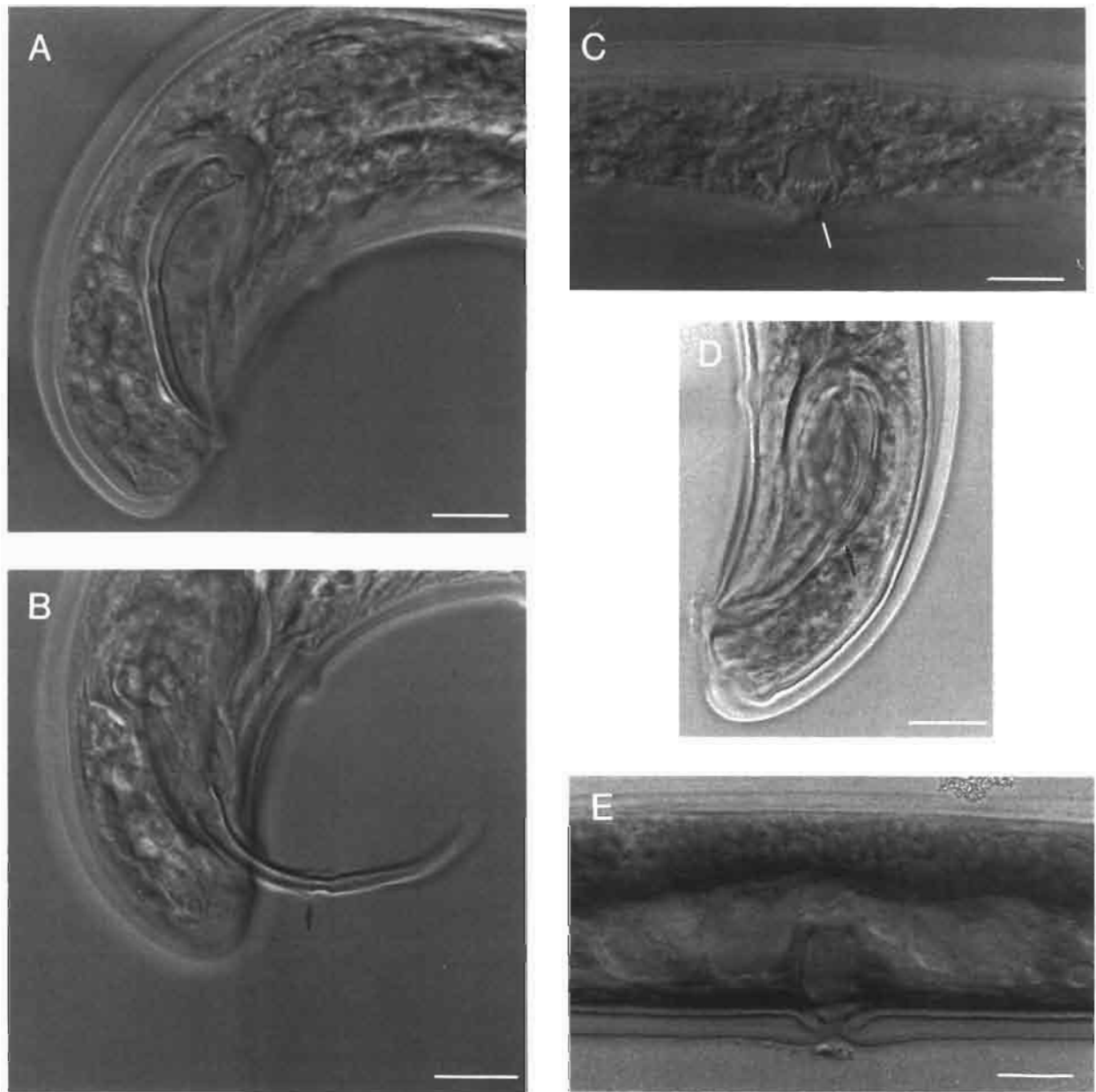


Fig. 2. *Trichodorus parorientalis* n. sp. A-B : Copulatory apparatus and tail (paratype males); C : Vaginal region (paratype female). — *Trichodorus orientalis* De Waele & Hashim, 1984; D : Copulatory apparatus and tail (paratype male); E : Vaginal region (holotype female). Bar is 10 μ m.

TYPE MATERIAL

Holotype male (slide 26173 : male 2), seventeen paratype males and 36 paratype females (slides 26167-26179), deposited in the National Collection of Nematodes, Biosystematics Division, Plant Protection Research Institute, Pretoria, South Africa. Four paratype males and four paratype females (slides RI 378, RI 379) deposited in the nematode collection of the Department of Invertebrates, Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels, Belgium.

DIAGNOSIS AND RELATIONSHIPS

Trichodorus parorientalis n. sp. is characterized by the onchiostyle length : 51-54 µm (male), 50.5-55 µm (fem.) and by the large sperm cells with long sausage-shaped nucleus. In the male, the new species can be identified by two well developed medioventral cervical papillae posterior to the onchiostyle base and with the excretory pore situated in between, the shape of the spicules with a slight constriction at mid-calamus, the arrangement of the three precloacal supplements with the posteriormost one at level of the spicule head when spicule retracted and a tail with the terminal cuticle not thickened. Females are characterized by the small oval and oblique vaginal sclerotizations in lateral view, the pore-like vulva in ventral view and the presence of one prevulvar lateral body pore on both sides.

T. parorientalis n. sp. closely resembles *T. orientalis* De Waele & Hashim, 1984 in morphometric data, in having two conspicuous ventromedian cervical papillae, a similar arrangement of the precloacal supplements, spicules with a mid-corpus constriction and sperm cells with sausage-shaped nucleus in males, and small rounded triangular to oval vaginal sclerotizations in females. The males of the new species differ from *T. orientalis* in the position of the excretory pore : in between the cervical papillae instead of posterior to them as in *T. orientalis*; the non-thickened terminal cuticle instead of a thickened terminal cuticle as in *T. orientalis* and in spicule shape; constriction less marked and the

wider posterior part of the calamus than in *T. orientalis*. Moreover, in *T. orientalis* the body appears slightly flattened ventrally at the level of the copulatory apparatus, giving the impression of the beginning of a bursa (Fig. 1-P, arrow). The females of *T. parorientalis* n. sp. differ from *T. orientalis* by the slightly larger and more oval vaginal sclerotized pieces in lateral view and the presence of a pair of prevulvar lateral pores, absent in *T. orientalis*.

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