

DESCRIPTION OF *TYLENCHORHYNCHUS ZAMBIENSIS* N. SP. (NEMATA: TYLENCHIDAE) FROM ZAMBIA[†]

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ABSTRACT

Venditti, M. E., and G. R. Noel. 1995. Description of *Tylenchorhynchus zambiensis* n. sp. (Nemata: Tylenchidae) from Zambia. *Nematropica* 25:1-6.

Tylenchorhynchus zambiensis n. sp., associated with roots of maize (*Zea mays* L.) in Zambia, is described and illustrated. Females of this bisexual species are characterized by having a body length of 512-648 μm ; a low, rounded, offset head region bearing 4 to 5 annuli; stylet 13.3-15.0 μm long; tail with 21-32 ventral annuli, smooth tail tip; and presence of a post-anal intestinal sac. *Tylenchorhynchus zambiensis* n. sp. is most similar to *T. brassicae* Siddiqi, 1961; *T. goffarti* Sturhan, 1966; *T. ventrosignatus* Tobar-Jimenez, 1969; *T. quaidi* Golden, Maqbool & Handoo, 1987; and *T. namibiensis* Rashid & Heyns, 1990. It differs from *T. brassicae* by the presence of a post-anal extension of the intestine, a shorter stylet, absence of areolation in the lateral field, and the shape of the female tail. *Tylenchorhynchus zambiensis* n. sp. differs from *T. goffarti* by having fewer head annuli (4-5 vs. 6-7), a post-anal intestinal sac, and ratio a (26.7 vs. 33.0). *Tylenchorhynchus zambiensis* n. sp. can be distinguished from *T. ventrosignatus* by ratio a (26.7 vs. 31.5), an obscure hemizonid, the excretory pore near mid median bulb vs. anterior to bulb in *T. ventrosignatus*, and the absence of a wave-like structure near the vulva. It differs from *T. quaidi* by having a rounded head region, presence of a post-anal intestinal sac, and lack of areolation in the lateral field. *Tylenchorhynchus zambiensis* n. sp. differs from *T. namibiensis* by a smaller body size, ratio a (26.7 vs. 43.3), ratio c (13.6 vs. 19.6), stylet length (14.0 vs. 17.0), number of annuli in the head region (4-5 vs. 6-9) and absence of areolation in the lateral field.

Key words: maize, morphology, nematode, new species, taxonomy, *Tylenchorhynchus zambiensis*, *Zea mays*.

RESUMEN

Venditti, M. E. y G. R. Noel. 1995. Descripción de *Tylenchorhynchus zambiensis* n. sp. (Nemata: Tylenchidae) de Zambia. *Nematropica* 25:1-6.

Tylenchorhynchus zambiensis n. sp., encontrado en asociación con raíces de maíz (*Zea mays* L.) en Zambia, es descrito e ilustrado. Las hembras de esta especie heterossexual se caracterizan por tener cuerpo de longitud entre 512-648 μm , la región de la cabeza baja, redondeada, y separada del cuerpo, con 4-5 anillos, longitud del estilete entre 13.3-15.0 μm , cola con 21-32 anillos ventrales, punta lisa y presencia de un saco post-anal. *Tylenchorhynchus zambiensis* es muy similar a *T. brassicae* Siddiqi, 1961; *T. goffarti* Sturhan, 1966; *T. ventrosignatus* Tobar-Jimenez, 1969; *T. quaidi* Golden & Maqbool, 1987 y *T. namibiensis* Rashid & Heyns, 1990. Se diferencia de *T. brassicae* por la presencia de un saco post-anal, estilete más corto, ausencia de aerolación en los campos laterales y la forma de la cola en la hembra. *Tylenchorhynchus zambiensis* se diferencia de *T. goffarti* por tener menor cantidad de anillos en la región de la cabeza (4-5 vs. 6-7), tener un saco post-anal, y por el radio de a (26.7 vs. 33.0). *Tylenchorhynchus zambiensis* n. sp. puede ser distinguido de *T. ventrosignatus* por el radio de a (26.7 vs. 31.5), hemizonidio poco visible, poro excretor cerca de la región media del bulbo medio vs. anterior al bulbo en *T.*

[†]Portion of an M.S. Thesis submitted by the first author to the University of Illinois.

ventrosignatus, y la ausencia de arrugas transversales que le dan un aspecto ondulado cerca de la vulva. Se diferencia de *T. quaidi* por tener redondeada la región de la cabeza, por la presencia de un saco post-anal y por la falta de aerolación en los campos laterales. *Tylenchorhynchus zambiensis* n. sp. se diferencia de *T. namibiensis* por el tamaño más pequeño del cuerpo, el radio de a (26.7 vs. 43.3), el radio de c (13.6 vs. 19.6), la longitud del estilete (14.0 vs. 17.0), el número de anillos en la región de la cabeza (4-5 vs. 6-9) y la ausencia de aerolación en los campos laterales.

Palabras clave: maíz, morfología, nemátodo, nueva especie, taxonomía, *Tylenchorhynchus zambiensis*, *Zea mays*.

INTRODUCTION

During a survey of plant-parasitic nematodes associated with maize, soybean, and sunflower in Zambia, an undescribed species of *Tylenchorhynchus* Cobb was recovered from a field of maize at the Regional Research Station, Magoye, Southern Province, Republic of Zambia (4). The nematode is described herein as *Tylenchorhynchus zambiensis* n. sp.

MATERIALS AND METHODS

Specimens were collected in Zambia by G. R. Noel and G. L. Hartman in 1985. The identification of the genus was made by G. R. Noel (8), and the nematode confirmed as a new species by A. M. Golden (pers. comm.). *Tylenchorhynchus zambiensis* n. sp. was obtained from the rhizosphere of maize (*Zea mays* L.) growing at the Regional Research Center near Magoye, Zambia. Nematodes were extracted from soil using the centrifugal-flotation technique (3), killed by gently heating to 55°C, fixed in Ditlevsen's fixative, processed by the slow method, and mounted in dehydrated glycerine on Cobb slides (2). Temporary mounts of freshly killed specimens and specimens in formalin also were studied. Measurements and drawings were made with a camera lucida (9).

SYSTEMATICS

Family Belonolaimidae Whitehead, 1960
 Subfamily Telotylenchinae Siddiqi, 1960
 Genus *Tylenchorhynchus* Cobb, 1913
Tylenchorhynchus zambiensis n. sp.
 (Fig. 1, A-J; Table 1)

Description

Holotype (female in glycerine): Length 623 μm ; width 22.0 μm ; a = 27.1; b = 5.6; c = 13.1; c' = 2.6; V = 54.0; stylet length 14.6 μm ; excretory pore 91 μm from anterior end; esophagus length 112 μm ; anal body width 18.3 μm ; tail length 47.7 μm ; tail annuli = 25.

Paratype females (n = 22): Morphometrics are given in Table 1. Body straight to slightly arcuate when killed. Cuticle annulated, annulus about 1.5 μm wide near mid-body and from 1.75 to 2.0 μm wide near middle of the tail. Lateral fields with four incisures, outer incisures crenated, not areolated. Head region low, rounded, offset from body contour by a constriction, bearing 4-5 annuli, labial disc slightly elevated. Labial framework moderately sclerotized. Stylet with well-developed basal knobs, rounded or directed posteriorly. Dorsal esophageal gland orifice (DEGO) 1.0-2.0 μm from basal knobs. Procorpus cylindrical, median bulb spheroid to ovate.

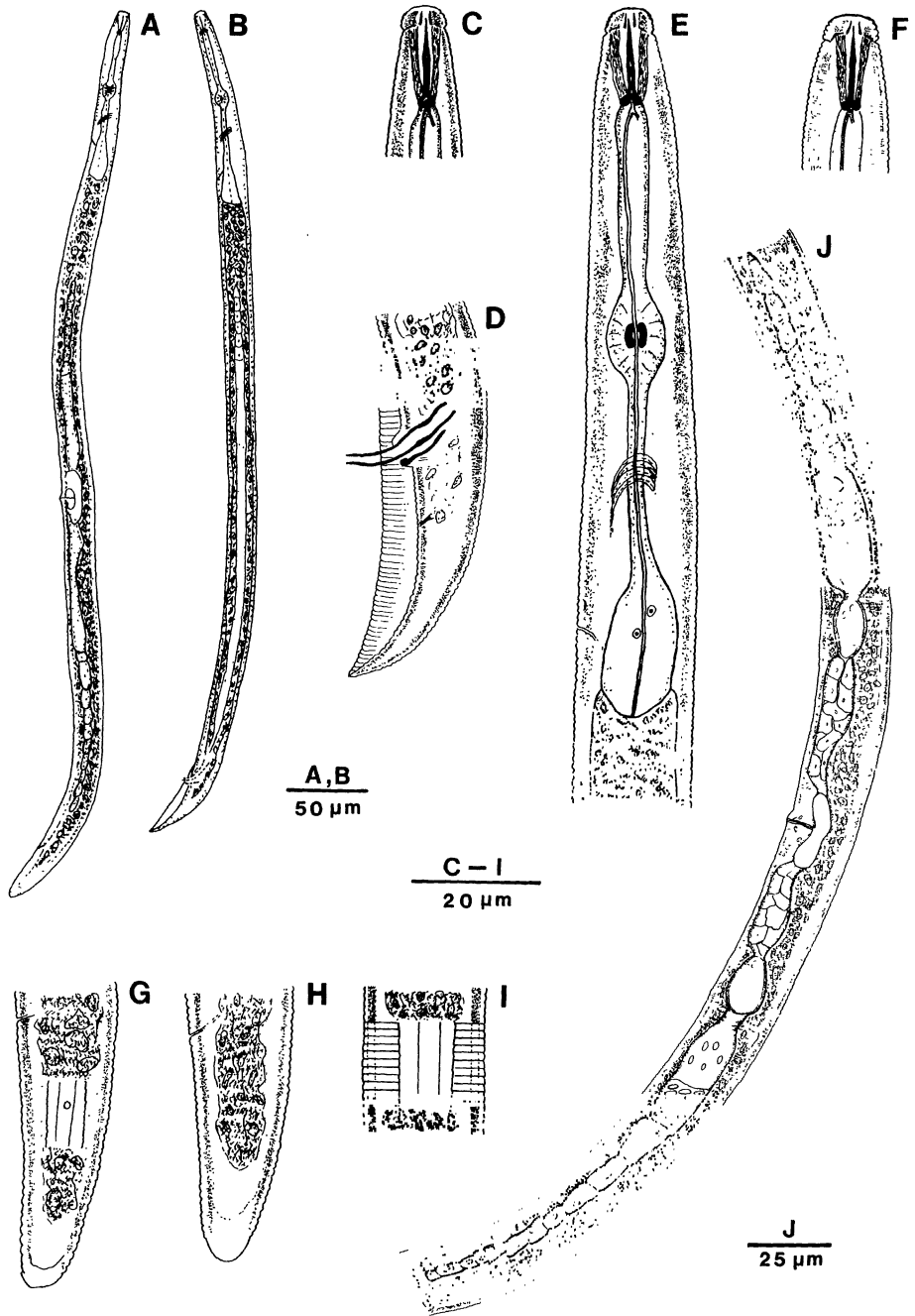


Fig. 1. A-J. *Tylenchorhynchus zambiensis* n. sp. A. Entire female. B. Entire male. C. Male head region. D. Male tail. E. Anterior body region, female. F. Female head region. G-H. Female tails. I. Lateral field of female near mid-body. J. Female reproductive system. All figures oriented laterally.

Table 1. Morphometrics (measurements in μm) for female and male paratypes of *Tylenchorhynchus zambiensis* n. sp. in glycerine.

Character	Female (n = 22)		Male (n = 11)	
	Range	Mean \pm SD ²	Range	Mean \pm SD ²
L	512 - 648	583 \pm 38	467 - 568	534 \pm 31
a	20.9 - 30.8	26.7 \pm 2.3	24.4 - 30.4	27.4 \pm 1.6
b	4.5 - 5.9	5.3 \pm 0.4	3.8 - 6.0	4.8 \pm 0.6
c	12.0 - 15.2	13.6 \pm 1.0	10.9 - 13.7	12.5 \pm 0.8
c'	2.2 - 3.1	2.6 \pm 0.2	2.8 - 3.3	2.9 \pm 0.1
V	50.0 - 56.2	54.6 \pm 1.3	—	V4, 34
Stylet Length	13.3 - 15.0	14.0 \pm 0.5	13.0 - 14.7	13.7 \pm 0.9
Excretory pore distance	81 - 96	89 \pm 6.3	73 - 104	87 \pm 7.6
Center median bulb length	48.0 - 60.3	52.9 \pm 3.9	44.0 - 54.7	49.4 \pm 4.6
Esophagus length	95 - 123	109 \pm 7	85 - 127	111 \pm 12
Body width	18.6 - 27.5	21.9 \pm 2.1	17.0 - 21.3	19.5 \pm 1.2
Anal body width	12.3 - 19.0	16.3 \pm 1.4	13.0 - 16.7	14.4 \pm 0.9
Tail length	35.5 - 55.7	43.4 \pm 4.8	40.3 - 46.7	42.8 \pm 1.9
Spicule length	—	—	17.3 - 22.0	20.6 \pm 1.2
Gubernaculum length	—	—	9.0 - 11.7	10.3 \pm 0.9

²SD = Standard deviation.

Hemizonid observed only in a few specimens, situated about four body annuli anterior to excretory pore. Excretory pore variable in distance from anterior end (81-96 μm) near mid region of median bulb. Deirids not seen. Basal esophageal bulb elongate, slightly overlapping the intestine. Reproductive system tylenchoid. Vulva transverse, flush with body surface or slightly raised. Vagina perpendicular to body axis. Ovaries amphidelphic, outstretched (in holotype anterior longer than posterior) with single row of oocytes, spermatheca small usually filled with sperm. A post-anal intestinal sac overlaps the rectum. Tail subcylindrical to conoid bearing 21 to 32 ventral annuli, terminus

smooth. Phasmid located in anterior third of tail. Anus an inconspicuous opening.

Allotype (male in glycerine): Length 527 μm ; width 19.3 μm ; a = 27.3; b = 5.6; c = 13.1; c' = 2.9; stylet length 13.0 μm ; esophagus length 93 μm ; anal body width 14 μm ; tail length 40.3 μm ; spicules 20.3 μm ; gubernaculum 9.3 μm .

Paratype males (n = 11): Morphometrics are given in Table 1. Body similar to female but slightly smaller. Lateral field not areolated, outer incisures crenated. Testis single. Caudal alae tylenchoid with crenated margin, enveloping the tail. Spicules ventrally arcuate. Gubernaculum arcuate, distal end curved. Phasmid located in anterior third of tail. Opening of cloaca with protruding lips.

Type host and locality

From soil around roots of maize (*Zea mays* L.) from an experimental field of the Regional Research Station, Magoye, Zambia.

Type specimens

Holotype female and allotype male deposited at the USDA Nematode Collection, Beltsville, Maryland. Paratypes deposited at the University of California, Davis, California; Rothamsted Experimental Station, Harpenden, England; and the University of Illinois, Champaign-Urbana, Illinois.

Diagnosis

Tylenchorhynchus zambiensis n. sp. is characterized by having a body length of 512-648 μm ; a low, rounded offset head region with 4-5 annuli; stylet 13.3-15 μm long; an a ratio of 20.9-30.8; b ratio of 4.5-5.9; c ratio of 12.5-15.2; hemizonid obscure; excretory pore at mid esophageal bulb; lateral fields not areolated; tail with 21-32 ventral annuli and presence of a post-anal intestinal sac.

Relationships

This new species is closely related to *T. brassicae* Siddiqi, 1961 (6); *T. goffarti* Sturhan, 1966 (7); *T. ventrosignatus* Tobar-Jimenez, 1969 (10); *T. quaidi* Golden, Maqbool, & Handoo, 1987 (1) and *T. namibiensis* Rashid & Heyns, 1990 (5). From *T. brassicae*, it differs in the presence of a post-anal extension of the intestine. It further differs in having a shorter stylet, lip region bearing 4-5 annuli, no areolation of the lateral fields, and in the shape of the female tail; in *T. brassicae* post-anal intestinal sac absent, stylet 16-17 μm , head with only 4 annuli, transverse striae passing across lateral field in anterior region of the body,

and tail conoid with large conoid-obtuse terminus. From *T. goffarti* it differs by fewer annuli in the head region, post-anal intestinal sac and value of a; in *T. goffarti* head region with 6-7 annuli, no post-anal intestinal sac, and a = 33 (29-37). It is distinguished from *T. ventrosignatus* in having a head region with 4 to 5 annuli, value of a, an obscure hemizonid, excretory pore at mid esophageal bulb, and by absence of a wave-like structure near the vulva; in *T. ventrosignatus* head with only 4 annuli, a = 31.5 (28.1-36.5), prominent hemizonid, excretory pore anterior to esophageal bulb, and presence of a wave-like structure near vulva. From *T. quaidi* it differs by having no areolation of the lateral fields, off-set, rounded head region with 4 to 5 annuli, lesser number of tail annuli, vagina unsclerotized, and presence of post-anal intestinal sac; in *T. quaidi* lateral fields areolated, lip region set off, sunken, dome-shaped with 5-6 annuli, tail bearing 31-41 annuli, half of vagina sclerotized and the other half unsclerotized, and absence of post-anal intestinal sac. From *T. namibiensis*, *T. zambiensis* n. sp. can be distinguished by the comparatively smaller size of the body, a and c values, shorter stylet, fewer head annuli, and absence of areolation of the lateral fields. In *T. namibiensis* body length is 670-880 μm , a = 43.3 (39.4-49.4), c = 19.6 (15.3-21.9), stylet 15.5-19.5 μm , head region bearing 6-9 annuli, and lateral fields areolated.

Etymology

This species is named after the Republic of Zambia which in 1992 peacefully installed its first democratically elected government.

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Received:

25.VII.94

Accepted for publication:

22.VIII.94

Recibido:

Aceptado para publicación: