Descriptions of Chitwoodius brasiliensis n.sp., Chitwoodius rusticulus n.sp., and Vanderlindia venata n.sp. (Dorylaimida: Tylencholaimidae: Vanderlindiinae)

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Abstract: Chitwoodius brasiliensis n.sp. is described from soil around plant roots in Vicosa, MG State, Brazil. It has a body 1.9 mm (1.6-2.5) long, odontostyle and odontophore 33 μm (31-37) and 34 μm (31-36) long, respectively, and males with spicules 59-61 μm long. Chitwoodius rusticulus n.sp. from Colombian rain forest differs from other species of the genus in having a weakly muscular anterior part of the oesophagus, a pore-like vulva, and an unsclerotized vagina. Vanderlindia venata n.sp. from lucerne soil in South Kilimanjaro, Tanzania, differs from the type and only other known species of its genus in having a smaller and less slender body (L = 3.34 mm [3.15-3.71], a = 50 [46-53]), odontostyle 2.3-2.5 times lip region width long, and stylet guiding ring located at 1.2-1.4 times lip region width from anterior end. Key words: Chitwoodius brasiliensis, Chitwoodius rusticulus, Vanderlindia venata, Vanderlindiinae, taxonomy.

Two new species of the genus Chitwoodius (Furstenberg & Heyns, 1966) Furstenberg & Heyns, 1966 (2) from South America and a new species of Vanderlindia Heyns, 1964 (3) from Africa are described below. Chitwoodius and Vanderlindia are similar in their large body size, tylencholaimid cuticle with distinct radial elements, offset lip region, large strongly sclerotized odontostyle, dorylaimoid odontophore, a large muscular oesophagus enlarging near middle, and oligocytous intestine. They are here considered to belong to the subfamily Vanderlindiinae Siddiqi, 1969 of the family Tylencholaimidae (4).

MATERIALS AND METHODS

The nematodes for this study were killed by applying heat, fixed in a 3-5% solution of formaldehyde, and mounted in anhydrous glycerine after processing through warm lactophenol.

Chitwoodius brasiliensis n.sp.

(Fig. 1)

Paratypes. Females (20): L = 1.9 mm (1.6-2.5); a = 35 (30-40); b = 3.9 (3.5-4.4); c = 70 (59-89); c' = 0.7 (0.6-0.8); V = 55 (52-59); odontostyle = 33 μm (31-37); odontophore = 34 μm (31-36).

Males (2): L = 1.97-2.0 mm; a = 33-35; b = 4.2-4.4; c = 76-83; c' = 0.77-0.78; T = 47-48; odontostyle = 36-37 μm; odontophore = 32-36 μm; spicules = 59-16 μm.

Holotype (female): L = 1.93 mm; a = 34; b = 3.6; c = 71; c' = 0.7; V = 58.5-65; odontostyle = 36 μm; odontophore = 36 μm.

Description of females: Body ventrally arcuate. Cuticle finely striated, with fine rod-like radial elements and fixation folds; lateral hypodermal chords 1/4 to 1/3 body width. Lip region rounded, set off from body by a deep groove; inner labial papillae forming liplets (Fig. 1, A). Amphid apertures just over half lip region width long. Stylet guiding ring single, about one lip region width from anterior end; stoma not sclerotized. Odontostyle elongate-tubular, with small 2.5-3 μm long aperture and ventral wall furcate at base, slightly arcuate dorsally, about 2.5 μm wide, and 1.7–2 times lip region width long. Odontophore dorylaimoid. Oesophagus muscular, 490 μm (460–560) long, gradually enlarging at 52% (50–55) of its length from anterior end; enlarged part 256 μm (232–292) long and 29 μm (26–33) wide (Fig. 1, C). Nucleus of dorsal gland near beginning of the enlargement, almost at middle of oesophagus; nuclei of posterior subventral gland opposite or just anterior to gland orifices at 54 μm (45–65) in front of base of oesophagus. Oesophago-intestinal valve large with a terminal digitate elongation. Vulva longitudinal, flush with body surface. Vagina over half body width long; vaginal mass about half as wide as long; sclerotization of vagina vera strong, typical of the genus (Fig. 1, B & G). Ovaries symmetrical, with numerous (more than 15) oocytes. Uteri well developed, may contain sperm. Pre-

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rectum 100–120 μm long. Rectum about anal body width long. Tail dorsally convex-conoid to a small round terminus; cuticle on its dorsal and ventral sides may appear swollen (Fig. 1, I & J).


Fig. 1. Chitwoodius brasiliensis n.sp. A) Female anterior region. B,C) Vaginal regions. C) Female oesophageal region. D) Male anterior region. E,F) Anterior and posterior regions of enlarged part of female oesophagus, respectively. H) Male posterior region. I,J) Female posterior regions. K,L) Vagina vera and vagina uterina in ventral view, respectively.
μm anterior to cloacal aperture and extend over a distance of 190 μm. Spicules dorylaimoid, ventrally arcuate, 59–61 μm long, with small rounded, offset, notched tips (Fig. 1, H). Tail tapering to an obtusely rounded tip, with a pair of lateral pores.

Type habitat and locality: Soil around roots of various plants, Viçosa, Minas Gerais, Brazil.

Type specimens: Collected by Silamar Ferraz in 1978. Holotype 9, two ♂♂ and eight ♀♀ paratypes at Commonwealth Institute of Parasitology, St. Albans, England. Three ♀♀ paratypes each at these centers: Rothamsted Experimental Station, Harpenden, England; Landbouw Hogeschool, Wageningen, The Netherlands; Indian agricultural Research Institute, New Delhi, India; USDA Nematology Laboratory, Beltsville, Maryland, USA.

Relationship: Chitwoodius brasiliensis n.sp. differs from C. transvaalensis (Furstenberg & Heyns, 1966) Furstenberg & Heyns, 1966 and C. seshadrii Baqri, 1980 (1) in having a longer body, odontostyle, odontosphore, and oesophagus, vagina more than half body width long, and vaginal mass about twice as long as wide (almost spherical in latter species). (Three female paratypes of C. seshadrii studied by me have L = 1.26–1.38 mm; odontostyle = 27–30 μm; oesophagus = 350 μm; oesophageal enlarged part = 164–170 μm; and spheroidal vaginal mass.)

Chitwoodius rusticulus n.sp. (Fig. 2)

Paratypes. Females (4): L = 1.66 mm (1.5–1.78); a = 35.5 (34–40); b = 4 (3.6–4.5); c = 75 (58–89); c’ = 0.65 (0.6–0.78); V = 55 (51.4–54.3); odontostyle = 31 μm (30–33); odontosphore = 30 μm (29–32).

Holotype (female): L = 1.74 mm; a = 40; b = 4; c = 75; c’ = 0.67; V = 10.0–53.4–8.6; odontostyle = 31 μm; odontosphore = 30 μm.

Description of females: Body straight anteriorly, slightly arcuate posteriorly. Cuticle finely striated; subcuticle coarsely annulated; radial elements numerous; lateral body pores in two lines behind oesophagus.

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Fig. 2. Chitwoodius rusticulus n.sp. A) Female anterior region. B,G) Anterior and posterior regions of enlarged part of female oesophagus. D) Vulval region. E,F,G) Vulva, vagina vera, and vagina uterina in ventral view, respectively. H) Female posterior region.
Lip region rounded, offset by a sharp depression, 14-15 µm wide; papillae not raised (Fig. 2, A). Amphid apertures about half lip region width long. Stylet guiding ring 15-19 µm or 1-1.4 lip region width from anterior end. Odontostyle straight to slightly arcuate, 1.9 µm (1.8-2.0) wide, lumen about 1.1 µm in holotype, aperture 2-3.5 µm long, base furcate. Odontophore dorylaimoid, offset from oesophagus by a depression. Anterior part of oesophagus weakly muscular (Fig. 2, B); posterior enlarged part very muscular, 234 µm (215-249) or 54-57% of oesophagus long and 23-25 µm wide; a small micro resembling odontostyle tip present in anterior part of holotype oesophagus at 12 µm behind base of odontophore. Total length of oesophagus 421 µm (400-435). Orifice of dorsal oesophageal gland 12-15 µm from the beginning of the oesophageal enlargement; orifices of the anterior subventral glands not distinct, in holotype at 81 µm and 114 µm from oesophageal base (Fig. 2, C). Oesophago-intestinal valve large, cylindroid. Vulva pore-like (Fig. 2, E); vagina about half body width long, not sclerotized (Fig. 2, D). Reproductive system didelphic, amphidelphic; no sperm in uteri. Prerectum in holotype 93 µm long. Rectum about one anal body width long. Tail and its inner protoplasmic mass hemispheroidal; two pairs of caudal pores (Fig. 2, H).

Male: Not found.

Type habitat and locality: Sandy soil around roots of heliconia (Heliconia sp.) in old secondary rain forest near Araracuara, Amazonas, Colombia.

Type specimens: Collected by Ms. Kate Williamson during Colombian Amazonas Expedition in 1977. Holotype ♀ and two ♀ ♀ paratypes at C.I.P., St. Albans; one ♀ ♀ paratype each at I.A.R.I., New Delhi, and USDA, Beltsville.

Relationship: Chitwoodius rusticulus n.sp. differs from other nominal species of the genus in having a weakly muscular anterior part of the oesophagus, a pore-like vulva, and an unsclerotized vagina.

Vanderlindia venata n.sp. (Fig. 3)

Paratypes: Females (3): L = 3.35 mm (3.15-3.71); a = 50 (46-53); b = 5.3 (5.1-5.6); c = 153 (145-161); c' = 0.63 (0.6-0.7); V = 51 (50-54); odontostyle = 48 µm (47-50); odontophore = 49 µm (48-51).

Holotype (female): L = 3.67 mm; a = 52; b = 5.6; c = 147; c' = 0.66; V = 52-52-10; odontostyle = 48 µm; odontophore = 50 µm.

Description of females: Body slightly arcuate ventrally. Cuticle with numerous radial elements. Lateral hypodermal chords 22-23 µm wide; body pores inconspicuous. Lip region rounded, offset by a sharp constriction, with lipped-like elevations around oral opening. Amphid stirrup-shaped, aperture 9 µm long or slightly less than half lip region width. Stylet guiding ring single, at 1.2-1.4 times lip region width from anterior end. Odontostyle ventrally arcuate, 2.3-2.5 times lip region width long, with thick wall, prominent lumen, subterminal aperture, and furcate base, protruding in all specimens (Fig. 3, A & B). Odontophore dorylaimoid, at base narrower than adjoining oesophagus. Oesophagus very muscular, very gradually expands at about 40-42% of its length from anterior end (Fig. 3, C); enlarged part 370 × 27 µm in holotype; oesophageal base may be overlapped by intestine dorsally (Fig. 3, G). Nucleus and orifice of dorsal gland at beginning of oesophageal enlargement; nuclei and orifices of posterior subventral glands at about 103 µm and 90 µm, respectively, from oesophageal base; nuclei and orifices of anterior subventral glands obscure. Oesophago-intestinal valve large, cylindroid. Vulva small, longitudinally oval, pore-like. Vagina +−-shaped with thick muscular walls, 2/5 as long as body width. Reproductive system didelphic, amphidelphic; no sperm in uteri. Prerectum in holotype 98 µm long. Rectum about one anal body width long. Tail and its inner protoplasmic mass hemispheroidal; two pairs of caudal pores (Fig. 2, H).

Male: Not found.

Type habitat and locality: Soil around roots of lucerne (Medicago sativa), South Kilimanjaro, Tanzania.

Type specimens: Holotype ♀ and one ♀ paratype at C.I.P., St. Albans. one ♀ paratype each at I.A.R.I., New Delhi, and
Fig. 3. *Vanderlindia venata* n.sp. A,B) Female anterior regions. C) Female oesophageal region. D) Female posterior region. E,F) Female dorsal oesophageal gland regions, lateral and dorsal views, respectively. G) Posterior region of female oesophagus. H) *Vanderlindia duplopapillata*: paratype female anterior region (for comparison).
**Effect and Reproduction of Rotylenchulus reniformis on Sweet Potato Selections**

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Abstract: Growth, yield, and quality of 10 sweet potato selections and reproduction of the reniform nematode, *Rotylenchulus reniformis*, were studied in fumigated and nonfumigated plots in a naturally infested field. Nematode reproduction on the different selections in the field was similar to that reported in the greenhouse but was not related to the effect of the nematode on yield of the different selections. Goldrush supported the least reproduction but was the most severely affected by the nematode, while Centennial supported the most reproduction but was the least affected. Although reniform nematode was not found within enlarged fleshy roots, sweet potatoes were more frequently cracked in nonfumigated plots even when nematode populations were relatively low. One selection, P-104, was resistant to cracking. Yield of all selections tested was significantly reduced when initial populations were moderate to high (1,500–10,000 nemas per 500 cm²). Correlations were made between nematode population parameters and growth, yield, and cracking of the sweet potatoes. The initial populations and the reproduction ratio for the last part of the growing season gave the most significant negative correlations with yield for most selections. Key words: *Ipomoea batatas*, reniform nematode.

The reniform nematode, *Rotylenchulus reniformis* Linford & Oliveira, has been reported in most of the Southeastern United States and many other subtropical and tropical areas of the world where sweet potatoes *Ipomoea batatas* (L.) Lam. are grown.

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(3,4,10,11). Birchfield and Martin (2) and Martin (15) reported that *R. reniformis* markedly reduced sweet potato yields, and in 1979 Gapasin and Valdez (11) demonstrated that the nematode also reduced quality by causing cracks and distortions in the sweet potatoes. Resistance to the reniform nematode has been found in soybeans, *Glycine max* (L.) Merr., (14,21), and resistance and tolerance have been noted in Irish potatoes, *Solanum tuberosum* L., (18, 19). Martin et al. (16) compared larval populations of the nematode produced on different sweet potato selections in the

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