

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.

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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 = 18–58.5–16; 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).

Description of males: Cuticle, lip region, stylet, and oesophagus as in female. En-

larged part of oesophagus 230–232 μm \times 26–28 μm . Stylet guiding ring 20–21 from anterior end. Testes paired, dorylaimoid. Sperm oval to spindle-shaped, about 6–7 μm long. Paired ventrosubmedian papillae 20–25 μm from cloacal aperture. Series of 12–13 ventromedian papillae begin 75–77

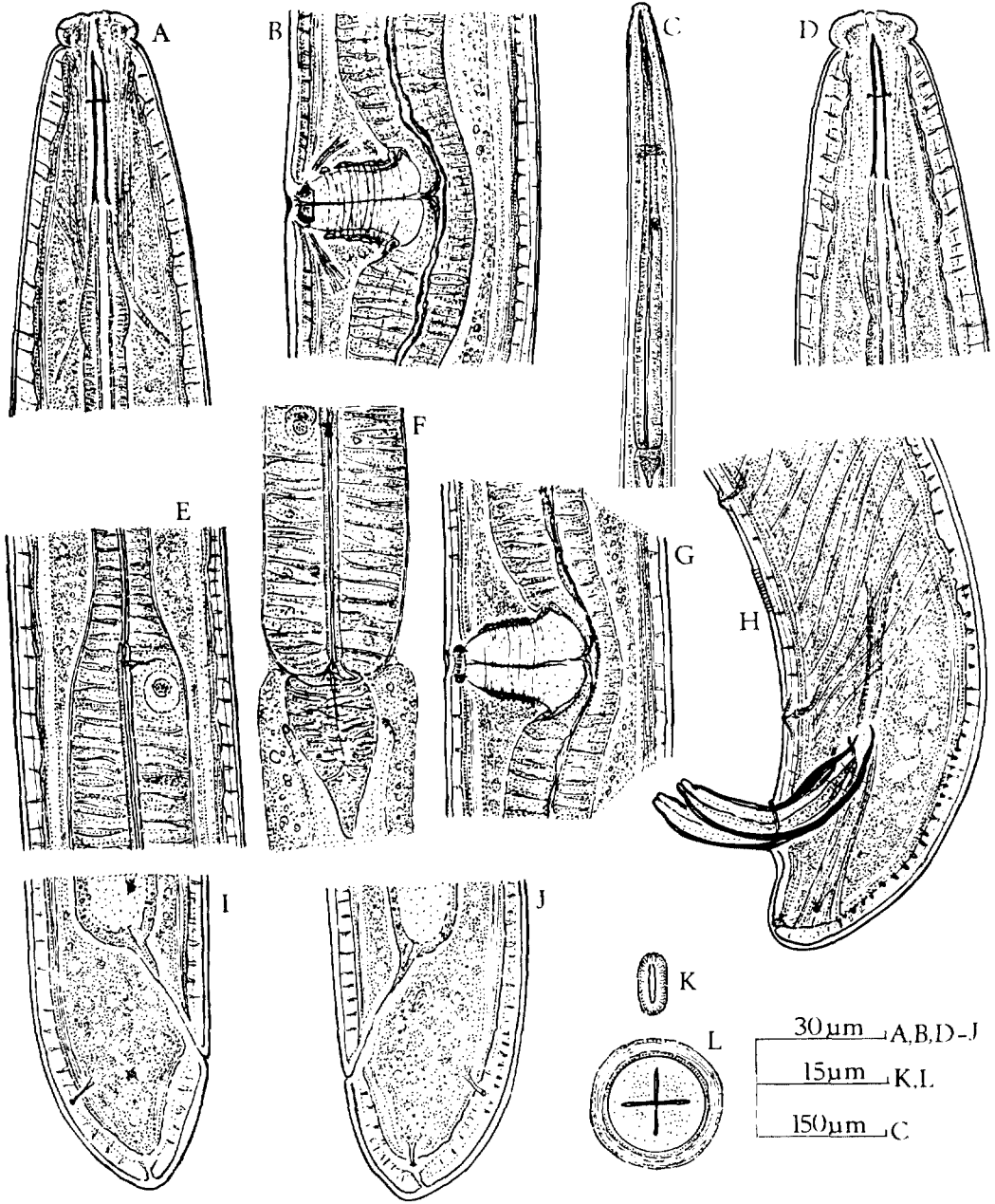


Fig. 1. *Chitwoodius brasiliensis* n.sp. A) Female anterior region. B, G) Vaginal regions. C) Female oesophageal region. D) Male anterior region. E, F) Anterior and posterior regions of enlarged part of female oesophagus, respectively. H) Male posterior region. I, J) Female posterior regions. K, L) *Vagina 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 ♀, two ♂♂ and eight ♀♀ paratypes at Commonwealth Institute of Parasitology, St. Albans, England. Three ♀♀ paratypes each at these centers: Rothamsted Experimental Station, Harpenden, England; Landbouwhogeschool, 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 (I) in having a longer body, odontostyle, odonto-

phore, 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 = 73 (58–89); c' = 0.65 (0.6–0.78); V = 53 (51.4–54.3); odontostyle = 31 μm (30–33); odontosphere = 30 μm (29–32).

Holotype (female): L = 1.74 mm; a = 40; b = 4; c = 75; c' = 0.67; V = 53.4–58.6; odontostyle = 31 μm ; odontosphere = 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.

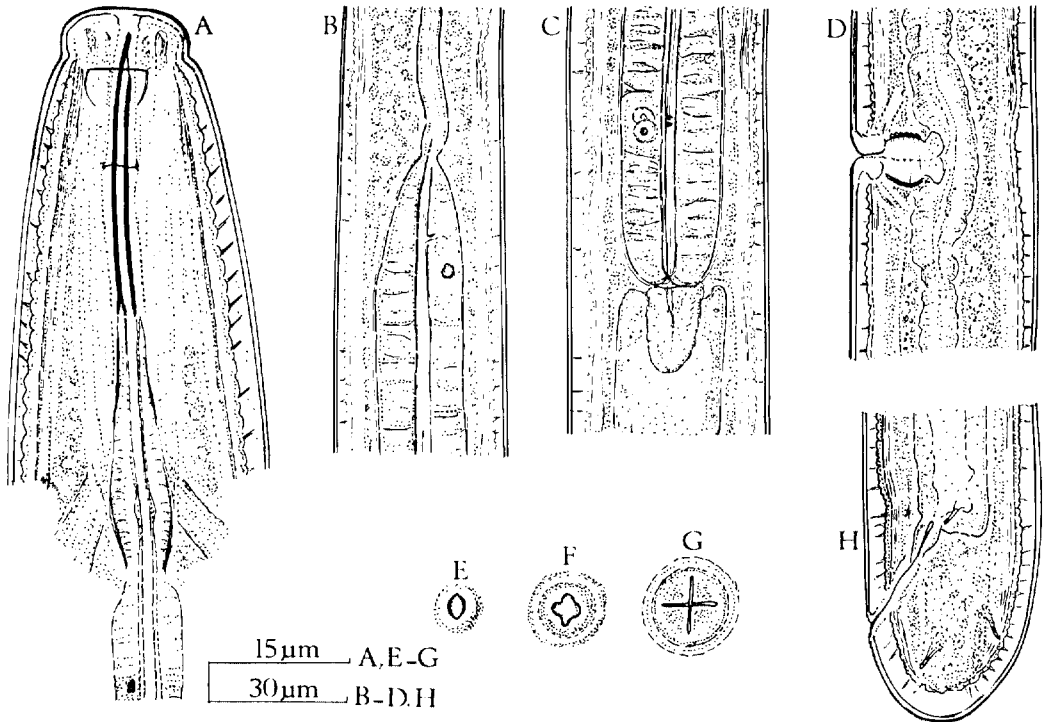


Fig. 2. *Chitwoodius rusticulus* n.sp. A) Female anterior region. B,C) Anterior and posterior regions of enlarged part of female oesophagus. D) Vulval region. E,F,G) Vulva, vagina vera, and vagina uterina in ventral view, respectively. H) Female posterior region.

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 mucro 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 = 51–52–10; 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 liplet-like elevations around oral opening. Amphids 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 pair of 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 with both branches well developed. Ovaries with 15–20 oocytes. Prerectum 350 μm and rectum 1½ anal body widths long in holotype. Tail convex conoid to a broadly rounded terminus 0.6–0.7 anal body width long, with two pairs of lateral pores; inner protoplasmic mass conoid-rounded (Fig. 3, D).

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

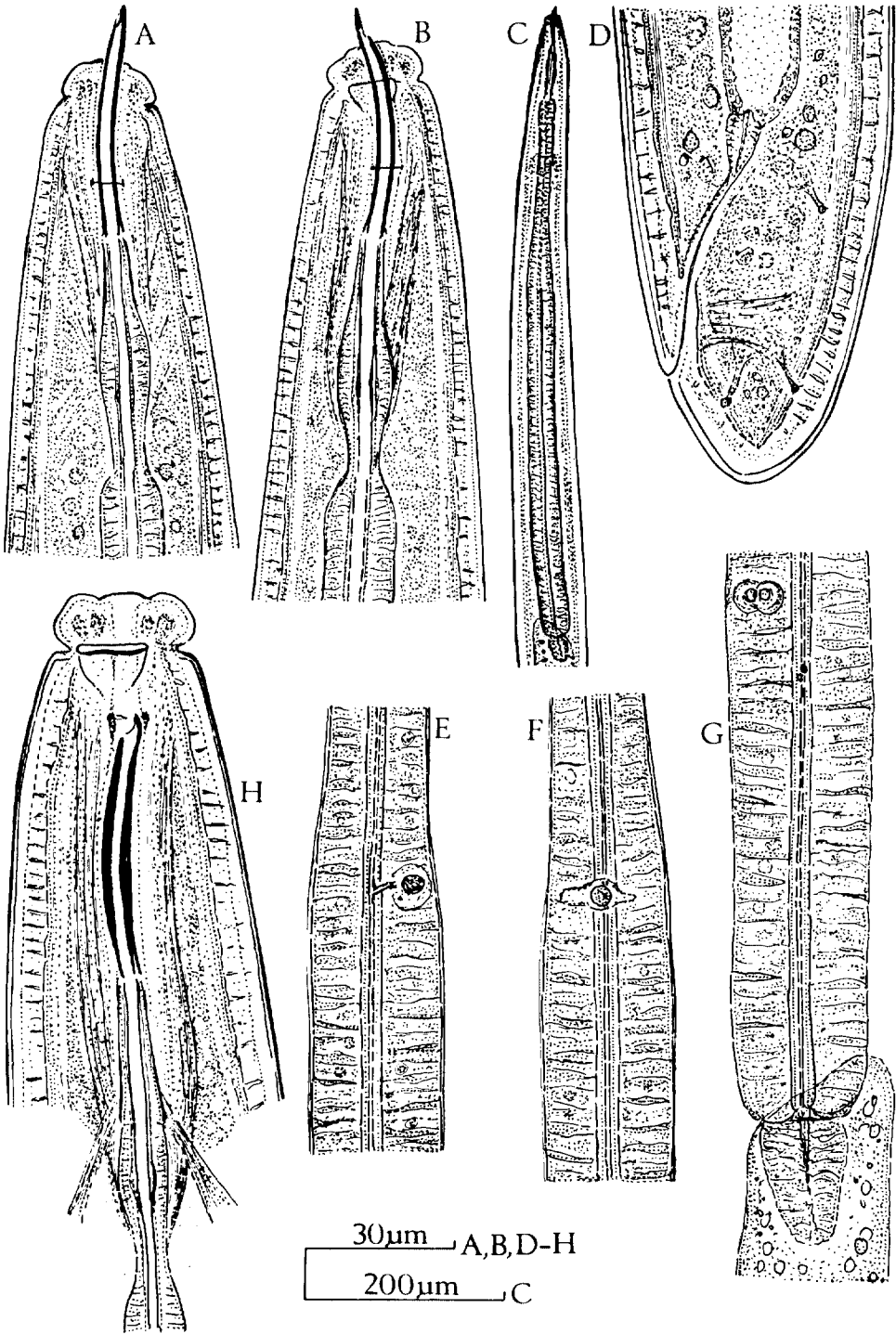


Fig. 3. *Vanderlindia venata* n.sp. A,B) Female anterior regions. C) Female oesophageal region. D) Female posterior region. E,F) Female dorsal oesophageal gland regions, lateral and dorsal views, respectively. G) Posterior region of female oesophagus. H) *Vanderlindia duplopapillata*: paratype female anterior region (for comparison).

USDA, Beltsville.

Relationship: Vanderlindia venata n.sp. differs from the type and only other known species, *V. duplopapillata* Heyns, 1964 in having a smaller and less slender body, odontostyle over two lip region widths long, stylet guiding ring 1.2–1.4 lip region widths from anterior end, and longer oesophagus in relation to body length. Females of *V. duplopapillata* have L = 4.91–5.75 mm; a = 61–72; b = 7.4–8.3; odontostyle 1.6–1.9 times lip region width and stylet guiding ring 0.8–0.9 lip region width from anterior end in four paratypes examined by me; odontophore of *V. duplopapillata* is similar in structure to that of *V. venata* and lacks knobs at the base of its anterior part, contrary to an earlier report (3).

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