Further records of dorylaim species from Botswana (Nematoda: Dorylaimida)

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Received 2 April 1992; accepted 3 July 1992

Seven known dorylaim species are recorded from Botswana. Illustrations and brief descriptions are given for *Neoactinolaimus thornei* Chaturvedi & Khera, 1979; *Nygolaimus anneckei* Heyns, 1968; *Solididens vulgaris* (Thorne, 1930) Thorne, 1974; *Axodorylaimellus caffrae* (Kruger, 1965) Jairajpuri & Ahmad, 1980; *Dorylaimellus andrassyi* Heyns, 1963; *Dorylaimellus directus* Heyns, 1963 and *Tylencholaimus dorae* Kruger, 1965.

Sewe bekende dorylaim spesies word uit Botswana aangemeld. Illustrasies asook kort beskrywings word gegee vir *Neoactonolaimus thornei* Chaturvedi & Khera, 1979; *Nygolaimus anneckei* Heyns, 1968; *Solididens vulgaris* (Thorne, 1930) Thorne, 1974; *Axodorylaimellus caffrae* (Kruger, 1965) Jairajpuri & Ahmad, 1980; *Dorylaimellus andrassyi* Heyns 1963; *Dorylaimellus directus* Heyns 1963 en *Tylencholaimus dorae* Kruger, 1965.

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This third report on Dorylaimida collected during a survey conducted in Botswana during July and August 1989 deals with seven known species, for which only brief descriptions are given based on the Botswana specimens, often supplementing or emending the existing descriptions in the literature.

Materials and Methods

Specimens were extracted by a modified sieving-sedimentation method (Loubser 1985), killed by gentle heat, fixed in FAA, processed into glycerine by Thorne's slow method and mounted on permanent slides. Measurements and drawings were made with the aid of a Zeiss Standard 18 research microscope equipped with a drawing tube. The body and all curved structures were measured along the median line. Oesophagus length (neck length) was measured from the anterior end of the body to the base of the oesophagus. All measurements are in µm unless stated otherwise.

Slide numbers refer to the nematode collection of the Department of Zoology, Rand Afrikaans University.

Taxonomy

Neoactinolaimus thornei Chaturvedi & Khera, 1979 (Figure 1)

Two females and two males from the Chobe National Park are in agreement with the description of *N. thornei* by Chaturvedi & Khera (1979). In the Botswana specimens the odontophore is, however, much shorter (23 µm *vs* 42 µm in females; 23 µm & 25 µm in males). This discrepancy may be due to a difference in interpretation of the odontophore. It may well be that Chaturvedi & Khera (1979) measured the odontophore as if reaching to the base of the probulbus which then gives it a calculated length of 39 µm according to their figure 18A. Considering that the odontophore in dorylaims normally reaches to more or less the middle of the probulbus, the calculated length of the odontophore according to figure 18A may be 21 or 26 µm, corresponding in this regard with the present specimens. The cuticle in our specimens appears to be smooth and not finely striated, and in the female, the tail tip is ventrally curved *vs* straight.

Brief description of Botswana specimens

Measurements

Females: (n = 2): L = 2,55 & 2,15 mm; a = 52,0 & 48,9; b = 4,9 & 4,8; c = 12,9 & 11,6; c′ = 7,9 & 7,7; V = 44 & 41%; odontostyle = 22 & 24 µm; odontophore = 23 & ? µm; total stylet length = 45 & ? µm; tail = 197 & 185 µm.

Males: (n = 2): L = 2,62 & 2,66 mm; a = 53,5 & 55,1; b = 4,9 & 4,0; c = 154 & 157; c = 0,6; odontostyle = 22 & 21 µm; odontophore = 23 & 25 µm; total stylet length = 45 & 46 µm; spiculum = 50 & 52 µm; tail = 17 µm.

Female: Lateral and ventral pores distinct, present over entire body; dorsal pores limited to neck region. Lip region 17–18 µm wide, 8 µm high (n = 1). Stoma as in original description. Guiding ring double, 16 µm from anterior end. Oesophagus 450–520 µm long. Endolid present in lumen of anterior part of oesophagus. Cardia 20–24 µm long; 10–13 µm wide. Nerve ring 133–142 µm from anterior end. Hemizonid not seen. Intestine four cells in circumference. Prerectum and rectum 136 µm and 30 µm long (n = 1) respectively. Rectal glands not seen. Tail elongate-conoid tapering to a ventrally curved tip. Hyaline part 26–39 µm long, or cytoplasmic core comprising 79–87% of tail length. Two pairs of caudal papillae present. Reproductive system as in original description.

Male: Description as for females with the following differences. Lateral, dorsal and ventral pores distinct in neck region; indistinct over rest of body, except lateral pores conspicuous in posterior region (Figure 1F). A row of about eight subventral pores occurs in the posterior region (Figure 1F), as well as two pairs of subventral papillae just anterior to adanal pair of supplements (Figure 1D). Amphid apertures at base of lip region (Figure 1C). Guiding ring 15–17 µm from anterior end. Oesophagus 530–560 µm long. Tail short, bluntly rounded, with six pairs of caudal papillae.

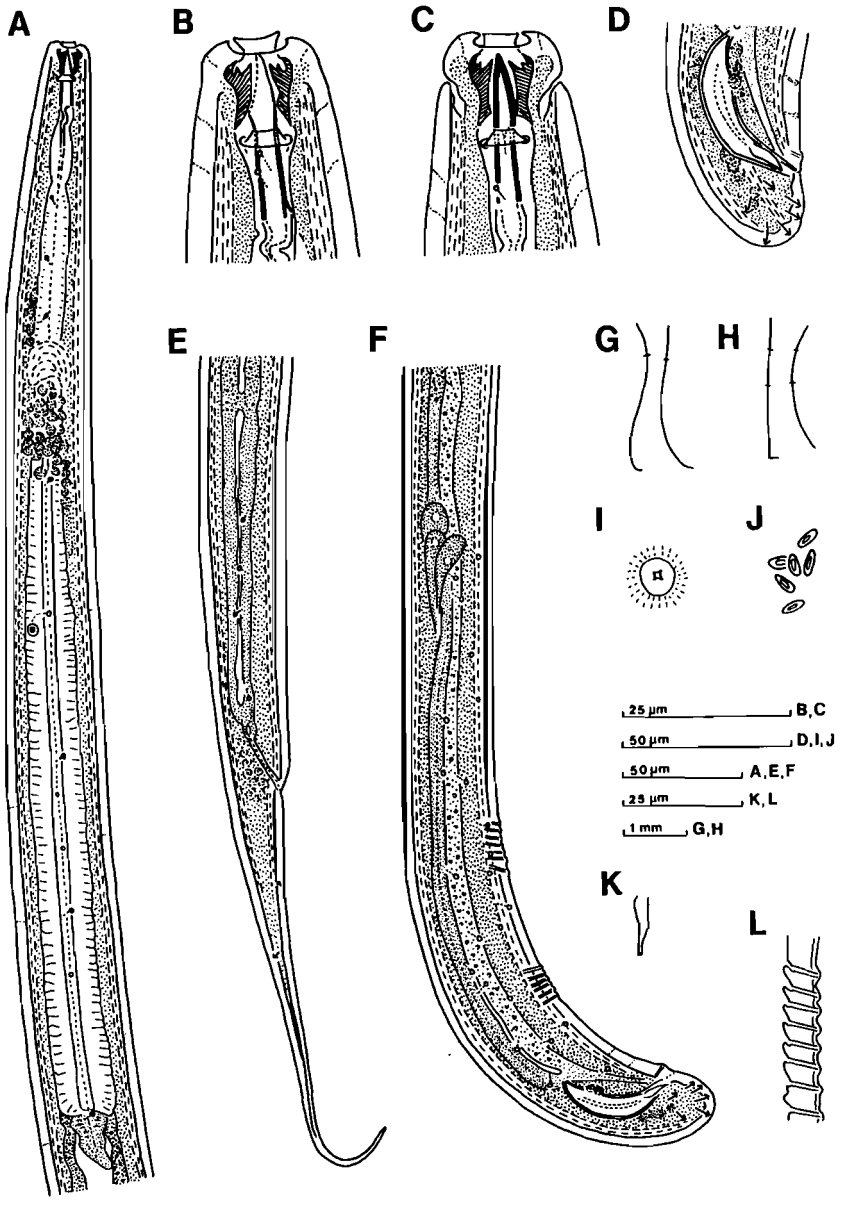

Figure 1 *Neoactinolaimus thornei.* **A** Neck region (female); **B & C** Head in lateral and dorso-ventral view; **D** Tail region of male; **E** Posterior region of female; **F** Posterior region of male; **G** Body posture of heat-relaxed males; **H** Body posture of heat-relaxed females; **I** *En face* view of vulva; **J** Sperm cells; **K** Lateral guiding piece; **L** Anterior fascicle of ventromedian supplements.

Reproductive system diorchic; testes opposed and outstretched, with common spermoduct. No muscular ejaculatory duct present. Sperm cells ovoid, 8–9 µm long. Three pairs of ejaculatory glands seen in one specimen, but the course of their ducts could not be followed. Spicules arcuate. Lateral guiding pieces 14–16 µm long. Supplements papilloid arranged in two fascicles, anterior fascicle with 7–8 and posterior fascicle with six contiguous supplements. No third fascicle could be seen in the present specimens. Copulatory muscles reaching up to anterior-most fascicle.

Juvenile: (Second stage) (n = 1): L = 1,34 mm; a = 46,2; b 4,2; c = 8,3; c′ = 9,4; odontostyle = 11 µm; odontophore = ?; replacement odontostyle = 16 µm; tail = 160 µm.

General morphology similar to adults.

Locality: From soil on the bank of the Chobe River near the Lamont Ruins, Chobe National Park, collected 24 July 1989.

Specimens: Females on slides RAU 4852 and 4854; males on slides RAU 4853 and 4855; juvenile on slide RAU 4849.

Nygolaimus anneckei Heyns, 1968 (Figure 2A–D)

Syn. *Nygolaimus (Nygolaimus) anneckei* Heyns, 1968

N. anneckei was first described by Heyns (1968) from specimens collected at Aliwal North, Cape Province, South Africa, at Roodeplaat near Pretoria, South Africa, and at Halle, Germany. A single female from the Chobe National Park is in agreement with the type population of this species.

Brief description of the Botswana specimen

Measurements

Female: (n = 1): L = 1,27 mm; a = 42,3; b = 3,7; c = 63,5; c′ = 1,0; V = 46%; mural tooth = 7 µm; tail = 20 µm.

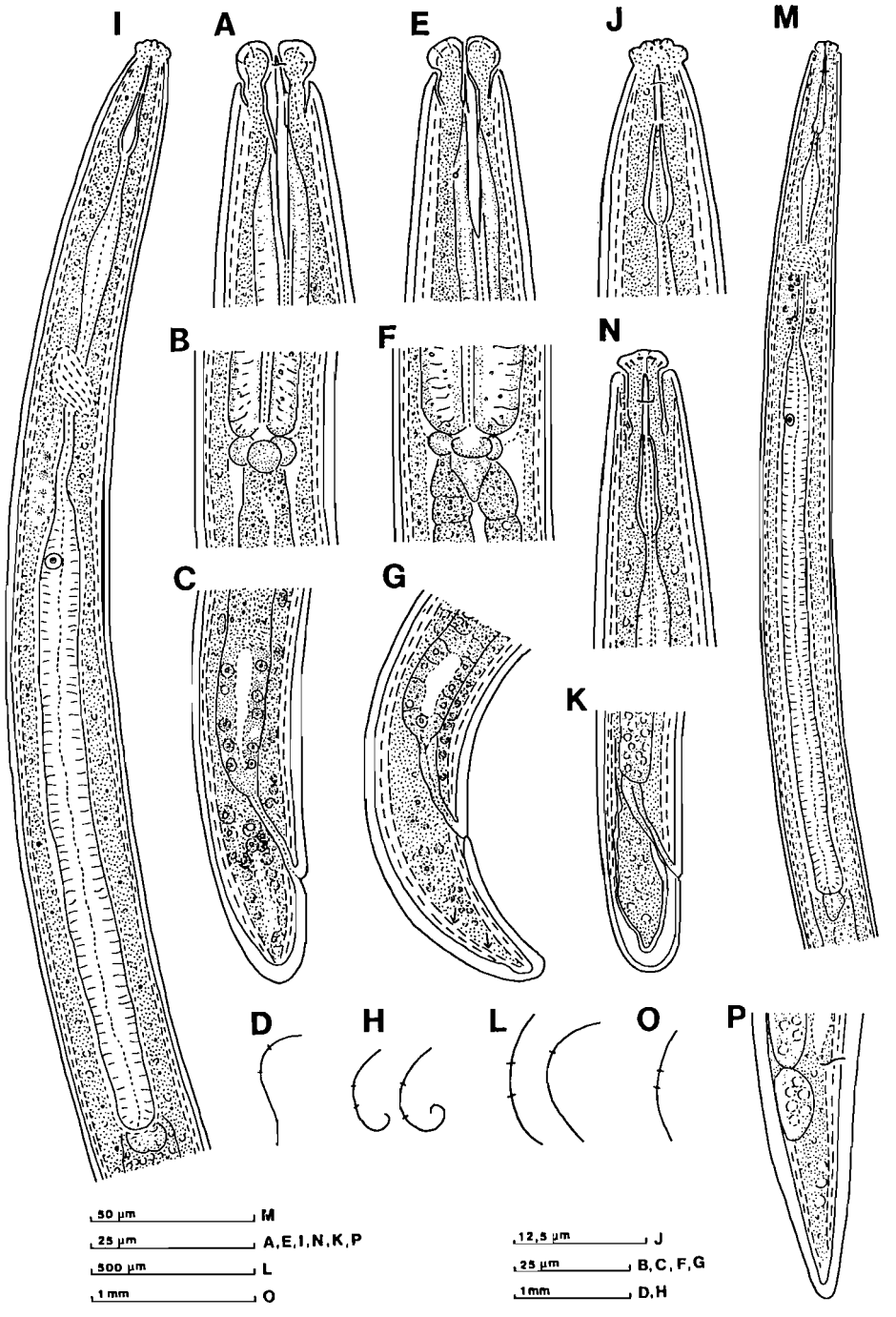

Figure 2A–D *Nygolaimus anneckei*. **A** Dorso-ventral view of head; **B** Oesophago-intestinal junction; **C** Posterior region; **D** Body posture of heat-relaxed specimen; **Figure 2E–H** *Solididens vulgaris*. **E** Dorso-ventral view of head; **F** Oesophago-intestinal junction; **G** Posterior region; **H** Body posture of heat-relaxed specimens. **Figure 2I–L** *Axodorylaimellus caffrae*. **I** Neck region; **J** Head region; **K** Tail region; **L** Body posture of heat-relaxed specimens. **Figure 2M–P** *Dorylaimellus directus*. **M** Neck region; **N** Dorso-ventral view of head region; **O** Body posture of heat-relaxed specimen; **P** Tail region.

Heat-relaxed body posture irregularly curved in the shape of a letter S (Figure 2D). Cuticle appearing to be without transverse striations; subcuticle with indistinct punctations visible on parts of body. Body pores indistinct. Lateral chord 4 µm wide or 13% of corresponding body width. Lip region rounded, 12 µm wide, 6 µm high; labial papillae distinct. Amphids seen in dorso-ventral view; apertures at base of lip region (Figure 2A). Mural tooth deltoid, dorsal curvature not seen due to dorso-ventral view of head; 7 µm long. Stoma 32,8 µm long. Nerve ring at 92 µm from anterior end. Numerous ganglia present. Hemizonid not seen. Oesophagus widening at 39% of neck length. Sheath surrounding basal bulb rather distinct. Width of body at base of oesophagus divided by lip region width 2,4. Cardia not visible. Intestine four cells in circumference. Prerectum 35 µm long or 1,9 times the anal body diameter. Rectum 21 µm long or 1,2 times the anal body diameter. Tail conoid, bluntly rounded. Caudal papillae inconspicuous.

Reproductive system didelphic–amphidelphic. Anterior and posterior reproductive branches 77 µm and 86 µm long

respectively. Vulva a long transverse slit. Individual cells of uteri difficult to discern; no *pars dilatata uteri* or *pars dilatata oviductus* present. Sphincter muscle between uterus and oviduct not visible. Anterior and posterior ovaries 41 µm and 48 µm long. No eggs or sperm cells present.

Juvenile (n = 1) (? third stage): L = 0,66 mm; a = 24,4; b = 2,3; c = 38,8; c′ = 1,1; tooth = 5 µm; replacement tooth = 6 µm; tail = 17 µm.

General morphology similar to adult.

Male: Not found.

Locality: Female and juvenile from soil among the roots of grasses and mopane trees near the Savuti Marsh in the Chobe National Park, collected 27 July 1989.

Specimens: Female on slide RAU 5202 and juvenile on slide RAU 5203.

***Solididens** * **vulgaris* (Thorne, 1930) Thorne, 1974 (Figure 2E–H)**

Syn. *Nygolaimus (Solididens) vulgaris* (Thorne, 1930) Heyns, 1968

***Nygolaimus vulgaris* Thorne, 1930**

* Thorne (1974) inadvertently used the generic name *Solidens* instead of *Solididens*

Two females from the Okavango are in almost complete agreement with the measurements of topotypes from Utah, U.S.A., as well as with specimens from Venezuela, Mauritius and South Africa (see Table 6 in Heyns 1968). The present specimens differ only in having a longer tail in one specimen (39 µm *vs* 20–30 µm) and a slightly narrower lateral chord. According to Heyns (1968) the body of *S. vulgaris* has a characteristic sideways twist after death, with the result that mounted specimens may assume the shape of either a letter S or a letter C. The Botswana specimens lie more in the shape of an incomplete figure 6 (Figure 2H).

Brief description of Botswana specimens

Measurements

Females: (n = 2): L = 1,11 & 1,29 mm; a = 34,7 & 43; b = 2,6 & 3,1; c = 35,8 & 39,6; c′ = 1,6 & 1,7; V = 54 & 55%; tooth = 8 µm; tail = 28 & 36 µm.

Cuticle appearing to be smooth. Body pores inconspicuous, except for a few lateral pores in the neck region of one specimen. Lateral chord 4–5 µm wide or 14–16% of corresponding body width. Lip region in dorso–ventral view owing to twisted condition of body, 11 µm wide, 5 µm high; labial papillae distinct. Amphid apertures at base of lip region. Mural tooth solididentoid, 8 µm long; basal third hollow. Stoma 25–28 µm long. Nerve ring at 101–102 µm from anterior end; ganglia distinct. Hemizonid not seen. Oesophagus 410–420 µm long, widening at 37–38% of total neck length. Basal bulb 255–264 µm long. Sheath surrounding basal bulb conspicuous at base (Figure 2F). Width of body at base of oesophagus divided by lip region width 2,8–3,2. Cardia 8–11,5 µm long and 8,5–9 µm wide. Intestine four cells in circumference. Prerectum and rectum 25 µm and 19–21 µm long or 1,2–1,4 and 19–21 times the anal body diameter respectively. Tail bluntly conoid, dorsally convex. Two pairs of caudal papillae seen.

Reproductive system didelphic–amphidelphic. Anterior and posterior reproductive branches 64–90 µm and 71–105 µm long respectively. Vulva a transverse slit; lips unsclerotized. No distinct *pars dilatata uteri* or *pars dilatata oviductus* could be seen. Sphincter muscle discernible. Anterior and posterior ovaries 36–53 µm and 44–49 µm long respectively. No sperm cells or eggs present.

Male and juvenile: Not found.

Locality: From soil under herbaceous plants and palm trees on Boba Island (near Jedibe) in the Okavango Swamps, collected 31 July 1989.

Specimens: On slides RAU 5219 and 5225.

***Axodorylaimellus caffrae* (Kruger, 1965) Jairajpuri & Ahmad, 1980 (Figure 2I–L)**

Syn: *Dorylaimellus caffrae* Kruger, 1965

Four female specimens from the Okavango agree with the original description of *A. caffrae* by Kruger (1965) as well as with measurements given by Jordaan & Heyns (1984).

Brief description of Botswana specimens

Measurements

Females: (n = 4): L = 0,50 (0,47–0,54) mm; a = 30 (27,6–31,8); b = 2,6 (2,5–2,8); c = 32,5 (29,4–35,3); c′ = 1,4 (1,3–1,5); V = 57,8 (55–62) %; odontostyle = 5,5 (5–6) µm; odontophore = 9,8 (9–10) µm; total stylet length = 15,3 (15–16) µm; tail 15,5 (15–16) µm.

Lateral chord 5,3 (5–6) µm wide or 31 (29–35)% of corresponding body width. Glandular organs obscure. Lip region 6 µm wide, 2,8 (2,5–3,0) µm high. Amphids indistinct. Stylet aperture one third the odontostyle length. Guiding ring single, unsclerotized; 3,5 µm from anterior end. Nerve ring distinct in two specimens, 52,5 and 56,0 µm from anterior end. Hemizonid and hemizonion not seen. Oesophagus 193 (170–210) µm long. Anterior slender part of oesophagus less muscular than posterior expanded bulb, which is surrounded by a thick muscular sheath; basal bulb 97,8 (89–103) µm long, or comprising 51 (42–59)% of total neck length. Oesophageal gland nuclei indistinct, except for the dorsal gland nucleus, situated at 50–53% (n = 3) of total neck length. Cardia 5 µm wide, 4,8 (4–6) µm long. Prerectum 44,7 (37–46) µm long or 3,78 (3,7–3,8) times the anal body diameter. Rectum 11,3 (10–13) µm long or 1,02 (0,8–1,2) times the anal body diameter. Caudal papillae indistinct. Reproductive system didelphic–amphidelphic and not clearly defined. Vulva a transverse slit with unsclerotized lips. Anterior and posterior ovaries of unequal length viz. 12–48,5 µm (n = 3) and 17–40 (n = 3) respectively. Eggs and sperm cells absent.

Male and juvenile: Not found.

Locality: Specimens collected from wet soil among the roots of a sausage tree (*Kigelia africana*) standing on the edge of the water on Boba Island, Okavango Swamps, 1 August 1989.

Specimens: On slide RAU 5279.

Remark: In his diagnosis Kruger (1965) compared *A. caffrae* with *Axodorylaimellus parvulus* (Thome, 1939) Jairajpuri & Ahmad, 1980. According to him *A. caffrae* differs from *A. parvulus* by a much shorter prerectum and in having fewer lateral gland organs (11 *vs* 15). In their report on several more specimens of *A. caffrae*, Jordaan & Heyns (1984) made no reference to the glandular organs and in the Botswana specimens these are unfortunately indistinct. In the original description of *A. caffrae*, the prerectum length is reported as slightly more than two times the body diameter. Considering the a-ratio, the calculated prerectum length would be 37 µm or 2,8 anal body widths which corresponds with the prerectum length of 37–46 µm or 3,7–3,8 anal body widths in the Botswana specimens and three anal body widths in Jordaan & Heyns's specimens. According to the original description of *A. parvulus* the prerectum is five body widths long, which seems to be incorrect, since body width is 21,2 µm (according to the formula) and the prerectum thus 106 µm long. The calculated prerectum length from Thorne's (1939) figure 184A is, however, 64 µm or three anal body widths, which corresponds to that of *A. caffrae*. Prerectum length thus does not seem to be a distinguishing character between *A. caffrae* and *A. parvulus*. The only reliable character left is the more strongly offset lip region of *A. caffrae*. Apart from *Axodorylaimellus crassidens* Siddiqi, 1983 and *A. iari* Siddiqi, 1983 with which Jordaan & Heyns further compared *A. caffrae*, it is also very similar to *A. aghai* Siddiqi, 1983 regarding the distinctly striated cuticle, indistinct glandular bodies and poorly developed uteri. It differs from this species only in the cylindrical tail *vs* subcylindrical in *A. aghai*.

Dorylaimellus andrassyi Heyns, 1963 (Figure 3)

This is the most common dorylaimellid found in southern Africa. Heyns (1963) based the description of this species on 14 females and four males from several localities in the Transvaal, as well as from Clocolan in the Orange Free State, South Africa. Jordaan & Heyns (1984) subsequently reported some 165 females and 11 males from various localities in southern Africa. According to them this is an extremely variable species.

A single female from the Okavango and three males from the Chobe National Park are in agreement with the description of *D. andrassyi* by Heyns (1963) as well as the descriptions by Chaturvedi & Khera (1979) and by Jordaan & Heyns (1984). Heyns stated that the lateral guiding pieces are clearly visible in the type specimens, whilst Chaturvedi & Khera reported them to be obscure. According to Jordaan & Heyns the lateral guiding pieces are absent. In the Botswana specimens they are distinct in one specimen, but obscure in the other two specimens.

Brief description of the Botswana specimens

Measurements

Female: (n = 1): L = 1,64 mm; a = 51,3; b= 9,1; c = 32,8; c′ = 2,3; V = 49%; odontostyle = 9 µm; odontophore 12 µm; total stylet length = 21 µm; tail = 50 µm.

Males: (n = 3); L = 1,6 (1,55–1,61) µm; a = 57,1 (51,7–60,0); b = 8,9 (8,8–9,1); c = 37,9 (35,0–39,7); c′ = 1,77 (1,7–1,9); odontostyle = 6,3 (5–8) µm; odontophore = 8,6 (11–13) µm; total stylet length = 18,3 (18–19) µm; tail = 42,7 (39–46) µm.

Female: Lateral chord 11 µm wide or 34% of corresponding body width. Lip region 9 µm wide, 4 µm high. Amphid apertures at base of lip region (Figure 3B). Nerve ring 79 µm from anterior end. Oesophagus 180 µm long; basal bulb 71 µm long or comprising 39% of total neck length. Dorsal gland nucleus at 71% of total neck length; outlet indistinct. Subventral gland nuclei not visible. Cardia 10 µm long; 8,5 µm wide. Intestine four cells in circumference. Junction between prerectum and intestine indistinct. Rectum 27 µm long or 1,2 times the anal body diameter. Tail conoid, dorsally convex; caudal papillae inconspicuous.

Reproductive system didelphic–amphidelphic. Anterior and posterior branches 115 µm and 109 µm long respectively. Sphincter muscle between *pars dilatata oviductus* and *pars dilatata uteri* distinct. No eggs or sperm cells present.

Male: Description as for females, but with the following differences. Lateral chord 8 (6–9) µm wide or 28 (22–32)% of corresponding body width. Nerve ring 68 µm (*n* = 2) from anterior end. Oesophagus 180 (170–190) µm long; basal bulb 69,7 (63–73) µm long or comprising 28 (22–32)% of total neck length. Dorsal gland nucleus visible in only one specimen, situated at 71,3% of total neck length. Cardia 11,7 (11–12) µm long, 7,7 µm wide. Prerectum 136 µm long (*n* = 1).

Reproductive system diorchic; testes opposed and outstretched. Sperm cells ovoid, 5 µm long. No ejaculatory glands seen. Spicules 37,7 (37–38) µm long. Supplements papilloid, 3–5 in number, arranged as shown in Figure 3G, I and J. Copulatory muscles reaching up to anterior-most supplement.

Juvenile: Not found.

Locality: Female from wet soil among the roots of a sausage tree (*Kigelia africana*) standing on the edge of the water on Boba Island, Okavango Swamps. Males from soil around the roots of grasses under an *Acacia* tree at Serondella, close to the Chobe River in the Chobe National Park. Specimens collected 1 August and 26 July respectively.

Specimens: Female on slide RAU 5281 and males on slide RAU 5146.

Dorylaimellus directus Heyns, 1963 (Figure 2M–P)

A single female from the Okavango agrees with the type description of *D. directus* by Heyns (1963) as well as with the figures given by Jordaan & Heyns (1984) and with the measurements by Heyns & Jordaan (1985).

D. directus, *Dorylaimellus montenegricus* Andrássy, 1959 and *Dorylaimellus monticolus* Clark, 1963 are three closely related species. According to Heyns & Jordaan (1985), *D. montenegricus* can be distinguished from the other two species by the relatively shorter basal bulb (basal bulb percentage is 43–52% for *D. montenegricus vs* 50,7–64% for both *D. directus* and *D. monticolus*), whilst *D. directus*

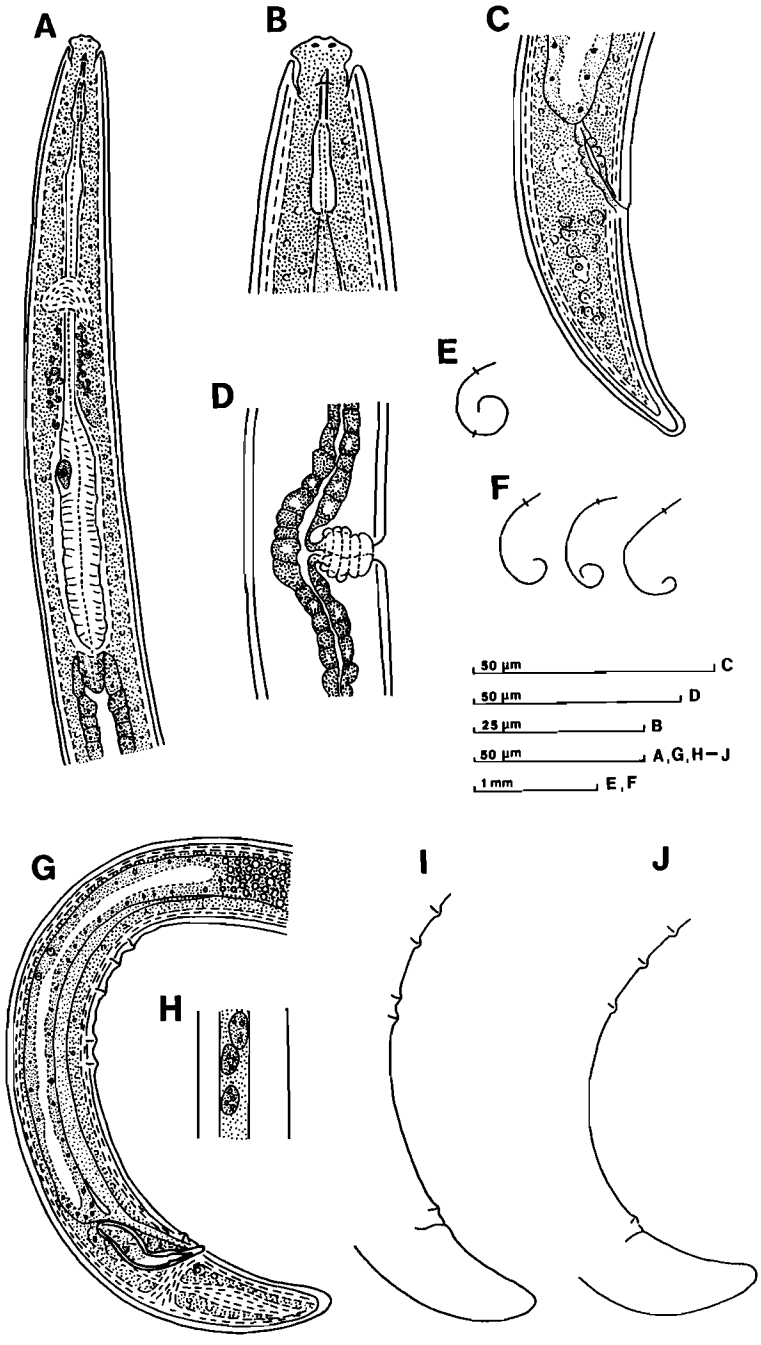

Figure 3 *Dorylaimellus andrassyi*. **A** Neck region of female; **B** Dorso-ventral view of head region of male; **C** Female tail region; **D** Vulva and vagina region; **E** Body posture of heat-relaxed female; **F** Body posture of heat-relaxed males; **G** Posterior region of male; **H** Lateral chord with gland-like organs; **I & J** Variation in position of male supplements.

can be distinguished from *D. monticolus* by greater odontostyle, odontophore and total stylet lengths.

Brief description of Botswana specimen

Measurements

Female: (n = 1): L = 0,75 mm; a = 30; b = 2,8; c = 21,4; c′ = 2,3; V = 50%; lip region width = 8 µm; lip region height = 2 µm; odontostyle = 9 µm; odontophore = 15 µm; total stylet length = 24 µm; tail = 36 µm.

Lateral chord 4 µm wide or 34% of corresponding body width. Glandular organs which are obscure in the type specimens (Heyns, 1963), can be seen quite distinctly in the present specimen. Lip region 8 µm wide, 2 µm high. Nerve ring 66 µm from anterior end. Oesophagus 259 µm long; basal bulb 169 µm long, comprising 65% of total neck length. Dorsal gland nucleus located at 67,4% of total neck length; outlet indistinct. Subventral gland nuclei and their outlets inconspicuous. Cardia 8 µm long, 6,5 µm wide. Individual intestinal cells obscure. Junction between prerectum and intestine indistinct. Rectum 26 µm long or 1,6 times the anal body diameter. Tail elongate conoid; caudal papillae inconspicuous. Reproductive system didelphic– amphidelphic. Uteri weakly developed. No sperm cells or eggs present.

Male and juvenile: Not found.

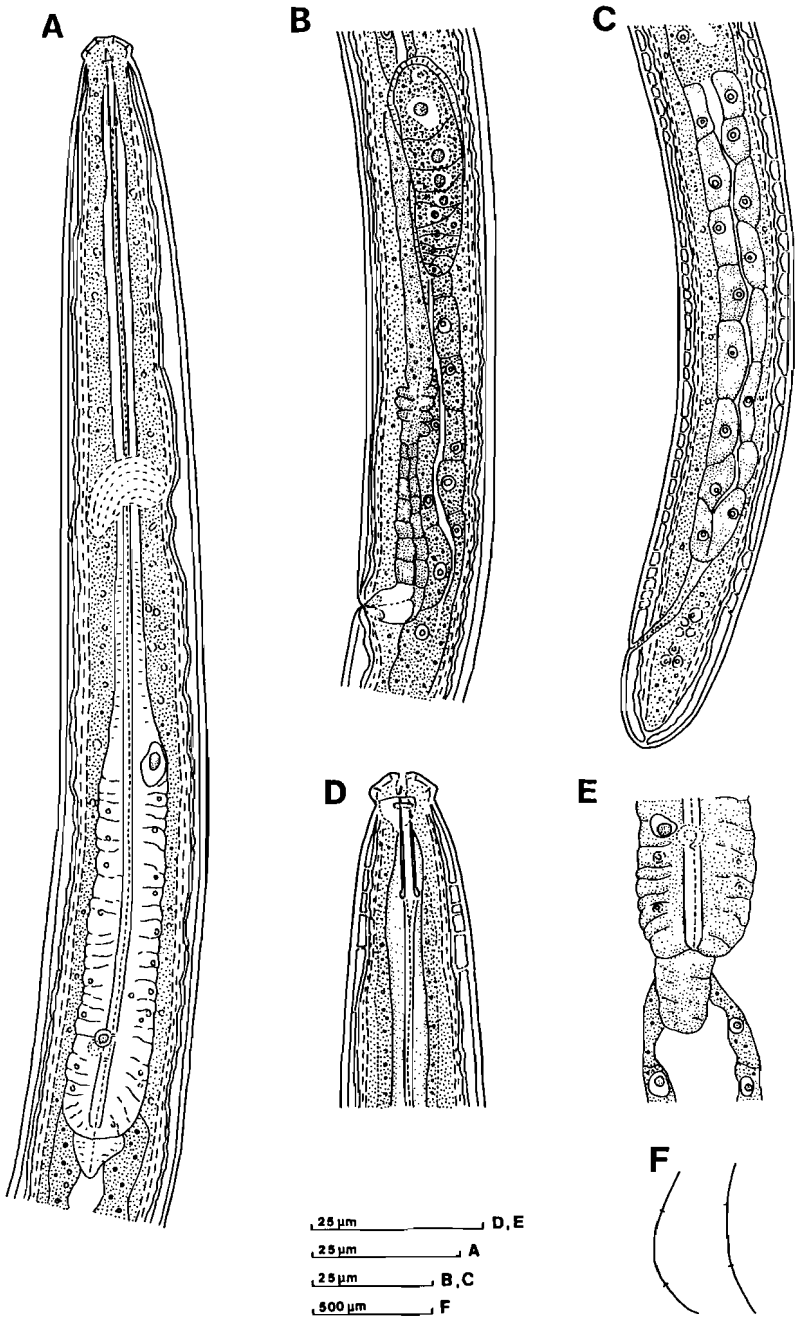

Figure 4 *Tylencholaimus dorae*. **A** Neck region; **B** Reproductive system; **C** Posterior region; **D** Head region; **E** Oesophago-intestinal junction; **F** Body posture of heat-relaxed specimens.

Locality: From soil around the roots of grasses under an *Acacia* tree at Serondella, close to the Chobe River in the Chobe National Park, collected 26 July 1989.

Specimen: On slide RAU 5145.

Tylencholaimus dorae Kruger, 1965 (Figure 4)

Two females from the Chobe National Park correspond well with the description of *T. dorae* by Kruger (1965), except for a somewhat shorter and stouter body.

Brief description of Botswana specimens

Measurements

Females (n = 2): L = 0,68 & 0,70 mm; a = 21,9 & 17,9; b = 3,8; c = 30,9 & 38,8; c′ = 1,04 & 0,94; V = 66 & 71%; odontostyle = 5,5 & 6,5 µm; odontophore = 10,5 & 7,5 µm; total stylet length = 13 & 17 µm; tail = 22 & 18 µm

Transverse striations on the cuticle are not conspicuous, except at the neck region in one specimen. Subcuticle striated, though sometimes irregularly separated from rest of cuticle. Radial elements visible towards the neck and tail regions, appearing as 'punctations' when seen *en face*. Crystalloids present at tail region in one specimen. Lateral chord 8 µm wide or 21% (n = 1) of corresponding body width. No body pores could be seen. Lip region 8,5–10 µm wide, 4–5 µm high. Guiding ring single, sclerotized; 4–4,5 µm from anterior end. Oesophagus 180 µm long; basal bulb 77–81 µm long, comprising 43–45% of total neck

length. Cardia 7–12 μm long, 9 μm wide. Nerve ring at 75–77 μm from anterior end. Hemizonid conspicuous in one specimen, opposite nerve ring. In the original description, Kruger (1965) mentioned nothing about the oesophageal glands and did not show them in his figure. In our material, the dorsal gland nucleus was clearly visible in both specimens, but nothing could be seen of the subventral nuclei, except in the one specimen where the posterior pair was quite conspicuous (Figure 4A). The positions of the nuclei and their outlets are as follows: DO = 66,6% (n = 1); DN = 65,4 and 63,9%; S_2O_1 = 90,3%; S_2O_2 = 93,1%; S_2N_1 = 90,6%; S_2N_2 = 91,9%. Intestine four cells in circumference. Prerectum and rectum 106 μm and 23 μm long or 2,6 and 0,6 (n = 1) times the anal body diameter respectively. Caudal papillae could not be seen.

Reproductive system monodelphic–prodelphic. Reproductive branch 87 μm long; uterus 52 μm long. No *pars dilatata uterus* or sphincter muscle seen. Sperm cells and eggs absent.

Male and juvenile: Not found.

Locality: One specimen from grasses under a solitary palm tree in the north-western part of the Savuti Marsh, and a second specimen from grasses under mopane shrubs near the Savuti Marsh, both collected in the Chobe National Park on 27 July 1989.

Specimens: On slides RAU 5177 and 5190.

Acknowledgements

The authors wish to thank the Foundation for Research Development of the CSIR for financial support, and Dr. P.A.A. Loof for valuable comments on the manuscript.

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