Oncholaimus jessicae n.sp. (Nematoda: Oncholaimidae) from fresh water in the Transvaal

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Oncholaimus jessicae n.sp. is described from several sites in the Blyde River system in the eastern Transvaal. The new species closely resembles *O. deconincki* Heyns & Coomans, 1977, from which it differs mainly in the absence of males and details of the demanian system: the ductus entericus is much longer, the uvette is situated closer to the anus, and the main duct is better developed and glandular.
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Oncholaimus jessicae n.sp. word beskryf uit verskeie plekke in die Blyderivier-sisteem in die oos-Transvaal. Die nuwe spesie herinner sterk aan *O. deconincki* Heyns & Coomans, 1977, maar het geen mannetjies nie en verskil ook wat die struktuur van die deman-sisteem betref: die ductus entericus is baie langer, die uvette is nader aan die anus geleë, en die hoofbuis is beter ontwikkel en klieragtig.
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The first freshwater species of *Oncholaimus* viz. *O. aquae-dulcis* was described by Schneider in 1937, from East Java. A second freshwater species *O. deconincki* was described fourty years later from South Africa, by Heyns & Coomans (1977). In 1983 Coomans & Heyns described a third species, *O. sahariensis* from an oasis in Algeria and in 1984 Nicholas & Stewart added a fourth species *O. balli* from a volcanic crater lake in Papua New Guinea. This paper describes yet another freshwater species, the second to be found in South Africa.

Oncholaimus jessicae n.sp.

Measurements

Holotype female: L = 3,79 mm; a = 89; b = 7,7; c = 37; c′ = 2,9; V = 68,6; G = 10; longest body width = 42,5 µm; anal body width = 35 µm; neck length = 492 µm.
Paratype females (n = 13): L = 3,09 – 3,97 ($\bar{x}$ = 3,64) mm; a = 70 – 92 ($\bar{x}$ = 83,6); b = 6,7 – 8,4 ($\bar{x}$ = 7,72); c = 33,5 – 43 ($\bar{x}$ = 37,7,n = 11); c′ = 2,4 – 3,3 ($\bar{x}$ = 2,93,n = 10); V = 60,5 – 71,5 ($\bar{x}$ = 66,8); G = 9,3 – 15,8 ($\bar{x}$ = 12,8); largest body width = 37,5 – 50 µm ($\bar{x}$ = 44,1 µm); anal body width = 28 – 35 µm ($\bar{x}$ = 33,2 µm,n = 10).

Description

Body usually slightly ventrally curved to C-shaped, rarely almost straight upon fixation. Cuticle smooth, with a thin outer and thick inner part; the latter forming a rather weakly developed cephalic capsule or endocupola (*cf.* Belogurov 1985). Sparse somatic setae present throughout the body, but mainly near both ends, arranged in irregular sublateral, subdorsal and subventral rows. Of the nine sublateral setae of the neck region, four are in front of the nerve ring. The first sublateral seta is dorsosublateral and situated 10 – 13 µm ($\bar{x}$ = 11,25 µm, n = 6) behind the amphid aperture. Between the anterior end and the nerve ring there are also five subdorsal and five subventral setae. Epidermal chords with large, vacuolated cells, especially in the posterior body region (Figure 3C & D). Some of these cells may be (pseudo)coelomocytes. Orthometanemes present, but only occasionally visible.

Head continuous with body contour, six lips with a circlet of six inner labial papillae (i.l.p.) and a circlet of six longer outer labial setae (o.l.s.) and four shorter cephalic setae (c.s.). The exact length of the setae may be difficult to measure owing to foreshortening, therefore only those in profile were measured. From these measurements it appears that the lateral o.l.s. are shorter (7 µm) than the submedian o.l.s. (8 – 9 µm) and that the c.s. vary from 6 to 7 µm in length. The lateral o.l.s. are slightly dorsally displaced (Figure 1C). Amphids with

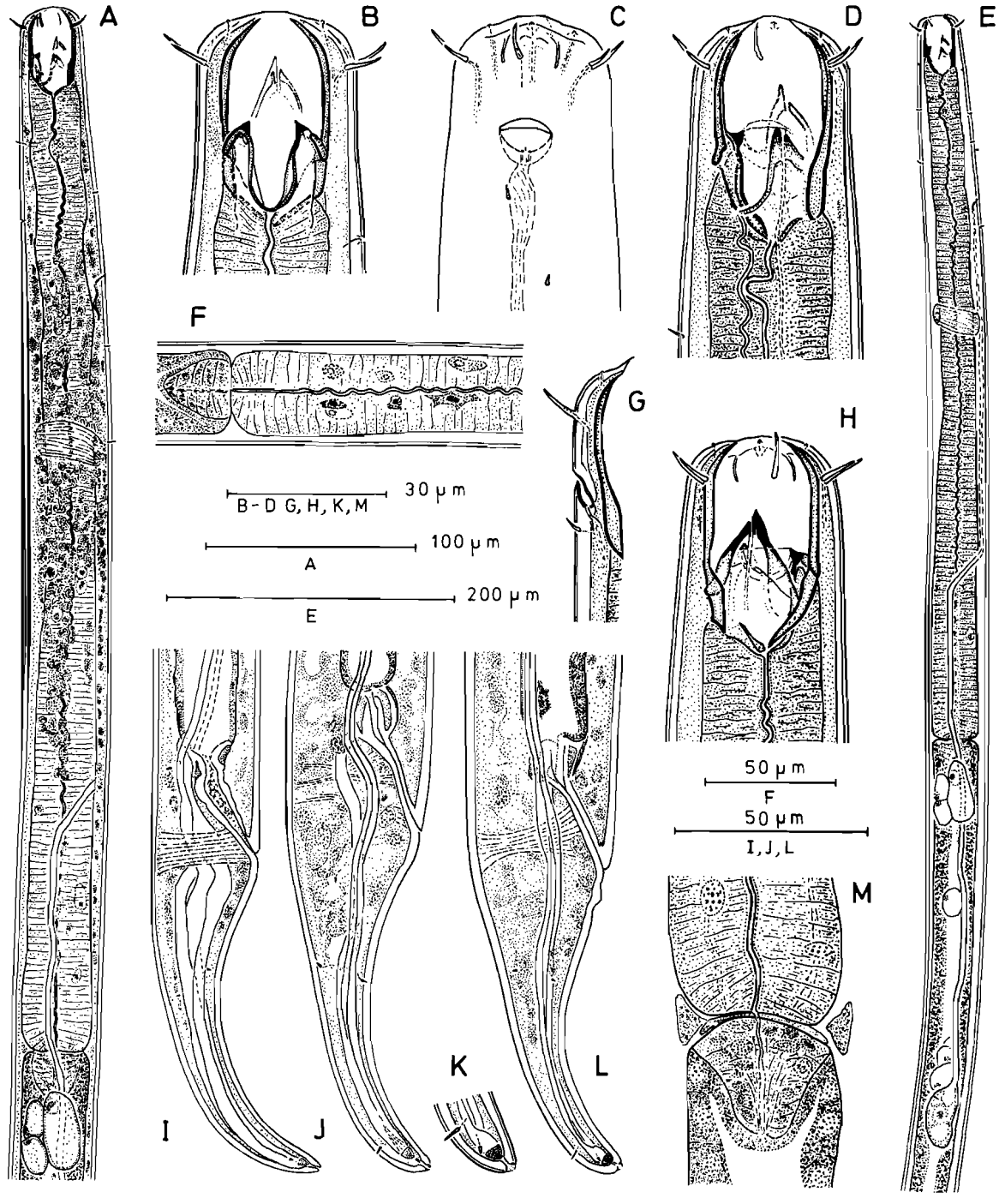

Figure 1 *O. jessicae* n.sp. A: Pharyngeal region. B: Head end, dorsosublateral view. C: Head end, right lateral surface view. D: Head end, right lateral view (*cf.* C). E: Anterior body region. F: Posterior region of pharynx. G: Head region, in lateral longitudinal optical section. H: Head end, left lateral view. I: Tail of 4th stage juvenile. J: Female tail. K: Spinneret. L: Female tail. M: Pharyngo-intestinal junction.

stirrup-shaped, shallow fovea and curved elliptical apertures 8,5 – 9,5 µm wide (n = 4), situated at 18 – 19,5 µm ($\bar{x}$ = 19,1 µm, n = 7) behind the lateral i.l.p. and 10,5 – 12 µm ($\bar{x}$ = 11,2 µm, n = 7) behind the lateral o.l.p. Head 28 – 30 µm ($\bar{x}$ = 29,0 µm, n = 7) wide at level of setae; the latter 7,5 – 8 µm from the anterior end.

Buccal cavity 37,5 – 41 µm ($\bar{x}$ = 40,2 µm, n = 7) deep and 17,5 – 19,5 µm ($\bar{x}$ = 18,5 µm, n = 7) wide. Its structure as described for *O. sahariensis* (see Coomans & Heyns 1983). Pharynx cylindrical, anteriorly surrounding the base of the buccal capsule. Seven or eight pharyngeal gland nuclei may be seen in the basal portion; the ventrosublateral glands apparently trinucleate, the dorsal one possibly binucleate. Neck region 407,5 – 497,5 µm ($\bar{x}$ = 473,4 µm, n = 14) long. Body width at pharyngo-intestinal junction 38 – 42,5 µm ($\bar{x}$ = 40,8 µm, n = 14). Cardia cordiform (Figure 1F & M). Intestine with six to eight cells in circumference; sometimes showing a well developed 'peritrophic' membrane (Figure 3D) throughout its length. Rectum a broad dorsoventrally flattened tube, 32,5 – 40 µm ($\bar{x}$ = 34,3 µm, n = 5) long, i.e. 0,93 – 1,28 anal body widths. Anus a transverse slit (18 µm, n = 1) with posteriorly curved ends.

Excretory pore 105 – 150 µm ($\bar{x}$ = 128,9 µm, n = 11) from anterior end, i.e. at 22,6 – 30,8% ($\bar{x}$ = 27,0%, n = 11) of neck length. Excretory gland situated at the right (Figure 1E) or left side of the intestine, some 5 – 7 body widths behind cardia. Nerve ring 167,5 – 218 µm ($\bar{x}$ = 196,0 µm, n = 14) from anterior end, i.e. at 37,4 – 43,9% ($\bar{x}$ = 41,2%, n = 14) of the neck length.

Anterior sexual branch 290 – 590 µm ($\bar{x}$ = 459,8 µm,

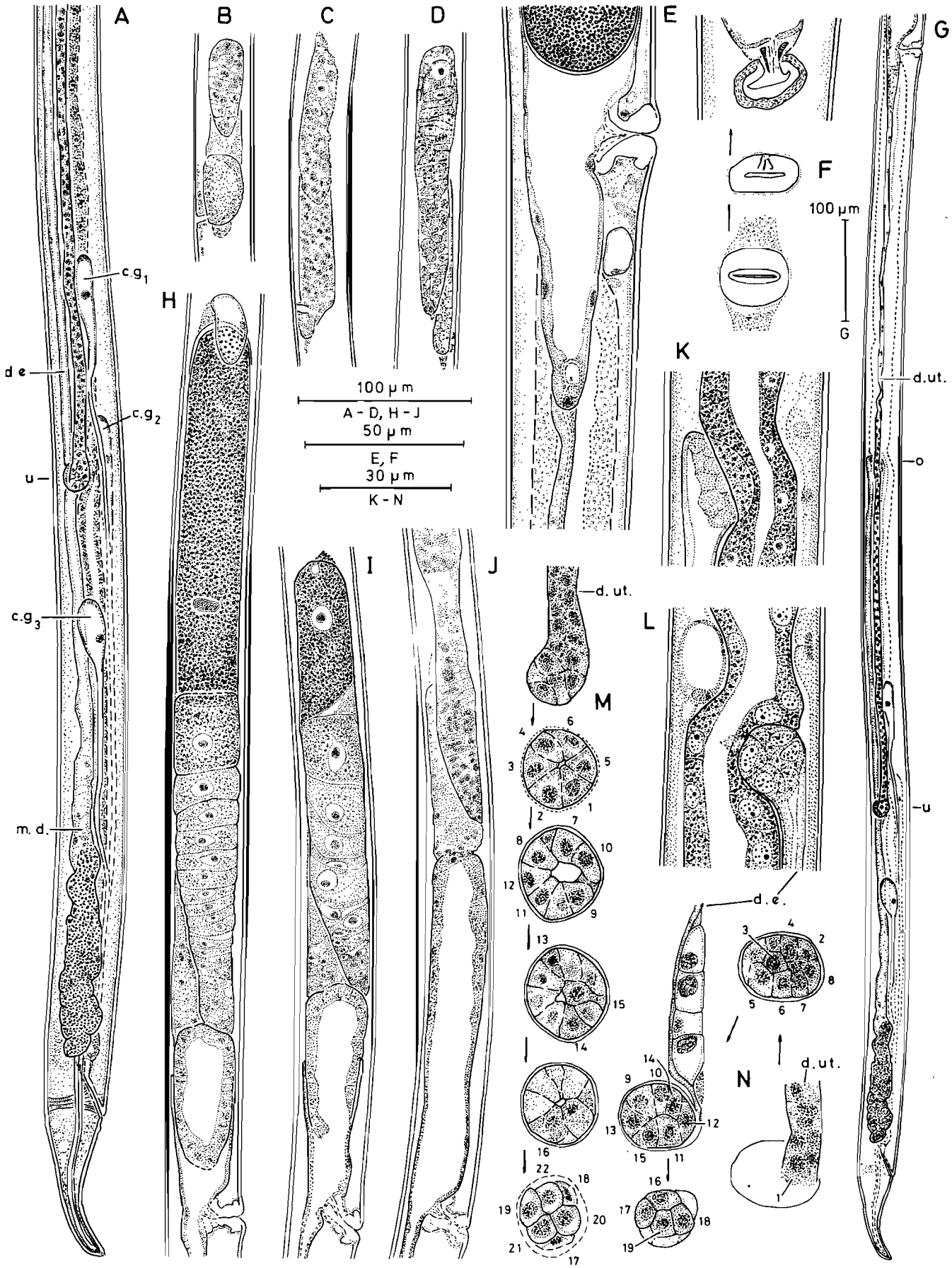

Figure 2 *O. jessicae* n.sp. A: Posterior body region. B, C, D: Genital primordia of the 4th stage juveniles. E: Vulva-vagina region. F: Serial optical sections from vulva down to vagina-uterus junction. G: Posterior half of body. H, I, J: Female reproductive system. K, L: Osmosium. M, N: Serial views of uvette from its junction with the ductus uterinus down to the junction with the ductus entericus. 1 – 21: cells of the uvette. cg. – cg.: caudal glands. d.e.: ductus entericus. d.ut.: ductus uterinus. m.d.: main duct. o.: osmosium. u: uvette.

n = 14) long, situated on right side of intestine except for one specimen where it is on the left side; consisting of an ovary, short oviduct and bipartite uterus. Small nuclei and a bigger cell (coelomocyte ?— see Figure 2H) may be visible at the

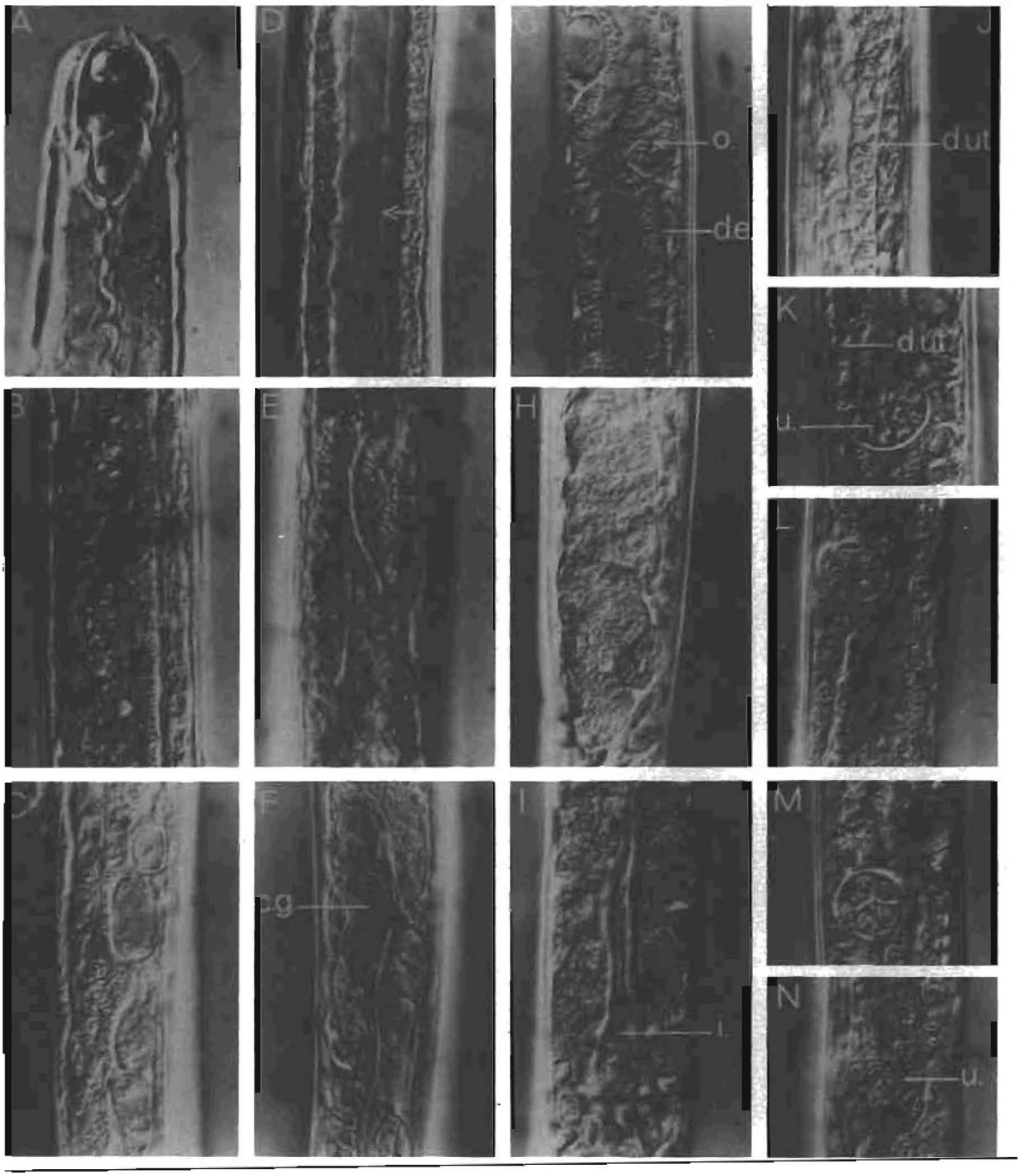

Figure 3 *O. jessicae* n.sp. A: Head end, stoma filled with detritus. B: Intestine containing detritus. C: Epidermal cells with large vacuoles in lateral chord. D: Intestine with 'peritrophic' membrane (arrow). E: Intestine containing annelid setae. F: Caudal gland (c.g.) and duct surrounded by vacuolized epidermal cells. G: Intestine, ductus entericus (d.e.) and osmosium (o.). H: Terminal part of main duct in lateral view. I: Same in ventral view, surrounding intestine (i.). J: Ductus uterinus (d.ut.). K: Junction of ductus uterinus (d.ut.) and uvette (u.). L, M, N: Consecutive optical sections through uvette (u.).

anterior end of the ovary. The latter varies from 187 to 408 µm in length, according to the development of the oocytes. The proximal, thicker walled (and probably glandular) part of the uterus may be pushed inside the thin-walled distal part by the growing ovary (compare Figure 2J with 2I and 2H). Intra-uterine eggs measure 142 – 162 µm × 37 – 44 µm ($\bar{x}$ = 150,2 µm × 40,8 µm, n = 7). Vagina a simple tube perpendicular to body wall (Figure 2E & H) or anteriorly directed (Figure 2I & J); its cuticular wall thicker towards the vulva (Figure 2E & F). The latter transverse oval at the surface and slit-like at the junction with the vagina; 16 µm wide (n = 1).

The demanian system starts with a sac-like extension of the uterus that can be wide (Figure 2E) or collapsed and then not distinguishable from the remainder of the ductus uterinus (d.ut.). This ductus is 596 – 856 µm ($\bar{x}$ = 752,8 µm, n = 13) long; at first it is weakly developed with flattened cells (Figure 2E & G), then it becomes more obvious with closely packed cells containing prominent nuclei (Figures 2A, G, M, N & 3J). The d.ut. extends laterally, usually along the right side of the intestine to the more dorsally located uvette, which occurs 327 – 417 µm ($\bar{x}$ = 369,9 µm, n = 12) or 9,3 – 14,3 ($\bar{x}$ = 11,3, n = 10) anal body widths in front of the anus (Figure 2A & G). In three out of fourteen females the d.ut. shifts to the left body side shortly after the vulva. The uvette is composed of about twenty closely packed cells that surround a small to almost non-existent cavity (Figures 2M & N; 3K – N); it is connected to the dorsally located and rather indistinct

ductus entericus which runs anteriad to the osmosium (Figures 2K & L; 3G), located 319 – 392 µm ($\bar{x}$ = 355,6 µm, n = 10) in front of the uvette and 265 – 503 µm ($\bar{x}$ = 343,9 µm, n = 10) behind the vulva; composed of 10 – 12 cells. The uvette is also attached to the posteriorly directed main duct. The latter is very well developed in front of the rectum as a highly granular, glandular area that occupies most of the lateral and dorsal sides of the body, squeezing the posterior part of the intestine to a narrow tube (Figures 2A & G; 3H & I). No terminal ducts or pores observed.

Tail conoid with cylindrical posterior half; 84 – 114 µm ($\bar{x}$ = 99,0 µm, n = 12) long. At each side there is a minute dorsolateral or lateral seta close to the tail terminus and a longer subdorsal one slightly further away; halfway along the tail there is a subventral and a subdorsal seta. Spinneret small, terminal (Figure 1J – L). Caudal glands (c.g.) extending far anterior to the anus, usually two at the right side of the body and one on the left side (Figures 2A & G; 3F). The one on the left side usually the middle one, but sometimes the first or the last one. C.g. 511 – 1 064 µm ($\bar{x}$ = 753,1 µm, n = 8) from tail tip; c.g. 449 – 701 µm ($\bar{x}$ = 604,3 µm, n = 7) and c.g. 351 – 551 µm ($\bar{x}$ = 463,5 µm, n = 7) from tail terminus.

Juveniles

Three juveniles were found, all belonging to the fourth stage. They resemble the adults in general body shape. L = 2,71 – 2,94 mm ($\bar{x}$ = 2,84 mm); a = 82 – 84 ($\bar{x}$ = 83,2); b = 6,3 – 7,5 ($\bar{x}$ = 6,8); c = 26,4 – 34,6 ($\bar{x}$ = 31,47); c' = 3,2 – 3,7 ($\bar{x}$ = 3,4); 'V' = 65,0 – 66,6 ($\bar{x}$ = 65,9). Lip region 25 – 26 µm ($\bar{x}$ = 25,5 µm) wide and 7 – 8 µm ($\bar{x}$ = 7,3 µm) high. Amphid aperture 8 – 9 µm ($\bar{x}$ = 8,5 µm) wide, 16,5 – 17,5 µm ($\bar{x}$ = 17,0 µm) behind i.l.p. and 9,5 – 11 µm ($\bar{x}$ = 10,2 µm) behind o.l.p. Buccal cavity 33,5 – 35 (34,5) × 14 – 16 (15) µm. Neck length 384 – 437 µm ($\bar{x}$ = 418,0 µm). Body width at cardia 36,0 – 37,5 µm ($\bar{x}$ = 36,8 µm) at mid-body 32,5 – 35,0 µm ($\bar{x}$ = 34,2 µm) and at anus 26,0 – 27,5 µm ($\bar{x}$ = 26,5 µm). Rectum 27,5 – 32,5 µm (n = 2) or 1 – 1,24 times the anal body width. Excretory pore 117,5 – 132,5 µm ($\bar{x}$ = 124,2 µm) from anterior end, i.e. at 27 – 32% ($\bar{x}$ = 29,8%) of the pharynx. Nerve ring 160 – 185 µm ($\bar{x}$ = 175,0 µm) from anterior end or at 41,6 – 42,3% ($\bar{x}$ = 41,9%) of the neck length. Genital primordium 115 – 187 µm ($\bar{x}$ = 144,2 µm) or 4,2 – 6,5% of the body length; 12,5 – 20 µm of it forms a short postvulvar sac. Two of the primordia are reflexed to the left side, one to the right side (Figure 2B – D). Tail 85 – 102 µm ($\bar{x}$ = 91,2 µm) long.

Remarks

One of the females was aberrant in having the reproductive system on the left side of the intestine and in having a poorly developed demanian system; the latter only recognizable by a faint ductus uterinus at the left side of the body, leading to an elongated, atypical and far posteriorly situated uvette.

The so-called peritrophic membrane seen in some specimens may be equivalent to the lamellar systems described by Nuss (1985) for *Adoncholaimus thalassophygos* and two species of *Tobrilus*.

Bionomics

Probably omnivorous. The intestinal contents consist of organic material sometimes containing recognizable elements e.g. unicellular green algae, a mastax of a bdelloid rotifer and setae of oligochaetes (Figure 3E), but apparently detritus can also be swallowed (Figure 3A & B).

Type locality. Various sites in the upper Blyde River system near Sabie, Eastern Transvaal. Collected May 1978 by J. Heyns.

Type specimens. Holotype and one paratype female on type slide 267 in the Nematode Collection of the Rand Afrikaans University, Johannesburg, South Africa. Four female and one juvenile paratypes in the same collection. Six female and three juvenile paratypes in the Nematode Collection of the Instituut voor Dierkunde, Rijksuniversiteit Gent, Belgium. Two female paratypes in the British Museum (Natural History) London, England.

Differential diagnosis. *Oncholaimus jessicae* n.sp. closely resembles *O. deconincki* Heyns & Coomans, 1977 but differs mainly in the absence of males and details of the demanian system. The ductus entericus is much longer (only about two body widths long in *O. deconincki*), the uvette is closer to the anus (distance varies from 420 – 480 µm in *O. deconincki*) and the main duct is more developed and glandular. The new species is also slightly slenderer (a = 48 – 75 in females of *O. deconincki*) and has a somewhat more posteriorly situated excretory pore (90 – 112 µm from anterior end in *O. deconincki*).

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