

南极乔治王岛寡毛纲(环节动物门)两新种*

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提要 于 1993 年 2 月在南极乔治王岛菲尔德斯半岛的湖泊和邻近海域采集寡毛类标本。鉴定表明,有寡毛纲两新种,为淡水种缺刻丝线蚓 新种 *Lumbricillus incisus* sp. nov. 和海洋种球茎似水丝蚓 新种 *Limnodriloides bulbopenitus* sp. nov.;前者是乔治王岛内陆寡毛类的首次记载,后者为该属分布地球最南端的种。模式标本保存于中国科学院水生生物研究所。

关键词 南极 寡毛纲 新种

南极寡毛类的研究始于十九世纪末。1888 年由 Michaelsen 报道南乔治亚岛的 4 个寡毛类新种(Mitchell, 1890)。至本世纪 30 年代在南极已发现 10 多种小蚓类(Stephenson, 1930, 1932),此后有关南极寡毛类区系的工作较少,80 年代以来才有较大发展[Bloch et al., 1985(见 Edwards et al., 1986); Erséus, 1993, 1994]。在寡毛类的分布方面,最南端的分布区域为威德尔海, *Capilloverter* 的一个种分布至 75°38.4'S(Erséus, 1993)。本文报道南极乔治王岛的寡毛类两新种,为南极有关寡毛类分类研究丰富新资料。

1 材料与方法

1993 年 2 月,在乔治王岛菲尔德斯半岛从湖泊和海洋中用 1/40 m² 的彼得生采泥器采集标本。固定液为 10% 福尔马林。永久封片用明矾胭脂红染色。

2 分类学描述及讨论

2.1 缺刻丝线蚓 新种 *Lumbricillus incisus* sp. nov. Wang et Liang (图 1、图 2,表 1)

2.1.1 特征描述 体长 5.5—8.0 mm(正模:8.0 mm,活体:4—7 mm),宽 0.2—0.3 mm。32—50 节。活体淡红色。口前叶钝圆。头孔在 O/I。刚毛“S”型,无毛节;长 60—80 μ m,粗 2.8—3.8 μ m;环带前每束 2—5 条,环带后每束 1—4 条。环带在 XII—XIII 节,腺细胞排列不规则。

脑略呈方形,后缘凹陷明显。咽后球 1 对,短小,位于 III 节。食道连肠处平缓。隔膜腺 3 对,在 IV—VI 节,背叶均相连,腹叶较大。XII—XV 节的腹神经索各有一团交配腺环绕,IV 节者较小。背血管始于 XV 节。黄色细胞始自 VI 节。肾管的隔膜前组织仅含肾漏斗,排泄管始于隔膜后组织的后部。体腔球形或椭圆形,透明或半透明,生活时易观察。

精巢包裹于储精囊中;储精囊两侧对称,每侧约 8 叶;叶近锥状,呈扇状排列,分布在 X—XI 节。成熟卵仅见 1 个。精漏斗长约 230 μ m,为宽度的 2—3 倍;颈部长约 30—40 μ m,与漏斗体等宽。输精管长 1.3 mm,宽约 12 μ m,不规则盘绕于 XII 节。阴茎球卵形,中

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收稿日期:1997 年 3 月 27 日,接受日期:1997 年 11 月 25 日。

间略缢缩。雄孔在Ⅻ节腹侧。受精囊限于V节,以一短的内囊管连食道。囊腔纺锤形,长约 $180\ \mu\text{m}$,中部宽约 $76\ \mu\text{m}$ 。精子分布于整个囊腔,平行或散乱排列。外囊管短,长约 $22\ \mu\text{m}$,宽约 $34\ \mu\text{m}$,与囊腔分界不明显,但因细胞核稀少,故易分辨;外囊管生活时可收缩。沿外囊管均有腺体包围,腺体的外侧后部有一深凹。受精囊孔在4/5节间侧面。

正模标本 整体封片(性成熟),保存于中国科学院水生生物研究所。于1993年2月1日采自长城站($62^{\circ}12'59''\text{S}$, $58^{\circ}57'52''\text{W}$)站区的西湖。栖息地为淤泥,深4—6.5 m。西湖为缺盐性水体,电导率为 $45\ \mu\text{s}/\text{cm}$,夏季(12—3月)水温为 $1\text{—}9^{\circ}\text{C}$ 。在与西湖邻近的高山湖、燕鸥湖亦采到该种。

副模标本 超过300条,其中10条为永久封片(含3条解剖标本),其余保存于10%福尔马林液中。采集的时间和地点同模式标本。

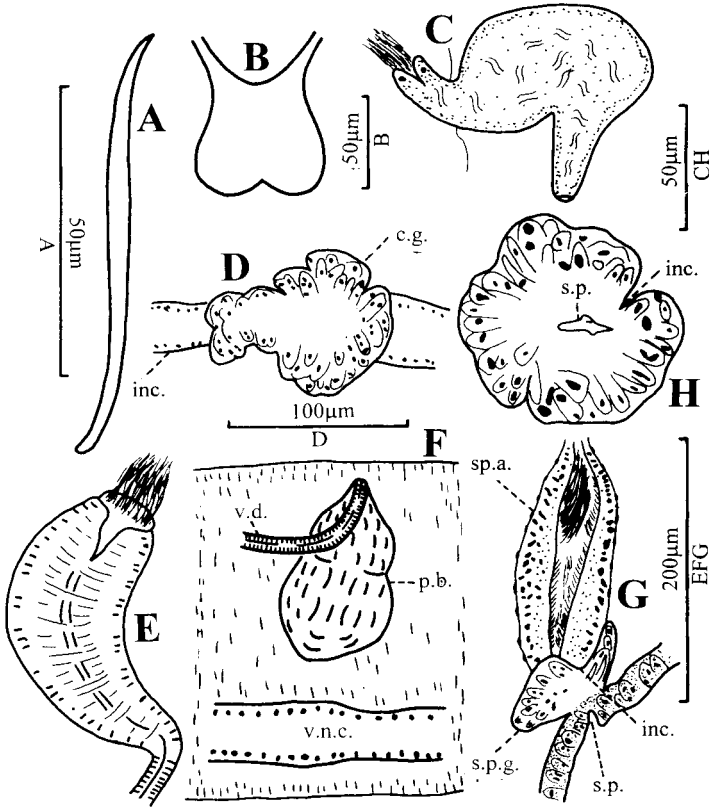


图1 缺刻丝线蚓 新种 *Lumbricillus incisus* sp. nov.

A. II节刚毛[seta(II)]; B. 脑(brain); C. 排泄肾管(XXIII)[nephridium(XXIII)]; D. 交配腺(Ⅻ)[copulatory gland(Ⅻ)]; E. 精漏斗(sperm funnel); F. 阴茎球(penial bulb); G. 受精囊(spermatheca); H. 环受精囊孔腺(伸展状态)[glands at spermathecal pore (extended)]. c.g., 交配腺(copulatory gland); inc., 缺刻(incision); p.b., 阴茎球(penial bulb); s.p., 受精囊孔(spermathecal pore); sp.a., 受精囊腔(spermathecal ampulla); s.p.g., 环受精囊孔腺(glands at spermathecal pore); v.d., 输精管(vas deferens); v.n.c., 腹神经束(ventral nerve cord)。图3同。

2.1.2 与相似种的比较 本新种与4个相似种的比较列于表1。就形态而言,本种与

L. antarcticus Stephenson 和 *L. lineatus* (Müller)最接近,但新种每束刚毛数较少、受精囊的腺体分叶不明显,易于与之区别。在生境方面,新种栖于淡水,而两已知种均栖于海洋。鉴于本种受精囊的腺体有一深凹,为此定名为缺刻丝线蚓 新种 *Lumbricillus incisus* sp. nov.。本种是乔治王岛内陆寡毛类的首次记载。

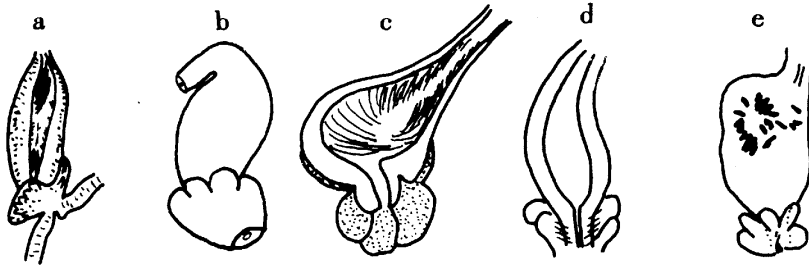


图 2 缺刻丝线蚓 新种与相似种受精囊的比较

Fig. 2 Spermathecal comparison of *Lumbricillus incisus* sp. nov. and allied species

a. *L. incisus*; b. *L. rutilus*; c. *L. brunoi*; d. *L. antarcticus*; e. *L. lineatus*

表 1 缺刻丝线蚓 新种与相似种的比较¹⁾

Tab. 1 Comparison of *Lumbricillus incisus* sp. nov. and allied species

种 (species)	<i>L. incisus</i> sp. nov.	<i>L. rutilus</i> Welch	<i>L. brunoi</i> Mar. - Ans.	<i>L. antarcticus</i> Stephenson	<i>L. lineatus</i> (Müller)
体长(length)(mm)	5.5—7.5	15—19	5—7	6—7	8—10
体节数(segments)	32—50	41—49	41—49	35—38	40—45
刚毛数/束(setae/b.)	1—5	2—10	3—6	2—7	4—9
背血管起源(origin of d. v.)	XV	XIII—XIV	XII—XIII	XIII	XIII
交配腺(copulatory glands)	XIII—XV	XIII—XIV	?	XIII—XV	XIII—XV
精漏斗(长:宽)(sperm funnels)	2—3:1	4—5:1	1—2.5:1	1.2—1.25:1	2—3:1
储精囊(sperm sacs)	规则 ²⁾	规则 ²⁾	不规则 ³⁾	规则 ²⁾	规则 ²⁾
受精囊(spermathecae)	囊腔纺锤形,囊孔腺仅具一深凹	囊腔纺锤形,囊孔腺分叶明显	囊腔球形,具囊孔腺和腺细胞	囊腔纺锤形,囊孔腺分叶明显	囊腔筒状,囊孔腺分叶明显
生境(habitat)	淡水湖,底泥	生活污水处理场	河流	海洋	潮间带淤泥
分布(distribution)	南极菲尔德斯半岛	美国	西班牙	南极南乔治亚 Wilson 港	澳大利亚,中国,欧洲,美洲,南极
作者(authors)	本文作者	Welch(1914)	Martinez-Ansemil(1982)	Stephenson(1932)	Coates(1990), Stephenson(1932)

1)受精囊的区别另见图 2。2) regular。3) irregular。b. 束;d.v. dorsal vessel,表 2 同。

2.2 球茎似水丝蚓 新种 *Limnodriloides bulbopenitus* sp. nov. Wang et Liang (图 3、图 4, 表 2)

2.2.1 特征描述 性成熟个体长8—11 mm (正模:10 mm),宽0.25—0.39 mm。43—53节(正模:53节)。活体淡红色。口前叶钝圆。刚毛长52—60 μm,粗2 μm;背腹同型,均为钩状,毛节在远端;环带前每束2—3条,Ⅱ—Ⅵ节刚毛的远叉通常较短小(远叉/近叉=2.6—3.0 μm/3.4—3.6 μm);环带后每束1—2条,远叉通常较长(远叉/近叉=2.6—3.8 μm/2.2—2.4 μm)。环带在Ⅸ—Ⅻ节,Ⅹ—Ⅺ节特别增厚,染色后腺体富细长颗粒,横向排列;Ⅹ和Ⅺ节的背刚毛少或缺,Ⅺ节无腹刚毛。

脑方形,后缘弧状内凹。咽头腺在Ⅲ—Ⅴ节,Ⅲ节者紧密,略小,Ⅳ和Ⅴ节者疏散。Ⅸ节有1对条状食道盲囊,始于体节中间,向前延伸至8/9节间隔膜后。无体腔球。

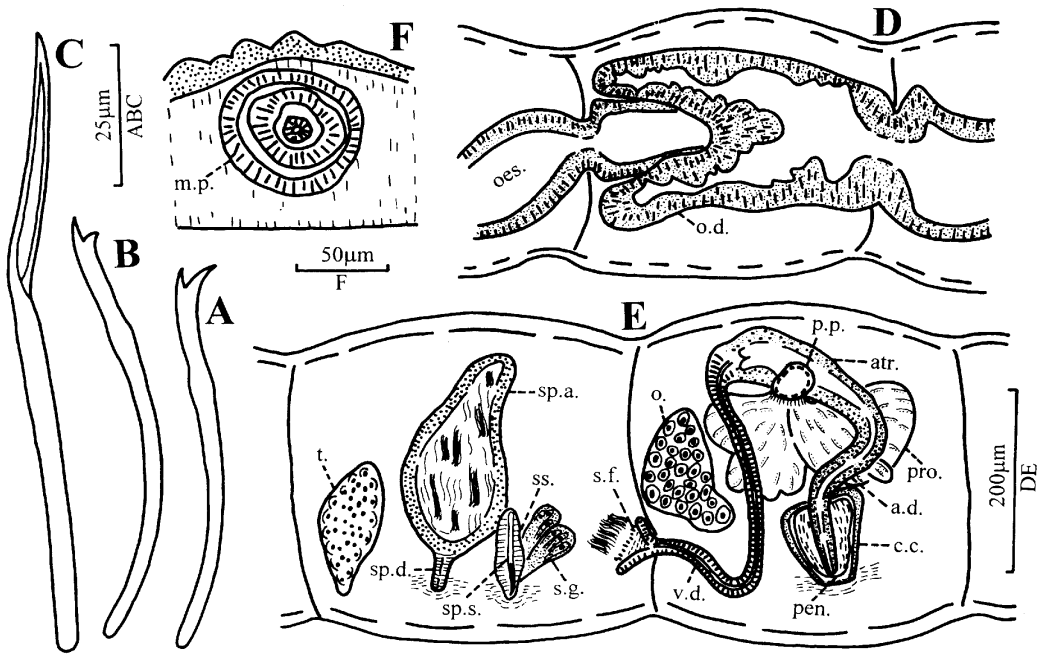


图3 球茎似水丝蚓 新种 *Limnodriloides bulbopenitus* sp. nov.

A. Ⅲ节刚毛[seta(Ⅲ)]; B. XVII节刚毛[seta(XVII)]; C. 受精囊毛(spermathecal seta); D. Ⅸ节腹面观(ventral view of IX); E. Ⅹ—Ⅺ节侧面观(lateral view of X—XI); F. 雄孔腹面观(ventral view of male pore)。a. d. 射精管(atrial duct); atr. 精管膨部(atrium); c. c. 交配腔(copulatory chamber); m. p. 雄孔(male pore); o. 卵巢(ovary); oes. 食道(oesophagus); o. d. 食道盲囊(oesophageal diverticulum); pen. 阴茎(penis); p. p. 前列腺垫部(prostatic pad); pro. 前列腺(prostate); s. f. 精漏斗(sperm funnel); s. g. 刚毛腺(setal gland); sp. d. 受精囊管(spermathecal duct); sp. s. 受精囊毛(spermathecal seta); ss. 刚毛囊(setal sac); t. 精巢(testis)。

雄性生殖器官均成对。精漏斗位于10/11节间隔膜前,喇叭形,长约36 μm,开口处宽约60 μm。输精管长约350 μm,宽16—20 μm,与精管膨部的顶端相连。精管膨部与射精管之间分界不明显,但射精管较细,且管壁的胞核较多,两者总长约310 μm,宽28—64 μm。前列腺由数叶组成,位于精管膨部的腹面;腺体与膨部的连结处宽,形成球状垫部(直径36—44 μm)。交配腔内有真阴茎,阴茎钝圆锥状,长46—50 μm,宽30—64 μm。雄

孔 1 对,在 XI 节中间腹侧,与腹刚毛在一纵线上。受精囊 1 对,在 X 节。囊腔梨形,长约 230 μm ,宽 43—105 μm ,腔内充满精子,成束平行排列。囊管明显,较短,长约 30 μm ,宽 18—24 μm 。受精囊孔 1 对,在 X 节中间腹侧,与腹刚毛同在一纵线上。囊孔的后方各有 1 条刺刀状受精囊毛,单尖,无毛节,全长约 94 μm ;远段尖削,中间凹陷,长约 34 μm ,最宽处约 3 μm ;近段直棒状,宽约 2.4 μm 。

正模标本 整体封片(性成熟),保存于中国科学院水生生物研究所。于 1993 年 2 月采自南极菲尔德斯半岛东侧的长城海湾(在长城站和阿德雷岛之间)。栖息地为黑色淤泥,深 13—30 m。采集时海面上有浮冰。

副模标本 约 182 条,其中 4 条为永久封片(含 2 条解剖标本),其余保存于 10% 的福尔马林液中。采集的时间和地点同正模标本。

2.2.2 与相似种的比较 本新种与 3 个相似种的比较列于表 2。新种与 *Limnodriloides problematicus* Erséus 最接近,但新种的受精囊腔较长,且囊管明显,可以与 *L. problematicus* 相区别。鉴于本种的阴茎为球状,为此定名为球茎似水丝蚓 新种 *Limnodriloides bulbopenitus* sp. nov.。本种是似水丝蚓属分布地球最南端的种,亦是南极地区该属的初次记录[过去记录该属最南端的采集地为新西兰达尼丁的奥塔戈港(45°55' S, 170°40' E) (Erséus, 1989, 1990)。最北端的种已进入北极圈(Erséus, 1982)]。

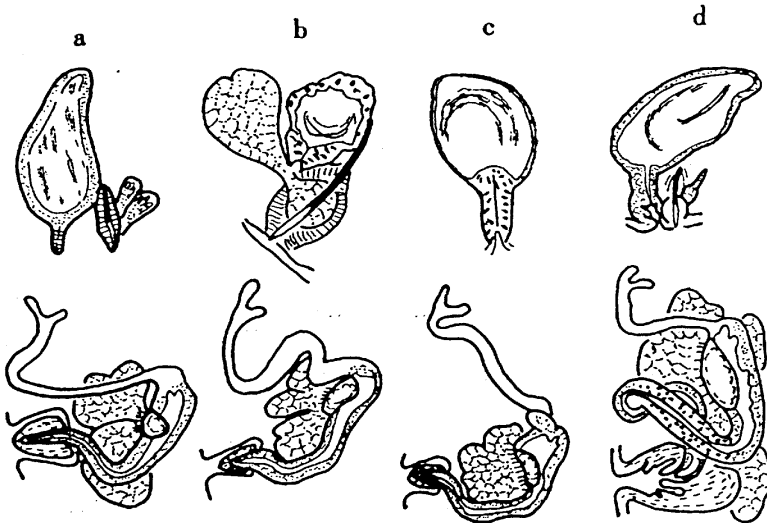


图 4 球茎似水丝蚓 新种与相似种受精囊、雄生殖管的比较

Fig. 4 Comparison of spermathecae and male ducts of *Limnodriloides bulbopenitus* sp. nov. and allied species

a. *L. bulbopenitus*; b. *L. problematicus*; c. *L. stercoreus*; d. *L. scandinavicus*.

表2 球茎似水丝蚓 新种与相似种的比较¹⁾Tab. 2 Comparison of *Limnodriloides bulbopenitus* sp. nov. and allied species

种(species)		<i>L. bulbopenitus</i> sp. nov.	<i>L. problematicus</i> Erséus	<i>L. stercoreus</i> Erséus	<i>L. scandinavicus</i> Erséus
体长(length)(mm)		8—11	6.8—9.2	6.2—9.2	7.8—19.8
体节数(segments)		43—53	51—55	36—52	52—75
刚毛数/束 setae/b.	前(anterior)	2—3	2—3	2—4	2—3
	后(posterior)	1—2	1—2	2—3	2
受精囊(spermathecae)		囊腔梨形,囊管明显;具受精囊毛	囊腔球状,囊管不明显;具受精囊毛	囊腔球状至椭圆球状,囊管明显;无受精囊毛	囊腔梨形,囊管明显;具受精囊毛
雄生殖管(male ducts)		射精管与膨部+射精管等长,前列腺垫部球状,阴茎钝圆锥状	射精管与膨部+射精管等长,前列腺垫部杯状,阴茎锥状	射精管与膨部+射精管等长,前列腺垫部杯状,阴茎锥状	射精管短于膨部+射精管,前列腺垫部椭圆球状,具假阴茎
生境(habitat)		潮下带;淤泥	潮间带,潮下带;淤泥,沙;海洋,咸淡水	潮间带,潮下带;淤泥,沙	潮间带,潮下带
分布(distribution)		南极菲尔德斯半岛附近海域 62°S, 59°W	澳大利亚,新西兰 33—46°S, 119—171°E	澳大利亚 34—38°S, 144—151°E	德国,挪威,瑞典,大西洋东北 58—69°N, 5—19°E
作者(authors)		本文作者	Erséus(1990)	Erséus(1990)	Erséus(1976,1982)

1)受精囊、雄生殖管的区别另见图4。

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TWO NEW SPECIES OF OLIGOCHAETA (ANNELIDA) FROM KING GEORGE ISLAND, ANTARCTICA

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Abstract Two new species collected from Fildes Peninsula, King George Island, Antarctica are described. The freshwater *Lumbricillus incisus* sp. nov. (Enchytraeidae) is the first recorded Oligochaeta in inland area of King George Island, whereas the marine *Limnodriloides bulbopenitus* sp. nov. (Tubificidae) is the southernmost record in the distribution of this genus. Types of two new species are deposited in the Institute of Hydrobiology, The Chinese Academy of Sciences.

1 *Lumbricillus incisus* sp. nov. (Fig. 1, Fig. 2, Tab. 1)

$L(\text{Length})(\text{preserved}) = 5.5-8.0$ mm (Holotype: 8.0 mm), $L(\text{Living}) = 4-7$ mm; $W(\text{Width}) = 0.2-0.3$ mm. $S(\text{Segments}) = 32-50$. Body reddish when living. Prostomium round. Head pore at O/I. Setae sigmoid, without nodulus; preclitellar 2-5 per bundle, postclitellar 1-4. Clitellum in XII-XIII.

Brain distinctly incised posterior, length nearly equal to width. A pair of small postpharyngeal bulbs present in III. Stomachal dilatation gradual. Septal glands 3 pairs in IV-VI, all united dorsally, with large ventral lobes. Glands enveloping nerve cord (copulatory glands) in XIII-XV, with the last one smaller. Dorsal vessel originating from XIV. Nephridia with small preseptal part and large postseptal; efferent duct originating from postero-ventral of postseptal part. Coelomocytes round or oval, transparent or semitransparent; abundant when living, but inconspicuous after preserved.

Testes enclosed in large seminal vesicles, extending over X-XI; symmetrically lobed, ca. 8 per side; lobes conical, in fan-like arrangement. Only one egg present. Sperm funnel 2-3 times as long as width, with collar equally wide. Vas deferens irregularly coiled in XIII. Penial bulbs oval, slightly constricted in the middle, opening ventro-laterally at XIII. Spermathecae in V, communicated with oesophagus by short ental duct. Ampulla spindle, with spermatozoa parallel or scattered. Ectal duct short, with few nuclei, opening ventro-laterally at 4/5. Glands at ectal pore completely surrounding ectal duct, wavyly lobed, with a deep incision in the side near body wall.

Holotype Mature, whole mount in Canada balsam, collected from sediment (4-6.5 m deep), West Lake (62°12'59"S, 58°57'52"W) (February 1, 1993); water conductivity 45 $\mu\text{S}/\text{cm}$.

Paratype 10 whole mounts (3 dissected), over 300 specimens in 10% formalin, from type locality.

Other localities Two lakes in the vicinity of West Lake.

Remarks The new species resembles the marine species *Lumbricillus antarcticus* Stephenson and *Lumbricillus lineatus* (Müller), but differs from the known species by having fewer setae in a bundle and indistinctly lobed spermathecal glands with only a deep incision.

2 *Limnodriloides bulbopenitus* sp. nov. (Fig. 3, Fig. 4, Tab. 2)

L (Preserved) = 8—11 mm (Holotype: 10 mm), W = 0.25—0.39 mm. S = 43—53 (Holotype: 53). Body reddish when living. Prostomium round. Setae all bifid crotchets, nodulus distal. Preclitellar setae 2—3 per bundle, those in II—VI with distal prong shorter than proximal one; postclitellar setae 1—2 per bundle, with distal prong longer. Clitellum in IX—XII, with gland cells in transverse rows.

Pharyngeal glands in III—V, first one smaller and denser. A pair of oesophageal diverticula in IX. No coelomocytes.

Sperm funnel in front of 10/11, trumpet-shaped. Vas deferens nearly as long as atrium, joining atrium apically. Atrial ampulla pear-shaped; prostatic pad spherical; atrial duct with more nuclei; prostate large and lobed, broadly attached to ventral of ampulla. Penis blunt cone in shape, enclosed in copulatory chamber. A pair of male pores situated ventro-laterally at mid XI. Spermathecae paired in X, with short ectal duct. Ampulla large and pear-shaped, with parallel spermatozoa. Spermathecal pores situated ventro-laterally at mid X. Spermathecal setae bayonet-shaped, without nodulus, 1 per bundle, enclosed completely in setal sacs with accessory glands.

Holotype Mature, whole mount in Canada balsam, collected from black sediment (13—20 m deep), Great Wall Bay, between the Great Wall Station (62°12'59"S, 58°57'52"W) and Ardley Island (February, 1993).

Paratype About 182 specimens in total, 4 whole mounts (2 dissected), the rest in 10% formalin, from type locality.

Remarks This new species is closer to *Limnodriloides problematicus* Erséus and *Limnodriloides stercoreus* Erséus in the respect that they possess true penes. However, it differs from *L. problematicus* by its longer spermathecal ampulla with a conspicuous ectal duct, and from *L. stercoreus* by the presence of spermathecal setae.

Key words Antarctica Oligochaeta New species