

Scientific Report on the Belgian Expedition to The Great Barrier Reef in 1967. Nematodes V

Observations on *Desmoscolex* (Nematoda, Desmoscolecida) with description of three new species

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Abstract

Decraemer, Wilfrida (Instituut voor Dierkunde, Rijksuniversiteit, B-9000 Gent, Belgium.) *Scientific report on the Belgian expedition to The Great Barrier Reef in 1967. Nematodes V. Observations on Desmoscolex (Nematoda, Desmoscolecida) with description of three new species.* Zool. Scr. 3 (5-6): 243-255, 1974.—Three new species of *Desmoscolex*, found in samples from Yonge Reef, Lizard Island, Nympe Island and between One Tree Isles and Wistari Reef are described: *D. australicus* sp.n., characterized by the head-shape with naked semi-circular anterior part, by the jointed cephalic setae inserted close to the anterior extremity and by the shape of the gubernaculum with less sclerotized proximal part; *D. membranosus* sp.n. close to *D. granulatus* Decraemer, 1974, but differing from it by the presence of a partly disconnected circumoral membrane and by the oval amphids not reaching the extreme anterior end; *D. yongei* sp.n. resembling *D. americanus* Chitwood, 1936, but differing from it by the longer and more slender spicules, by the presence of fine spines on the secondary rings, by the head-shape without a truncated anterior end and by the almost circular amphids.

Australian specimens belonging to *D. falcatus* Lorenzen, 1972, and *D. gerlachi* Timm, 1970, are compared with the type specimens.

1. Introduction

The present paper is the fifth of a series dealing with free-living marine nematodes from the Great Barrier Reef (for reference to the previous papers see Decraemer, 1974a-d). Three new species and two known ones are described. They resemble each other in having 9 pairs of subdorsal setae and 8 pairs of subventral ones. The 17-ring species as *D. australicus* sp.n., *D. falcatus* Lorenzen, 1972, *D. gerlachi* Timm, 1970 and *D. yongei* sp.n. possess a typical setal pattern (Timm, 1970). *D. membranosus* sp.n. has 18 concretion rings and its setal pattern is comparable with that of 17-ring species presuming the presence of an additional main ring between the 14th and 15th concretion ring.

The study of the type material and the Australian specimens of *D. falcatus* Lorenzen, 1972, and *D. gerlachi* Timm, 1970 yielded more information about intraspecific variations.

2. Material and methods

The species described were found in the following samples:

Yonge Reef. Sample 1: Sandy bottom from channel 1 km behind the reef at -35 m, collected on 28.9.1967 (fixed with 5% formalin and TAF=7 ml 40% formaldehyde, 2 ml triethanolamine, 91 ml aq. dest.): *D. falcatus* 1 ♀, 2 ♂♂, *D. yongei* sp.n. 1 ♂.

Sample 2: Sandy patch on reef flat, collected on 2.9.1967 (fixed with cold 5% formalin): *D. australicus* sp.n. 1 ♂.

Nympe Island. Shallow gully among Cyanophyceae and Foraminifera collected on 24.9.1967 (fixed with 5% formalin and hot FA 4: 1=10 ml 40% formaldehyde, 1 ml glacial acetic acid, 89 ml aq. dest.): *D. membranosus* sp.n. 1 ♂, 3 ♀♀.

Lizard Island. Sample 1: 800 m west of the island, sandy bottom covered with a layer of silt and rich in Foraminifera, at -21.5 m, collected on 12.9.1967 (fixed with 5% formalin, hot FA 4: 1): *D. falcatus* 9 ♂♂, 10 ♀♀, *D. gerlachi* 2 ♂♂, 1 ♀, *D. membranosus* sp.n. 1 ♂, 1 ♀.

Sample 2: at 800 m west of the island, among sponges, at -20 m, collected on 13.9.1967 (fixed with neutralized 5% formalin): *D. falcatus* 2 ♀♀.

Sample L 36, at -17 m, collected on 14.9.1967 (fixed with 5% formalin): *D. falcatus* 1 ♂, 1 ♀.

Station 1 between One Tree Isles and Wistari Reef, at -53 m, collected on 8.11.1967 (fixed with 5% formalin): *D. membranosus* sp.n. 1 juv.

All samples were collected by Prof. Dr. A. Coomans.

All the type material is deposited in the collection of the Instituut voor Dierkunde, Rijksuniversiteit Gent, Belgium.

3. Explanation of abbreviations used

L=length of the body
hd=maximum head diameter (width × length)
cs=length of cephalic setae
sd₁=length of subdorsal setae on the first main ring
sl₂=length of sublateral setae on the 2nd main ring
sv₄=length of subventral setae on the 4th main ring
t=tail length
tmr=length of the terminal main ring + naked end-part with spinneret
tmrw=width of the terminal main ring devoided from foreign material
spic.=length of spicules, measured along the submedian line
gub.=length of gubernaculum
oes.=length of the oesophagus
oes. till 1st conc.=length of the oesophagus till first concentration of dark coloured granules.
hd. vulva=body diameter at the level of the vulva
mbd=maximum body diameter
(mbd)=maximum body diameter devoided from foreign material.
All measurements are in microns.

4. Description of the species found

Desmoscolex australicus sp.n. (Fig. 1)

Measurements

Holotype ♂: L=200, hd=11 × 11, cs=16, sd₁=15, sd₂=11, sd₃=12, sd₁₁=13, sd₁₂=13, sd₁₃=17, sd₁₇=23, sl₂=9, sv₄=8, sv₁₂=8, sv₁₄=8.5, sl₁₂=7.5, t=37, tmr=21, tmrw=10, spic.=29, gub.=13, mbd=31, (mbd)=27, oes.=28.

Male. Body curved ventrally; cuticle transparent with 17 main rings formed by fine granular concretion particles, lying

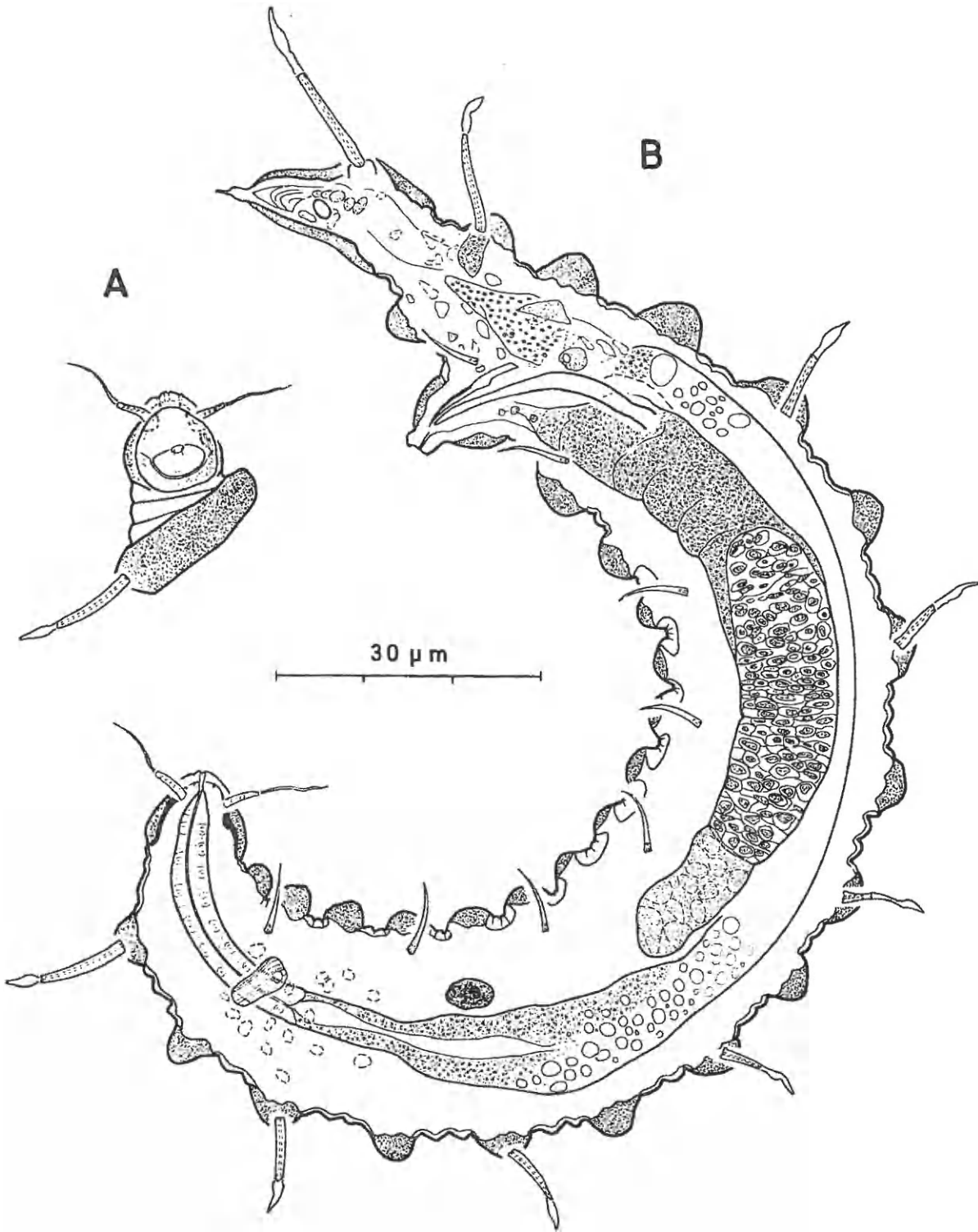


Fig. 1. *Desmoscolex australicus* sp.n. — A, surface view of male head; B, total view of holotype.

on 2–3 somewhat irregular cuticular annules. These prominent rings are separated from each other by intermediate zones, composed of 2 secondary rings except for the interzone between the 10th and 11th main ring with 3 such rings. The interzones are usually as broad as or a little narrower than the corresponding concretion rings.

The somatic setae are arranged according to the typical pattern of 17-ring species (Timm, 1970):

subdorsal: $\frac{1,3,5,7,9,11,13,16,17}{1,3,5,7,9,11,13,16,17} = 9$

subventral: $\frac{2,4,6,8,10,12,14,15}{2,4,6,8,10,12,14,15} = 8$

with pair 2 and 15 in sublateral position. The subventral setae are shorter and more slender than the subdorsal ones. They have all about the same length and end on an acute tip. The subdorsal setae consist of a broad basal shaft and a large lance-shaped distal part. The subdorsal setae on the 1st main ring are longer than the following ones which become slightly longer posteriorly. The caudal subdorsal setae are elongated, especially the terminal ones.

The head is subspherical, tapering anteriorly towards a nearly semi-circular end. It can be divided in two parts: a small naked anterior and a larger covered posterior part, both marked off at the level of the insertion of the cephalic setae. The presence of 6 labial nerves is revealed by small canals leading to minute interruptions in the labial cuticle.

Four slender cephalic setae insert far anteriorly on the head, i.e. at somewhat less than 1/3 head-length. They consist of a broader basal shaft of 5 μm length and an offset attenuated distal part (11 μm long). The cephalic setae are 1.4 times longer than the maximum head-width.

Large rounded amphids cover nearly completely the lateral sides of the head. The small oval amphidial pores are located just posterior to the middle of the head, at the anterior end of a naked, oval-shaped region demarcated from the surrounding covered head-cuticle.

The mouth opening leads to a short buccal cavity. The oesophagus is narrow, cylindrical and of the general type (cf. Decraemer, 1974a). It is surrounded by the nerve ring at the level of the 2nd main ring. The oesophago-intestinal junction occurs at the beginning of the 3rd concretion ring. The globular intestine begins at the 5th main ring and extends till the cloacal tube. The latter protrudes from the middle of the conically expanded ventral side of the 15th main ring.

Large, lightly coloured, oval ocelli are situated at the level of the interzone between the 4th and 5th main ring.

Reproductive system with single outstretched testis, consisting of a short germinal zone followed by a large differentiation zone which projects into a finely granular vas deferens.

Spicules arcuate, slightly cephalated. Gubernaculum nearly half as long as the spicules, consisting of a thick, slightly sclerotized proximal part and a distinctly sclerotized tapering distal part.

Tail with two concretion rings. Terminal main ring, about 4 times as long as the former one. Anterior to the protuberances on which the subdorsal setae insert the ring is rather wide; posterior to this insertion it tapers to a 4 μm long naked spinneret. Large circular non-sclerotized phasmata are situated just posterior to the level where the subdorsal setae insert; several large nuclei occur in this region.

Female not found.

Type locality and habitat. Yonge Reef, sandy patch on reef flat, collected on 2.9.1967.

Material. Holotype σ : Yonge Reef, slide no. 145.

Differential diagnosis. This species is close to *Desmoscolex falcatus* Lorenzen, 1972 in having a similar general habitus. It, however, differs from latter species by the distinctly jointed cephalic setae inserted close to the anterior end, by the shorter arcuate spicules, by the shape of the gubernaculum differentiated in a well sclerotized distal part and a slightly sclerotized proximal part, by the shape of the terminal main ring (not elongated cylindrically with naked, slightly swollen end-part), by the shorter subdorsal setae with large lance-shaped end, by the smaller body-length ($L = 280\text{--}390 \mu\text{m}$ in *D. falcatus*) and by the absence of subdorsal setae on the 1st main ring.

D. australicus is apparently a rare species since it was only found once in the many samples studied. The new species

was nevertheless named since it shows some interesting characters and is clearly different from other species so far described.

Desmoscolex falcatus Lorenzen, 1972 (Figs. 2, 3).

Measurements

Yonge Reef:

\varnothing ($n=1$): $L=320$, $hd=16 \times 14$, $cs=16$, $sd_1=19$, $sd_3=16$, $sd_{13}=20$, $sd_{16}=25$, $sd_{17}=29$, $sv_2=10$, $sv_4=11$, $sv_{14}=12$, $sl_{15}=12$, $t=55$, $tmr=32$, $tmrw=8$, $oes.=26$, $bd.vulva=41$.

σ ($n=2$): $L=260\text{--}335$, $hd=16 \times 13\text{--}15$, $cs=14\text{--}15$, $sd_1=18\text{--}20$, $sd_3=15\text{--}16$, $sd_{13}=18\text{--}19$, $sd_{16}=22\text{--}25$, $sd_{17}=27\text{--}29$, $sv_2=13\text{--}15$, $sv_4=13$, $sv_{14}=13$, $sv_{16}=10\text{--}11$, $t=58\text{--}67$, $tmr=31\text{--}38$, $spic.=34\text{--}37$, $gub.=10\text{--}13$, $oes.=26$, $mbd=43$, $(mbd)=32\text{--}35$.

Lizard Island:

\varnothing ($n=13$): $L=245\text{--}330$, $hd=14\text{--}17 \times 13\text{--}18$, $cs=11\text{--}16$, $sd_1=17\text{--}20$, $sd_3=14\text{--}17$, $sd_5=12\text{--}15$, $sd_{11}=14\text{--}19$, $sd_{13}=17\text{--}25$, $sd_{16}=19\text{--}27$, $sd_{17}=24\text{--}39$, $sv_2=8\text{--}11$, $sv_4=10\text{--}13$, $sv_{12}=9\text{--}12$, $sv_{14}=10\text{--}13$, $sv_{18}=11\text{--}14$, $t=53\text{--}68$, $tmr=34\text{--}44$, $tmrw=9\text{--}12$, $oes.=29\text{--}38$, $bd.vulva=31\text{--}58$, $mbd=43\text{--}69$.

σ ($n=10$): $L=250\text{--}350$, $hd=13\text{--}16 \times 13\text{--}16$, $cs=10\text{--}16$, $sd_1=17\text{--}24$, $sd_3=14\text{--}17$, $sd_5=14\text{--}16$, $sd_{11}=15\text{--}23$, $sd_{13}=17\text{--}22$, $sd_{16}=20\text{--}25$, $sd_{17}=25\text{--}30$, $sv_2=12\text{--}15$, $sv_4=11\text{--}14$, $sv_{13}=11\text{--}14$, $sv_{14}=10\text{--}15$, $sv_{18}=9\text{--}14$, $t=55\text{--}64$, $tmr=31\text{--}41$, $tmrw=7\text{--}10$, $spic.=32\text{--}40$, $gub.=10\text{--}14$, $oes.=32\text{--}40$, $mbd=35\text{--}56$, $(mbd)=27\text{--}43$.

Male. Body spindle-shaped, curved ventrally; cuticle with 17 main rings, consisting of a layer of fine and coarse concretion particles, lightly or darkly coloured according to the habitat and lying on 2–3 somewhat deformed cuticular annules. In some individuals these prominent rings are separated from each other by intermediate zones, narrower than the corresponding main rings and composed of 2 secondary rings over the whole body; or in other specimens the interzones are divided in 2 secondary rings in the anterior and posterior parts of the body and consist of 3 annules in the middle part; in the latter case the interzones are as broad as or broader than the corresponding concretion rings.

The somatic setae are arranged according to the typical pattern of 17-ring species (Timm, 1970):

subdorsal: $\frac{1,3,5,7,9,11,13,16,17}{1,3,5,7,9,11,13,16,17} = 9$
 subventral: $\frac{2,4,6,8,10,12,14,15}{2,4,6,8,10,12,14,15} = 8$

with pair 17 dorso-laterally in specimens from Yonge Reef and varying between dorso-lateral and ventro-lateral position in those from Lizard Island. The setae inserted on the 13th and 16th main ring are sublateral in individuals from Yonge Reef and subdorsal to sublateral in those from Lizard Island.

The slender subdorsal setae consist of a wide basal and a slender distal part ending on a slightly broader, short spatulate tip. The subdorsal setae of the body are about of the same length except the slightly longer ones on the 1st and 13th main ring. The caudal setae are elongated. The shorter subventral setae consisting of a broader base and fine short end have all about the same length. Those inserted on the 2nd

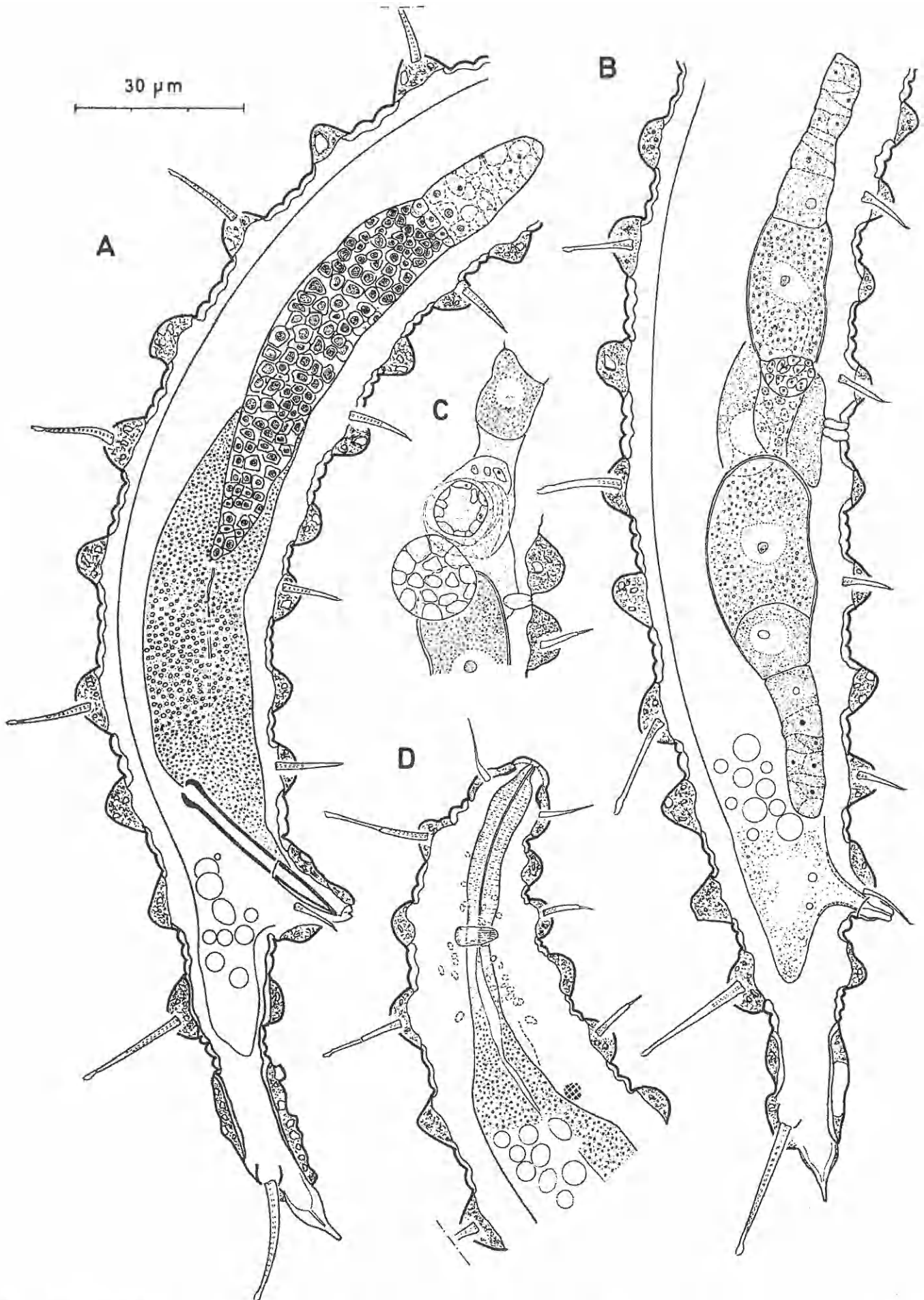


Fig. 2. *Desmoscolex falcatus*. — A, male reproductive system and tail region (♂ from Yonge Reef); B, female reproductive system and posterior body region (♀ from Yonge Reef); C, part of female repro-

ductive system at the level of the vulva, showing the spermathecae (♀ from Lizard Island); D, anterior body region (♀ from Yonge Reef).

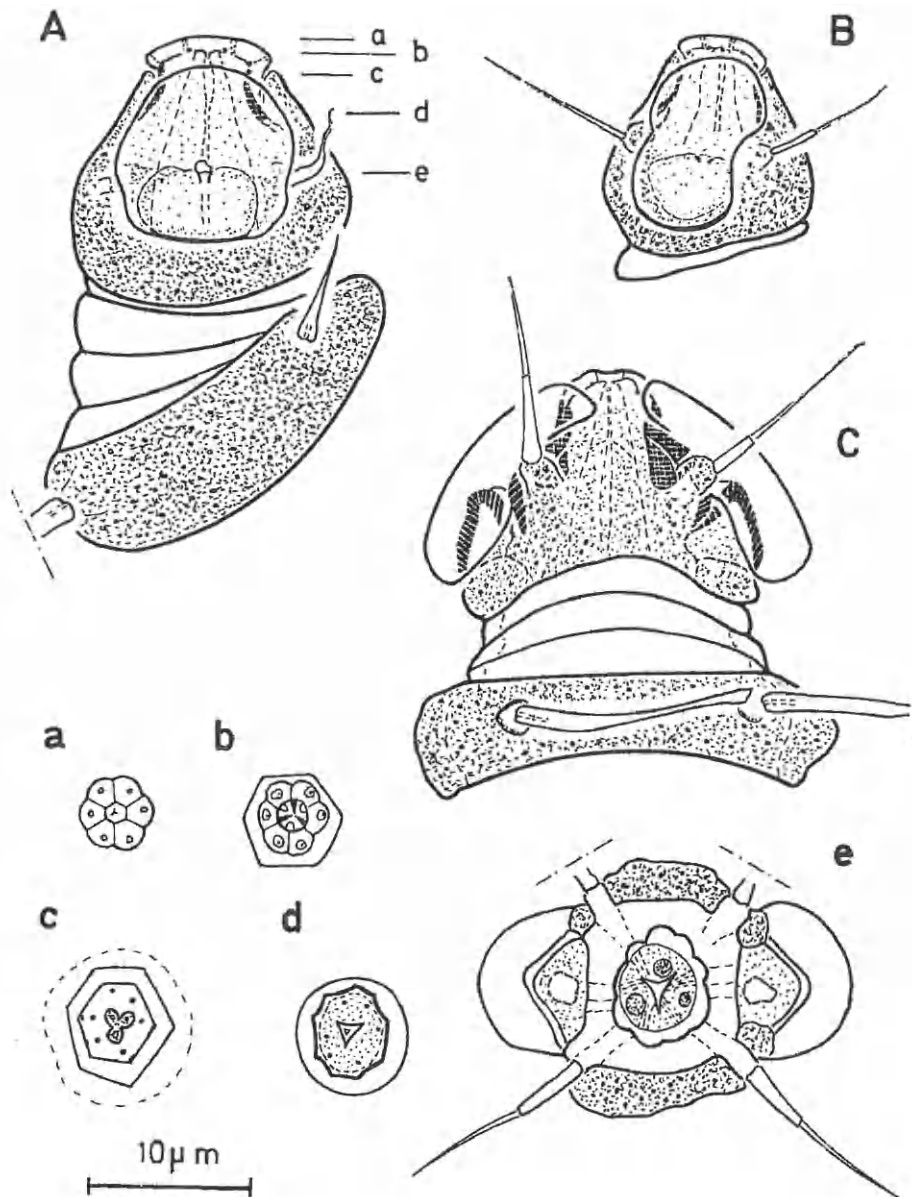


Fig. 3. *Desmoscolex falcatus*. — A, surface view of head (holotype ♂) with indication (a–e) of comparable levels at which the sections were made from another male; B, surface view of male head from Lizard Island; C, surface view of dorsal side of male head from Lizard Island; a, en face view of male head from Lizard Island; b, transverse section at the base of the lip-region (♂ from Lizard Island); c, transverse section through closed anterior oesophageal part; d, transverse section at the base of the head sclerotization; e, transverse section at the level of the insertion of the cephalic setae.

main ring are still in subventral position but slightly shifted laterally.

The head is subspherical to pear-shaped, tapering anteriorly towards a truncate end, with more or less offset lip region. The head is wider than or as wide as long and with exception of the lip zone, it is completely covered by a layer of fine concretion particles. In lateral view, four dots can be found at the base of the lip region; they apparently are sclerotizations of the anterior head-part seen in optical section.

In 'en face' view the extreme anterior end shows six slightly offset lips surrounding a small hexaradial mouth; each lip possesses a small papilla. At the base of the lips the hexaradial headsclerotization becomes visible and the oesophagus has a three-lobed shape with small lumen. More posteriorly, the triradial oesophageal lumen opens. At the level of the insertion of the cephalic setae, the internal border of the sclerotized head-cuticle is distinctly lobed; the amphids are large, semi-circular, each with the amphidial pore situated slightly more posteriorly.

The cephalic setae are slender and situated just anterior to the level of the maximum head-width, i.e. about half-way the head-length.

The large, rounded amphids cover a great part of the head and show a small constriction halfway due to the presence of the peduncle of insertion of the cephalic setae. The amphidial pore, which is large, rounded in transverse section, is only faintly visible as a groove in lateral view. It is situated opposite the insertion of the cephalic setae and at the anterior end of a large, naked, oval-shaped zone, which is marked off from the surrounding covered head-cuticle.

The oesophagus is of general type (cf. Decraemer, 1974 a), it extends to the very anterior end and its short narrow anterior part is lightly marked off. The oesophagus is surrounded by the nerve-ring at the level of the 2nd main ring of the interzone lying just in front of it. The oesophago-intestinal junction, obscured by the presence of many nuclei, occurs at the end of the 2nd main ring or in the following interzone. The globular intestine begins at the level of the 4th or 5th main ring and overlaps the rectum dorsally, extending through, the 16th main ring. The cloacal tube protrudes from the middle of the conically expanded ventral side of the 15th main ring.

Lightly coloured oval ocelli are situated at the level of the 4th or the 5th main ring or the interzone in between.

Reproductive system with single outstretched testis. The

short germinal zone is followed by a long, wide differentiation zone with large nuclei, which projects into the finely granular vas deferens.

The cephalated spicules are straight or slightly arcuate. Gubernaculum short (10–14 μm), lying parallel to the spicules.

The tail has two concretion rings. The terminal ring with naked end-part is about 4 times as long as the former ring and forms an anteriorly annulated cylinder till the peduncle on which the subdorsal setae insert. The terminal subdorsal setae are situated about halfway the length of the terminal main ring, or somewhat more posteriorly; they may have shifted in dorsolateral or lateral position. Posteriorly, the ring tapers towards a mostly naked end-part with a fine and minute or a 2.5–5.5 μm long spinneret. In some individuals the concretion particles extend till the extremity. Phasmata not observed.

Female. Similar to male for most characteristics.

The lightly coloured ocelli are lying at the level of the 3rd main ring or following interzone or at the end of the 4th main ring and the beginning of the following secondary ring.

Reproductive system with outstretched ovaries; each branch with several immature and one growing or mature oocyte. A part of both, poorly defined uteri seems to act as a spermatheca, situated near the vulva. The latter occurs in the interzone between the 10th and 11th main ring. In some individuals the posterior ovary is pressed against the ventral body wall in front of the anal tube. The anal tube is variable in length and protrudes from the posterior border of the 15th concretion ring.

Localities and habitats. Yonge Reef (sample 1); Lizard Island (samples 1, 2, 36).

Discussion. After a comparison with the type material the Australian specimens are considered very close to *D. falcatus* Lorenzen, 1972 in having a similar habitus, an identical head- and tail-shape.

They differ, however, in their setal pattern without sexual dimorphism (typical pattern in female and an additional pair of subventral setae on the 1st main ring in male in *D. falcatus*).

The Australian specimens can also be distinguished from those found in samples from the North Sea and Baltic Sea (cf. Lorenzen, 1972) by the position and relative length of the last three pairs of subdorsal setae. In the specimens described above, the setae on the 13th and 16th main rings are both mostly inserted sublaterally or sometimes subdorsally; however, in some Australian individuals, the subdorsal setae on the 13th concretion ring are shifted laterally towards a ventro-lateral position, while those on the 16th main ring insert subdorsally. The last three pairs of subdorsal setae of the Australian specimens become gradually longer whereas *D. falcatus* specimens from Europe have shorter subdorsal setae on the 16th main ring, located between elongated setae on the 13th and 17th concretion rings.

In the Australian specimens the cephalic setae are somewhat longer (i.e. 10–16 μm against 8–10 μm).

Considering the large similarities, especially the identical head and the lack of information about intraspecific varia-

bility, the Australian specimens are regarded as belonging to *D. falcatus* Lorenzen, 1972.

Desmoscolex gerlachi Timm, 1970 (Fig. 4)

Measurements

Australian specimens:

$\delta\delta$ ($n=2$): L=500–535, hd=26 \times 25–26, cs=28–33, sd₁=30–38, sd₂=27–33, sd₃=27–32, sd₁₁=28–36, sd₁₈=26–, sd₁₆=31–, sd₁₇=42–45, sv₂=20–22, sv₄=24–26, sv₁₀=27, sv₁₂=25–28, sv₁₄=21–23, sv₁₅=23–25, t=110–123, tmr=66–79, spic.=52–59, gub.=25–, oes.=58, mbd=68–80, (mbd)=45–54.

\varnothing ($n=1$): L=540, hd=25 \times 26, cs=23, sd₁=31, sd₂=28, sd₃=28, sd₁₁=29, sd₁₈=30, sd₁₆=32, sd₁₇=40, sv₂=21, sv₄=24, sv₁₀=27, sv₁₂=27, sv₁₄=25, sv₁₅=28, t=125, tmr=75, oes.=57, mbd=76, hd. vulva=48.

Male. Stout body with 17 large main rings consisting of many coarse and opaque concretion particles, partly extending on the interzones. The somatic setae are arranged according to the typical pattern of 17-ring species (Timm, 1970).

The pear-shaped head tapers anteriorly towards a naked, narrow, slightly offset, snout-like region.

Dorso-ventral and lateral views of the head allowed a more detailed study of the amphidial structure. The amphids are apparently bipartite, consisting of (1) a pear-shaped posterior part, almost reaching the posterior border of the head, and (2) an anterior, narrower, elongated portion. The two parts join at the level of the cephalic setae. The anterior amphidial part becomes wider in the region of the buccal cavity, giving off a small extension towards the dorsal and ventral side of the head; here, both amphids come very close to each other. A small, rounded, amphidial pore is situated at the level of the insertion of the cephalic setae.

The stoma is very small and leads to the oesophagus. The latter is narrow in the head region but widens posteriorly and extends till the end of the 2nd main ring. The intestine is of the general type (cf. Decraemer, 1974a), overlapping the rectum dorsally.

The nerve ring is very obscure, probably lying just anterior to the oesophago-intestinal junction.

A long, narrow gubernaculum with thickened distal part lies parallel to the long and slender spicules.

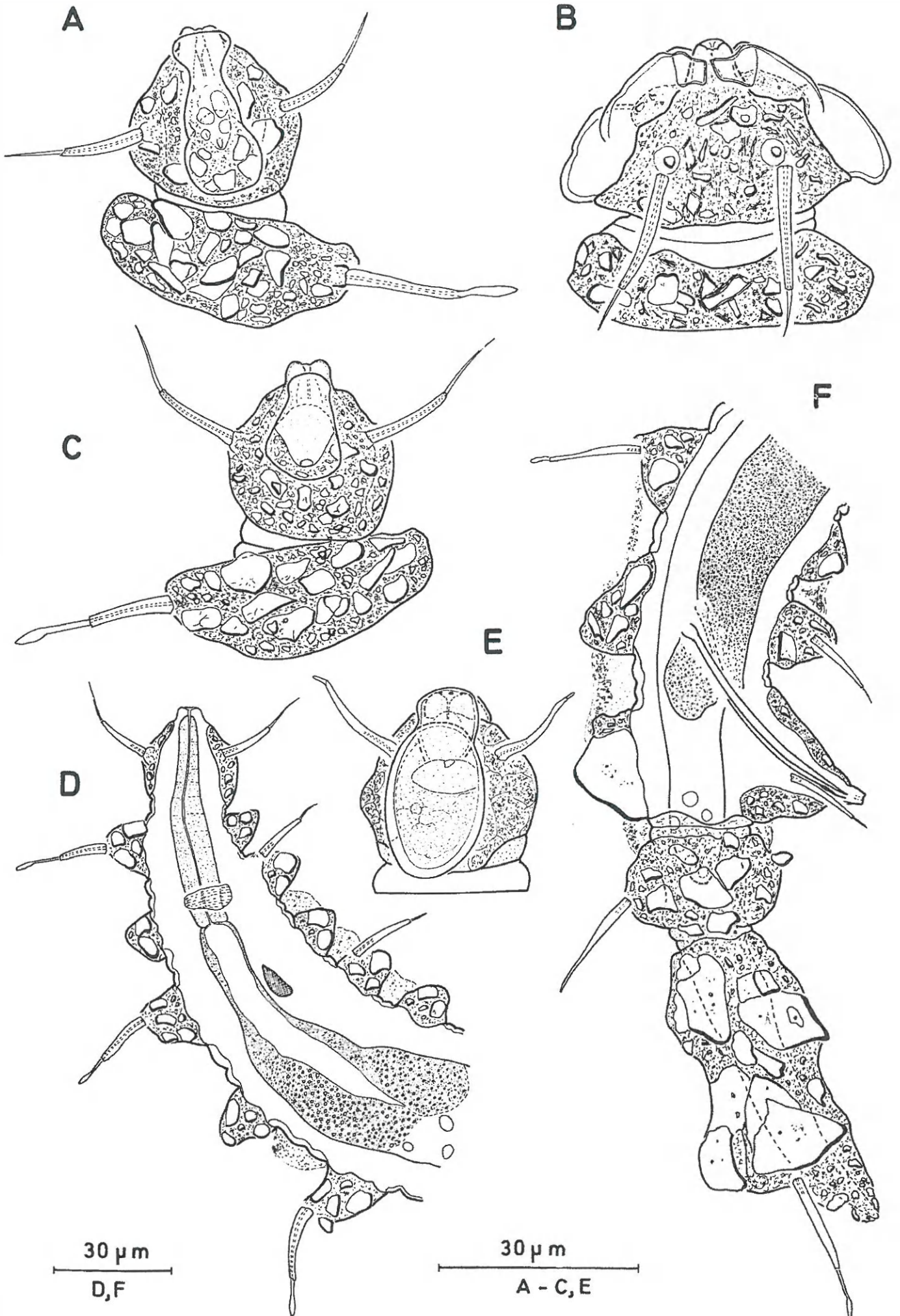
Female. Similar to males for most characteristics.

The amphids are similarly built, but nevertheless differ somewhat in shape from those of the males. The amphids are shorter in females due to a shorter, pear-shaped, posterior part which extends to just behind the insertion of the cephalic setae; the anterior amphidial part becomes only slightly wider in the region of the buccal cavity.

Locality and habitat. Lizard Island (sample 1).

Discussion. The Australian specimens correspond to the type specimens of *D. gerlachi* Timm, 1970, for most items. They

Fig. 4. Desmoscolex gerlachi. — A, surface view of male head (δ_1 from Lizard Island); B, surface view of ventral side of head (δ_2 from Lizard Island); C, surface view of head (\varnothing from Lizard Island); D, anterior body region (\varnothing from Lizard Island); E, surface view of head (holotype δ); F, posterior body region with tail in surface view (δ_1 from Lizard Island).



have a similar general habitus, an identical setal pattern, similar spicules, an elongated terminal main ring and similar shape and length of the somatic setae.

The individuals from Lizard Island, however, show some differences from the type material. Their head seems to have a more pronounced snout-like part. In the type specimens this snout-like anterior part is somewhat obscured by the enlarged amphids, which nearly surround the anterior head-end.

Although the amphids have the same basic structure, there are some differences in shape between the Australian and the type specimens. In the latter, the posterior amphidial part is a large, raised, thick-walled oval sac covering a great part of the head, reaching the posterior head-end; the smaller anterior part covers the anterior head-region, slightly passing the extremity.

The structure of the digestive tract and the position of the nerve ring, not mentioned in the original description, are similar to those of the Australian specimens.

Because of the great similarities, the Australian specimens are regarded as *D. gerlachi* Timm, 1970.

Desmoscolex membranosus sp.n. (Figs. 5, 6)

Measurements

Holotype ♂: L = 270, hd = 22 × 16, cs = 14, sd₁ = 21, sd₂ = 17, sd₁₃ = 19, sd₁₇ = 23, sd₁₈ = 25, sl₂ = 12, sl₁₆ = 9, sv₄ = 11, sv₁₄ = 14, t = 58, tmr = 37, tmrw = 6, spic. = 59, gub. = 10, oes. = 35, oes. till 1st conc. = 16, (mbd) = 32.

Paratype ♂ (n = 1): L = 265, hd = 19 × 14, cs = 12, sd₁ = 16, sd₂ = 15, sd₁₃ = 16, sd₁₇ = 19, sd₁₈ = 20, sl₂ = 11, sl₁₄ = 9, sv₄ = 11, sv₁₄ = 10, t = 47, tmr = 25, tmrw = 7, spic. = 52, gub. = 13, mbd = 39, (mbd) = 30.

Paratype ♀ (n = 4): L = 260–380, hd = 22–24 × 13–18, cs = 13–19, sd₁ = 19–20, sd₂ = 16–17, sd₁₃ = 17–20, sd₁₇ = 19–22, sd₁₈ = 21–27, sl₂ = 11–13, sl₁₆ = 12–13, sv₄ = 12–13, sv₁₄ = 12, t = 53–63, tmr = 30–40, tmrw = 8, oes. = 38–43, oes. till 1st conc. = 18–23, bd. vulva = 36–50, mbd = 46–62.

Juvenile (n = 1): L = 250, hd = 15 × 12, cs = 12, sd_{8–7} = 12, sd_{16–17} = 11, sd_{25–26} = 9, sd_{35–38} = 10, sd_{35–38} = 11, sd_{43–48} = 10, sd₄₃ = 12, sd₇₇ = 10, sd₈₅ = 13, sd₉₃ = 13, t = 49, oes. till 1st conc. = 18, mbd = 32.

Male. Body slender, tapering towards the extremities; with 18 prominent raised rings, consisting of many coarse concretion particles, lying on 2–3 somewhat deformed cuticular annules. The main part of the concretion material occurs on the anterior most one(s) of the annules, giving a triangular posteriorly sloping outline. The interzones are as broad as or narrower than the adjacent concretion rings and composed of 2 or 3 secondary rings.

The somatic setae are arranged as follows:

subdorsal:	1,3,5,7,9,11,13,17,18	9
	1,3,5,7,9,11,13,17,18	9
subventral:	2,4,6,8,10,12,14,16	8
	2,4,6,8,10,12,14,16	8

with pair 2 and 16 in sublateral position.

This scheme can be compared with the typical pattern of 17-ring species assuming the presence of an extra ring between the 14th and 15th main rings. The subdorsal setae are longer

than the subventral ones. The subdorsal setae on the 3rd main ring are the shortest; these on the 1st main ring are longer; posteriorly the subdorsal setae become gradually longer. The caudal setae are somewhat elongated, especially in the specimens from Lizard Island.

The head is wide, rounded, tapering to a truncate anterior end. It is, except for the extreme anterior part, completely covered by many usually coarse concretion particles. At the extreme anterior end lies a loose, partly disconnected circum-oral membrane. This membrane consists of 6 lobes with a position similar to that of the lips.

The four cephalic setae are situated one-third distant from the anterior end. They consist of a basal shaft occupying 46% (58%) of the total setal length. The central canal of the setae ends in an acute tip.

The large, swollen, oval amphids cover the main part of the head and are partly lying on naked cuticle. The amphidial pore is small, circular and situated posterior to the insertion of the cephalic setae.

The stoma is short and obscure. The oesophagus is similar to that found in *D. granulatus* Decraemer, 1974, i.e. slightly swollen in the region of the head, narrowing inside the 1st main ring and obscured by a concentration of small granules opposite the end of the 1st main ring. Immediately posterior to this mass of granules lies the ventro-caudally sloping nerve ring. The oesophago-intestinal junction is obscured by a second concentration of such granules. In the intestinal region similar small granules occur with a distribution comparable to that found in *D. granulatus*. The 16th main ring is strikingly expanded at the ventral side, where the thick-walled cloacal tube projects.

Reproductive system with single outstretched testis, composed of a short germinal zone and a long differentiation zone with large spermatozoa. The vas deferens tapers posteriorly.

Spicules cephalated, slender and strongly arcuate, as long as or longer than the tail. Gubernaculum narrow and short (10–13 μm), parallel with the spicula.

Tail with two concretion rings. Terminal ring elongated, cylindrical till the insertion of the subdorsal setae, ending in a very short spinneret. Phasmata small, circular, rather obscure.

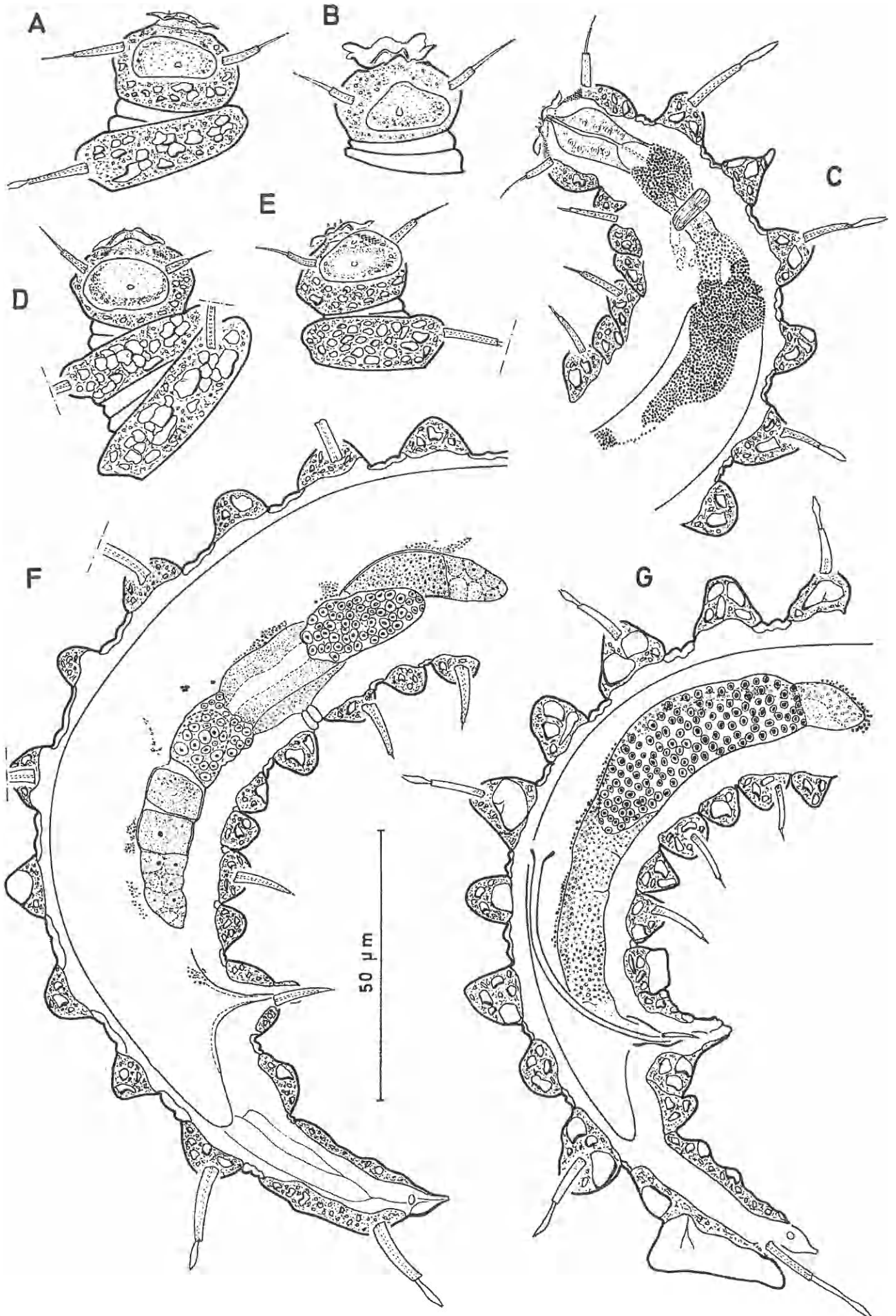
Female. Similar to male in most details.

Upon removal of the concretion particles, a transverse row of short pegs becomes visible in the middle of the main ring. The basal shaft of the cephalic setae occupies 34–55% of the total length.

Reproductive system didelphic-amphidelphic, with outstretched ovaries, containing several immature and growing oöcytes. Two large spermathecae with globular sperms occur anterior and posterior to the vulva. The latter is situated in the interzone between the 10th and 11th main ring.

Juvenile. Body without raised concretion rings, distinctly tapering, caudally. Its cuticle consists of approximately 93

Fig. 5. Desmoscolex membranosus sp.n. — A, B, D surface view of head in paratypes females; C, anterior body region (holotype); E, surface view of male head (holotype); F, female reproductive system and posterior body region; G, male reproductive system and tail region (holotype).



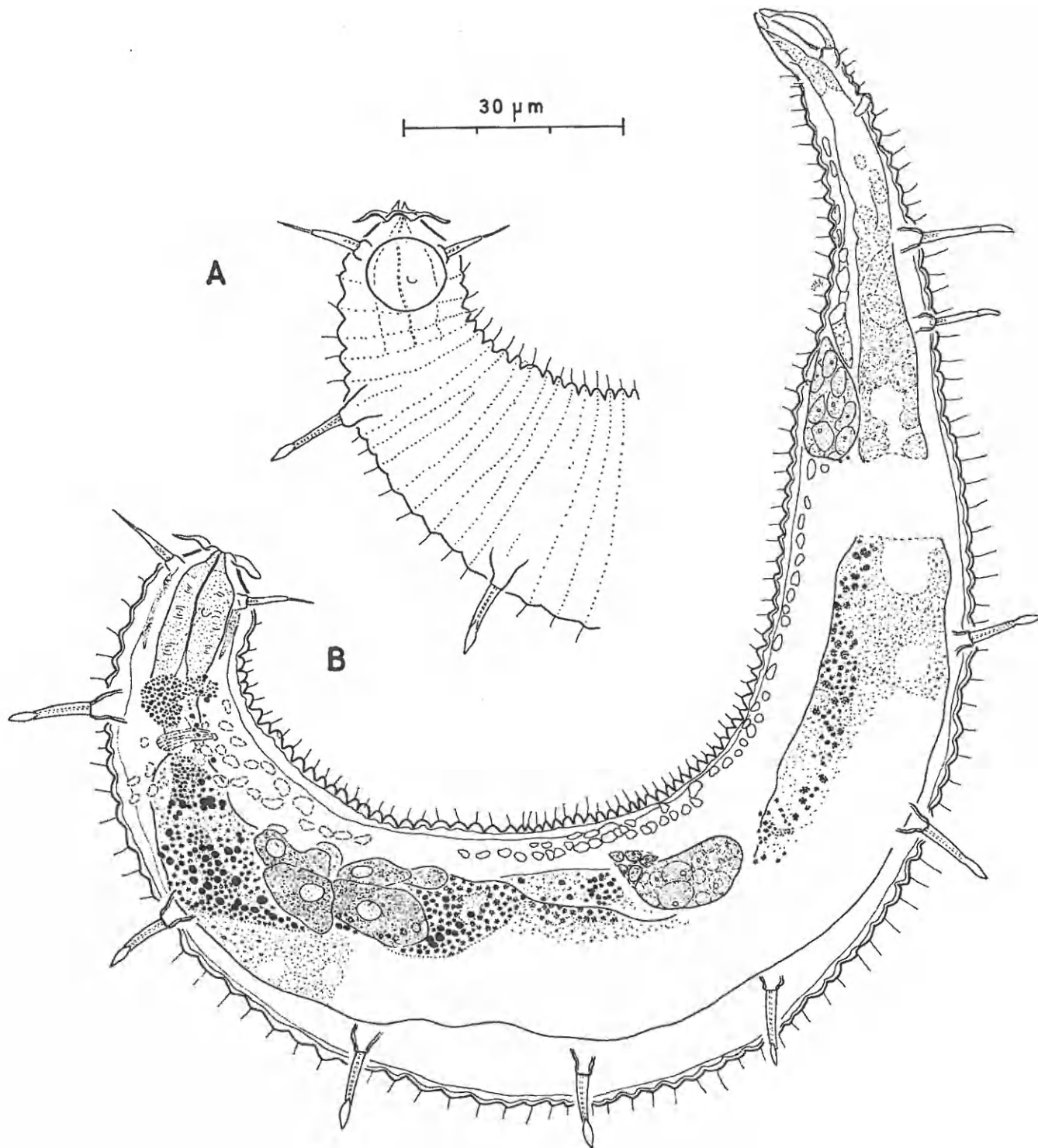


Fig. 6. *Desmoscolex membranosus* sp.n. — A, surface view of anterior body region in juvenile; B, total view of juvenile.

narrow, similarly built annules on the dorsal side and about 87 rings on its ventral side (as counted by the annular spines). In the anterior head-region (including the insertion of the cephalic setae) and in the terminal part of the body (posterior to the peduncle of the last pair of subdorsal setae) the cuticle is smooth. Each cuticular annule bears in its middle a transverse row of fine short spines (2–4 μm long). The rings, bearing the six anterior pairs of subdorsal setae, possess dorsally and in between the corresponding setae of each pair, 2 rows of such spines; these rings are also slightly subdivided in that area. This subdivision increases posteriorly and is completed at the level of the 7th pair of subdorsal setae.

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Setal pattern without subventrally inserted somatic setae; the subdorsal setae are arranged as follows:

right side:	6 16 25 35 45 55 63, 77, 82, 85, 93 = 11
	7' 17' 26' 36' 46' 56'
left side:	6 16 25 35 45 55 65, 78, 82, 87, 92 = 11
	7' 17' 26' 36' 46' 56'

The subdorsal setae are nearly equal in length. The last two pairs are somewhat longer than the preceding ones. The setae on both sides of the body are paired except for one or to annules.

The anterior part of the head to just posterior to the insertion of the cephalic setae is similar to that of the adults, i.e. tapering to a truncate anterior end and bearing a loose, partly disconnected circumoral membrane with 6 lobes. The head, however, differs posteriorly from the adults by being continuous with the rest of the body due to the presence of small cuticular annules posterior to the peduncle of insertion of the cephalic setae instead of being well offset.

The cephalic setae are situated just anterior to the maximum head-width. They consist of a basal shaft (8 μm long) and a fine distal part, which is half as long.

Large globular amphids extend from just anterior to the peduncle on which the cephalic setae insert as far as the transverse row of fine spines on the 2nd cuticular annule. The small, obscure amphidial pore lies at the level of the 1st annule.

Digestive system similar to that of the adults. The oesophagus almost reaches the extreme anterior end, showing a narrower demarcated anterior part. Posteriorly the oesophagus is obscured by a concentration of darkly coloured small granules at the level of the 1st subdorsal setae, i.e. between the 4th and 8th cuticular annule. The oesophago-intestinal junction, obscured by a second concentration of such granules, presumably occurs at the level of the 10th dorsal annule. The nerve ring lies in between both masses of granules opposite the 9th annule. In the intestinal region the distribution of these granules is comparable to that found in the adults. The anal tube is very small and situated between rings 70 and 71. Four fine granular cells (pseudocoelomocytes?) each with a large nucleus, are lying on both lateral sides in the pseudo-coel, in the region between the 2nd and 3rd subdorsal setae.

The genital primordium consists anteriorly of an oval cellular mass containing two large germinal cells. In the region of the rectum a group of about 16 cells, apparently representing spicular primordium, is present. According to the developmental stage of the reproductive system the individual is probably a 3rd stage juvenile, but since no other juvenile forms were found, this is not completely certain.

The tail tapers gradually caudally and possesses 19 annules up to the peduncles on which the last subdorsal setae insert. Posterior to these, the tail is ventrally curved and tapers towards the spinneret. Phasmata not observed.

Type locality and habitat. Sandy bottom covered with a layer of silt and rich in Foraminifera, 800 m west of Lizard Island, at -21.5 m, collected on 12.9.1967.

Other localities and habitats. Nympe Island and station 1 between One Tree Isles and Wistari Reef.

Material. Holotype ♂: Lizard Island, slide no. 148; paratype ♀: Nympe Island, slide no. 149.

Differential diagnosis. These specimens are close to *D. granulatus* Decraemer, 1974, but differ by the presence of a partly disconnected circumoral membrane, by the oval amphids (not reaching the extreme anterior end) and by the more arcuate spicules.

Discussion. Characteristic of *D. membranosus* and *D. granulatus* is the presence of dark red-brown granulae in the lateral epidermal chords throughout the main part of the body and concentrated anterior and posterior to the nerve-ring.

Orange red cephalic pigment located in the inner tissues was reported by Cobb (1926) in females of *Mermis subnigrescens* Cobb, 1926. This pigment was identified as haemoglobin (Ellenby, 1964), highly concentrated in the epidermal chord material at the anterior end, but also detected in the oesophagus and in more posterior parts of the lateral chords.

Although haemoglobin is present in many parasitic nematodes, the only free-living marine nematodes so far found to contain this substance are *Enoplus brevis* Bastian, 1865 and *E. communis* Bastian, 1865 (cf. Ellenby & Smith, 1966). *E. brevis* and *E. communis* are similar to *M. subnigrescens* in that haemoglobin is also found in the epidermal chord. In *E. brevis*, there is in addition a high concentration of the pigment in the oesophageal wall of both sexes and in the copulatory muscles of the male. The distribution of the red-brown granules in the epidermal chord of *D. granulatus* and *D. membranosus* resembles that of haemoglobin in *Enoplus* as reported by Ellenby (1964) and Ellenby & Smith (1966a, b). In view of the fact that only few and fixed specimens of *D. granulatus* and *D. membranosus* were available, the presence of haemoglobin in these species can only be presumed.

Considering *E. brevis* as an active mudfeeder, Ellenby & Smith (1966b) presume that the presence of large amounts of haemoglobin in its oesophagus would be conceivable with a function of the pigment in oxygen supply. Atkinson et al. (1972) also support this hypothesis.

Desmoscolex yongei sp.n. (Fig. 7)

Measurements

Holotype ♂: L = 470, hd = 24 × 21, cs = 21, sd₁ = 27, sd₂ = 22, sd₃ = 22, sd₄ = 25, sd₅ = 25, sd₆ = 33, sd₇ = 33, sl₂ = 17, sv₄ = 19, sv₈ = 19, sv₁₂ = 19, sv₁₄ = 20, sv₁₆ = 22, t = 95, tmr = 53, tmrw = 14, spic. = 44, gub. = 10, oes. = 45, mbd = 63, (mbd) = 45.

Male. Body tapering towards the extremities; cuticle with 17 main rings, consisting of large, coarse but rather transparent concretion particles lying on 2 somewhat deformed cuticular annules. The prominent raised rings are separated from each other by slightly narrower interzones, composed of 2 secondary rings. Each secondary ring bears a transverse row of fine short spines (5 μm long). The secondary ring anterior to the 8th main ring has 48 of these spines, with 15 spines distributed over a distance of 28 μm .

The somatic setae are arranged according to the typical pattern of 17-ring species (Timm, 1970):

$$\begin{array}{l} \text{subdorsal: } \frac{1,3,5,7,9,11,13,16,17}{1,3,5,7,9,11,13,16,17} = 9 \\ \text{subventral: } \frac{2,4,6,8,10,12,14,15}{2,4,6,8,10,12,14,15} = 8 \end{array}$$

pair 2 in sublateral position. A gland cell is visible at the base of some of the somatic setae. The subdorsal setae on the 3rd main ring are the shortest; these on the 1st main ring are distinctly longer; the posteriorly situated setae become gradually longer. The setae on the tail are clearly elongated compared

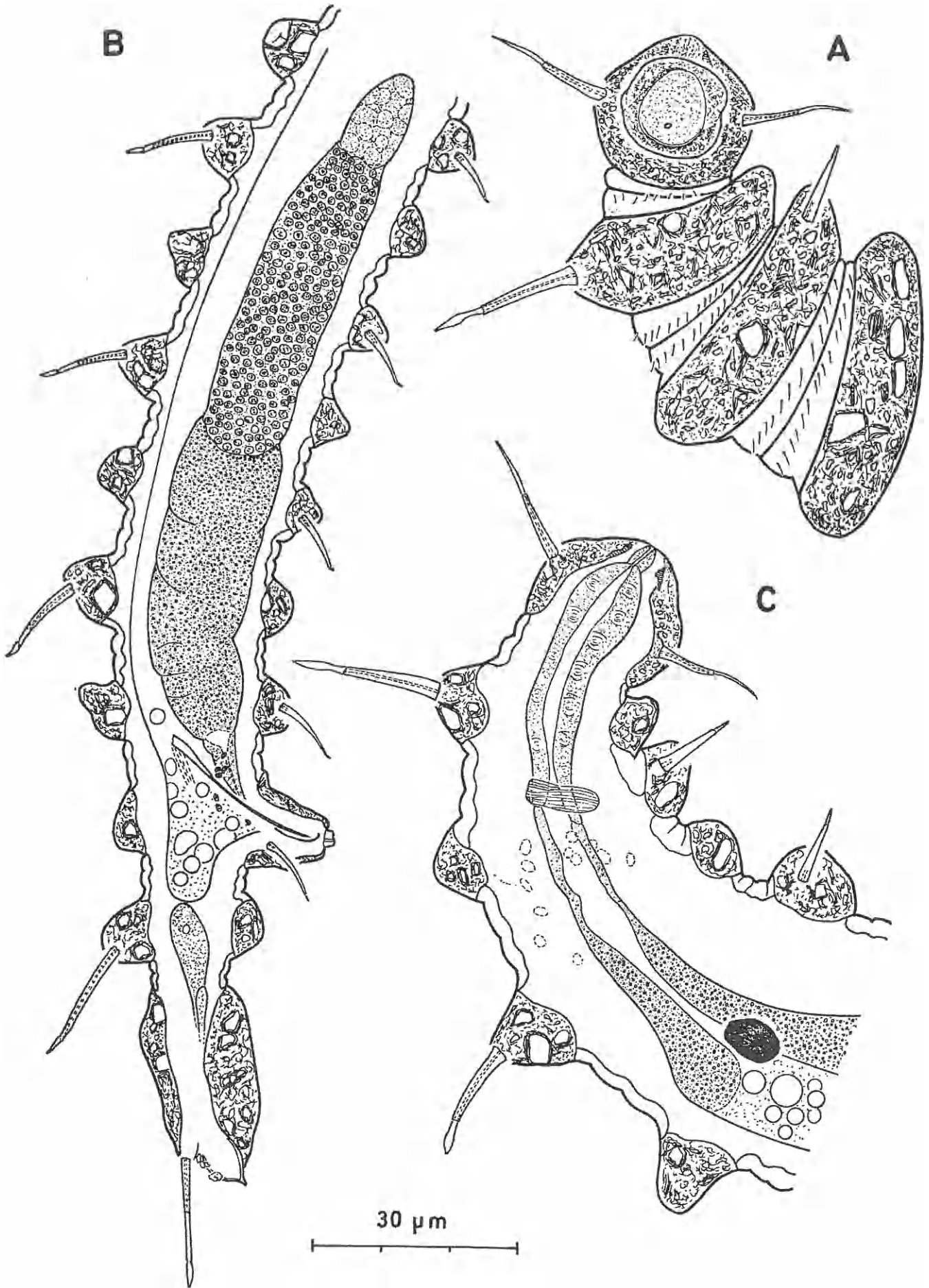


Fig. 7. *Desmoscolex yongei* sp.n. — A, surface view of male head; B, male reproductive system and tail region; C, anterior body region.

with the others. The subventral setae are shorter than the subdorsal ones. Posterior to the shortest bristles on the 2nd main ring, the other subventral setae have more or less the same length. The setae of the 15th ring are a little longer.

The head is rounded, though tapering anteriorly. It is a little broader than long, with maximum width halfway its length. The head is completely surrounded by a layer of foreign particles.

The four submedian cephalic setae are of the hollow tubular type with a filiform distal part. They are shorter than the head-width and situated halfway the headlength.

The amphids are rather large, nearly circular; their margin covers the concretion particles. Close to the head-cuticle the amphids show a minute indentation at the level of the cephalic setae. The small, circular amphidial pore is situated just posterior to the level of the insertions of the cephalic setae.

The mouth opening leads into a narrow offset anterior stomal part. The oesophagus is short, slightly swollen in the region of the head, extending as far as the anterior part of the 2nd main ring. The ventro-caudally sloping nerve-ring surrounds the oesophagus just in front of the oesophago-intestinal junction. The anteriormost part of the ventricular intestine is very thinwalled and finely granulated; further backwards the wall thickens and becomes highly granular. The globular intestine begins at the end of the 4th main ring and overlaps the rectum dorsally. A small cloacal tube protrudes from the middle of the swollen ventral side of the 15th main ring.

The dark yellow oval ocelli are situated at the level of the 4th main ring.

Reproductive system with single outstretched testis.

The slightly arcuate spicules are, except for the proximal widened part, very slender. Gubernaculum thin, plate-like, with strongly arcuate distal portion.

The tail has two main rings. The terminal ring is about 3 times as long as the preceding ring. Posterior to the insertion of the subdorsal setae, the swollen tail tip leads to a short spinneret. Only two caudal glands seen. Phasmata not observed.

Female not found

Type locality and habitat. Sandy bottom from a channel, 1 km behind Yonge Reef at -35 m, collected on 28.9.1967.

Material. Holotype ♂: Yonge Reef, slide no. 151.

Differential diagnosis. This species comes closest to *D. americanus* Chitwood, 1936, which has the same habitus, body-length and setal pattern. It differs, however, by the shape of the head (not anteriorly truncated), by the amphids with nearly circular outline instead of consisting of two distinctly offset pyriform parts as in *D. americanus*, by the longer and more slender spicules, by the terminal ring with swollen endpoint, by the longer somatic setae and by the presence of fine spines on the secondary rings after comparison with the type material of *D. americanus*.

D. yongei is apparently a rare species since it was only found once in the many samples studied. The new species was nevertheless named since it shows some interesting characters and is clearly different from other species so far described.

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