THE GENUS DESMOLORENZENIA FREUDENHAMMER, 1975 WITH A REDESCRIPTION OF D. CRASSICAUDA (TIMM, 1970) (NEMATODA-DESMOSCOLECIDA). CONTRIBUTION N° VIII ON THE NEMATODES FROM THE GREAT BARRIER REEF, COLLECTED DURING THE BELGIAN EXPEDITION IN 1967.

by

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Résumé

Le genre *Desmolorenzenia* Freudenhammer, 1975 avec une redescription de *D. crassicauda* (Timm, 1970) (Nematoda, Desmoscolecida). Contribution VIII à l'étude des Nématodes de la Grande Barrière d'Australie, récoltés lors de l'expédition belge de 1967.

Une étude morphologique et systématique est faite du genre *Desmolorenzenia* Freudenhammer, 1975. La structure de la cuticule et la disposition annelée sont étudiées en détail ainsi que les organes internes qui sont comparables à ceux des espèces de *Desmoscolex* pourvues de 17-18 anneaux principaux. D. *crassicauda* (Timm, 1970) Freudenhammer, 1975 est redécrite.

Introduction

The genus *Desmolorenzenia* Freudenhammer, 1975 is mainly composed of marine organisms; only one terrestrial species has been reported untill now. The genus is reexamined on the basis of type material, original descriptions and specimens from the Great Barrier Reef.

A redescription is given of *D. crassicauda* (Timm, 1970) Freudenhammer, 1975 based on type material and on Australian specimens. The species *D. hupferi* (Steiner, 1916) Freudenhammer, 1975 and *D. parva* (Timm, 1970) Freudenhammer, 1975 are discussed.

Material and methods

The Australian specimens of *D. crassicauda* were found in a sample from Lizard Island, from a sandy bottom with *Halimeda,* at

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20 m depth, collected on 14-10-1967 by A. Coomans and fixed with 5 per cent formalin.

The following type material from other nematode collections was studied:

D. crassicauda: University of California Nematode Collection, Davis: paratypes: $ slide nr 1177 (UCNC), 9 slide nr 1776 (UCNC).

D. desmoscolecoides: Nematodensammlung des Instituts für Meeresforschung, Bremerhaven: paratype 9 slide nr 283 a (NSIMB).

D. frontalis: University of California Nematode Collection, Davis: *S.*

D. hupferi: United States Department of Agriculture, Maryland: lectotype 9 slide nr T-688 p (USDA), paralectotype $ slide nr T-689 p (USDA).

D. longicauda: Nematodensammlung des Instituts für Meeresforschung, Bremerhaven: holotype $ slide nr 215 b (NSIMB).

D. parva: University of California Nematode Collection, Davis: holotype 9 slide nr 1183 (UCNC).

Desmolorenzenia spec.: Institut für Hackfruchtkrankheiten und Nematodenforschung der Biologischen Bundesanstalt, Munster (Westfalen): 1$ (Suriname), 3 9 9 (Uganda).

Explanation of abbreviations used

cs: length of cephalic setae; gub.: length of gubernaculum; hd: maximum head dimensions (width by length); L: length of body; mbd: maximum body diameter; (mbd): maximum body diameter (foreign material not included); nr: position nerve ring from anterior body end; oes: length of oesophagus; sd_1: length of subdorsal setae on the first main ring; spic: length of spicules, measured along the median line; sv_2: length of subventral setae on the second main ring; t: tail length; tmr: length of terminal ring + naked end-part with spinneret. All measurements are in micrometer *(μm).*

DESCRIPTION OF GENUS AND SPECIES

GENUS *DESMOLORENZENIA* FREUDENHAMMER, 1975

Diagnosis (emended)

Desmoscolecinae. Body mainly with 18 quadricomoid rings separated by narrower or equally broad interzones completely or partly covered; naked part of the cuticle sometimes with slight annulation. Inversion occurring over two rings with opposite orientation, not separated by a broad interzone and covered with a continuous layer of secretion and foreign material. Somatic setae with desmoscolecid arrangement and differentiation in shape between the sub-

dorsal and subventral setae. Cephalic setae jointed and far anteriorly inserted on the head. Oesophagus short, cylindrical. Male reproductive system with one testis.

Type species

Desmolorenzenia vittata (Lorenzen, 1969) Freudenhammer, 1975.

Discussion

In the original diagnosis of the genus, Freudenhammer (1975) mentioned the presence of only 17 main rings, hereby considering both rings at the inversion as a single, indented transition ring.

In the description of the known Desmolorenzenia-species we find, on the one hand, species with 18 rings: *D. crassicauda, D. desmoscolecoides, D. frontalis, D. longicauda* and *D. parva* and, on the other hand, species with 17 rings: *D. eurycricus, D. hupferi, D. platycricus* and *D. vittata.* A study of the type material and of the original descriptions and figures shows that this difference in number of main rings is not real but only due to a difference in interpretation since some authors considered the inversion site as being composed of two single rings while others recognised only one composite transition ring.

The presence at the level of the inversion of two elevated cuticular rings with distinct cavity between both main layers of the cuticle (Chitwood and Chitwood, 1950) indicates that the so called biconically shaped transition ring from the original diagnosis of the genus consists in fact of two separate rings in spite of the absence of a clear interzone and the presence of a continuous layer of secretion and foreign material.

Structure of the cuticle and annulation

Main rings quadricomoid. Cuticle with broad rings separated from each other by a narrower or equally broad interzone completely or only half covered with the desmos of the corresponding main ring. Naked part of the cuticle in some species such as *D. crassicauda* and *D. vittata* faintly annulated.

The inversion of the direction of the slope of the main rings occurs over two cuticular rings which are not separated from each other by a clear interzone and are covered by a continuous layer of secretion and foreign material.

With the exception of *D. vittata* and *Desmolorenzenia* spec, the inversion occurs between main rings 14 and 15; in *D. vittata* however between rings 15 and 16 and in *Desmolorenzenia* spec, at the level of rings 13 and 14 in the Surinam specimen studied and rings 10 and 11 or 11 and 12 in the specimens from Uganda (variation due to the presence or forked rings). In the latter species, both opposite rings are little pronounced and both main rings together are hardly longer than the other main rings.

In contradiction with Freudenhammer (1975), the inversion in *D. frontalis* also occurs between rings 14 and 15, as in most species, and not between rings 13 and 14.

Digestive system

Stoma short, thick-walled. Oesophagus with the typical desmoscolecid structure of the Desmoscolex-species with 17-18 main rings: short, cylindrical till the level of the nerve ring and behind this level somewhat tapered. Intestine anteriorly with fine granular cells (ventricular part), soon widening to a cylindrical part and there provided with small and large globular inclusions. Postrectal blindsac often present.

List of nominal species of *Desmolorenzenia*

D. crassicauda (Timm, 1970) Freudenhammer, 1975
syn. *Quadricoma crassicauda* Timm, 1970
D. desmoscolecoides (Timm, 1970) Freudenhammer, 1975
syn. *Quadricoma desmoscolecoides* Timm, 1970
D. eurycricus (Filipjev, 1922) Freudenhammer, 1975
syn. *Desmoscolex eurycricus* Filipjev, 1922
D. frontalis (Gerlach, 1952) Freudenhammer, 1975
syn. *Desmoscolex frontalis* Gerlach, 1952
syn. *Quadricoma frontalis* (Gerlach, 1952) Timm, 1970
D. hupferi (Steiner, 1916) Freudenhammer, 1975
syn. *Desmoscolex hupferi* Steiner, 1916
D. longicauda (Timm, 1970) Freudenhammer, 1975
syn. *Quadricoma longicauda* Timm, 1970
D. parva (Timm, 1970) Freudenhammer, 1975
syn. *Quadricoma parva* Timm, 1970
= spec. inq.
D. platycricus (Steiner, 1916) Freudenhammer, 1975
syn. *Desmoscolex platycricus* Steiner, 1916
D. vittata (Lorenzen, 1969) Freudenhammer, 1975
syn. *Desmoscolex vittalus* Lorenzen, 1969
Desmolorenzenia spec., in Decraemer, 1976.

Key to the species of Desmolorenzenia

1 - inversion between rings 14 and 15 2
inversion elsewhere 8
2 - head strongly tapering anteriorly, cephalic setae subterminal *D. frontalis*
head more or less rounded rectangular, cephalic setae inserted far anteriorly 3
3 - terminal ring narrow, elongated: about 4 times longer than wide 4
terminal ring broad, not elongated 6

4 - somatic setae with typical desmoscolecid pattern of 9 pairs of subdorsal and 8 pairs of subventral setae 5
pattern of somatic setae aberrant: with 9 pairs of subdorsal setae and only 6 pairs of subventral setae *D. desmoscolecoides*

5 - tail with 2 rings *D. longicauda*
tail with 3 rings *D. eurycricus*

6 - Naked part of body cuticle slightly annulated *D. crassicauda*
naked part of body cuticle not annulated 7

7 - endring with strongly ventrally curved, elongated terminal part *D. platycricus*
endring without distinct ventrally curved terminal part *D. hupferi*

8 - inversion between rings 15 and 16 *D. vittata*
inversion between rings 13 and 14, 10 and 11 or 11 and 12 (variation due to the presence of forked rings) *Desmolorenzenia* spec.

DESMOLORENZENIA CRASSICAUDA (TIMM, 1970) FREUDENHAMMER, 1975 (Fig. 1)

Redescription based on Australian specimens for males and on type material for females.

Measurements:

Australian specimens

Male 1 : L=295, hd=18 X 15, cs=15, sd_1=17, sd_3=14, sd_5=14, sd_7=14, sd_9=15, sd_{11}=17, sd_{13}=17, sd_{17}=18, sd_{18}=23, sv_2=10, sv_4=10, sv_8=ll, sv_{10}=9.5, sv_{12}=10, sv_{14}=9, sv_{16}=9.5, spic.=25, gub.=17, t=57, tmr=31, oes.=37, n.r.=25, mbd=36, (mbd)=29.

Male 2: L=290, hd=18 x 14, cs=17, sd_1=14, sd_3=14, sd_5=14, sd_7=15, sd_9=16, sdn=18, sd_{13}=18, sd_{17}=20, sd_{18}=23, sv_2=10, sv_4=10, sv_6=10, sv_{12}=lO, sv_{14}=10, sv_{16}=ll, spic.=29, gub.=18, t=53, tmr=31, oes,=39, n.r.=25, mbd=40, (mbd)=31.

Males:

Body ventrally curved and slightly tapering towards the extremities. Cuticle with 18 broad quadricomoid rings with the layer of secretion and foreign material covering the interzone. Naked part of the cuticle slightly annulated. Inversion of direction of the main rings situated between rings 14 and 15.

Somatic setae arranged according to the typical desmoscolecid pattern:

subdorsal $\frac{1, 3, 5, 7, 9, 11, 13, 17, 18 = 9}{1, 3, 5, 7, 9, 11, 13, 17, 18 = 9}$

subventral $\frac{2, 4, 6, 8, 10, 12, 14, 16 = 8}{2, 4, 6, 8, 10, 12, 14, 16 = 8}$ (one male with at the left body-side two subventral setae on main ring 8).

Somatic setae with differentiation in jointed subdorsal setae, consisting of a broad cylindrical basal part and a spear-shaped apical part with open top and in subventral setae with short and fine distal part. The subdorsal

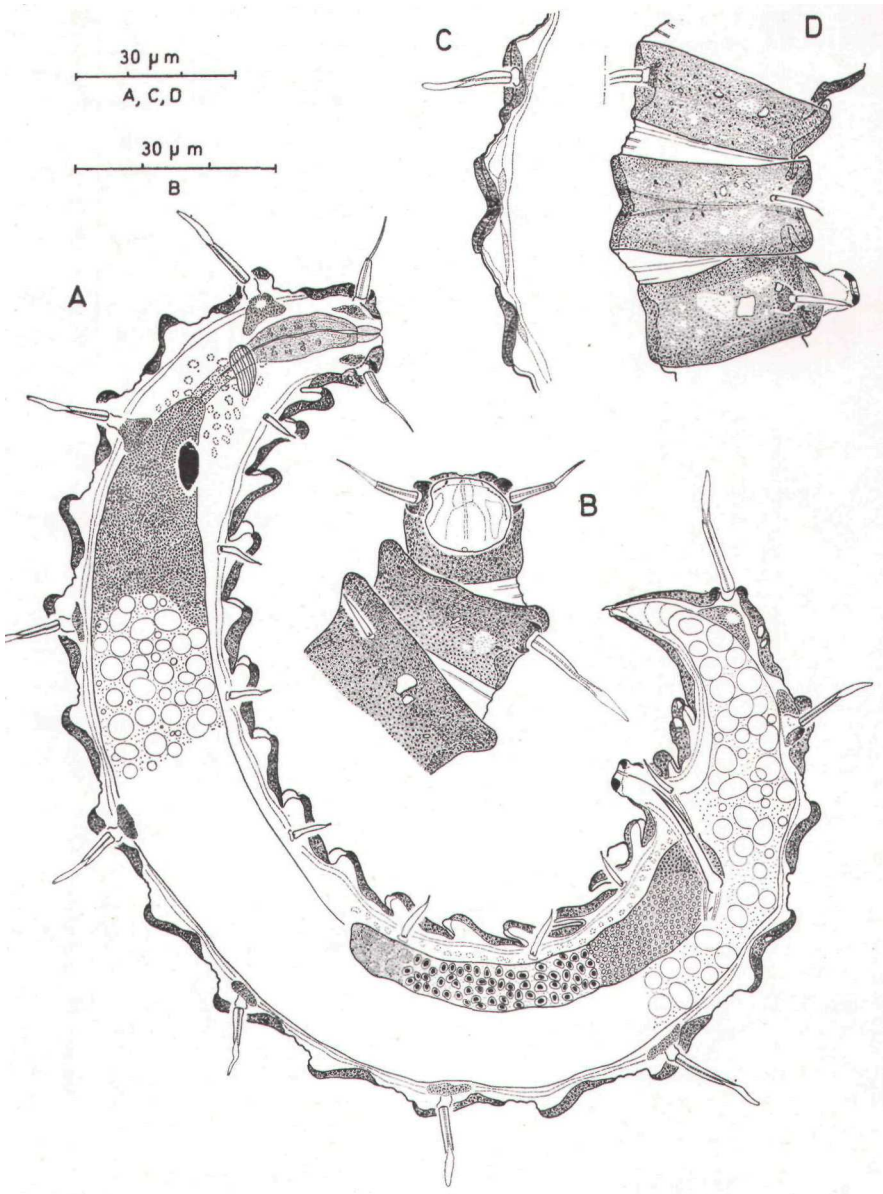

FIG. 1
Desmolorenzenia crassicauda

A: total view of male from Lizard Island; B: surface view of anterior body end (♂); C: detail of body wall at the level of the inversion (main rings 13-16); D: surface view of detail of body wall at the level of main rings 13-16.

setae are clearly longer than the subventral setae and insert on very low peduncles, not protuding out of the main rings. The first pair of subdorsal setae can be elongated compared with the following setae; the subdorsal setae become longer caudally, with the terminal pair distinctly elongated. The subventral setae have all about the same length and insert almost immediately on the cuticular rings, thus without a distinct peduncle. All setae are in connection with a fine granular glandular cell situated at their base.

Head more or less rectangular in longitudinal optical section, broader than long. Cuticle except for the zone with the amphids, completely covered by foreign material; in the labial region, the cuticle is somewhat thickened.

Labial region not distinctly indicated and apparently without division in lips; six minute papillae, difficult to observe, are present.

Cephalic setae jointed, composed of a broad basal half with fine central canal and a very fine distal part with pointed top. The setae are about as long as the maximum headwidth and insert far anteriorly on the head at the level of the stomatal region on low cuticular projections, hardly protuding out of the head.

Amphids broadly rounded, slightly raised. They cover a great part of the head, extending anteriorly till the terminal border and posteriorly till the posterior head end. The amphidial canal ends in a small pore situated in the posterior half of the head.

A small oral opening leads to a thick-walled stoma, 4 µm long. Oesophagus short, with muscular anterior part till the nerve ring. The ventrocaudally orientated nerve ring surrounds the oesophagus at the level of the end of the first or the beginning of the second main ring and is followed by many nuclei of nerve cells. From this level on, the oesophagus becomes narrow cylindrical and is rather obscure. The oesophago-intestinal junction occurs shortly behind the nerve ring, opposite the posterior end of the second main ring. Intestine narrow anteriorly, gradually widening to a broad cylinder behind the level of the ocelli. The cells of the anterior intestinal wall are finely granular and surround at first a narrow lumen that enlarges halfway main ring 3 and the intestine becomes provided with numerous small and large globules. Postrectal intestinal sac well developed, extending far into the tail. Cloacal tube broad, strongly protuding from the medio-ventral body-wall in the anterior half of main ring 16. Apical wall of cloacal tube with two small sclerotized parts.

Ocelli dark-yellowish; with elliptical shape and situated opposite main ring 3; in one male specimen, the ocellus on the left body-side is conspicuously larger and extends from main ring 5 till the beginning of main ring 7.

Reproductive system with one testis. No ejaculatory glands observed.

Spicules 25-29 µm long, nearly straight, corpus distinctly caudally tapered to a pointed top and proximally provided with a more or less offset capitulum.
Muscles of spicular apparatus typical.

Gubernaculum 17-18 µm long, obscure, probably consisting of a narrow trough-shaped structure; in longitudinal optical section visible as a fine rod parallel to the spicula.
Muscles of gubernaculum obscure, only the M. retractores gubernaculi arc seen.

Tail with two main rings. Endring, 31 µm long, consisting of a broad cylindrical anterior part extending till the insertion of the terminal subdorsal setae and of a ventrally bent terminal part tapering towards a fine short spinneret. The endring is, with exception of the terminal spinneret, totally covered by a layer of secretion and foreign material.

Phasmata small circular, situated at the beginning of the tapering terminal part of the endring.

Caudal glands were not observed, presumably because of the enormous extension of the postrectal intestinal blindsac.

Females:

Not found in the samples from Australia.

The study of type material showed that the females are identical with the males for most characteristics.

Reproductive system didelphic-amphidelphic. Two spermathecae present. Vulva small, situated in the interzone between main rings 10 and 11.

Locality and habitat of Australian specimens:

Lizard Island, sandy bottom with *Halimeda,* —20 m, collected on 14-10-1967 and fixed with 5 percent formalin.

Material:

2 ♂♂

Discussion:

From a study of the type material, appears that the Australian specimens largely agree with them. The Australian individuals however possess a more truncated head end.

D. crassicauda resembles *D. hupferi* (Steiner, 1916) Freudenhammer, 1975 in head-shape: rounded rectangular with far anteriorly inserted cephalic setae, but differs from it by the smaller dimensions of body and especially of the head; by the shorter cephalic setae; by the length and shape of the somatic setae: longer and with distinct offset spear-shaped apical part absent in *D. hupferi* and by the shape of the endring with broad anterior part and distinctly tapering, ventrally bent terminal part instead of a nearly equally broad endring without clearly tapering terminal part as in *D. hupferi.*

D. crassicauda also resembles *D. desmoscolecoides* (Timm, 1970) Freudenhammer, 1975 in head-shape and in the position of the insertion of the cephalic setae. It is however distinguishable by its different setal pattern: typical desmoscolecid in *D. crassicauda* instead of aberrant in *D. desmoscolecoides* and by the shape of the terminal ring, broad instead of being narrower and elongated as in *D. desmoscolecoides.*

DESMOLORENZENIA HUPFERI (STEINER, 1916) FREUDENHAMMER, 1975

Both specimens from the collection of Steiner were described as lectotype and paralectotype by Timm (1970) since no types were designated in the original description.

Although Steiner (1916) made reference to one ♂ and one ♀, Timm (1970) considered both individuals as juveniles. A study of the type material revealed that both specimens were indeed adults: lectotype slide nr T-688p is a female and paralectotype slide nr T-689p is a male.

The bodycuticle consists of 18 quadricomoid rings with inversion between main rings 14 and 15.

In the female specimen, the vulva is situated at the posterior border of main ring 10.

The internal structures have become vague.

DESMOLORENZENIA PARVA (TIMM, 1970) FREUDENHAMMER, 1975

Discussion

This species was based on a single female specimen, dorso-ventrally orientated. For lack of more individuals including males and because of the dorso-ventral position of the only type specimen, *D. parva* cannot be distinguished from the other species with certainty and is therefore considered as spec. inq.

D. parva possesses, like most other species of the genus, 18 quadricomoid rings with inversion between main rings 14 and 15 and the somatic setae have a desmoscolecid shape and arrangement. The digestive system is also comparable with that of other *Desmolorenzenia*-species : a thick-walled stoma, a short cylindrical oesophagus with oesophago-intestinal junction probably occurring at the level of the third main ring, an intestine provided with globules and with a short postrectal blindsac. The anal tube is very short and protudes from the medio-ventral body-wall between main rings 16 and 17. The vulva is located between main rings 9 and 10.

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Summary

A morphological and systematical study was made of the genus *Desmolorenzenia* Freudenhammer, 1975. The structure of the cuticle and the annulation were studied in detail as well as the internal organs; the latter are comparable with those of the Desmoscolex-species provided with 17-18 main rings.

A redescription is given of *D. crassicauda* (Timm, 1970) Freudenhammer, 1975.

Samenvatting

Een morfologische en systematische studie werd gemaakt van het genus *Desmolorenzenia* Freudenhammer, 1975. De struktuur van de kutikula en de ringeling werden in detail bestudeerd evenals de inwendige organen welke vergelijkbaar zijn met die van Desmoscolex-species met 17-18 hoofdringen.

D. crassicauda (Timm, 1970) Freudenhammer, 1975 wordt herbeschreven.

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