

Desmoscolex (Desmolorenzenia) camerunensis n.sp. (Nematoda : Desmoscolecida) from Cameroon

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Accepted for publication 3 May 1996.

Summary – A new terrestrial desmoscolecid species, *Desmoscolex (Desmolorenzenia) camerunensis* sp. n., is described from a tropical forest in Cameroon. The new species is characterized by eighteen main rings, a rounded rectangular head, a lip region pattern with a rosette-like labial ridge of which each sector embrace a fine labial seta with a pore at its base, large grooved amphids, sexual dimorphism in the somatic setal pattern, and the shape of the end ring with uncovered annulated tube-like end.

Résumé – *Desmoscolex (Desmolorenzenia) camerunensis* n. sp. (Nematoda : Desmoscolecida) provenant du Cameroun – Une nouvelle espèce de Desmoscolécide terrestre, *Desmoscolex (Desmolorenzenia) camerunensis* sp. n., récoltée en forêt tropicale du Cameroun, est décrite. Elle est caractérisée par dix-huit anneaux principaux, la forme de la tête plus ou moins rectangulaire, la structure de la région labiale comportant une crête labiale en forme de rosette, chaque secteur enveloppant une fine soie labiale ayant un pore à sa base, de grandes amphides cannelées, la présence d'un dimorphisme sexuel concernant le nombre et l'arrangement des soies somatiques et par la forme du dernier anneau comportant un terminus tubulaire annelé dépourvu de couverture.

Key-words : *Desmoscolex (Desmolorenzenia) camerunensis* sp. n., description, ultrastructure, nematodes.

Species of the mainly marine nematode order Desmoscolecida, are found occasionally in freshwater and in brackish soils. Currently, terrestrial Desmoscolecidae are represented by two subgenera of the genus *Desmoscolex* : *Desmoscolex* and *Desmolorenzenia*. The first subgenus includes three species : *Desmoscolex (Desmoscolex) vinealis* Weischer, 1962, *D. (Desmoscolex) koloensis* Decraemer, 1984 and *D. (Desmoscolex) parakoloensis* Decraemer, 1984, and the second subgenus includes two species : *Desmoscolex (Desmolorenzenia) montana* Decraemer & Sturhan, 1982 and *D. (Desmolorenzenia) indicus* Lal, 1989. Non-described specimens belonging to the genus/subgenus *Desmoscolex/Desmolorenzenia* have been recorded from soil samples from Uganda (Decraemer, 1975) and Zaire (De Grisse, 1968) and from the rhizosphere of two different trees from the rain forest on a river terrace of the Ndiain River in the Korup National Park, Cameroon (Price & Siddiqi, 1994).

From March 24 to 26, 1994, several soil samples were collected by the second author in the coastal rain forest region of South Cameroon in sites about 300 km south of the record of Price and Siddiqi (1994). A new terrestrial *Desmoscolex* species was observed, described here as *Desmoscolex (Desmolorenzenia) camerunensis* n.sp. A SEM study of the *en face* view revealed a type of lip region structure previously unknown in Desmoscolecidae.

The samples were stored uncooled and nematodes were extracted in the laboratory at Münster only on

April 21, using the centrifugation-flotation method with MgSO₄. The nematode suspensions were fixed with hot TAF, transferred to glycerine by a slow evaporation method and the specimens were mounted on permanent slides.

In one of the two samples collected from natural forest directly on the coast (about 560 g of soil), eight desmoscolecids were found and, in one of a total of four samples from virgin rain forest about 3 km east of the coastal line, eight desmoscolecid specimens were found in about 500 g of soil.

Desmoscolex (Desmolorenzenia) *camerunensis* sp. n. (Figs 1, 2)

MEASUREMENTS

See Table 1.

DESCRIPTION

Adults : Body very small, tapered anteriorly and in the tail region; cuticle annulated, with eighteen main rings (female 1 with nineteen main rings; additional ring less developed) separated by narrower interzones of two uncovered annuli with mid-annulus ridge. Main rings quadricomoid with inversion in orientation at level of main ring 10 (at main ring 11 in female 2). Each main ring consisting of a band of secretion and finely granular (rarely with large particles) foreign material (= *desmos*) covering a large and a narrow annulus or two large

Table 1. Morphometric data of *Desmoscolex* (*Desmolorenzenia*) *camerunensis* sp. n. (all measurements in μm).

	Females		Male	J2	J3
	Holotype	Paratypes			
n	1	10	1	1	3
Body length	155	150-210 (166 \pm 18.1)	190	105	105-150 (126 \pm 20.8)
Length of pharynx	30	19-30 (23.5 \pm 3.2)	25	19	17-24 (21.0 \pm 3.6)
Tail length	39	35-44 (40.3 \pm 2.9)	48	–	30 (n = 1)*
Length of end ring	24	20-27 (23.3 \pm 2.1)	24.5	–	–
Length of cephalic setae	14.5	12-15 (13.6 \pm 1.0)	15	8	6.5-11 (8.8 \pm 2.3)
Length of 1st subdorsal somatic seta (sd)	12	11-13.5 (12.0 \pm 0.9)	11.5	7.5	6.5-9.0 (7.5 \pm 1.3)
Length of 2nd sd	8.5	10-13 (10.8 \pm 1.0)	11	8.5	6.5-8.0 (7.3 \pm 0.8)
Length of 3rd sd	11	9-12.5 (11.1 \pm 1.2)	9.5	–	7-8.5 (7.8 \pm 1.1)
Length of last but one sd	12	11.5-13 (12.0 \pm 0.5)	12	–	–
Length of terminal sd	17.5	15-19 (17.0 \pm 1.2)	16.5	15	10-12 (11.0 \pm 1.4)
Length of 1st subventral somatic seta (sv)	9.5	7-10.5 (9.1 \pm 1.1)	7.5	–	–
Maximum body diam. (mbd) = <i>desmos</i> included	23	20-27 (24 \pm 2.6)	24	14	15-18 (16.3 \pm 1.5)
mbd (= without <i>desmos</i>)	20	18-24 (20.6 \pm 1.8)	19	–	–
V	51.6 %	48.5-53.0 (50.9 \pm 1.5)	–	–	–
a	6.7	5.9-7.6	7.9	7.5	7.3-8.3
b	5.2	4.3-10	7.6	5.5	5.0-8.8
c	4.0	3.5-4.9	4.0	–	4.0 (n = 1)*

* Anus difficult to localize in two specimens.

annuli at the main ring of inversion. SEM micrographs show large platelets on the main rings. Somatic setae with desmoscoleoid arrangement, but differing from the typical pattern by the reduced number of setae. Setal arrangement showing sexual dimorphism: number of ventrolateral/subventral setae larger in male than in female: four or five *vs* one or exceptionally two in female 7 (for details see further under male and female characters). Subdorsal setae with a large basal shaft, tapered to a fine open tip; first pair slightly longer and terminal pair clearly longer than other setae. Subventral/ventrosublateral setae similar in shape to subdorsal setae, but shorter. Head about one and a half times wider than long (maxi-

mum width 12.5 μm in holotype female), with an anteriorly orientated protruding dorsal and ventral wall, embracing the narrow lip region (not protruding in female 6). Cuticle thick, laterally largely covered by the amphids; posteriorly with a thin layer of "desmos". Amphideal fovea with a large, striated vesicular *corpus gelatum*, extending from lip region to posterior head end. Amphidial pore small, subterminal. Cephalic setae with broad basal shaft, tapered to a fine open tip and inserted at base of lip region. SEM *en face* views reveal a rosette-like labial ridge with tubular structures (= cephalic tubercles?) in between; each of the six sectors with a seta, showing some similarity with the six-lobed outer ridge

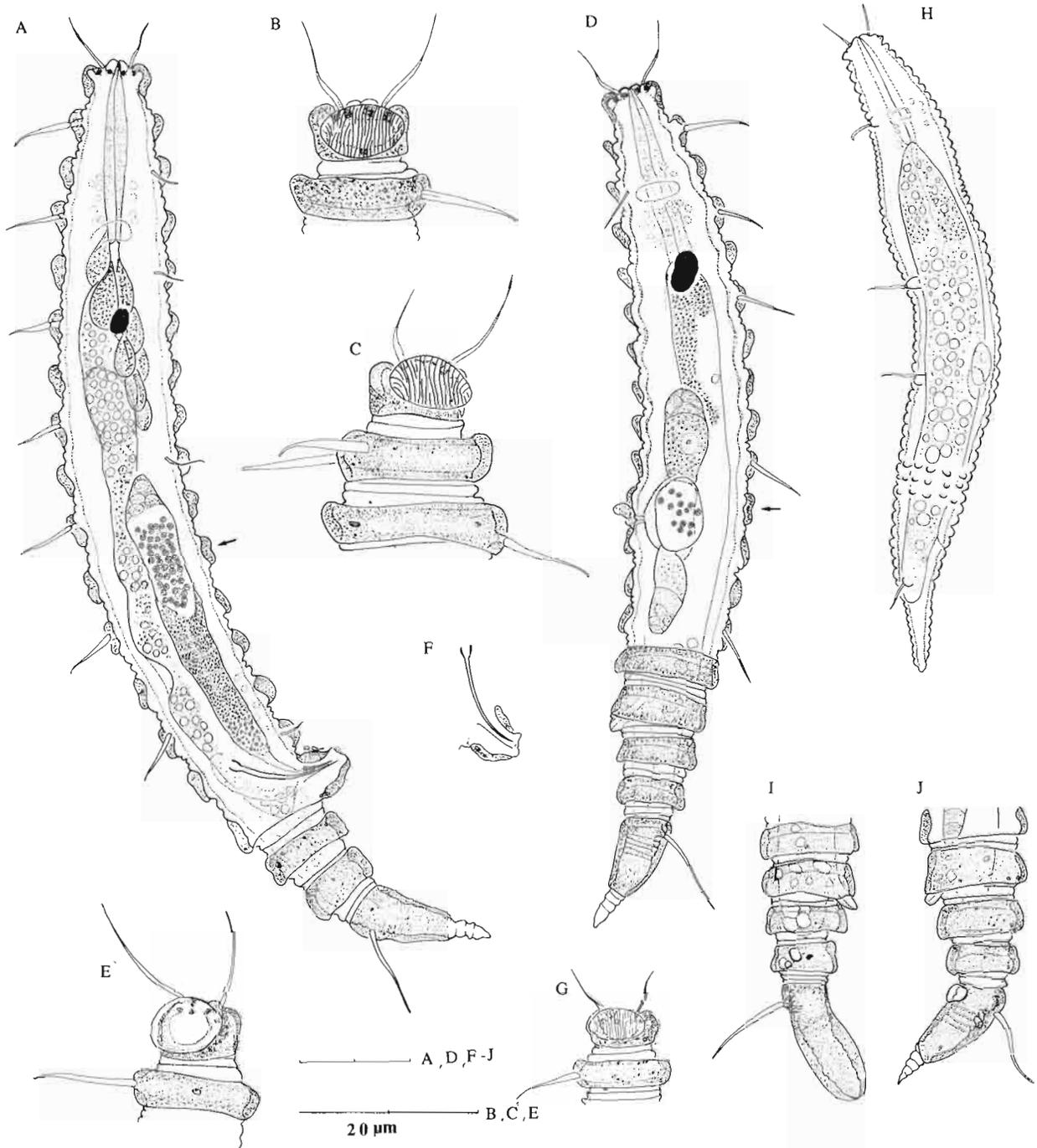


Fig. 1. *Desmoscolex* (*Desmolorenzenia*) *camerunensis* sp. n. **A**: General view of the male paratype (tail in surface view); **B**, **C**, **E**, **G**: Surface view of head region and anterior body ring(s), respectively of holotype female, paratype females (**C**, **E**) and the paratype male; **D**: General view of holotype female (tail region in surface view); **F**: Copulatory apparatus; **H**: General view of a third-stage juvenile; **I**-**J**: Females (tail region in surface view).

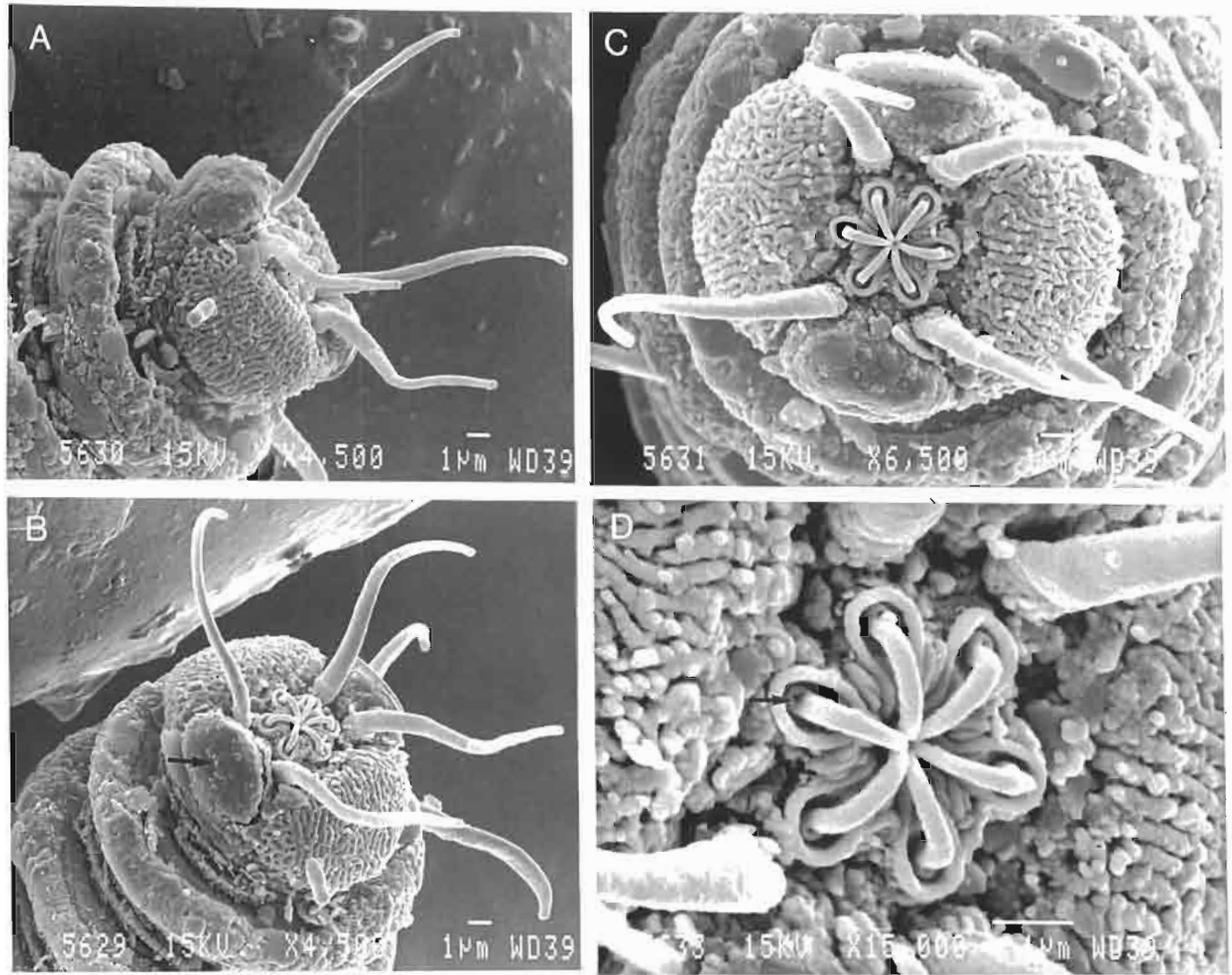


Fig. 2. SEM observations of *Desmoscolex* (*Desmolorenzenia*) *camerunensis* sp. n., female. *A*: Lateral view of head and first main ring; *B*: Oblique, ventrolateral view of head (arrow indicates vesicle-like protruding part of the ventral wall); *C*: En face view of lip region, dorsal side uppermost; *D*: En face view: detail of labial ridge and outer labial sensilla (arrow indicates pore at base of a labial seta).

surrounding six outer labial papillae in *Desmoscolex* (*Desmoscolex*) *parvospiculatus* Decraemer, 1996. Each labial seta having a pore at its base, and all labial setae bent inward (due to fixation?) through the oral opening, thus obscuring its structure. Presence of a pore at the base of each outer labial papilla in the new species observed for the first time. Digestive system with a minute buccal cavity, a short cylindrical pharynx extending to main ring 3 or to the interzone between main rings 3 and 4; from this level, joining in a thin-walled, finely granular anterior intestine, distinctly enlarging opposite main ring 4. Posterior intestine with large globules and terminally overlapping the rectum dorsally over a short distance. At level of main rings 3 to 5, presence of a yellowish to brownish pigment concentration (*ocellus*). One to three finely granular cells with pale nucleus (= pseudocoelomocytes) occasionally observed ventrally along

anterior intestine, posterior to the ocelli on each side. Tail with three main rings. End ring anteriorly broadly cylindrical, finely annulated, bearing insertion of terminal pair of subdorsal setae; at mid-length tapering and largely smooth. End ring surrounded by *desmos* except for a short (about 10 µm) annulated tube-like end (female 6 with two pairs of subventral somatic setae has *desmos* to tail terminus).

Female: Somatic setal arrangement in holotype female: subdorsally: 1, 3, 5, 9, 13, 18 = 6 (left side), 1, 3, 7, 9, 11, 13, 18 = 7 (right side); ventrolaterally, on both sides: 2 = 1. Paratype females with one pair of ventrolaterally inserted setae on main ring 2 (except female 7 with two pairs, respectively on main rings 2 and 6). Number of subdorsal setae varying from six to eight, similar on both sides or with one seta difference; setae

Table 2. *Desmoscolex* (*Desmolorenzenia*) *camerunensis* sp. n. : somatic setal pattern with indication of the number of somatic setae on the right and left body side; in parenthesis the number of the rings which lack setae

	No subdorsal setae, right side	No subdorsal setae, left side
Female 1	6 (rings 4, 6)	6 (rings 9, 13)
Female 2	7 (ring 7)	6 (rings 7, 11)
Female 3	7 (ring 5)	6 (rings 7, 11)
Female 4	6 (rings 7, 11)	7 (ring 5)
Female 5	7 (ring 7)	7 (ring 7)
Female 6	7 (ring 7)	6 (rings 7, 11)
Female 7	8 (-)	8 (-)
Female 8	6 (rings 7, 11)	7 (ring 5)
Female 9	6 (rings 7, 11)	7 (ring 5)
Female 10	7 (ring 11)	8 (-)

occasionally lacking on rings 5, 7 and 11, on one side or on both sides, without any evidence of being broken off. Reproductive system didelphic-amphidelphic with both branches outstretched, largely ventral to the intestine; posterior branch occasionally reaching the anal region. At level of uteri, two globular spermathecae (not always clearly differentiated) with small globular sperm. Vulva situated at the posterior end of main ring 10; in some specimens vulva with a secretion plug. Short anal tube, 1.5-3 μm long, protruding from posterior border of main ring 15.

Male: Somatic setal arrangement: subdorsally, on both sides: 1, 3, 5, 7, 9, 11, 13, 18 = 8; subventrally: 2, 4, 8, 14, 15 = 5 (left side), 2, 6, 14, 15 = 4 (right side). Reproductive system with a single outstretched testis extending to main ring 8. Spicules short, 21 μm long, with a knob-like capitulum and with a very fine shaft, slightly curved distally. Gubernaculum, 7 μm long, parallel to spicules. Cloacal tube protruding from the ventrally expanded body wall in main ring 15.

Third-stage juvenile: Body shape different from adults by the absence of main rings. Cuticle finely annulated, with 65 annuli in all three specimens observed; each annulus with a transverse row of warts (23 warts on ring 18; about 15 warts on posterior annuli). Somatic setal pattern without subventral setae; four subdorsal setae present on each side respectively on rings 7, 21, 37, 54 (left side) and rings 7, 27, 37, 54 (right side); subdorsal setae short, terminal pair longer; similar shape as in adults. A small pigment spot (3.5 by 4.5 μm), opposite ring 35 (left) or ring 38 (right) observed in one specimen lost during processing for SEM. Reproductive system little developed, consisting of two branches of a few cells each (4.5-9.5 μm long). Anus obscure.

Second-stage juvenile: Similar to third stage juveniles but slightly shorter, with a somewhat larger number of annuli: 67 (right)- 68 (left) in the single specimen found; three subdorsal somatic setae on the right body side: on rings 8, 28 and 57 and one seta on the left side on ring 57. Genital primordium of a few cells, 3 μm long.

TYPE MATERIAL

Holotype female, slide no. 114/2/1 and eight paratypes (five fem. [fem. 1 to 5], three juveniles) deposited in the Deutsche Nematodensammlung (DNST), Institut für Nematologie und Wirbeltierkunde, Münster (slides no. 114/2/2-6); five paratypes (one male, four fem. [fem. 6 to 9]) in the nematode collection of the Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels (KBIN), slides no RIT 481-482. Female 10 was used for SEM studies.

TYPE LOCALITY AND TYPE HABITAT

South Cameroon, about 30 km south of Kribi, near settlement Mbode, in northern part of Campo Reserve. Natural forest vegetation immediately on coastal beach and close to a small brook, fine-textured loamy-sandy soil, rather wet. Also found about 30 km south of Kribi, near settlement Mbode. Virgin rain forest about 3 km east of coastal line, with almost no undervegetation, sandy soil covered by fallen leaves.

DIAGNOSIS

Desmoscolex (*Desmolorenzenia*) *camerunensis* sp. n. has eighteen (exceptionally nineteen) quadricomoid main body rings in the adults with inversion of direction at level of main ring 10 (exceptionally ring 11); a rounded rectangular head shape with four cephalic setae inserted at the base of the lip region; large, striated/grooved vesicular amphids; sexual dimorphism in the somatic setal pattern with typical number (eight) and arrangement of the subdorsal somatic setae in male *vs* six to eight in female, and four to five subventral setae in male *vs* one (exceptionally two) in female; characterized by the shape of the end ring with uncovered annulated tube-like end and in male by short, slender and cephalated spicules.

D. (D.) camerunensis sp. n. most closely resembles *D. (Desmolorenzenia) montana* Decraemer & Sturhan, 1982 type specimens in number and structure of the main rings, a similar rounded-rectangular head shape with far anterior insertion of the cephalic setae, similar somatic setal pattern in juveniles and a comparable spicule shape. It also resembles *D. (D.) indicus* in habitus. The new species differ from the *D. (D.) montana* and *D. (D.) indicus*, the other terrestrial species of the subgenus *Desmolorenzenia*, by the features presented in Table 3.

Table 3. Differences between *Desmoscolex* (*Desmolorenzenia*) *camerunensis* n.sp. and the other terrestrial species of the subgenus *Desmolorenzenia* : *Desmoscolex* (*Desmolorenzenia*) *montana* and *Desmoscolex* (*Desmolorenzenia*) *indicus*.

		<i>D. (D.) camerunensis</i> n. sp.	<i>D. (D.) montana</i> type specimens	<i>D. (D.) montana</i> Papua New Guinea	<i>D. (D.) montana</i> Solomon Islands	<i>D. (D.) indicus</i>
No subdorsal setae	Male	8	9	9	9	–
	Female	6-8	9 (8)	9	9	8-9
No subventral setae	Male	4-5	4	4	4	–
	Female	1 (2)	1	1	1-2	1
Amphid		striated	smooth	dotted	dotted	? smooth
Endring		long, uncovered end, annulated	minute uncovered end, smooth, narrow	minute uncovered end, smooth, narrow	minute uncovered end, smooth, narrow	tail end covered
Inversion ring	Male	10	14	13-14	14	–
	Female	10 (11)	14 (13)	13-14	13 or 11	13-14

REMARKS

One male specimen of *D. (D.) montana* from Guatemala and one male from the Philippines have five subventral setae (Decraemer & Sturhan, 1982).

The protruding cuticle dorsally and ventrally on the head, as well as the invisibility of labial setae in LM and the absence of some subdorsal setae in the female somatic setal pattern, may be due to the fixation procedure. Provided the visibility of the labial setae and the setal pattern are not caused by fixation procedure, these two characteristics are also different in *D. (D.) montana*.

Conclusion

The SEM studies of *D. (D.) camerunensis* n. sp. from terrestrial habitats show a type of lip region (= with a rosette-like labial ridge of which each sector embracing a fine labial seta) not known before within the Desmoscolecida (Shirayama & Hope, 1992; Decraemer, 1996). Hitherto, the ultrastructure of the lip region in the subgenus *Desmolorenzenia* is known from a single species: *D. (Desmolorenzenia)* sp. 1 from a marine habitat (Shirayama & Hope, 1992). Its lip region pattern was described as similar to that of *D. (Desmoscolex) laevis* Kreis, 1928: "labial structure with thin cephalic tubercles arranged in a single crown near the labial ridge; six depressions, formed by five to six flat specialized cephalic tubercles situated mesial to the crown of cephalic tubercles and a labial sensillum present within each depression". The ornamented (= with pliae/striae) amphidial fovea observed in the new species is a new feature for desmoscolecids.

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