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Morphometric studies on *Coomansus* Jairajpuri & Khan, 1977 (Nematoda: Mononchida) and descriptions of two new species from the Subantarctic region

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Summary – Four known and two new species of the genus *Coomansus* Jairajpuri & Khan, 1977, inhabiting different areas of New Zealand, the Antarctic Peninsula, and Subantarctic America, are studied. A morphometric analysis is carried out to differentiate between *C. gerlachei* (de Man, 1904), *C. mesadenus* (Clark, 1960), *C. composticola* (Clark, 1960), *C. intestinus* (Vinciguerra & La Rosa, 1990), *C. meridionalis* sp. n., and *C. magellanicus* sp. n. *C. meridionalis* sp. n. is characterized mainly by body length (2.10-2.65 mm), buccal cavity size (39-45 × 18-22 µm), apex of the dorsal tooth at 84-95 % of the total buccal cavity measured from the base, spicule length (94-110 µm), very slender lateral guiding pieces, conoid and ventrally curved tail with rounded terminus, and absence of spinneret. *C. magellanicus* sp. n. can be separated from the other species of the genus by the following combination of characters: body length (1.7-2.1 mm), buccal cavity size (32-36 × 18-22 µm), apex of the dorsal tooth at 76-80 % of the total buccal cavity from base, spicule length (97-98 µm), not very slender lateral guiding pieces, conoid and ventrally arcuate tail with broadly rounded terminus, and absence of caudal glands. © Orstom/Elsevier, Paris

Résumé – ***Étude morphométrique sur le genre* Coomansus *Jairajpuri & Khan, 1977 (Nematoda : Mononchida) et description de deux nouvelles espèces provenant de l'aire subantarctique*** – Quatre espèces déjà connues et deux nouvelles appartenant au genre *Coomansus* Jairajpuri & Khan, 1977, provenant de différentes régions de la Nouvelle Zélande, de la Péninsule Antarctique et de l'Amérique subantarctique, sont étudiées. Une analyse morphométrique a été réalisée en vue de différencier *C. gerlachei* (de Man, 1904), *C. mesadenus* (Clark, 1960), *C. composticola* (Clark, 1960), *C. intestinus* (Vinciguerra & La Rosa, 1990), *C. meridionalis* sp. n. and *C. magellanicus* sp. n. *C. meridionalis* sp. n. est principalement caractérisé par la longueur du corps (2,10-2,65 mm), la taille de la cavité buccale (39-45 × 18-22 µm), l'apex de la dent dorsale situé à 84-95 % de la longueur totale de la cavité buccale mesurée à partir de sa base, la longueur des spicules (94-110 µm), les pièces-guides latérales très minces, une queue conoïde, courbée ventralement, à extrémité arrondie, et l'absence de filière. *C. magellanicus* sp. n. peut être distingué des autres espèces du genre par la combinaison de caractères suivante: longueur du corps (1,7-2,1 mm), taille de la cavité buccale (32-36 × 18-22 µm), apex de la dent dorsale situé à 76-80 % de la longueur totale de la cavité buccale mesurée à partir de sa base, longueur des spicules (97-98 µm), pièces-guides latérales pas très minces, queue conoïde, arquée, à extrémité largement arrondie, absence de glandes caudales. © Orstom/Elsevier, Paris

Keywords: *Coomansus meridionalis* sp. n., *Coomansus magellanicus* sp. n., Mononchida, Nematoda, Subantarctica, taxonomy.

Five species of the genus *Coomansus* Jairajpuri & Khan, 1977 are known from the Antarctic and Subantarctic Territories and New Zealand Islands: *C. gerlachei* (de Man, 1904) Jairajpuri & Khan, 1977, *C. campbelli* (Allgén, 1929) Jairajpuri & Khan, 1977, *C. composticola* (Clark, 1960) Jairajpuri & Khan, 1977, *C. mesadenus* (Clark, 1960) Jairajpuri & Khan, 1977, and *C. intestinus* (Vinciguerra & La Rosa, 1990) Andrássy, 1993. These species were studied by Loof and Winiszewska-Slipinska (1993) and Andrássy (1993) who gave dichotomous keys for all large *Coomansus* species with the dorsal tooth located in the anterior half of the buccal cavity. Populations of some of these species were recorded from widely separated geographic areas, *e.g. C. campbelli,* a species described from Campbell Island, was reported by Mulvey and Jensen (1967) from Nigeria and by Coetzee (1968*b*) from South Africa. Mulvey and Jensen (1967) point out that their specimen differs from those collected near the type locality and described by Clark (1963). In our opinion, this specimen represents a different *Coomansus* species. However, Coetzee (1968*a*) later described her material as *Mononchus jugalis*, a species since transferred to the genus *Clarkus* (Jairajpuri, 1970; Jairajpuri & Khan, 1977) and synonymized

with *C. sheri* (Mulvey, 1967) by Andrássy (1983), a decision supported by de Bruin and Heyns (1992).

The present paper studies the rest of the abovementioned species, with a review of specimens previously described by Clark (1960, 1963), Chaves (1990), and Vinciguerra and La Rosa (1990) and with detailed descriptions and illustrations of more recent collections. *C. meridionalis* sp. n. and *C. magellanicus* sp. n. are described from subantarctic localities of New Zealand (Campbell Island) and Chile, respectively.

Materials and methods

For this study, the following type material was examined from The National Nematode Collection of New Zealand (Wouts, 1973): *C. mesadenus*, male and female paratypes, slides n° 410, 412, 414-418, 421-424, 430 and 431; *C. composticola*, allotype and male and female paratypes, slides n° 444, 447, 448, 450-454, 458, 465 and 466.

Other specimens, originating from Campbell Island, labelled as *M. mesadenus* by Dr Clark and as *Clarkus* in the collection of Dr Wouts were added, along with specimens of *C. gerlachei* loaned by Dr Chaves, the female paratype of *C. intestinus* loaned by Dr Vinciguerra and material collected from southern Chile by Dr Bello.

The most recently collected specimens were extracted by the Flegg (1967) technique, killed and fixed by heat in F.G. 4:1, processed in hot lactophenol, and mounted in pure glycerin.

All previously described specimens used in the present work were remeasured. The univariate analysis of variance (ANOVA) was used to test significant differences in selected characters between groups of individuals. The grouping was checked using principal component analysis (PCA), an objective ordination method which emphasizes the major pattern of the variation in order to better search for species separation (for univariate and multivariate methods see *i. al.* Sneath & Sokal, 1973; Afifi & Clark, 1990; Sokal & Rohlf, 1994).

Morphometric studies

The primary purpose of this study was to determine characters for the separation of the 53 female and 24 male specimens of the analysis. Table 1 shows the measurements of four females and four males of *C. gerlachei* described by Chaves (1990) from the Antarctic Peninsula, some male and female paratypes of *C. mesadenus* described by Clark (1960) from different localities on New Zealand Islands, specimens of the same species described by Clark (1963) from Campbell Island, and one female paratype of *C. intestinus* from Tierra del Fuego (South America). The measurements of the allotype and some paratypes of *C. composticola* are given in Table 2. Table 3 contains measurements of specimens from Campbell Island, supplied by Dr Wouts, described below as *C. meridionalis* sp. n., and of specimens collected from southern Chile by Dr Bello, named here *C. magellanicus* sp. n. The tables include all characters or variables used in this study.

A preliminary study of the data revealed significant ($P < 0.01$) linear correlations between some measurements. Thus, in females, the body length was correlated with labial diameter, buccal cavity length, buccal cavity diameter, nerve ring and excretory pore distances to anterior body end, and pharynx length. Nevertheless, there were no significant correlations with respect to height of the lip region, length of the amphid aperture, and tail length. Likewise, in males, significant correlations were found between body length and buccal cavity length, nerve ring distance to anterior body end, pharynx length, and tail length. This correlation was low with respect to the height of the lip region and length of the amphid aperture and gubernaculum length. As there were few highly significant ($P < 0.01$) correlations, a total of twenty variables for females and nineteen for males were used in the analysis.

Each single variable was analysed using one-way ANOVA, to establish which ones gave significant differences ($P \leq 0.01$) among the species (Table 4). In females, significant differences were found for twenty variables, but only for fifteen in males. Because of this, characters with less significant differences (*i.e.*, b, c and T indices and variables related to amphid and gubernaculum) were removed from the analysis.

A principal components analysis was carried out on log transformed data. In females (Fig. 1), the first two principal components account for 44.2 and 25.1 % of the total variation, respectively. The first principal component (axis I) is dominated by high positive weights for body length, labial diameter, buccal cavity length and diameter, nerve ring and excretory pore to anterior body end distances, and pharynx and vagina length. It provides an ordination of the individuals that is much in agreement with the linear measurement variables. Note that index variables are not essential elements on this axis. Consequently, this component can be interpreted as a general size axis that separates the individuals (and species) by their sizes. On the contrary, the second principal component (axis II) arranges the individuals more on the basis of index variables, a, b, c' and apex indices and tail length, which have a negative weight. This component represents shape and indicates how shapes separate individuals. Both axes provide separate ordinations of the individuals in groups that identify the species considered. Thus, *C. composticola* (below) and

Table 1. *Morphometric data of remeasured specimens of* Coomansus gerlachei, C. mesadenus *and* C. intestinus *(all measurements in µm, except L in mm)*

	C. gerlachei		*C. mesadenus*				*C. intestinus*
	Antarctic Peninsula		New Zealand Islands		Campbell Island		Tierra del Fuego
	Females	Males	Female (paratypes)	Males (paratypes)	Females	Males	Female (paratype)
n	4	4	7	11	11	1	1
L	3.51 ± 0.43 (2.85-4.07)	3.40 ± 0.18 (3.24-3.67)	3.35 ± 0.28 (3.01-3.75)	3.18 ± 0.26 (2.68-3.66)	3.35 ± 0.30 (2.93-4.05)	3.51	1.76
a	36.6 ± 5.8 (28.0-43.9)	38.0 ± 0.7 (37.2-38.8)	37.0 ± 3.7 (34.0-44.5)	35.0 ± 3.7 (28.1-41.3)	38.8 ± 3.0 (34.9-45.8)	38.2	32.5
b	5.2 ± 0.2 (4.9-5.6)	4.8 ± 0.1 (4.7-5.1)	4.5 ± 0.2 (4.2-4.9)	4.3 ± 0.2 (4.0-4.7)	4.6 ± 0.2 (4.3-4.9)	4.7	4.3
c	17.2 ± 1.6 (15.2-19.2)	20.9 ± 0.7 (20.2-22.0)	13.5 ± 1.3 (11.8-15.8)	19.4 ± 1.8 (16.7-23.5)	15.2 ± 0.9 (13.1-16.7)	22.6	12.7
c'	3.8 ± 0.2 (3.5-4.0)	2.0 ± 0.1 (1.8-2.1)	4.8 ± 0.6 (3.6-5.6)	2.5 ± 0.2 (1.9-2.8)	4.4 ± 0.3 (3.8-4.9)	2.2	4.1
V/T	52.7 ± 1.7 (51.5-55.6)	52.7 ± 1.7 (50.6-55.3)	54.3 ± 1.3 (52.5-56)	53.5 ± 4.5 (41.1-59.5)	54.5 ± 1.3 (52.8-57.1)	56.9	58.6
G_1	12.6 ± 2.3 (10.9-16.5)	-	12.9 ± 1.5 (10.4-15.4)	-	12.7 ± 0.7 (11.8-13.8)	-	16.2
G_2	12.9 ± 3.4 (10.9-18.8)	-	12.3 ± 1.3 (10.7-14.7)	-	12.7 ± 0.6 (11.7-13.7)	-	14.1
Max. body diam.	96.7 ± 8.8 (81.5-103.5)	89.4 ± 3.2 (86.5-94.5)	91.3 ± 11.1 (74.5-110.0)	91.7 ± 10.5 (76.0-115.0)	86.7 ± 9.5 (67.0-103.5)	92.0	54.0
Cuticle at head	3.2 ± 0.5 (2.5-4.0)	2.8 ± 0.5 (2.5-3.5)	5.7 ± 1.0 (4.0-7.5)	5.0 ± 0.8 (3.5-6.5)	4.5 ± 0.4 (3.5-5.0)	4.0	2.0
– at midbody	3.9 ± 0.7 (2.5-4.5)	4.4 ± 1.2 (3.0-6.0)	6.3 ± 1.3 (4.5-8.0)	6.0 ± 0.6 (5.5-7.5)	5.1 ± 0.7 (4.0-6.0)	6.5	3.0
– on tail	5.0 ± 0.2 (5.0-5.5)	4.2 ± 1.1 (3.0-6.0)	8.8 ± 0.5 (8.0-10)	6.5 ± 1.2 (5.0-8.5)	8.0 ± 1.7 (5.0-10.0)	8.5	3.5
Lat. chord	36.7 ± 3.5 (31.5-41.5)	31.4 ± 5.0 (23.5-36.0)	16.1 ± 3.4 (12.0-21.5)	16.2 ± 3.9 (11.5-23.0)	18.5 ± 2.5 (11.0-20.5)	14.0	16.0
Head diam.	43.5 ± 3.1 (39.5-48.0)	43.7 ± 0.6 (43.0-44.5)	43.1 ± 3.4 (39.0-48.0)	42.3 ± 1.6 (39.5-44.5)	44.1 ± 1.5 (41.0-46.5)	45.0	35.5
– height	14.7 ± 2.3 (13.0-18.5)	15.0 ± 0.7 (14.0-16.0)	14.9 ± 2.3 (12.0-19.0)	15.6 ± 1.4 (14.0-19.0)	15.5 ± 1.1 (12.5-17.0)	14.5	13.0
Amphid	5.2 ± 0.2 (5.0-5.5)	6.0 ± 0.5 (5.5-6.5)	6.1 ± 0.4 (6.0-7.0)	6.2 ± 0.5 (5.5-7.0)	5.2 ± 0.6 (4.5-6.5)	5.5	5.0
Bucc. cav. length	49.7 ± 1.2 (47.5-51.0)	49.5 ± 0.6 (49.0-50.5)	49.5 ± 3.7 (44.0-54.0)	49.2 ± 1.5 (47.5-52.5)	51.1 ± 1.8 (48.5-55.0)	53.0	38.0
– diameter	27.4 ± 1.2 (25.5-29.0)	25.2 ± 1.5 (22.5-27.5)	26.4 ± 2.1 (23.0-29.5)	25.1 ± 1.2 (23.5-27.0)	25.5 ± 1.5 (23.0-28.0)	23.0	21.0
Dors. tooth apex	85.4 ± 1.1 (84.6-87.3)	85.6 ± 2.1 (82.1-87.6)	87.6 ± 2.0 (85.0-91.5)	88.3 ± 2.4 (84.6-93.4)	90.7 ± 1.5 (88.5-93.0)	92.0	86.0
Nerv. ring-ant. end	201.4 ± 22.0 (166-220)	225.0 ± 4.3 (219-231)	215.4 ± 8.2 (197-221.5)	215.6 ± 20.4 (165-241.5)	214.9 ± 19.3 (179.5-255.5)	215.5	135.0
Excr. pore-ant. end	224.7 ± 22.9 (188-248.5)	248.5 ± 4.5 (242-254.5)	250.1 ± 16.0 (225.5-272.0)	243.8 ± 22.2 (183-277)	242.4 ± 20.5 (197-282)	246.0	172.5
Pharynx length	626.9 ± 60.8 (524-683)	654.7 ± 21.4 (630.5-685)	682.0 ± 29.5 (623.5-713.5)	688 ± 32.7 (611-743)	683.2 ± 43.1 (631-783.5)	692.5	374.5

End of Table 1 next page

Table 1. (End).

	C. gerlachei		*C. mesadenus*				*C. intestinus*
	Antarctic Peninsula		New Zealand Islands		Campbell Island		Tierra del Fuego
	Females	Males	Female (paratypes)	Males (paratypes)	Females	Males	Female (paratype)
Vagina length	59.1 ± 8.5 (48.5-71.5)	-	37.6 ± 1.3 (36.0-39.0)	-	45.1 ± 4.2 (40.0-52.0)	-	25.0
Tail	204.2 ± 13.0 (188-221)	162.7 ± 10.7 (147-177)	248.4 ± 10.1 (236.5-267.5)	164.1 ± 11.8 (148.5-184.5)	220.1 ± 16.9 (197.5-258)	155.0	138.0
Spicules	-	155.5 ± 6.2 (147-164.5)	-	134.5 ± 5.8 (119.5-142)	-	129.5	-
Gubernaculum	-	39.5 ± 1.0 (38.0-40.5)	-	37.3 ± 4.0 (27.5-41.5)		39.0	-
Lat. guid. pieces	-	33.5 ± 0.5 (33.0-34.5)	-	-	-	-	-
Supplements	-	10.0 ± 0.7 (9-11)	-	10.0 ± 0.7 (9-11)	-	11	-
Sperm	-	16.2 ± 1.3 (14.5-17.5)	-	8.2 ± 1.2 (7.0-10.0)	-	8.5	-
Egg length	172*	-	117, 127.5**	-	-	-	-
– diameter	66.5*	-	66, 68**	-	-	-	-

* n = 1; ** n = 2.

C. magellanicus sp. n. (above) are on the left of the graph, *C. meridionalis* sp. n. is in the center, and the specimens of *C. mesadenus* and *C. gerlachei*, two species that do not separate clearly in this analysis, are on the right of the graph.

In males (Fig. 2), the first two principal components explain 55.4 % and 13.0 % of the variance, respectively. The first principal component arranges more species by size alone than in the females, which means that the second and next components only make minor contributions to ordination. The main elements of the first axis are body length, labial diameter, buccal cavity length and diameter, nerve ring distance to the anterior body end, and pharynx, tail and spicules length. Besides spicule length, tail length is the most important character for separating the individuals, unlike in females. In the corresponding graph, showing the first two axes only, the individuals and species are plotted as for the females. From the two graphs, the separation as new species of *C. meridionalis* sp. n. and *C. magellanicus* sp. n. appears to be justified, but this is not so for the specimens of *C. mesadenus* and *C. gerlachei*. This result is confirmed by ANOVA results (Table 4) which, in the multiple range test, show high significant differences between both males and females of these two species in only few of the characters considered, *i.e.*, b and c' indices, lateral chord, and apex in addition to vagina and spicule length.

Coomansus gerlachei (de Man, 1904) Jairajpuri & Khan, 1977

(Figs 3, 4)

Four male and four female specimens of this species were available for study. Measurements are given in Table 1. They agree well with the description by Chaves (1990), except that two intestinal constrictions are clearly visible in both sexes.

Steiner (1916) reported this species from the Comores Islands, but this record is doubtful because it is based on juvenile specimens only. Mulvey (1978) reported a single male specimen from Canada. This seems to be an exceptional finding since, otherwise, the species is known only from Antarctica.

Coomansus mesadenus (Clark, 1960) Jairajpuri & Khan, 1977

(Figs 5, 6)

Measurements of *C. mesadenus* male and female paratypes from New Zealand Islands and specimens from Campbell Island are given in Table 1. They agree with those by Clark (1960), who considers this species, along with *C. gerlachei*, *C. major* (Cobb, 1893) Loof & Winiszewska-Slipinska, 1993, and *C. composti-*

Table 2. *Morphometric data of remeasured specimens of* Coomansus composticola *from New Zealand Islands (all measurements in µm, except L in mm)*

	Male (allotype)	Male (paratypes)	Female (paratypes)		Male (allotype)	Male (paratypes)	Female (paratypes)
n	1	1	14	Amphid	-	4.5	4.2 ± 0.3 (4.0-4.5)
L	3.37	3.53	2.28 ± 0.21 (1.78-2.68)	Bucc. cav. length	50.0	48.0	35.1 ± 1.6 (31.5-38.0)
a	43.0	4.8 39.1	34.9 ± 2.3 (29.8-38.2)	– . – diameter	22.5	21.0	18.0 ± 0.9 (15.5-19.0)
b	4.6		4.6 ± 0.2 (4.2-4.8)	Dors. tooth apex	90.5	88.0	90.3 ± 2.2 (85.0-93.5)
c	20.4	19.1	8.3 ± 0.4 (7.5-8.9)	Nerv. ring-ant. end	213.5	227.5	165.9 ± 10.1 (143-181)
c'	2.5	2.8	7.1 ± 0.4 (6.4-8.1)	Excr. pore-ant. end	234.5	250.5	184.8 ± 9.2 (169-203)
V/T	51.2	58.9	51.1 ± 1.4 (48.9-55.4)	Pharynx length	688.5	694.5	466.2 ± 30.2 (399-516)
G_1	-	-	9.8 ± 1.4 (8.4-12.7)	Vagina length	-	-	28.8 ± 2.7 (24.0-35.0)
G_2	-	-	9.6 ± 1.7 (7.4-12.9)	Tail	165.5	184.5	273.6 ± 17.3 (236.5-302)
Max. body diam.	78.5	90.5	65.5 ± 6.2 (56.0-78.0)	Spicules	127.0	122.0	-
Cuticle at head	4.0	3.5	2.8 ± 0.6 (2.0-4.0)	Gubernaculum	31.5	31.0	
– at midbody	4.5	4.0	3.8 ± 0.7 (2.5-5.5)	Lat. guid. pieces	29.5	30.0	
– on tail	4.5	4.5	5.9 ± 0.9 (4.0-7.5)	Suppl.	13	13	
Lat. chord	14.0	27.5	15.8 ± 3.3 (12.0-23.5)	Sperm	10.0	9.5	
Head diam.	37.5	34.5	28.9 ± 1.5 (26.5-32.0)	Egg length			124.4 ± 6.5* (112.5-131.5)
– height	13.5	11.5	11.0 ± 1.1 (9.0-13.0)	Egg diameter			57.1 ± 3.3* (51.5-61.5)

* n = 6

cola, to constitute a southern group of closely related species. Loof and Winiszewska-Slipinska (1993) separate *C. mesadenus* from *C. gerlachei* by the length of the spicules (about 70 µm in *C. mesadenus vs* 160 µm in *C. gerlachei*). Our study showed that spicule length is 120-142 µm in *C. mesadenus* and that there are slender lateral guiding pieces in the male, which were overlooked by Clark (1960). Moreover, *C. mesadenus* has reduced caudal glands and a ventrally subterminal caudal pore in the male. It can be distinguished from *C. gerlachei* by the longer tail, shorter spicules and egg and sperm size. If *C. mesadenus* and *C. gerlachei* were the same species it would occur in distant geographic areas.

Coomansus intestinus (Vinciguerra & La Rosa, 1990) Andrássy, 1993

(Fig. 6)

Measurements of the single female paratype studied are given in Table 1. These measurements are smaller

Table 3. *Morphometric data of* Coomansus meridionalis *sp. n. from Campbell Island and* C. magellanicus *sp. n. from Punta Arenas (all measurements in µm, except L in mm)*

	C. meridionalis sp. n.			*C. magellanicus* sp. n.		
	Female (holotype)	Female (paratypes)	Male (paratypes)	Female (holotype)	Female (paratypes)	Male (paratypes)
n	1	7	4	1	7	2
L	2.39	2.41 ± 0.17 (2.16-2.65)	2.39 ± 0.21 (2.09-2.67)	1.99	1.85 ± 0.78 (1.77-2.02)	1.84, 1.97
a	30.6	32.3 ± 2.8 (28.3-37.5)	31.7 ± 1.9 (29.6-34.8)	28.9	28.4 ± 1.4 (26.0-30.0)	29.6, 30.0
b	4.5	4.5 ± 0.2 (4.2-4.8)	4.6 ± 0.4 (4.3-5.2)	5.1	5.0 ± 0.2 (4.7-5.3)	5.0, 5.0
c	15.5	17.9 ± 1.6 (15.8-20.5)	23.4 ± 0.6 (22.8-24.4)	13.0	13.9 ± 0.8 (12.6-14.9)	21.4, 18.0
c'	3.5	3.2 ± 0.3 (2.8-3.5)	1.9 ± 0.1 (1.8-1.9)	3.7	3.2 ± 0.3 (2.6-3.5)	1.5, 1.9
V/T	56.6	55.1 ± 0.9 (53.9-57.0)	56.8 ± 3.7 (53.8-62.8)	52.6	53.3 ± 2.0 (51.3-56.6)	53.1, 74.1
G_1	13.3	12.3 ± 1.2 (10.0-13.8)	-	11.6	12.1 ± 0.7 (10.8-13.2)	-
G_2	12.0	12.0 ± 1.0 (11.0-14.2)	-	9.4	11.8 ± 1.3 (10.3-13.7)	-
Max. body diam	78.5	75.0 ± 8.9 (63.5-94.0)	76.2 ± 10.8 (60.0-90.0)	69.0	65.1 ± 2.9 (61.5-69.5)	62.0, 65.5
Cuticle at head	3.5	3.4 ± 0.4 (2.5-4.0)	3.4 ± 0.6 (2.5-4.0)	4.0	4.0 ± 0.6 (3.0-5.0)	5.0, 4.5
– at midbody	4.0	3.9 ± 0.9 (2.0-5.0)	4.1 ± 0.6 (3.0-5.0)	4.5	5.7 ± 0.6 (5.0-6.5)	6.0, 5.5
– on tail	6.0	6.3 ± 1.1 (5.0-8.0)	4.9 ± 0.6 (4.0-6.0)	6.5	6.8 ± 1.3 (4.5-8.5)	6.5, 6.0
Lat. chord	18.0	17.5 ± 2.8 (13.0-20.5)	19.6 ± 3.6 (15.5-25.0)	22.5	20.6 ± 2.7 (17.5-24.0)	18.5, 21.0
Head diam.	31.0	32.5 ± 1.2 (30.0-34.0)	32.2 ± 2.9 (28.0-35.0)	31.5	31.5 ± 1.4 (30.0-34.0)	32.0, 32.0
– height	12.0	12.5 ± 0.7 (11.0-13.0)	11.6 ± 1.2 (9.5-13.0)	14.0	13.7 ± 0.8 (12.5-14.5)	15.0, 13.5
Amphid	4.0	4.6 ± 0.1 (4.5-5.0)	4.9 ± 0.1 (4.5-5.0)	5.5	6.1 ± 0.4 (5.5-6.5)	6.0, 6.5
Bucc. cav. – length	41.0	41.6 ± 2.0 (39.0-45.0)	42.0 ± 1.9 (40.5-45.0)	34.0	34.4 ± 1.1 (33.0-36.0)	32.5, 33.0
– diameter	19.0	19.4 ± 0.8 (18.5-20.5)	20.0 ± 1.1 (18.5-21.5)	22.0	19.4 ± 0.9 (18.0-20.5)	20.0, 22.0
Dors. tooth apex	86.7	87.8 ± 3.7 (83.5-95.0)	87.8 ± 0.3 (87.4-88.3)	74.0	77.7 ± 1.5 (76.0-79.6)	77.0, 78.0
Nerv. ring-ant. end	157.0	175.8 ± 15.3 (153-196.5)	163.0 ± 10.0 (147.5-174.5)	123.5	113.1 ± 5.6 (101.5-121)	114.0, 115.0
Excr. pore-ant. end	182.0	194.7 ± 12.6 (177.5-211.5)	185.1 ± 12.9 (167-198.5)	145.0	140.3 ± 5.7 (128.5-148.0)	130.5, 131.0
Pharynx length	490.0	498.3 ± 36.4 (434.5-541)	482.6 ± 24.8 (448.5-507.5)	353.0	334.4 ± 8.7 (322.0-346.0)	331.5, 354.0
Vagina length	27.0	34.6 ± 4.2 (27.5-39.5)	-	34.5	29.1 ± 1.7 (25.5-31.5)	-

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Table 3. *(End).*

	C. meridionalis sp. n.			*C. magellanicus* sp. n.		
	Female (holotype)	Female (paratypes)	Male (paratypes)	Female (holotype)	Female (paratypes)	Male (paratypes)
Tail	154.0	135.1 ± 6.8 (126.5-144)	102.4 ± 9.4 (91.5-117.5)	154.0	132.8 ± 8.2 (118.5-144.5)	86.0, 109.5
Spicules	-	-	104.0 ± 6.6 (93.5-110.5)	-	-	98.0, 97.0
Gubernaculum	-	-	28.4 ± 4.9 (20.0-33.0)	-	-	19.5, 23.0
Lat. guid. pieces	-	-	25.3 ± 1.0 (23.5-26.0)	-	-	21.0, 23.0
Supplements	-	-	12.2 ± 0.4 (12-13)	-	-	11, 12
Sperm			10.7 ± 0.4 (10.0-11.5)			9.5, 8.5

than those by Vinciguerra and La Rosa (1990) for body, pharynx and tail length. In the paratype, the uterus lacks a coiled region but a poorly developed swollen part is present. This species is a member of the aforementioned group of species and was reported from South America (Tierra del Fuego) by its original authors and from near Antarctica (Deception Island) by Andrássy (1993).

Coomansus composticola (Clark, 1960) Jairajpuri & Khan, 1977

The allotype and several male and female paratypes were examined. Measurements are provided in Table 2 and are in agreement with those by Clark (1960). Although no mention of lateral guiding pieces was made by Clark, they are present and appear very slender as in *C. gerlachei* and *C. mesadenus* (Fig. 5).

Coomansus meridionalis * sp. n.

(Figs 7, 8)

MEASUREMENTS

See Table 3.

DESCRIPTION

Female: Large, about 75 µm wide at midbody and 2.5 mm long. Body cylindrical, with truncate head, tapering slightly towards anterior end and more gradually towards posterior extremity. Habitus more or less ventrally curved when fixed, frequently G- to J-shaped, and strongly curved in the caudal region. Cuticle smooth or with obscure transverse striations. Lateral chord occupying 23 ± 3 (18-30) % of midbody diameter. Lip region separated from the adjacent body by a depression, 2.6 ± 0.16 (2.5-3) times as wide as high. Lips separated and rounded. Labial and cephalic papillae prominent, jutting out from the head contour. Amphid cup-shaped, located at the level of the cephalic depression; its aperture extending 14 ± 1 (13-15) % of lip region diameter. Buccal cavity barrel to funnel-shaped and not flattened at base, with thick walls, 2.1 ± 0.1 (1.9-2.3) times as long as wide. A dorsal tooth, forward directed, situated at the anterior region; its apex located at 87.6 ± 3.47 (83.7-95) % of the buccal cavity length from the base. Large ventrosublateral foramina visible in the basal plates. Pharynx cylindrical, muscular, surrounding the basal part of the stoma. Nerve ring located at 32.2 ± 1.9 (30-35) % of the total neck region measured from the anterior end. Excretory pore small but easily visible, situated behind the nerve ring. Pharyngo-intestinal junction not tuberculate, with conical organ short and rounded. Intestinal cells polygonal, granular, eight to ten in transverse section. Bacillary layer well developed, especially visible at the anterior and posterior regions. Genital system didelphic-amphidelphic. Ovary short, not reaching to the oviduct-uterus junction. Oocytes few in number. Oviduct consisting of a narrow distal part and a well developed proximal *pars dilatata*. A small sphincter present at the oviduct-uterus junction with an inner, poorly sclerotized part surrounded by a muscular part. Uterus consisting of a narrow coiled distal part and a large swollen proximal part filled with abundant sperm. Vagina cylindrical, extending over 45 ± 6 (34-53) % of the corresponding body diameter. Two small to medium sized sclero-

* The specific epithet is derived from Latin word *meridianus*, referring to a southern geographical location.

Table 4. *One-way ANOVA of the differences in character values, for females and males, concerning all the species of* Coomansus *studied, except* C. intestinus. *Snedecor's F values are for significant differences (P ≤ 0.01). a* = C. mesadenus, *b* = C. meridionalis, *c* = C. gerlachei, *d* = C. composticola, *e* = C. magellanicus

Character	Females		Males	
	F value	Significant differences between species	F value	Significant differences between species
1. L	70.4	a-b/a-d/a-e/b-c/b-e/c-d/c-e/d-e	26.5	a-b/a-e/b-c/b-d/b-e/c-e/d-e
2. a	14.0	a-b/a-d/a-e/b-c/b-e/c-e/d-e	5.0	a-d/a-e/b-c/b-d/c-e/d-e
3. b	18.5	a-c/a-e/b-c/b-e/c-d/d-e	4.2	a-c/a-e
4. c	90.5	a-b/a-c/a-d/b-d/b-e/c-d/c-e/d-e	–	–
5. c'	160.9	a-b/a-c/a-d/a-e/b-c/b-d/c-d/d-e	9.7	a-b/a-c/a-e/b-d/c-d/d-e
6. V/T	13.4	a-d/b-c/b-d/b-e/d-e	–	–
7. G_1	10.4	a-d/b-d/c-d/d-e	–	–
8. G_2	7.1	a-d/b-d/c-d/d-e	–	–
9. Lateral chord	36.0	a-c/a-e/b-c/b-e/c-d/c-e/d-e	6.2	a-c/b-c/c-d/c-e
10. Lip region diam.	128.7	a-b/a-d/a-e/b-c/b-d/c-d/c-e/d-e	30.9	a-b/a-d/a-e/b-c/b-d/c-d/c-e/d-e
11. Lip region height	18.9	a-b/a-d/a-e/b-c/b-d/c-d/d-e	8.7	a-b/a-d/b-c/b-e/c-d
12. Amphid	3.8	a-b/a-d/c-d/d-e	–	–
13. Bucc. cav. length	140.0	a-b/a-d/a-e/b-c/b-d/b-e/c-d/c-e	70.5	a-b/a-e/b-c/b-d/b-e/c-e/d-e
14. Bucc. cav. diameter	89.9	a-b/a-d/a-e/b-c/b-d/c-d/c-e/d-e	13.7	a-b/a-d/a-e/b-c/c-d/c-e
15. Dorsal tooth apex	41.5	a-c/a-e/b-d/b-e/c-d/c-e/d-e	12.3	a-c/a-e/b-e/c-e/d-e
16. N. r.-ant. end	70.8	a-b/a-d/a-e/b-c/b-e/c-d/c-e/d-e	34.2	a-b/a-e/b-c/b-d/b-e/c-e/d-e
17. Excr. p.-ant. end	72.2	a-b/a-c/a-d/a-e/b-c/b-e/c-d/c-e/d-e	33.0	a-b/a-e/b-c/b-d/b-e/c-e/d-e
18. Pharynx length	149.6	a-b/a-c/a-d/a-e/b-c/b-e/c-d/c-e/d-e	124.7	a-b/a-e/b-c/b-d/b-e/c-e/d-e
19. Vagina length	42.8	a-b/a-c/a-d/a-e/b-c/b-d/c-d/c-e	–	–
20. Tail	129.9	a-b/a-c/a-d/a-e/b-c/b-d/c-d/c-e/d-e	36.2	a-b/a-e/b-c/b-d/c-e/d-e
21. Spicules	–	–	47.9	a-b/a-c/a-e/b-c/b-d/c-d/c-e/d-e
22. Supplement number	–	–	12.6	a-b/a-d/a-e/b-c/c-d/c-e

tized pieces in the vagina-vulva junction. Vulva apparently a short transverse slit. Zero to three prevulval and zero to five postvulval papillae, irregularly spaced, prevulval papillae mostly absent and sometimes no vulval papillae at all. Tail conoid, ventrally curved and gradually tapering to a rounded terminus. Caudal glands indistinct and spinneret and its opening absent. Caudal papillae or pore weakly visible, apparently four on each side of the tail.

Male: General morphology similar to female. About 75 µm wide at mid-body and 2.5 mm long, posterior region more ventrally curved. Lateral chord extending over 26 ± 2 (22-28) % of midbody diameter. Lip region 2.8 ± 0.08 (2.7-2.9) times as wide as high. Amphid occupying 16 ± 2 (14-17) % of the lip region diameter. Buccal cavity 2.1 ± 0.1 (1.9-2.3) times as long as wide. Nerve ring located at 31.3 ± 1.5 (30-33) % of the total neck region measured from the anterior end. Genital system diorchid. Testes opposed with elongate, spindle-shaped sperm. *Vas deferens* and *ductus ejaculatorius* separated by a constriction with a surrounding group of eight to ten muscular bands. Ventral body contour slightly contracted in region of the anterior supplement. Ejaculatory glands in tandem, sometimes indistinct; rectal glands visible. Twelve to thirteen ventromedian supplements present, more or less regularly spaced, the anterior and posterior ones poorly developed, the rest prominent, mamilliform, and echinulate. Spicules rather thick, ventrally curved, 1.9 ± 0.2 (1.6-2.2) times as long as anal body diameter, measured along axis. Gubernaculum well developed, extending laterally to spicules, with lateral guiding pieces extraordinarily slender with fine bifurcated tip. Tail similar to female but relatively shorter and with more rounded terminus. Caudal glands reduced, subventral duct and opening present. Three subdorsal and three subventral caudal papillae on each side of the tail.

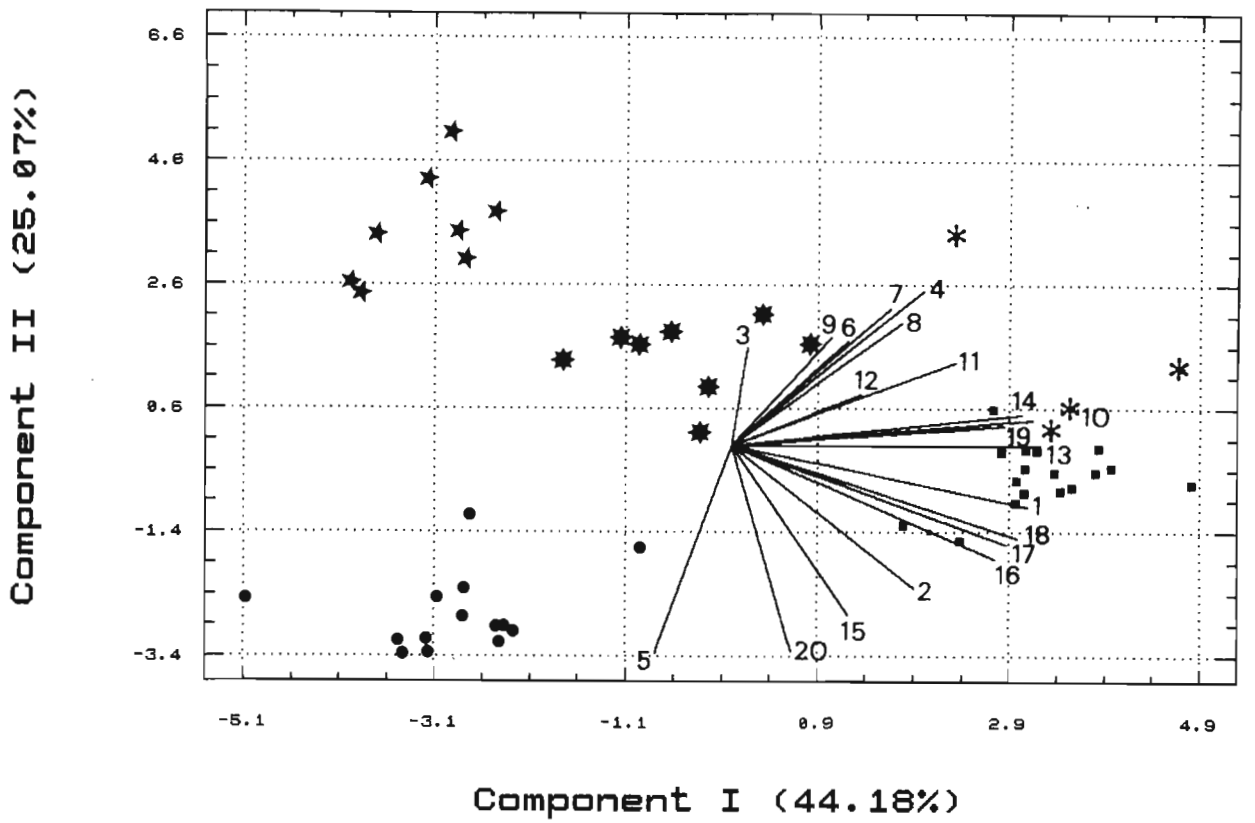

Fig. 1. *Biplot of* Coomansus *females and corresponding characters from the results of the PCA, along the two first axes.* C. magellanicus (★); C. meridionalis (✱); C. composticola (●); C. gerlachei (✲); C. mesadenus (■). *Character numbers as in Table 4.*

TYPE HABITAT AND LOCALITY

Holotype from soil under *Myrsine divaricata* on the east side of Mt. Dumas, Campbell Island, New Zealand. *Paratypes* from the same locality and the following sites from the same island: Tucker Valley, associated with *Dracophyllum scoparium* and *D. longifolium*, and northern slopes of Mt. Honey, around *Poa* sp.

TYPE MATERIAL

Holotype female on slide n° 174, labelled *Clarkus*, from Dr Wouts collection. *Paratypes*, male and female, on slides n° 114, 152, 173 and 174 from the same collection and labelled *Mononchus mesadenus*, Campbell Island S.2. and S.6., from Dr Clark collection. All material deposited in The National Nematode Collection of New Zealand.

DIAGNOSIS AND RELATIONSHIPS

C. meridionalis sp. n. is characterized by its large size (body length 2.10-2.65 mm), lip region set off by a depression, buccal cavity 39-45 × 18-22 µm or 1.9-2.3 times as long as wide, apex of the dorsal tooth at 84-95 % of the total buccal cavity length from base, V = 54-57, ventral body contour slightly contracted at the beginning of the supplement series, ejaculatory glands in tandem, spicules 94-110 µm, very slender and with finely bifurcate lateral guiding pieces, twelve to thirteen mostly echinulate and mammilla-shaped ventromedian supplements, conoid and ventrally curved tail with rounded terminus, and caudal glands and spinneret absent in the female and reduced in the male.

C. meridionalis sp. n. is closely related to *C. gerlachei*, *C. mesadenus* and *C. intestinus*. It can be separated from *C. gerlachei* by the shorter body, smaller size of the buccal cavity, intestinal constrictions absent, shorter spicules, greater number of supplements, more slender guiding pieces, and shorter tail with a more rounded terminus in both sexes. It is similar in several respects to *C. mesadenus*, but it can be distinguished by the shorter body, smaller buccal cavity, slightly greater number of supplements, and shorter and more conical shaped tail. Its measurements are quite similar

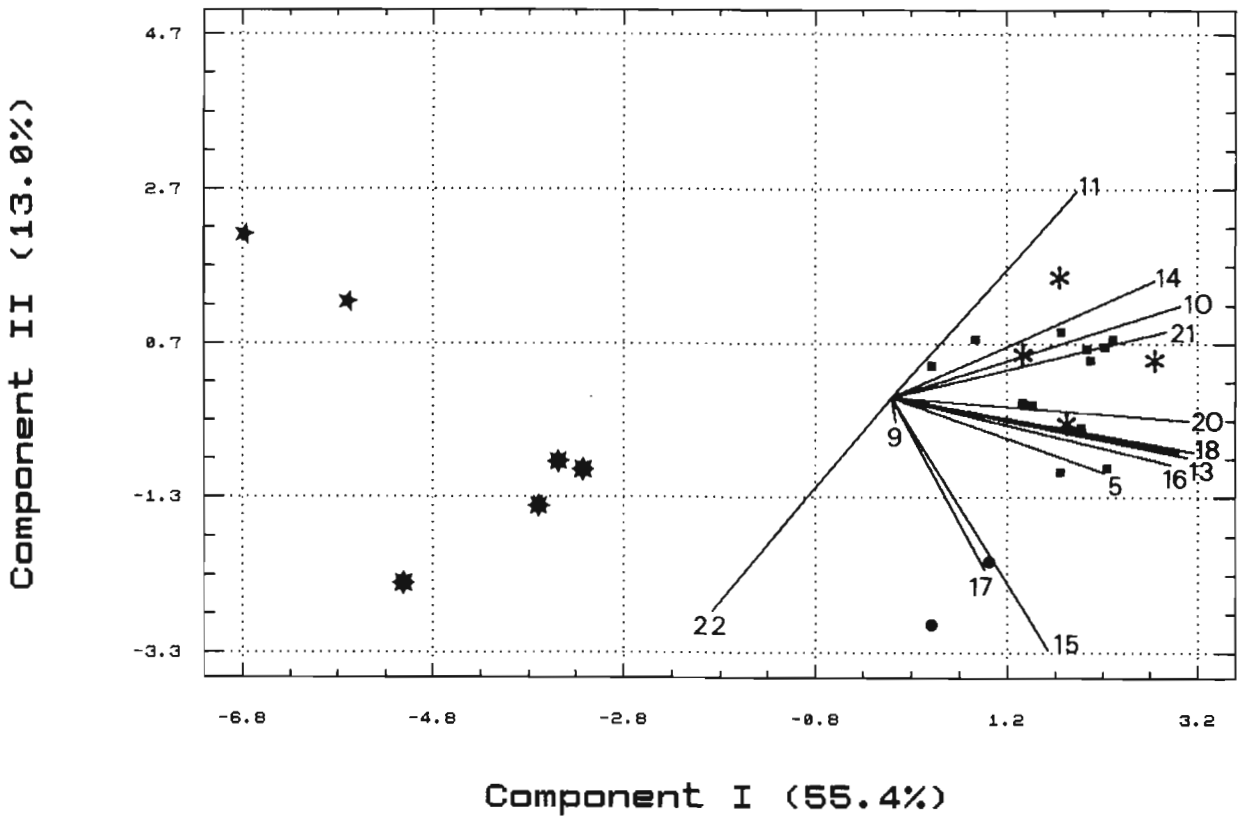

Fig. 2. *Biplot of* Coomansus *males and corresponding characters from the results of the PCA, along the two first axes.* C. magellanicus (★); C. meridionalis (✳); C. composticola (●); C. gerlachei (✲); C. mesadenus (■). *Character numbers as in Table 4.*

to those of *C. intestinus,* but it can be separated from this species by a uterus with a swollen part larger than the coiled region, lack of intestinal constrictions, and more rounded tail terminus.

Coomansus magellanicus * sp. n.

(Figs 9, 10)

MEASUREMENTS

See Table 3.

DESCRIPTION

Female: Body of medium to large size, about 2 mm long and 65 µm wide at mid-body. Body cylindrical, truncate anteriorly and tapering clearly toward posterior end. Habitus frequently G-shaped when fixed and relaxed and clearly curved in the caudal region. Cuticle smooth or with obscure fine transverse striations. Lateral chord occupying 32 ± 3 (28-38) % of midbody diameter. Lip region set off by a depression, 2.3 ± 0.13 (2.1-2.4) times as wide as high. Lips moderately separated and rounded. Labial and cephalic papillae prominent and jutting out from the head contour. Amphids cup-shaped, situated at the level of the labial constriction; their opening occupying 20 ± 1 (18-21) % of the head diameter. Buccal cavity subrectangular, flattened at base, with thick walls, 1.75 ± 0.12 (1.5-2) times as long as wide. Dorsal tooth large, forward directed, its apex located at 77.7 ± 1.5 (76-79.6) % of the stoma length measured from base. Ventrosublateral foramina visible in the basal plates. Pharynx cylindrical, muscular and surrounding the basal part of the buccal cavity. Nerve ring located at 30.8 ± 1.7 (26.8-32.5) % of the neck region measured from the anterior end. Excretory pore small and sometimes poorly visible. Pharyngo-intestinal junction not tuberculate and conical organ generally rounded. Intestine with six to eight granular polygonal cells in transverse section. Bacillary layer present, especially visible at the anterior and posterior regions. Genital system didelphic-amphidelphic.

* The specific name is the Latin gentilic adjective of Magellan, the Portuguese explorer of the geographic area where this species was found.

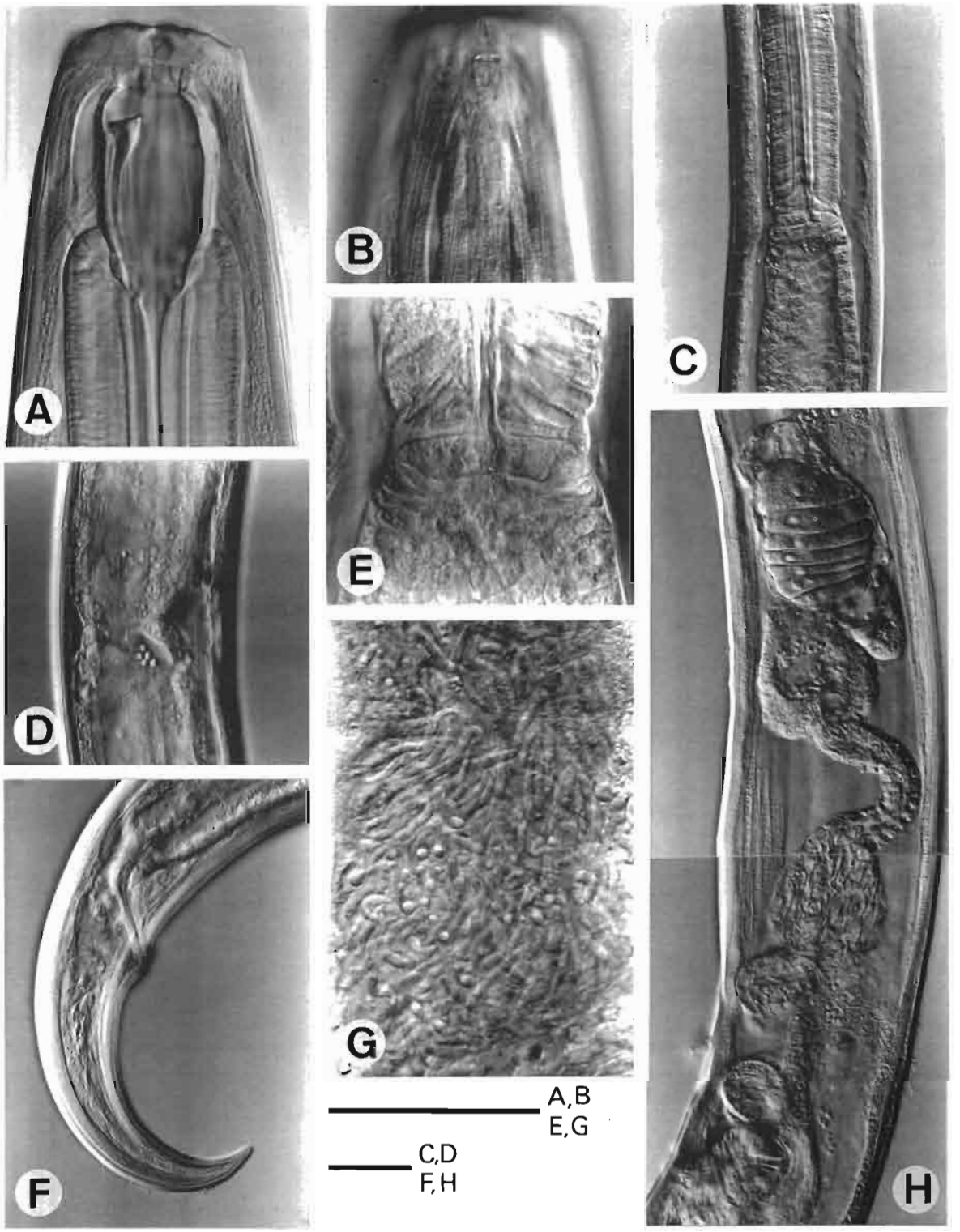

Fig. 3. Coomansus gerlachei *(specimens from Antarctic Peninsula). A, B: Head; C, E: Pharyngo-intestinal junction; D: Intestinal constriction; F: Female tail; G: Sperm; H: Female genital system. (Scale bars = 50 μm).*

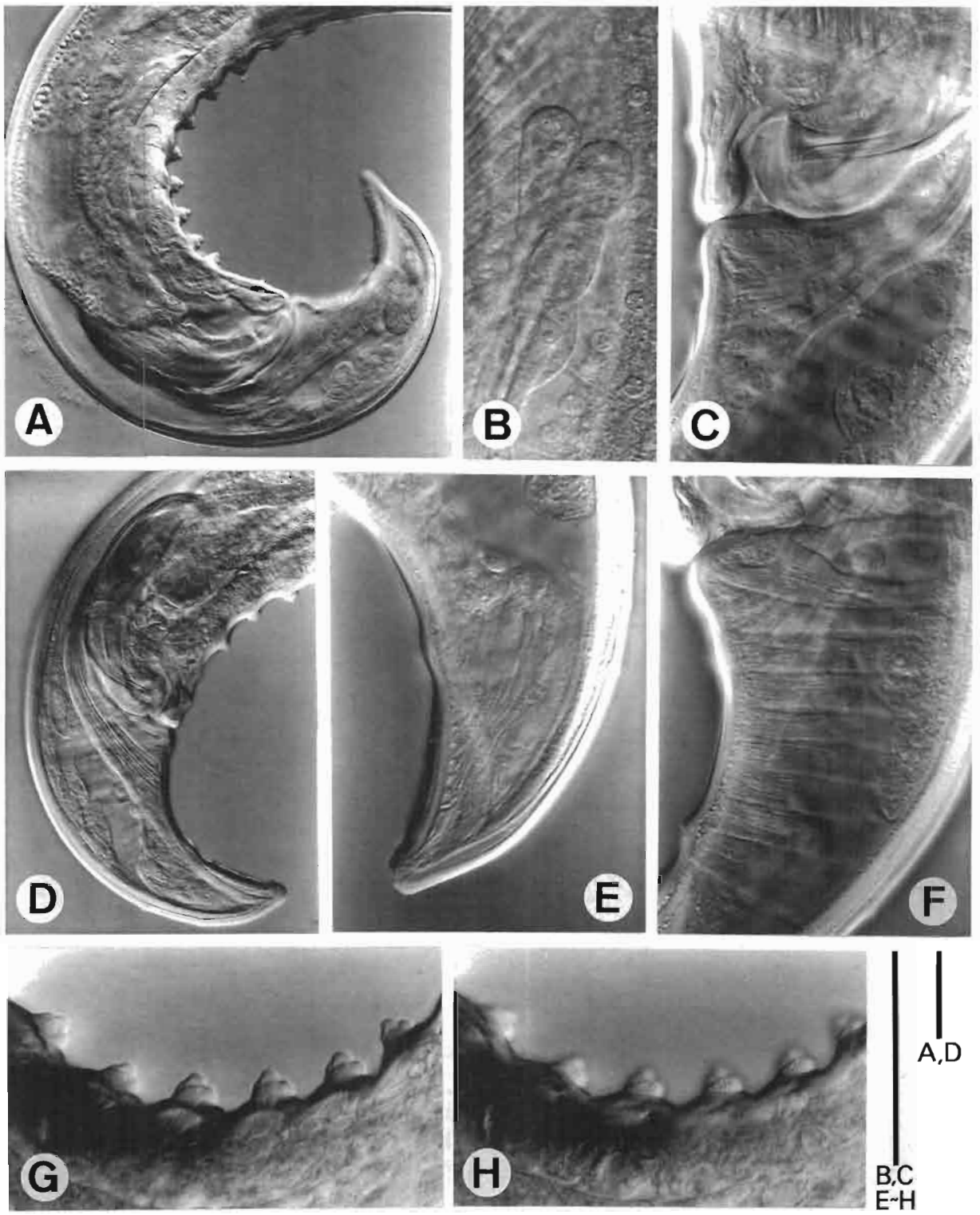

Fig. 4. Coomansus gerlachei *(specimens from Antarctic Peninsula). A, D, E, F: Male posterior region; B: Ejaculatory glands; C: Lateral guiding pieces; G, H: Supplements. (Scale bars = 50 μm).*

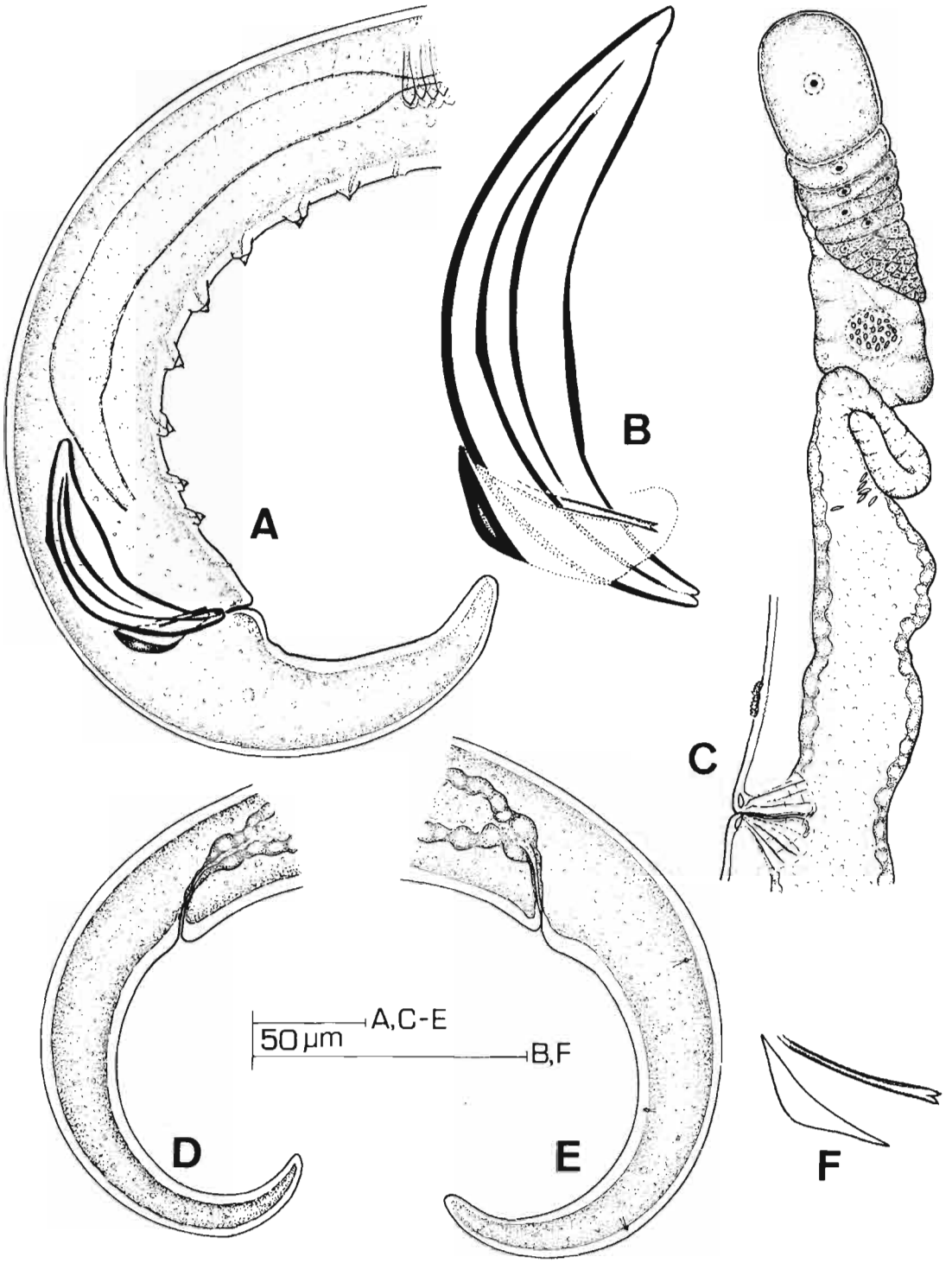

Fig. 5. Coomansus mesadenus. *A: Male posterior region; B: Spicules; C: Female genital branch; D, E: Female tail* — C. composticola. *F: Gubernaculum and lateral guiding pieces.*

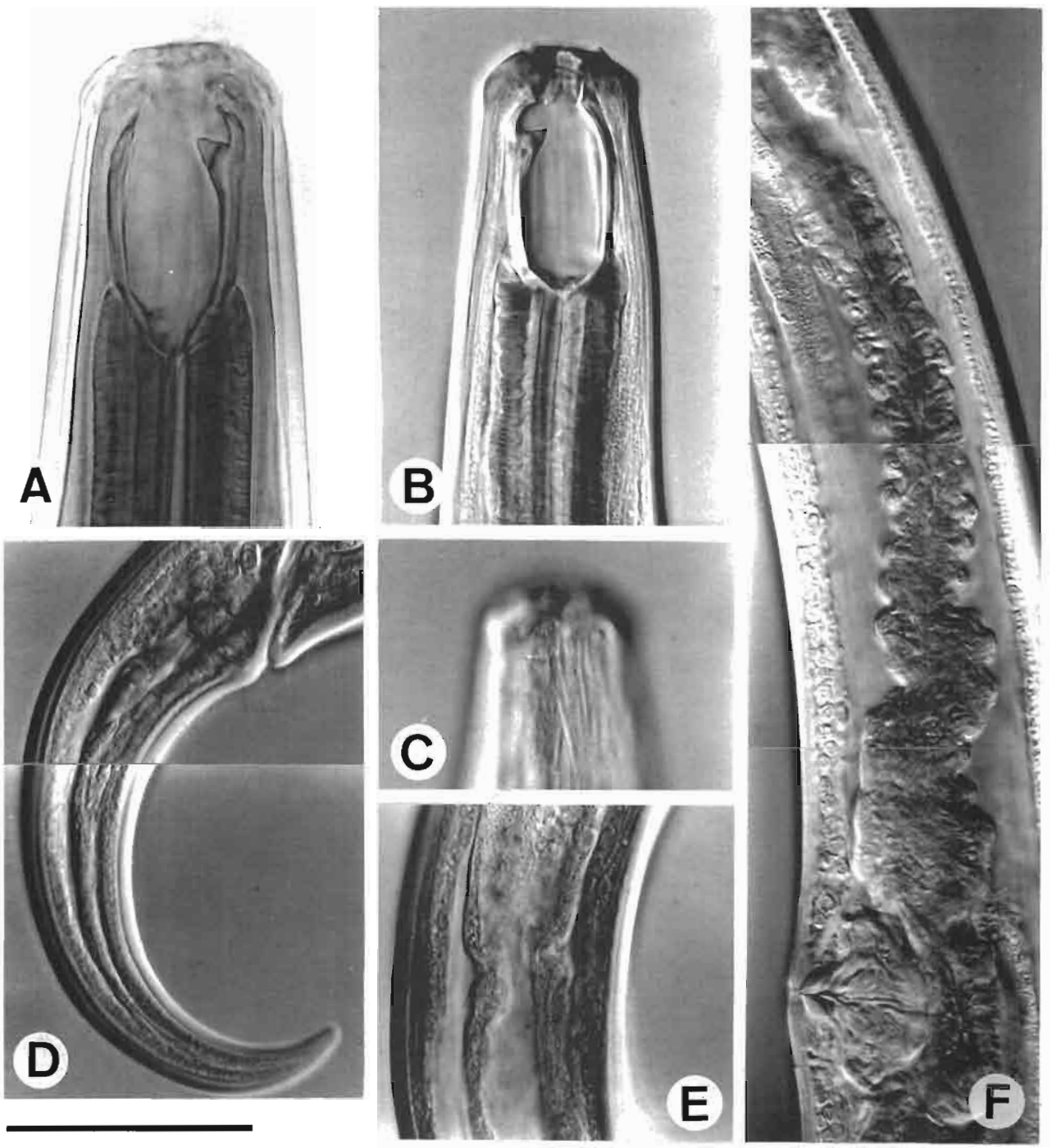

Fig. 6. Coomansus mesadenus. *A: Head—* C. intestinus *(specimen from Tierra del Fuego); B, C: Head; D: Female tail; E: Intestinal constriction; F: Female genital branch. (Scale bar = 50 μm).*

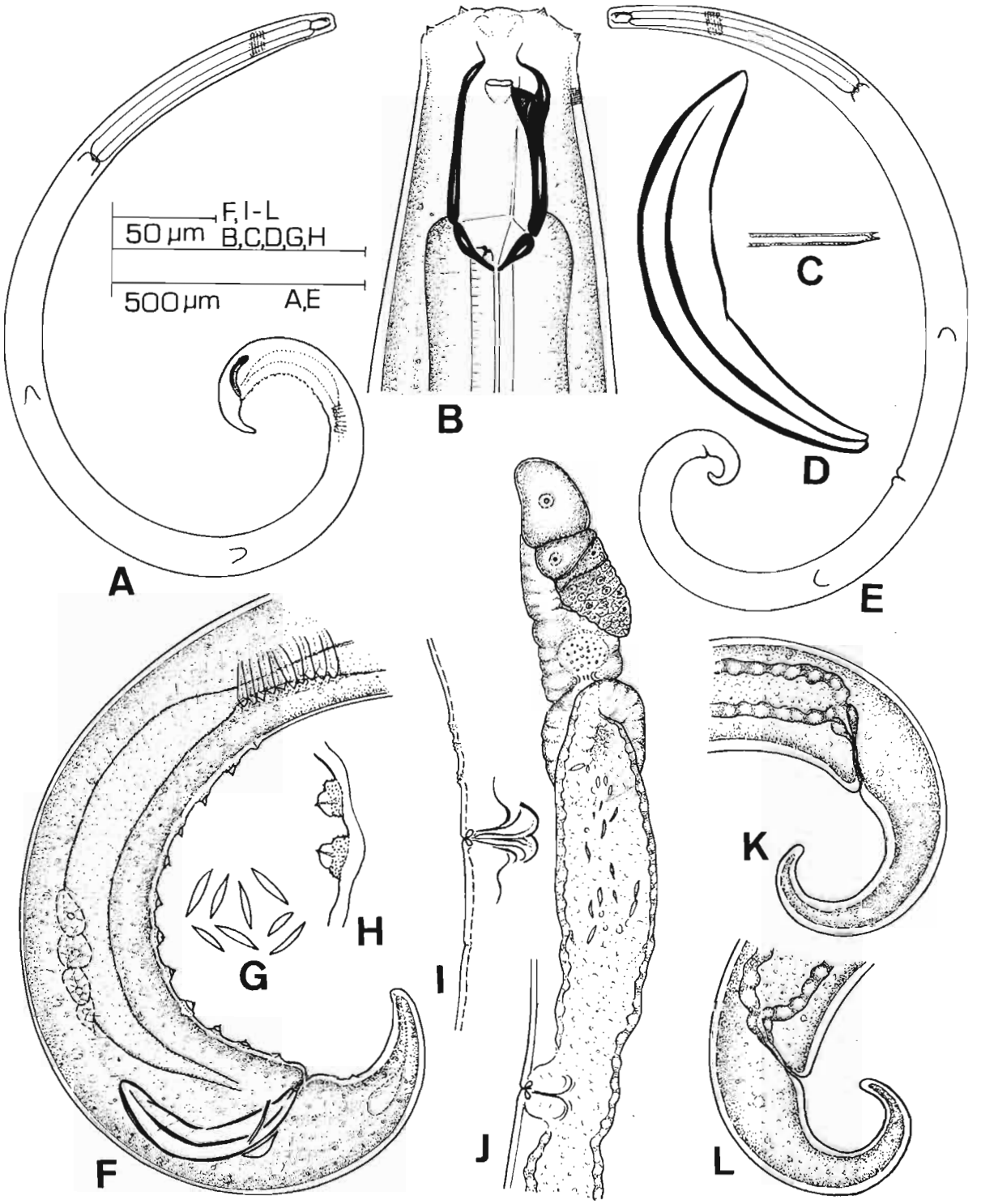

Fig. 7. Coomansus meridionalis *sp. n. A, E: Habitus; B: Head; C: Lateral guiding pieces; D: Spicules; F: Male posterior region; G: Sperm; H: Supplements; I: Vulval region; J: Female genital branch; K, L: Female tail.*

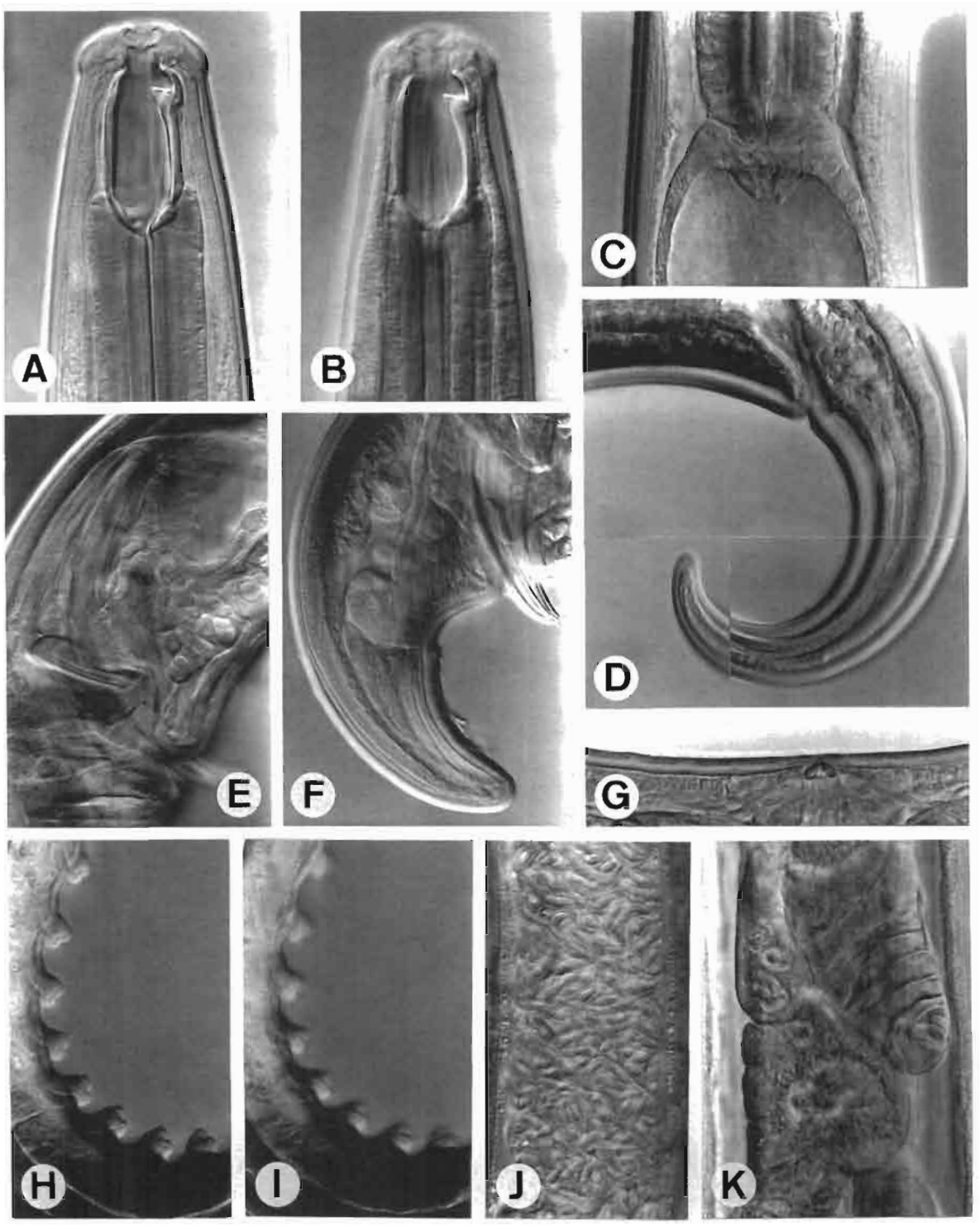

Fig. 8. Coomansus meridionalis *sp. n. A, B: Head; C: Pharynx-intestine junction; D: Female tail; E: Lateral guiding pieces; F: Male tail; G: Vulval region; H, I: Supplements; J: Sperm; K: Ovary and oviduct region. (Scale bar = 50 µm).*

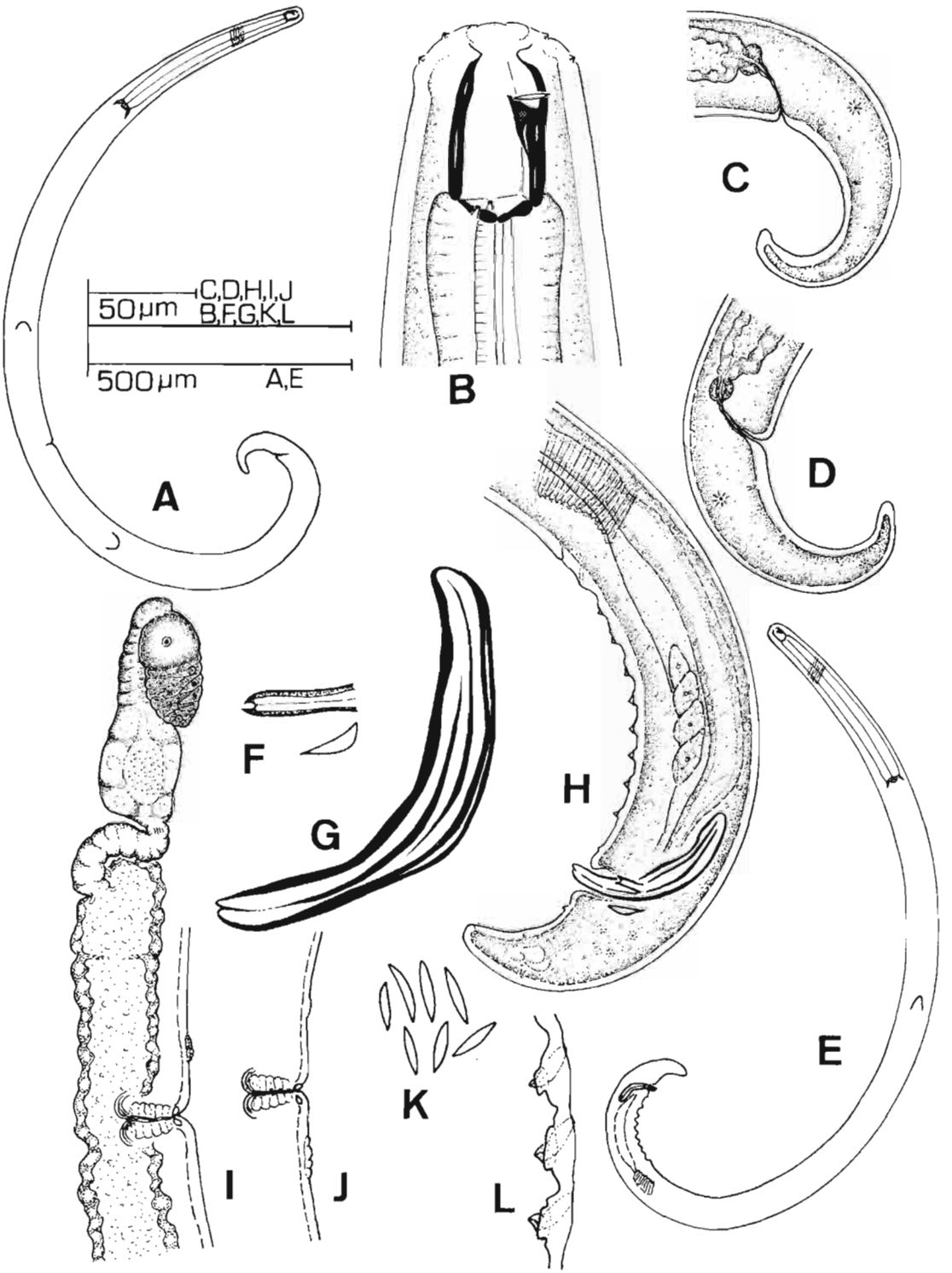

Fig. 9. Coomansus magellanicus *sp. n. A, E: Habitus; B: Head; C, D: Female tail; F: Gubernaculum and lateral guiding pieces; G: Spicules; H: Male posterior region; I: Female genital branch; J: Vulval region; K: Sperm; L: Supplements.*

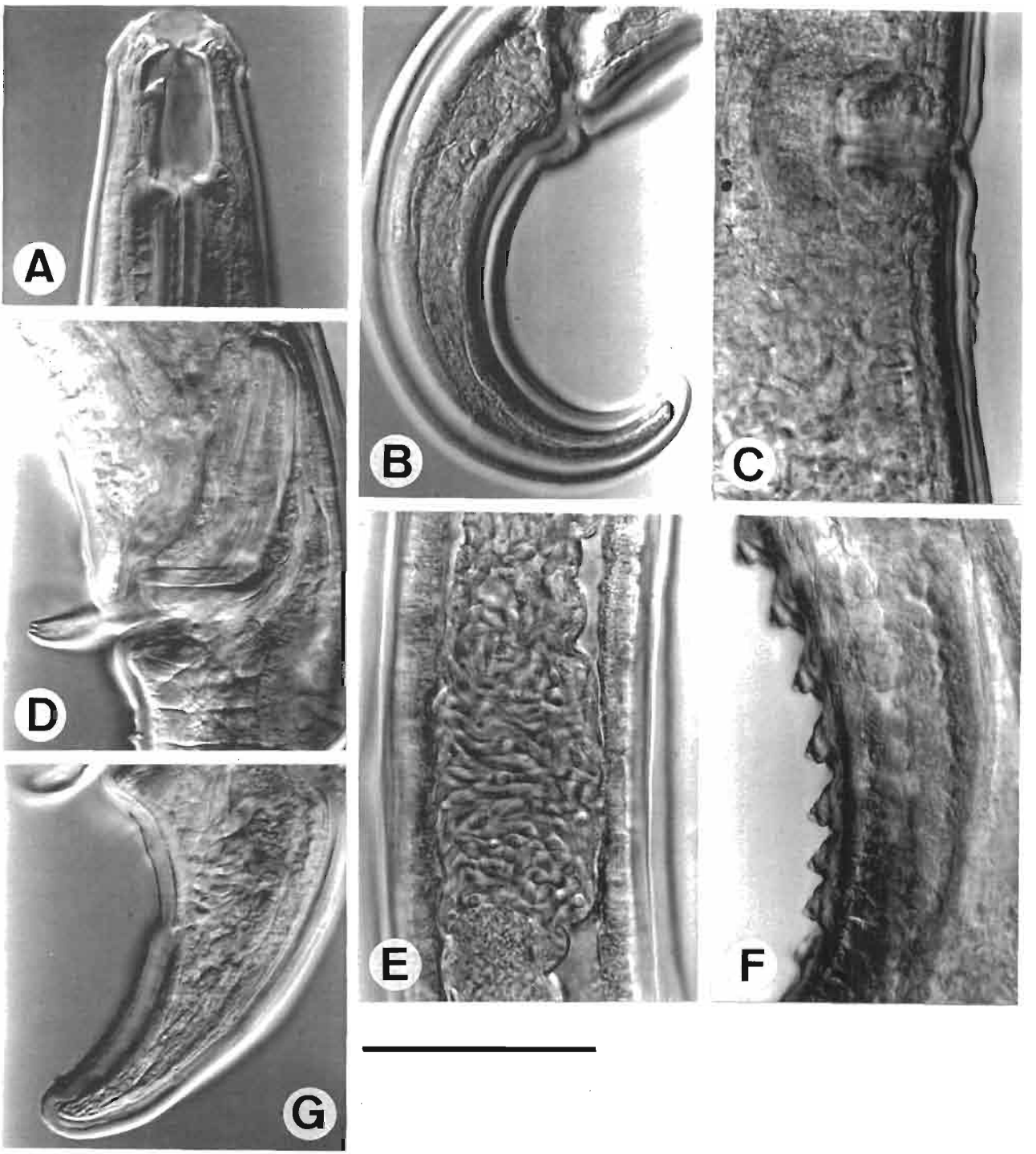

Fig. 10. Coomansus magellanicus *sp. n. A: Head; B: Female tail; C: Vulval region; D: Spicules and lateral guiding pieces; E: Sperm; F: Supplements; G: Male tail. (Scale bar = 50 μm).*

Ovary short, not reaching to the oviduct-uterus junction. Oocytes few in number. Oviduct consisting of a narrow region and a well developed *pars dilatata*. Sphincter present at the oviduct-uterus junction with an inner, poorly sclerotized part surrounded by a muscular part. Uterus consisting of a moderately developed, coiled distal part and a large swollen proximal region filled with sperm. Vagina cylindrical, extending inwards over 46 ± 3 (41-51) % of the corresponding body diameter. Small to medium sized sclerotized pieces in the vagina-vulva junction. Vulva a short transverse slit. Zero to two prevulval and zero to two postvulval papillae. Tail conoid, ventrally curved and with rounded terminus. Caudal glands indistinct, duct and opening absent. Four caudal papillae on each side of tail.

Male: General morphology similar to female but with posterior region more ventrally curved. Lateral chord extending over 30-32 % of the midbody diameter. Lip region 2.1-2.4 times as wide as high. Amphid occupying 18-20 % of the lip region diameter. Buccal cavity 1.5-1.7 times as long as wide. Nerve ring located at 29.5-31 % of the total neck region measured from the anterior end. Genital system diorchid. Testes opposed, with spindle-shaped to cylindrical spermatozoa. *Vas deferens* and *ductus ejaculatorius* separated by a well developed constriction; associated muscles consisting of about sixteen bands located just in front of the supplement series. Ventral body contour slightly contracted in this region of the body. Ejaculatory glands in tandem, often obscure; rectal glands poorly visible. Eleven to twelve ventromedian supplements more or less regularly spaced, the two anterior and one posterior ones poorly developed, the rest prominent, mamilliform, and slightly echinulate. Spicules rather thick, ventrally curved, about 1.75 times as long as anal body diameter, measured along axis. Gubernaculum moderately developed and elongate; lateral guiding pieces not especially slender, with bifurcated extremity. Tail as in female but shorter and with more rounded terminus. Caudal glands apparently reduced and duct opening subterminal. Three subdorsal and three subventral caudal papillae on each site of the tail.

TYPE HABITAT AND LOCALITY

Soil with unidentified grasses in subantarctic steppe, Punta Arenas, Chile.

TYPE MATERIAL

Holotype female in the collection of the Departamento de Biología Animal, Universidad de Córdoba, Spain. *Paratypes*: one male and one female both in the same collection, and one male and six females in that of the Centro de Ciencias Medioambientales, C.S.I.C., Madrid, Spain.

DIAGNOSIS AND RELATIONSHIPS

C. magellanicus sp. n. is characterized by its medium to large size (body length 1.7-2.1 mm), lip region set off by a depression, buccal cavity 32-36 × 18-22 µm or 1.5-2 times as long as wide, dorsal tooth in the corresponding vertical plate with the apex at 76-80 % of the total buccal cavity length from base, V = 51-57, muscles between *vas deferens* and *ductus ejaculatorius* forming approximately sixteen circular bands in front of the supplement series, ventral body contour slightly contracted at beginning of supplement series, ejaculatory glands in tandem, spicules 97-98 µm long, lateral guiding pieces not especially slender, eleven to twelve ventromedian supplements mostly conical, mamilla-shaped and slightly echinulate, conoid, ventrally curved tail with rounded terminus, and caudal glands absent in the female and reduced in the male.

C. magellanicus sp. n. can be distinguished from all above-mentioned species by its buccal cavity shape and dorsal tooth location. It is most similar to *C. campbelli* after the description by Clark (1963) and *C. major*. It differs from *C. campbelli* by a shorter body (*vs* 2-3.5 mm), smaller buccal cavity (*vs* 47-58 × 20-37 µm), apex of the dorsal tooth more anteriorly located in the buccal cavity (*vs* 69-72 %), lateral guiding pieces not especially slender and straight, and different geographic distribution (*vs* Campbell, Auckland and Antipodes Islands). It can be differentiated from *C. major* by shorter body (*vs* 3.4 mm), smaller buccal cavity (*vs* 44 × 26 µm), apex of the dorsal tooth more anteriorly located in the buccal cavity (*vs* 75 %), shorter tail (*vs* 170 µm), shorter spicule (*vs* 156 µm) absence of spinneret (*vs* presence), and different geographic distribution (*vs* Australia and Tasmania).

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