

Three new species of the free-living nematode genus *Oncholaimus* Dujardin, 1845 (Enoplida, Oncholaimidae) from Atlantic coasts of Argentina

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Summary.- Three new species of the genus *Oncholaimus* are described from coastal Patagonia in the Argentinian provinces of Río Negro, Chubut and Santa Cruz. *Oncholaimus rionegrensis* sp. n. is characterized by males having a precloacal sexual protuberance bearing two fine tubular organs, three short setae on each side in front of the cloacal opening, two pairs of subventral setae located at both sides of the cloacal opening, a large ventro-median protuberance near the tail tip, and spicules with distal cuticular reinforcement. *Oncholaimus madrynensis* sp. n. is distinguishable by males having a precloacal ovoid plate, a precloacal sexual protuberance bearing two small precloacal supplementary tubular organs and two small setae on both sides, four pairs of long setae in pericloacal position, a huge postcloacal sexual protuberance, and two pairs of subventral papillae on tail. And *Oncholaimus deseadenensis* sp. n. is characterized by the morphology of its precloacal area having one pair of short setae, one short seta, two tubular organs and one pair of setae on each side, and the presence of one postcloacal sexual protuberance bearing a pair of setae on it.

Keywords: Description, endemism, morphology, systematics, taxonomy.

Resumen.- Se describen tres nuevas especies del género *Oncholaimus* procedentes de las costas de la Patagonia en las provincias argentinas de Río Negro, Chubut y Santa Cruz. *Oncholaimus rionegrensis* sp. n. se caracteriza por su macho que posee una protuberancia sexual precloacal con dos órganos tubulares finos, tres sedas cortas a cada lado de la abertura cloacal, dos pares de sedas subventrales situadas a ambos lados de la abertura cloacal, una gran protuberancia ventromediana cerca del extremo de la cola, y espículas con un refuerzo cuticular distal. *Oncholaimus madrynensis* sp. n. se distingue por su macho que posee una placa ovoidea precloacal, una protuberancia sexual precloacal con dos pequeños órganos suplementarios tubulares y dos pequeñas sedas a ambos lados, cuatro pares de sedas largas alrededor de la abertura cloacal, una protuberancia sexual postcloacal de gran tamaño, y dos pares de papilas subventrales en la cola. Y *Oncholaimus deseadenensis* sp. n. se caracteriza por tener un área precloacal con un par de sedas cortas, una seda corta, dos órganos tubulares y un par de sedas en cada lado, y una protuberancia sexual postcloacal con un par de sedas sobre ella.

Keywords: Descripción, endemismo, morfología, sistemática, taxonomía.

Introduction

The genus *Oncholaimus* Dujardin, 1845 is a diverse, free-living, marine nematode taxon belonging to the subfamily Oncholaiminae Filipjev, 1916, which hitherto includes other six valid genera (Smol & Coomans, 2006). A total of 15 *Oncholaimus* species are known to occur in South Atlantic region. Gerlach (1954) reported *O. cobbi* (Kreis, 1932) Rachor, 1969 from Lagoa de Freitas, Rio de Janeiro, Brazil. The same author (1956) described *O. cavatus* from São Sebastião, Brazil and *O. gladius* from Cananeia, Rio Nohrega, Brazil, and, in 1957, *O. manilius*

and *O. rapax* Kreis, 1932 from Santos, Brazil. Allgén (1958) described *O. notoviridis* from Argentinian coast, Falkland Islands and Fuegian Archipelago. The same author (1959) described *O. longissimus* from Falkland Islands, Port Louis, South Georgia and Graham Land, *O. paradjardini*, *O. rotundicaudatus* and *O. notoxyuris* from Falkland Islands and *O. notolangrunensis* from South Georgia and Falkland Islands, and reported *O. dujardinii* de Man, 1876 and *O. viridis* Bastian, 1865 from Fuegian Archipelago, South Georgia and Falkland Islands. Coles (1977) described *O. problematicus* from False bay, Cape province, South Africa. Pastor de Ward (1993) described *O. salobrus* from Puerto Deseado, Santa Cruz province, Argentina.

Nematological surveys conducted in the period 2006-2012 for three projects (PNUD/GEF 02/018; PICT/SECYT N° 2/33345; PID/CONICET N°11220090100440) on biodiversity of macrobenthos and meiofauna in several beaches along the Argentinian

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Atlantic coast yielded some material belonging to *Oncholaimus*. The study of this material revealed the existence of some non-described forms, which are presented in the following.

Materials and Methods

Nematodes were collected from four locations in the Argentinian Atlantic coast (Fig. 1): San Antonio Oeste river estuary (40° 43'S, 64° 58'W) and Cormoranes beach (40° 53'S, 65° 07'W) in San Matías gulf, Río Negro province; Puerto Madryn beach (42° 46'S, 65° 01'W) in Nuevo gulf, Chubut province; and Puerto Deseado river estuary, Santa Cruz province. Samples were obtained using a Plexiglas corer, fixed *in situ* in 5% formalin with rose Bengal and sieved through 50 µm mesh. Nematodes were extracted by the elutriation/decantation/LUDOX™ method. Preserved specimens were transferred to pure glycerine through a solution of ethanol - water - glycerine in 2:2:1 proportion, leaving at least one week in desiccator. After that, permanent mounts on glass slides were prepared and sealed with CADANAX resin. Morphometric data were obtained by a digital camera NIKON D80 with adapted software or from drawings made with a camera lucida attached to a light microscope (Zeiss Photomicroscope or Olympus BX51) equipped with DIC optics. All curved structures were measured along the arc or median line.

The new term 'sexual protuberances' is herein coined to describe the bumps observed in males of some species of *Oncholaimus*, located in front of and behind the cloacal opening, and that were previously referred to as papillae. These structures, in which setae and papillae are inserted, seem to be more related to the protuberances of precloacal organs found in *Deontostoma* Filipjev, 1916 or other genera of the family Leptosomatidae Filipjev, 1916 rather than true papillae as known in nematodes.

Descriptions

Oncholaimus rionegrensis sp. n. (Fig. 2)

Measurements: See Table I.

Male (holotype): Body cylindrical. Cuticle smooth. Lip region with six lips. Anterior sensilla pattern 6+6+4: inner labial sensilla papilliform, six cephalic setae are 9 µm whereas the remaining four ones are 6.5 µm long. Endocopola short (6.0 µm), not easily perceptible. Cervical setae scattered (4.5-5.0 µm) only on the anterior end. Buccal cavity rectangular, longer than wide, with left ventrosublateral tooth 20 µm long, and dorsal (15 µm) and right ventrosublateral (12 µm) teeth nearly similar

in length. Amphid fovea curved, 10 µm in diameter and located at 13 µm from the anterior end. Excretory pore at 2.5 times the stomatal length from the anterior end. Pharynx cylindrical. Cardia short. Tail curved ventrad, conical in its anterior three-fourths, but cylindrical in its posterior fourth. Reproductive system diorchic, with opposed and equally-sized testes: anterior testis located to the right and posterior one to the left of the intestine. Spicules paired, symmetrical, 1.9 cloacal diameters long, with a cuticular reinforcement on tip. Gubernaculum absent. Nine pairs of subventral setae 5 µm long present. One short seta, one precloacal sexual protuberance bearing two fine tubular organs, and three short setae on each side are present in front of the cloacal opening (Fig. 2F, G). Two pairs of subventral setae 2 µm located at both sides of the cloacal opening (Figs 2G & 4C). Five pre-cloacal and 2-4 pairs of post-cloacal strong setae are distinguishable around the cloacal opening. A large ventro-median protuberance 7 µm high, with one seta on each side (Fig. 2G) is present near the tail tip. And three pairs of subdorsal setae are observed on tail.

Female (paratype): Similar to the male in general body shape, anterior sensilla and amphid fovea. Buccal cavity shorter than that of the male, whereas the conical tail is slightly longer than that of the male. Reproductive system monodelphic-prodelphic. Ovary reflexed, located to the right of the intestine. Oblique vagina with glands around it. Demanian system consisting of one osmosium connecting *ductus entericus* and intestine, and one uvette (at 200 µm from anus) connecting *ductus uterinus* with a double main tube that splits into two terminal ducts leading to two respective pores located at 100 µm in front of the anus on each side of the body (Fig. 2E).

Diagnosis: *Oncholaimus rionegrensis* sp. n. is characterized by males having a precloacal sexual protuberance bearing two fine tubular organs, three short setae on each side in front of the cloacal opening, two pairs of subventral setae located at both sides of the cloacal opening, a large ventro-median protuberance near the tail tip, and spicules with distal cuticular reinforcement. Tubular precloacal supplements are similar to those found in *Metoncholaimus antarcticus* (Linstow, 1896) by Pastor de Ward (1993, Fig. 3I).

Relationships: The new species differs from other *Oncholaimus* species, except *O. brevicaudiculatus* (Kreis, 1934) Rachor, 1970 and *O. domesticus* (Chitwood & Chitwood, 1938) Rachor, 1969, by having precloacal supplementary tubular organs, the presence of two pairs (*vs* one pair) of setae at both sides of cloacal opening. It can be differentiated from *O. brevicaudiculatus* by the presence of three setae at both sides of the precloacal sexual protuberance, and the existence of a postcloacal sexual protuberance. And from *O. domesticus* in its three pairs (*vs* one pair) of setae on the precloacal sexual protuberance, only one ventral protuberance on tail, and fewer number of circumcloacal setae (six pre- and six post-cloacal *vs* five pre- and 2-4 post-cloacal setae in Argentinian specimens of *O. domesticus*).

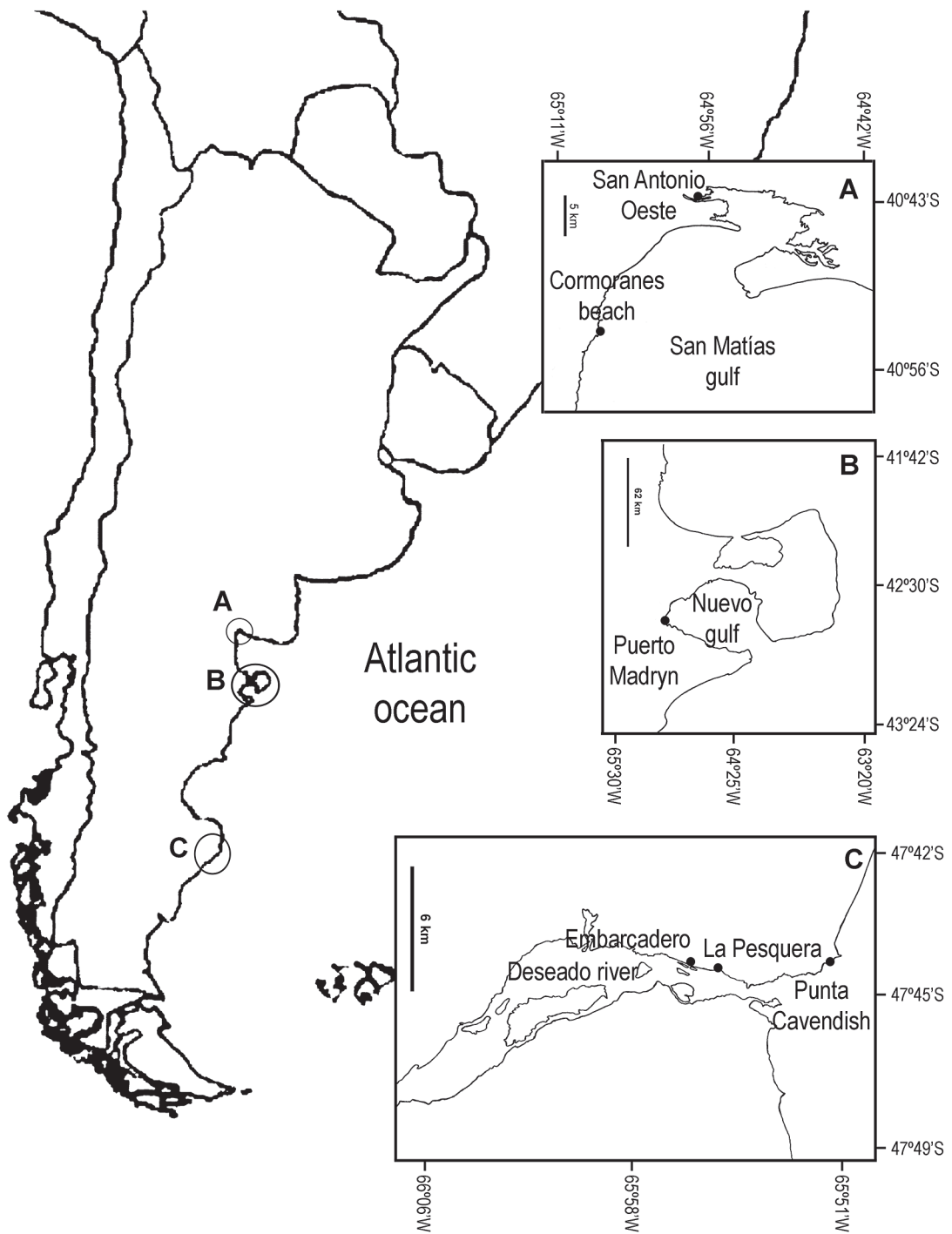


FIGURE 1. Map showing the study sites. A: San Antonio bay. B: Puerto Madryn beach. C: Puerto Deseado estuary.

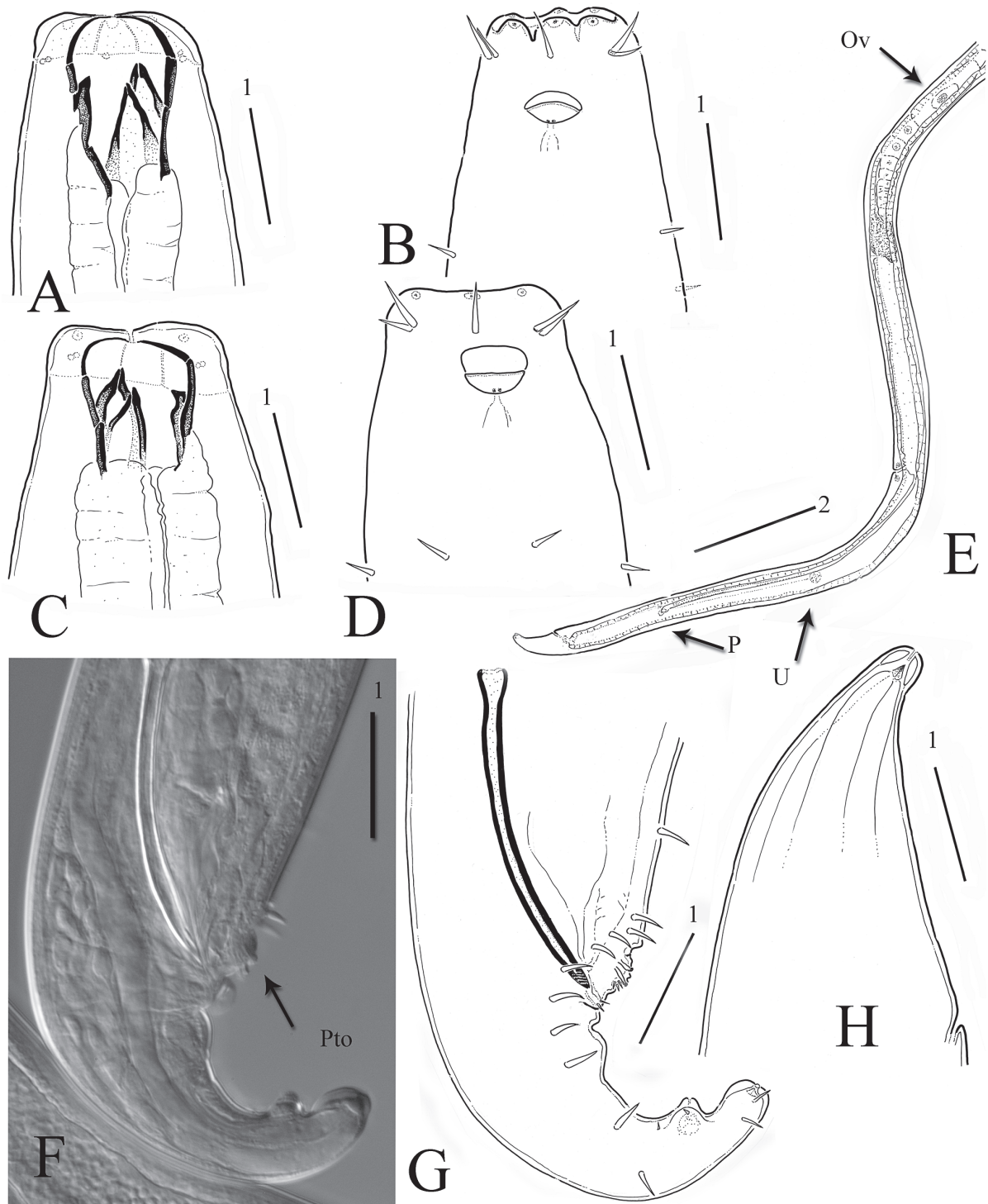


FIGURE 2. *Oncholaimus rionegrensis* sp. n. A: Holotype, lip region in median view. B: Holotype, lip region in surface view. C: Female, lip region in median view. D: Female, lip region in surface view. E: Female genital system (Ov = ovary; U = uvette; P = pores). F, G: Holotype, posterior body region showing the copulatory apparatus. H: Female, posterior body region. (Pto = precloacal tubular organ). (Scale bars: 1 = 20 µm; 3 = 200 µm.)

TABLE I. Morphometrics of *Oncholaimus rionegrensis* sp. n. and *O. madrynensis* sp. n. All measurements are in μm except L in mm, and in the form: mean \pm s.d. (range).

Character	Species		<i>O. rionegrensis</i> sp. n.			<i>O. madrynensis</i> sp. n.		
	Locality		Río Negro			Puerto Madryn		
	n	♂	Paratypes 3♂♂	Paratypes 4♀♀	Paratypes 4♀♀	Holotype ♂	Paratypes 3♂♂	Paratypes 4♀♀
a		47	45.2 \pm 6.4 (38-49)	43.8 \pm 6.2 (37-51)		55	49.2 \pm 15.0 (38-60)	52.4 \pm 4.5 (49-58)
b		7.1	7.2 \pm 0.5 (6.8-7.8)	7.0 \pm 0.4 (6.4-7.3)		6.9	5.8 \pm 1.0 (5.1-6.5)	7.7 \pm 1.21 (6.6-9.0)
c		47	33.7 \pm 4.6 (29-38)	36.1 \pm 6.4 (30-45)		56	56.2 \pm 11.8 (48-65)	79.8 \pm 12.4 (66-89)
c'		2.0	2.1 \pm 0.4 (1.6-2.4)	2.0 \pm 0.9 (1.3-3.2)		1.2	1.1 \pm 0.0 (1.1)	0.9 \pm 0.2 (0.7-1.2)
V		-	-	68.9 \pm 1.7 (67-72)		-	-	76.6 \pm 1.7 (73-77)
Body length (L)		2.84	2.80 \pm 0.32 (2.44-3.03)	3.06 \pm 0.30 (2.83-3.59)		3.44	2.84 \pm 0.64 (2.39-3.29)	4.06 \pm 0.50 (3.61-4.60)
Body width		60	63.3 \pm 15.3 (50-80)	69.0 \pm 7.4 (60-80)		62	58.5 \pm 4.9 (55-62)	77.3 \pm 3.1 (74-80)
Pharynx length		400	390 \pm 40 (350-430)	454 \pm 53 (390-520)		500	490 \pm 28 (470-510)	529 \pm 17 (510-543)
Tail length		60	83.3 \pm 2.9 (80-85)	88.4 \pm 15.8 (67-106)		61	50.5 \pm 0.7 (50-51)	52.5 \pm 15.5 (40-70)
Cloacal/ anal body diameter		30	41.0 \pm 7.2 (35-49)	43.8 \pm 13.4 (30-63)		51	46.5 \pm 0.7 (46-47)	55.7 \pm 4.0 (52-60)
Head diameter		27	26.7 \pm 5.9 (20-31)	28.8 \pm 5.0 (23-36)		36	32.0 \pm 7.1 (27-37)	39.0 \pm 1.7 (37-40)
Buccal cavity length		30	29.3 \pm 3.5 (26-33)	28.4 \pm 6.7 (20-35)		37	36.9 \pm 1.3 (36-38)	42.7 \pm 2.5 (40-45)
Buccal cavity width		18.0	16.3 \pm 4.6 (11-19)	19.4 \pm 3.6 (15-24)		19	20.5 \pm 0.7 (20-21)	22.0 \pm 2.6 (20-25)
Cephalic setae length (6)		9	9.8 \pm 0.8 (9.0-10.5)	9.5 \pm 2.1 (6.5-12.0)		6.0	6.1 \pm 0.1 (6.0-6.2)	7.5 \pm 0.5 (7.0-8.0)
Cephalic setae length (4)		6.5	6.8 \pm 1.0 (6.0-8.0)	5.8 \pm 1.1 (4.0-7.0)		5.0	4.8 \pm 0.4 (4.5-5.0)	6.0 \pm 1.0 (5.0-7.0)
Cervical setae length		4	4.1 \pm 0.1 (4.0-4.2)	4 \pm 1.2 (3.0-6.0)		2.5	2.5 \pm 0.1 (2.4-2.5)	2.8 \pm 0.3 (2.5-3.0)
Amphid width		10.0	9.5 \pm 0.5 (9.0-10.0)	7.6 \pm 1.3 (6.0-9.0)		8.0	9.3 \pm 0.4 (9.0-9.5)	8.5 \pm 1.5 (7.0-10.0)
Amphids width (%)		33,3	31.7 \pm 1.7 (30-33)	29.3 \pm 7.6 (21-41)		22	23.0 \pm 1.4 (22-24)	22.5 \pm 4.5 (17-26)
Spicule length		57	47.7 \pm 1.2 (47-49)	-		62	52.0 \pm 5.7 (48-56)	-
Excretion pore – anterior end		75	99.3 \pm 11.0 (88-110)	78.4 \pm 11.6 (60-90)		80	89.0 \pm 15.6 (78-100)	76.7 \pm 15.3 (60-90)

Type locality and habitat: Argentina, Río Negro province, San Matías gulf, San Antonio Oeste river estuary, in upper littoral zone with moderately well sorted fine to medium sand (Q2=0.1-0.5mm; %FF= 10.7-23.03; SO=0.5-0.7). Collected by Virginia Lo Russo and Gabriela Villares, on February 13, 2009.

Type material: Male holotype on slide MACN-In N° 38925 and female paratype on slide MACN-In N° 38926, deposited in Museo Nacional de Ciencias Naturales (MACN) 'Bernardino Rivadavia', Buenos Aires, Argentina. Three male and three female paratypes on slides CPN-NEM N° 1635-1640 deposited in the collection of Centro Nacional Patagónico (CENPAT-CONICET), Chubut, Argentina.

Etymology: The specific epithet refers to Río Negro, the Argentinian province where the species was collected from.

Oncholaimus madrynensis sp. n. (Fig. 3)

Measurements: See Table I.

Male (holotype): Body shape cylindrical. Cuticle smooth. Lip region 37 μm broad at level of cephalic setae, offset by weak constriction located at level of amphid fovea. Six small labial papillae, 6+4 cephalic sensilla (six 6 μm long and four 5 μm long). Amphid fovea 8 μm or about

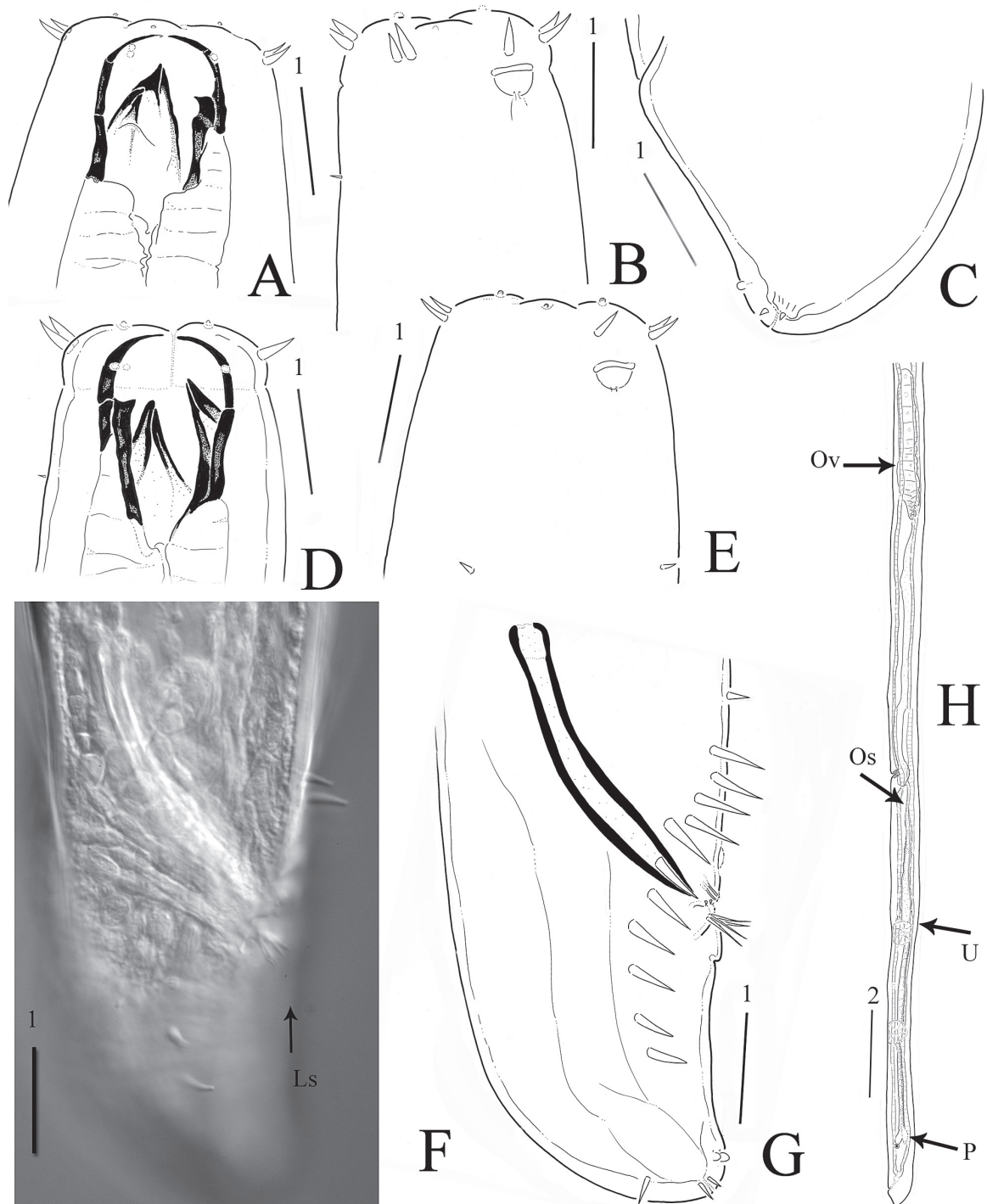


FIGURE 3. *Oncholaimus madrynsis* sp. n. A: Holotype, lip region in median view. B: Holotype, lip region in surface view. C: Female, posterior end. D: Female, lip region in median view. E: Female, lip region in surface view. F: Holotype, picture of posterior end, showing the adcloacal setae. G: Holotype, posterior end showing the copulatory apparatus. H: Female, reproductive system. (Ls = lateral setae; Ov = ovary; Os = osmosium; U = uvette; P = pores). (Scale bars: 1 = 20 µm; 2 = 100 µm.)

one-fifth (22%) of the corresponding body diameter, with oval opening. Cephalic capsule (endocopola) 8 µm long. Buccal cavity near rectangular, 37 µm deep and 19 µm wide, bearing three teeth: one left ventrosublateral tooth 29 µm long, and dorsal and right ventrosublateral teeth both 18 µm long. Scattered cervical setae 2.5 µm long. Pharynx cylindrical. Cardia present. Excretory pore at 2.2 stomatal lengths from anterior end. Tail short, conical and curved ventrad. Two pairs of papillae near the tail tip. Two pairs of subventral setae around the spinneret and one pair of subdorsal setae are present in subventral position at the same distance from spinneret. Reproductive system diorchic, with equally sized testes: anterior testis to the right, posterior one to the left of the intestine. Spicules paired, slightly cephalated, symmetrical and 62 µm long. Gubernaculum absent. One midventral seta and 11 pairs of robust setae around the cloacal aperture. An oval plate 5 µm long is present at 7 µm the cloacal opening. A precloacal sexual protuberance bearing two small precloacal tubular supplements and two pairs of small subventral setae (Figs 3G & 4C) is present behind the plate. A bunch of four, 8 µm long setae is observed in sublateral, adcloacal position, near the cloaca and inside the pericloacal crown of setae. A huge papillae 8 µm long is visible behind the cloacal opening (Figs 3G & Fig. 4C).

Female (paratype): General morphology similar to that of male. Reproductive system monodelphic-prodelphic. Ovary reflexed, to the right of the intestine. Muscular vagina bent forwards an angle of 45 degrees. Tail conical rounded, 62 µm long, shorter than that of the male, and slightly curved ventrad. Demanian system with one osmosium connecting *ductus entericus* and intestine, and one uvette, located 150 µm in front of the anus, connecting *ductus uterinus* with a double main tube that splits into two terminal ducts leading to two pores situated 50 µm in front of the anus on each side of the body (Fig. 3H).

Diagnosis: *Oncholaimus madryniensis* sp. n. is characterized by males having a peculiar combination of supplements: an oval precloacal plate, a precloacal sexual protuberance bearing two small tubular organs and two small setae at both sides, four pairs of long adcloacal setae, a huge postcloacal sexual protuberance, and two pairs of subventral papillae on tail.

Relationships: In having two tubular organs (*vs* only one), the new species can be easily distinguished from its congeners with precloacal supplements. It is morphometrically very similar to *O. rionegrensis* sp. n., but it differs from this by its four (*vs* two) long subventral setae at both sides of the cloacal opening, eleven (*vs* nine) pairs of bursal setae, two pairs of papillae on tail tip (*vs* one huge protuberance with two setae) and the shape and size of tail.

Type locality and habitat: Argentina, Chubut province, Nuevo gulf, Puerto Madryn beach, in upper littoral zone with well sorted fine sand (Q₂ = 0.19 mm;

%FF = 0.8-1.8; SO = 0.3-0.5). Collected by Catalina T. Pastor de Ward on July 27, 2012.

Type material: Male holotype on slide MACN-In N° 38927 and female paratype on slide MACN-In N°38928, deposited in Museo Nacional de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires, Argentina. Two male and two female paratypes on slides CPN-NEM N° 1641 to 1644, deposited in the collection of Centro Nacional Patagónico (CENPAT-CONICET), Chubut, Argentina.

Etymology: The specific epithet refers to Puerto Madryn beach, the location where the species was collected.

Oncholaimus deseadenensis sp. n.

Syn. *Oncholaimus paredron* (Mawson, 1958) Rachor, 1969 *apud* Pastor de Ward (1993) (Fig. 4A-B)

Measurements: See Table II.

Male (holotype) (see also Pastor de Ward, 1993): Body shape cylindrical. Cuticle smooth. Lip region with six lips; anterior sensilla pattern 6+6+4: inner labial sensilla papilliform, six cephalic setae 10 µm long and four 9 µm long. Endocopola not seen. Cervical setae 3 µm long, scattered only on the anterior end. Buccal cavity square-shaped, with left ventrosublateral tooth 20 µm long, and dorsal and right ventrosublateral teeth nearly equally sized, both 15 µm long. Amphid fovea with oval opening, 6 µm in diameter, and positioned at 15 µm from the anterior end. Excretory pore at three stomatal lengths from anterior end. Pharynx cylindrical. Cardia short. Tail short, conical, curved ventrad. Reproductive system diorchic, with opposed testes of similar size, both to the right of the intestine. Spicules paired, symmetrical, 1.3 times the anal body diameter long. Gubernaculum absent. Seven pairs of 13 µm long setae are present in subventral position. Precloacal area bearing one pair of setae, one short seta, and a precloacal sexual protuberance with two supplementary tubular organs in anterior position and one seta on both sides (originally misinterpreted as a third precloacal supplement) (see Fig. 4C). Postcloacal area with a sexual protuberance having one pair of setae. Four pairs of subdorsal setae and one pair of small subventral papillae have been observed on tail (Fig. 4C).

Female: General morphology similar to that of male. Reproductive system monodelphic-prodelphic, with a postvulvar sac (Fig. 4B). Ovary reflexed, to the right of the intestine. The Demanian system seems to be well developed but it is difficult to see: the main duct (Fig. 4B) is situated between intestine and reproductive system, connecting to the intestine by means of the *ductus entericus* and the osmosium (Fig. 4B); the uvette was seen at 150 µm in front of the anus; and the main duct

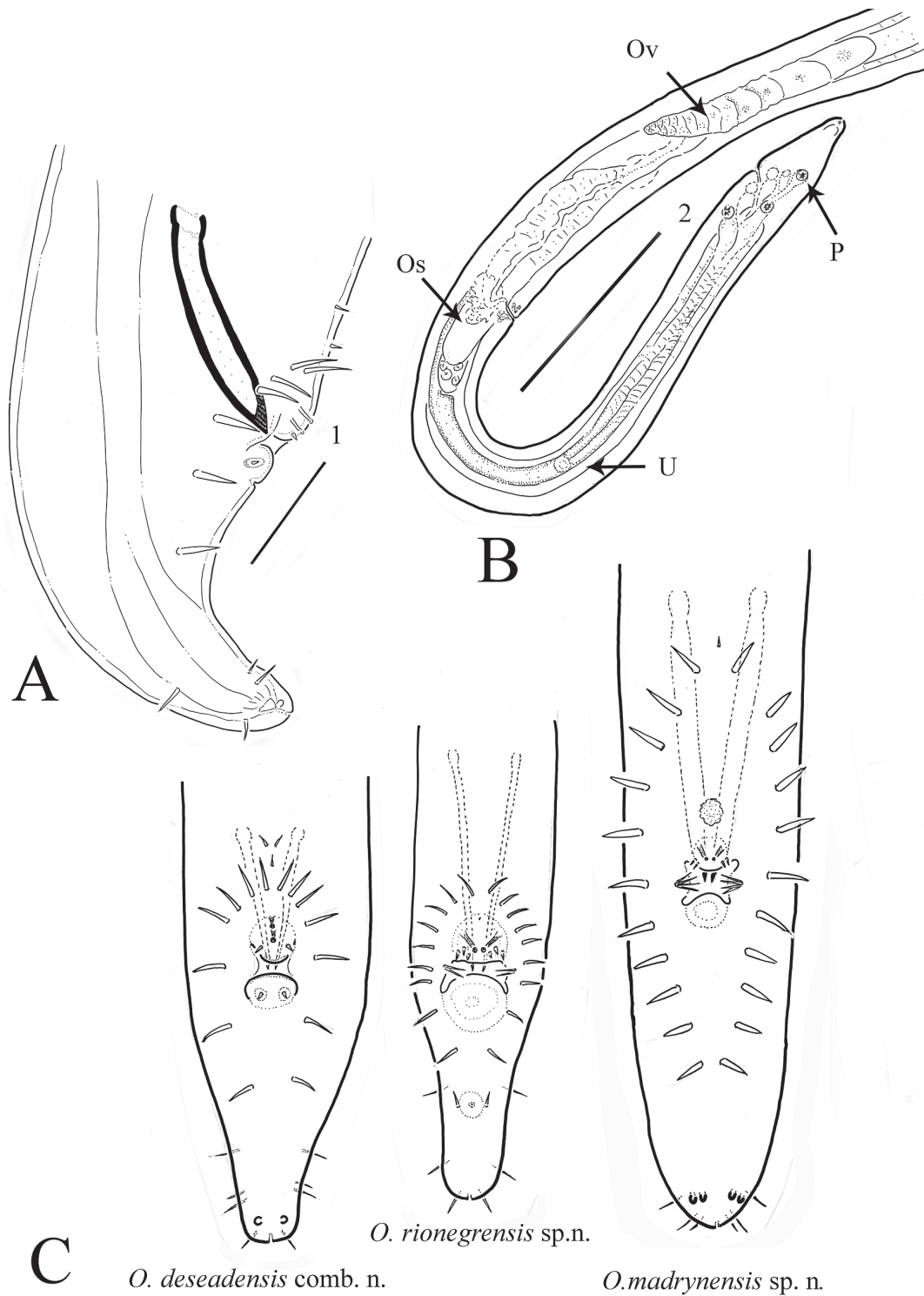


Figure 4. A, B: *Oncholaimus deseadensis* sp. n. A: Holotype, posterior end showing the copulatory apparatus. B: Female, reproductive system (Ov = ovary; Os = osmosium; U = uvette; P = pores). C: Ventral view scheme of the three new *Oncholaimus* species found. (Scale bars: 1 = 20 μ m; 2 = 100 μ m.)

TABLE II. Morphometrics of *Oncholaimus deseadensis* sp. n. All measurements are in μm except L in mm, and in the form: mean \pm s.d. (range).

Character	Locality	Argentina, Puerto Deseado, Santa Cruz		
	n	Holotype σ	Paratypes 2 σ	Paratypes 3 f
a		73	77.8 \pm 12.9 (69-87)	74.9 \pm 6.5 (69-75)
b		8.8	7.7 \pm 1.1 (7-9)	9.5 \pm 0.4 (9-10)
c		67.7	66.3 \pm 15.9 (55-78)	81.1 \pm 11.7 (80-93)
c'		1.6	1.6 \pm 0.4 (1.3-1.8)	2.0 \pm 0.3 (1.7-2.0)
V%		-	-	66.8 \pm 3.5 (64-71)
Body length (L)		4.40	3.89 \pm 1.62 (2.75-5.04)	5.10 \pm 0.44 (4.80-5.60)
Body width		60	49.0 \pm 12.7 (40-58)	68.3 \pm 7.6 (70-75)
Pharynx length		500	465 \pm 92 (400-530)	533 \pm 23 (520-560)
Tail length		65	57 \pm 10.6 (50-65)	63.3 \pm 5.6 (60- 61)
Cloacal/ anal body diameter		40	36.0 \pm 1.4 (35-37)	31.7 \pm 2.9 (30-35)
Head diameter		34	30.3 \pm 0.4 (30-31)	33.3 \pm 5.8 (30-40)
Buccal cavity length		20	22.5 \pm 3.5 (20-25)	41.0 \pm 3.6 (38-45)
Buccal cavity width		18.0	19.5 \pm 0.7 (19-20)	21.7 \pm 1.5 (20-23)
Cephalic setae length (6)		6.0	5.8 \pm 1.1 (5.0-6.5)	8.1 \pm 0.4 (7.5-8.5)
Cephalic setae length (4)		5.0	4.8 \pm 1.1 (4.0-5.5)	5.8 \pm 0.3 (5.5-6.0)
Cervical setae length		3.0	3.1 \pm 0.1 (3.0-3.5)	4.0 \pm 0.1 (4.0)
Amphid width		6.0	5.8 \pm 1.1 (5.0-6.5)	7.5 \pm 0.5 (7.0-7.5)
Amphids width (%)		17.5	16.3 \pm 0.4 (16.0-16.5)	25.3 \pm 1.2 (24-25)
Spicules length		38	37.5 \pm 3.5 (35-40)	-
Excretory pore – anterior end		92	92.5 \pm 3.5 (90-95)	107 \pm 6.4 (100-112)
Excretory pore in stoma length		4.6	4.2 \pm 0.5 (3.8-4.5)	2.6 \pm 0.4 (2.2-2.9)

continues up to the tail, ending in three terminal ducts that lead to three pores on each side of the body, in adanal and postanal positions (Fig. 4B).

Diagnosis: *Oncholaimus deseadensis* sp. n. is characterized by the morphology of its precloacal area having one pair of short setae, one short seta, two tubular organs and one pair of setae on each side, and the presence of one postcloacal sexual protuberance bearing a pair of setae on it.

Relationships: The new species differs from its congeners in its male having two tubular precloacal organs. It is similar to *O. domesticus* but differs from this in its lower number of pericloacal setae (*vs* 13-15), a pair of postcloacal setae, short spicules and different Demanian *b*- and *c*-ratios, and in the presence of two small papillae at distal part of male tail. Males of *O. domesticus* have large papillae at tail (*cf.* Chitwood & Chitwood, 1938, Fig. 1F-H). From previous described species in this paper have a different combination of cloacal characters in males (see Fig. 4C), spicules length and De Man's ratios *a*, *b* and *c* (see Tables I-II).

Type locality and habitat: Argentina, Santa Cruz province, Puerto Deseado estuary, La pesquera, in upper littoral zone. Collected by Catalina Pastor de Ward, on January 23, 1975.

Type material: Male holotype on slide CPN-NEM N° 1334, two male paratypes and three female paratypes on slides CPN-NEM N° 1333, 1335, 1337, 1345 & 1337, deposited in the collection of Centro Nacional Patagónico (CENPAT-CONICET), Chubut, Argentina.

Discussion

The three new species herein described increase the number of *Oncholaimus* species from South Atlantic region, now being 18. Nevertheless, four of them (*O. notolangrunensis*, *O. notoviridis*, *O. paradujardini* and *O. rotundicaudatus*) are regarded as *species inquirendae* as available information about them are not enough to their characterization and separation from other member of the

genus: descriptions are very brief and based on one or two females, illustrations are very similar between them and lack many relevant details, type localities are not identified with accuracy, and collection dates are missing.

The detailed study of male cloacal and caudal regions of the three new Argentinian species has revealed the existence of a series of interesting characters that, as mentioned by Belogurov and Belogurova (1989), may be very useful for the separation of close species. Among these characters, the precloacal, adcloacal and postcloacal supplements, tubular organs, papillae and setae deserve special attention.

Recent molecular studies (Derycke *et al.*, 2013) suggest that historical processes and biogeographic barriers have strongly affected the genetic variation of marine nematode populations. The three *Oncholaimus* species now described are endobenthic nematodes, living inside littoral sediments. These species show very fast vertical migration, related to tides (unpublished data), probably avoiding re-suspension. They are restricted to a narrow littoral area in three sites along Argentinian coasts, separated by biogeographic barriers like gulfs and by large geographical distances: more than 200 km in the case of *O. rionegrensis* sp. n. and *O. madrynensis* sp. n., more than 600 km in the case of *O. madrynensis* sp. n. and *O. deseadensis* sp. n. Ponce *et al.* (2011) and Malumián and Nández (2011) hypothesized that the Patagonian gulfs (actually San Matías, Nuevo and San Jorge gulfs, Puerto Deseado river estuary, and San Julián bay) were natural endorreic basins that could be isolated as inland saline lakes during the Last Glacial Maximum, Holocene times. Thus, a tentative explanation for the high endemism found in *Oncholaimus* species is that such isolation, at least from -22.000 to -11.000 calibrated years BP, (around ten thousand years), along with changes in temperature and salinity, might force species to differentiate or at least to keep some plesiomorphic characters. The presence of two (instead of one) precloacal supplements in *Oncholaimus* species could be one of these characters.

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