Fundam. appl. Nematol., 1993, **16** (1), 63-72

Mononchid nematodes from Spain. One known and another new species of the genus *Miconchus* Andrássy, 1958

Domingo JIMÉNEZ GUIRADO *, Reyes PEÑA SANTIAGO ** and Pablo CASTILLO CASTILLO ***

* *Departamento de Biología Animal, Facultad de Ciencias, San Alberto Magno s/n, Universidad de Córdoba, 14004 Córdoba, Spain;*
** *Escuela Universitaria de Formación del Profesorado de E.G.B., Virgen de la Cabeza 2, 23008 Jaén, Spain, and* *** *Centro de Investigación y Desarrollo Agrario, Camino de Purchil s/n, Apartado 2027, 18080 Granada, Spain.*

Accepted for publication 17 April 1992.

Summary – Two species of the genus *Miconchus, M. studeri* (Steiner, 1914) Andrássy, 1958 and *M. longicaudatus* sp. n., are described and illustrated from material collected in natural and cultured areas in Spain. *M. studeri* is retained under *Miconchus* and the synonymy of *Miconchoides* Jairajpuri & Khan, 1982 with that genus is proposed. Measurements of three different populations of *M. studeri,* including a male specimen, are given and discussed. The new species of *Miconchus* is characterized by having a great size (2.26-3.33 mm), slender body (a = 44-62 in females and a = 30-49 in males), buccal cavity 24-41 × 42-65 µm, dorsal and ventrosublateral teeth of similar morphology with apexes situated at 22-36 % from basis of buccal cavity, V = 48.6-58.4, very long tail (687-827 µm in females, 562-777 µm in males) with caudal glands in tandem and spinneret present, spicules 73-85 µm long and 10-14 ventromedian supplements.

Résumé – ***Nématodes Mononchides d'Espagne. Sur une espèce connue et une nouvelle espèce du genre* Miconchus *Andrássy, 1958*** – Deux espèces du genre *Miconchus, M. studeri* (Steiner, 1914) Andrássy, 1958 et *M. longicaudatus* sp. n., sont décrites et illustrées à partir de matériel récolté dans les zones naturelles ou cultivées d'Espagne. *M. studeri* est conservé dans le genre *Miconchus* et la synonymisation de *Miconchoides* Jairajpuri & Khan, 1982 avec *Miconchus* proposée; les mensurations relatives à trois populations de cette espèce – dont un mâle – sont rapportées et discutées. La nouvelle espèce est caractérisée par sa grande longueur (2.26 – 3.33 mm), son corps élancé (a = 44-62 chez les femelles et 30-49 chez les mâles), une cavité buccale mesurant 24-41 × 42-65 µm, des dents dorsale et subventrales de forme identique, à apex situé à 22-30 % de la base, V = 48,6-58,4, une très longue queue (687-827 µm chez les femelles et 562-777 µm chez les mâles) pourvue de glandes caudales en tandem et de « spinnerets », des spicules longs de 73-85 µm et dix à quatorze suppléments ventro-médians.

Key-words : Taxonomy, description, *Miconchus longicaudatus* sp. n., nematoda, Spain.

Despite scarce previous records the genus *Miconchus* Andrássy, 1958 is widely distributed in Spanish soils. The study of different nematode collections and a recent survey carried out during the last year have allowed us to find several populations of nematodes belonging to this genus. Two different species have been identified, *M. studeri* (Steiner, 1914) Andrássy, 1958 and the new species *M. longicaudatus*; both species are described and illustrated below.

The nematodes were extracted by Flegg's method (1967), fixed in hot F.G. 4:1 and processed and mounted in anhydrous glycerin by the rapid method of Seinhorst (1962).

Miconchus studeri (Steiner, 1914) Andrássy, 1958

(Figs 1 & 2)

MEASUREMENTS

See Table 1

DESCRIPTION

Female : Nematodes of medium size, about 2 mm long. Body cylindrical tapering clearly towards extremity. Habitus after fixation ventrally curved to C-shaped, generally more curved in posterior half. Cuticle with fine transverse striations, sometimes obscure. Lateral chord occupying one-third to two fifths of midbody width. Lip region set off from the adjacent body by depression, about 2.5-3.5 times as wide as high. Lips amalgamated for the most part. Labial and cephalic papillae conical and somewhat prominently interfering with the head contour. Amphid cup-shaped, located at level of the cephalic depression; its opening 11-15 % of the corresponding body diameter. Buccal cavity barrel-shaped with moderately thick walls, 1.4-1.8 times as long as wide. Dorsal ventrosublateral teeth of similar morphology and situated at the base; they are forward directed and small; dorsal tooth apex located at 21-31 % of the bucal cavity length from the base. Replacement teeth are often present, even in the adult, within the functional ones. Two pairs of ventrosublateral foramina are visible in the basal plates. Pharynx cylindrical, muscular, about 11.5-13.5 times as long as wide, surrounding the basal part of the stoma. Nerve ring located at 30-36 % of the total neck length. Excretory pore small and inconspicuous,

Table 1. Morphometric data on three populations of *Miconchus studeri* (all measurements in µm, except L in mm).

	Pop. Güejar-Sierra, Granada	Pop. Andújar, Jaén		Pop. Tobía, La Rioja
	Females	Male	Females	Females
n	7		5	7
L	2.06 ± 0.17 (1.70-2.24)	1.37	1.82 ± 0.11 (1.65-1.97)	1.80 ± 0.09 (1.70-1.95)
a	33.8 ± 2.8 (29-38.5)	25.3	28.5 ± 3.5 (23.5-34)	30.6 ± 2.4 (26-34)
b	4.3 ± 0.2 (4.1-4.6)	3.7	4.2 ± 0.3 (3.9-4.7)	4.1 ± 0.1 (3.9-4.3)
c	14.3 ± 0.7 (13.1-15.2)	14	12.6 ± 1.1 (11.7-14.7)	14 ± 1.1 (12.9-16.1)
c′	3.8 ± 0.3 (3.3-4.3)	2.2	3.5 ± 0.2 (3.2-3.9)	3.4 ± 0.2 (3.2-3.7)
V/T	64.2 ± 0.9 (63.2-66.1)	44.8	62 ± 1.5 (60.3-64.8)	65.1 ± 0.9 (63.9-66.3)
G_1	12.5 ± 1.2 (11.5-15.2)	–	10.6 ± 0.8 (9.3-11.6)	10.7 ± 0.9 (9-12)
G_2	12.2 ± 0.9 (11-14)	–	10.7 ± 0.6 (10-11.4)	10.8 ± 0.9 (9.4-12.4)
Cut. head	2 ± 0.4 (1.5-2.5)	2	2.6 ± 0.7 (1.5-3.5)	1.9 ± 0.3 (1.5-2)
Cut. midbody	2.5 ± 0.7 (1.5-3.5)	3.5	3.6 ± 1.1 (2.5-5)	2.5 ± 0.6 (1.5-3)
Cut. tail	3.3 ± 0.4 (2.5-4)	4	4.1 ± 0.7 (3.5-5)	3.5 ± 0.9 (2.5-5)
Lat. chord	20.9 ± 4.1 (15-27.5)	16	19 ± 2.9 (14.5-22.5)	21.8 ± 2.1 (19.5-25.5)
Lip region width	37.8 ± 1.6 (35.5-40)	35	39.1 ± 1.1 (37-40)	42 ± 1.7 (40-45)
Lip region height	13.4 ± 1.8 (11-15.5)	14	12.5 ± 0.5 (12-13.5)	13.3 ± 1.2 (12-16)
Amphid	5.1 ± 0.3 (4.5-5.5)	5	4.9 ± 0.8 (4-6)	5.4 ± 0.2 (5-5.5)
Bucc. cav. length	44 ± 2.2 (40-47.5)	40.5	44.5 ± 1 (42.5-45.5)	46.6 ± 2.1 (44-49.5)
Bucc. cav. width	25.9 ± 1.2 (24-28)	24	27.3 ± 0.8 (26-28)	29.4 ± 0.8 (28.5-31)
N. r.-ant. end	156 ± 11.1 (133-170)	131	144 ± 18.8 (119-167)	143 ± 10.9 (132.5-161)
Excr. p.-ant. end	171.3 ± 7.6 (158-180.5)	150	161 ± 21.3 (130.5-184.5)	155.5 ± 12.5 (142-176.5)
Ph. length	433.8 ± 28.2 (372.5-468)	337	390.8 ± 44 (336.5-440.5)	398.8 ± 15.8 (377-428.5)
Vag. length	23.2 ± 4 (16.5-29.5)	–	24.9 ± 3.4 (19-28)	25.4 ± 1.9 (23.5-29.5)
Tail	144.4 ± 9.9 (130-158)	98	145 ± 12 (127-164.5)	129 ± 4.9 (121-135)
Spicules	–	68.5	–	–
Gubern.	–	22.5	–	–
Lat. g. pieces	–	16	–	–
Suppl.	–	11	–	–
Sperm	–	7.5	–	–
Egg length	112 ± 8.8 (97.5-121.5) *	–	–	–
Egg width	54.8 ± 7.5 (47-65) *	–	–	–

* n = 4.

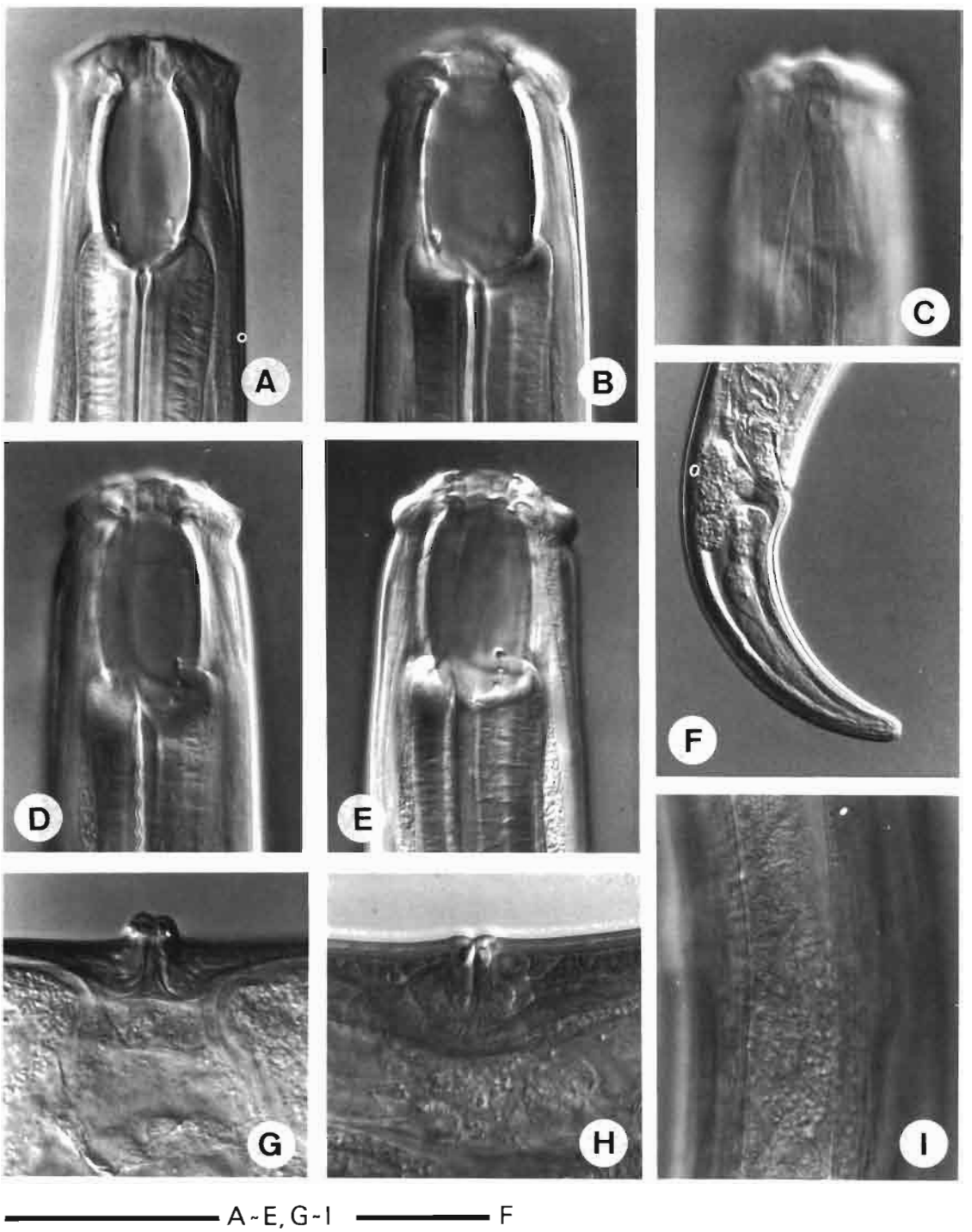

Fig. 1. *Miconchus studeri.* A-E : Head; F : Female tail; G, H : Vulval region; I : Lateral chord. *(Scale bars = 50 µm).*

situated somewhat behind the nerve ring. Pharynx-intestine junction tuberculate but tubercles rarely prominent; conical part more or less slender. Intestinal cells polygonal, 6-8 in transverse section and with a developed bacillary layer. Genital system didelphic-amphidelphic. Ovary short, not reaching the oviduct-uterus junction. Oocytes few in number. Oviduct consisting of a slender part with high cells and a developed *pars dilatata*. Sphincter present between the oviduct and the uterus; it consists of an inner sclerotized part surrounded by muscles. Uterus relatively short, narrower than oviduct when empty. Vagina cylindrical, extending inwards over two-sevenths to two-fifths of the corresponding body width. Vulva a transverse slit. Medium sized sclerotized pieces are present at the vagina-vulva junction. Vulval papillae absent. Uterine eggs elliptical, about 1.7-2.5 times as long as wide. Tail conical, ventrally curved and with truncate extremity. Caudal pores apparently two pairs. Caudal glands well developed, in tandem and leading to a common duct which opens terminally; ampulla and spinneret present.

Male : General appearance similar to female. Testes opposed; spermatozoa elongate, spindle-shaped. *Vas deferens* and *ductus ejaculatorius* separated by a well marked constriction. Ejaculatory and rectal glands distinct. Eleven regularly spaced ventromedian supplements are present. Spicules moderately slender, ventrally curved and 1.5 times as long as anal body width, measured along the curved median line. Gubernaculum well developed. Lateral guiding pieces thickening towards the extremity which is forked. Tail similar to female but somewhat shorter. Caudal pores not clearly observed. Caudal glands similar to female.

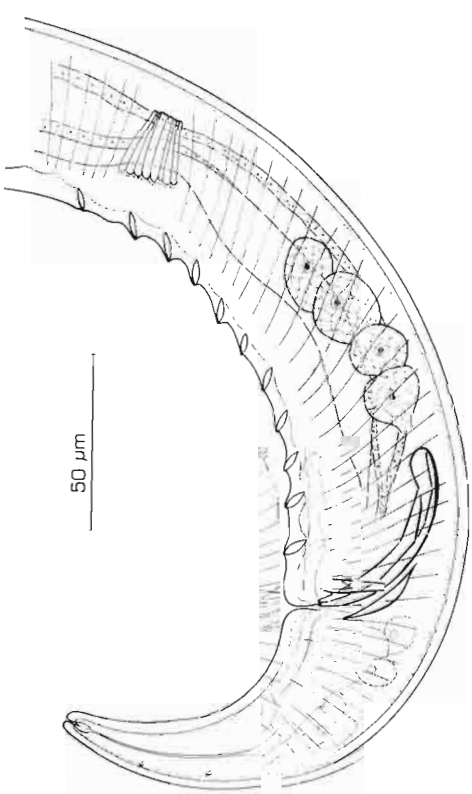

Fig. 2. *Miconchus studeri.* Male posterior region.

Distribution in Spain

The species has been collected from more than ten different localities in Spain. It has been frequently found in association with wild plant communities : beech *(Fagus sylvatica),* oak (*Quercus* spp.), and coniferous *(Pinus* spp., *Abies pinsapo)* forests, mediterranean brushwood (*Cistus* spp.), etc.; its presence in agricultural areas is, however, rarer.

Remarks

Spanish populations are close in their measurements and general description with those previously studied (Mulvey, 1962; Baqri & Jairajpuri, 1973; Zullini, 1978; Bongers, 1988). Still, some morphometric differencies have been observed in the case of the male, surely due to the low number of specimens examined at present : smaller body (*vs* 1.7-2.3 mm), shorter tail (*vs* about 120 µm) shorter spicules (*vs* 88-104 µm) and less ventromedian supplements (*vs* 12-14).

On the other hand, we agree with Khan and Coomans (1981) that replacement teeth are frequently present in the adult specimens and the foramina visible in the basal plates of the buccal cavity are pore-like structures and not small teeth. In our opinion these features must be interpreted as intraspecific variability; so, we cannot support the action of Jairajpuri and Khan (1982) who proposed the new genus *Miconchoides,* with *M. studeri* as type and only species, differing of *Miconchus* by having three pairs of smaller suprabasal teeth. As consequence, we consider both genera as synonymous and retain the species considered under *Miconchus.*

***Miconchus longicaudatus* sp. n.**

(Figs 3, 4 & 5)

Measurements

See Table 2

Description

Female : Slender and large sized nematodes (about 3 mm long). Body cylindrical throughout the anterior two-thirds of its length, then tapering gradually towards the tail tip. Habitus after fixation straight or somewhat ventrally curved especially in the caudal region. Cuticle appearing smooth under the light microscope, slightly thinner at head and thicker at midbody and tail. Lateral

Table 2. Morphometric data of *Miconchus longicaudatus* sp. n. (all measurements in μm, except L in mm).

	Pop. Jándula riverside, Jaén			Pop. Andújar, Jaén	Pop. Santa Elena, Jaén
	Holotype	Paratypes			
		Females	Males	Females	Females
n		9	8	2	2
L	2.89	2.85 ± 0.16 (2.55-3.07)	2.50 ± 0.24 (2.26-2.87)	3.11, 2.94	3.33, 3.01
a	47.2	48.9 ± 3.3 (44.6-54.3)	41.2 ± 5.7 (30.2-48.6)	52.6, 47.4	61.8, 52.2
b	5.4	5.5 ± 0.2 (5.2-5.9)	5.4 ± 0.2 (5.0-5.6)	5.3, 5.6	4.9, 5.4
c	3.9	3.7 ± 0.2 (3.2-4)	3.8 ± 0.3 (3.4-4.4)	4.5, 4.3	4, 3.9
c′	18.1	20.8 ± 2.5 (17.9-24.6)	15.1 ± 1.6 (12.4-17.9)	15, 18.2	19.5, 17.9
V/T	54.5	54.2 ± 2.5 (48.6-57.9)	33.3 ± 1.8 (30.9-36.7)	58.4, 57.4	56.5, 56.9
G_1	10.6	10.5 ± 1.6 (9.3-13.6)	–	12.9, 12.2	10.9, 9.4
G_2	9.2	9.8 ± 2.4 (7.5-15.7)	–	11.2, 11.1	9.9, 9.3
Cut. head	3	2.1 ± 0.5 (1.5-3)	2.6 ± 0.6 (1.5-3.5)	2, 3	2, 2
Cut. midbody	4	2.5 ± 0.6 (1.5-3.5)	3.2 ± 0.7 (2-4)	2, 2.5	2.5, 3
Cut. tail	5	3.7 ± 0.8 (2.5-4.5)	3.1 ± 0.3 (2.5-3.5)	3.5, 3.5	4.5, 4.5
Lat. chord	18.5	21.4 ± 4.9 (14.5-28)	21.4 ± 1.7 (19.5-23.5)	–, 23.5	–, 25.0
Lip region width	45	41.5 ± 1.9 (39-45)	37.5 ± 1.9 (34-40)	47, 44.5	51, 49.5
Lip region heigth	17.5	14.8 ± 1.7 (11.5-17.5)	14.1 ± 0.5 (13.5-15)	15, 12	14.5, 20.5
Amphid	7	5.9 ± 0.5 (5.5-7)	6.8 ± 0.5 (6-7.5)	–, 6.5	–, 7.5
Bucc. cav. length	55	50.2 ± 3 (46-56)	45.8 ± 3.2 (42.5-52)	53.5, 47	63.5, 65
Bucc. cav. width	30.5	30.8 ± 2.7 (26.5-36)	27.1 ± 1.9 (24.5-30)	33, 33.5	40, 41
N. r.-ant. end	186.5	160.2 ± 11.3 (131-172.5)	157.8 ± 13.4 (136.5-178)	181, 179	201.5, 179
Excr. p.-ant. end	208	177 ± 11.5 (152.5-190)	183.1 ± 16.2 (165-215)	–, 194	233, 200
Ph. length	480	465 ± 37.2 (398-519)	414.6 ± 41.3 (360-475)	541, 477.5	605, 488.5
Vag. length	23	21.3 ± 2 (19.5-25.5)	– –	–, 29	–, 30
Tail	748	760 ± 30.6 (687.5-789.5)	659 ± 64.2 (562-777)	687.5, 682.5	827, 774
Spicules	–	–	79.2 ± 3.3 (73.5-83.0)	–	–
Gubern.	–	–	16.2 ± 2.5 (13.5-21.5)	–	–
Lat. g. pieces	–	–	12.1 ± 0.9 (11-14)	–	–
Suppl.	–	–	12 ± 1.1 (10-14)	–	–
Sperm	–	–	6.7 ± 0.5 (6-7)	–	–
Egg length	–	–	–	–, 170	–
Egg width	–	–	–	–, 54	–

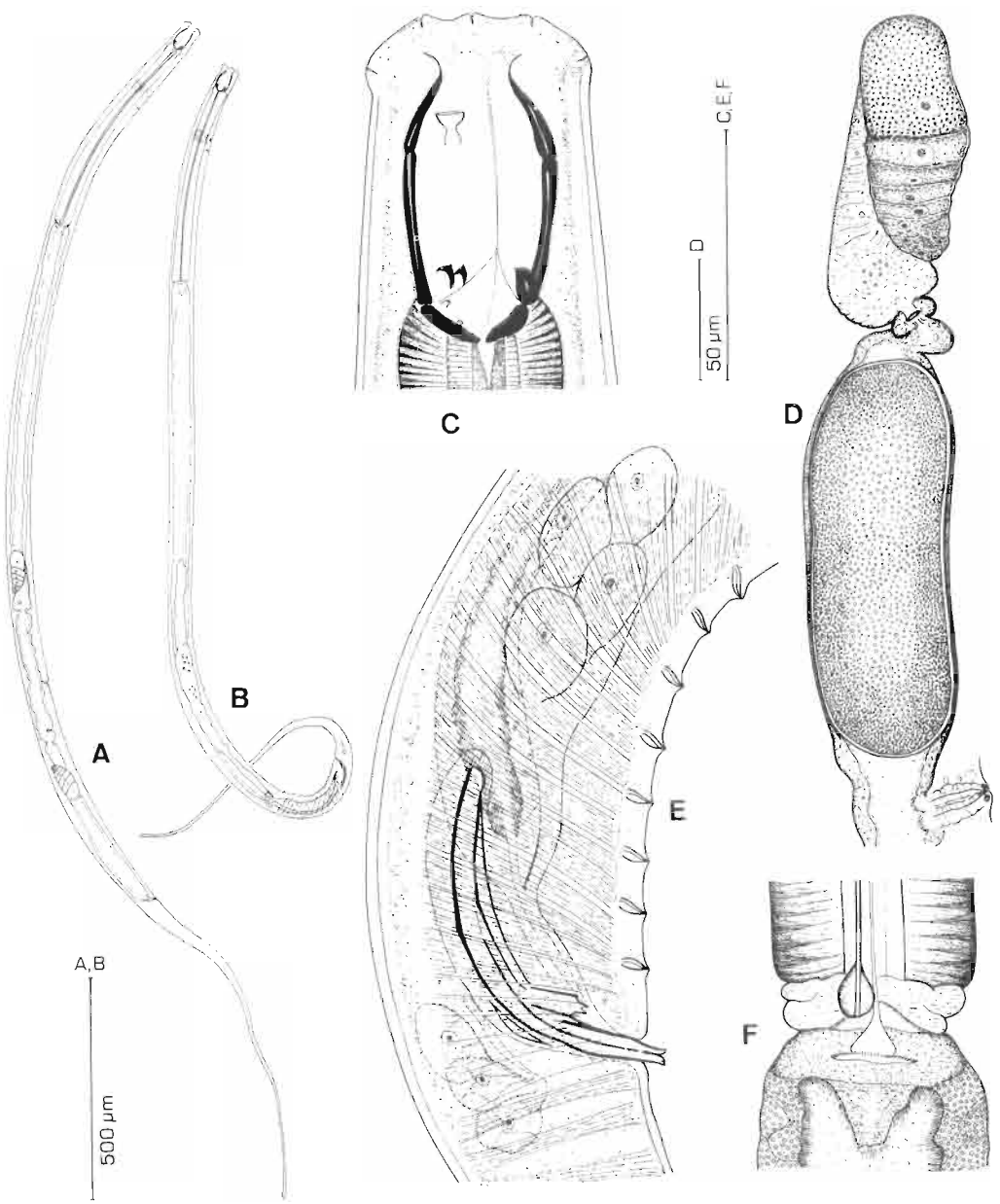

Fig. 3. *Miconchus longicaudatus* sp. n. A, B : Body habitus; C : Head; D : Female genital branch; E : Male cloacal region; F : Pharynx-intestine junction.

Fig. 4. *Miconchus longicaudatus* sp. n. A, B : Head; C : Female anal region; D : Amphid; E : Pharynx-intestine junction; F : Female tail; G : Tail terminus; H : Anus. *(Scale bars = 50 µm).*

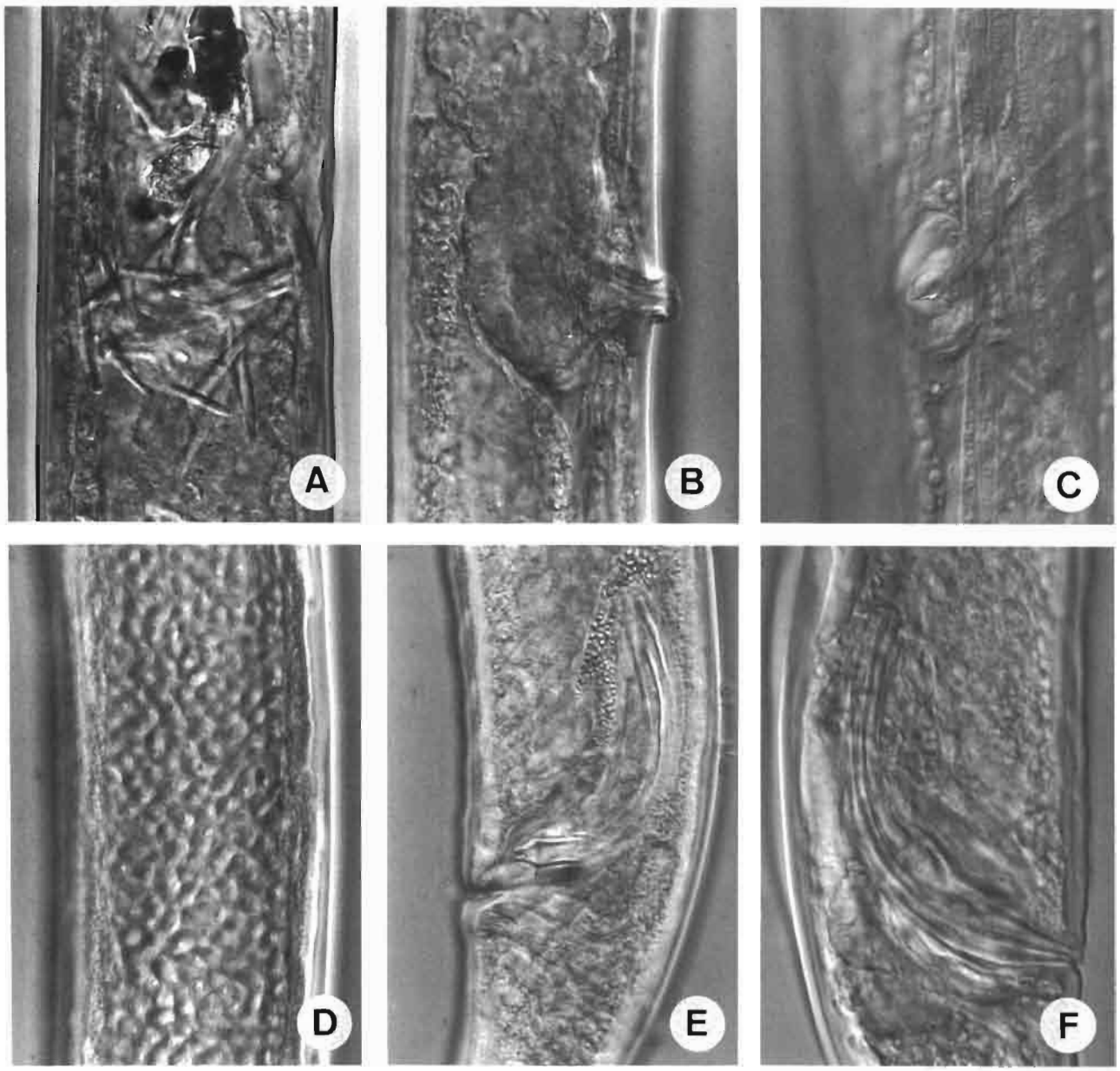

Fig. 5. *Miconchus longicaudatus* sp. n. A : Intestinal contents (with oligochaete setae). B, C : Vulval region. D : Sperm. E, F : Male cloacal region. *(Scale bars = 50 µm).*

chord occupying one-third or two-fifths of the midbody diameter. Lip region set off by depression, about 2.5-3 times as wide as high. Lips amalgamated for the most part, rounded. Labial and cephalic papillae slightly interfering with head contour. Amphid cup-shaped, opening just behind the cephalic depression and occupying one-sixth to one-eighth of the corresponding body width. Buccal cavity broad and flattened at the base, 1.5-1.8 times as long as wide, and with relatively thick walls. Dorsal and ventrosublateral teeth similar in morphology, large and suprabasal; sometimes replacement teeth are present within the functional ones; dorsal tooth

apex located at 26-36 % of the total length of the buccal cavity measured from base. Two pairs of distinct foramina are located on the ventrosublateral basal plates. Pharynx cylindrical, muscular, 12-14 times as long as wide; it surrounds the basal part of the buccal cavity and appears somewhat thinner from its anterior end to level of the excretory pore. Nerve ring located at 25-34 % of the total neck length. Hemizonid obscure but the excretory pore is easily visible. Pharynx-intestine junction tuberculate with prominent tubercles. Intestine with 6-8 granular polygonal cells in transverse section; a distinct bacillary layer is present and especially visible at the anterior and posterior regions. Anus a transverse slit. Genital system didelphic-amphidelphic. The oviduct joins the ovary subterminally and consists of a slender part and a well developed *pars dilatata*. Sphincter present at the oviduct-uterus junction. Vagina cylindrical, extending inwards over one-third to two-fifths of the corresponding body diameter. Medium sized sclerotized pieces are present at the vagina-vulva junction. Vulva a short transverse slit. No vulval papillae observed. Tail very long, tapering slightly from anus to the tip. Caudal glands in tandem and leading to a very long but visible common duct which expands forming an ampulla. Spinneret opens terminally or sometimes subterminally on the tail tip. Caudal pores obscure.

Male : General appearance similar to female but having slightly shorter body, habitus more ventrally curved especially in the posterior body region and somewhat smaller buccal cavity. Genital system diorchic. Testes opposed. Spermatozoa rounded to elliptical. Between the *vas deferens* and the *ductus ejaculatorius* a well marked constriction with associated muscles is present. Three pairs of rectal glands are visible behind the spicules. Ejaculatory glands also developed. Spicules relatively slender, ventrally curved and 1.8-1.9 anal body widths long, measured along axis. Lateral guiding pieces relatively short and robust, narrowing abruptly at the end which is forked. Ten to fourteen ventromedian supplements, more or less regularly spaced; at level of the most anterior supplement the body appears thinner and more ventrally curved. Tail similar to female but somewhat shorter. Caudal glands and spinneret distinct.

Type habitat and locality

Soil around roots of different herbaceous plant in Jándula riverside, Andújar, province of Jaén, Spain.

Other habitats and localities

Soil arounds roots of *i)* oak forest in Sierra Morena, Andújar, province of Jaén, *ii)* oak forest in Sierra Morena, Santa Elena, province of Jaén, *iii)* oak forest in Sierra Caracolera, Alcaudete, province of Jaén, *iv)* oak forest in Sierra de Cazorla, province of Jaén, *v)* brushwood in Sayalonga, province of Málaga, *vi)* olive in Valmojado, province of Toledo, *vii)* vineyard in Toledo, province of Toledo and *viii)* vineyard in Navalcarnero, province of Madrid.

Type material

Holotype, seven female and six male paratypes in collection of the Departamento de Biologia Animal, Universidad de Granada, Granada, Spain. One female and one male paratypes in the following two collections : Laboratoire de Biologie Parasitaire, Muséum National d'Histoire Naturelle, Paris, France and Instituut voor Dierkunde, Rijksuniversiteit Gent, Belgium. Other specimens in collection of the Departamento de Biologia Animal, Universidad de Córdoba, Córdoba, Spain.

Diagnosis and relationships

The new species is characterized by having a large size (length 2.55-3.33 mm in females and 2.26-2.87 mm in males) and very slender body (a = 44-62 in females and a = 30-49 in males), buccal cavity 24-41 × 42-65 µm and 1.4-1.8 times as long as wide, dorsal and ventrosublateral teeth of similar morphology with apexes situated at 22-36 % of the total buccal cavity length from base, V = 48.6-58.4, very long tail (687-827 µm, c = 3.2-4.5 and c′ = 15-24.6 in females, and 562-777 µm, c = 3.4-4.4 and c′ = 12.4-17.9 in males) with caudal glands in tandem and spinneret opening terminally or subterminally, spicules 73-85 µm long or 1.8-1.9 anal body widths long, lateral guiding pieces abruptly narrowed before forked tip, and 10-14 ventromedian supplements.

M. longicaudatus sp. n. comes close to *M. dadayi* (Micoletzky, 1914) Andrássy, 1958 and *M. pararapax* Mulvey & Jensen, 1967. *M. dadayi* was considered *species inquirenda* by Mulvey and Jensen (1967) and its identity needs clarification; however, and taking into consideration the data of these authors, the new species differs clearly from it by its shorter buccal cavity (*vs* 90 µm)and longer tail (*vs* 260 µm). The new species can be distinguished from *M. pararapax* in the more anterior vulva (*vs* V = 58-65), longer tail (*vs* 290-420 µm, c = 5.2-7.9 in females) and lateral guiding pieces with different morphology.

Acknowledgement

We thank the financial support received of the Projects D.G.I.C.Y.T. PB87-0397 and PB89–0081 (Fauna Ibérica I & II) of the Museo Nacional de Ciencias Naturales, C.S.I.C., Madrid.

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