

# Two new species of *Amplimerlinius* Siddiqi, 1976 (Nematoda : Tylenchida) from Southeastern Spain

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## SUMMARY

Two new *Amplimerlinius* species are described and illustrated from Southeastern Spain. *Amplimerlinius paraglobigerus* n. sp. differs from species of the genus in the combination of a small body and stylet, measuring 870 (650-997)  $\mu\text{m}$  and 21 (20-23)  $\mu\text{m}$ , respectively. *A. longicauda* n. sp. differs from all the species of the genus by having an elongate female tail [ $c' = 3.1$  (2.9-3.5)].

## RÉSUMÉ

Deux nouvelles espèces d'*Amplimerlinius* Siddiqi, 1976 (Nematoda : Tylenchida) provenant du Sud-Est de l'Espagne

Deux nouvelles espèces d'*Amplimerlinius* provenant d'Espagne sont décrites et illustrées. *Amplimerlinius paraglobigerus* n. sp. est caractérisé par la longueur réduite du corps et du stylet, et *A. longicauda* n. sp. par la grande longueur de la queue de la femelle.

Two undescribed species of *Amplimerlinius* Siddiqi, 1976, were found in soil samples collected in several natural plant communities of the Sierra de Cazorla, a mountain in the Southeastern Spain.

Specimens were killed by gentle heat and fixed in a 4% solution of formaldehyde, then dehydrated and processed to glycerine according to the Seinhorst's method. Body length and curved structures were measured with the aid of a precision curvimeter straight structures such as maximum body width, stylet, anal body width, etc. were measured using a micrometer-scale in the eyepiece of high-power (1250 $\times$ ) microscope.

### *Amplimerlinius paraglobigerus* n. sp. (Fig. 1)

#### MEASUREMENTS

Females and males : see Tab. 1.

*Holotype (female)* : L = 870  $\mu\text{m}$ ; a = 32.0; b = 5.2; c = 18.3; c' = 2.5; V = 57; G<sub>1</sub> = 23; G<sub>2</sub> = 21; stylet = 22.5  $\mu\text{m}$ .

#### DESCRIPTION

*Female* : Body C shaped or more curved to a closed-circle. Cuticle prominently annulated; annuli about

1.2  $\mu\text{m}$  wide at mid-body. Lateral field 7-8  $\mu\text{m}$  wide or about one-fourth of body width, not areolated behind oesophageal base. Cephalic region continuous with body; cephalic sclerotization not appearing bead-like in optical section, hemispherical, with 8-10 annuli up to the end of outer extension of framework; framework moderately sclerotized, outer margins crescent-shaped in optical cross-section and extending over three body annuli; inner margins forming bulboid stylet guide measuring 10  $\mu\text{m}$  from anterior end of body to its base. Anterior and posterior cephalids 7-8 and 13-14  $\mu\text{m}$  respectively from anterior end. Stylet well developed; conus just longer than shaft; knobs 3-4  $\mu\text{m}$  across, rounded, outer margins convex or posteriorly sloping. Orifice of dorsal oesophageal gland 2.5-3.0  $\mu\text{m}$  from base of stylet. Deirids about level of hemizonid, 2-7  $\mu\text{m}$  anterior to level of excretory pore. Hemizonid 3-4 annuli long, 1-3 annuli anterior to excretory pore, with six lateral lines at its level. Median oesophageal bulb oval, with prominent valve plates, 17-20  $\times$  10-11  $\mu\text{m}$ . Distance from anterior end to centre of median bulb 83 (76-88)  $\mu\text{m}$ . Isthmus slender, about 1.5 times length of basal bulb. Basal bulb elongate-saccate, offset from intestine, 30-31  $\times$  9-11  $\mu\text{m}$ ; cardia prominent, rounded. Vulva transverse, flush with body surface, with inner epiptygma. Vagina extending about half-way into body. Spermathecae rounded, with sperm. Ovaries outstretched, with a single row of oocytes, except in multi-plication zone. Rectum about as long as anal body width; no post-anal intestinal sac. Tail cylindroid,

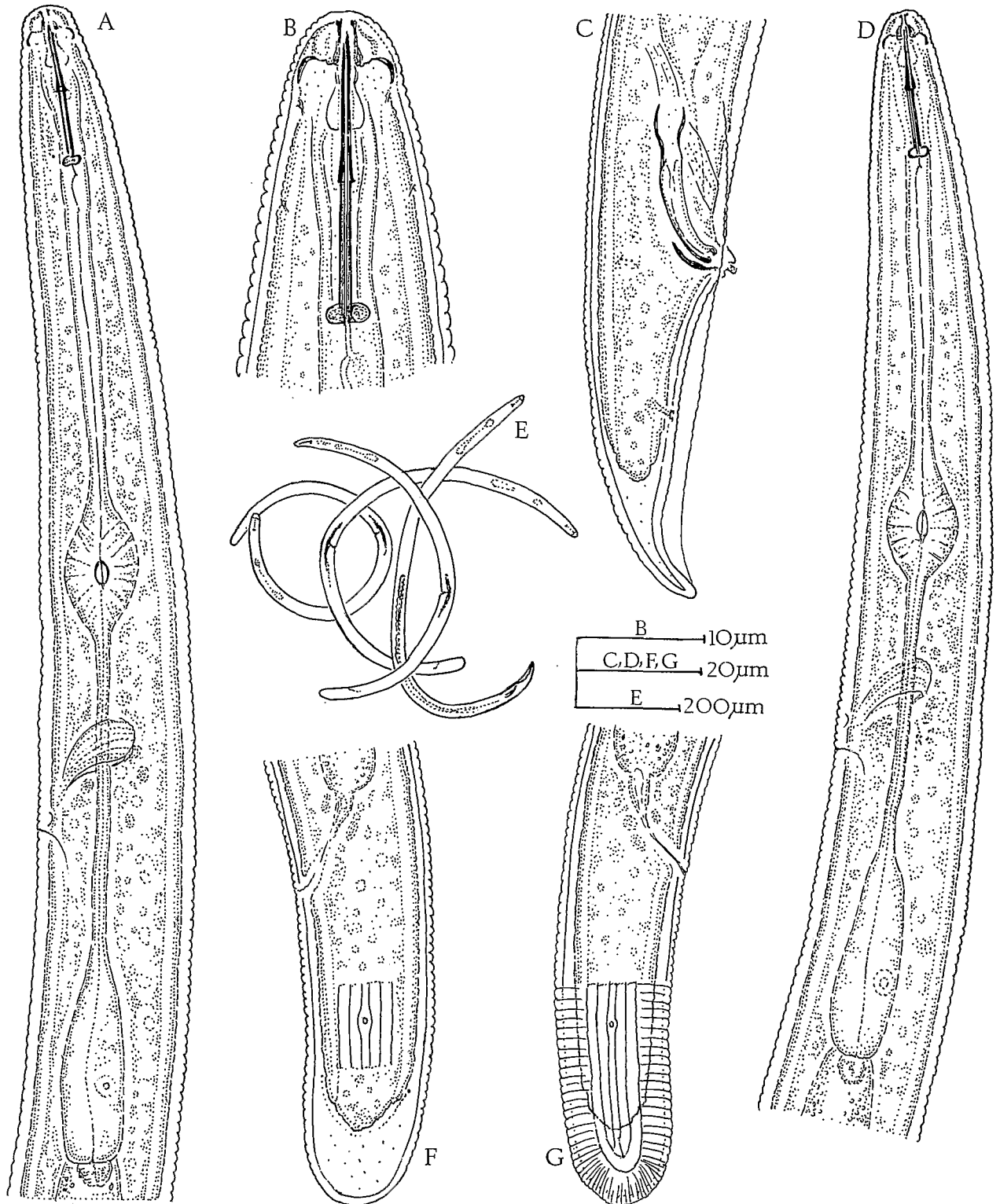


Fig. 1. *Amplimerlinius paraglobigerus* n. sp. A : Oesophageal region of female; B : Head end of female; C : Tail end of male; D : Oesophageal region of male; E : Body posture of females and male; F, G : Tail ends of female.

Table 1  
Morphometric data of *Amplimerlinius paraglobigerus* sp. n. (measurements in  $\mu\text{m}$ )

	Females (n = 30)			Males (n = 12)		
	$\bar{X} \pm \text{SD}$	Extr. Val.	CV %	$\bar{X} \pm \text{SD}$	Extr. Val.	CV %
L	870 $\pm$ 86	650-997	9.9	873 $\pm$ 77	742-959	8.8
a	34.3 $\pm$ 3.3	28.3-42.4	9.5	35.9 $\pm$ 3.7	30.6-41.7	10.2
b	5.1 $\pm$ 0.4	4.3-5.8	8.6	5.1 $\pm$ 0.4	4.4-5.7	7.4
V	57 $\pm$ 1.9	54-61	3.3	—	—	—
T	—	—	—	34 $\pm$ 6.5	22-41	19.2
G <sub>1</sub>	23 $\pm$ 4.8	17-33	20.9	—	—	—
G <sub>2</sub>	22 $\pm$ 4.6	14-28	21.0	—	—	—
c	18.0 $\pm$ 2.0	13.3-23.0	11.4	16.1 $\pm$ 0.9	14.3-17.4	5.8
c'	2.5 $\pm$ 0.4	1.7-3.1	14.2	2.8 $\pm$ 0.3	2.3-3.2	9.2
Stylet	21 $\pm$ 0.8	20-23	3.6	21 $\pm$ 0.6	20-22	2.7
m	51 $\pm$ 2.1	50-53	4.0	51 $\pm$ 1.5	50-54	2.9
O	13 $\pm$ 2.2	8-17	17.0	13 $\pm$ 1.2	11-15	9.0
S	1.3 $\pm$ 0.1	1.1-1.5	7.5	1.4 $\pm$ 0.1	1.2-1.5	6.6
MB	49 $\pm$ 2.5	43-55	5.0	50 $\pm$ 2.2	46-53	4.5
Procorpus	49 $\pm$ 4.1	39-54	8.4	50 $\pm$ 2.9	45-53	5.9
Nerve ring	106 $\pm$ 10.4	86-123	9.8	108 $\pm$ 7.8	98-122	7.2
Excretory pore	126 $\pm$ 12.5	101-148	10.0	128 $\pm$ 10.4	113-150	8.2
Oesophagus	172 $\pm$ 10.1	145-194	5.9	170 $\pm$ 9.2	149-183	5.4
Maximum body width	26 $\pm$ 2.8	21-33	10.9	24 $\pm$ 2.6	20-29	10.8
Anal body width	20 $\pm$ 2.4	16-24	12.2	20 $\pm$ 1.6	16-22	8.4
Tail length	49 $\pm$ 4.5	40-60	9.1	54 $\pm$ 6.9	47-70	12.7
Spicules	—	—	—	26.6 $\pm$ 1.5	24-29	5.5
Gubernaculum	—	—	—	9 $\pm$ 1.3	6-11	14.6

straight to slightly arcuate, with  $40 \pm 4.6$  (33-50) annuli; annuli finer at tail terminus which is hemispherical and may appear smooth; terminal hyaline region (h) 10-14  $\mu\text{m}$  thick; ratio between tail length to width of terminal hyaline region 4.1 (3.2-5.2). Phasmids punctiform, at about middle of tail. The six incisures of lateral fields continue behind phasmids.

*Male*: Body C-shaped. Cephalic region, stylet and oesophagus as in female. Testis outstretched. Spicules and gubernaculum typical of the genus. Spicules about half as long as tail. Hypoptygma prominent. Bursa striated, enveloping tail. Phasmids near middle of tail, extending into bursa. Tail with a conspicuous terminal hyaline region measuring about two-fifths of tail length.

#### TYPE HABITAT AND LOCALITY

Specimens collected from soil around the roots of gall oak (*Quercus faginea* Lam.) from Arroyo Frio in the Sierra de Cazorla, Jaén, Spain.

#### TYPE SPECIMENS

Holotype, female and male paratypes deposited in the collection of the Instituto "López-Neyra" de Para-

sitología (CSIC), Granada, Spain; three female paratypes and one male paratype at the Muséum national d'Histoire naturelle, Paris, France; six female paratypes and three male paratypes at CIP, St. Albans, Herts, England.

#### DIAGNOSIS AND RELATIONSHIPS

*Amplimerlinius paraglobigerus* n. sp. is characterized by a small body and stylet measuring under 1 mm and under 24  $\mu\text{m}$ , respectively, and differs from all species of the genus except *A. globigerus* Siddiqi, 1979; *A. umbonatus* Ivanova, 1982; *A. clavicaudatus* (Choi & Geraert, 1975) Siddiqi, 1976, *A. omentelus* Kleynhans & Heyns, 1983 and *A. socialis* (Andrássy, 1962) Siddiqi, 1976.

*A. paraglobigerus* n. sp. differs from *A. globigerus* in having 8-10 annuli in the cephalic region vs 6-7 in the latter; cephalic sclerotization not appearing bead-like in optical section vs appearing bead-like in optical section in *A. globigerus*; a longer isthmus as compared with the length of the basal bulb (1.5 times vs 1-1.1 in *A. globigerus*) and female body becoming C-shaped to closed-circle upon relaxation vs straight to slightly arcuate in *globigerus*.

From *A. umbonatus* it differs in having a hemispheri-

cal cephalic region, moderately strong sclerotization *vs* cephalic region conical and with weak sclerotization in *A. umbonatus*; lesser number of annuli on female tail (45-55 annuli on ventral side of tail in *A. umbonatus*), female and male tails with longer terminal hyaline region and spicules measuring about half as long as male tail (spicules 33-42% of tail in *A. umbonatus*).

From *A. clavicaudatus* it differs in having a cylindroid female tail with 40 (33-50) annuli *vs* a clavate female tail with 51 (47-55) annuli and shorter spicules and gubernaculum, 24-29  $\mu\text{m}$  and 6-11  $\mu\text{m}$  *vs* 34-37  $\mu\text{m}$  and 10-15  $\mu\text{m}$  in *A. clavicaudatus*, respectively.

From *A. omentelus* it differs in having a cephalic region with 8-10 annuli and framework moderately sclerotized *vs* smooth cephalic region and lightly sclerotized cephalic framework in the latter. Furthermore it differs in having a tail terminus finely annulated and six incisures behind phasmids *vs* smooth tail terminus and only four incisures behind phasmids in *A. omentelus*.

It differs from *A. socialis* in having a hemispherical cephalic region *vs* anteriorly flattened in the latter; and stylet length 20-23  $\mu\text{m}$  *vs* 24-26  $\mu\text{m}$  in *A. socialis*.

***Amplimerlinius longicauda* n. sp.**

(Fig. 2)

MEASUREMENTS

*Females and males* : see Tab. 2.

*Holotype (female)* : L = 1 210  $\mu\text{m}$ ; a = 35.5; b = 7.2; c = 15.3; c' = 3.3; V = 52; G<sub>1</sub> = 23; G<sub>2</sub> = 18; stylet = 35- $\mu\text{m}$ .

DESCRIPTION

*Female* : Body ventrally arcuate upon relaxation. Cuticle 2.8-3.5  $\mu\text{m}$  thick on body, 13-15  $\mu\text{m}$  at tail terminus, distinctly annulated; annuli averaging 1.2, 0.9-1 and 1.5  $\mu\text{m}$  at mid-oesophagus, mid-body and mid-tail respectively. Lateral fields 12-15  $\mu\text{m}$  or one-third as wide as body, outer bands with a few scattered striae in oesophageal and tail regions, very sparingly on rest of body. Cephalic region anteriorly flattened, continuous with body; with 9-11 (10) annuli between anterior end of body to posterior extremity of outer

Table 2

Morphometric data of *Amplimerlinius longicauda* sp. n. (measurements in  $\mu\text{m}$ )

	Females (n = 25)			Males (n = 11)		
	$\bar{X} \pm \text{SD}$	Extr. Val.	CV %	$\bar{X} \pm \text{SD}$	Extr. Val.	CV %
L	1 427 $\pm$ 146	1 187-1 773	10.3	1 223 $\pm$ 174	1 030-1 567	14.2
a	33.6 $\pm$ 3.3	29.2-46.6	9.8	38.9 $\pm$ 3.0	34.6-43.0	7.6
b	6.8 $\pm$ 0.7	5.9-8.7	10.9	6.5 $\pm$ 0.7	5.2-7.4	10.8
V	52 $\pm$ 1.9	49-55	3.6	—	—	—
T	—	—	—	30 $\pm$ 7.5	18-42	24.6
G <sub>1</sub>	18 $\pm$ 3.8	12-23	20.4	—	—	—
G <sub>2</sub>	17 $\pm$ 3.6	13-21	20.6	—	—	—
c	15.8 $\pm$ 1.4	13.5-18.8	8.9	14.1 $\pm$ 1.2	12.3-15.7	8.2
c'	3.1 $\pm$ 0.2	2.9-3.5	6.2	3.6 $\pm$ 0.1	3.4-3.9	4.2
Stylet	35 $\pm$ 1.4	32-37	4.0	32 $\pm$ 1.4	31-34	4.5
m	50 $\pm$ 1.6	48-53	3.2	50 $\pm$ 2.8	48-52	5.6
O	10 $\pm$ 1.4	7-13	14.3	10 $\pm$ 1.6	8-12	15.8
S	1.4 $\pm$ 0.05	1.3-1.4	3.8	1.5 $\pm$ 0.1	1.4-1.6	5.8
MB	53 $\pm$ 1.8	53-57	3.3	54 $\pm$ 1.5	52-57	2.8
Procorpus	60 $\pm$ 6.8	47-70	11.2	50 $\pm$ 7.4	43-58	14.9
Nerve ring	139 $\pm$ 12.3	116-161	8.8	128 $\pm$ 17.8	108-162	13.9
Excretory pore	161 $\pm$ 17.0	118-192	10.6	148 $\pm$ 21.2	121-196	14.3
Oesophagus	211 $\pm$ 15.7	183-237	7.4	189 $\pm$ 26.2	160-235	13.8
Maximum body width	43 $\pm$ 4.9	36-54	11.4	32 $\pm$ 5.6	26-41	17.8
Anal body width	28 $\pm$ 3.9	24-35	13.5	24 $\pm$ 2.9	20-28	12.2
Tail length	89 $\pm$ 11.9	77-124	13.3	87 $\pm$ 12.3	71-104	14.1
Spicules	—	—	—	36 $\pm$ 2.1	32-39	5.9
Gubernaculum	—	—	—	10 $\pm$ 1.1	8-12	11.5

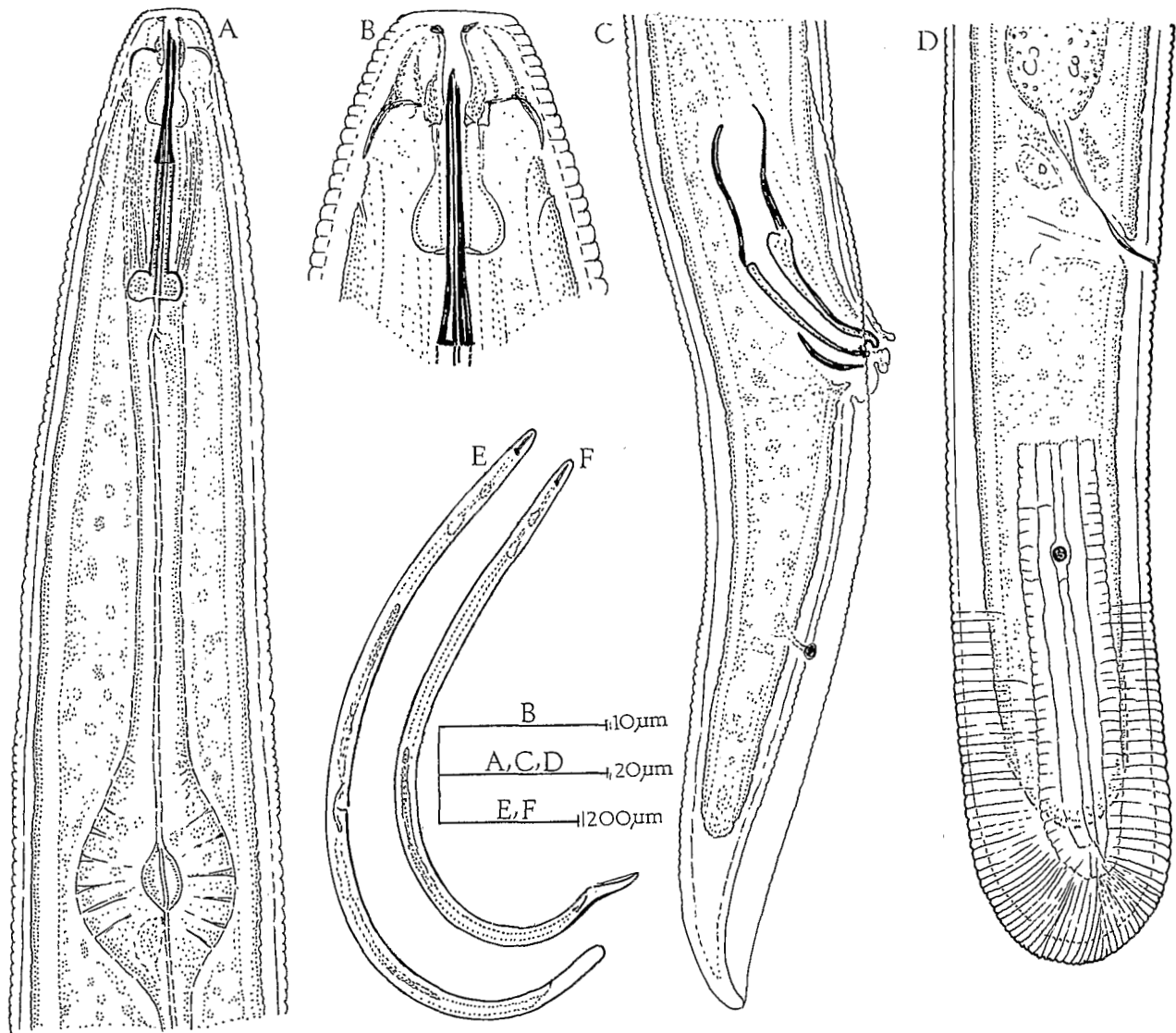


Fig. 2. *Amplimerlinius longicauda* n. sp. A, B : Head ends of female; C : Tail end of male; D : Tail end of female; E : Female; F : Male.

extension of the framework which is moderately sclerotized. Posterior end of stylet guiding tube 13-14  $\mu\text{m}$  from anterior end. Outer extension of framework extending over four body annuli. Anterior and posterior cephalids at 11-12 and 19-20  $\mu\text{m}$  from anterior end respectively. Stylet stout; conus about half as long as shaft; knobs rounded, 5-6  $\mu\text{m}$  across; orifice of dorsal oesophageal gland 3-4  $\mu\text{m}$  behind stylet knobs. Median oesophageal bulb very muscular, with large valve plates, 24-28  $\times$  16-18  $\mu\text{m}$ ; anterior end to its centre 102-137  $\mu\text{m}$ . Basal bulb 41-47  $\times$  17-20  $\mu\text{m}$ , about 1.2 times as long as body width at its base. Cardia large,

rounded. Excretory pore just behind hemizonid which is 2-3 annuli long. Deirids 7-19  $\mu\text{m}$  anterior to level of excretory pore, with six lateral lines at its level. Vulva cavity with double sunken epiptygma. Spermathecae rounded. Ovaries outstretched in opposite directions. Rectum 0.8-1 anal body width long. No post-anal intestinal sac. Tail elongate-cylindrical with 58-93 annuli between anus and tail tip; ratio between tail length to width of terminal hyaline region 4.6-6.3. Tail terminus hemispherical, with fine striae, phasmids small button-like, just anterior to middle of tail. The six incisures of lateral fields continue behind phasmids.

*Male* : Essentially similar to female but tail elongate-conoid, enveloped by a moderately developed bursa, with terminal hyaline region 20-22  $\mu\text{m}$  long. Spicules stout, with rounded, notched tip, 32-39  $\mu\text{m}$  or just under one half tail length. Gubernaculum trough-shaped, fixed. Phasmids conspicuous, plugged, extending into bursa, at or anterior to middle of tail.

#### TYPE HABITAT AND LOCALITY

Specimens collected from soil around the roots of gall oak (*Quercus faginea* Lam.) with herbaceous plants and grasses from Arroyo Frio and soil around the roots of pine (*Pinus pinaster* Aiton) from Monte Guadahornillos both in Sierra de Cazorla, Jaén, Spain.

#### TYPE SPECIMENS

Holotype, female and male paratypes deposited in the collection of the Instituto " López-Neyra " de Parasitología (C.S.I.C.), Granada, Spain; female and male paratypes at the Muséum national d'Histoire naturelle, Paris, France and three female paratypes and three male paratypes at CIP, St. Albans, Herts, England.

#### DIAGNOSIS AND RELATIONSHIPS

*Amplimerlinius longicauda* n. sp. differs from all known species of the genus except *A. clavicaudatus* (Choi & Geraert, 1975) Siddiqi, 1976 in having an elongate female tail measuring 2.9-3.5 anal body widths long, a stout stylet measuring  $35 \pm 1.4 \mu\text{m}$  (32-37) and outer bands of lateral fields with a few scattered striae in oesophageal and tail regions.

From *A. clavicaudatus* it differs in having an elongate-cylindrical female tail with 58-93 annuli, female and male body 1 325  $\mu\text{m}$  (1 030-1 773) long and stylet 32-37  $\mu\text{m}$  long vs a clavate female tail with 45-55 annuli, female and male body under 0.9 mm long and the stylet measuring 20-25  $\mu\text{m}$  long in *clavicaudatus*.

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In many other characters (such as body, stylet, and spicules length) *A. longicauda* n. sp. comes close to *A. intermedius* Bravo, 1976 and *A. nectolineatus* Siddiqi, 1976. From *A. intermedius* it differs in having an anteriorly flattened head compared with hemispherical head in the latter, conus not conspicuously shorter than shaft, outer bands of lateral fields with a few scattered striae on tail and a longer tail (these differences were noted upon studying the paratypes of *A. intermedius*). It differs from *A. nectolineatus* in having body not spirally curved, cephalic region anteriorly flattened (conoid-rounded in *A. nectolineatus*), phasmids more prominent and a longer female tail with more annuli (tail 2.2-2.5 anal body widths long, with 41-43 annuli in *A. nectolineatus*).

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