

FIRST RECORD OF *LONGIDORUS JUGLANDICOLA* LIŠKOVÁ *ET AL.*, 1997 (NEMATODA: DORYLAIMIDA) FROM SERBIA

L. Barsi and F. Lamberti

Institute of Biology and Ecology, Faculty of Sciences, University of Novi Sad, 21000 Novi Sad, Yugoslavia
Istituto di Nematologia Agraria del C.N.R., 70126 Bari, Italy

Summary. *Longidorus juglandicola* is reported for the first time from Serbia. The morphometric variability of females, males and of the four juvenile stages is discussed.

In 1998 a female and a male of a *Longidorus* species were found in a soil sample collected from the rhizosphere of *Rosa canina* L. at Neradin, Fruška gora Mountain, Serbia. On the basis of these specimens and the others subsequently collected in the same locality, the population was identified as *L. juglandicola* Lišková *et al.*, 1997. Morphometrics of females, males and juvenile stages are reported here.

MATERIAL AND METHODS

Samples were collected in the rhizosphere of *R. canina* and *Crataegus monogyna* Jacq. at Neradin (UTM: DQ19), Fruška gora Mountain in several occasions between 1998-2001. Nematodes were extracted by Cobb's wet sieving technique. Specimens were killed in hot FP 4-1 and processed and mounted on permanent slides in dehydrated glycerin. Measurements were made with an eyepiece graticule, except body length which was determined with the aid of a drawing tube and a map measurer.

MEASUREMENTS AND DESCRIPTION

LONGIDORUS JUGLANDICOLA Lišková, Robbins *et Brown*, 1997 (Tables I-III; Figs 1-4)

Female body assuming a spiral to almost J shape when killed by heat. Cuticle appearing smooth except in the tail region where is more or less visibly transversally striated; body pores inconspicuous. Lip region slightly expanded, very slightly arcuate to flattened frontally, and from very slightly arcuate to truncate laterally. Amphidial pouches mostly indistinct, when visible they appear shallowly bilobed at the base. Odontostyle about 2 to 2.3 μm wide at the base; odontophore and guiding ring typical of the genus. Oesophagus dorylaimoid; muscular bulb measuring 115 to 148 μm long and 23 to 28 μm wide. Vulva slightly elevated; vagina

occupying 1/2 or slightly more of the corresponding body diameter. Reproductive system amphidelphic with equally developed genital branches; uterus 3.3 to 7.7 mid-body widths in length, filled with sperm cells in most females; it is separated by a sphincter from the oviduct; ovaries opposed, reflexed. Prerectum as long as 4 to 15 times the anal body width; rectum about 0.6 to 0.9 body diameter at anus. Tail dorsally convex, bluntly conoid with rounded terminus bearing two pairs of lateral pores on each side.

Males morphologically similar to females, with the posterior region of the body more coiled. Testes fully developed. Spicules robust, lateral guiding pieces 19 (15-21) μm long, not always clearly visible. The adanal pair of supplements is preceded by a row of 10-15 ventromedian supplements. Post-cloacal papilla developed. Tail conical, ventrally curved, with tip semi-hemispherical to conical bearing two or rarely three pairs of lateral pores on each side.

Juveniles separate into four groups (Fig. 3). They resemble adults except for smaller size, with some overlapping in the body length between the fourth juvenile stage and the adults.

All stages correspond well with the juvenile stages described from Slovakia by Lišková *et al.* (1997) with the exception of body and stylet lengths. Body length is longer in the second, third and fourth juvenile stages and in females of the population from the rhizosphere of *R. canina* from Neradin; odontostyle and odontophore are shorter in the second, third and fourth juvenile stages and in the females; replacement odontostyle is shorter in all the developmental stages from Neradin.

L. juglandicola was originally found in the rhizosphere of walnut growing in Soroška, in south-eastern Slovakia (Lišková *et al.*, 1997). Subsequently, it was reported from several other localities (Lišková and Brown, 1998; Lišková, 2001). To the best of our knowledge this is the first record of this species outside Slovakia. The morphology of our populations was similar to the original description of the species and to the specimens kindly sent by Dr. M. Lišková.

Table I. Morphometrics of females and males of *Longidorus juglandicola*.

Locality:	Neradin			
Host:	<i>Rosa canina</i>		<i>Crataegus monogyna</i>	
n	32 females	19 males	7 females	2 males
L (mm)	6.93±0.57 (5.62-7.98)	6.63±0.63 (5.55-8.18)	6.93±0.47 (6.37-7.63)	6.43, 6.54
a	116±6.8 (101-131)	119±8.7 (105-135)	119±7.2 (108-128)	123, 121
b	14.2±0.9 (12.1-16.3)	13.8±1.5 (11.8-17.4)	14.5±1.1 (13.3-16.6)	13.1, 13.7
c	175±16.9 (149-210)	149±16.4 (130-189)	161±12.5 (149-179)	157, 116
c'	0.9±0.1 (0.7-1.0)	1.0±0.1 (0.8-1.1)	0.9±0.1 (0.8-1.0)	1.0, 1.1
d*	1.6±0.1 (1.4-1.8)	1.7±0.1 (1.5-1.8)	1.5±0.04 (1.5-1.6)	1.6, 1.5
d***	1.4 ±0.05 (1.3-1.5)	1.3±0.04 (1.3-1.4)	1.4±0.06 (1.3-1.4)	1.3, 1.3
J'	0.4±0.05 (0.3-0.5)	0.5±0.1 (0.4-0.6)	0.4±0.05 (0.3-0.5)	0.6, 0.6
V %	54±1.7 (50-57)	–	54±1.3 (53-56)	–
Odontostyle µm	86±3.1 (79-91)	86±3.5 (79-91)	87±2.8 (84-91)	91, 85
Odontophore µm	67±4.0 (55-78)	68±3.5 (61-74)	67±2.3 (64-70)	70, 65
Total stylet µm	153±4.0 (144-164)	153±5.2 (141-161)	154±4.4 (149-161)	161, 150
Oral aperture to guide ring µm	31±1.5 (28-34)	33±1.9 (31-38)	30±1.1 (29-32)	34, 31
Tail µm	40±3.2 (35-46)	45±4.0 (36-53)	43±2.3 (39-45)	41, 56
J (hyaline portion of tail) µm	12±1.7 (9-17)	12±1.4 (10-16)	13±1.9 (11-16)	13, 14
Body diam. at lip region µm	19±0.7 (18-21)	20±0.8 (18-21)	20±0.5 (19-21)	21, 21
Body diam. at guide ring µm	26±1.1 (24-29)	27±1.4 (24-29)	27±1.2 (26-29)	27, 28
Body diam. at base of oesophagus µm	48±2.1 (45-54)	47±2.5 (43-51)	48±1.5 (46-51)	46, 48
Body diam. at mid-body or vulva µm	60±4.0 (52-68)	56±4.0 (48-62)	58±3.3 (55-63)	52, 54
Body diam. at anus µm	46±2.3 (41-52)	45±1.8 (42-48)	48±1.5 (47-51)	41, 50
Body diam. at beginning of J µm	29±2.2 (25-36)	23±2.0 (20-26)	31±1.4 (29-33)	24, 22
Spicules µm	–	68±3.8 (60-74)	–	69, 64

d* - anterior to guide-ring/body width at lip region

d*** - body width at guide-ring/body width at lip region (Brown *et al.*, 1994)

J' - length of the hyaline region of the tail/hyaline width (Lišková *et al.*, 1997)

Table II. Morphometrics of juvenile stages of *L. juglandicola*.

Locality:	Neradin			
Host:	<i>Rosa canina</i>			
n	12 J1	13 J2	17 J3	22 J4
L (mm)	1.41±0.15 (1.23-1.73)	2.30±0.34 (1.81-2.86)	3.47±0.27 (2.80-3.97)	4.97±0.56 (3.70-6.04)
a	67±2.9 (62-71)	75±4.0 (67-82)	92±4.3 (84-101)	105±7.4 (93-120)
b	5.6±0.9 (4.7-7.3)	7.9±1.8 (5.9-10.9)	9.5±0.9 (7.6-11.2)	12.2±1.9 (9.3-17.2)
c	33±3.2 (29-37)	52±7.0 (40-64)	78±6.0 (68-88)	115±11.2 (93-144)
c'	2.7±0.2 (2.3-3.1)	1.8±0.2 (1.5-2.3)	1.4±0.1 (1.2-1.5)	1.0±0.1 (0.9-1.2)
d*	1.7±0.05 (1.7-1.8)	1.8±0.1 (1.6-1.9)	1.8±0.1 (1.7-1.9)	1.7±0.1 (1.5-1.8)
d***	1.3±0.03 (1.3-1.4)	1.4±0.04 (1.3-1.5)	1.4±0.03 (1.4-1.5)	1.4±0.1 (1.3-1.5)
J'	0.8±0.1 (0.7-1.0)	0.8±0.1 (0.6-1.0)	0.6±0.1 (0.5-0.7)	0.4±0.04 (0.4-0.5)
Odontostyle µm	48±2.0 (46-53)	55±1.8 (53-59)	65±2.3 (61-69)	74±3.1 (68-78)
Odontophore µm	35±3.4 (30-40)	46±3.8 (39-51)	54±2.2 (50-58)	61±3.6 (55-69)
Total stylet µm	83±3.6 (78-90)	100±3.7 (94-106)	119±3.4 (113-123)	135±4.6 (126-144)
Replacement odontostyle µm	55±2.0 (50-57)	64±2.3 (59-66)	76±2.7 (73-83)	87±2.6 (84-96)
Oral aperture to guide ring µm	17±0.6 (16-18)	20±0.8 (19-21)	25±0.9 (24-27)	28±1.3 (25-30)
Tail µm	43±2.9 (38-48)	44±4.3 (38-53)	45±3.6 (40-53)	43±3.8 (36-51)
J (hyaline portion of tail) µm	8±0.8 (7-10)	8±1.9 (6-13)	10±1.0 (8-11)	11±1.1 (8-13)
Body diam. at lip region µm	9.7±0.2 (9.4-10)	11.5±0.7 (10.5-12.5)	14±0.5 (13-15)	17±0.8 (15-17.5)
Body diam. at guide ring µm	13±0.4 (12.5-14)	16±0.8 (15-17)	20±0.8 (19-21)	23±1.0 (21-25)
Body diam. at base of oesophagus µm	21±1.3 (19-24)	29±3.2 (24-34)	35±2.0 (30-39)	42±3.0 (35-48)
Body diam. at mid-body µm	21±2.1 (18-25)	31±4.9 (23-39)	38±2.9 (31-43)	47±5.6 (37-63)
Body diam. at anus µm	16±1.1 (14-18)	25±3.5 (20-31)	33±2.1 (27-36)	42±3.5 (35-50)
Body diam. at beginning of J µm	7±0.4 (6-8)	11±1.3 (8-13)	18±1.9 (14-21)	24±2.1 (18-28)

d* - anterior to guide-ring/body width at lip region

d*** - body width at guide-ring/body width at lip region (Brown et al., 1994)

J' - length of the hyaline region of the tail/hyaline width (Lišková et al., 1997)

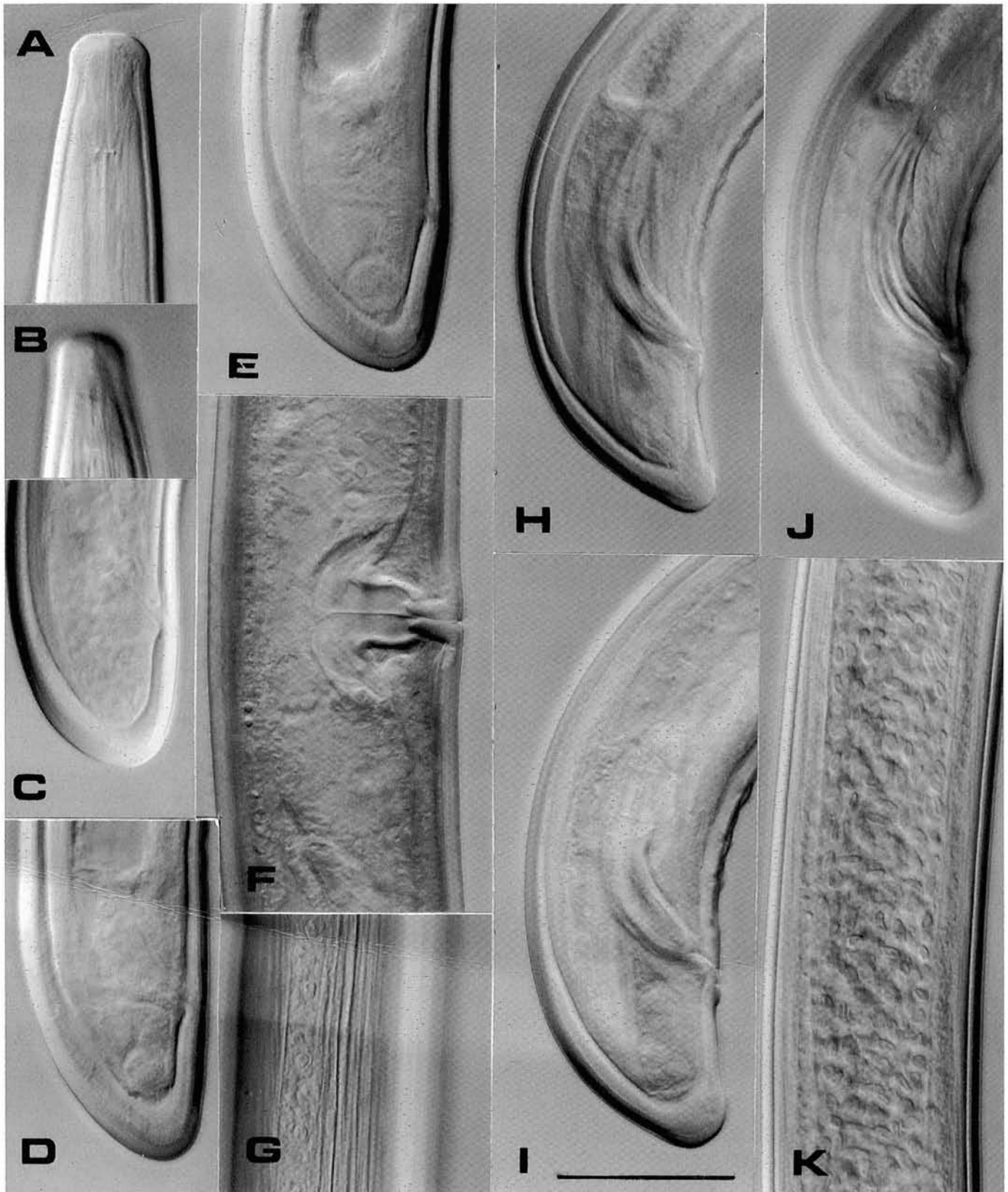


Fig. 1. Photomicrographs of *Longidorus juglandicola*. A: female anterior region; B: female amphidial pouch; C-E: female tail; F: vulva region; G: hypodermal chord; H-J: male tail; K: testis with sperms. Scale bar - 50 μ m.

Compared to the type population (Lišková *et al.*, 1997) *L. juglandicola* from Neradin has slightly longer body (5.62-7.98 *vs* 5.61-7.51 mm in females and 5.55-8.18 *vs* 5.43-7.30 mm in males, respectively), slightly

higher «c» value (149-210 *vs* 136-180 in females and 116-179 *vs* 116-163 in males, respectively), slightly shorter odontophore (55-78 *vs* 71-83 μ m in females and 61-74 *vs* 65-81 μ m in males, respectively), slightly short-

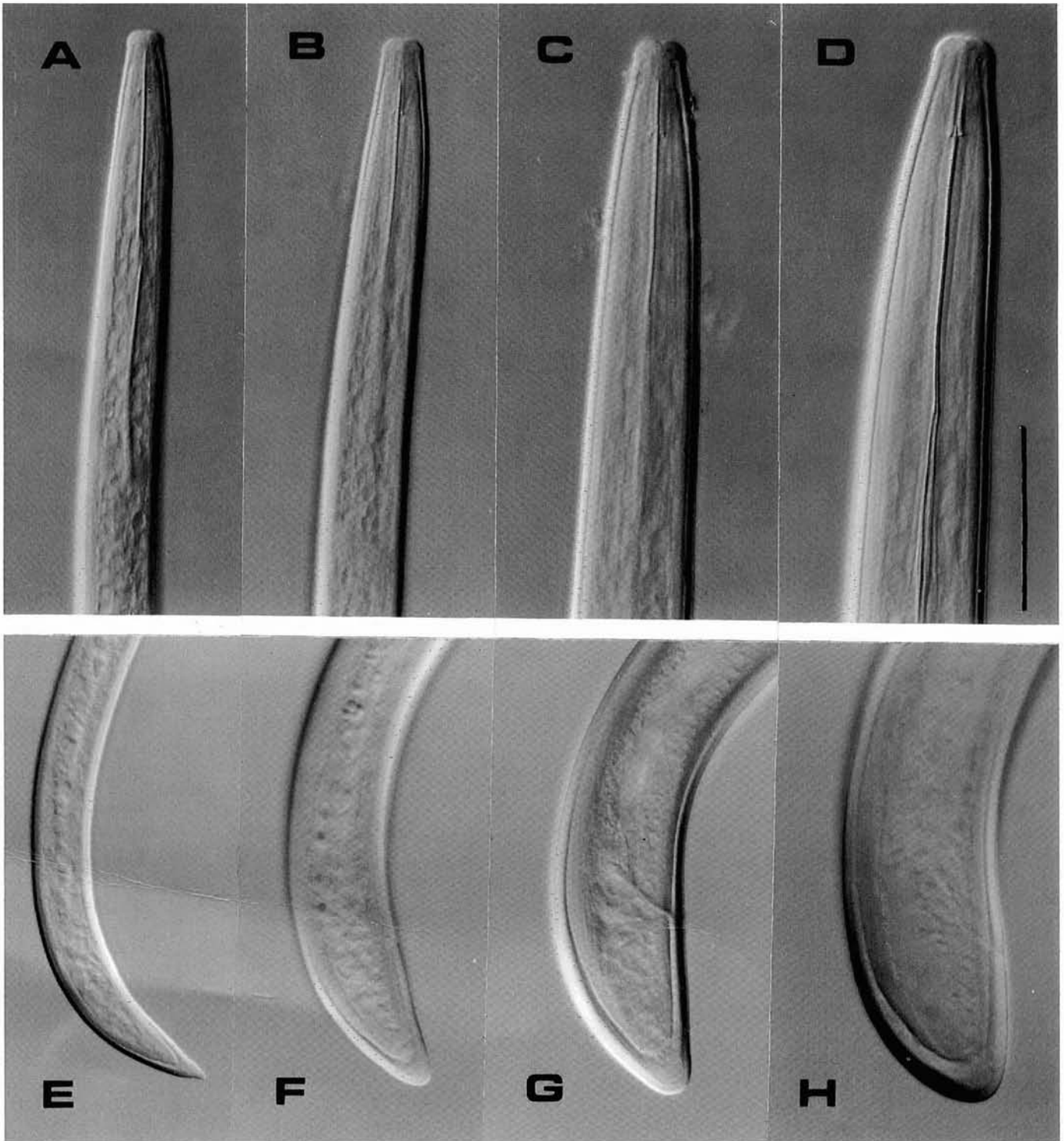


Fig. 2. Photomicrographs of juvenile stages of *L. juglandicola*. A-D: anterior region of J1, J2, J3 and J4 stage, respectively; E-H: tail of J1, J2, J3 and J4 stage, respectively. Scale bar - 50 μ m.

er distance from oral aperture to guide ring (28-34 *vs* 31-37 μ m in females and 31-38 *vs* 33-37 μ m in males, respectively), slightly shorter tail length (35-46 *vs* 36-51 μ m in females) and slightly longer spicules (60-74 *vs* 57-71 μ m in males).

Taking into consideration the existing intraspecific variability of this species, the identification code for *L. juglandicola* in the polytomous key of Chen *et al.* (1997) and Loof and Chen (1999) should be modified as: A23-

B34-C23-D3-E2-F34-G23-H12-I2.

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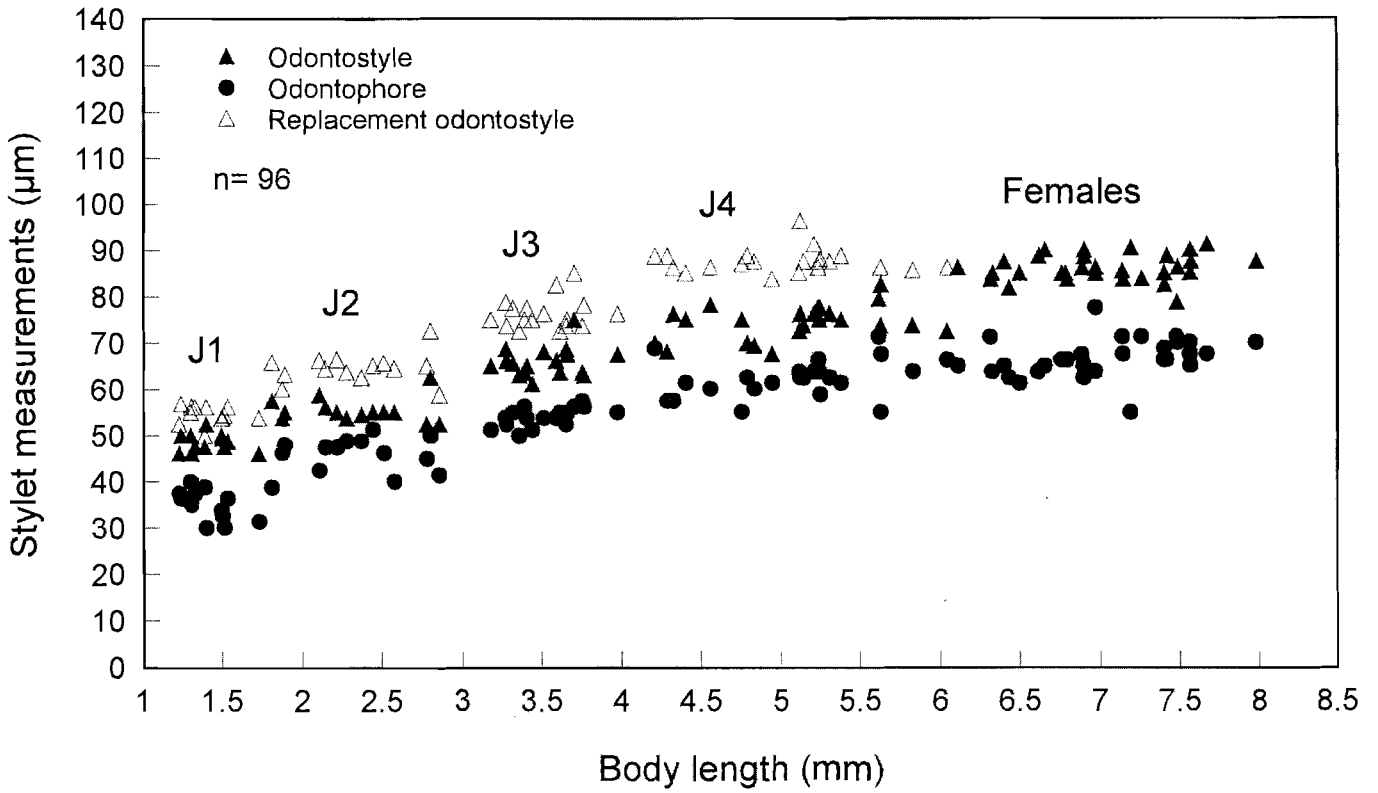


Fig. 3. Scatter diagram separating juveniles and females of *L. juglandicola* from Serbia.

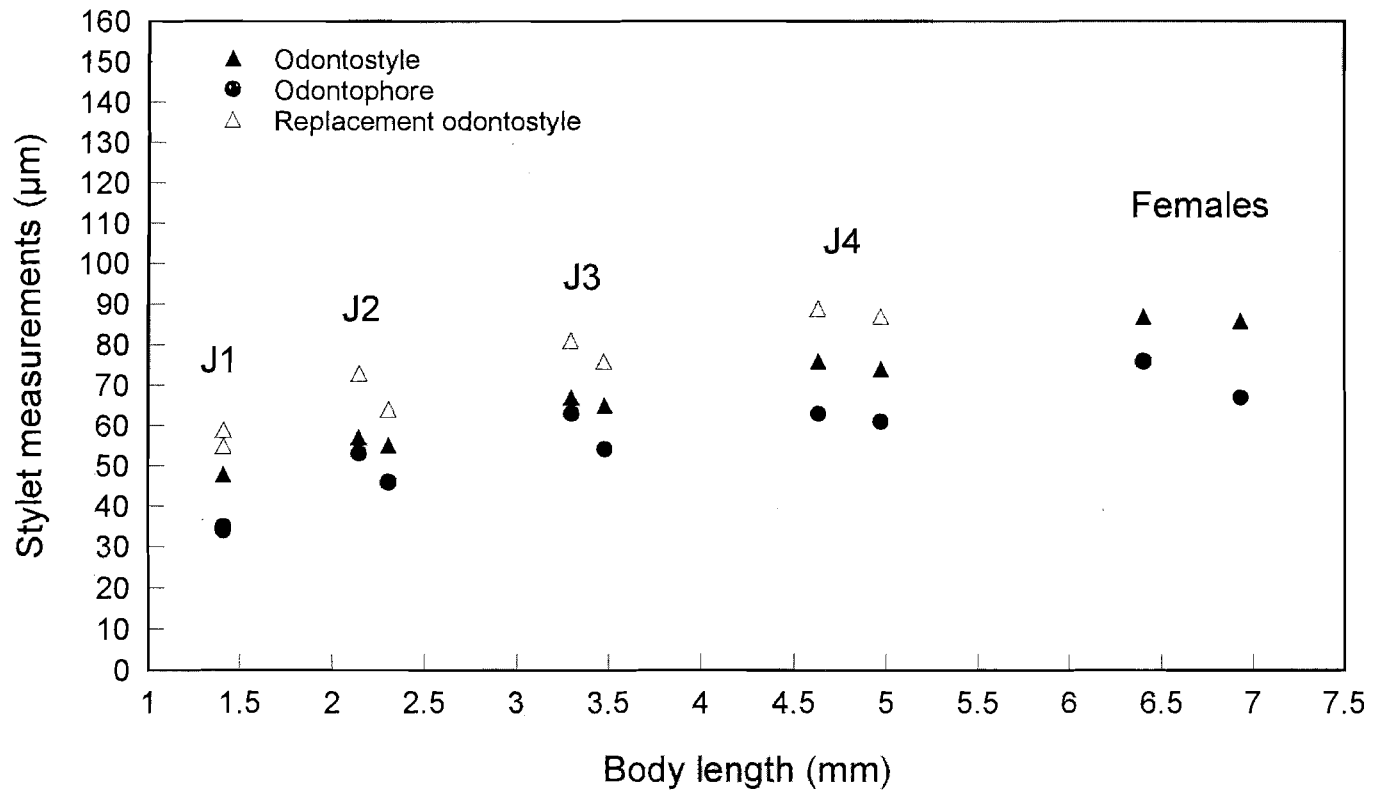


Fig. 4. Scatter diagram separating juveniles and females of *L. juglandicola* from two selected populations (for details see Table III).

Table III. Morphometrics of juvenile stages and females of *L. juglandicola* from populations from Slovakia and Serbia.

Developmental stages and populations	Body length (mm) (mean)	Odontostyle (μm) (mean)	Odontophore (μm) (mean)	Replacement odontostyle (μm) (mean)
J ₁				
Soroška, eastern Slovakia ¹	1.41	48	34	59
Neradin, Serbia ²	1.41	48	35	55
J ₂				
Soroška, eastern Slovakia	2.14	57	53	73
Neradin, Serbia	2.30	55	46	64
J ₃				
Soroška, eastern Slovakia	3.29	67	63	81
Neradin, Serbia	3.47	65	54	76
J ₄				
Soroška, eastern Slovakia	4.63	76	63	89
Neradin, Serbia	4.97	74	61	87
Females				
Soroška, eastern Slovakia	6.40	87	76	–
Neradin, Serbia	6.93	86	67	–

¹ Lišková et al., 1997; ² original.

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