



UDC 595.132.1]591.4:591.9(477)

**MORPHOLOGICAL AND CHOROLOGICAL CHARACTERIZATION
OF *LONGIDORUS INTERMEDIUS* KOZLOWSKA & SEINHORST, 1979
FIRSTLY REPORTED FROM UKRAINE WITH THE COMMENTS
ON *LONGIDORUS ELONGATUS* (DE MAN, 1876) THORNE & SWANGER, 1936**

S. A. Susulovska, J. V. Tsaryk

*Ivan Franko National University of Lviv, 4, Hrushevskyyi St., Lviv 79005, Ukraine
e-mail: solomija.s.a@gmail.com*

*Susulovska S. A., Tsaryk J. V. Morphological and chorological characterization of *Longidorus intermedius* Kozłowska & Seinhorst, 1979 firstly reported from Ukraine with the comments on *Longidorus elongatus* (de Man, 1876) Thorne & Swanger, 1936. **Studia Biologica**, 2018: 12(2); 53–62 • DOI: <https://doi.org/10.30970/sbi.1202.552>*

The family Longidoridae Thorne, 1935 is a big taxon of Dorylaimina sub-family. Its species are ectoparasites of vascular plants inhabiting terrestrial biotopes. Longidoridae is one of the most homogeneous groups of Dorylaimina, which differs distinctly in morphology and biology from other dorylaimids, but its representatives structurally and ecologically are very similar to each other. Seventeen species of this family belonging to three genera were previously reported from the territory of Ukraine. This paper presents first record of *Longidorus intermedius* Kozłowska & Seinhorst, 1979 and new records of closely related species *Longidorus elongatus* (de Man, 1876) Thorne & Swanger, 1936 from Ukraine. Data on morphology, morphometrics and main differences between Ukrainian populations of these two species are provided. Ukrainian populations of *L. intermedius* are also compared in details with other previously reported populations of this species, and main differences are described. The presence of only three juvenile developmental stages in *L. intermedius* was confirmed. In model natural and anthropogenically altered localities on the territory of Opillia, the host preference of *L. intermedius* and *L. elongatus* was analyzed in detail. On this territory, *L. intermedius* is closely associated with *Quercus robur* L., so it can be used as an indicator for natural and semi-natural forests in which oak associations represent a primary vegetation type. On the contrary, *L. elongatus* populations were reported from the rhizosphere of a wide range of host plants. According to its chorological characters, *L. intermedius* can be also used in phylogeographical research in order to determine the formation ways of nemoral complexes of soil organisms after the Last Glacial Maximum.

Keywords: *Longidorus intermedius*, *Longidorus elongatus*, Ukraine, morphology, host-plant specialty

INTRODUCTION

The genus *Longidorus* Micoletzky, 1922 consists of more than 150 valid species which are ectoparasites of vascular plants inhabiting terrestrial biotopes [1]. Nine *Longidorus* species have been previously reported from Ukraine: *Longidorus attenuatus* Hooper, 1961, *L. caespiticola* Hooper, 1961, *L. danuvii* Barsi, Lamberti, De Luca, 2007, *L. distinctus* Lamberti, Choleva, Agostinelli, 1983, *L. elongatus* (de Man, 1876) Thorne & Swanger, 1936, *L. holovachovi* Peneva, Susulovsky, Lazarova, 2009, *L. poessneckensis* Altherr, 1974, *L. rubi* Romanenko & Tomilin in Romanenko, 1993 and *L. sylphus* Thorne, 1939. [11, 13, 14]. During recent survey, four populations of *Longidorus* genus were identified as *Longidorus intermedius* Kozlovskaya, Seinhorst, 1979. This is the first report of *L. intermedius* on the territory of Ukraine. This species was described from Netherlands and Germany from the rhizosphere of *Quercus robur* L. [7]. It was also previously reported from Belgium, Italy, Spain, countries of Balkan Peninsula and Central Europe and from the European part of Russia [2, 9, 10, 12]. Most populations of *L. intermedius* were collected in oak forests from the rhizosphere of *Quercus* spp. But it has also been reported on the rhizosphere of some other plant species, for example olive *Olea europea* L. in Spain and from the grasses in Belgium and Poland [4, 10]. Based on these data, Bulgarian nematologists concluded that this species is closely associated with oak forests and its potential distribution range may extend eastwards to the Dnipro River [10].

Longidorus elongatus is more widely distributed on the territory of Western Ukraine. It was previously detected in different types of oak and beech forests in Opillia, Subcarpathia and Carpathian mountains [6].

The objectives of this study were to determine main morphological and chorological characteristics of four populations of *L. intermedius* from the Western Ukraine and to describe morphological differences between *L. intermedius* and the most closely related and widely distributed species of *L. elongatus*.

MATERIALS AND METHODS

Soil samples containing *L. intermedius* and *L. elongatus* were taken from natural and anthropogenically altered localities on the territory of Opillia and Zakarpattia in Ukraine. Localities and host-plants are presented in Table 1, 3. Nematodes were extracted from 500 cm³ of soil by modified sieving and decanting method [3]. Extracted specimens were heat killed, fixed in triethanolamine formalin (TAF), processed to glycerol by a slow evaporation method and mounted on permanent slides. Measurements and photos were made using Olympus BX 51 microscope with Nomarski differential interference contrast, equipped with a digital camera Olympus DP 72 and computer program Quick PHOTO MICRO 2.3.

RESULTS AND DISCUSSION

***Longidorus intermedius* Kozlovskaya & Seinhorst, 1979** (Fig. 1, 2; Table 1, 2)

Female

Body of a medium length – 3.31–5.16 mm, assuming C-shape or open spiral when heat relaxed. The anterior body end is conical, tapering gradually. Lip region slightly offset from the rest of the body, 5–6 μm high and 11–13 μm wide, rounded, slightly flattened frontally. Amphidial pouches large, stretching to about halfway of the distance from anterior end to guiding ring, symmetrically bilobed at the base. Odontostyle, odontophore and guide ring typical for genus. Oesophagus dorylaimoid with muscular bulb

equaled 105 (91–119) × 21 (17–25) μm. Oesophago-intestinal valve variable in shape, from conical to rounded. Vuvla a transverse slit situated almost equatorially, vagina 16 (13–19) μm wide and 26 (23–33) μm long occupying approximately half of the corresponding body width. Reproductive system amphidelphic, with equally developed genital branches 260 (205–314) and 240 (192–295) μm long, respectively. Prerectum of a variable length 344 (233–483) μm, rectum 29 (23–36) μm long or as long as 3/4 of anal body width. Tail dorsally convex, ventrally almost straight, bluntly conoid with a rounded terminus.

Male

Males are very rare and morphologically similar to female, with a posterior region of body more coiled. Body length – 3.31–4.22 μm. Spicules of a medium length – 53.3 (51–56) μm, very slightly curved ventrally. Lateral guiding pieces 16.9 (16.8–17) μm long, almost straight with slightly bifid distal ends. Adanal pair of supplements preceded by ventromedian row of 8–10 supplements. Tail ventrally more curved than in female, bluntly conoid with a rounded terminus.

Table 1. Data on localities, host plants and morphometrics of Ukrainian populations of *L. intermedius*. All measurements were done in μm, except for body length (mm) and in form: mean ± standard deviation (range)

Таблиця 1. Дані про місцезнаходження, рослин-хазяїв і морфометрію українських популяцій *L. intermedius*. Усі виміри подано в мікрометрах, за винятком загальної довжини тіла (у міліметрах), у вигляді: середнє значення ± стандартна похибка (межі мінливості)

Location and host plants	Lviv region, Mykolaiv district, Ustia village 49°30'16.15"N 23°54'54.23"E <i>Quercus robur</i> L., <i>Acer campestre</i> L.		Lviv region, Horodok district, Liubin Malyj 49°42'04.86"N 23°45'57.90"E <i>Quercus robur</i> L.		Lviv, Ivan Franko Park 49°50'15.90"N 24°01'06.26"E <i>Quercus robur</i> L.		Zakarpattia region, Uzhhorod 48°35'54.85"N 22°22'11.43"E <i>Quercus robur</i> L.	
	female	male	female	female	female	female	male	
n	31	2	13		11	14	1	
<i>L</i>	4.22±0.41 (3.54–5.16)	4.19; 3.76	4.12±0.39 (3.32–4.63)		4.08±0.41 (3.56–4.53)	3.82±0.27 (3.49–4.49)	3.31	
<i>a</i>	79.3±6.24 (66.1–97.4)	83.8; 78.3	80.8±4.46 (75.4–92.5)		77.5±5.81 (67.1–87.0)	75.5±1.84 (72.5–78.5)	92.0	
<i>b</i>	11.2±1.76 (9.2–17.0)	9.6; 9.5	10.2±1.12 (8.4–12.7)		10.7±1.84 (8.4–13.3)	10.3±1.07 (7.9–12.4)	9.0	
<i>c</i>	111.1±15.42 (78.7–139.6)	107.5; 85.4	98.3±9.31 (80.9–115.7)		107.1±14.58 (83.0–128.3)	100.8±8.71 (89.7–115.2)	82.8	
<i>c'</i>	1.09±0.13 (0.91–1.44)	1.1; 1.2	1.22±0.05 (1.12–1.29)		1.15±0.12 (0.92–1.31)	1.12±0.09 (1.0–1.3)	1.11	
<i>d</i>	2.7±0.20 (2.4–3.9)	2.8; 2.7	2.8±0.16 (2.5–3.1)		2.9±0.15 (2.7–3.2)	2.6±0.18 (2.4–3.0)	2.4	
<i>d'</i>	1.9±0.12 (1.6–2.1)	2; 2	2.0±0.12 (1.8–2.3)		2.1±0.13 (1.8–2.3)	2.0±0.12 (1.8–2.3)	1.8	
V / Spicules length	46.5±2.12 (40.0–50.2)	56; 53	48.3±1.19 (46.0–49.7)		47.0±2.34 (41.5–50.4)	47.2±1.73 (43.0–50.0)	51	
Odontostylet length	111.2±3.1 (106–122)	110; 107	108.8±2.9 (105–114)		111.2±1.9 (109–114)	107.9±2.6 (106–112)	106	

End of the Table 1

Odontophore length	63.8±3.5 (57–72)	63; 67	65.2±2.4 (61–69)	63.3±3.0 (58–68)	60.9±2.2 (58–65)	53
Total stylet length	175.0±5.2 (167–188)	173; 174	174.0±3.4 (168–181)	174.5±3.2 (171–182)	168.8±3.8 (164–177)	159
Anterior and to guide ring	34.0±1.1 (32–36)	34; 32	32.4±1.0 (31–34)	33.7±1.3 (31–35)	31.0±1.0 (29–33)	29
Pharyngeal bulb length	106.4±6.0 (93–119)	113; 105	107.2±5.7 (99–118)	106.3±6.5 (93–114)	99.9±5.5 (91–110)	98
Pharyngeal bulb width	20.7±1.4 (18–23)	21; 22	20.5±1.7 (17–23)	21.6±1.6 (18–24)	21.6±1.6 (19–25)	21
Tail length	38.4±3.9 (31–46)	39; 44	42.0±2.5 (38–47)	38.5±4.0 (32–46)	38.1±3.2 (34–43)	40
Hyaline part of tail length	12.1±1.1 (10–15)	14; 13	11.8±0.9 (11–14)	12.0±1.2 (10–14)	10.5±1.5 (7–13)	10
Width at level of:						
lips	12.6±0.9 (11–14)	12; 12	11.8±0.7 (11–13)	11.6±0.5 (11–12)	11.8±0.8 (11–13)	12
guide ring	24.6±1.0 (23–27)	24; 24	23.7±0.8 (22–25)	24.2±2.3 (22–26)	23.6±1.1 (22–25)	22
base of pharynx	44.7±2.2 (41–49)	44; 43	43.5±2.6 (39–48)	44.2±2.1 (42–49)	42.9±2.7 (38–48)	42
vulva or mid-body	53.3±5.1 (46–65)	50; 48	51.0±3.9 (44–57)	52.7±3.9 (48–60)	50.6±3.8 (47–60)	46
anus	35.1±2.6 (29–40)	35; 37	34.5±2.1 (31–38)	33.5±2.7 (28–38)	34.0±2.2 (30–37)	36

Juveniles (Table 2)

The analysis of morphometrics revealed presence of only three juvenile developmental stages, same as in previous publications [2, 7, 9, 10]. Morphologically juveniles are similar to adults. Juvenile stages can be clearly distinguished by the body length and the length of functional and replacement odontostyle. Tail length of juveniles doesn't change significantly during their development, but J1 tail is characterized by a digitate terminus.

All four Ukrainian populations of *L. intermedius* are very similar to each other and to previously described populations, but some differences were revealed during the analysis. In comparison to type population from the Netherlands, they have higher values of *b* (10.1 (8.4–12.7); 11.2 (9.2–17.0); 10.7 (8.4–13.3); 10.3 (7.9–12.4) vs 9–10) and *c* (98.3 (80.9–115.7); 111.1 (78.6–139.6); 107.1 (83.0–128.3); 100.8 (89.7–115.2) vs 87–109) indices, more posterior position of guiding ring (29–36 vs 27–34 μm) and wider lip region (11–14 vs 11–12 μm) [7].

Studies populations are most similar to populations from Bulgaria, but differ by slightly shorter tail (mean 38.1; 38.4; 38.5; 42 vs 41; 42; 43; 43; 44; 47 μm) and lower *c'* value (mean 1.09; 1.12; 1.15; 1.22 vs 1.2; 1.2; 1.2; 1.3; 1.3; 1.4) [10]. They are more similar to Italian, Spanish and Czech populations [9, 10].

Previously, few male specimens were reported from the countries of Balkan Peninsula: Bulgaria, Croatia, Bosnia and Herzegovina and Serbia [2, 10]. Males from Ukrainian populations differ from the Bulgarian ones by more slender body (index *a* values: 78–92 vs 66–74), slightly longer spicules (51–56 vs 41–51 μm), and different number of supplements (8–10 vs 6–7) [10]. In comparison to males from Croatia, Bosnia and Herzegovina and Serbia, studied male specimens have slightly shorter body (3.35–4.19 vs 3.31–4.72 μm) and tail (39–44 vs 42–52 μm), but slightly longer spicules (51–56 vs 43–52 μm) and higher number of supplements (8–10 vs 4–8) [2].

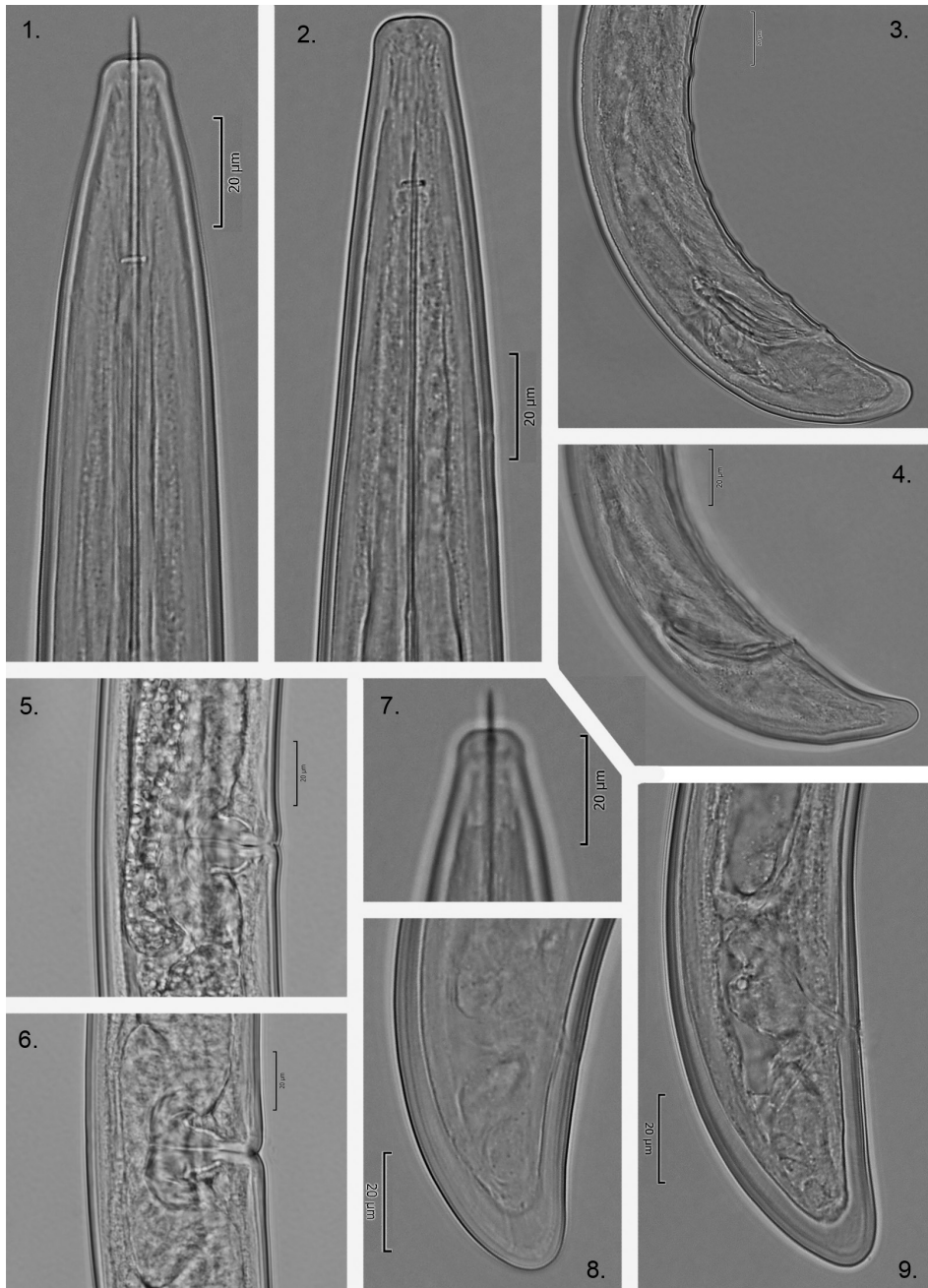


Fig. 1. Morphology of *Longidorus intermedius* (1, 3, 5, 7, 8) and *L. elongatus* (2, 4, 6, 9) from Ukraine: 1, 2 – female anterior regions; 3, 4 – male tail regions; 5, 6 – vulval regions; 7 – female anterior region with focus on aphidial fovea; 8, 9 – female tails

Рис. 1. Морфологічні особливості українських популяцій *Longidorus intermedius* (1, 3, 5, 7, 8) і *L. elongatus* (2, 4, 6, 9): 1, 2 – передня частина тіла самок; 3, 4 – хвостова частина тіла самців; 5, 6 – вульва; 7 – передня частина тіла самки з акцентом на амфід; 8, 9 – хвости самок

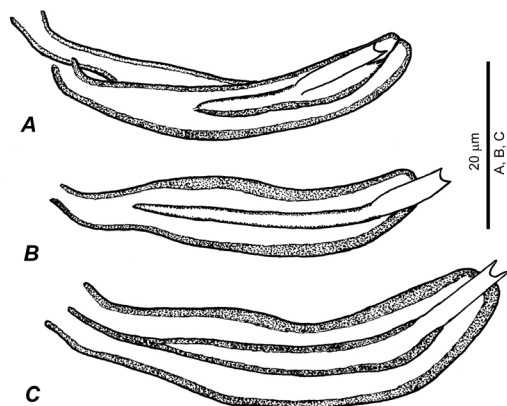


Fig. 2. Morphology of male spicules of *Longidorus intermedius* (A, B) and *L. elongatus* (C) from Ukraine (Lviv region)

Рис. 2. Морфологія спікул самців *Longidorus intermedius* (A, B) і *L. elongatus* (C), зібраних на території України (Львівська область)

Table 2. Data on morphometrics of *Longidorus intermedius* juveniles from the floodplain forest near Ustia (Lviv region, Ukraine). All measurements are in μm , except for body length (in mm) and in form: mean \pm standard deviation (range)

Таблиця 2. Морфометричні параметри личинок популяції *Longidorus intermedius* із заплавного лісу поблизу с. Устя (Львівська область, Україна). Усі виміри подано в мікрометрах, за винятком загальної довжини тіла (у міліметрах), у вигляді: середнє значення \pm стандартна похибка (межі мінливості)

Character	J2	J3	J4
n	17	25	17
L	1.24 \pm 0.53 (1.16–1.34)	1.92 \pm 0.20 (1.62–2.30)	2.89 \pm 0.20 (2.44–3.17)
a	54.3 \pm 2.03 (50.3–57.8)	61.8 \pm 4.59 (47.7–69.6)	71.4 \pm 3.99 (66.0–78.1)
b	4.8 \pm 0.91 (4.3–8.1)	6.4 \pm 0.52 (5.5–7.2)	8.2 \pm 0.79 (6.9–9.9)
c	26.9 \pm 1.25 (24.6–29.6)	41.6 \pm 3.96 (35.1–48.9)	64.0 \pm 5.73 (55.5–78.4)
c'	3.11 \pm 0.18 (2.81–3.43)	2.12 \pm 0.17 (1.90–2.47)	1.50 \pm 0.10 (1.23–1.66)
d	2.9 \pm 0.22 (2.5–3.3)	2.8 \pm 0.22 (2.5–3.3)	2.8 \pm 0.19 (2.5–3.3)
d'	2.1 \pm 0.19 (1.8–2.5)	2.0 \pm 0.15 (1.7–2.3)	2.0 \pm 0.11 (1.9–2.3)
Odontostylet length	74.0 \pm 2.0 (70–78)	81.6 \pm 1.6 (78–85)	93.8 \pm 2.8 (87–98)
Odontophore length	43.7 \pm 2.8 (40–51)	50.5 \pm 2.5 (44–54)	59.9 \pm 3.0 (55–65)
Total stylet length	117.8 \pm 3.9 (112–126)	132.1 \pm 3.0 (124–138)	153.7 \pm 4.1 (147–162)
Replacement odontostylet length	81.2 \pm 2.7 (78–88)	96.9 \pm 2.9 (90–102)	112.6 \pm 3.4 (107–118)
Anterior end to guide ring	19.5 \pm 0.9 (18–21)	24.8 \pm 1.2 (23–28)	28.4 \pm 1.2 (26–30)
Pharyngeal bulb length	62.5 \pm 3.4 (55–69)	74.4 \pm 4.3 (68–86)	85.8 \pm 5.2 (78–95)
Pharyngeal bulb width	12.6 \pm 1.2 (10–14)	16.0 \pm 1.2 (13–18)	18.3 \pm 1.0 (16–20)
Tail length	46.4 \pm 1.7 (43–49)	46.2 \pm 3.5 (40–53)	45.3 \pm 3.8 (37–51)
Hyaline part of tail length	9.5 \pm 1.5 (6–13)	9.0 \pm 1.0 (8–11)	9.5 \pm 0.9 (8–11)
Width at level of:			
lips	6.9 \pm 0.7 (6–8)	8.8 \pm 0.7 (8–10)	10.0 \pm 0.4 (9–11)
guide ring	14.1 \pm 0.8 (13–16)	17.1 \pm 1.0 (15–19)	20.4 \pm 0.7 (19–21)
base of pharynx	21.8 \pm 0.8 (20–23)	29.4 \pm 2.2 (26–34)	36.7 \pm 1.8 (33–40)
mid-body	22.9 \pm 0.9 (22–25)	31.0 \pm 2.4 (26–35)	40.5 \pm 2.7 (36–46)
anus	14.9 \pm 0.7 (14–16)	19.9 \pm 2.7 (15–25)	30.2 \pm 1.7 (27–33)

Juveniles from Ustia (Lviv region, Ukraine) population are very similar to those from Dedevo-Rhodopi Mountain population, Bulgaria [10], but have some difference from juveniles of Czech population. They differ by slightly longer tail (JI – 46.4 (43–49) vs 43 (36–52) μm ; JII – 46.2 (40–53) vs 43 (39–51) μm ; JIII – 45.3 (37–51) vs 42 (37–49) μm) and higher c' values (JI – 3.11 (2.81–3.49) vs 2.83 (1.96–3.36); JII – 2.12 (1.90–2.47) vs 1.98 (1.78–2.25); JIII – 1.5 (1.23–1.66) vs 1.47 (1.16–1.88)) in all juvenile developmental stages, longer replacement odontostyle in JII (96.9 (90–102) vs 91 (84–99) μm) and higher a values (71.4 (66.0–78.1) vs 64.9 (57.8–77.1)) in JIII [9].

Table 3. Data on localities, host plants and morphometrics of two Ukrainian populations of *L. elongatus*. All measurements were conducted in μm , except for body length (mm) and in form: mean \pm standard deviation (range)

Таблиця 3. Дані про місцезнаходження, рослин-хазяїв і морфометрію двох українських популяцій *L. elongatus*. Усі виміри подано в мікрометрах, за винятком загальної довжини тіла (у міліметрах), у вигляді: середнє значення \pm стандартна похибка (межі мінливості)

Location and host plant	Lviv, garden square "Enzyme" 49°50'02.20"N 24°05'14.13"E <i>Acer</i> sp.		Lviv region, Mykolaiv district, Ustia village 49°30'18.85"N 23°54'56.95"E <i>Salix</i> sp.
	female	male	female
Character	n	n	n
	30	4	20
<i>L</i>	5.25 \pm 0.56 (4.52–6.90)	5.15 (4.39–5.74)	5.14 \pm 0.40 (4.41–6.04)
<i>a</i>	97.5 \pm 5.66 (86.9–109.4)	101.2 (95.3–108.3)	95.6 \pm 6.04 (83.2–108.6)
<i>b</i>	12.6 \pm 1.74 (10.4–18.6)	11.8 (9.3–13.4)	12.1 \pm 1.12 (10.4–14.7)
<i>c</i>	112.5 \pm 16.79 (86.6–160.3)	94.3 (78.3–110.8)	120.1 \pm 12.01 (101.4–137.7)
<i>c'</i>	1.19 \pm 0.10 (1.00–1.39)	1.40 (1.23–1.56)	1.15 \pm 0.07 (0.97–1.28)
<i>d</i>	2.2 \pm 0.13 (1.9–2.5)	2.2 (2.1–2.4)	2.3 \pm 0.12 (2.1–2.5)
<i>d'</i>	1.6 \pm 0.08 (1.4–1.7)	1.5 (1.4–1.6)	1.6 \pm 0.07 (1.5–1.7)
V / Spicules length	48.5 \pm 1.92 (44.4–52.1)	59 (47–63)	48.6 \pm 2.09 (44.5–52.7)
Odontostylet length	85.5 \pm 6.3 (77–99)	82.5 (80–89)	91.2 \pm 4.1 (85–100)
Odontophore length	65.6 \pm 3.1 (59–73)	68 (67–69)	60.2 \pm 4.0 (51–65)
Total stylet length	148.9 \pm 43.5 (138–165)	150.5 (147–158)	151.1 \pm 5.7 (149–159)
Anterior end to guide ring	32.0 \pm 1.1 (30–34)	32.8 (31–34)	32.2 \pm 1.1 (30–35)
Pharyngeal bulb length	113.4 \pm 5.9 (104–125)	115 (107–120)	117.2 \pm 8.3 (104–136)
Pharyngeal bulb width	20.2 \pm 1.2 (18–22)	18.7 (17–21)	21.8 \pm 1.8 (19–24)
Tail length	47.0 \pm 3.8 (40–55)	55.3 (48–67)	43.0 \pm 3.6 (35–50)
Hyaline part of tail length	11.3 \pm 1.7 (9–16)	13.5 (12–16)	12.3 \pm 1.0 (11–14)
Width at level of:			
lips	14.5 \pm 0.8 (13–16)	14.8 (14–15)	14.1 \pm 0.6 (13–15)
guide ring	22.7 \pm 0.7 (22–24)	22 (21–23)	22.6 \pm 0.8 (20–24)
base of pharynx	44.3 \pm 1.7 (40–47)	43.5 (41–46)	45.3 \pm 2.1 (41–49)
vulva or mid-body	53.7 \pm 3.6 (48–63)	50.8 (45–54)	53.8 \pm 3.2 (47–59)
anus	39.6 \pm 1.5 (37–43)	39.5 (35–43)	37.3 \pm 2.0 (34–41)

***Longidorus elongatus* (de Man, 1876) Thorne & Swanger, 1936** (Fig. 1, 2; Table 3)

During this study new populations of *Longidorus elongatus* were identified. This species is more widely distributed in the Western Ukraine. It was previously reported from the basin of Dnister river, but no morphological data for those populations are available [6]. In this paper, for the first time we provide morphometrics of two Ukrainian populations of *L. elongatus*. This species morphologically is most similar to *L. intermedius* and closely related molecularly [4, 7, 12]. As these two species were found in adjacent localities, it is important to distinguish them from each other in order to avoid misidentification.

Main differences between Ukrainian populations of *L. intermedius* and *L. elongatus* are:

- Body length (3.32–5.16 vs 4.41–6.90 mm)
- Odontostyle length (105–122 vs 77–100 μm)
- Form of lip region (more rounded in *L. intermedius*)
- Length of genital branches (192–314 vs 311–626 μm)
- Form and length of spicules in males (slightly curved ventrally, 51–56 μm vs arcuate, 47–63 μm ; in *L. elongatus* lateral guiding pieces are shorter (14–15 μm) and more distinctly bifid) (Fig. 2)

L. intermedius and *L. elongatus* also differ in their host plant specialty, which was analyzed in two model localities: floodplain forest near Ustia village and the city of Lviv. In the floodplain forest, most *L. intermedius* specimens were found in the rizosphere of *Quercus robur* L. and only in one case – from *Acer campestre* L. Samples were also taken from the rizosphere of *Tilia cordata* Mill., *Fraxinus excelsior* L., *Euonymus europaeus* L., *Acer negundo* L. and *Corylus avellana* L., but no *L. intermedius* specimens were found. *L. elongatus* specimens, unlike *L. intermedius*, were present only in samples from the rizosphere of *Salix alba* L., *S. fragilis* L., *Populus* sp. and grasses in the riparian zone of Dnister river, however never from oak tree in the middle part of the forest.

On the territory of Lviv only one population of *L. intermedius* was identified from the rizosphere of tricentennial oak tree (*Quercus robur* L.) in Ivan Franko Park – one of the oldest parks which was set up in the end of 16th century in Lviv [8]. This finding may reveal that old oak trees currently growing on the territory of this park in spite of its numerous reconstructions are the elements of natural forests which had been growing in this region in the past. On the contrary, *L. elongatus* populations were found in many parks in different parts of the city in the rhyzosphere of *Acer platanoides* L., *A. pseudo-platanus* L., *Fagus sylvatica* L., *Salix* spp., some fruit trees (*Malus domestica* Borkh, *Pyrus* sp., *Prunus cerasifera* Ehrh, *Prunus avium* L.) and grasses.

The results of study of *L. intermedius* on the territory of the Western Ukraine show that this species is closely associated with natural oak forests. Four populations of *L. intermedius* were found on this territory, and three of them were collected in old oak forests and the fourth – from the rizosphere of tricentennial oak tree in the city park in Lviv. These data confirm a hypothesis of Bulgarian nematologists that this species, together with other nematode species, belongs to nemoral horological complex. According to this characteristic, *L. intermedius* can be used as an indicator for natural and semi-natural forests in which oak associations represent a primary vegetation type [10]. Taking into account the chorological characters, this species can be also used in the phylogeographical study in order to determine the formation ways of nemoral complexes of soil organisms after the Last Glacial Maximum (24.0–17.0 kyr BP). That is why distribution study of this species on the whole territory of Ukraine is of a great significance.

CONCLUSION

The results of morphological and morphometrical analysis show that the Ukrainian populations of *L. intermedius* are similar to type and other previously reported populations, however differ in some characters and morphometric parameters. Differences between *L. intermedius* and closely related species *L. elongatus* are provided. In addition, current research reveals that *L. intermedius* is closely associated with *Quercus robur* L. and can be used for indication of natural and semi-natural forests in which oak associations represent a primary vegetation type and in phylogeographical study of the formation ways of nemoral complexes of soil organisms.

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**МОРФОЛОГІЯ ТА ХОРОЛОГІЯ НОВОГО ДЛЯ ФАУНИ УКРАЇНИ ВИДУ
LONGIDORUS INTERMEDIUS KOZLOWSKA & SEINHORST, 1979
І МОРФОЛОГІЧНІ ДАНІ УКРАЇНСЬКИХ ПОПУЛЯЦІЙ *LONGIDORUS ELONGATUS*
(DE MAN, 1876) THORNE & SWANGER, 1936**

С. А. Сусуловська, Й. В. Царик

Львівський національний університет імені Івана Франка
вул. Грушевського, 4, Львів 79005, Україна
e-mail: solomija.s.a@gmail.com

Родина Longidoridae Thorne, 1935 – це один із найчисленніших таксонів під-ряду Dorylaimina (Enoplia), представники якого населяють наземні біотопи і є екто-паразитами вищих рослин. Лонгідориди складають одну з найбільш гомогенних груп Dorylaimina, яка, з одного боку, морфологічно і біологічно чітко відокремлена від усіх інших груп дорилаймін, а з іншого – її представники структурно і екологічно дуже близькі між собою. Раніше на території України було виявлено 17 видів цієї родини, що належать до родів *Longidorus*, *Paralongidorus* і *Xiphinema*. У статті детально проаналізовано морфологічні й морфометричні особливості *Longidorus intermedius* Kozłowska & Seinhorst, 1979, що вперше зібраний на території України. Проведено порівняння українських популяцій цього виду із типовою та іншими раніше відомими популяціями, а всі відмінності детально описано. Підтверджено наявність у *L. intermedius* лише трьох личинкових стадій. Встановлено основні відмінності між українськими популяціями *L. intermedius* і близькоспорідненого виду *Longidorus elongatus* (de Man, 1876) Thorne & Swanger, 1936. Уперше наводиться морфометрія для популяцій *L. elongatus*, зібраних в Україні. На модельних, природній і антропогенно зміненій ділянках на території Опілля проаналізовано гостальну специфічність обох видів. Встановлено, що *L. intermedius* тісно асоційований із дубом звичайним (*Quercus robur* L.) і може слугувати індикатором для природних та напівприродних лісів, у яких угруповання дуба є первинним типом рослинності. На відміну від попереднього виду, *L. elongatus* було виявлено у пробах ґрунту із ризосфери багатьох видів рослин, проте жодного разу з дуба. Запропоновано використання *L. intermedius* як модельного об'єкта у філогеографічних дослідженнях, щоби встановити способи формування неморальних комплексів ґрунтових організмів після останнього льодовикового максимуму.

Ключові слова: *Longidorus intermedius*, *Longidorus elongatus*, Україна, морфологія, гостальна специфічність

Одержано: 20.03.2018