

Description of *Discolaimus karachiense* n. sp. with Observation on Two Known Species (Dorylaimida: Mononchida) from Pakistan

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ABSTRACT

A compendium of the genus *Discolaimus*, characterized by body length, stylet, and spicule length, number of supplements, ratios a, b, c, c', and vulva percentage, these allometric and morphometric characters were derived from original descriptions. *Discolaimus karachiense* n. sp. is described and illustrated, collected around the roots of tomato (*Lycopersicon esculentum* L.) from Karachi, Sindh, Pakistan, and two undescribed species were also recorded. *D. karachiense* n. sp. is characterized as having constriction in the anterior region of basal bulb, pharynx with conspicuous single sheath in the expanded part of oesophagus, odontostyle length 22-24µm; V% 50-52; tail conoid rounded. *Mylonchulus cavensis* and *Mylonchulus curvicaudatus* are newly recorded species from Pakistan, which are briefly described and illustrated.

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Authors' Contribution

UI conducted the survey, sample collection, processing, and identification under the supervision of NK, XY, and SD. UI drafted the manuscript. SD, SH, NK, and XY reviewed the draft and contributed to finalizing the manuscript.

Key words

Discolaimus karachiense n. sp., *Mylonchulus cavensis* and *Mylonchulus curvicaudatus*, New records, Taxonomy, Compendium

INTRODUCTION

The order Dorylaimida Pearse, 1942 is one of the most diversified ordinal nematode taxa, and they are found in all types of soil, climates, and habitats, making them a crucial part of the ecosystem. Their adaptability and widespread presence make them an essential component of the soil food web and highlight their importance in maintaining soil health (Khan and Kim, 2006). The main morphological features of dorylaims consist of a protrusible odontostyle, an "amphidial" fovea, usually a cup or goblet located behind the lateral lips with a large aperture, and a pharynx consisting of an anterior region that gradually enlarges to combine with the basal expanded part. The intestine is divided into longer anterior part, which is called the intestine proper, and a smaller posterior part

called prerectum. In males, a series of clearly developed papillae are present in the precloacal region which are arranged in two groups: An adanal pair and ventromedian supplements. In Pakistan the order Dorylaimida occurs most, it contains 132 species in 55 genera (Shahina *et al.*, 2019). In this group during the survey of research studies, a new species of the genus *Discolaimus* (Cobb, 1913) as *D. tabacum* (Uzma *et al.*, 2022) collected from around the roots of tobacco (*Nicotiana tabacum* L.) in Mansehra, Khyber Pakhtunkhwa (KP) is described and illustrated. Besides these four species of *Discolaimus* viz., *Discolaimus laksi* (Khan and Laha, 1982), collected from the cotton field (*Gossypium hirsutum* L.) from Sargodha, Punjab; *Discolaimus omanensis* (Siddiqi, 2005) collected from mango (*Mangifera indica* L.) from Faisalabad, Punjab; *D. conicus* (Siddiqi, 2005) isolated from soil around the roots of sugarcane field (*Saccharum officinarum* L.) in Mirpurkhas, Sindh, and *D. paratenax* (Siddiqi, 2005) collected from decaying matter in Peshawar, KPK, Pakistan. These species are reported for the first time in Pakistan as new records (Uzma *et al.*, 2022b). During recent research studies, a new species *Discolaimus karachiense* n. sp. collected from soil around the root of tomato (*Lycopersicon esculentum* L.) at Sindh, Karachi was described and illustrated. Previously five species of the genus *Discolaimus* were reported by several scientists viz., (Akhtar, 1962) reported

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D. bulbiferous (Cobb, 1906; Thorne and Swanger, 1936), *D. major* (Thorne, 1939) from sugarcane soil in Lahore, Punjab. Khan (1998) described *D. lahorensis* from Lahore. Nasira *et al.* (1999) reported *D. texanus* Cobb, 1913 from citrus soil from Karachi. Nasira *et al.* (2008) described a new species *D. pakistanensis* from soil around the roots of wheat (*Triticum aestivum* L.) plants in Mirpurkhas, Sindh. Some of the research studies made in recent years found a reported species *Discolaimoides spatilabium* (Khan and Laha, 1982) collected from soil around the roots of maize (*Zea mays* L.) in Swat, KP. *Dorylaimoides micoletzkyi* (de Man, 1921; Thorne and Swanger, 1936), a new record from Pakistan were redescribed and illustrated, collected from grapes (*Vitis vinefera* L.) in Quetta, Balochistan. *Sectonema ventralis* (Thorne, 1930) was reported from Pakistan for the first time and isolated from Peach (*Prunus persica* L.) in Peshawar, KPK (Uzma *et al.*, 2022b).

MATERIALS AND METHODS

The species were extracted from soil according to Cobb's sieving and decanting methods (Cobb, 1917) and processed by modified and Baermann's funnel technique, (Baermann, 1918) killed in water by gradual application of heat, fixed and preserved in TAF solution (7ml formalin, 2ml triethanolamine, 91ml distilled water) for 24 h as described by Courtney *et al.* (1955). After 24 h, TAF was removed by washing three times with distilled water and then placed it in an incubator for 4-5 days at 40-60 °C and mounted in anhydrous glycerin on glass slides according to the slow method of (Seinhorst, 1959) technique. Observations, morphometrics, measurements, and photographs were made using a Nikon Eclipse 80i light microscope equipped with Nomarsk. DIC accessories, Nikon DS-Fi1 digital camera. Illustrations were made by using a drawing tube attached to the compound microscope. The photographs were edited using Adobe Photoshop and 7.0 software.

RESULTS

Discolaimus karachiense n.sp.

(Figs. 1, 2; Table I)

Female

Body cylindrical, slightly curved ventrally upon fixation. Maximum width 49-51 µm. Cuticle smooth, striae fine. Lateral hypodermal chord about one-third of body width. Cuticle (2 µm) at the anterior region, (2 to 3 µm) at the mid region of the body, and on the tail region (4 to 5 µm) thick. A cephalic region well set off by a constriction with a rounded outer margin, 0.51-0.52 times as wide as the body diameter at the pharyngeal base or 6.05-5.3 times as wide as high. Stirrup-shaped amphid with slit-like aperture

6-7 µm or about 0.26-0.29 times the width at the lip region. Odontostyle straight sclerotized with a distinct lumen, 0.95-1.0 times head width long, with its aperture 50% of its length. Odontophore rod-like with a wide lumen 1.58-1.59 times odontostyle length. The anterior guiding ring from the head ends 9-10 µm. Nerve ring located at 28.2%-28.3% from neck length. The anterior oesophagus gradually expanded and the unusual constriction was seen in the posterior expanded part of oesophagus, which is anteriorly 45-46µm long and 21-22µm wide, with a corresponding width 42-43µm. The enlarged part of the esophagus is surrounded by a single sheath. Pharyngeal gland nuclei and their orifices are located as follows: DO=20; DN=38-40; S1N1=130-132; S2N1=180-185. Cardia is large round to conoid about 16µm in length. The genital system is amphidelphic-didelphic. Ovaries are reflexed, oocytes arranged in a single row, except near the germinal cell. A distinct sphincter present between the oviduct and uterus. Valva is a transverse slit, vagina extending inwards about 18 to 19µm or about one-third to two-fifths of body width long walls moderately thick, not sclerotized. Prerectum about 20-24µm long. Rectum straight 22-24 µm long. The tail is dorsally convex with a rounded terminus.

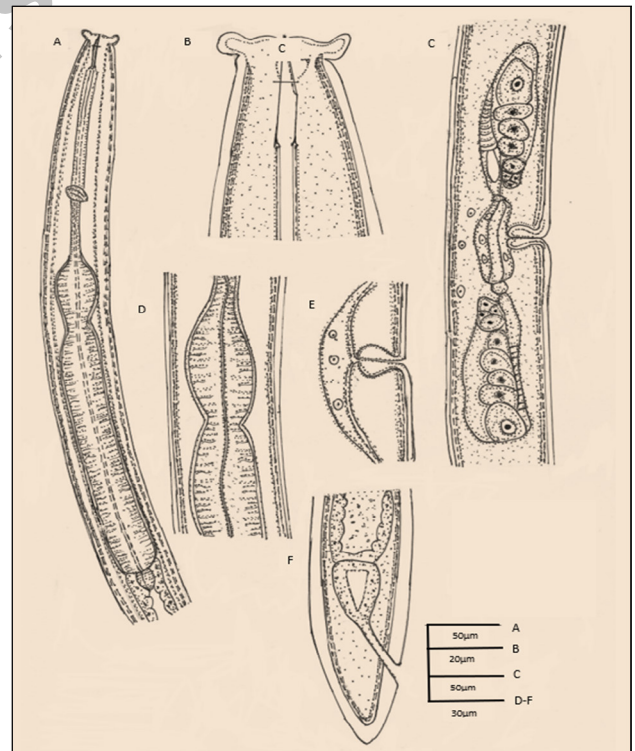


Fig. 1. *Discolaimus karachiense* n. sp., Female: A, Oesophageal region; B, Anterior region; C, Reproductive system; D, Anterior part of oesophageal basal bulb showing constriction; E, Vulva region; F, Tail region.

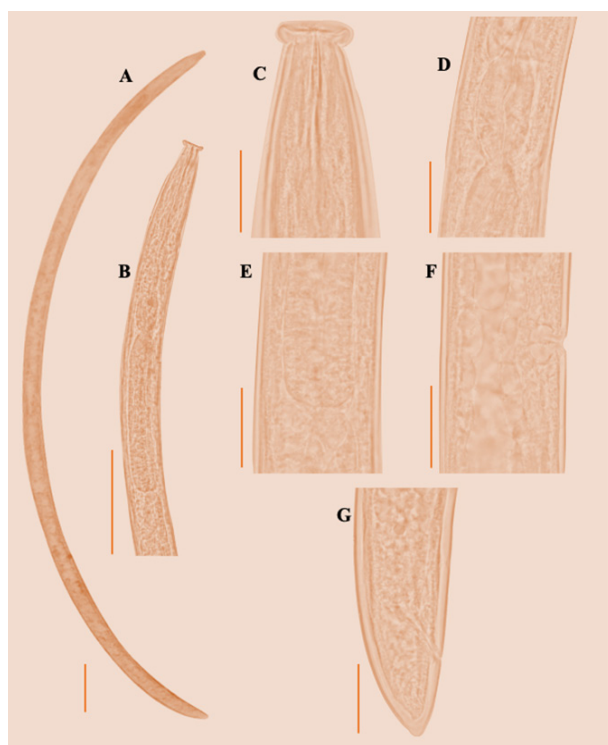


Fig. 2. *Discolaimus karachiense* n. sp. Female: A, Whole body; B, Oesophageal region; C, Anterior region; D, Anterior end of basal oesophageal bulb showing constriction; E, Basal oesophageal bulb and cardia; F, Vulval region; G, Tail region (Scale: A-B=100µm, C-G=30µm).

Table I. Morphometrics of *Discolaimus karachiense* n. sp. (new species) Measurements (except where indicated) are in µm and column A and b are shown as mean ± SD (range).

Characters	Holo-type female	Paratypes female (Range) (n=5)	<i>Discolaimus anemagen</i> n. sp.	<i>Discolaimus bicorticus</i>
L	1.903	1.913 ± 0.122 (1.77-2.07)	2.04 ± 0 (1.92-2.15)	1.77, 2.07
A	38.0	40.66 ± 3.09 (38.0-45.0)	37.2 ± 3.0 (34.1-41.9)	39, 46
B	4.91	4.471 ± 0.686 (3.5-5.)	4.2 ± 0.2 (4.0-4.4)	3.5, 4.0
C	55.9	57.96 ± 1.67 (55.9-60)	58.5 ± 3.7 (52.8-62.4)	68, 71
c'	1.0	1.1 ± 0.80 (1.0-1.2)	1.2 ± 0.1 (1.1-1.3)	---

Table continues on next column.....

Characters	Holo-type female	Paratypes female (Range) (n=5)	<i>Discolaimus anemagen</i> n. sp.	<i>Discolaimus bicorticus</i>
V%	52.4	50.86 ± 1.08 (50.0-52.4)	47.3 ± 1.0 (46.3-49.0)	49.7, 52.0
G ₁	5.67	5.72 ± 0.32 (5.36-6.15)	9.2 ± 2.5 (5.2-11.9)	-
G ₂	5.67	5.67 ± 0.24 (5.31-6.15)	8.7 ± 2.0 (5.2-11.0)	-
Odontostyle	23	23 ± 0.81 (22-24)	20 ± 0.5 (19.0-20.0)	23
Odontophore	35	36.6 ± 1.24 (35.0-38.0)	36.5 ± 1.2 (34.0-38.0)	38
Total stylet	58	57.6 ± 1.24 (56.0-59.0)	---	61
Stylet aperture	12	11.5 ± 0.40 (11.0-12.0)	---	11
Lip width	24	23.5 ± 0.408 (23.0-24.0)	26.0 ± 0.8 (25.0-27.0)	-
Lip height	4	4.1 ± 0.28 (3.8-4.5)	7.0 ± 0.4 (6.0-7.0)	-
Amphid width	6	6.5 ± 0.408 (6.0-7.0)	7.0 ± 0.9 (6.0-8.0)	-
Amphid corresponding body diameter	16	15.5 ± 0.408 (15.0-16.0)	---	-
Anterior guiding ring from the head end	10	9.5 ± 0.408 (9.0-10.0)	10.5 ± 0.1 (10.0-11.0)	-
Nerve ring	109	109.5 ± 0.816 (109.0-110.0)	149.0 ± 3.5 (146.0-155.0)	126
Oesophagus	387	387 ± 0.816 (386.0-388.0)	490 ± 16.2 (467.0-516.0)	-
Body width at base of oesophagus	45	45.5 ± 0.408 (45-46)	50.0 ± 6.8 (42.0-59.0)	-
Body width at mid body	50	49.8 ± 0.62 (49-50.5)	55.0 ± 6.5 (46.0-62.0)	-
Body width at anus	32	31 ± 0.816 (30-32)	30.0 ± 1.6 (28.0-32.0)	-
Tail length	34	33.83 ± 0.623 (33.0-34.5)	35.0 ± 3.0 (31.0-39.0)	-
Pre rectum	20	22.3 ± 1.699 (20-24)	26.0 ± 2.3 (22.0-28.5)	-
Rectum	22	22 ± 0.816 (22-24)	27.0 ± 2.9 (22.0-31.0)	-

Male

Not found.

Differential diagnosis

According to the key of *Discolaimus* species provided by Wu *et al.* (2016), the present new species comes close to *Discolaimus bicorticus* (Furstenberg and Heyns, 1965) but can be differentiated from it in having a unusual constriction in the posterior region of basal bulb against constriction absent; basal part of the pharynx with single sheath vs double sheath; tail conoid rounded vs tail conoid bluntly rounded terminus; in lower value of c ratio 55-60 vs 68-71. This species is also close to *Discolaimus anemagen* (Wu *et al.*, 2016), but differs in lip region height (3-4.5 µm vs 6-7 µm) and in more anteriorly located nerve ring (109-110 µm vs 146-155 µm) in having small pharyngeal length and expanded part of pharynx (389-388 µm vs 467-516 µm) and (226-235 µm vs 257-299 µm).

Type habitat and locality

Soil samples were collected from different sites around the roots of tomato (*Lycopersicon esculentum* L.) from Sindh, Karachi, Pakistan.

Type specimens

Holotype and paratypes females deposited in the Nematode Collection of the National Nematological Research Centre, University of Karachi.

Etymology

The name of the new species is derived from the name of the sampling region, Karachi, and province of Sindh, Pakistan.

Mylonchulus cavensis Schneider, 1940

(Figs. 3-4; Table II)

Female

Body length measured between 1.15-1.25mm. Funnel-shaped buccal cavity, large and thick 22-23 µm long and 13-14 µm wide. Lip region 20-21 µm wide and 5.5-6 µm high. Amphidal aperture from anterior end at 5-8 µm wide and 10-12 µm high. The dorsal tooth is massive, its apex is anteriorly directed and 11-18 µm or 50-78.2% of the length of the buccal cavity from the base. Subventral transverse rows of denticles 8-9, anterior row prominent and regularly arranged. Sub-median teeth present. The proximal end of the esophagus is simple slender and muscular 320-330 µm long. The nerve ring is located at 80 µm from the anterior end of the body. Cardial length 10-12 µm and width is 12-14 µm. Excretory pores present behind the nerve ring. Reproductive system amphidelphic-didelphic. Ovaries reflexed, oocytes arranged in a single row except near tip. Vulva transverse. Vagina with *parsrefringens*. Rectum 17.4-20.3 µm. Tail conical-conoid ventrally arcuate two to three anal body diameter long, caudal glands and terminal spinneret present.

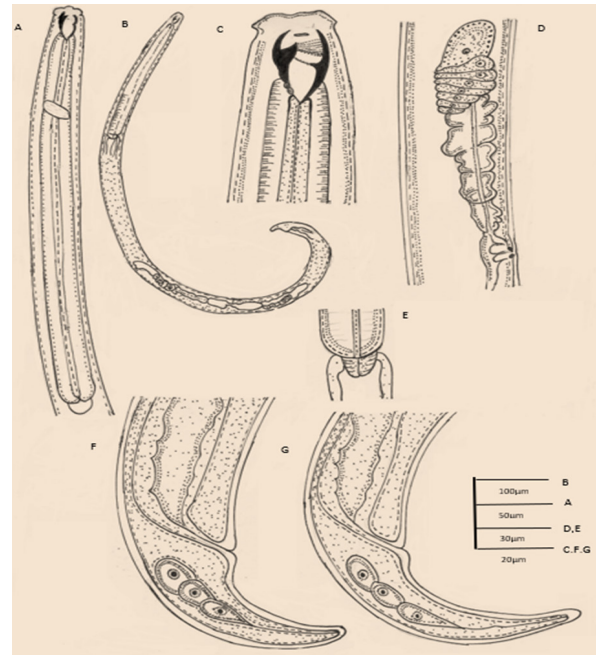


Fig. 3. *Mylonchulus cavensis* Schneider, 1940. Female: A, Oesophageal region; B, Whole body; C, Anterior region; D, Genital system; E, Basal oesophageal bulb and cardia; F-G, Tail region.

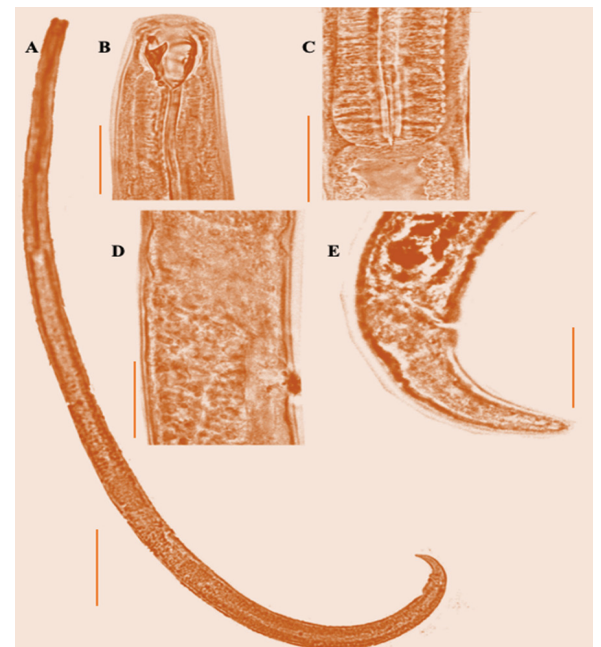


Fig. 4. *Mylonchulus cavensis* Schneider, 1940. Female: A, Whole body; B, Anterior region; C, Basal oesophageal bulb and cardia; D, Vulval region; E, Tail region (Scale: A=100 µm; B-E=20 µm).

Table II. Morphometric data of females of *M. cavensis* Schneider, 1940 and *M. curvicaudatus*. All measurements are in μm except L and are shown as Mean $\pm$ SD.

Characters	<i>Mylonchulus cavensis</i> (n=6)	<i>Mylonchulus curvicaudatus</i> (n=10)
L(mm)	1.21 $\pm$ 0.039 (1.15-1.25)	0.98 $\pm$ 89.8 (0.87-1.09)
A	30.4 $\pm$ 1.81 (29.0-33.0)	22.3 $\pm$ 1.41 (21.3-24.3)
B	3.7 $\pm$ 0.08 (3.6-3.8)	3.2 $\pm$ 0.16 (3.0-3.4)
C	23.97 $\pm$ 1.44 (22.81-26.0)	31.9 $\pm$ 2.21 (29.1-34.2)
c'	2.33 $\pm$ 0.286 (2.0-2.7)	0.9 $\pm$ 0.04 (0.9-1.0)
V%	63.4 $\pm$ 1.020 (62.2-64.7)	68.0 $\pm$ 0.28 (67.7-68.4)
G1	189.3 $\pm$ 63.3 (100-240)	86.3 $\pm$ 2.05 (84.0-89.0)
G2	192 $\pm$ 63.89 (102-244)	86.3 $\pm$ 1.6 (84.0-88.0)
Stoma length		27.3 $\pm$ 0.47 (27.0-28.0)
Stoma width		16.0 $\pm$ 0.81 (15.0-17.0)
Lip width	20.3 $\pm$ 0.47 (20-21)	--
Lip height	5.6 $\pm$ 0.23 (5.5-6.0)	--
Tooth from anterior end	7.8 $\pm$ 0.23 (7.5-8.0)	--
Tooth from base of Buccal cavity	15.3 $\pm$ 3.09 (11.0-18.0)	--
Amphid from anterior end	11.0 $\pm$ 0.81 (10.0-12.0)	--
Amphid width	6.3 $\pm$ 1.2 (5.0-8.0)	--
Oesophageal length	324.0 $\pm$ 4.32 (320.0-330.0)	302.0 $\pm$ 10.2 (291.0-316.0)
Body width at base of oesophagus	33.3 $\pm$ 2.05 (31.0-39.0)	41.6 $\pm$ 2.05 (39.0-44.0)
Cardial length		12.0 $\pm$ 1.63 (10.0-14.0)
Nerve ring	78.0 $\pm$ 1.6 (76.0-80.0)	89.6 $\pm$ 0.47 (89.0-90.0)
Body width at mid	40.0 $\pm$ 3.55 (35.0-43.0)	44.0 $\pm$ 2.16 (41.0-46.0)
Body width at anus	21.3 $\pm$ 1.24 (20.0-23.0)	31.0 $\pm$ 0.81 (30.0-32.0)
Pre-Rectum		60.0 $\pm$ 16.3 (60.0-70.0)

Table continues on next column.....

Characters	<i>Mylonchulus cavensis</i> (n=6)	<i>Mylonchulus curvicaudatus</i> (n=10)
Tail length	50.6 $\pm$ 2.49 (48.0-54.0)	30.6 $\pm$ 0.94 (30.0-32.0)

Male

Not found.

Remarks

Several specimens were recovered during the survey of soil samples at Karachi, Sindh, Pakistan from the plant of chilies (*Capsicum annum* L.). It has much resemblance with Schneiden, 1940., but except in anteriorly located vulva.

Mylonchulus curvicaudatus Mulvey and Jensen, 1967 (Figs. 5-6; Table III)

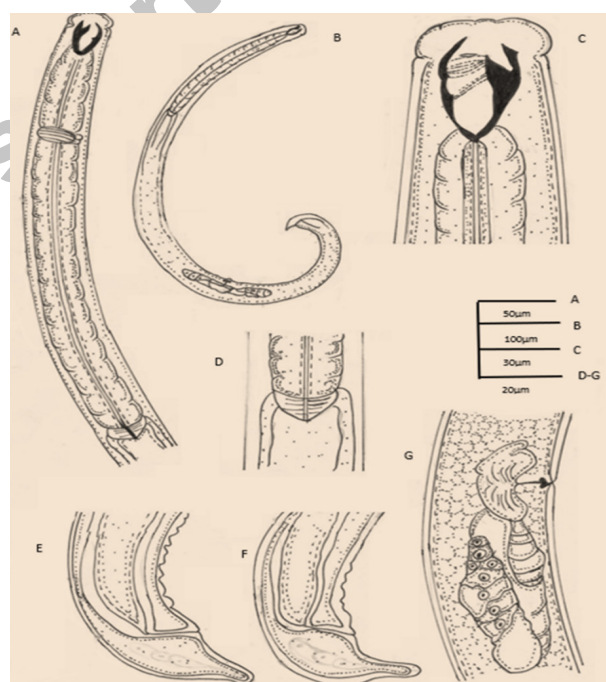


Fig. 5. *Mylonchulus curvicaudatus* Mulvey and Jensen, 1967. Female: A, Oesophageal region; B, Whole body; C, Anterior region; D, Basal oesophageal bulb and cardia; E, F, Tail region; G, Vulval region.

Female

Median-sized body, ventrally curved, C-shaped upon fixation gradually tapering towards both ends. Its anterior end is straight, and its posterior half varies between 875-1173mm. Smooth and slightly thick cuticles. Lip conoid in shape, 25-27 μm wide, 6-10 μm high. Labial papillae

Table III. Compendium of genus *Discolaimus*.

<i>Discolaimus</i> species	L (mm)	a	b	c	c'	V%	Odontostyle length (µm)	Spicule (µm)	Supple- ments	Reference
<i>D. acuticapitus</i>	♀ 1.5-1.6 ♂ 1.6	28-31 31	3.1-3.3 3.7	52-59 50	1.0	55-58 -	17-20 -	- 54	- 18	Furstenberg and Heyns, 1965
<i>D. affinis</i>	♀ 1.2	33-38	3.8	55	1.1	53-55	14	-	-	Loof, 1964
<i>D. agricolus</i>	♀ 1.3-1.7	28-32	3.9-4.4	59-84	0.8-1.1	45-48	21-23	-	-	Saucer and Annells, 1986
<i>D. albarossicus</i>	♀ 4.0-4.3	29-33	4.2-4.8	80-88	0.8	52-53	-	-	-	Merzheevskaja, 1951
<i>D. anemaqen</i>	♀ 1.92-2.15	34.1- 41.9	4.0-4.4	52.8- 62.4	1.1-1.3	46.3- 49.0	19-20	-	-	Wen-Jia <i>et al.</i> , 2016
<i>D. auritus</i>	♀ 1.6	27	4.3	44	0.9	44	24.9	-	-	Lordello, 1955
<i>D. bicoritus</i>	♀ 1.8-2.1 ♂ 2.4	39-46 53	3.5-4.0 4.2	68-71 73	1.1 -	50-52 -	23 -	- 50	- 8	Furstenberg and Heyns, 1965
<i>D. brevis</i>	♀ 0.9-0.99	31-36	3.4-3.6	44-50		41-45	13-14	-	-	Siddiqi, 1964
<i>D. conicus</i>	♀ 1.25-1.43	39-45	3.4-4.0	50-57	1.1-1.3	53-57	16-17	-	-	Siddiqi, 2005
<i>D. constrictus</i>	♀ 1.68-2.46 ♂ 1.7, 1.9	53-61 58, 58	4.4-5.7 4.4, 5.1	58-81 54, 71	1.2-1.4 1.0, 1.3	54.2- 61.9-	17-17.5 17, 18.5	- 32, 39	- 4	Heyns, 2001
<i>D. curvus</i>	♀ 2.4-3.1 ♂ 2.68	48-55 51.5	4.0-4.5 4.4	90-121 76.5	0.6-0.9 0.9	48-55 -	29-33 31	- 50	- 8	Siddiqi, 2005
<i>D. discocephalus</i>	♀ 1.6	32	4.2	53	1.0	54	-	-	-	Tulaganov, 1949
<i>D. elegans</i>	♀ 1.1-1.2	27-30	3.2-3.5	65-80	0.6-0.8	50-53	14-15	-	-	Sauer and Annells, 1986
<i>D. gossypiorum</i>	♀ 0.8-0.85	31-33	3.1-3.8	40-42	1.4-1.5	54-58	11	-	-	Karimova, 1957
<i>D. intermedius</i>	♀ 1.3 ♂ 1.5	28 26	3.6 3.6	52 69	1.0 -	51 -	- -	- 55	- 8	Heyns and Lagerwey, 1965
<i>D. Karachiensis</i> <i>n.sp</i>	♀ 1.77-2.17	38-45	3.5-5	55.9- 60	1.0-1.2	50- 52.4	22-24	-	-	
<i>D. krugeri</i>	♀ 2.9-3.4 ♂ 2.7	46-54 47	3.7-4.2 4.2	65-81 75	1.0 -	49-58 -	29-38 -	- 58-68	- 7-8	Furstenberg and Heyns, 1965
<i>D. labiatus</i>	♀ 0.99-1.2	37-46	4.0-4.6	37-46	1.5-1.7	39-43	10.0-12.5	-	-	Pena <i>et al.</i> , 2002
<i>D. lahorensis</i>	♀ 1.6-1.8	39-41	3.6-4.0	36-45	-	50-51	17.2-18.5	-	-	Khan, 1998
<i>D. laski</i>	♀ 0.8-1.1	25-37	3.1-4.3	40-52	1.0		15-16	-	-	Khan and Laha, 1982
<i>d. leviniae</i>	♀ 1.9 ♂ 1.8-2.1	43 42-46	4.1 4.0-4.2	73 65-77	0.8	48-57	24 23	- 40	- 11	Furstenberg and Heyns, 1965
<i>D. magnistylus</i>	♀ 2.9	41.4	3.86	75.5	0.9	54.3	45	-	-	Siddiqi, 2005
<i>D. major</i>	♀ 1.9-2.6	33-52	4.0-4.7	55-92	0.8	47-52	19-20	-	-	Thorne, 1939
<i>D. mariae</i>	♀ 2.4-3.3	39-54	3.9-4.9	72-88	0.9-1.0	46-53	23-25	-	-	Pena <i>et al.</i> , 2002
<i>D. microdorus</i>	♀ 0.88-1.14	35-40	3.2-3.9	42-50	1.0-1.2	43-46	11.5-13	-	-	Siddiqi, 2005
<i>D. monoplanus</i>	♀ 0.8	24	3.5	29	1.5	46	15-16	-	-	Heyns, 1963
<i>D. neomajor</i>	♀ 1.9-2.0	41-47	3.8-4.0	65-74	0.9-1.0	408- 42.3	24-27	-	-	Siddiqi, 2005
<i>D. omanensis</i>	♀ 1.0-1.2 ♂ 1.14	29-36 38	3.6-3.9 4	34-45 43.8	1.0-1.3 1.2	44-47	15-17 17	- 36	- 8	Siddiqi, 2005
<i>D. pakistanense</i>	♀ 2.2-2.4 ♂ 2.0	42-44 43	5.5-6.0 5.5	94-100 80.6	0.6-0.7 0.8	55-57 -	21-24 21	- 39	- 9	Nasira <i>et al.</i> , 2008
<i>D. papillatus</i>	♀ 1.7-1.9 ♂ 1.77	44-47 42	4.2-4.6 4.3	54-60 54	1.2-1.3 1.2	51-57 -	18-19 18	- 39	- 15	Khan <i>et al.</i> , 1994
<i>D. paramajor</i>	♀ 1.3-2.0 ♂ 1.6	26-35 29	3.4-4.3 4.0	45-72 42	1.0 1.0	45-52 -	25-28 -	- 46	- 6	Coomas, 1966

Table continues on next page.....

<i>Discolaimus</i> species	L (mm)	a	b	c	c'	V%	Odontostyle length (μm)	Spicule (μm)	Supplements	Reference
<i>D. paratenax</i>	♀1.1-1.2	36-40	3.9-4.2	45-51	1.2-1.3	50-53	16-17	-	-	Siddiqi, 2005
<i>D. pernix</i>	♀1.2-1.4	28-33	4.0-4.2	50-55	0.83-1.03	49-51	28-30	-	-	Siddiqi, 2005
<i>D. perplexans</i>	♀1.9	40	3.2	65	1.0	54	-	-	-	Siddiqi, 2005
<i>D. pizai</i>	♀1.2-1.3	37-41	3.3-3.5	59-70	0.9	51-52	-	-	-	Monteiro, 1970
	♂1.1-1.2	30-35	3.1-3.5	55-61	-	-	-	-	6-11	
<i>D. pygmaens</i>	♀0.66	26.6	3	35	0.9	46.6	13	-	-	Siddiqi, 2005
<i>D. rotundicaudatus</i>	♀0.8-0.9	2.2-2.5	2.9-4.5	38-41	1.0	51-53	16-19	-	-	Khan and Laha, 1982
<i>D. silvicolus</i>	♀1.6-1.9	37-42	3.7-5.5	48-57	1.2-1.4	51-53	20-22	-	-	Sauer and Annells, 1986
<i>D. similis</i>	♀1.3-2.2	33-51	3.5-5.2	43-66	9.3-1.5	48-58	18-19	-	-	Thorne, 1939
	♂1.5	40	4.1	43	-	-	20	40	4	
<i>D. tabacum</i>	♀0.99-1.19	33.1-39.6	3.5-4.7	41.4-57.7	1.0-1.2	42.8-55.4	15-16	29-	11	Ishaque <i>et al.</i> , 2022
	♂1.096	♂40.5	♂4.7	54.8	-	-	16	-	-	
<i>D. tenax</i>	♀1.0-1.2	35-39	3.8-4.2	40-46	1.5	50-54	14-15	-	-	Siddiqi, 1964
	♂1.2	37	3.8	44	-	-	-	-	10	
<i>D. texanus</i>	♀0.9-1.3	28-40	3.4-4.4	39-63	0.8-	37-45	14-16	-	-	Cobb, 1913
	♂1.2-1.3	29	4	43-56	11.1-1.0	-	15	32	7-11	
<i>D. trapezoids</i>	♀1.9-2.0	44-47	3.7-4.0	59-66	1.0-1.1	50-52	28-30	-	-	Siddiqi, 2005
<i>D. zicsii</i>	♀1.7	52	4.3	78	1.0	54	22	-	-	Andrassy, 1968

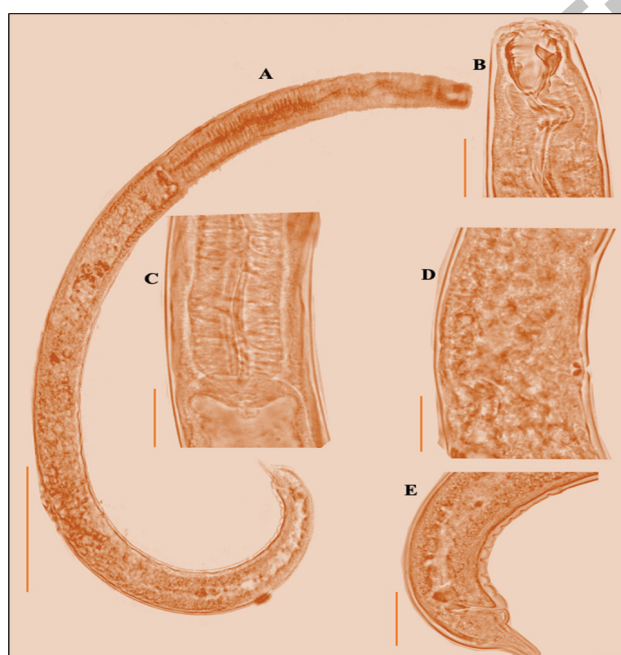


Fig. 6. *Mylonchulus curvicaudatus* Mulvey and Jensen, 1967. Female: A, Whole body; B, Anterior region; C, Oesophageal bulb and cardia; D, Vulval region; E, Tail region (Scale: A=100μm; B-E=20μm).

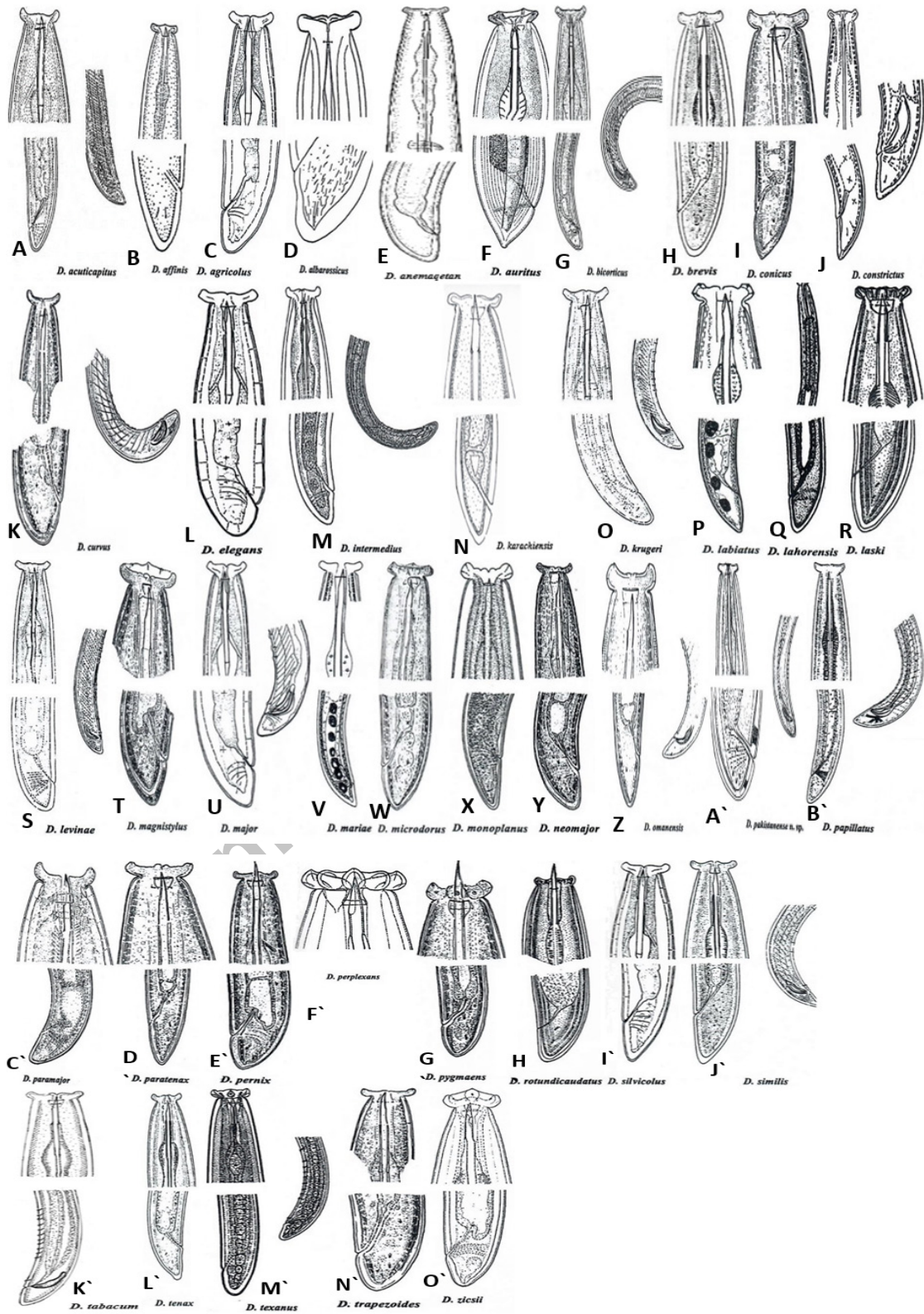
are well developed. Amphids slit large, 6-7μm wide. Dorsal tooth claw-like, its apex is anteriorly directed and 33.7% -35.7% of stoma length. Denticles are small, arranged in 6-7 rows. Large sub-median teeth oesophageal - intestinal junction non-tuberculate 291-316μm long or 1/3 of body length. Nerve ring presents at 89-90μm from anterior region of the body. Cardial 10-14μm long. The reproductive system of a female amphidelphic-didelphic, with ovaries reflexed, vulva transverse, lips moderately sclerotized. Cuticularised pieces 3x3 in diameter occur at the vulva-vagina junction. The vagina is 12-14 μm in depth, uterus and oviduct are well developed. Each gonad about equally developed, anterior 90-94 μm while posterior gonad 80-84 μm long. Tail about one anal body diameter, ventrally arcuate. Caudal glands in tandem, spinneret terminal. Rectum 20-21μm long.

Male

Not found.

Remarks

Isolated from soil around the roots of mango (*Mangifera indica* L.) from different sites in Faisalabad, Punjab, Pakistan. Measurements are in close agreement with the description of Mulvey and Jensen (1967), but except in the more posteriorly located vulva (67.7-68.4 vs 58-62) and in a lower value of c ratio (29.1-34.2 vs 36-41).

Fig. 7. Compendium of Genus *Discolaimus*.

Compendium of *Discolaimus*

A compendium of genus *Discolaimus* was developed. The compendium is based on sixteen key diagnostic nematodal characteristics mentioned in Table III. These features include body length, stylet and spicule length, number of supplements, ratios a, b, c, c', and vulva percentage, is presented. These allometric and morphometric characters were derived from the original descriptions. The compendium (Table III) described forty-one species of *Discolaimus*. A sketch illustration of this compendium is also developed in Figure 7.

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