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Description of *Distorhabditis poonchiana* n. gen., n. sp. (Nematoda: Rhabditidae) from Jammu and Kashmir, India

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Abstract: Distorhabditis poonchiana n. gen., n. sp. from humus in Jammu and Kashmir, India, is described and illustrated. The new genus is characterized by a small body; slightly setoff labial region; long tubular gymnostom; prominently cuticularized cheilostom; absence of glottoid apparatus; monoprodelphic reproductive system; vulva (V) = 81 to 84; spicules with trifurcated distal ends, simple gubernaculum, peloderan bursa with eight pairs of bursal papillae arranged in 1 + 1 + 1 + 2 + 1 + 2 arrangement.

Key words: Distorhabditis, morphology, new genus, Rhabditidae, taxonomy.

During the screening of the humus samples of Dera Ki Gali forests, district Poonch, Jammu and Kashmir, India, as part of an ongoing project, a very interesting species of family Rhabditidae (Örley, 1880) was isolated. Although resembling *Protorhabditis* (Osche, 1952; Dougherty, 1953), *Curviditis* (Dougherty, 1953; Andrassy, 1983), *Rhabditella* (Cobb, 1929; Chitwood, 1933), *Cruznema* (Artigas, 1927), *Rhabpanus* (Massey, 1971), and *Pelodera* (Schneider, 1866), detailed observation revealed it to be a species that could not be assigned to any of the known genera of Rhabditidae. The objective of this work is to describe and propose the genus *Distorhabditis poonchiana* n. gen., n. sp. to accommodate this species.

Materials and Methods

Samples were processed using modifications of Cobb's (1918) sieving and decantation and Baermann's (1917) funnel techniques. Extracted nematodes were simultaneously killed and fixed in hot fixative agent (4:1) and dehydrated in glycerine—alcohol (5 parts glycerine + 95 parts 30% alcohol). The dehydrated nematodes were mounted in anhydrous glycerine. All diagrams and morphological observations were made on an Olympus BX51 DIC microscope and photographed using an Olympus DP25 digital camera.

Results and Discussion

systematics

Distorhabditis poonchiana n. gen., n. sp.
(Figs. 1,2, Table 1)

Description

Females: Short nematodes, 0.3 to 0.38 mm in length. Body straight to slightly arcuate on fixation, tapering at the extremities more so toward the posterior end. Cuticle finely, transversely annulated and also longitudinally striated and punctuate. Punctations small, dot like. Lateral fields with four lines. Labial region 5.8- to 6.8-μm wide, continuous or slightly setoff from adjoining body. Six lips, symmetrical each with small papilla. Amphidial apertures indistinct. Stoma long, narrow 1.7 to 2.0 lip diameters long. Cheilostom small, cuticularized; gymnostom long with parallel walls; stegostom simple without glottoid apparatus. Pharyngeal collar tissue covering about 22% to 26% of stoma. Procorpus muscular, median bulb well separated 1.3 to 1.5 lip diameters wide. Isthmus cylindrical and muscular. Terminal bulb well developed, 1.5 to 2 lip diameters wide. Corpus 48% to 56% of pharyngeal length. A large glandular body 60- to 63-μm long present in the pharyngeal region. Nerve ring encircling isthmus 52 to 63 μm from anterior end or at 60% to 70% of pharyngeal length. Excretory pore near the basal bulb, 65 to 75 μm from anterior end or at 72% to 82% of pharyngeal length. Cardia small. Intestine with large sized cells and narrow, prominent lumen.

Reproductive system monoprodelphic: Ovary well developed, dorsally reflexed on right side of the intestine, oocytes arranged in two or more rows in germinal zone. Oviduct dilated proximally. Uterus well developed with glandular and muscular parts. Vagina simple, less than half of body diameter long. Vulva a transverse slit, posteriorly situated, V = 84%. Postuterine sac absent. Rectum 12- to 15-μm long or 1.3 to 1.6 anal body diameters long with three rectal glands at its junction with the intestine. Tail short, conoid, 1.6 to 2.2 anal body diameter long. Phasmids not visible.

Males: Body slender, arcuate, curved in posterior region. Morphologically similar to females. Testis single, dorsally reflexed. Spicules curved, free, with trifurcated distal end, 1.1 to 1.4 anal body diameter long. Gubernaculum simple, 44% to 48% of spicule length. Bursa peloderan, open, well developed. Caudal papillae eight pairs, two pairs precloacal and six pairs post cloacal, arranged in 1 + 1 + 1 + 2 + 1 + 2 arrangement. Fifth and eighth pairs of caudal papillae are dorsally curved. Tail short and conoid, 1.6 to 2.2 anal body diameters long.

Type habitat and locality

Collected from litter of forest soil containing decaying leaves and bird droppings, Dera Ki Gali forests, Topa village, Poonch district, Jammu and Kashmir, India.

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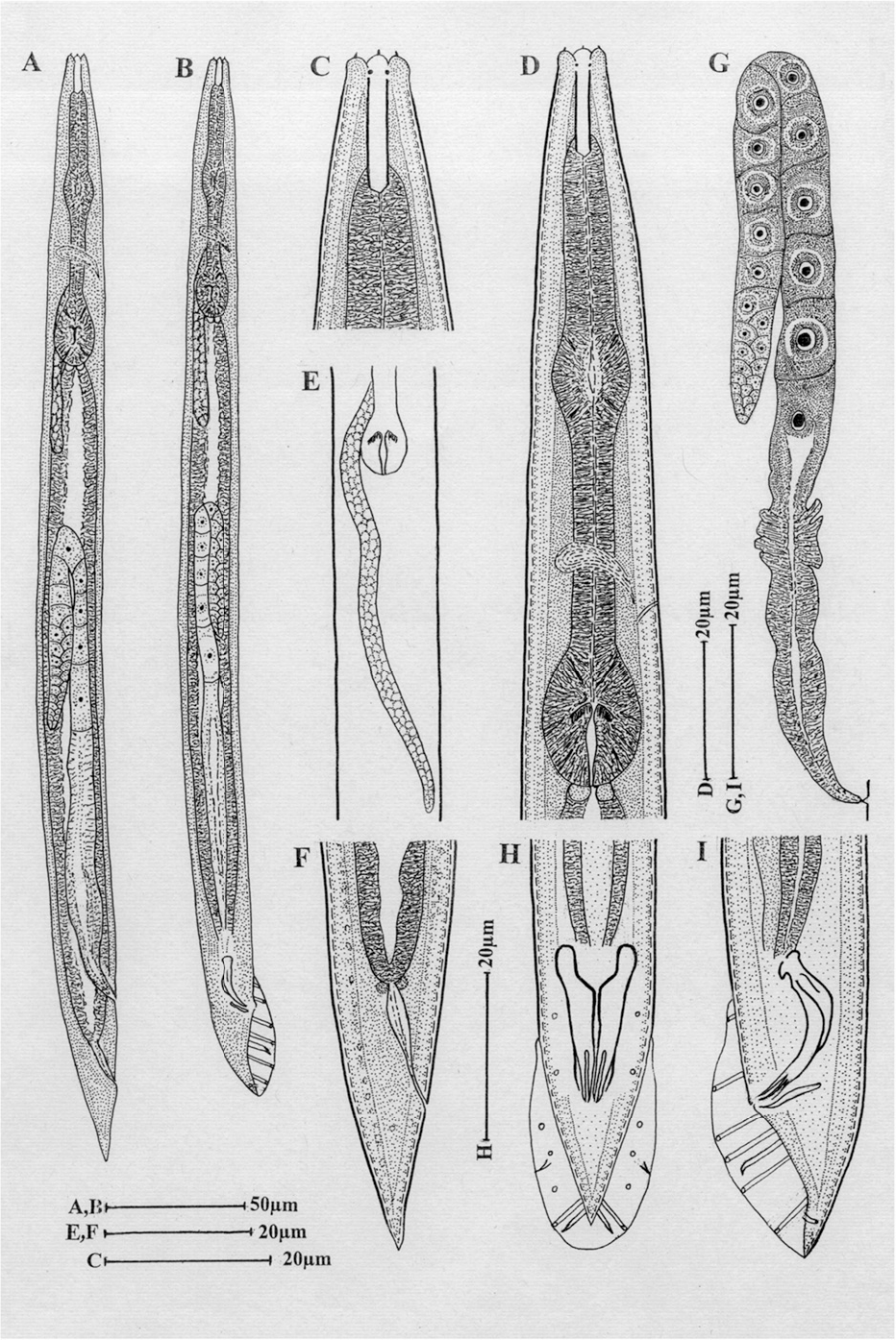

Fig. 1. *Distorhabditis poonchiana* n. gen., n. sp. A. Entire female. B. Entire male. C. Anterior end. D. Pharyngeal region. E. Glandular body in female. F. Female posterior region. G. Female genital tract. H. Male posterior region (dorsoventral). I. Male posterior region (lateral).

Type material

Holotype (female): SLHC (Studies on Lower and Higher Climatic Zones of Poonch district, Jammu and Kashmir State, India) 1 deposited in the nematode collection of the Centre for Biodiversity Studies, School of Biosciences and Biotechnology, Baba Ghulam Shah Badshah University, Rajouri, India.

Paratypes (females and males) on slide: SLHC 2–7 deposited in the nematode collection of the Centre for Biodiversity Studies, School of Biosciences and Biotechnology, Baba Ghulam Shah Badshah University, Rajouri, India. One paratype female at the Instituut voor Dierkunde, Rijksuniversitat, Gent, Belgium.

Etymology

The species name is based on the name of the collection site.

Diagnosis

D. poonchiana n. gen., n. sp. has a small body, cuticle finely annulated and punctated. Labial region continuous or slightly set off from adjoining body. Stoma long and narrow, cheilostom small cuticularized, glottoid apparatus absent. Pharyngeal collar short. A glandular body

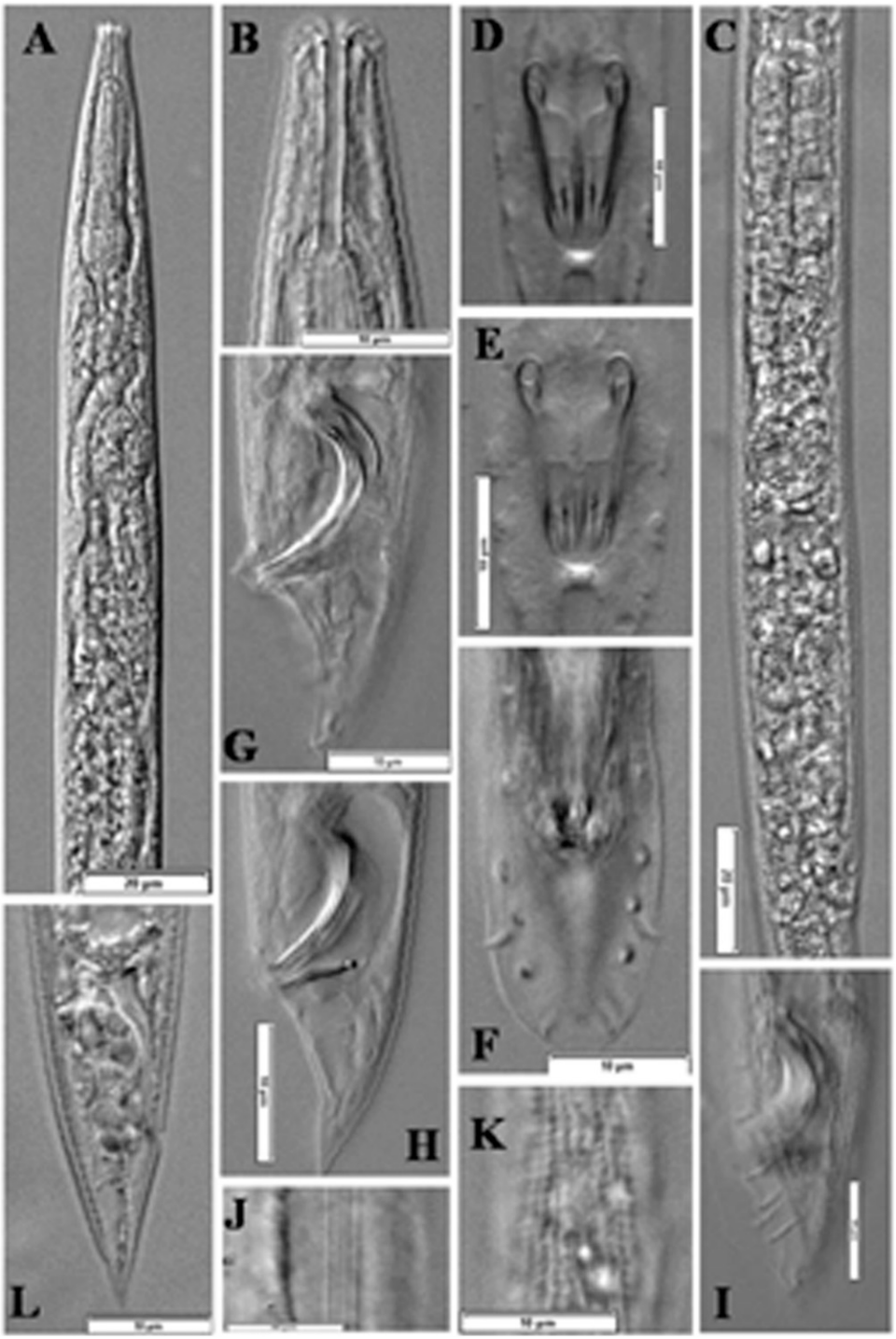

Fig. 2. *Distorhabditis poonchiana* n. gen., n. sp. A. Pharyngeal region. B. Stoma. C. Female genital tract. D–F. Male tail (dorsoventral). G. Mail tail (lateral) showing spicule. H. Male tail (lateral). I. Mail tail (lateral) showing bursa and caudal papillae. J. Lateral lines. K. Cuticle showing punctuations. L. Female posterior region showing rectum.

60- to 63-μm long present in the pharyngeal region. Female reproduction system monoprodelphic. Vulva posteriorly situated, V = 81 to 84. Spicules curved, free, with trifurcated distal end. Gubernaculum simple, 44% to 48% of spicule length. Bursa well developed, peloderan, open. Caudal papillae eight pairs, two pairs precloacal, and six pairs post cloacal, arranged in 1 + 1/1 + 2 + 1 + 2 arrangement. Tail short and conoid.

Etymology

The genus name is derived from the character of spicules, which are distally trifurcated.

Relationships

D. poonchiana n. gen., n. sp. resembles *Protorhabditis* in having small body, long and narrow stoma, short cuticularized cheilostom, absence of glottoid apparatus, free spicules and peloderan bursa. However, *D. poonchiana*

TABLE 1. Morphometrics of *Distorhabditis poonchiana* n. gen., n. sp. (measurements are in micrometers and in the form of mean ± SD (range).

Character	Holotype female	Paratype females (n = 4)	Paratype males (n = 3)
L	386	314 ± 25.4 (283–339)	367 ± 31 (340–390)
A	16.4	17.7 ± 1.5 (16–19)	21 ± 1 (20–22)
B	4	3.6 ± 0.3 (3.3–4.1)	3.5 ± 0.2 (3.3–3.8)
C	20	17.5 ± 2.5 (15–21)	22 ± 2.1 (20–25)
c'	1.6	1.9 ± 0.2 (1.7–2.2)	1.2 ± 0.1 (1.1–1.3)
V	84	82 ± 1.2 (81–84)	–
Maximum body width	28	17 ± 2.1 (14–19)	17.7 ± 1.7 (16–20)
Lip width	7	6.5 ± 0.5 (6–7)	6.5 ± 0.5 (6–7)
Lip height	3	2.5 ± 0.5 (2–3)	2.5 ± 0.5 (2–3)
Length of stoma	12	12 ± 0.7 (11–13)	11.6 ± 0.5 (11–12)
Anterior pharynx	43	43.7 ± 2.9 (40–47)	63 ± 2.3 (62–67)
Posterior pharynx	44	42.5 ± 2.3 (40–45)	42 ± 2.8 (39–45)
Pharynx	87	86 ± 5.1 (80–91)	106 ± 4.5 (102–112)
Excretory pore from anterior end	73	70.4 ± 4.8 (65–75)	-
Nerve ring from anterior end	63	54 ± 1 (53–55)	78 ± 4.5 (73–84)
Median bulb	11	9.2 ± 0.9 (8–10)	10.4 ± 0.5 (10–11)
Isthmus	29	28 ± 1.4 (26–29)	29.5 ± 1 (29–31)
Basal bulb	13	11.21 ± 0.5 (11–12)	10.5 ± 0.5 (10–11)
Anterior gonad	156	117 ± 20.8 (98–146)	-
Post-vulvalar sac	-	-	-
Vulva body diameter	21	15.2 ± 0.9 (14–16)	-
Vulva–anal distance	41	33.2 ± 2.5 (30–36)	-
Rectum	15	13.7 ± 0.5 (13–14)	-
Tail	19	17 ± 2 (15–19)	16.7 ± 1.5 (16–19)
ABD	12	9.4 ± 0.5 (9–10)	14 ± 1.4 (13–16)
Testis	-	-	207 ± 30 (169–229)
Spicule	-	-	17.5 ± 0.5 (17–18)
Gubernaculum	-	-	8.5 ± 0.5 (8–9)
Bursa	-	-	30.5 ± 2.6 (28–34)
Bursal papillae	-	-	8

n. gen., n. sp. can be differentiated from that genus in having monoprodelphic reproductive system, V = 81 to 84, free spicules with trifurcated distal ends and having a long glandular body in pharyngeal region (reproductive system amphidelphic, spicules simple and long glandular body absent in *Protorhabditis*). The new genus also resembles *Cruznema* and *Rhabpanus* in having small cuticularized cheilostom, prodelphic gonads, free spicules, and conoid tail. However, it can be differentiated from these related genera in having continuous or slightly setoff labial region, long narrow stoma, absence of glottoid apparatus, distally trifurcated spicules (labial prominently wider than adjoining body, stoma wide, glottoid apparatus well developed, spicules straight without furcation at distal ends in *Cruznema and Rhabpanus*). The new genus also resembles *Rhabditis (Oscheius) pheropsophi* (Grover et al., 1994) in having trifurcate spicule tip but it can be differentiated from this species in having spicules free, prodelphic gonad and vulva near the anal aperture (spicules fused, didelphic gonads and with a vulva at the mid body in *Rhabditis* (*Oscheius*) *pheropsophi*).

Remarks

D. poonchiana n. gen., n. sp. is clearly distinguishable from the related genera of Mesorhabditinae *Cruznema* and *Rhabpanus* by the continuous or slightly setoff labial region, long and narrow stoma devoid of glottoid apparatus, and the denticles which are characteristics of *Protorhabditid* nematodes. The new genus is unique in having its spicules with trifurcated distal ends, a character not normally reported in Rhabditids. Although a dorsal arm is present in spicules in *Curviditis, Rhabditella, and Metarhabditi* (Tahseen et al., 2004), the trifurcated distal ends of spicules in the new genus clearly distinguish it from these genera. The new genus can further be differentiated from the abovementioned genera of subfamily Rhabditinae (Örley, 1880) by having a long tubular stoma devoid of glottoid apparatus, and by monoprodelphic reproductive system. Peloderan bursa is one of the main characters of subfamily Peloderinae, but the new genus can be clearly differentiated from its genera in having a small body, continuous or slightly setoff labial region, long and narrow stoma devoid of glottoid apparatus, monoprodelphic reproductive system, and in spicules with trifurcate distal ends.

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