DESCRIPTION OF *MONONCHUS INTERMEDIUS* SP. N. (MONONCHIDAE: NEMATODA)

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Summary. A new species of nematode, *Mononchus intermedius*, has been described. It is characterised by medium-sized females with continuous lip region; amalgamated lips; moderate to large buccal cavity; dorsal tooth at 25-30% of buccal cavity from anterior; ventral ridge at the apex or middle level of tooth; vagina without or with weak to moderately cuticularised pieces; cruciform vulva with small cuticularised lips; a long cylindroid tail and absence of males. The species, which has reasonably consistent morphometrics, shows extensive variation in morphological characters.

Keywords: Morphological characters, morphometrics, new species, variations.

The genus *Mononchus*, representing a group of predatory nematodes, has a long taxonomic history. Bastian (1865) proposed the genus and described the species *M. cristatus, M. macrostoma, M. papillatus, M. truncatus* and *M. tunbridgensis.* The genus remained a heterogeneous taxon most of the time. However, with the raising of the genera *Clarkus* Jairajpuri, 1970 and *Coomansus* Jairajpuri *et* Khan, 1977, some species originally placed under *Mononchus* were transferred to the two new genera (Jairajpuri, 1970; Jairajpuri and Khan, 1977). Besides, other workers, Andrássy (1959, 1985, 1993) contributed significantly to the taxonomy of the genus by adding and synonymising species.

So far, species of the genus *Mononchus* have been reported from different parts of the world including all the continents except Antarctica. *Mononchus truncatus* is the most cosmopolitan species, being reported from 39 countries, followed by *M. tunbridgensis* and *M. aquaticus.*

During the screening of samples, an interesting species of *Mononchus* was found and is described hereunder.

MATERIALS AND METHODS

The soil samples had been processed by Cobb's (1918) sieving and decantation and modified Baerman's funnel techniques. The extracted nematodes were heat-killed and fixed in formalin-glycerol fixative, dehydrated by the slow evaporation method (Seinhorst, 1959) and mounted in anhydrous glycerine. The measurements were taken with an ocular micrometer. Drawings were made using a drawing tube while LM photographs were taken with an Olympus digital camera DP-11 mounted on an Olympus BX-51 DIC Trinocular Microscope. For SEM, nematodes were fixed in glutaraldehyde, post-fixed with osmium tetroxide, dehydrated in alcohol series, critical point dried, mounted on stubs and coated with gold before observing under a SEM at 10 kV.

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DESCRIPTION

MONONCHUS INTERMEDIUS **sp. n.**
(Figs 1-4; Table I)

Measurements. See Table I.

Female. Body medium-sized, slightly ventrally arcuate, wider in the middle, tapering slightly at anterior end but sharply at posterior extremity. Cuticle smooth, about 1.5-3 µm thick in different body regions. Lip region continuous with adjoining body, about 3.5-4 times as wide as high. Lips not separated, labial sensilla of outer and inner circlet small, not raised. Amphids cup-shaped, 3 µm across, located 9-13 µm from anterior end, ahead of dorsal tooth. Stoma barrel-shaped, about 2.2-3.2 times as long as wide or 1/7-1/9 of pharyngeal length, with heavily sclerotised vertical and oblique plates; vertical walls consisting of a dorsal tooth-bearing wall and two subventral toothless walls. Dorsal tooth prominent, 4-6 µm in thickness, located at 25-30% of buccal capsule. Subventral transverse ridge fine but distinct, at the level of apex to middle of dorsal tooth. Pharyngeal sleeve surrounding stoma at 1/3-1/4 of its length from base. Pharynx cylindroid, muscular, 24-25% of body length. Body at pharyngeal end 2-2.6 times wider than lip diameter. Pharyngeo-intestinal junction non-tuberculate with cardial flap of variable lengths hanging in intestinal lumen. Intestine with small polygonal cells. Some small cephalobids observed in the

intestine of a few specimens. Rectum about as long as anal body diameter. Reproductive system didelphic amphidelphic with reflexed ovaries. Posterior genital branch usually larger than anterior one. Oocytes arranged in two rows close to distal end followed by single tier proximally. Oviduct with a prominent *pars dilata*. A strong constriction provided with sphincter present between each uterus and *pars dilata*. Uteri large and muscular accommodating usually one egg at a time. Eggs smooth-shelled, ovoid to elongate depending upon their orientation in uterus. Vagina 1/3-1/4 of the corresponding body diameter with very weak to moderately cuticularised pieces, provided with prominent radiating muscle bands. Vulva a cruciform slit surrounded by small cuticularised lips. Vulva-anus distance 2.5-4 times the tail length. Tail cylindroid with slightly wider terminus in some specimens. Spinneret generally terminal in position, obscure in few specimens. Caudal glands well developed, arranged in tandem. Terminal papillae very small or inconspicuous.

Table I. Morphometric data of *Mononchus intermedius* sp. n. Measurements are in µm and in the form: mean ± standard deviation (range).

Character	Holotype ♀	Paratype ♀♀ (No. 8)
L	1500	1476.2±108.6 (1320-1647)
a	26.8	23.9±2.8 (20.5-28.8)
b	4.0	4.3±0.3 (3.8-4.7)
c	8.7	9.3±1.1 (8.7-10.6)
c'	5.3	4.6±0.7 (3.9-5.8)
V	55.4	52.0±1.5 (50.3-55.4)
G_1	16.2	18.8±1.8 (16.2-21.3)
G_2	17.8	24.3±6.9 (17.0-39.6)
Body diameter	52	63.7±10.5 (52-80)
Lip diameter	24	22.7±1.4 (20-26)
Lip height	7	7.1±0.6 (6.0-8.0)
Buccal cavity length	44	39.5±4.4 (36-44)
Buccal cavity diameter	15	14.7±1.2 (13-16)
Pharynx length	375	339.7±20.2 (307-375)
Nerve ring	118	108.4±5.4 (102-120)
Cardia length	15	12.7±2.2 (10-16)
Rectum length	29	28.6±1.7 (25-34)
Tail length	172	159.1±12.1 (145-182)
Anal body diameter	32	35.1±3.5 (30-39)
Vulva-anus distance	496	551.0±61.3 (496-640)
Egg dimension	54×44	59.4±9.1 × 42.5±7.6 (50-78 × 39-53)

Male. Not found.

Type habitat and locality. Soil samples collected from Lakheempur, Assam, India.

Type material. Holotype female, seven paratype females on slide *Mononchus intermedius* sp. n. no S-75/1-4 deposited in the Nematode Collection of the Depart-

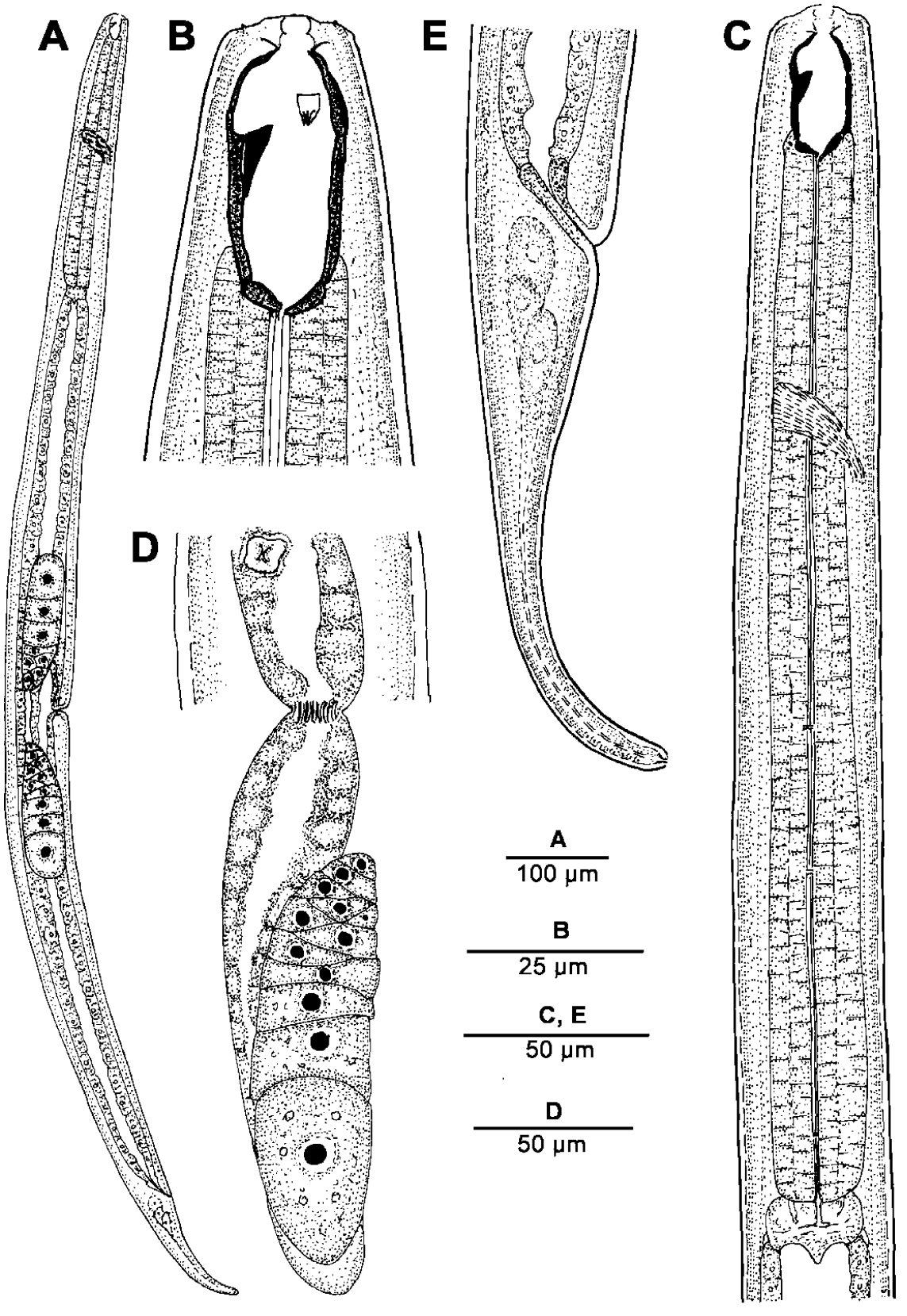

Fig. 1. *Mononchus intermedius* sp. n. A: Entire female; B: Female anterior end; C: Pharyngeal region; D: Female reproductive system (posterior branch); E: Female caudal region.

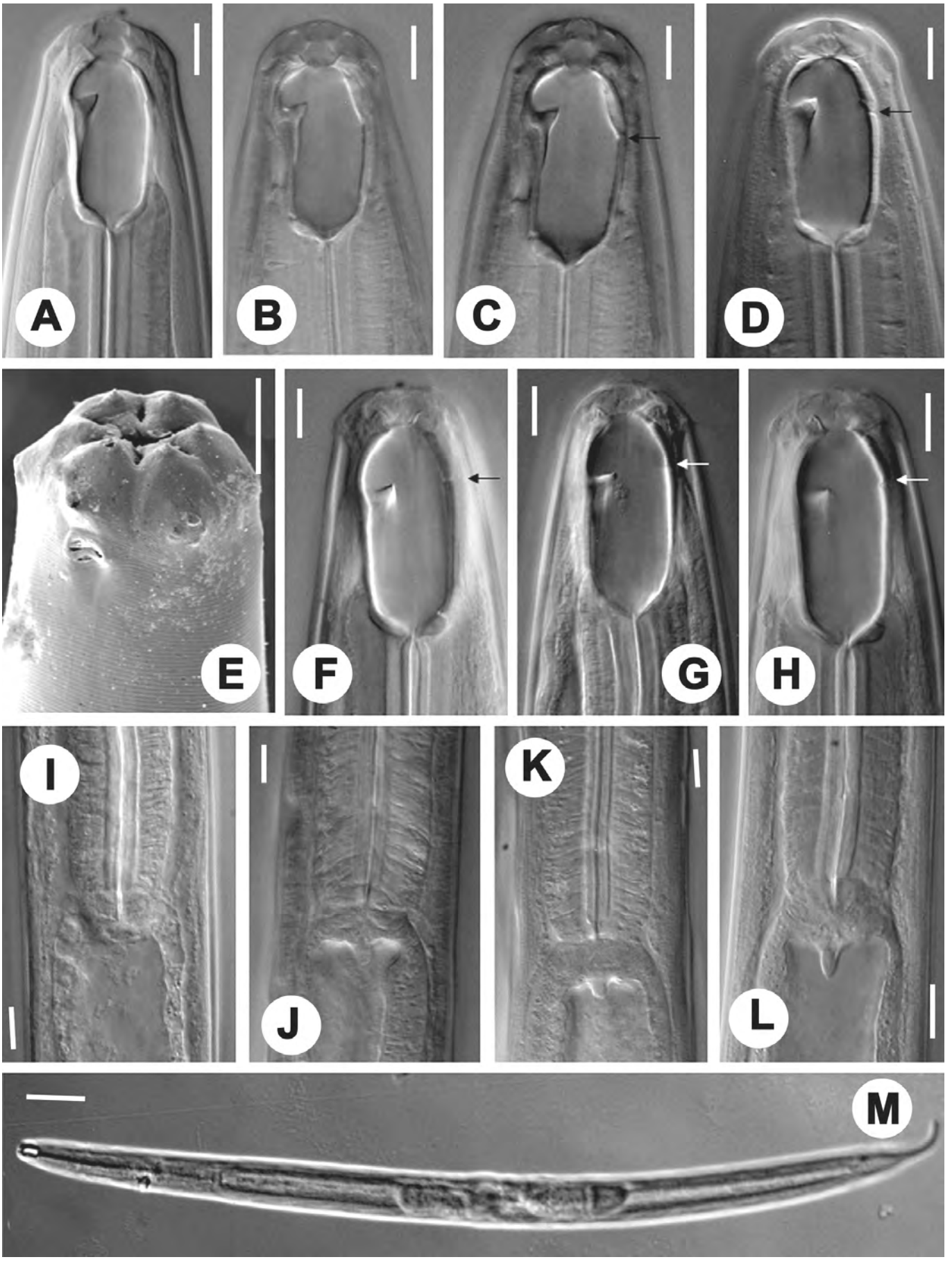

Fig. 2. *M. intermedius* sp. n. A-D, F-H: Anterior end (arrow indicates the subventral ridge); E: Anterior end (SEM); I-L: Pharyngeo-intestinal junction; M: Entire female. (Scale bars A-L = 10 µm; M = 100 µm).

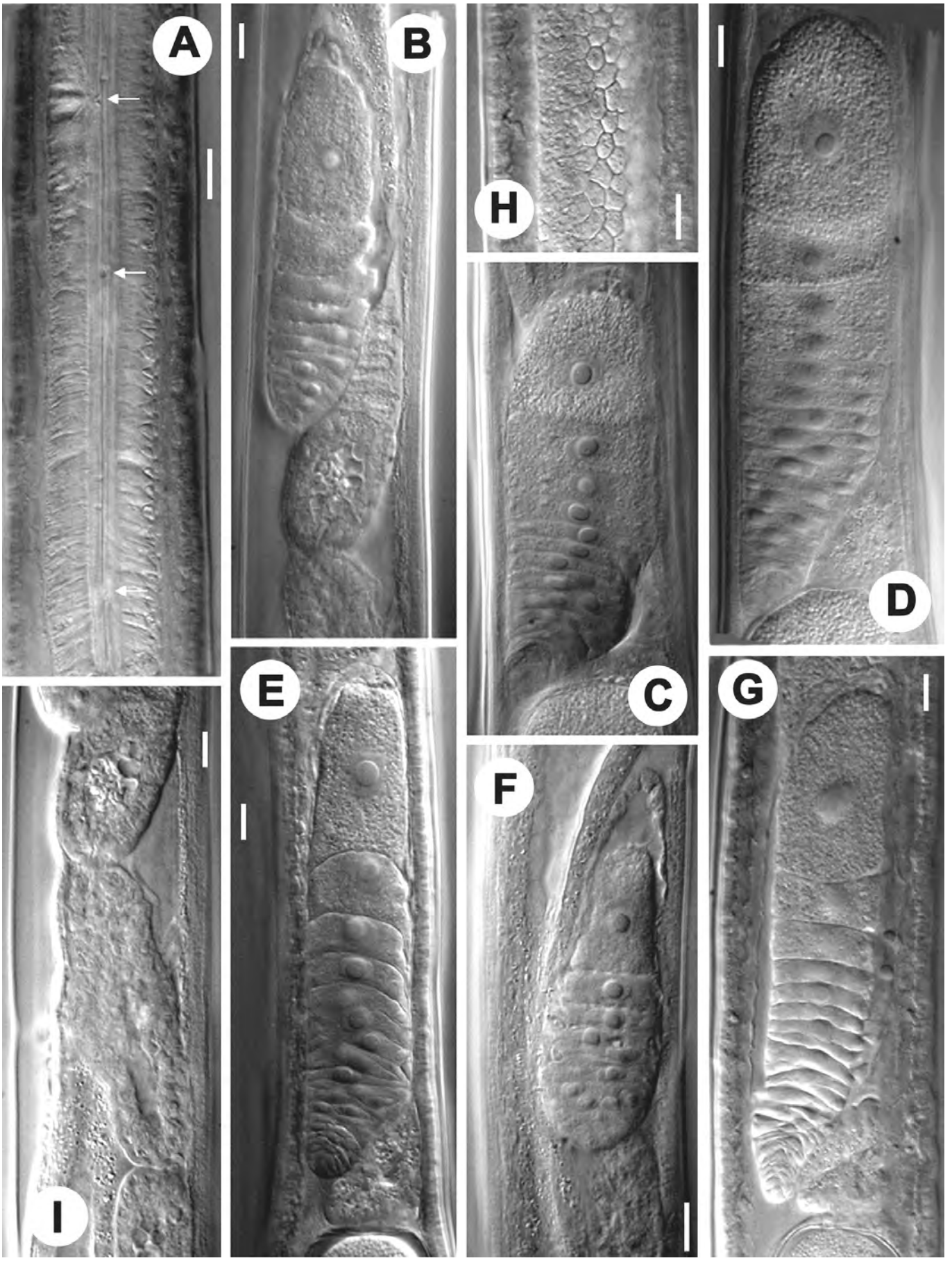

Fig. 3. *Mononchus intermedius* sp. n. A: Posterior pharyngeal region (arrow indicates pharyngeal gland opening); B-G: Anterior genital branch; H: Intestinal region; I: uterine region. (Scale bars = 10 µm).

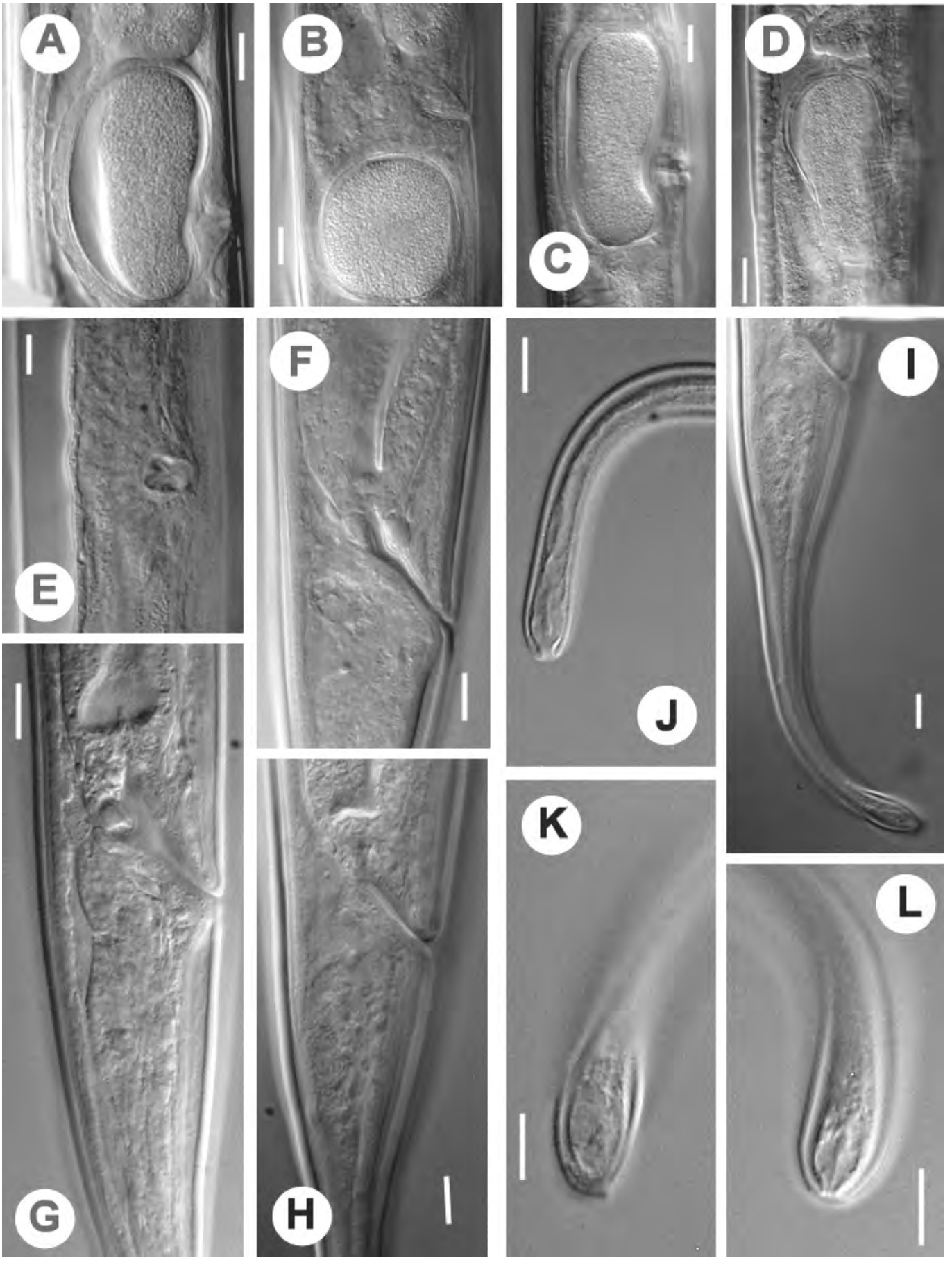

Fig. 4. *Mononchus intermedius* sp. n. A-D: Vulval region (lateral); E: Vulval region (ventral); F-H: Anal body region; I: Tail region (lateral); J-L: Tail terminus. (Scale bars = 10 µm).

ment of Zoology, Aligarh Muslim University, Aligarh, India. One paratype female on slide *Mononchus intermedius* sp. n. no. S-75/5 deposited at the Laboratory of Nematology, Wageningen University and Research Centre (WUR), 6700 ES Wageningen, The Netherlands.

Diagnosis and relationships. Mononchus intermedius sp. n. is characterised by continuous lip region; amalgamated lips; moderate to large buccal cavity; dorsal tooth at 25-30% of buccal cavity from anterior end; ventral ridge at the apex or middle level of tooth; vagina without or with weak to moderately cuticularised pieces; cruciform vulva with small cuticularised lips; a long cylindroid tail and absence of males.

The new species differs from *M. aquaticus* Coetzee, 1968 in having relatively smaller body (1.3-1.6 mm *vs* 1.2-2.0 mm); larger buccal cavity (35-44 µm *vs* 27-31 µm); posterior-placed dorsal tooth (25-30% *vs* 19-23%); variably sclerotised (*vs* conspicuously sclerotised) vaginal pieces; vulval opening cruciform (*vs* transverse) and relatively larger (145-182 µm *vs* 94-160 µm) tail in *M. aquaticus* (Coetzee, 1968).

Mononchus intermedius sp. n. differs from *M. truncatus* Bastian, 1865 in having smaller body (1.3-1.6 mm *vs* 1.6- 2.1 mm), relatively smaller 'a' value (20.5-28.8 *vs* 26-40), greater 'c' value (8.7-10.6 *vs* 6.4-8.6), variably sclerotised (*vs* conspicuously sclerotised) vaginal pieces, vulval opening cruciform (*vs* transverse) and smaller (145-182 µm *vs* 250-280 µm) tail in *M. truncatus*.

Remarks. The population of *M. intermedius* sp. n. was collected from north-eastern India from soil rich in organic matter. The morphometric values were more or less consistent but the nematodes were found to show extensive variation in some morphological characters, thus putting a question mark on the credibility of such characters in species differentiation. However, the characters showed a continuum in the present population, so the doubts about the species heterogeneity were ruled out. The buccal cavity length and the position of the ventral ridge with respect to dorsal tooth were markedly variable. The pharynx length showed relative constancy ranging from 307-375 µm; however, the non-tuberculate pharyngeo-intestinal junction showed a gradation in the extent of development of the flap. The posterior gonad tended to be larger than the anterior one in most specimens; however, the shape and size of ovaries exhibited a great degree of variation. Similarly, the vagina reflected a condition from no sclerotised pieces to weakly or moderately sclerotised ones. The tail length, showing a moderate range of 145-182 µm, exhibited variation in terms of the level of the terminus and positions of the spinneret. Despite the variations, the present population was found to differ markedly from the Indian population (= *M. sinensis)* reported by Soni and Nama (1983) in having smaller 'a' value (20.5-28.8 *vs* 32-38), greater 'c' (8.7-10.6 *vs* 7.2-8.7) and 'V' values (50-55 *vs* 47-50), longer buccal cavity (35-44 µm *vs* 29-33 µm), relatively posterior dorsal tooth (25-30% *vs* 20-23%), smaller ratio of buccal cavity to pharynx (1/7-1/9 *vs* 1/11-1/12), a larger (posterior *vs* anterior) genital branch, variably sclerotised (*vs* no sclerotised) vaginal pieces, vulval opening (cruciform *vs* transverse) and smaller (145-182 µm *vs* 180-205 µm) tail. Andrássy (1993) raised *M. pulcher* to name the specimens earlier presumed to be *truncatus* (*apud* Andrássy 1985). Our population shows marked differences from those specimens in having smaller 'a' value (20.5-28.8 *vs* 35-39), greater 'c' value (8.7-10.6 *vs* 6.0-6.5), relatively longer buccal cavity (35-44 µm *vs* 35-38 µm), smaller ratio of buccal cavity to pharynx (1/7-1/9 *vs* 1/11-1/12), posterior-placed dorsal tooth (25-30% *vs* 20-22%), variably sclerotised (*vs* sclerotised) vaginal pieces, smaller eggs (54-78 × 35-45 µm *vs* 98-100 × 42-44 µm), cruciform (*vs* transverse) vulval opening and smaller (145-182 µm *vs* 186-225 µm) tail.

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