



Description of *Aulolaimus mubarakvilli*, New Species (Nematoda: Aulolaimidae) with Observation on *Heterodorus longidens* from Pakistan

Salma Javed, Saima Majeed, Nasira Kazi and Shahina Fayyaz*

National Nematological Research Centre, University of Karachi, Karachi 75270

ABSTRACT

Aulolaimus mubarakvilli new species is described and illustrated from specimens collected from sediments of Mubarak Village in Karachi, Pakistan. The new species is characterized by a cuticle bearing 20-22 longitudinal ridges, tail conical, tapering evenly to narrow terminus 116-128 μ m long. Cellular body content extending 2/3 of the tail length. *Heterodorus longidens* (Jairajpuri and Loof, 1968) Andrassy, 2009 is reported for the first time from Pakistan is briefly redescribed and illustrated.

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Authors' Contribution

SJ analysis the data and took photographs. SM performed survey and collected samples. NK designed and drafted the manuscript. SF critically reviewed and revised the manuscript.

Key words

Nematodes, *A. mubarakvilli* n. sp., *H. longidens*, New geographic record.

INTRODUCTION

The genus *Aulolaimus* de Man, 1880 currently contains fourteen valid species (Holovachov *et al.*, 2007). From Pakistan only one species is described as *A. rashidae* by Shahina *et al.* (1996). However, the genus *Aulolaimus* was first reported by Shah and Chaudhary (1975) and Gul and Chaudhary (1987), up to the generic level from different hosts and localities of Pakistan (Maqbool and Shahina, 2001). Recently, a new species *Aulolaimus mubarakvilli* collected from sediments of Mubarak Village in Karachi, Sindh, Pakistan is described and illustrated. The genus *Heterodorus* Altherr, 1952 is reported for the first time from Pakistan as *H. longidens* (Jairajpuri and Loof, 1968; Andrassy, 2009).

MATERIALS AND METHODS

Nematodes were isolated from sediments samples collected from Mubarak Village by Cobb's (1918) sieving and decanting method followed by Baermann (1917). Specimens were fixed in 4% formaline, then they were examined in Petri Dish under a binocular microscope and approximately the first 200 nematodes encountered were hand pick and place into a solution of 1.5% glycerol in distilled water. It was slowly dehydrated to anhydrous glycerol at 40°C (Hooper, 1986). Permanent mounts were

made in a tiny drop of pure glycerine and covered with a cover slip sealed by paraffin wax supported by a glass rod. They were later measured and drawn by using ocular micrometer and drawing tube attachment, respectively. For still photography Ds-L2 camera was used.

Aulolaimus mubarakvilli new species (Figs. 1, 2)

Measurements

Holotype female: L= 0.68 mm; a= 32.9; b= 6.0; c= 5.5; c'= 9.6, V%= 50.

Paratype females: (n=4): L= 0.64-0.68 (0.65 \pm 0.01) mm; a= 31.6-32.9 (31.9 \pm 0.72), b= 5.9-6.3 (6.1 \pm 0.15); c= 5.1-5.5 (5.3 \pm 0.16); c'= 9.0-9.6 (9.3 \pm 0.25); V%= 49-50.6 (49.9 \pm 0.57).

Description

Female

Body straight to slightly arcuate upon fixation, sharply narrowing at the anterior and posterior end. Lip region 2.5-3.0 μ m in diameter with constriction appearing slightly offset. Neck region behind head with 8-9 annules, cuticle bearing 20-22 distinct longitudinal ridges equal in size along most of body, starting along anterior part of pharyngeal region and extending towards posterior part of tail. Amphidial aperture a transverse slit, located 2 μ m from anterior end. Pharynx composed of a long narrow cuticularized tube 68-73.6 μ m long and 1-1.6 μ m wide leading into expanded part about 36-40 μ m long. Pharyngeal length 104-114.3 μ m, panduriform basal bulb

* Corresponding author: shahinafayyaz@gmail.com
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comprising 34.6-35.4% of the entire pharyngeal length. Basal bulb 4.1-4.5 times as long as broad with strongly sclerotized lining, with 4 sets of internal cuticularizations. Cardia distinct, glandular 8-10 μm long. Body at posterior end of oesophagus 5.3-6.0 times as wide as head, maximum body width 20-22 μm . Nerve ring encircling the anterior half of basal bulb, 76-80 μm from anterior end. Hemizonid just posterior to nerve ring. Reproductive system didelphic amphidelphic with reflexed ovaries. Vulva oval in ventral view with a small transverse slit, surrounded by a triangular sclerotized pieces laterally. Vagina relatively short with thick cuticularized walls and wing like expansions. Rectum short, 8-10 μm long intestine slightly overlap rectum. Anus distinct with an overhanging anterior lip. Cellular body content extending 2/3 of the tail length. Tail conoid 116-128 μm long, tapering evenly to a finely pointed terminus and 12.8-14 times as long as anal body diameter.

Male

Not found.

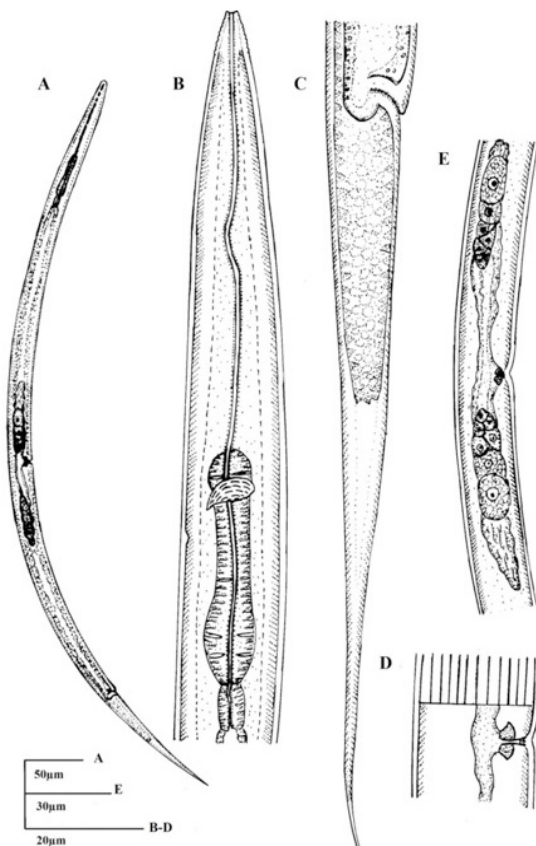


Fig. 1. *Aulolaimus mubarakvilli* new species. Female: A, entire body; B, pharyngeal region; C, tail region; D, longitudinal lines; E, reproductive system.

Type habitat and locality

Specimens were collected from the sediment of Mubarak Village, Karachi, Pakistan.

Type specimens

Holotype female and two paratype females deposited in the National Nematode Collection of National Nematological Research Centre, University of Karachi, Karachi, Pakistan and one paratype female has been deposited in the nematode collection at Nematode Taxonomy Laboratory, 24 Brantwood Road Luton, England, UK.

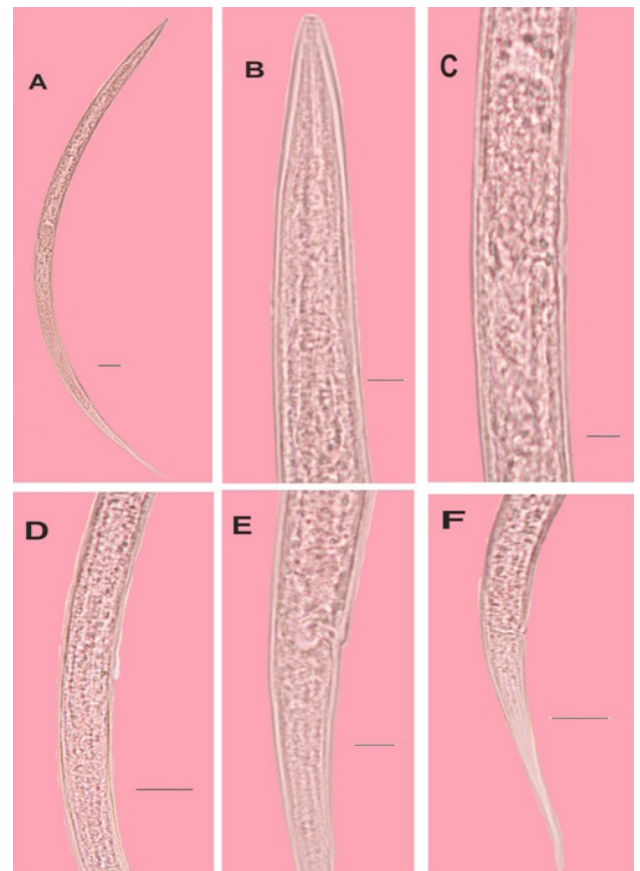


Fig. 2. Light micrographs of *Aulolaimus mubarakvilli* new species. Female: A, entire body; B, pharyngeal region; C-D, vulval region; E, anal region; F, tail region.

Etymology

The name refers to the location of sample Mubarak Village.

Differential diagnosis

Aulolaimus mubarakvilli n. sp. is characterized by a cuticle bearing 20-22 distinct longitudinal ridges, tail

conical, tapering evenly to narrow terminus 116-128 μm long with body content extending 2/3 of the tail length. However, it comes close to *A. mowhiti* (Yeates, 1967) (Jairajpuri and Hooper, 1968) and *A. nanocephalus* (Andrassy, 1972) but differs from the former by smaller body length and b value and by lesser number of longitudinal ridges (in *A. mowhiti*: $L=700-1060\ \mu\text{m}$; $b=6.6-9.03$; longitudinal ridges= 50 vs $L=640-680\ \mu\text{m}$; $b=5.9-6.3$; longitudinal ridges=20-22). It differs from *A. nanocephalus* in smaller body length, lesser number of longitudinal ridges and shorter tail (in *A. nanocephalus* $L=759-962\ \mu\text{m}$; longitudinal ridges= 34-40; tail length= 141-199 μm vs $L=640-680\ \mu\text{m}$; longitudinal ridges = 20-22; tail length= 116-128 μm).

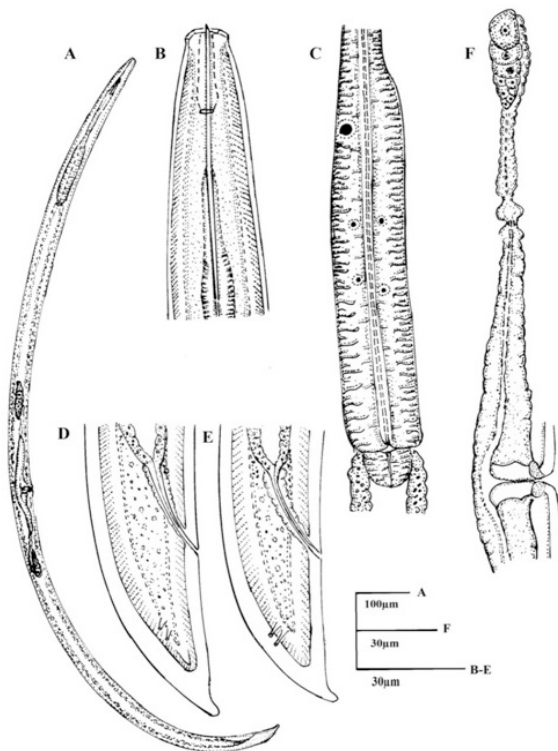


Fig. 3. *Heterodorus longidens*. Female: A, entire body; B, anterior region; C, posterior pharyngeal region; D-E, tail region; F, female gonad.

Heterodorus longidens (Jairajpuri and Loof, 1968) (Andrassy, 2009)
(Figs. 3, 4)

Measurements

Female (n=5): $L=1.6-1.8\ (1.6\pm0.07)\ \text{mm}$; $a=36.4-42.4\ (38.4\pm2.31)$; $b=4.5-5.4\ (5.1\pm0.31)$; $c=36.4-38.7\ (37.5\pm0.75)$; $c'=1.5-1.7\ (1.63\pm0.08)$; $V\%=47-$

$52\ (49.7\pm1.56)$; odontostyle= $42-44\ (42.6\pm0.81)\ \mu\text{m}$; odontophore = $38.4-44.6\ (41.6\pm1.79)\ \mu\text{m}$.

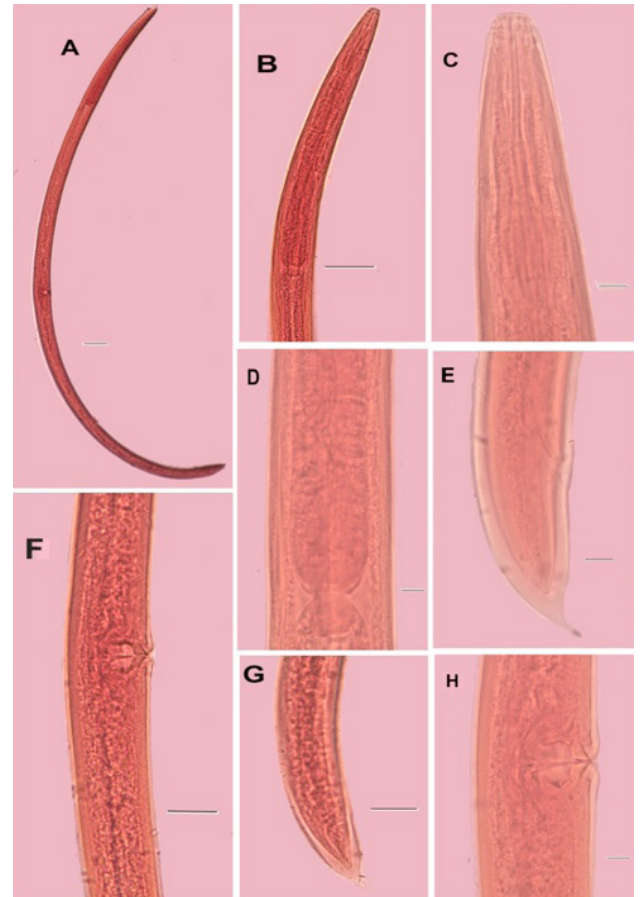


Fig. 4. Light micrographs of *Heterodorus longidens*. Female: A, entire body; B, pharyngeal region; C, anterior region; D, posterior pharyngeal region; E and G, tail region; F and H, vulval region.

Description

Female

Body ventrally curved upon fixation, rarely an open c-shape. Cuticle smooth under light microscopy, subcuticle with very fine transverse striations. Lateral chord 10-12 μm wide one forth to one fifth of body width. Lateral pores obscure. Lip region set off by a shallow depression 2.5-3.0 times as broad as high. Amphids stirrup-shaped opening at level of cephalic depression with aperture more than half as wide as lip region. Odontostyle 3-4 times as long as diameter of lip region, or 2.3-2.6% of total body length. Odontophore 0.8-1.0 times as long as odontostyle, without basal swelling 38-44 μm long. Guiding ring double, thin, located at 2.0-2.4 lip region diameter from anterior end. Pharynx consisting of a slender, well muscular portion

expanding gradually into basal expansion, occupying 116-125 µm or 34-38% of total neck length. Dorsal nucleus located at 71-77% of pharyngeal length or 13-15% of entire length of body. Anterior subventral and posterior subventral nuclei well discerable, smaller to dorsal nucleus located in the middle of glandurium. Cardia rounded, conoid 10-12 µm long. Female genital system amphidelphic, both branches almost equally developed, anterior 155-190 µm, posterior 170-190 µm long, ovaries short, reflexed. Each uterus branch with a proximal wider and a distal narrower part. Uterine egg not observed. Uterine oviduct junction with sphincter. Vulva a transverse oval slit. Vagina more than one half body width deep, extending inwards 54-59% of body diameter with two trapezoid sclerolization. Rectum 1.0-1.3 times and prerectum 2.7-3.8 times the anal body diameter. Tail conoid curved ventrad with rounded tip, 1.5-1.7 anal body diameter long. Two pairs of subterminal caudal pore on each side.

Male

Not found.

Remarks

Specimens of *Heterodorus longidens* (Jairajpuri and Loof, 1968; Andrassy, 2009) were collected from soil around the roots of herbaceous plants and grasses from Saifulmuluk, NWFP, Pakistan. The morphometric and morphological characters correspond with the original description given by these authors.

Statement of conflict of interest

Authors have declared no conflict of interest.

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