

Studies on some Criconematoidea (Nematoda) from Pakistan with a description of *Hemicriconemoides ghaffari* n. sp.

M. A. MAQBOOL

Nematological Research Centre, University of Karachi, Karachi-32, Pakistan.

SUMMARY

During a study of ring and sheathoid nematodes of Pakistan an undescribed species of the genus *Hemicriconemoides* was collected and is described and illustrated herein. *Hemicriconemoides ghaffari* n.sp. is closely related to *H. strictathecatus* Esser, 1960 and *H. mangiferae* Siddiqi, 1981, but is distinguished from these and all the species of this genus by the presence of massive rounded basal knobs which slope backwards. *Criconemella onoensis* (Luc, 1959) Luc & Raski, 1981, *C. curvata* (Raski, 1952) Luc & Raski, 1981, *C. xenoplax* (Raski, 1952) Luc & Raski 1981 and *Hemicriconemoides strictathecatus* Esser, 1960, were found around the roots of fruit plants. These four species are recorded for the first time in Pakistan and measurements of each are given.

RÉSUMÉ

Etude de quelques Criconematoidea (Nematoda) du Pakistan et description d'Hemicriconemoides ghaffari n. sp.

Au cours de l'étude des Criconematoidea du Pakistan une nouvelle espèce du genre *Hemicriconemoides* a été collectée ; elle est décrite ici sous le nom de *H. ghaffari* n. sp. ; cette espèce est proche de *H. strictathecatus* Esser, 1960 et de *H. mangiferae* Siddiqi, 1981, mais se distingue de toutes les espèces décrites du genre par la présence de boutons du stylet massifs, arrondis et dirigés vers l'arrière. *Criconemella onoensis* (Luc, 1959) Luc & Raski, 1981, *C. curvata* (Raski, 1952) Luc & Raski, 1981, *C. xenoplax* (Raski, 1952) Luc & Raski, 1981 et *Hemicriconemoides strictathecatus* Esser, 1960, ont été récoltés dans la rhizosphère d'arbres fruitiers ; les mesures et coefficients de ces quatre espèces, signalées pour la première fois au Pakistan, sont donnés dans l'article.

Within Pakistan little work has been done on Criconematoidea *sensu* Geraert, 1966. Akhtar (1962) reported *Hemicycliophora gracilis* Thorne, 1955 on *Agrostis* species and *Hemicycliophora penetrans* Thorne, 1955 on *Avena sativa* from Lahore. Khan (1971) described *Criconemoides kamaliei* from around roots of *Bougainvillea* in Karachi ; this species was later considered by Luc and Raski (1981) as a minor synonym of *Criconemella bakeri* (Wu, 1965) Luc & Raski, 1981. Saeed and Ashrafi (1973) reported *Criconemella sphaerocephala* (Taylor, 1936) Luc & Raski, 1981 on *Musa sapientum* from Karachi. Hussain and Yasmin (1976) gave brief description of *Hemicriconemoides cocophilus* (Loos, 1949) Chitwood & Birchfield, 1957, *H. mangiferae* Siddiqi, 1961 and *H. gaddi* Loos, 1949.

In a nematode survey carried out during 1978-79, among the various ring and sheathoid nematodes found, *Hemicriconemoides ghaffari* n. sp. was collected

from Muzaffargarh (Punjab) around the roots of Citrus. This new species is described and illustrated below. *Criconemella curvata* (Raski, 1952) Luc & Raski, 1981, *C. onoensis* (Luc, 1959) Luc & Raski, 1981, *C. xenoplax* (Raski, 1952) Luc & Raski, 1981 and *Hemicriconemoides strictathecatus* Esser, 1960 were found around the roots of several fruit plants. These four species are recorded here for the first time in Pakistan.

Materials and methods

Specimens were killed by gentle heat, fixed in TAF for 24 hours, processed to glycerine, by the slow method, and mounted in dehydrated glycerine. Measurements were made by means of a disc micrometer in the microscope eyepiece and drawings were made by camera lucida.

Hemicriconemoides ghaffari n. sp.
(Fig. 1)

MEASUREMENTS

Paratypes (25 females) : L = 0.43-0.46 (0.45) mm ; a = 17.2-18.7 (17.5) ; b = 4.2-4.4 (4.3) ; c = 17.0-18.5 (17.8) ; c' = 1.5-1.7 (1.6) ; V = 94.2-94.5 (94.3) ; V' = 35-39 (37) μ m ; VL/VB = 1.66-1.95 (1.75) ; R = 137-148 (144) ; RV = 13-15 (14) ; R ex = 35-37 (36) ; R an = 9-10 (9) ; R Van = 4-5 (4) ; stylet = 65-73 (69) μ m ; prorhabdion = 47-56 (52) μ m.

Holotype (female) : L = 0.43 mm ; a = 17.6 ; b = 4.2 ; c' = 1.5 ; V = 94.2 ; V' = 36.7 μ m ; VL/VB = 1.78 ; R = 145 ; R an = 9 ; R Van = 4 ; R ex = 35 ; stylet = 72 μ m ; prorhabdion = 53 μ m.

DESCRIPTION

Female : Body cylindrical, robust, tapering at both ends, assuming arcuate shape on killing, covered by cuticular sheath attached to body at anterior end on the second lip annule and at vulva, but well separated from tail in all the paratypes. Lip region not clearly set off, with three annules ; first annule elevated, set off, projecting outwards, 8 μ m wide ; second annule small but slightly larger than first annule ; third annule prominent, 10 μ m wide ; oral disc slightly elevated, rounded at top. Body annules coarse, 3.5-4.0 μ m wide at mid body. Sheath annules flattened and not rounded. Lateral fields absent. Stylet knobs strong massive, rounded and sloping backwards, 6.5 μ m wide and 3.0 μ m high. Prorhabdion protruding 15-17 μ m, outside the oral opening in all paratypes observed. Dorsal oesophageal gland orifice situated 3.5 μ m behind basal knobs. Excretory pore 114-116 μ m from anterior end and 6-7 annules posterior to esophageal base. Oesophagus 94-97 μ m long. Median oesophageal bulb 11 μ m wide. Isthmus narrow, 4.0-4.5 μ m wide at nerve ring. Vulva transverse, located at 13-15 annules from terminus. Anterior vulval lip more prominently elevated than the posterior one. Vulval sheath absent. Spermatheca functional, filled with rounded spermatozoa measuring 2.5-3.0 μ m. Anus at 9th annule. Tail bluntly conoid, with annulation at tail tip.

Male : Unknown.

TYPE MATERIAL

Holotype : Female collected in December, 1979, Slide No. NRC-351, deposited in the National Collection of N.R.C. University of Karachi.

Paratypes : Slide Nos. NRC-352 (20 females) deposited in the National Collection of N.R.C., University of Karachi, Karachi, Pakistan. Slide No. NRC-353 (4 females) also deposited in the USDA Nematode Collection, Nematology Laboratory, Beltsville, Maryland, U.S.A.

TYPE HABITAT AND LOCALITY

Specimens were collected from soil around the roots of *Citrus* sp. from Muzaffargarh, (Punjab), Pakistan.

DIAGNOSIS AND RELATIONSHIP

H. ghaffari n. sp. can easily be distinguished from all other species of the genus by the presence of massive, rounded stylet knobs sloping backwards and the three labial annules. *Hemicriconemoides ghaffari* n. sp. is closely related to *H. strictathecatus* Esser, 1960 and *H. mangiferae* Siddiqi, 1961.

It differs from *H. strictathecatus* in having a smaller body, shorter stylet, three lip annules and bluntly conoid tail with annulation at tip (in *H. strictathecatus* : L = 0.49-0.51 mm, lip annules 2, stylet = 73-83 μ m, tapering tail with smooth tip).

H. ghaffari n. sp. is distinguished from *H. mangiferae* by its more posterior vulva, rounded stylet knobs sloping backwards, lip region with three annules (V = 91-93%, stylet knobs anchor-shaped, lip annules two in *H. mangiferae*).

Criconemella onoensis (Luc, 1959)
Luc & Raski, 1981

In Pakistan specimens of *C. onoensis* have been collected for the first time around the roots of *Citrus* sp. from Sargodha (Punjab) and on pear (*Pyrus communis* L.) from Naushera (N.W.F.P.). Measurements of these specimens conformed closely to those of Luc (1959) and Raski and Golden (1966).

MEASUREMENTS

From Sargodha, Punjab (10 females) : L = 0.44-0.52 (0.47) mm ; a = 11.0-12.6 (11.7) ; b = 4.1-4.5 (4.3) ; c = 18.3-20.6 (19.5) ; V = 92-94 (93) ; R = 121-132 (126) ; RV = 8-10 (9) ; R an = 6-7 ; R Van = 2-4 (3) ; stylet = 55-59 (58.4) μ m ; R ex = 32-36 (34).

From Naushera, N.W.F.P. (6 females) : L = 0.49-0.53 (0.55) mm ; a = 9.0-9.5 (9.5) ; b = 4.2-4.8 (4.5) ; C = 17-18 (17.5) ; V = 92-94 (93) ; R = 121-128 (124) ; R V = 7-9 (8) ; R an = 6-7 ; R Van = 3-4 ; stylet = 55-61 (58) μ m ; R ex = 33-37 (35).

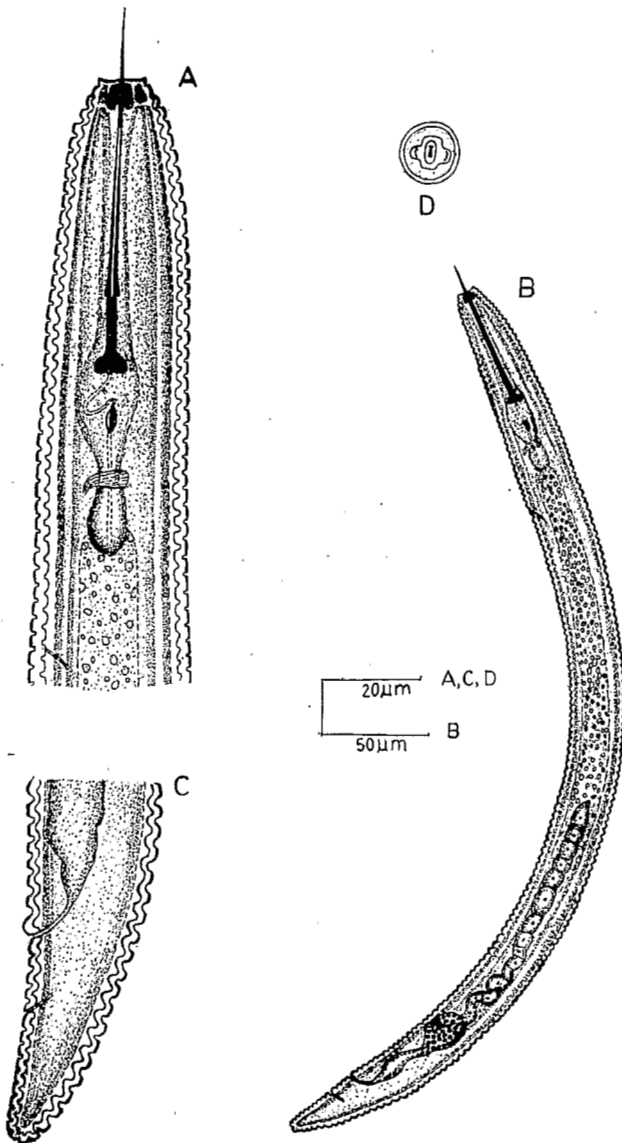


Fig. 1. *Hemicriconemoides ghaffari* n. sp. Female : A : Oesophageal region ; B : Entire female body ; C : Tail, lateral view ; D : En face view.

***Criconemella curvata* (Raski, 1952)**
Luc & Raski, 1981

In Pakistan *C. curvata* is recorded for the first time from around the roots of apple (*Malus sylvestris* L.) and vineyards from Quetta, Baluchistan. Measurements of these specimens as recorded by various authors, including Raski (1952) and Heyns (1970), have been compared with those of the specimens found in Pakistan, which are quite identical with negligible variations.

MEASUREMENTS

(15 females) : L = 0.44-0.55 (0.48) mm ; a = 9.0-9.8 (9.5) ; b = 4.2-5.5 (4.3) ; c = 23.3-24.7 (23.7) ; V = 95.0-95.5 (95) ; R = 92-102 (100) ; R_{ex} = 27-28 ; R V = 6-7 ; R_{an} = 4-5 ; R_{Van} = 1-2 ; VL/VB = 0.89-0.96 (0.90) ; stylet = 61.0-68.0 (65) µm.

***Criconemella xenoplax* (Raski, 1952)**
Luc & Raski, 1981

C. xenoplax is recorded for the first time in Pakistan from around the roots of plum (*Prunus domestica* L.), peach (*Prunus persica* L.) and grape (*Vitis vinifera* L.) from Abbottabad, D.I. Khan and Pishin respectively. Measurements of the specimens collected from all these localities come close to those of Raski (1952), Heyns (1970) and Van Den Berg (1980).

MEASUREMENTS

(10 females) : L = 0.53-0.67 (0.60) mm ; a = 8.2-12.8 (10.5) ; b = 3.5-4.7 (4.2) ; c = 22.6-36.5 (29) ; V = 92-94 (93.5) ; stylet = 60-85 (77) µm ; R = 80-95 (87) ; R V = 6-8 (7) ; R_{an} = 4-6 (5) ; R_{van} = 2-3 ; R_{ex} = 21-26 (24).

Hemicriconemoides strictathecatus
Esser, 1960

From Karachi specimens of *H. strictathecatus* were collected in abundance about the roots of coconut (*Cocos nucifera* L.) The measurements of these specimens closely fit the original description of *H. strictathecatus* by Esser (1960) and Dasgupta, Raski and Van Gundy (1969).

MEASUREMENTS

(12 females) L = 0.48-0.50 (0.49) mm ; a = 17.6-20.4 (19.0) ; b = 4.4-5.2 (4.8) ; c = 17.5-20.2 (18.8) ; V = 91-93 (92) ; V' = 35-43 (39) ; VL/VB = 1.6-2.1 (1.8) ; R = 147-154 (150) ; R_{st} = 15-16 (15) ; R_{oes} = 26-27 (26) ; R_{ex} = 23-24 (24) ; R V = 12-13 (13) ; R_{an} = 9-10 (9) ; R_{Van} = 3 ; stylet = 72-86 (79) µm.

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