Description of three new species of the genus *Ogma* Southern, 1914 (Nematoda : Criconematidae) from Pakistan

Fayyaz SHAHINA and Mohammad A. MAQBOOL

National Nematological Research Centre, University of Karachi, Karachi-75270, Pakistan.

SUMMARY

Specimens of the three new species of the genus *Ogma* i.e. *O. sadabhari* n. sp., and *O. multiannulata* n. sp., *O. qamari* n. sp. were collected from soil around the roots of *Vinca rosea* L. and *Cynodon dactylon* L., respectively, from Karachi in August, and September 1988. They are described and illustrated herein. These three new species can be separated from all the known species of the genus *Ogma* by having greater number of body annuli. *O. sadabhari* n. sp. differs from other species of the genus by having smaller body length, single elevated disc shaped head annule and presence of single irregular lateral line, it differs from *O. multiannulata* n. sp. and *O. qamari* n. sp. by having smaller " b " and " c " value, greater Rst, ROes and Rex. *O. multiannulata* n. sp. differs from *O. qamari* n. sp. by smaller body length and " b " value, greater ROes, number of longitudinal rows of scale and presence of submedian lobes.

RÉSUMÉ

Description de trois nouvelles espèces du genre Ogma *Southern, 1914 (Nematoda : Criconematidae) provenant du Pakistan*

Des individus appartenant à trois nouvelles espèces du genre *Ogma* ont été collectés à Karachi en août et septembre 1988. *O. sadabhari* n. sp. et *O. multiannulata* n. sp. proviennent de la rhizosphère de *Vinca rosea* L. et *O. qamari* n. sp. de celle de *Cynodon dactylon* L. Ces espèces sont décrites et illustrées. Elles se séparent de toutes les autres espèces du genre *Ogma* par un plus grand nombre d'anneaux du corps. *O. sadabhari* n. sp. diffère des autres espèces du genre par sa plus petite taille, un anneau céphalique séparé et en forme de disque et la présence d'une seule ligne latérale; il diffère de *O. multiannulata* n. sp. et *O. qamari* n. sp. par les valeurs plus faibles de " b " et " c ", et plus grandes de Rst, ROes et Rex. *O. multiannulata* n. sp. diffère de *O. qamari* n. sp. par une taille plus faible, un coefficient " b " moins élevé, une valeur plus grande de Roes, le nombre de rangées longitudinales d'écailles et la présence de lobes submédians.

During the recent survey (August and September, 1988) of plant parasitic nematode, undescribed specimens from soil around the roots of ever green plant (*Vinca rosea* L.) and lawn grass (*Cynodon dactylon* L.) were collected from Karachi. These specimens can be placed under the genus *Ogma* Southern, 1914 by the presence of cuticular ornamentation over the entire body and presence of submedian lobes, keeping in view of the characterization of subfamily Criconematinae by Raski and Luc (1987). Since these specimens possess some unusual characters so the diagnosis of the genus *Ogma* is partially emended, to accommodate these specimens. These three species are described and illustrated along with SEM photomicrographs.

Specimens were killed by gentle heat, fixed in TAF and mounted in thin glass slide. The specimens were placed in a very tiny drop of glycerine and covered with 19 mm cover slip supported by paraffin wax. Measurements were taken by an ocular micrometer and illustration were made with the help of a drawing tube. All measurements are in micrometers unless otherwise stated. For SEM study specimens were mounted in glycerine, placed on to a SEM stub with double sided adhesive tape and coated with gold by the conventional method. Observations were made by JSM-T200 Jeol scanning microscope.

Genus *Ogma* Southern, 1914

DIAGNOSIS EMENDED (after Raski & Luc, 1987)

Female : Body length small to rather large (0.215-0.860 mm). Annuli 44-155 with various cuticular ornamentations over the entire body (simple scales or rounded or pointed appendages arranged in 8-18 longitudinal rows); each annule bearing eight palmate lobes with two to six finger-shaped spines arranged alternating with spines on adjacent rows, single spine may appear scattered on annuli; scales or spines arranged in 9-20

(rarely 27) longitudinal lines, many bi-or multilobed (two to seven at tip), or with continuous fringe of scales or spines, bluntly rounded, unipointed, not arranged in rows, 24-90 in number on one annule at midbody. Labial annuli two (exceptionally one discoidal). First annule well set off from next succeeding annules; occasionally separation is not distinct; with or without ornamentation; first usually wider or some time smaller than second but it may be about equal in width; submedian lobes absent or more or less developed when present. Stylet 48-130 µm. Vulva closed or open, on 3rd-19th annules from terminus, anterior lip seldom longer than posterior one. Tail conoid-pointed to bluntly rounded.

Ogma sadabhari n. sp.
(Figs 1, 2)

MEASUREMENTS

Female (paratype; n = 10) : L = 249.6 µm ± 21.03 (215.0-270.0); a = 10.6 ± 1.77 (8.6-12.0); a′ = 13.0 ± 1.88 (11.0-14.6); b = 2.4 ± 0.27 (2.10-2.75); c = 13.4 ± 1.28 (12.0-14.4); c′ = 1.0 ± 0.076 (0.95-1.1); V = 91.6 ± 2.54 (90-93); stylet = 55 µm ± 2.88 (52.0-57.6); R = 148 ± 5.92 (144-154); Rst = 44 ± 4.18 (40-48); ROes = 77 ± 2.80 (75-81); Rex = 67 ± 2.64 (65-70); RV = 11 ± 1.20 (10-12); Ran = 9 ± 0.78 (9-10); RVan = 2 ± .57 (1-2).

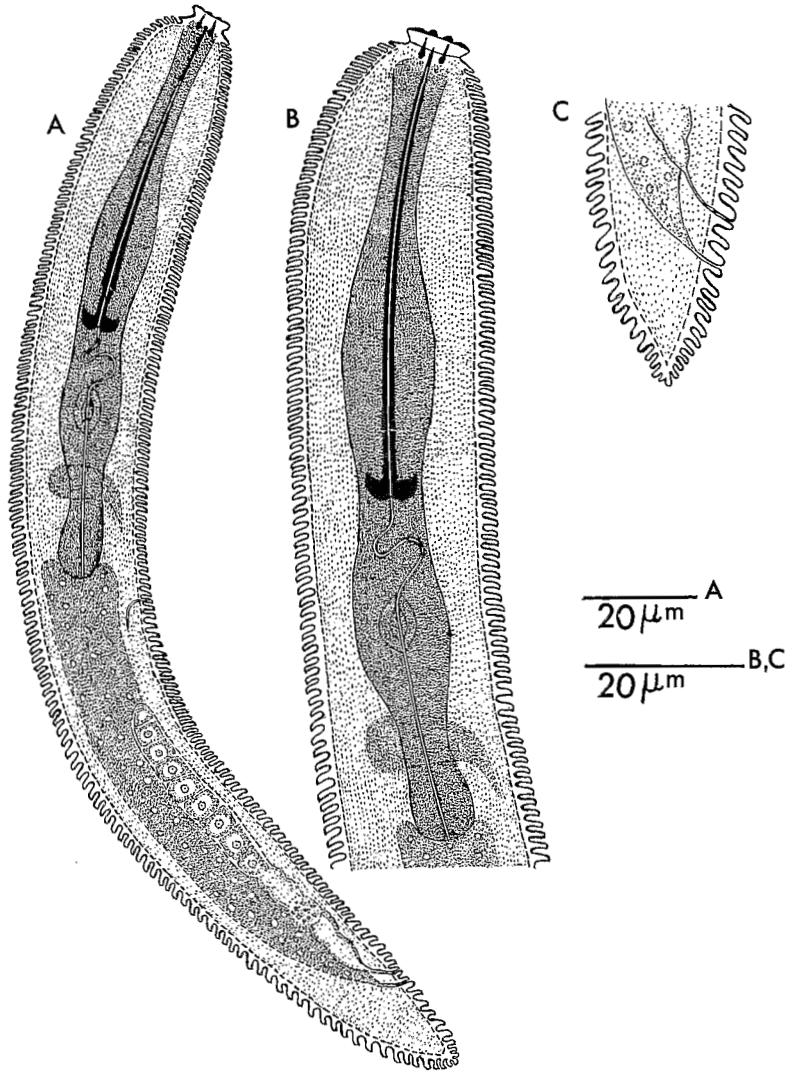

Fig. 1. *Ogma sadabhari* n. sp. A : Whole body; B : Anterior part; C : Tail.

Holotype (female) : L = 251 µm; a = 8.6; a′ = 11.1; b = 2.10; c = 12; c′ = 1.1; V = 90; stylet = 57.5 µm; R = 146; Rst = 47; ROes = 78; Rex = 66; RV = 11; Ran = 9; RVan = 2.

DESCRIPTION

Female : Body almost straight after fixation, narrows gradually to the posterior end. Body annuli 2.0-3.0 µm apart at mid body, slightly retrorse, rounded at the margin, more closely anteriorly; annuli ornamented by scales, each scale very wide as proportion to length, smooth, discontinuous, arranged in 16 separated longitudinal rows. The number of rows decreases towards both ends of body, the appendages remain, however, of the same shape throughout the body. Scales constitute a continuous film-like superficial structure all over the body. Lateral field marked by single irregular line formed by anastomosing of annuli. Head small with single annule, distinctly set off from the body, 7.0 to 7.5 µm in diameter. Head annule with wavy margin and characterized (with SEM) by the large inward protuberance from the head margin. Submedian lobes absent. Behind head annule body expanding rapidly and developed into rounded dome shape structure. Stylet slender, slightly curved, metenchium 85-86 % of stylet length, basal knobs 6-7 µm wide, anchor shaped. Isthmus short, narrow. Esophageal bulb 15.5-16.5 × 7.5-8.5 µm. Excretory pore 102-106 µm from anterior end. Vulva with close lips; gonad usually short postvulval part regularly conical. Anus distinct; last five or six annuli widely separated from each other. Tail with almost rounded terminus.

Male : Unknown.

TYPE HABITAT AND LOCALITY

Specimens collected from soil around the roots of evergreen plants (*Vinca rosea* L.) in September, 1988 from the HEJA Postgraduate Research Institute of Chemistry, University of Karachi, Karachi, Pakistan.

TYPE MATERIAL

Holotype slide No. NNRC 66/10 and *paratype* slide No. NNRC 66/11, 12 (8 females) deposited in the National Nematode Collection of NNRC, University of Karachi, Karachi, Pakistan. Slide No. NNRC 66/13 (2 females) deposited in USDA Nematode Collection, Beltsville, Maryland, USA.

DIAGNOSIS AND RELATIONSHIPS

On the basis of a combination of characters *Ogma sadabhari* n. sp. can be separated from all species of the genus *Ogma* by having smaller body length, much greater number of body annuli, presence of irregular single lateral line formed by anastomosing annuli, single elevated disc shape head annulus carrying wavy margin and large inward protuberances from the head margin.

O. sadabhari n. sp. comes close *O. multiannulata* n. sp. and *O. qamari* n. sp. by the presence of greater number of body annuli, but it differs in lacking the other four characters (as mentioned above). It is further distinguished from *O. multiannulata* n. sp. by having smaller b and c value, greater Rst, ROes and Rex (in *O. multiannulata* n. sp., b = 3.16-3.77; c = 16.8-28.0; Rst = 19-21; ROes = 36-39; Rex = 35-40.) It can be separated from the *O. qamari* n. sp. by its almost straight body shape, smaller, a, b and c values, greater Rst, ROes and Rex (in *O. qamari* n. sp. " c " shape body; a = 14.0-18.0; b = 4.0-5.1; c = 17.2-27.4; Rst = 18-20; ROes = 31-34; Rex = 30-35.)

***Ogma multiannulata* n. sp.**

(Figs 3, 4)

MEASUREMENTS

Female (paratype; n = 15) : L = 334.0 µm ± 11.10 (296.0-386.0); a = 14.59 ± 3.48 (12.12-16.65); a′ = 17.9 ± 2.38 (14.8-21.5); b = 3.37 ± 0.25 (3.16-3.77); c = 24.4 ± 4.38 (16.8-28.0); c′ = 1.1 ± 0.05 (1.04-1.20); V = 94.2 ± 0.70 (93.54-95.34); stylet = 53 µm ± 3.02 (48.0-56.8); R = 143 ± 4.20 (137-149); R st = 20 ± 0.53 (19-21); ROes = 37 ± 1.13 (36-39); Rex = 37 ± 2.02 (35-40); RV = 12 ± 1.01 (11-13); Ran = 9 ± 1.00 (8-11); RVan = 4 ± 0.18 (3-5).

Holotype (female) : L = 321.5 µm; a = 13.5; a′ = 19.0; b = 3.2; c = 24.3; c′ = 1.10; V = 93.0; stylet = 53 µm; R = 145; Rst = 21; ROes = 37; Rex = 38; RV = 11; Ran = 3; RVan = 8.

DESCRIPTION

Female : Body slightly curved, tapering very slightly posteriorly, more so anteriorly in some specimens. Body annuli retrorse, 3-4 µm apart at mid body, marked with longitudinal rows of scales; number of scales 16 on mid body, decreasing gradually in the tail region. Each scale directed backward, smooth blunt and rounded ends in widely separated rows, they are of the same shape on the whole body except the anterior and posterior ends where they are shorter. These scales constitute a continuous film-like superficial structure all over the body. Lateral field not marked, no anastomosis. Head composed of two annuli, the anterior one is 7.8-8.5 µm in diameter, disc-like, slightly narrower than the second annulus; the second 10.0-11.0 µm in diameter. Head framework fairly sclerotized. Submedian lobes moderately developed. Stylet slender, slightly curved; metenchium 84-86 % of stylet length; basal knobs 7.0-7.5 µm wide and anchor-shaped. Isthmus short, narrow. Esophageal bulb

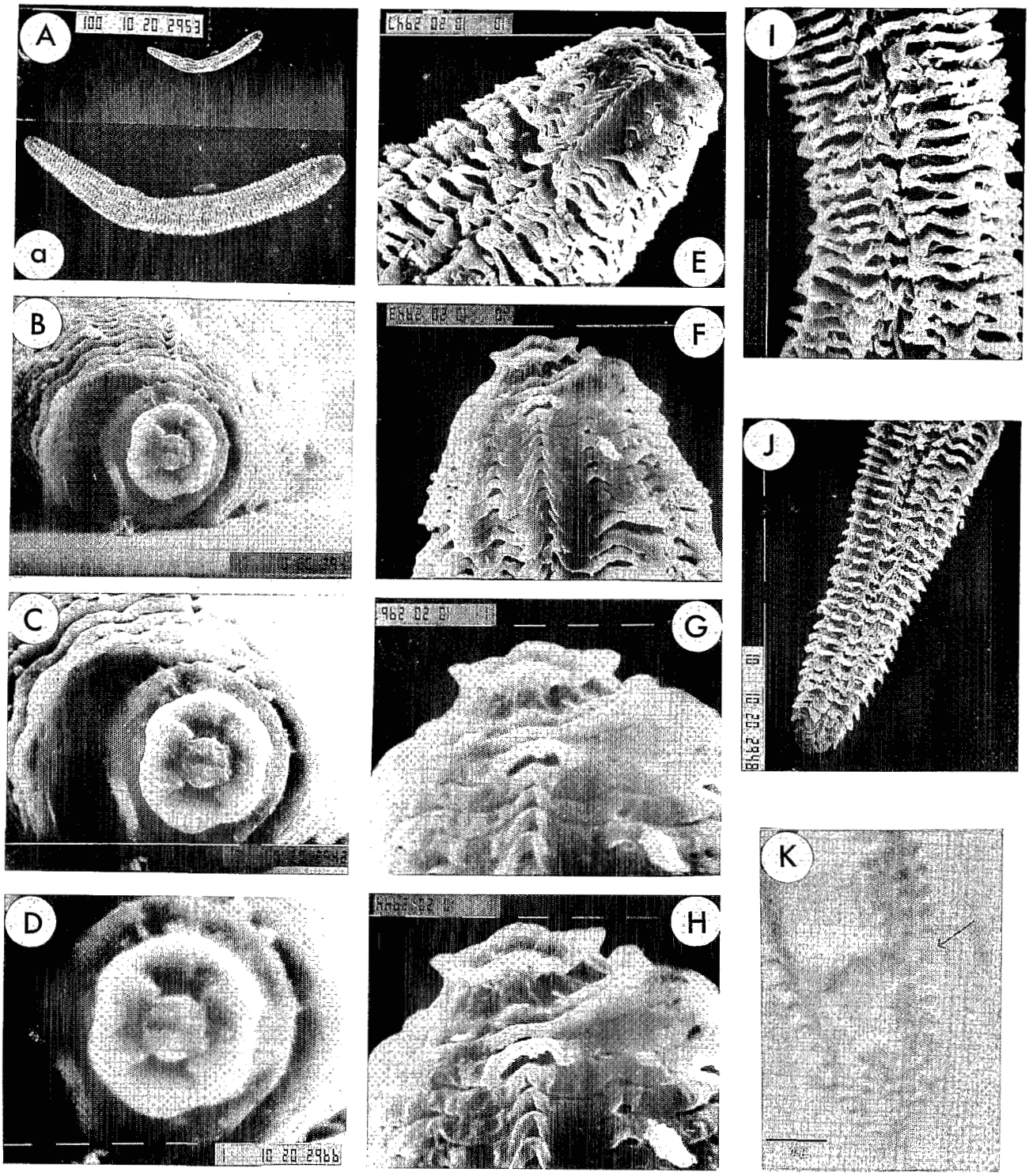

Fig. 2. *Ogma sadabhari* n. sp. A-J : SEM micrographs. A : Entire body; a : Enlargement; B-D : En-face view; E, F : Anterior region; E, G, H : Head annules; I : Scale at mid body; J : Posterior region; K : Photomicrograph, posterior region showing vulva. *(Bar on A-J = 10 µm, on K = 5 µm.)*

19.0-20.0 × 9-10.4 µm. Excretory pore 95-105 µm from anterior end. Vulva closed; ovary outstretched, extending upto one third region of esophagus; oocytes arranged in single file. Anus distinct. Tail tapers uniformly to a conoid terminus.

Male : Unknown.

TYPE HABITAT AND LOCALITY

Specimens collected from soil around the roots of lawn grass (*Cynodon dactylon* L.) in August, 1988 from North Nazimabad, Karachi, Pakistan.

TYPE MATERIAL

Holotype slide No. NNRC 66/16 and *paratype* slide Nos. NNRC 66/17-19 (10 females) deposited in the National Nematode Collection of NNRC, University of Karachi, Karachi, Pakistan. Slide No. NNRC 66/20-21 (4 females) deposited in USDA Nematode Collection, Beltsville, Maryland, USA.

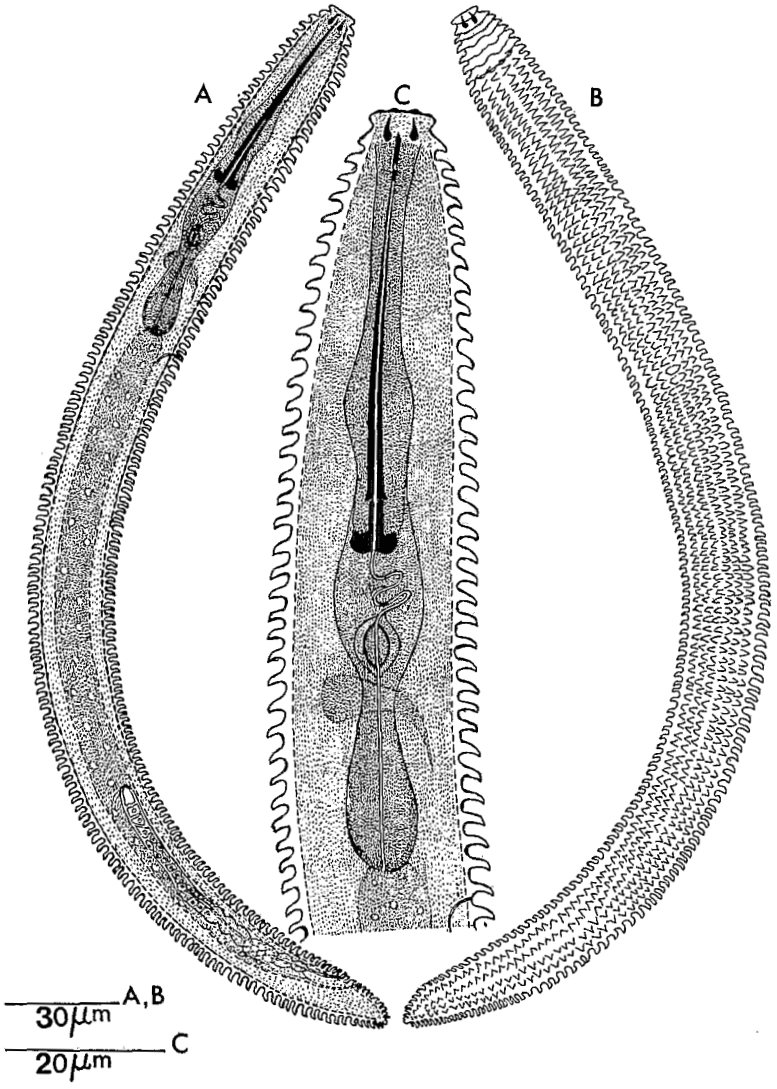

Fig. 3. *Ogma multiannulata* n. sp. A : Entire body; B : Cuticular pattern on entire body; C : Anterior part.

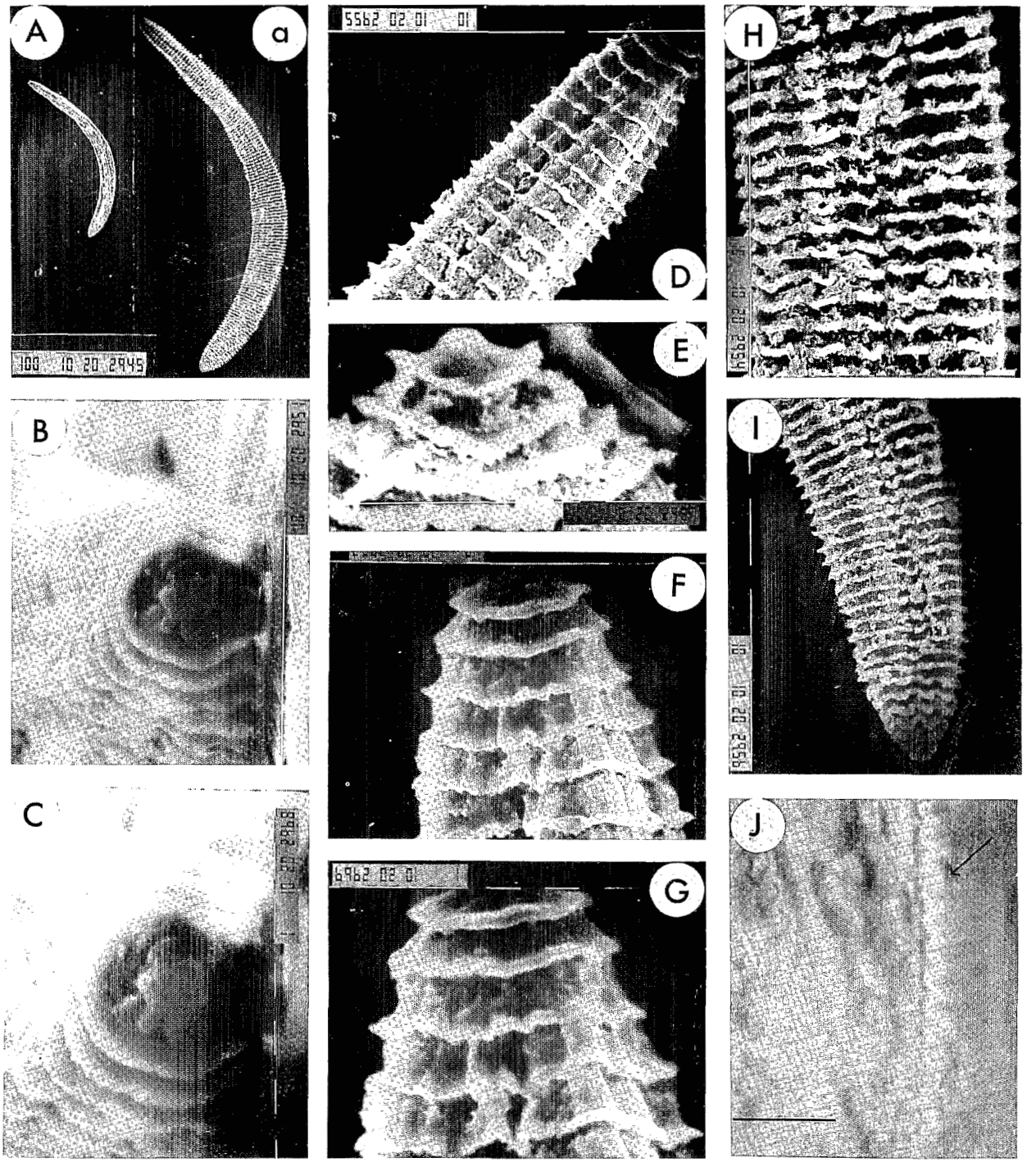

Fig. 4. *Ogma multiannulata* n. sp. A-I : SEM micrographs. A : Entire body; a : Enlargement; B, C : En-face view; D, F, G : Anterior region; E : Head annule; H : Scale at mid body; I : Posterior region; J : Photomicrograph, posterior region showing vulva. *(Bar on A-I = 10 µm, on J = 5 µm.)*

DIAGNOSIS AND RELATIONSHIPS

Ogma multiannulata n. sp. differs from all the known species of the genus but comes close to *O. sadabhari* n. sp. and *O. qamari* n. sp. by having greater number of body annuli, and differs from both these by having submedian lobes and absence of large inward protuberence arising from head margin.

This new species can be separated from *O. qamari* n. sp. by having smaller body length; almost straight body shape; body annuli strongly retrorse; greater number of longitudinal rows of scales; scales slightly elongate posteriorly; moderately developed submedian lobes; smaller " b " value; greater ROes. (In *O. qamari* n. sp. L = 395-477 µm; body " c " shape; body annuli rounded not retrorse; longitudinal rows of scale = 14; scales straight without covering the posterior margin of body annuli; absence of submedian lobes; b = 4.0-5.1; ROes = 31-34.)

Ogma qamari n. sp.

(Figs 5, 6)

MEASUREMENTS

Female (paratype; n = 10) : L = 447 µm ± 28.60 (395.0-477.0); a = 15.3 ± 1.42 (14.0-18.0); a′ = 18.0 ± 1.95 (15.5-21.7); b = 4.34 ± 0.01 (4.0-5.1); c = 22.2 ± 3.59 (17.2-27.4); c′ = 1.3 ± 0.13 (1.14-1.50); V = 93.35 ± 0.48 (92.8-94.0); stylet = 56 µm ± 2.76 (52.0-60.0); R = 144 ± 2.19 (142-148); Rst = 19 ± 1.0 (18-20); ROes = 32 ± 1.20 (31-34); Rex = 32 ± 2.0 (30-35); RV = 12 ± 1.0 (11-13); Ran = 9 ± .01 (9-10); RVan = 3 ± 1.0 (2-4).

Holotype (female) : L = 477 µm; a = 15.7; a′ = 17.5; b = 4.4; c = 17.2; c′ = 1.3; V = 93; stylet = 60 µm; R = 142; Rst = 18; ROes = 31; Rex = 33; RV = 12; Ran = 10; RVan = 2.

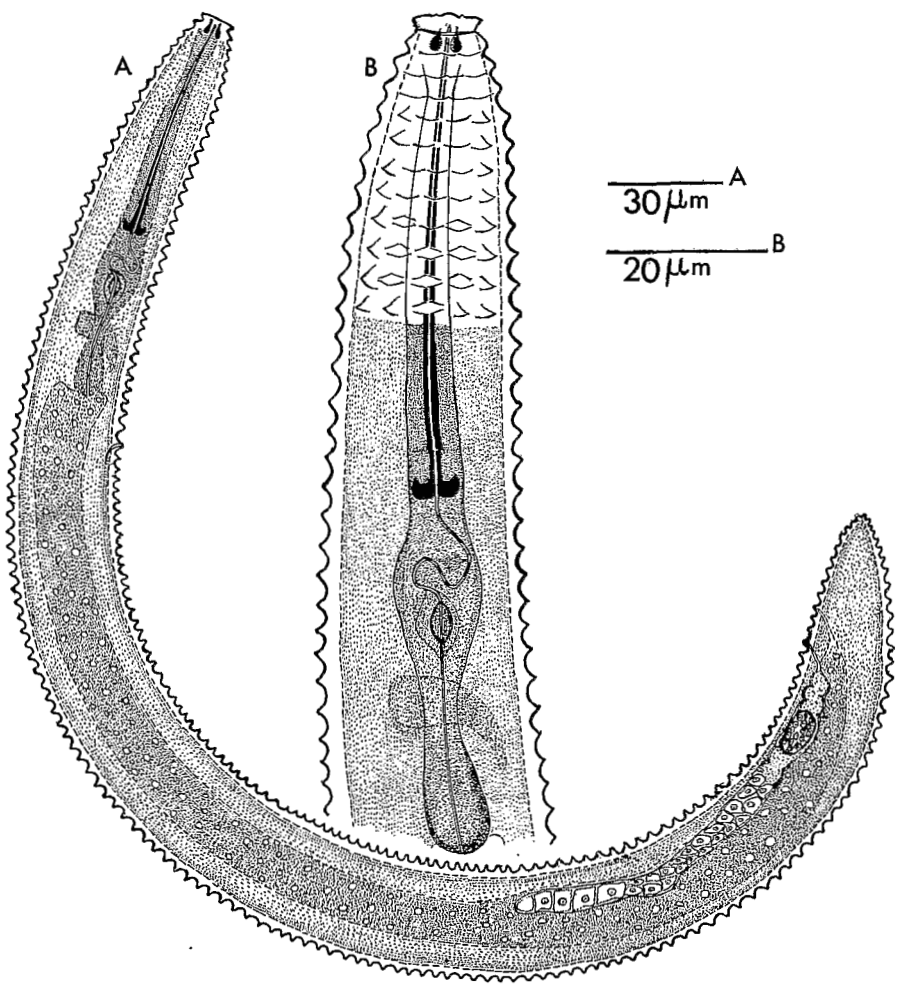

Fig. 5. *Ogma qamari* n. sp. A : Entire body; B : Anterior region.

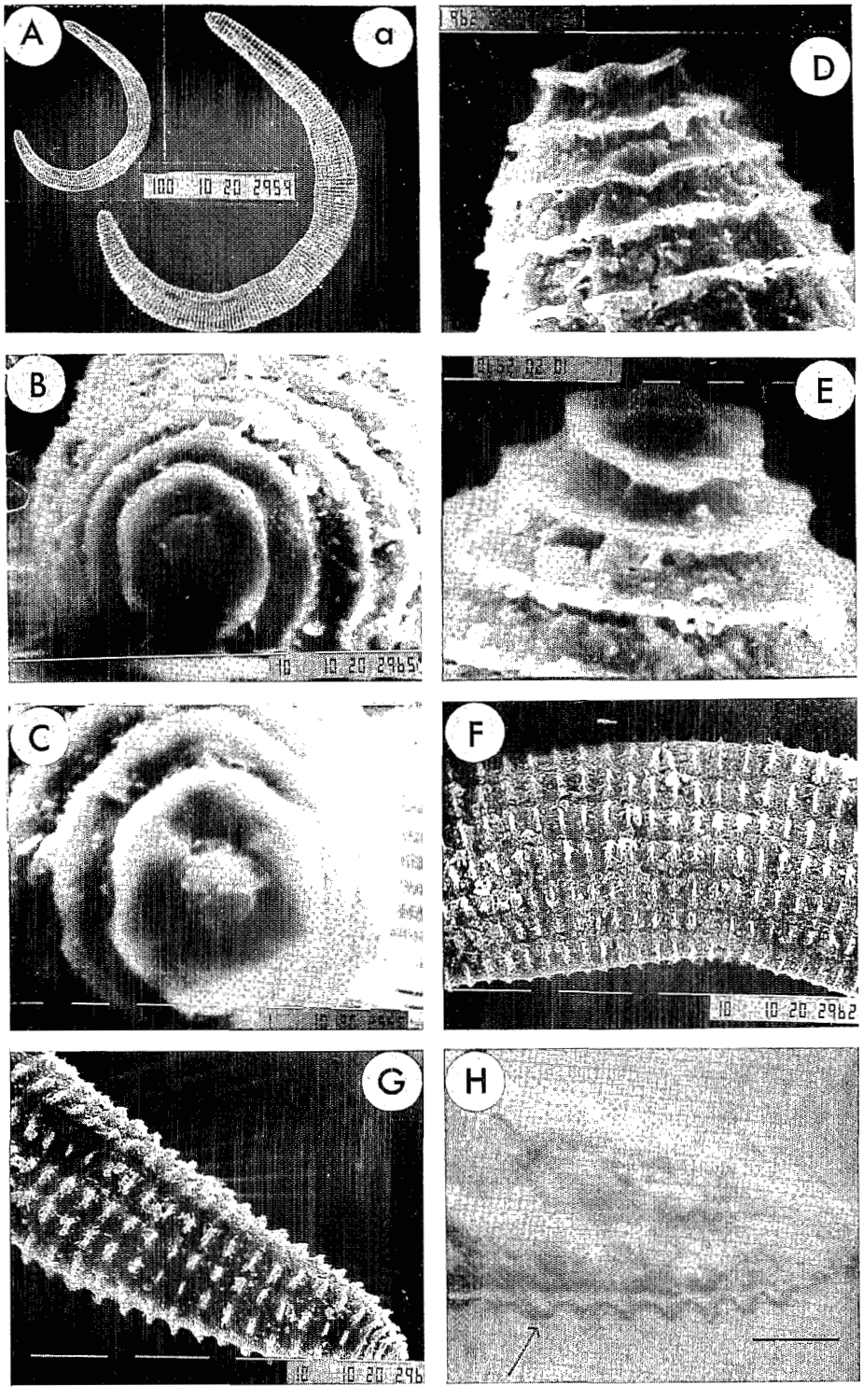

Fig. 6. *Ogma qamari* n. sp. A-G : SEM micrographs. A : Entire body (a : enlargement); B, C : En-face view; D : Anterior region; E : Head annule; F : Scales at mid body; G : Posterior region; H : Photomicrograph. Posterior region showing vulva. *(Bar on A-G = 10 µm on H = 5 µm.)*

Description

Female : Body usually " C " shaped after fixation, body narrows gradually anteriorly. Head region with two annules; first annule smaller, 8.0-8.8 µm diameter, not retrorse; second annule 10.0-11.0 µm in diameter, slightly retrorse and more closely resembles succeeding body annules. Cuticle thick annules not retrorse 4.0-5.0 apart in the middle of body; each of these annules bears fourteen longitudinal rows of scales at its posterior margin, number of these scales per annule decreases anteriorly and posteriorly twelve anteriorly, ten posteriorly annules being without any spination or modification; scales with blunt ends. Head framework fairly sclerotized and characterized (with SEM) by large inward protuberance from the head margin. Submedian lobes absent. Stylet slender, slightly curved; knobs about 6.2-7.0 µm across, anchor shaped. Nerve ring enveloping the isthmus. Excretory pore 102-110 µm from the anterior end. Esophageal bulb 15.0-17.0 × 7.0-8.0 µm. Vulva closed; ovary outstretched anteriorly with oocytes arranged in a single row except a half region in a double row. Spermatheca filled with sperm. Ovary reaching only one third of the posterior end of the esophagus. Anus distinct. Tail slightly conoid.

Male : Unknown.

Type habitat and locality

Specimens collected from soil around the roots of lawn grass (*Cynodon dactylon* L.) in August, 1988 from North Nazimabad, Karachi, Pakistan.

Type material

Holotype slide No. NNRC 66/24 and *paratype* slide No. NNRC 66/25, 26 (7 females) deposited in the National Nematode Collection of NNRC, University of Karachi, Karachi, Pakistan. Slide No. NNRC 66/27 (2 females) deposited in the USDA Nematode Collection, Beltsville, Maryland, USA.

Diagnosis and relationships

Ogma qamari n. sp. differs from all the known species of the genus *Ogma* but comes close to *O. sadabhari* n. sp. and *O. multiannulata* n. sp. by having greater number of body annuli.

O. qamari n. sp. can be distinguished from *O. sadabhari* n. sp. and *O. multiannulata* n. sp. by having greater body length; C shape body; rounded body annuli; lesser number of longitudinal rows of well separated smooth scales, greater " b " value, smaller ROes (for *O. sadabhari* n. sp. and *O. multiannulata* n. sp. see description).

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