

Description of *Rhabdolaimus scleroectum* sp. n. (Nematoda: Rhabdolaimidae) from Aligarh, India

Q. TAHSEEN, M. CHOWDHARY, D. KULSUM, I. AHMAD AND M. S. JAIRAJPURI

Section of Nematology, Department of Zoology, Aligarh Muslim University, Aligarh-202002, India.
E-mail: jairajpurims@lycos.com

Summary.- *Rhabdolaimus scleroectum* sp. n. is described and illustrated (L = 0.47-0.67; a = 24-29; b = 4.7-5.6; c = 3.7-4.1; c' = 6.9-9.0; V = 39-43%). The new species is characterised by its medium-sized body; stoma armed anteriorly with a large claw-shaped dorsal tooth and two smaller conical, sub-ventral teeth; pharynx with pyriform valvate basal bulb; a pair of pseudocoelomocytes posterior to cardia; didelphic genital system with reflexed ovaries; vagina with round sclerotised thickenings; rectum with thick sclerotised posterior lining; and tail with a long and cylindroid terminal spinneret.

Key-words: Description, India, new species, *Rhabdolaimus scleroectum*, taxonomy.

Resumen.- En esta contribución se describe e ilustra *Rhabdolaimus scleroectum* sp. n. (L = 0.47-0.67; a = 24-29; b = 4.7-5.6; c = 3.7-4.1; c' = 6.9-9.0; V = 39-43%). La nueva especie se distingue por su tamaño corporal medio; estoma armado con un diente dorsal anterior grande y con forma de garra, y dos dientes subventrales más pequeños y cónicos; faringe con un bulbo basal piriforme y provisto de valvas; un par de pseudocelomocitos situados más atrás del cardias; sistema genital didélfico con ovarios retroflexos; vagina con ensanchamientos esclerotizados redondeados; recto con un grueso revestimiento interno en su región posterior; y cola provista de una larga espinereta terminal cilindroidea.

Palabras clave: Descripción, India nueva especie, *Rhabdolaimus scleroectum*, taxonomía.

INTRODUCTION

The genus *Rhabdolaimus* De Man, 1880 has a worldwide distribution. Andrásy (1984) placed the genus along with two other genera under the family Rhabdolaimidae Chitwood, 1951. However, Eyualem and Coomans (1996) considered five genera, viz., *Rhabdolaimus* De Man, 1880; *Udonchus* Schneider, 1937; *Rogerus* Hoespli and Chu, 1932, *Sinanema* Andrásy, 1960 and *Tobrilia* Andrásy, 1967 under the family Rhabdolaimidae Chitwood, 1951 *sensu* Lorenzen (1981). *Rhabdolaimus* is represented by six valid species, viz., *R. aquaticus* De Man, 1880, *R. terrestris* De Man, 1880, *R. minor* Cobb, 1914, *R. brachyurus* Meyl, 1954, *R. limnophilus* (Soós, 1937) Andrásy, 1984 and *R. directistomus* Gagarin, 2000. Traunspurger (1989, 1995) emphasized on the similar characteristics of *R. aquaticus* and *R. terrestris* and considered them to be

conspecific. Eyualem and Coomans (1996), however, did not approve the synonymization and gave a detailed morphology of three species *R. aquaticus*, *R. terrestris* and *R. minor* collected from Ethiopia.

MATERIAL AND METHODS

The nematodes were isolated from soil samples using sieving and decantation and modified Baerman's funnel techniques. For light microscopy the nematodes were fixed in 4% formaldehyde solution, processed to anhydrous glycerine by the slow method (Seinhorst, 1962), and mounted in glycerine. All measurements, drawings and morphological observations were made on an Olympus BX51 DIC Microscope.

DESCRIPTION

Rhabdolaimus scleropectum sp. n.

(Figs 1 & 2)

Measurements: See Table I.

Female: Body medium-sized, 0.47-0.67 mm long, ventrally arcuate, tapering at both extremities but more so towards posterior end. Cuticle with two layers, smooth without discernible striations in LM, devoid of somatic setae. Lip region low, 6-7 μ m wide, 2 μ m high, almost continuous with body contour. Lips fused; labial and cephalic sensilla not visible under LM; oral aperture hexagonal with very short radiating arms in *en face* view. Amphidial apertures small, elliptical, about one lip width from anterior end. Cheilostom small and inconspicuous. Rest of stoma tubular with thick cuticularised walls, 25-35 μ m long, 1.5-2.5 μ m wide. A conspicuous claw-shaped dorsal tooth, measuring 1.5-2.0 μ m and two very small triangular subventral teeth located anteriorly. Stoma anisomorphic, with a thickened piece in dorsal wall close to its base. Pharyngeal sleeve surrounds stoma at level of teeth and forms an ellipsoidal swelling at stomal base. Pharyngeal corpus 96-125 μ m long, cylindroid, basal bulb pyriform, valvate, muscular, 14-21 \times 11-15 μ m in dimension. Pharyngeal lumen thick and prominent. Nerve ring at 56-70 μ m from anterior end. Excretory pore not visible. Cardia conoid, 4-6 μ m long. Intestine thin-walled with wide lumen. One pair of pseudocoelomocytes at about 1.5 body diameters from base of pharyngeal bulb. Rectum one anal body-width long, posterior rectal wall thickly sclerotised distally to half its length. Reproductive system amphidelphic, ovaries dorsally reflexed; anterior ovary usually longer than posterior one. Intra-uterine eggs not observed. Vagina one-fourth to one-third of corresponding body diameter in length, with round, thick cuticularised pieces. Vulva a small transverse slit, pre-equatorial. Tail long, tapering gradually, with a 7-10 μ m long, cylindroid terminal spinneret. Caudal glands rarely conspicuous.

Male: Not found.

Diagnosis and relationships: The new species is characterised by having a medium-sized body; stoma armed anteriorly with a large claw-shaped dorsal tooth and two very small conical subventral teeth;

pharynx with pyriform valvate basal bulb; a pair of pseudocoelomocytes posterior to cardia; didelphic genital system with reflexed ovaries, anterior usually longer; vagina with round cuticularised thickenings; rectum with thickly sclerotised posterior lining and a long and cylindroid terminal spinneret.

The new species most closely resembles *R. terrestris* De Man, 1880 in morphometric details but differs in having a smooth, non-striated double layered cuticle; a pair of pseudocoelomocytes posterior to cardia; vagina with rounded conspicuous thickenings; thickened and cuticularised rectal lining; a relatively obtuse, and less tapering terminal spinneret [cuticle finely annulated; pseudocoelomocytes not reported; vagina with elliptical thickenings; rectal lining not thickened or sclerotised; terminal spinneret conical, more tapering in *R. terrestris* De Man, 1880 [apud Andr ssy (1984) and Eyualem and Coomans (1996)].

R. scleropectum sp. n. differs from *R. minor* Cobb, 1914 in having a larger body; smaller ϕ value; having a smooth, cuticle; relatively anteriorly placed amphids; a pair of pseudocoelomocytes posterior to cardia; vagina with cuticularised thickenings and thickened cuticularised rectal lining; tail length less than vulva-anus distance and terminal spinneret visibly distinct from tail end [L = 0.28-0.33 mm; ϕ = 10.0-16.5; cuticle finely annulated; amphids up to 2 lip widths from anterior end; pseudocoelomocytes not reported; vaginal thickenings not reported; rectal lining not thickened or sclerotised; tail as long as the vulva-anus distance and terminal spinneret not markedly distinct from tail end in *R. minor* Cobb, 1914 [apud Andr ssy (1984) and Eyualem and Coomans (1996)].

R. scleropectum sp. n. further differs from *R. aquaticus* De Man, 1880 in having relatively smaller *a* and ϕ values; a pair of pseudocoelomocytes posterior to cardia; thickened, cuticularised rectal lining and a terminal spinneret about 4-5 times longer than wide [a = 26-46; ϕ = 10.0-14.4; pseudocoelomocytes not reported; rectal lining not thickened or sclerotised; a small terminal spinneret about twice longer than wide in *R. aquaticus* De Man, 1880 [apud Andr ssy (1984) and Eyualem and Coomans (1996)].

R. scleropectum sp. n. differs from *R. brachyurus* Meyl, 1954 in having larger ϕ value; a pair of pseudocoelomocytes posterior to cardia; more anteriorly placed vulva; thickened, sclerotised rectal lining and a terminal spinneret, about 4-5 times longer

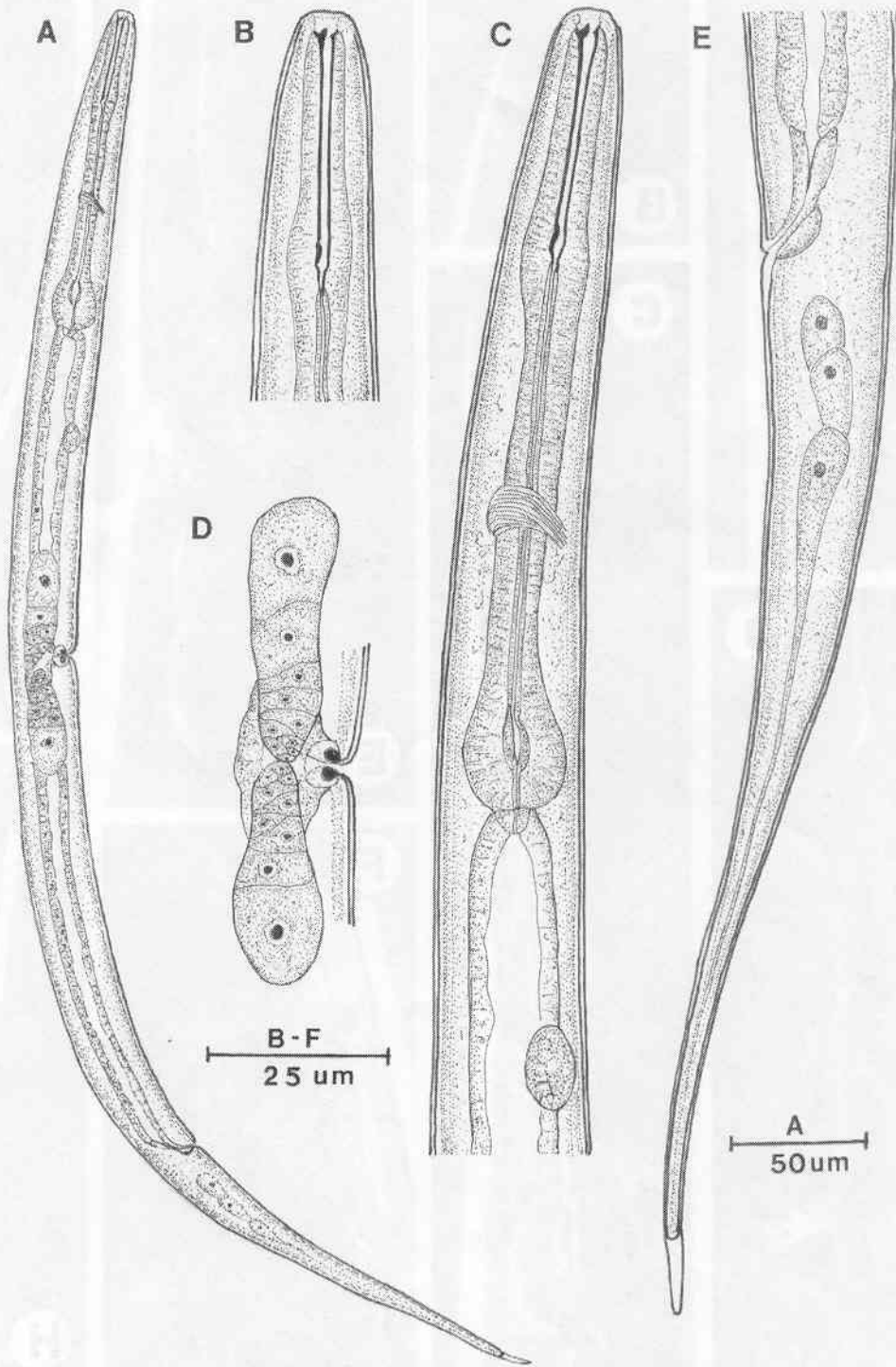


FIGURE 1. *Rhabdolaimus scleroectum* sp. n. A: Entire female. B: Anterior region. C: Pharyngeal region. D: Female reproductive system. E: Female tail.

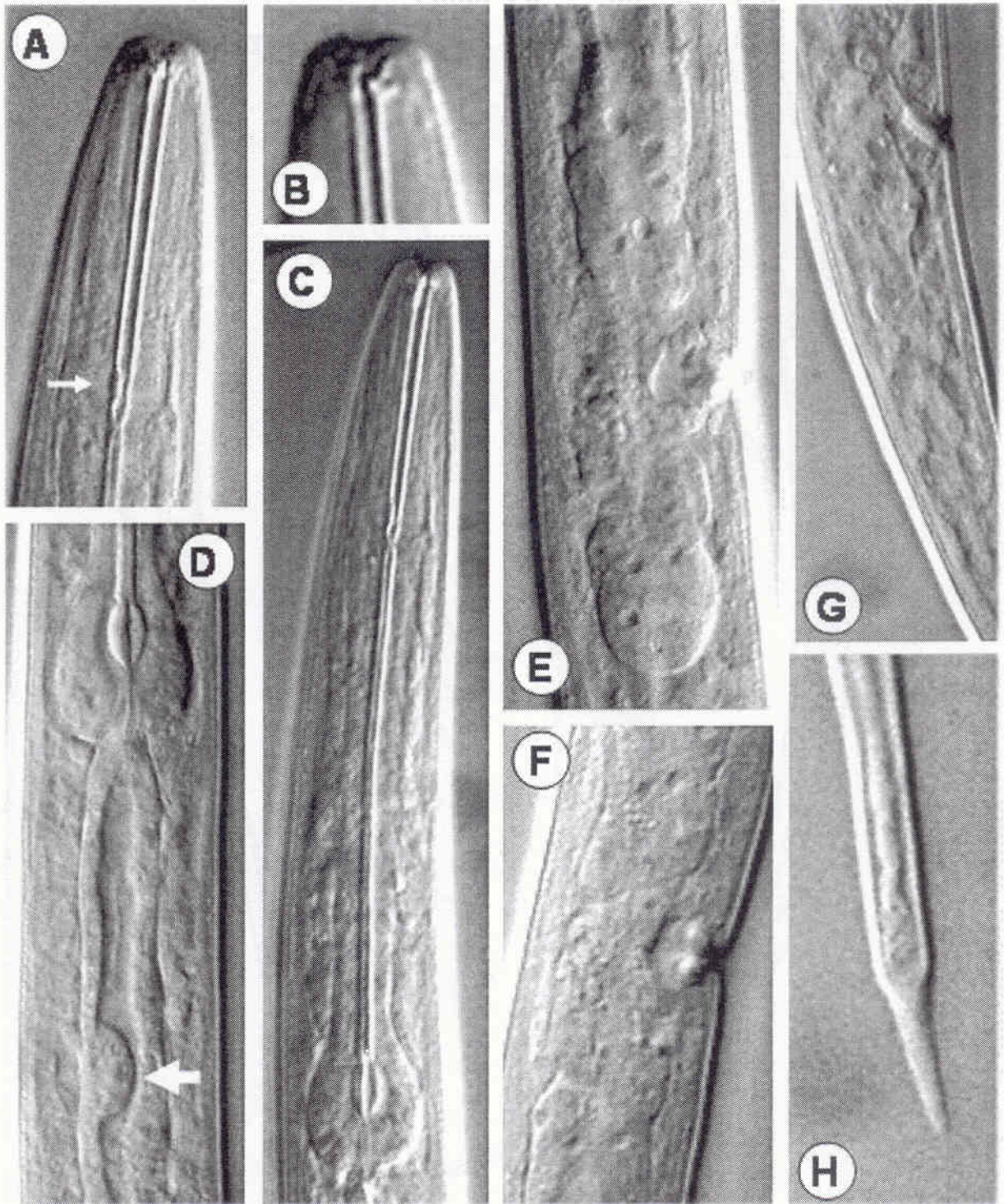


FIGURE 2. *Rhabdolaimum scleroectum* sp. n. A: Anterior region. B: Anterior end. C: Pharyngeal region. D: Pharyngo-intestinal junction with pseudocoelomocyte. E: Female reproductive system. F: Vulval region. G: Anal region. H: Tail terminus.

TABLE I. Measurements (in μm) of *Rhabdolaimus scleroectum* sp. n. [mean \pm SD (range)].

Character	n	Holotype ♀	Paratypes 10 ♀♀
Body length		531	537.87 \pm 58.04(469-665)
Body width		22	20.0 \pm 2.0(18-22)
Stoma length		35	28.4 \pm 3.9(25-35)
Stoma width		1.5	1.7 \pm 0.6(1.5-2.0)
Pharyngeal length		112	110.0 \pm 13.9(96-125)
Nerve ring from anterior end		60	64.5 \pm 7.8(56-70)
Anal body width		17	16.9 \pm 0.9(15-18)
Tail length		136	155.6 \pm 24.5(129-174)
a		24	27.0 \pm 2.8(24-29)
b		4.7	5.05 \pm 0.14(4.7-5.6)
c		3.9	3.85 \pm 0.26(3.67-4.09)
c'		8.0	7.98 \pm 0.78(6.90-9.04)
V (%)		42	40.9 \pm 1.2(39-43)
G ₁		14.8	18.8 \pm 4.5(9-15)
G ₂		10.2	8.4 \pm 1.6(6-11)

than wide [$c' = 5-6$; pseudocoelomocytes not reported; $V = 50-56\%$; rectal lining not thickened or cuticularised; and a short terminal spinneret about twice as long as wide in *R. brachyurus* Meyl, 1954 [apud Andrassy (1984)].

Type habitat and locality: Soil samples from an uncultivated field of Jamalpur locality, Aligarh, India.
Type material: Holotype female and ten female paratypes on slides '*Rhabdolaimus scleroectum* sp. n. / 1-7' deposited in the 'Nematode Collection' of the Department of Zoology, Aligarh Muslim University, Aligarh. Two paratype females on slide '*Rhabdolaimus scleroectum* sp. n. / 8' deposited in the Nematology Laboratory at Wageningen University and Research Center (WUR), 6700 ES Wageningen, The Netherlands.

Remarks: Earlier Ali *et al.* (1971) described *Rogerus rosae* from India, which was synonymised with *R. terrestris* by Andrassy (1984). Our specimens differ from that population in having a double, unstriated cuticle; a smaller c' -value; a pair of pseudocoelomocytes posterior to cardia; thickened, cuticularised rectal lining and a relatively cylindrical

and shorter terminal spinneret (cuticle single with fine striations, $c' = 9-10$; pseudocoelomocytes not reported; rectal lining not thickened or sclerotised, terminal spinneret sharply conical, 11.5 μm long in *Rogerus rosae* (= *Rhabdolaimus terrestris*)).

Key to species of *Rhabdolaimus* De Man, 1880

- 1 - Body length less than 1 mm.....2
- Body length more than 1 mm.....*directistomus*
- 2 - Rectal lining sclerotised.....*scleroectum* sp. n.
- Rectal lining not sclerotised.....3
- 3 - Longitudinal striations present.....
-*limnophilus*
- Longitudinal striations absent.....4
- 4 - Tail 5-6 ABD long.....*brachyurus*
- Tail 9-12 ABD long.....5
- 5 - Spinneret small about two times longer than wide.....
-*aquaticus*
- Spinneret large about four times longer than wide.....6
- 6 - L < 400 μm , amphids 1.2-2.0 labial widths from anterior end.....*minor*
- L > 500 μm , amphids 0.8-1.2 lip widths from anterior end,.....*terrestris*

ACKNOWLEDGEMENTS

We thank Prof. Mohd. Hayat, Chairman, Department of Zoology for the English translation of the description of *Rhabdolaimus directistomus* Gagarin, 2000. The financial assistance granted by the Department of Science and Technology (DST) and Indian National Science Academy (INSA) is also gratefully acknowledged.

REFERENCES

ALL, S. M.; SURYAWANSHI, M. V. & CHISHTY, K. Z. 1971. *Rogerus rosae* sp. n. (Nematoda: Cylindrolaimidae) from Marathwada, India. *Proceedings of helminthological Society of Washington*, **28**: 193-195.

ANDRÁSSY, I. 1960. Beiträge zur Kenntnis der freilebenden Nematoden Chinas. *Annales historico-naturales Musei nationalis Hungarici*, **52**: 201-216.

ANDRÁSSY, I. 1967. Ergebnisse der zoologischen Forschungen von Dr. Z. Kaszab in der Mongolei. 4. Einige Bodennematoden aus den Jahren 1964 und 1965. *Opuscula Zoologica Budapestinensis*, **6**: 203-233.

ANDRÁSSY, I. 1984. Klasse Nematoda (Ordnungen Monhysterida, Desmoscolecida, Araeolaimida, Chromadorida, Rhabditida). Stuttgart. Gustav Fischer Verlag. 509 pp.

CHITWOOD, B. G. 1951. North American marine nematodes. *Texas Journal of Science*, **3**: 617-672.

COBB, N. A. 1914. The North American free living fresh water nematodes. Contributions to a Science of Nematology 2. *Transactions of the American Microscopical Society*, **33**: 69-134.

DE MAN, J. G. 1880. Die einheimischen, frei in der reinen Erde und im süßen Wasser lebenden Nematoden. Vorläufiger Bericht und

descriptiv/systematischer Theil Tijdschrift der Nederlansche Dierkundige Vereeniging, **5**: 1-104.

EYUALEM, E. & COOMANS, A. 1996. Aquatic nematodes from Ethiopia, VII. The family Rhabdolaimidae Chitwood, 1951 sensu Lorenzen, 1981 (Chromadorida: Nematoda) with the description of *Udonchus merhatislebi* sp. n. *Hydrobiologia*, **341**: 197-214.

HOEPLI, R. J. C. & CHU, H. J. 1932. Free living nematodes from hot spring in China and Formosa. *Hong Kong Nature Supplements*, **1**: 15-28.

LORENZEN 1981. Entwurf eines phylogenetischen Systems der freilebenden Nematoden. *Veröffentlichungen Institut für Meeresforschung Bremerhaven, Supplement*, **7**: 472 pp.

GAGARIN, V. G. 2000. First data on nematode fauna in Lake Biwa (Japan). *Ekologiya Vnutrannykh Vod*, **2**: 31-41.

MEYL, A. H. 1954. Die Nematodenfauna höherer Pilze in Lauß und Nadelwäldern zwischen Braunschweig und dem Harz. *Mycopathologia et Mycologia applicata*, **7**: 1-80.

SCHNEIDER, W. 1937. Freilebende Nematoden der Deutschen Limnologischen Sundaexpedition nach Sumatra, Java und Bali. *Archiv für Hydrobiologie Supplements*, **15**: 30-108.

SEINHORST, J.W. 1962. On the killing, fixation and transferring to glycerine of nematodes. *Nematologica*, **4**: 67-69.

SOÓS, A. 1937. *Pseudorhabdolaimus limnophilus* n. gen., n. sp. eine neue, freilebende Nematode. *Zoologischer Anzeiger*, **118**: 323-325.

TRAUNSPURGER, W. 1989. Bemerkungen zu *Rhabdolaimus terrestris* de Man und *Rhabdolaimus aquaticus* de Man (Nematoda, Araeolaimida). *Spixiana*, **11**: 175-176.

TRAUNSPURGER, W. 1995. Autecology of *Rhabdolaimus terrestris* de Man - a dominant freshwater nematode in an oligotrophic lake. *Nematologica*, **41**: 603-616.

Received November 30, 2004

Accepted April 11, 2005