Freshwater nematodes from South Africa. 4. The genus *Monhystera* Bastian, 1865

A.P. Joubert and J. Heyns
Department of Zoology, Rand Afrikaans University

During a survey of freshwater nematodes in South Africa, five species of *Monhystera* Bastian, 1865, were encountered. The five species, three of which are new to science, are described and figured, viz. *Monhystera taaiboschiensis* n.sp., *M. magnacephala* n.sp., *M. gabaza* n.sp., *M. filiformis* Bastian, 1865 and *M. somereni* Allgen, 1952.
S. Afr. J. Zool. 1980, 15: 190 – 197

Vyf spesies van die genus *Monhystera* Bastian, 1865, wat in varswater in Suid-Afrika gevind is, word beskryf en afgebeeld. Drie van die spesies is nuut, nl. *Monhystera taaiboschiensis* n.sp., *M. magnacephala* n.sp. en *M. gabaza* n.sp. Die ander twee spesies is *M. filiformis* Bastian, 1865 en *M. somereni* Allgen, 1952.
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A.P. Joubert and J. Heyns*
Department of Zoology, Rand Afrikaans University,
P.O. Box 524, Johannesburg 2000
*To whom all correspondence should be addressed

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This genus was originally proposed by Bastian in 1865 in a paper in which he described seven species of *Monhystera*. Since then, some 220 nominal species were added, more than half of which were described during the years 1910 to 1940. Many of the older descriptions are inadequate by today's standards. This applies to the 50 or so species described before 1900 but to a large extent also to the 40 species proposed between 1900 and 1920. Moreover, many authors gave widely divergent descriptions for the same nominal species, often doubtless the result of faulty identifications. See for example the measurements given by various authors for *M. filiformis*, as listed in Table 1. This certainly does not make for easy or accurate identifications. Already in 1957 Meyl remarked that '...we do not know very much about the variability of the common diagnostic characters within the genus — such as absolute length, relative measurements, length of cephalic bristles, location of amphids and vulva — it must remain uncertain if all the hitherto described species can be considered valid ones. Those difficulties are increased by the frequent lack of males within the genus and the scarcely prominent characters of the females. A revision of *Monhystera* will become a hard work because of the lacking exactness of former descriptions and figures. Studies on an extensive and homogenous material of the closely related genus *Theristus* gave evidence to the fact that the variability within this group must be greater than we usually believe'. This situation has not improved since.

The first record of *Monhystera* from Southern Africa dates back to 1916 when Micoletzky reported *M. similis* Bütschli, 1873 and *M. vulgaris* De Man, 1880. A year later Steiner (1917) recorded *M. paludicola* De Man, 1880 and a new species which he named *M. bothriolaima*, both from South West Africa. *M. paludicola* was again recorded by Andrássy in 1970. None of these species were recovered during the present survey. The three new species described in this paper all show a close resemblance to *paludicola*, and it was possibly one or more of these which were identified as *paludicola* by Steiner (1917) and Andrássy (1970). The identity of Steiner's *bothriolaima* is uncertain since the description and figures leave some doubt as to whether this actually was a *Monhystera*.

Results and discussion

Slide numbers refer to the collection of the Dept. of Zoology, Rand Afrikaans University, Johannesburg.

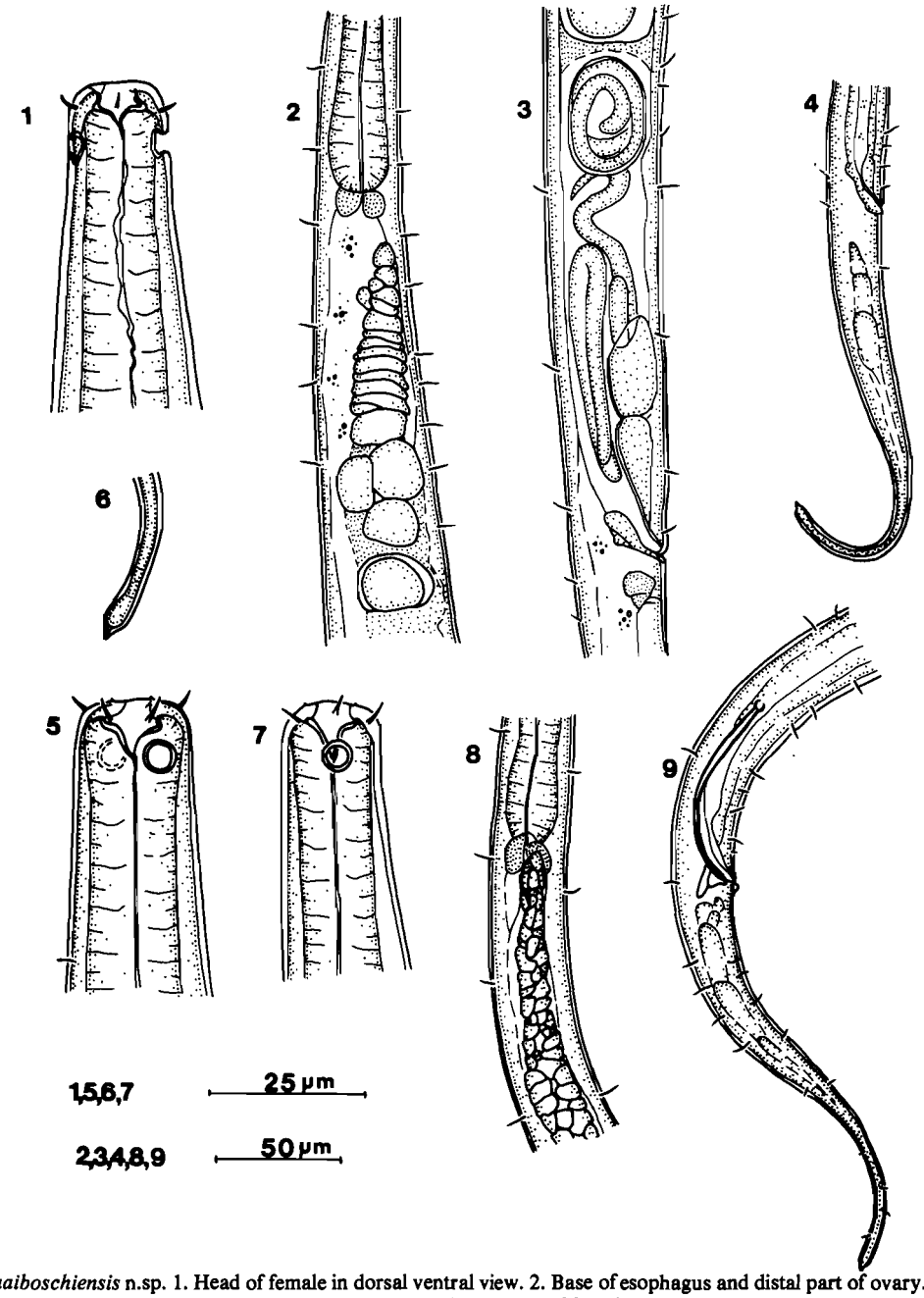

Fig. 1 *Monhystera taaiboschiensis* n.sp. 1. Head of female in dorsal ventral view. 2. Base of esophagus and distal part of ovary. 3. Vulval area showing unborn larvae. 4. Tail of female. 5. Head of female, sublateral view. 6. Tail terminus of female. 7. Head of male, lateral view. 8. Base of esophagus and distal part of testis. 9. Posterior part of body of male.

Measurements were made of specimens fixed in FAA and mounted in glycerine in the conventional way. Distance of amphid from anterior end was measured from the anterior end of the lip region to the anterior end of the amphid.

Monhystera taaiboschiensis n.sp. (Fig. 1)

Measurements

Female (n=10): L=1,13 (0,85–1,30) mm; a=20,9 (16,7–26,8); b=6,4 (5,7–7,3); c=5,7 (5,3–6,2); c'=8,3 (7,7–9,1); tail=200 (156–237) µm; V=64 (63–65)%; egg=30×43 (29–35×42–46) µm.

Female, holotype: L=1,07 mm; a=23,2; b=6,7; c=5,7; c'=8,3; tail=188 µm; V=64%.

Male (n=10): L=0,94 (0,81–1,04) mm; a=23,2 (17,1–28,6); b=6,0 (5,4–6,3); c=5,6 (5,3–5,9); c'=6,7 (6,0–8,3); tail=168 (138–195) µm; spiculum=84 (79–91) µm.

General

Cephalic setae with a mean length of 3,6 (2,5–4,0) µm. Setae unevenly distributed over the length of the body. Head flattened in front but not set off from the rest of the body. Male head 4 µm wider than that of female. Stoma shallow V-shaped, weakly sclerotized, and with small lateral extentions. Amphid with a mean diameter of 4,5 (3,5–5,0) µm. Esophagus cylindrical but widening towards the base. Esophago-intestinal gland cells relatively small and round. Tails in both sexes basally conoid, distally cylindroid.

Female

Head with a mean width of 16,1 (15,0–17,5) µm. Body straight, only slightly ventrally curved, but the distal part of the tail dorsally curved through about 120°. Tip of single outstretched ovary situated about one half body width behind the small inconspicuous esophago-intestinal gland cells. This species is ovoviviparous and in the proximal part of the

uterus larvae can usually be seen that have already hatched. Vaginal muscles insignificant, and with gland cells in the region of the vagina. Posterior to the vagina can be seen a 'cell' of unknown nature and function, similar to that described by Andrássy (1977) in *filiformis*. There seems to be a spinneret on the slightly swollen tip of the tail.

Male

Mean head width 13,0 (12,0–14,5) μm. Body ventrally curved through approximately 120° but with the distal part of the tail slightly dorsally bent. Esophago-intestinal gland cells slightly bigger than those of female, with the tip of the single outstretched testis in the region of the gland cells. Spiculum long and slender and with a distinct manubrium. Gubernaculum consisting of two parts, viz. a triangular ventral part and a short dorsal apophysis. Male tail also terminating in a spinneret-like structure.

Holotype:

Right hand female on slide W647.

Paratypes:

Three females on slides W647 and W648 and one male on slide W654.

Type locality:

In sediment among reeds in Taaiboschspruit near Vereeniging. Leg. J. Heyns, July, 1974.

Distribution and habitat

This species was found in two samples only, both from the Vaal River complex. One was taken in the Taaiboschspruit amongst reeds and the other in deep silt quite far from the bank in Loch Vaal. Both leg. J. Heyns, July, 1974.

Differential diagnosis

This species is fairly similar to *M. pseudomacrura* Khera, 1971 from India, but differs from *pseudomacrura* in the following: the spiculum is shorter, viz. 84 μm compared with 95 μm, the amphid is larger, the apophysis of the gubernaculum is longer, the esophago-intestinal gland cells are smaller and the cephalic setae are shorter, viz. 3,6 μm compared with 6 μm.

This species can also be compared with *M. macramphis* Filipjev, 1930, but differs from it in the longer spiculum, 84 μm compared with only 51 μm in *macramphis*, as well as in the longer and more conspicuous apophysis of the gubernaculum.

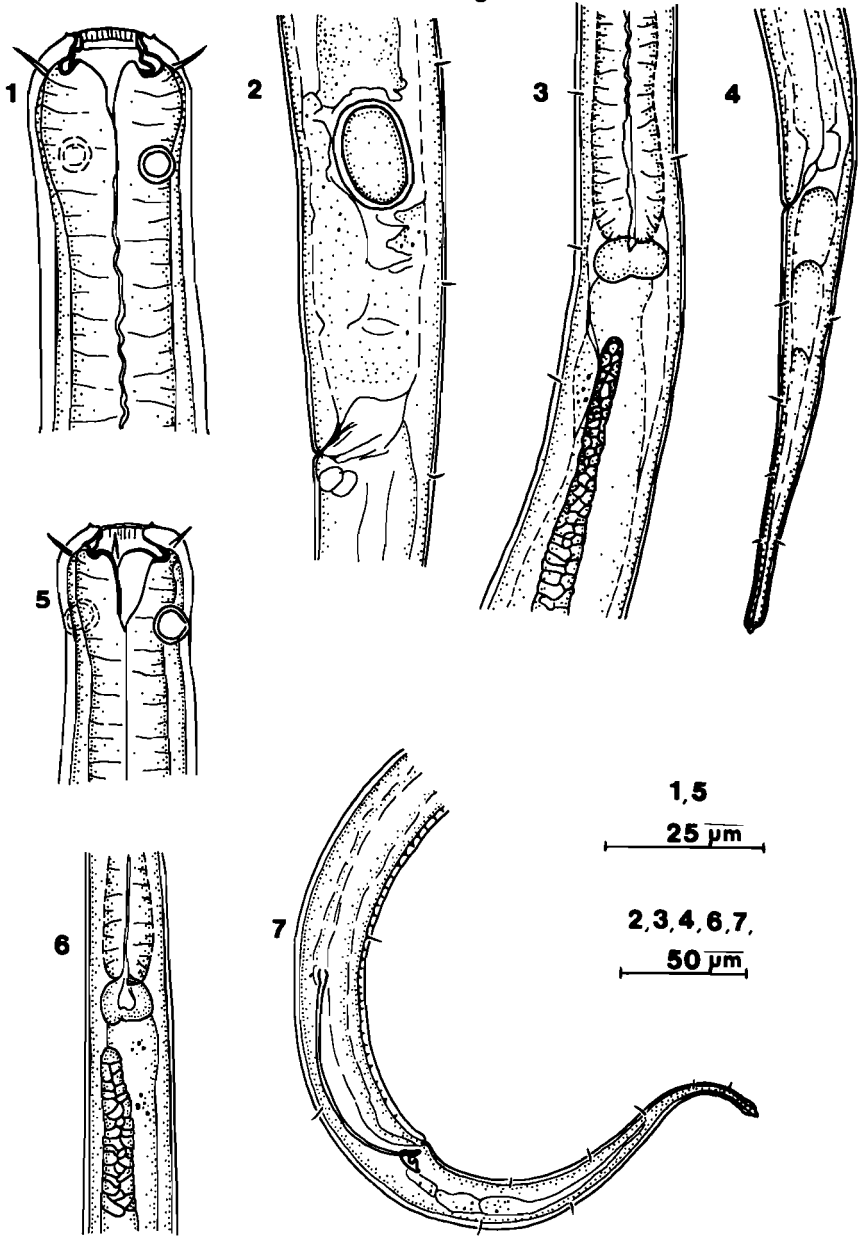

Fig. 2 *Monhystera magnacephala* n.sp. 1. Head of female, sublateral view. 2. Vulva, vagina and uterine egg. 3. Base of esophagus and distal part of ovary. 4. Tail of female. 5. Head of male, sublateral view. 6. Base of esophagus and distal part of testis. 7. Posterior part of body of male.

Finally it can be compared with *M. paludicola* De Man, 1880, from which it differs in the shorter spiculum, 84 μm compared with 145–160 μm, the longer and more conspicuous apophysis of the gubernaculum, and the absence of eyespots.

Monhystera magnacephala n.sp. (Fig. 2)

Measurements

Female (n=10): L=1,16 (0,90–1,32) mm; a=23,6 (18,6–28,9); b=5,4 (4,7–6,0); c=7,1 (6,5–7,9); c'=6,4 (5,6–7,1); tail=164 (138–188) μm; V=68 (67–69) %; cephalic setae=5,9 (4,0–6,5) μm.

Female, holotype: L=1,24 mm; a=19,8; b=5,4; c=7,4; c'=6,4; tail=168 μm; V=69%.

Male (n=7): L=1,18 (1,09–1,37) mm; a=29,3 (24,4–32,4); b=5,7 (5,3–6,2); c=7,5 (7,0–7,8); c'=5,7 (5,1–6,2); tail = 160 (141–176) μm; spiculum = 91 (90–94) μm; cephalic setae = 5,0 (4,0–6,0) μm.

General

Head slightly wider than adjacent body. Cephalic setae relatively long, with a mean length of 5,6 μm. Stoma with a large, strongly sclerotized chamber anterior to the small more weakly sclerotized V-shaped basal part. Amphids opposite, or just posterior to base of stoma. Mean diameter of amphids about 5 μm, slightly larger in male than in female. Esophagus cylindrical except for a slight widening at its base. Tail elongate-conoid, and typically with a distal dorsal curvature in the male. Body setae distributed irregularly over the entire body. With a spinneret-like structure at the tail terminus.

Female

Amphids with a mean diameter of 4,7 (4,0–5,0) μm and situated 15,7 (10,5–18,5) μm from the anterior end. Body relatively straight when relaxed, with only a slight ventral curvature. Esophago-intestinal gland cells of medium size and distal end of ovary approximately one half body width posterior to gland cells. Vulva situated more posterior than in any other South African freshwater *Monhystera*. Vaginal muscles small and inconspicuous. Gland cells clearly visible in tail.

Male

Amphids with a mean diameter of 5,0 (4,5–6,0) μm and situated 14,6 (13,0–16,0) μm from anterior end. When relaxed the body curls ventrally, while the tail terminus curls dorsally. Distal end of testis less than one half body width posterior to the gland cells. Long thin spiculum with manubrium. Gubernaculum with a characteristic shape as shown in Fig. 2.7, and with a ventral hook on the apophysis.

Holotype:

Right hand female on slide W1492.

Paratypes:

Two males on slide W666 and W664 and the left hand female on slide W1492.

Distribution and habitat

This species was found in only two localities, in close proximity in the Vaal River complex. The samples were taken from the deep muddy silt together with rotting plant material from the Vaal River and from deep muddy silt near reeds in the Taaiboschspruit, both points close to Vereeniging. Leg. J. Heyns, July, 1974.

Differential diagnosis

This species can be compared with *M. paludicola* De Man, 1880 and with *M. africana* Andrássy, 1964.

The females of the new species can be distinguished from that of *paludicola* by the following differences: a=23,6 compared with 33,5; b=5,4 compared with 7,2; c=7,1 compared with 4,7 and V=68% compared with 56% in *magnacephala* n.sp. and *paludicola* respectively. Additional differences seen in the male are the shorter spiculum of *magnacephala* n.sp., viz. 90–94 μm compared with 145–160 μm, and the presence of a ventral hook on the gubernaculum.

From *africana* it differs in being more stout, a=24–32 compared with 32–40, and in c=7,0–7,8 compared with 6,0–6,5, showing that the new species has a relatively shorter tail. The amphid of the new species is relatively smaller and lies more posterior than in *africana*. Furthermore, the spiculum is slightly longer than in *africana*, 90–94 μm compared with 80–84 μm.

M. magnacephala n.sp. can be easily distinguished from all other South African species by its broad head which is actually wider than the adjoining body, and by the relatively posterior position of its amphids, which are situated 15 μm from the anterior end.

Monhystera gabaza n.sp. (Fig. 3)

Measurements

Female (n=10): L=0,91 (0,71–1,00) mm; a=24,3 (20,1–29,7); b=6,0 (5,5–6,6); c=5,8 (4,9–6,3); c'=7,9 (6,8–9,0); tail=156 (129–174) μm; V=62 (60–64)%; cephalic setae=2,2 (2,0–2,5) μm.

Female holotype: L=0,91 mm; a=23,3; b=5,8; c=5,8; c'=7,9; tail=157 μm; V=60%.

Male (n=3): L=0,75 (0,74–0,77) mm; a=21,2 (16,5–27,2); b=5,85 (5,8–5,9); c=6,4 (6,0–7,0); c'=5,7 (4,3–6,5): tail = 117 (106–125) μm; spiculum = 70 (60–80) μm; cephalic setae = 2,5 (2,0–3,0) μm.

General

Anterior end flatly rounded and lips very slightly offset from body. Cephalic setae short, 2,3 μm, but slightly longer in male than in female. Stoma V-shaped and weakly sclerotized. Amphid situated far anteriorly, viz. 5,0–6,0 μm from the front end. Esophagus cylindrical with the base slightly swollen. Esophago-intestinal gland cells relatively small and rounded. Tail conical and somewhat elongate. Body seta scarce.

Female

Amphids with a mean diameter of 3,4 (3,0–3,5) μm and situated about 5,1 (4,0–6,0) from anterior end. Distal end of ovary about two body diameters posterior to gland cells. Vaginal muscles small and insignificant. Rectal muscles slightly better developed. Slender distal third of the tail dorsally curved, often through 360°.

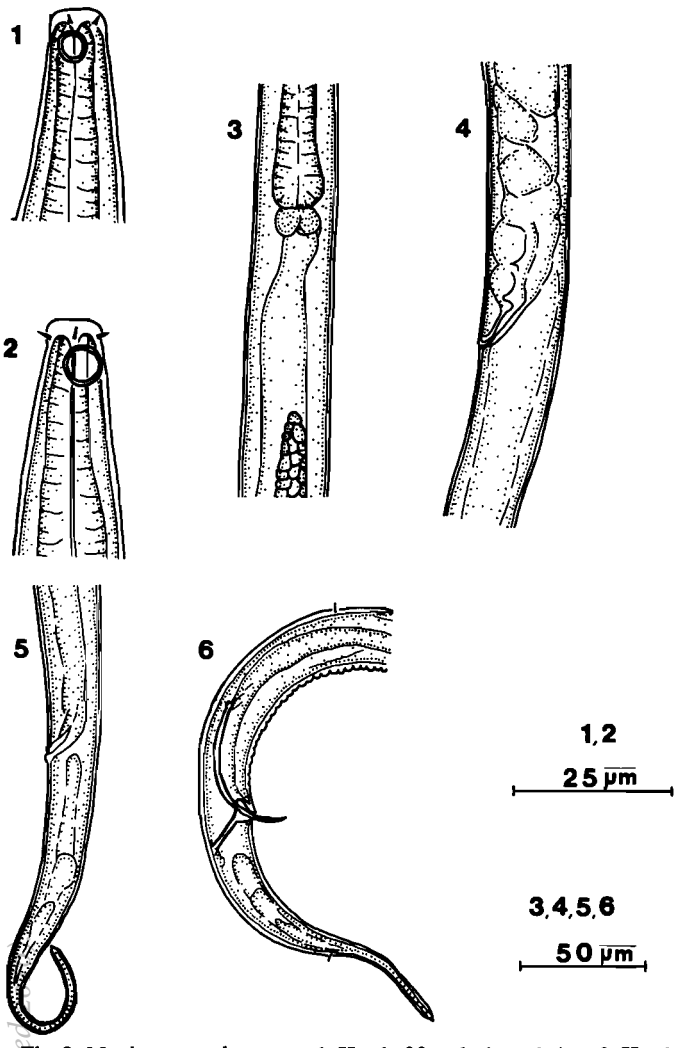

Fig. 3 *Monhystera gabaza* n.sp. 1. Head of female, lateral view. 2. Head of male, lateral view. 3. Base of esophagus and distal part of ovary. 4. Vulval area. 5. Tail of female. 6. Posterior part of body of male.

Male

Amphids with a mean diameter of 5,0 (4,0–6,0) µm and situated about 6,0 (5,0–8,0) µm from anterior end. Spiculum long and thin. Gubernaculum with a very long apophysis. With a midventral row of papillae anterior to the cloaca. A single dorsal seta situated just beyond the middle of the tail, slightly anterior to the slender distal part.

Holotype:

Right hand side female on slide W1464.

Paratypes:

Two females on slide W653 and five females on slides W1461, W1464 and W1468.

Distribution and habitat

Taken from benthic samples amongst reeds in Taaiboschspruit, Vereeniging, leg. J. Heyns, July, 1974.

Differential diagnosis

M. gabaza n.sp. differs from *M. africana* Andrássy, 1964 in body size, viz. 1,15–1,21 mm compared with 0,71–1,00 mm in *africana*, and in being stouter, as reflected in the a-value of 20–29 compared with 29–40. The two species correspond in having relatively large amphids situated close to the anterior end of the body.

The new species differs from *M. paludicola* De Man, 1880 in being somewhat smaller, in the vulva being more anteriorly situated, at 60–64% compared with 66%, in the much shorter spiculum, 70 µm compared with 150 µm, and in the exceptionally long apophysis of the gubernaculum.

From *magnacephala* n.sp. it can be distinguished by the anteriorly situated amphids, at 4–6 µm from the anterior end compared with 15 µm in *magnacephala*, by the narrower lip region, which is not conspicuously broader than the adjacent body as in *magnacephala*, and by the less strongly sclerotized stoma.

Monhystera filiformis Bastian, 1865 (Fig. 4)

Measurements

Female (n=6): L=0,61 (0,53–0,68) mm; a=24,1 (22,8–26,2); b=5,8 (5,4–6,4); c=4,5 (4,2–4,6); c'=8,8 (8,5–9,1); tail=137 (116–148) µm; V=63 (62–64)%; cephalic setae = 2,0 (1,5–2,5) µm, egg = 32,8 × 18,0 (31,5–34,0 × 16,5–19,5) µm.

Male unknown.

Body of female almost straight when relaxed. Head

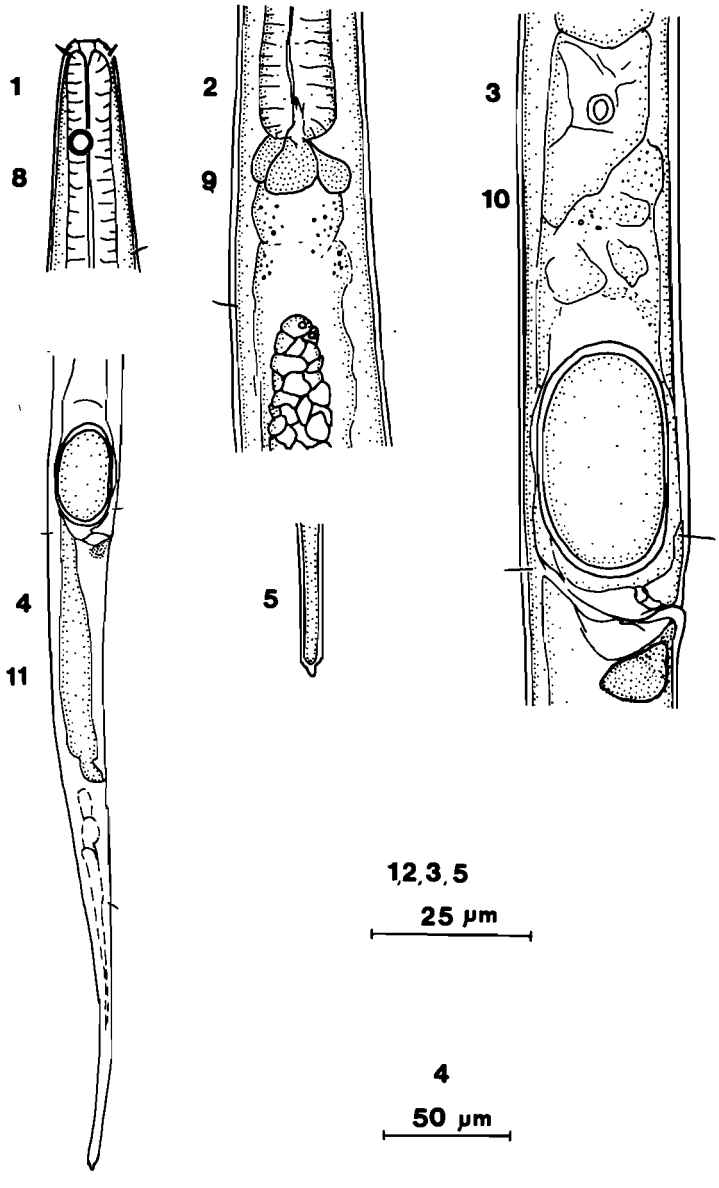

Fig. 4 *Monhystera filiformis* Bastian, 1865. 1. Head of female, lateral view. 2. Base of esophagus and distal part of ovary. 3. Vulva, vagina and uterine egg. 4. Posterior part of body of female. 5. Tail terminus of female.

approximately 8 μm wide and cephalic setae short, 2 μm long. Stoma simple, weakly sclerotized and V-shaped. Amphid with a diameter of 3,2 (2,5–4,0) μm and situated 12,6 (10,5–14,5) μm or approximately 1,8 head width from anterior end. Base of esophagus slightly expanded and esophago-intestinal glands rather large. Tip of ovary approximately one body diameter from glands. Vulva and vagina simple, without special features, but just posterior to the vulva a 'cell' occurs which was mentioned and illustrated by Andrássy (1977). Rectal muscles rather strong and rectum clearly visible. Tail not 'filiform' as name indicates, but elongate-conoid with cylindroid distal part. With long, slender setae scattered over the body surface.

Distribution and habitat

The species is rather widely distributed in South Africa. It has been found in the Witwatersrand, Pretoria, the Vaal River and also the Western Cape. On the Reef it was found in Westdene Dam, Florida Lake and Natalspruit, in the Pretoria area in the Hennop and Jukskei Rivers, at the Barrage in the Vaal River and in the Western Cape in the Cedar Mountains neat Clanwilliam, in the Elgin area and in the Bot River near Caledon.

Remarks

There seems to be some confusion and uncertainty about the identity of *M. filiformis* Bastian, 1865, *M. similis* Bütschli, 1873 and *M. vulgaris* De Man, 1880. The identification of the South African specimens as *filiformis* is done mainly on the basis of Andrássy's (1977) description of *filiformis* from Mongolia, with which the South African specimens agree in all respects except for a slight difference in the length of the esophagus, the latter being slightly longer in the local specimens, resulting in a b-value of 5,4–6,4 compared with 7,0–9,6 in Andrássy's specimens.

The original description of these species were inadequate, and the identifications and descriptions of subsequent authors added to the confusion. Table 1 lists some measurements given by various authors for *filiformis*. Scrutiny of the vulva position shows not only a variation of as much as 12% within a single population (52–63%: Meyl 1954; 53–65%: Meyl 1960) but also a variation ranging from 46–51% (Meyl 1955) to 64–69 (Schiemer 1978) in different populations. This is quite irreconcilable with our experience in this and other nematode genera, where vulva position is one of the relatively constant characteristics, subject to only slight intraspecific variation. Compare for example Table 2, where maximum variation found in South African specimens of *Monhystera* ranges from 2% (in *taaiboschiensis*) to 4% (in *gabaza*).

Apart from the size and position of the amphid, *filiformis* is most easily distinguished from *similis* and *vulgaris* by the presence of a 'cell' posterior and adjacent to the vagina, and by the slightly expanded basal part of the esophagus. It should be noted that although Bastian (1865) described the tail as filiform, De Man's (1880) description was of a species with a more elongate-conoid tail, and since 1880 this seems to have been the rule for all descriptions of *filiformis*.

Monhystera somereni Allgen, 1952 (Fig. 5)

Measurements

Female (n=10): L=0,97 (0,80–1,06) mm; a=30,6 (27,6–34,8); b=6,0 (5,3–6,5); c=5,6 (4,9–6,7); c'=9,1 (7,6–10,4); V = 61,0 (60,5–62,0)%; tail = 171 (144–191) μm; egg = 20 × 39 (20 × 37,5–42,5) μm.

Male unknown.

Body straight when relaxed. Papillae distinct. Head not offset, 10,6 (8–12) μm wide. Cephalic setae short, 3,5 (3,0–4,0) μm. Stoma shallow, V-shaped, weakly sclerotized. Amphids with a mean diameter of 3,5 (3,0–4,0) μm, situated just anterior to or opposite the base of the stoma, at 5,4 (4,0–6,5) μm from the front end of the body. Esophagus cylindroid, with relatively large esophago-intestinal gland cells, their length being equal to the diameter of the base of the esophagus. Distal end of ovary almost touching the gland cells. Tail elongate-conoid, the distal third cylindroid, with the terminus dorsally curved.

Table 1 Measurements of *M. filiformis* females as given by various authors

Author	L (mm)	a	b	c	c'	V%
Bastian (1865)	0,57	25	5	3,6	?	?
Bütschli (1873)	0,45	24	5	—	—	—
De Man (1880)	0,7	30	5 –6	4 –5	—	—
Rahm (1925)	0,57–0,75	25 –31	5,0–5,5	5,9–6,3	—	—
Wu & Hoeppli (1929)	0,49–0,59	25 –30	5,4–5,9	4,1–4,5	—	—
Stefanski (1938)	0,53–0,73	22 –30	4 –6	4 –5	—	62 –67
Meyl (1953)	0,36–0,62	23 –34	4,5–5,8	3,6–4,5	—	55 –63
Meyl (1954)	0,35–0,61	23 –36	4,5–5,8	3,4–4,5	—	52 –63
Meyl (1955)	0,36–0,46	28 –39	5,1–5,7	3,0–3,7	—	46 –51
Andrássy (1958)	0,43	33,5	5,7	4,6	11	55
Meyl (1960)	0,3 –0,8	20 –35	3,5–6,5	3 –6	—	53 –65
Loof (1961)	0,53	23	5,5	4,3	—	59,8
Loof (1971)	0,29–0,50	27 –37	4,1	3,5–4,7	—	52 –59
Zullini (1974)	0,33–0,62	29 –30	4,6–4,7	3,7–5,4	—	51 –63
Andrássy (1977)	0,53–0,57	25 –27	7,0–9,6	4,4–4,6	9 –10	61 –63
Schiemer (1978)	0,63–0,75	28,6–36,0	5,6–6,5	5,0–5,7	—	64 –69
South African specimens	0,53–0,68	23 –26	5,4–6,4	4,2–4,6	8,5–9,1	62 –64

Table 2 A comparison of the morphometrics of South African *Monhystera* species

	M. taaiboschiensis 10 ♀♀ 10 ♂♂	*M. magnacephala* 10 ♀♀ 7 ♂♂	*M. gabaza* 10 ♀♀ 3 ♂♂	*M. filiformis* 6 ♀♀	*M. somereni* 10 ♀♀
L (mm) ♀	1,13(0,85–1,30)	1,16(0,90–1,32)	0,91(0,71–1,00)	0,61(0,53–0,68)	0,97(0,80–1,06)
♂	0,94(0,81–1,04)	1,18(1,09–1,37)	0,75(0,74–0,77)	—	—
Cephalic setae (μm)	3,6	6,0	2,3	2,0	3,5
V %	64(63–65)	68(67–69)	62(60–64)	63(62–64)	61(60,5–62,0)
Egg (μm)	43×30	—	—	33×18	39×20
Spiculum (μm)	84(79–91)	91(90–94)	70(60–80)	—	—
Tail (μm) ♀	200(156–237)	164(136–188)	156(129–174)	137(116–148)	171(144–191)
♂	168(138–195)	160(141–176)	117(106–125)	—	—
Diameter of amphid (μm) ♀	4,5(3,5–5,0)	4,7(4,0–5,0)	3,4(3,0–3,5)	3,2(2,5–4,0)	3,5(3,0–4,0)
♂	4,5(3,5–5,0)	5,0(4,5–6,0)	5,0(4,0–6,0)	—	—
Distance of amphid to front end (μm) ♀	7,6(6,0–9,0)	15,7(10,5–18,5)	5,1(4,0–6,0)	12,6(10,5–14,5)	5,4(4,0–6,5)
♂	7,6(6,0–9,0)	14,6(13,0–16,0)	6,0(5,0–8,0)	—	—

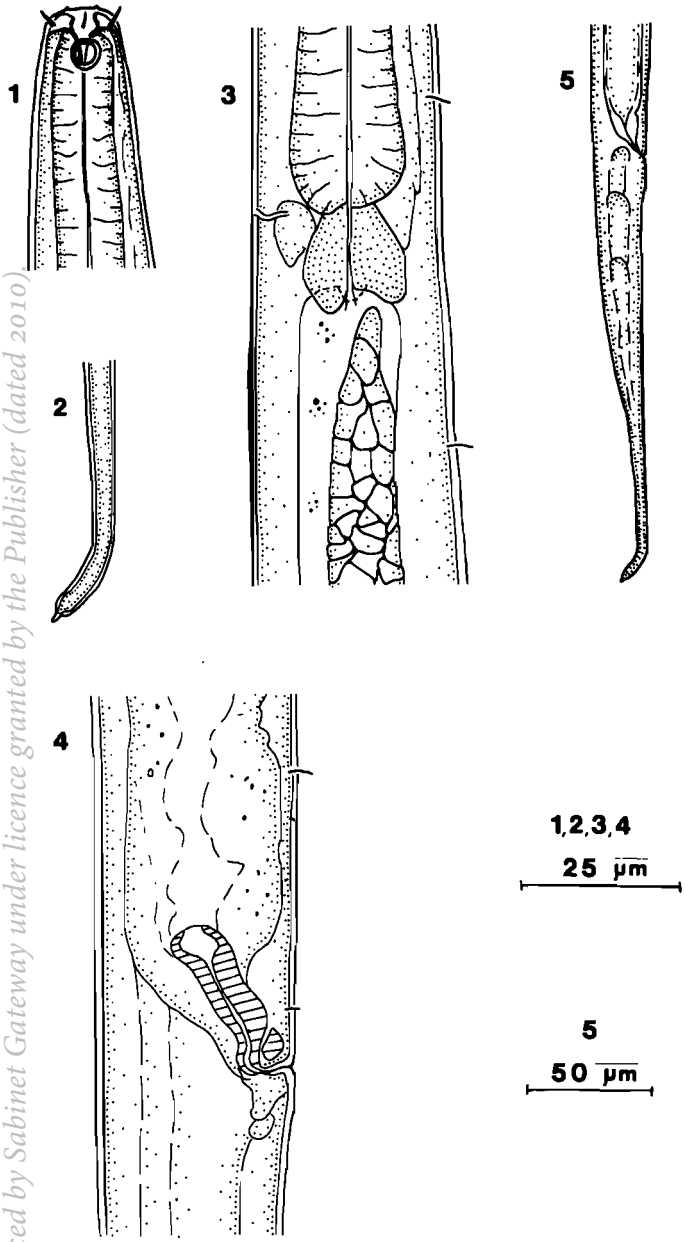

Fig. 5 *Monhystera somereni* Allgen, 1952. 1. Head of female, lateral view. 2. Tail terminus of female. 3. Base of esophagus and distal part of ovary. 4. Vulval area. 5. Tail of female.

Distribution and habitat

This is the most common and widely distributed *Monhystera* species in South Africa. Approximately 160 specimens were studied which were collected throughout the Transvaal and Eastern and Western Cape. In Transvaal it was found in the Pretoria region at the Fountains and in the Hennops River; in the Vaal River complex at the Barrage, Vaal Dam and Parys, in the Witwatersrand region at Emmerentia Dam, Westdene Dam, Forida Lake and Natalspruit; in the Western Transvaal at Boskop Dam and in the Eastern Transvaal at Bronkhorstspruit. In the Western Cape it was found at Elgin and Koëlbaai, and in the Eastern Cape in the Maitlands River near Port Elizabeth.

Remarks

The original description of Allgen (1952) was of females only. Andrássy (1956) found many females in the Ivory Coast but only one male, and in 1968 Andrássy again found only females in Paraguay. In the present study also, only females were found. The South African specimens agree well with the descriptions of Andrássy (1956 & 1968). Argo and Heyns (1973) described a species from South Africa which they identified as *somereni*, but which differ from it in the following aspects: the body length is much less than in the specimens examined in this study (0,6 mm compared with 0,9 mm), the cephalic setae are twice as long, and the gubernaculum has a ventral as well as a dorsal apophysis. The species of Argo and Heyns (1973), which was found in terrestrial habitats, does not agree with any of the five freshwater species found during the present study, and is probably an undescribed species.

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