New species of freshwater nematodes of the order Monhysterida from the Novaya Zemlya archipelago (Nematoda)

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Eumonhystera kuzmini sp. n., *E. bidenticulata* sp. n., *Monhystera amabilis* sp. n., and the hitherto unknown male of *Eumonhystera dispar* (Bastian, 1865) from the Novaya Zemlya archipelago are described and illustrated.

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Introduction

There is only one article (Steiner, 1916) on the fauna of free-living nematodes from the Novaya Zemlya archipelago. Morphological data on 27 species of nematodes found in mosses on these islands were given in this article. Three of them belong to the order Monhysterida: *Eumonhystera vulgaris* (de Man, 1880), *E. filiformis* (Bastian, 1865), and *Geomonhystera villosa* (Bütschli, 1873). That is why the material collected by V.I. Biserov, of Institute of Inland Waters Biology (Borok) is of great interest. 53 species of free-living freshwater nematodes are present, among them 9 species of the order Monhysterida: *Eumonhystera filiformis* (Bastian, 1865), *E. vulgaris* (de Man, 1880), *E. dispar* (Bastian, 1865), *E. barbata* Andrássy, 1981, *E. kuzmini* sp. n., *E. bidenticulata* sp. n., *Geomonhystera aenariensis* Meyl, 1953, *Monhystera amabilis* sp. n., and *Theristus flevensis* Schuurmans Stekhoven, 1935. We give here the descriptions of new species and notes on one species already known.

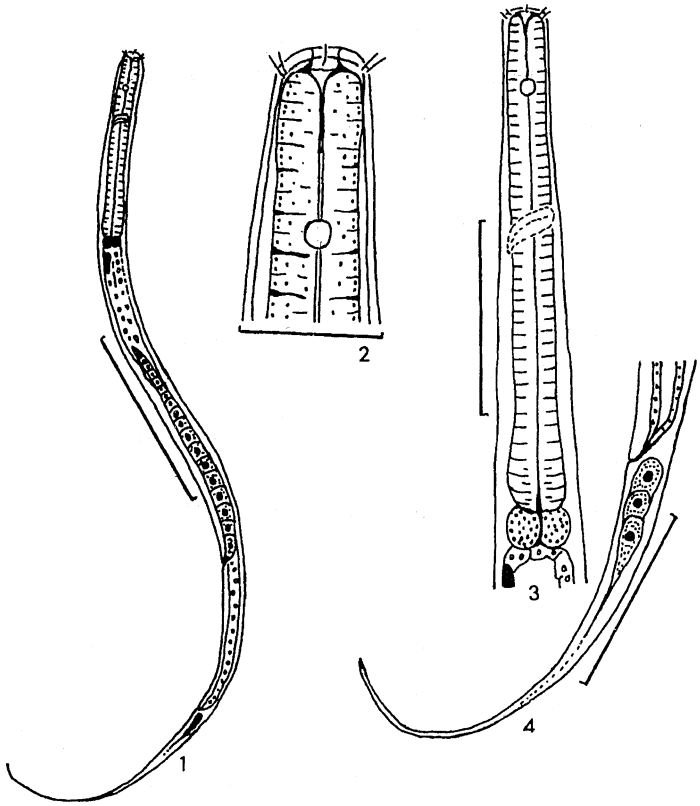
Eumonhystera kuzmini sp. n.
(Figs 1-4)

Holotype. ♀, Russia, Novaya Zemlya archipelago, South Island, Panykova Zemlya peninsula, lake No. 1, depth 0.2 m, ground mosses and detritus, 28.VII. 1995, slide No. 72/35, Institute of Parasitology, Russian Academy of Sciences, Moscow.

Paratypes. 15 ♀, 3 juv. collected with the holotype; 3 ♀ from lake No. 2, depth 0.5 m, ground mosses; 4 ♀, 1 juv. from lake No. 3, depth 0.2 m, ground detritus; 3 ♀ from lake No. 4, depth 0.3 m, ground mosses and detritus.

Measurements. See Table 1.

Description. Cuticle smooth, transverse striation absent. Thickness of cuticle in vulva region about 1.5 μm. Somatic setae only at tail, 2 μm long. Labial region not offset from neck, at level of cephalic setae 7-10 μm wide, about 2 μm high. Body at proximal end of oesophagus 1.7 times as wide as in labial region. Front edge of labial region slightly flattened. Lips rounded. Labial papillae very small, conoid. Cephalic setae 10 (6 + 4) in number, arranged in two circles brought together; longer of them 1.5-3.0 μm (20-38% of labial region width). Amphids circular, diameter 2.5-3.2 μm (1/3 corresponding body diameter). Anterior margin of amphids situated 12-18 μm from anterior end of body (1.4-2.2 labial region width). Stoma funnel-shaped, but narrow, not cuticularized. Small denticles at stoma base absent. Buccal ring strongly cuticularized. Oesophagus slender, muscular, slightly swollen proximally. Cardial glands large, rounded. Renette and its excretory pore not visible. Elongate-oval coelomocyte situated ventrally, slightly posterior to cardial glands. Length of rectum half of anal body diameter. Ovary simple, straight, fairly long. Lips of vulva not protruded. Vagina oblique, shorter than corresponding body diameter. Postvaginal cell absent. Usually one egg in



Figs 1-4. *Eumonhystera kuzmini* sp. n., female: **1**, general view; **2**, head; **3**, oesophagus; **4**, tail. Scales: 100 μm (1), 50 μm (3, 4), 15 μm (2).

uterus, size 42-46 × 21-25 μm. Tail slender, filiform, its length 1.5-2.0 times greater than vulva-anus distance and 8-14 times greater than anal body diameter. Spinneret short, beak-like. Male unknown.

Comparison. The species is close to *E. tuporis* Gagarin, 1991, but differs in the shorter cephalic setae (in *E. tuporis*, the length of the longer cephalic setae equal to 40% of labial region width) and amphids further removed from the anterior body end (in *E. tuporis*, they are situated at a distance of 1-1.5 labial region diameters beyond the anterior body end) (Gagarin, 1991).

Etymology. This species is named in honour of the Russian nematologist L.L. Kuzmin.

Eumonhystera bidenticulata sp. n.
(Figs 5-9)

Holotype. ♀, Russia, Novaya Zemlya archipelago, South Island, lake No. 5, depth 0.3 m, ground detritus, silt, 28.VII.1995, slide No. 72/36, Institute of Parasitology, Russian Academy of Sciences, Moscow.

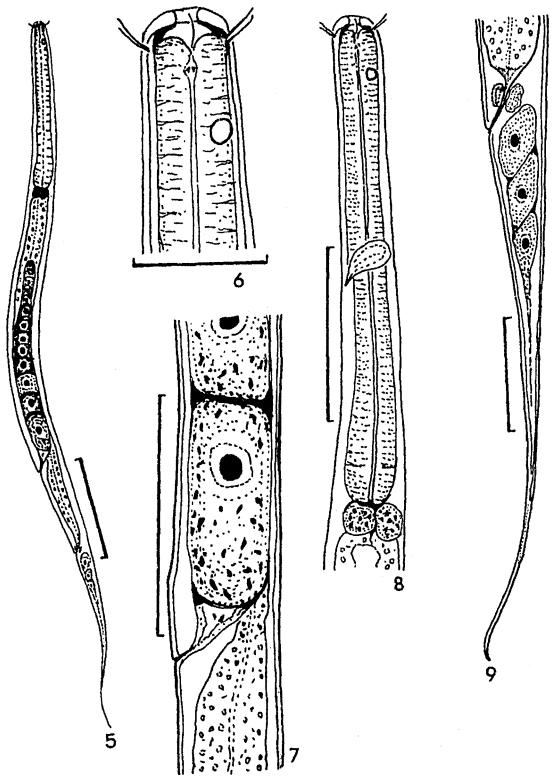
Paratypes. 9 ♀, 3 juv. collected with the holotype; 10 ♀, 1 juv. from lake No. 2, depth 0.5 m, ground mosses; 6 ♀ from lake No. 6, depth 0.2 m, ground silt, sand.

Measurements. See Table 2.

Description. Cuticle smooth, annulation absent. Thickness of cuticle in midbody 1 μm. Somatic setae not numerous, situated only at tail, 3 μm long. Labial region continuous with neck contour, 10-12 μm wide. Body at proximal end of oesophagus 1.5-2.0 times as wide as labial region. Front edge of labial region convex, not flattened. Lips rounded, low. Labial papillae very small, conoid. Cephalic setae 10 (6 + 4) in number, arranged in two circles brought together. Length of outer cephalic setae 45-55% of labial region width. Amphids circular, 3.5-4.5 μm in diameter, somewhat wider than 1/4 body diameter at the same level, located at a distance of about 1.4-2.2 labial region width from anterior body end. Stoma not cuticularized, funnel-shaped, with 2-3 well visible denticles at its basal part. Buccal ring also well developed, strongly cuticularized. Oesophagus muscular, swollen proximally, but not forming basal bulbus. Cardial glands rounded, 10-12 μm in diameter. Length of rectum half of anal body diameter. Rectal gland small, but visible. Ovary simple,

Table 1. Measurements of females of *Eumonhystera kuzmini* sp. n.

Characteristics	Lake 1				Lake 2			Lake 3			Lake 4		
	Holo-type	Paratypes (n=15)			Paratypes (n=3)			Paratypes (n=4)			Paratypes (n=3)		
		Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD
Body length, μm	571	526-669	570	46.8	505-525	518	11.3	430-513	481	37.1	470-599	532	64.6
Labial region width, μm	9	8-10	9	0.8	7-8	8	0.7	7-8	8	0.6	8-9	9	0.7
Longer cephalic setae, μm	3	2.5-3.0	2.8	0.3	2.5-3.0	2.8	0.3	1.7-2.0	1.8	0.2	1.5-1.7	1.6	0.1
Longer cephalic setae : labial region width	33	28-38	32	3.5	30-34	31	2.2	24-29	26	2.0	20-21	20	1.2
Amphid diameter, μm	3	2.5-3.0	2.8	0.2	2.5-3.0	2.9	0.3	3.0-3.2	3.1	0.1	2.7-3.0	2.8	0.2
Amphid diameter : corresponding body width	25	20-27	23	1.9	23-27	25	2.0	30-33	32	1.7	27-30	28	1.7
Anterior end to amphid, μm	19	14-20	16	3.6	14-16	16	2.0	12-17	14	2.2	14-18	15	2.3
Anterior end-amphid : labial region width	2.1	1.7-2.2	1.9	0.2	1.8-2.0	1.9	0.1	1.5-2.0	1.7	0.3	1.6-2.0	1.7	0.2
Oesophagus length, μm	133	119-151	133	9.0	116-120	119	2.3	105-118	113	5.6	105-128	116	11.5
Posterior end of oesophagus – vulva, μm	231	210-280	231	22.4	204-210	207	3.1	160-193	181	14.5	182-241	209	29.8
Vulva – anus, μm	80	73-98	80	8.4	73-75	74	1.2	56-71	65	7.1	70-87	78	8.5
Tail length, μm	127	115-144	126	9.5	112-121	118	4.9	109-134	122	10.7	113-143	129	15.0
a	29	25-34	28	2.4	30-34	32	2.0	24-30	27	2.8	27-34	31	3.5
b	4.3	4.0-4.5	4.3	0.2	4.3-4.4	4.4	0.2	4.1-4.5	4.3	0.2	4.5-4.7	4.6	0.1
c	4.5	4.2-4.7	4.5	0.1	4.3-4.5	4.4	0.3	3.8-4.0	3.9	0.1	4.1-4.2	4.2	0.1
c′	9	8-12	10	1.4	10-11	10	0.4	10-11	11	0.6	10-14	12	2.0
V	64	62-65	64	0.8	62-63	63	0.7	60-62	61	1.0	61-62	61	0.1
Tail : vulva-anus	1.6	1.5-1.7	1.6	0.1	1.5-1.6	1.6	0.2	1.8-2.0	1.9	0.1	1.6-1.7	1.6	0.1



Figs 5-9. *Eumonhystera bidenticulata* sp. n., female: **5**, general view; **6**, head; **7**, vulva region; **8**, oesophagus; **9**, tail. Scales: 100 μm (5), 50 μm (7-9), 15 μm (6).

straight. Lips of vulva flattened, not protruded. Vagina short, bent anteriorly. No postvaginal cell. Egg size 42-48 × 22-28 μm. Tail slender, filiform, usually straight, with 5 pairs of somatic setae, its length 1.4-2.2 times greater than vulva-anus distance and 10-15 times greater than anal body diameter. Spinneret beak-like, short. Male unknown.

Comparison. E. bidenticulata sp. n. is distinguished from the close species *E. subfiliformis* Cobb, 1918 by the shorter cephalic setae (in *E. subfiliformis* the longer cephalic setae about 75% of labial region width) and presence of denticles in the basal part of stoma (Andrássy, 1984).

Etymology. The species name means "bearing two denticles".

Eumonhystera dispar (Bastian, 1865) Andrássy, 1981
(Figs 10-16)

Monhystera dispar Bastian, 1865: 97, Fig. 1-2. Non *M. dispar* sensu Hofmaenner, 1913: 612-613, pl. 15, Fig. 2, 3a-b (*Monhystera lemani* Juget, 1969).
Monhystera crassa Bütschli, 1873: 63, Fig.24a-b.

Material examined. Russia, Novaya Zemlya archipelago, South Island, Panykova Zemlya peninsula: 1 ♂, 4 ♀, 1 juv. collected at lake No. 5, depth 0.3 m, ground detritus, silt; 12 ♀, 4 juv. at lake No. 4, depth 0.3 m, ground mosses and detritus, 13 ♀, 2 juv. at lake No. 1, depth 0.2 m, ground mosses and detritus; 10 ♀, 3 juv. at lake No. 2, depth 0.5 m, ground mosses.

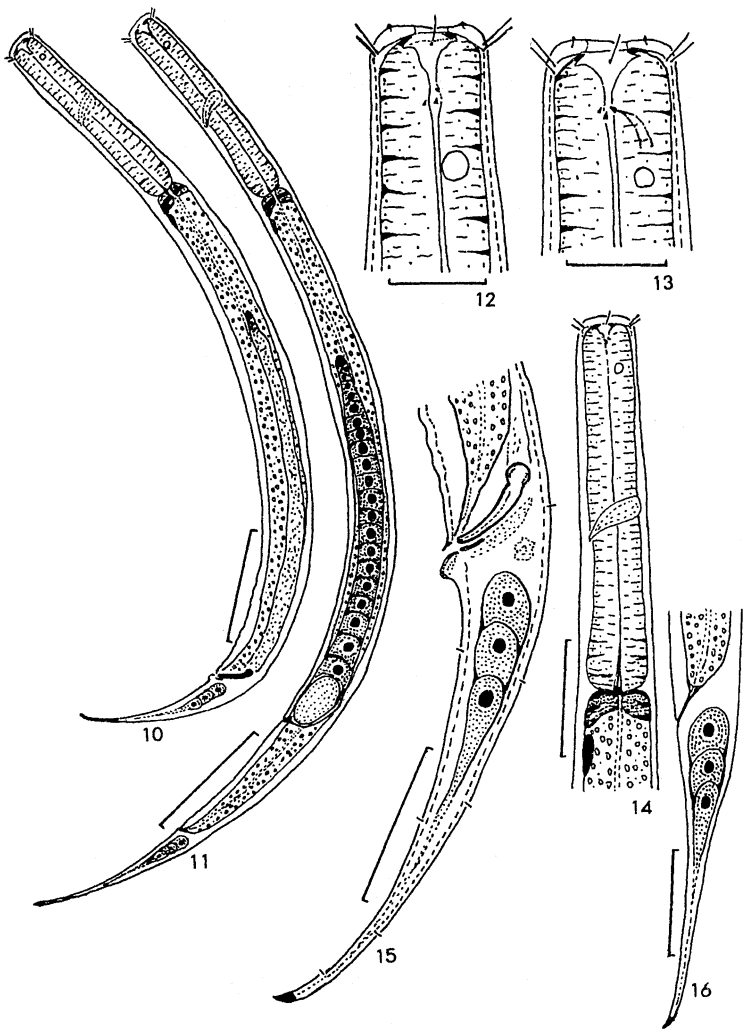
Eumonhystera dispar is a cosmopolitan species, widely spread in freshwater habitats in Russia (Sakhidov & al., 1972; Gagarin, 1993). Only females of this species were known. One male of *E. dispar* is found in lake No. 5 on Novaya Zemlya archipelago. Females are numerous in lakes of archipelago.

Measurements. See Table 3.

Description. Female. Cuticle smooth, transverse striation absent. Thickness of cuticle in midbody about 1 μm. Somatic setae scattered throughout body, not numerous, 5.0-5.5 μm long. Labial region continuous with neck contour, 17-24 μm wide. Front edge of labial region flattened. Body at proximal end of oesophagus 1.5-2.0 times as wide as labial region. Lips rounded, low. La-

Table 2. Measurements of females of *Eumonhystera bidenticulata* sp. n.

Characteristics	Lake 5				Lake 2			Lake 6		
	Holotype	Paratypes (n=10)			Paratypes (n=10)			Paratypes (n=6)		
		Range	Mean	SD	Range	Mean	SD	Range	Mean	SD
Body length, µm	699	630-762	684	36.9	689-826	758	45.0	620-754	702	49.1
Labial region width, µm	10	10-12	11	0.7	10-12	11	0.7	10-11	11	0.6
Longer cephalic setae, µm	5	5.6-6.0	5.4	0.4	5.0-6.0	5.4	0.2	5.0-6.0	5.4	0.3
Longer cephalic setae : labial region width	50	45-50	49	1.5	45-60	51	4.3	45-55	51	3.8
Amphid diameter, µm	4	4.0-4.5	4.2	0.2	3.5-4.5	4.0	0.4	3.5-4.5	3.7	0.3
Amphid diameter : corresponding body width	30	30-35	32	1.9	27-32	30	2.1	23-30	26	2.0
Anterior end to amphid, µm	14	14-18	17	1.3	15-17	16	0.8	14-19	17	1.9
Anterior end-amphid : labial region width	1.4	1.3-1.6	1.4	0.1	1.4-1.7	1.5	0.1	1.3-1.6	1.5	0.1
Oesophagus length, µm	141	106-148	135	11.9	146-175	158	8.3	123-154	138	11.4
Posterior end of oesophagus – vulva, µm	270	240-350	273	31.0	266-346	312	24.1	246-312	283	23.3
Vulva – anus, µm	95	87-115	94	5.1	102-130	115	8.9	87-119	104	12.9
Tail length, µm	193	160-199	183	10.6	158-186	173	8.3	164-192	177	8.3
a	33	24-36	33	3.4	28-38	33	3.6	24-28	26	1.5
b	5.0	4.6-6.1	5.1	0.4	4.5-5.1	4.8	0.1	4.9-5.2	5.0	0.1
c	3.6	3.3-4.2	3.7	0.3	3.9-4.6	4.4	0.1	3.4-4.3	3.9	0.3
c′	15	11-15	13	1.4	11-13	12	0.7	10-12	11	1.2
V	59	56-64	58	2.6	60-63	62	1.4	59-66	62	2.3
Tail : vulva-anus	2.0	1.7-2.2	2.0	0.2	1.4-1.7	1.5	0.1	1.5-2.0	1.7	0.2

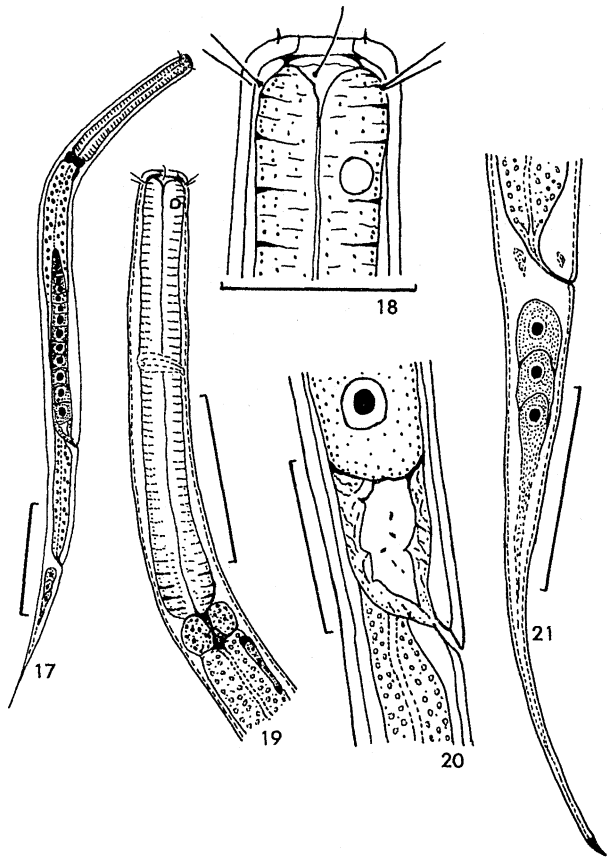


Figs 10-16. *Eumonhystera dispar* (Bastian, 1865): **10**, general view of male; **12**, general view of female; **12**, head of male; **13**, head of female; **14**, oesophagus of male; **15**, tail of male; **16**, tail of female. Scales: 100 μm (10, 11), 50 μm (14-16), 15 μm (12, 13).

bial papillae conoid, large. Cephalic setae 10 (6 + 4) in number, arranged in two circles brought together. Length of the longer cephalic setae 5-7 μm (23-39% of labial region width). Amphids circular, 3.5-4.5 μm in diameter, somewhat wider than 1/4 body diameter at the same level, located at a distance of 15-26 μm from anterior body end (0.9-1.2 corresponding body diameter). Stoma not cuticularized, funnel-shaped, with 2-4 denticles at its basal part. Duct of dorsal oesophageal gland opens into oesophageal lumen close to denticles. Buccal ring strongly cuticularized. Oesophagus muscular, cylindroid, slightly swollen proximally. Oesophageal glands and their nuclei not seen. Cardial glands rounded, their tissue stratified, musculature alternated with granular cytoplasm. Rectum as long as or slightly shorter than anal body diameter. Female reproductive system monodelphic, ovary straight, comparatively short. Vulva

Table 3. Measurements of *Eumonhystera dispar* (Bastian, 1865)

Characteristics	Lake 5				Lake 4			Lake 1			Lake 2		
	Male	Females (n=4)			Females (n=10)			Females (n=10)			Females (n=10)		
		Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD
Body length, µm	653	692-756	724	26.1	688-732	706	11.6	697-783	760	30.2	737-881	795	39.0
Labial region width, µm	18	18-19	18	0.6	17-20	19	1.7	20-23	22	1.0	20-24	21	1.2
Longer cephalic setae, µm	7	6.5-7.0	6.8	0.3	4.5-6.0	5.2	0.6	4.5-6.5	5.3	0.7	5.0-7.0	6.1	0.6
Longer cephalic setae : labial region width	39	36-39	37	1.4	23-33	27	3.4	23-30	25	3.0	23-33	29	3.6
Amphid diameter, µm	4	3.6-4.0	3.9	0.2	3.5-4.5	4.2	0.5	3.5-4.0	3.8	0.3	3.5-4.5	4.0	0.3
Amphid diameter : corresponding body width	19	16-19	18	1.3	16-26	20	3.0	16-19	18	1.2	15-19	17	1.1
Anterior end to amphid, µm	21	18-21	20	1.4	15-24	21	3.1	18-23	21	1.6	22-26	24	1.5
Anterior end-amphid : labial region width	1.2	1.1-1.2	1.2	0.1	0.8-1.3	1.1	0.1	0.9-1.1	0.9	0.1	1.0-1.3	1.2	0.1
Oesophagus length, µm	153	140-158	151	7.7	126-161	144	10.9	151-160	156	2.9	164-192	177	10.0
Posterior end of oesophagus – vulva, µm		298-328	309	14.3	294-319	303	7.5	294-336	324	14.8	305-378	333	23.7
Posterior end of oesophagus – anus, µm	374												
Vulva – anus, µm		127-146	138	8.7	115-143	134	8.9	130-161	152	11.0	126-164	146	11.7
Tail length, µm	126	116-133	126	7.4	118-137	126	5.6	116-140	128	5.8	122-151	139	9.8
a	17	20-24	21	1.9	16-24	20	2.9	16-20	18	1.2	15-20	18	1.6
b	4.3	4.6-5.2	4.8	0.3	4.4-5.4	5.0	0.3	4.4-5.0	4.8	0.2	4.2-4.8	4.5	0.1
c	5.2	5.5-6.0	5.7	0.2	5.2-5.9	5.6	0.2	5.5-6.2	6.0	0.2	5.2-6.6	5.8	0.4
c′	4.7	5.5-6.8	6.1	0.5	5.0-7.0	5.9	0.7	4.5-5.0	5.0	0.2	4.4-5.0	4.8	0.2
V		62-65	63	1.4	62-66	63	1.5	62-64	63	0.7	62-67	64	1.4
Tail : vulva-anus		0.9-1.0	0.9	0.2	0.8-1.0	0.9	0.3	0.8-1.0	0.8	0.1	0.9-1.0	0.9	0.1
Spicula length, µm	27												



Figs 17-21. *Monhystera amabilis* sp. n., female: **17**, general view; **18**, head; **19**, oesophagus; **20**, vulva region; **21**, tail. Scales: 200 μm (17), 100 μm (19-21), 40 μm (20).

as a transverse, slit-like opening. Lips of vulva not bulging. Vagina short, about 1/3 of body width. Uterus poorly developed. Egg size 43-52 × 32-42 μm. Postvaginal cell absent. Tail slender, gradually narrowing, 0.8-1.0 times as long as vulva-anus distance and 5.2-6.6 times longer than anal body diameter. Spinneret beak-like, short, slightly bent dorsally.

Male. Labial region 18 μm wide. Longer cephalic setae 7 μm long. Amphids 4 μm in diameter, situated at a distance of 21 μm from anterior body end. Stoma with 3 small denticles at its base. Length of oesophagus 153 μm. Cardial glands rounded, 3 in number, with stratified tissues. Testis simple. Cuticle in front of anus strongly wrinkled. Spicules well developed, ventrally curved, with large, rounded heads. Gubernaculum in form of narrow and short plate. Tail 126 μm long, 4.7 times longer than anal body diameter.

Monhystera amabilis sp. n.
(Figs 17-21)

Holotype. ♀, Russia, Novaya Zemlya archipelago, South Island, Panykova Zemlya peninsula, lake No. 5, depth 0.3 m, ground detritus, silt, 29.VII.1995, slide No. 72/38, Institute of Parasitology, Russian Academy of Sciences, Moscow.

Paratypes. 12 ♀, 2 juv. collected with the holotype; 3 ♀ from lake No. 6, depth 0.2 m, ground silt, sand.

Measurements. See Table 4.

Description. Slender, medium-sized nematodes. Cuticle smooth, transverse striation absent. Thickness of cuticle in vulva region about 1.5 μm. Somatic setae situated only at tail, 4 μm long. Labial region not offset from neck, 30-33 μm wide. Body at proximal end of oesophagus 1.5-1.7 times as wide as in labial region. Front edge of labial region convex. Labial papillae setiform, about 2 μm long. Cephalic setae 10 (6 + 4) in number, arranged in two circles brought together. Length of longer of them 14-15 μm (42-48%

Table 4. Measurements of females of *Monhystera amabilis* sp. n.'

Characteristics	Holo-type	Lake 5 Paratypes (n=13) Range	Mean	SD	Lake 6 Paratypes (n=3) Range	Mean	SD
Mody length, μm	1516	1353-1718	1552	112.4	1546-1655	1608	56.2
Labial region width, μm	33	30-36	34	1.5	30-31	30	1.2
Longer cephalic setae, μm	14	12-15	14	0.8	14-15	15	0.7
Longer cephalic setae : labial region width	42	39-44	41	1.7	47-48	48	0.7
Amphid diameter, μm	7.0	6.5-7.5	7.0	0.4	6.5-7.0	6.5	0.4
Amphid diameter : corresponding body width	19	18-21	19	1.0	17-18	18	0.7
Anterior end to amphid, μm	23	20-27	24	2.3	24-27	26	1.6
Anterior end-amphid : labial region width	0.7	0.5-1.0	0.7	0.1	0.8-1.0	0.9	0.1
Oesophagus length, μm	270	270-343	306	30.2	308-340	320	17.7
Posterior end of oesophagus – vulva, μm	616	535-749	636	62.1	532-682	631	85.7
Vulva – anus, μm	350	234-378	310	41.1	305-395	348	45.2
Tail length, μm	280	260-339	300	21.6	308-322	310	11.1
a	21	21-27	25	2.0	28-31	27	4.6
b	5.6	4.6-5.6	5.0	0.3	4.8-5.4	5.1	0.3
c	5.4	4.7-5.7	5.2	0.3	5.0-5.4	5.2	0.2
c'	8.3	7.5-9.1	8.2	0.5	9.0-10.0	9.7	0.5
V	58	56-63	61	1.9	55-63	59	4.1
Tail : vulva anus	0.8	0.7-1.3	1.0	0.2	0.8-1.0	0.9	0.1

of labial region width). Amphid circular, 6.5-7.0 μm in diameter (17-21% of corresponding body diameter), situated at a distance of 23-27 μm from anterior body end, or 0.5-1.0 labial region width. Buccal ring strongly cuticularized. Stoma small, funnel-sphaped. Denticles in basal part of stoma absent. Oesophagus muscular, cylindroid, slightly swollen proximally. One elongate-oval coelomocyte situated ventrally, at beginning of intestine. Cardial gland large, rounded. Rectum somewhat shorter than anal body diameter. Ovary simple, straight, comparatively short. Vulva as a transverse, slit-like opening. Lips of vulva not protruded. Vagina poorly developed, oblique, shorter than corresponding body diameter. Postvaginal cell absent. Egg size 63-70 × 52-70 μm. Tail slender, gradually narrowing, 280-322 μm long, 0.8-1.0 times as long as the distance between vulva and anus, and 7.5-10.0 times as long as anal body diameter. Spinneret short, beak-like. Male unknown.

Comparison. The species is close to *M. lemani* Juget,1969, but differs from it in the longer body (in *M. lemani* ♀, L = 0.9-1.5 mm), wider labial region (in *M. lemani* ♀, width of labial region 20μm), longer cephalic setae (in *M. lemani*, length of the longer cephalic setae 5-6 μm), vulva situated nearly at anterior body end (in *M. lemani* V = 66-70%), tail relatively longer (in *M. lemani*, tail 1.0-1.5 times as long as the distance vulva-anus and 5-7 times as long as anal body diameter) (Juget,1969).

Etymology. The species name means "pleasant, agreable".

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