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Nematodes of Peat-Mosses of the Białowieża Forest

(4 text-figures)

Nicienie torfowców Puszczy Białowieskiej

Нематоды торфяных мхов Бяловесской Пущи

The present work is the third one of a designed series of faunistic-ecological studies on the Nematodes of peat-mosses (BRZESKI, 1961d, 1962). Its purpose was to examine the *Nematoda* of the Białowieska Forest and to compare the specific composition of this fauna with that of the Nematode faunas of the Kampinoska Forest and the Kościeliska Valley in the Tatra Mts.

The whole material described was collected in the Białowieski National Park in the autumn of 1959. I wish to thank Dr Adolf RIEDEL (Warsaw) for rendering collection possible. The method used by me to analyse the samples was the same as the one I described in my work on the Nematodes of the Kościeliska Valley (BRZESKI, 1962). A total of 40 samples and about 10 000 individuals was collected.

COMPOSITION OF THE NEMATODE FAUNAS OF THE LOWLAND AND TATRA PEAT-MOSSES

The occurrence of 28 species representing 18 genera was ascertained in the material collected. I classified them in three groups according to the frequency of their occurrence (BRZESKI, 1961d, 1962).

In the first group I numbered the following species: *Plectus rhizophilus* de MAN, *Eudorylaimus carteri* (BASTIAN), *Prismatolaimus dolichurus* (BÜTSCHLI),

Tylenchus bryophilus STEINER and *T. davainei* BASTIAN. These species were present in all the samples examined.

The species included in the second group occurred less frequently (in about 50% of samples). They were *Eucephalobus elongatus* (de MAN), *Euteratocephalus crassidens* (de MAN), *Aphelenchoides parientinus* (BASTIAN) and *Iotonchus zschorkei* (MENZEL).

To the third group I assigned the species that appeared occasionally and in many cases were found in only one sample. These are *Rhabditis* sp. (sensu lato), *Cephalobus parvus* THORNE, *Heterocephalobus basilogoodeyi* BRZESKI, *Acrobeloides buitschli* de MAN, *Teratocephalus terrestris* (BÜTSCHLI), *T. costatus* ANDRÁSSY, *Tylenchus filiformis* BÜTSCHLI, *T. leptosoma* de MAN, *T. aberrans* ALTHERR, *Heliomena gracilis* n. sp., *Plectus cirratus* BASTIAN, *P. longicaudatus* BÜTSCHLI, *P. raabei* BRZESKI, *Wilsonema auriculatum* (BÜTSCHLI), *Aphelenchoides helophilus* (de MAN), *Prionchulus muscorum* (DUJARDIN), *Monhystera vulgaris* BASTIAN, *Eudorylaimus acuticauda* (de MAN) and *Amphidelus uniformis* THORNE.

Observations on the vertical distribution of the Nematodes in peat-moss tufts thoroughly confirm the conclusions which I made when working out the Nematodes of peat-mosses in the Kampinoska Forest (BRZESKI, 1961d).

A comparison of the Nematode faunas of the peat-mosses of the Białowieska Forest, Kampinoska Forest, various samples taken in the environs of Warsaw and Kusięta Nowe (Olsztyń Częstochowski district, leg. A. KACZANOWSKI, July 1958) shows great similarity of these assemblages. All the species so far collected are listed in Table I.

As results from the comparison of these environments, they have not only the chief species but also many accompanying ones in common. I consider the species to be chief, if they occur in a large number of samples and individuals in a given biotope. The accompanying species are those appearing less frequently (in about 50% of samples) as well as those seldom occurring, nevertheless present in all localities in question. The casual species are rare, and they are most often found in small tufts of moss (BRZESKI, 1962). They vary in different environments. The chief species include *Plectus rhizophilus* de MAN, *Eudorylaimus carteri* (BASTIAN), *Tylenchus bryophilus* STEINER and *Prismatolaimus dolichurus* (BÜTSCHLI). Although these species are chief, they are not characteristic. They all can occur frequently and in large numbers in other environments. The problem of characteristic species of the Nematode fauna of peat-mosses still demands some more studies.

Among the accompanying species I number *Cephalobus nanus* de MAN, *Euteratocephalus crassidens* (de MAN), *Tylenchus davainei* BASTIAN, *Aphelenchoides parientinus* (BASTIAN), *Plectus longicaudatus* BÜTSCHLI, *Monhystera vulgaris* de MAN, *Mononchus sphagni* BRZESKI, *Prionchulus muscorum* (DUJARDIN), *Iotonchus zschorkei* (MENZEL), *Alamus primitivus* de MAN and *Amphidelus dolichurus* (de MAN). In all probability this group comprises the characteristic species, i. e. those even seldom occurring in a given biotope, but never or hardly ever in other biotopes.

The remaining species are casual ones. Among these I have classified the species recently described (e. g. *Teratocephalus costatus* ANDRÁSSY, *Plectus opisthocirculus* ANDRÁSSY, *P. raabei* BRZESKI and *Tylenchus aberrans* ALTHERR), or described earlier but such that we have only poor information about.

The comparison of the chief species of the Nematodes of the peat-mosses from the lowlands and those from the Tatra Mts. presents itself differently. In my work on the Nematodes of the peat-mosses of the Kościeliska Valley (BRZESKI, 1962), I named *Tripyla tatica* STEFAŃSKI, *Plectus rhizophilus* de MAN, *Eudorylaimus circulifer* LOOF, *E. carteri* (BASTIAN) and *Prismatolaimus dolichurus* (BÜTSCHLI) as chief species. Out of these five species only three (60%) are common to both environments. The remaining two (*Tripyla tatica* STEFAŃSKI and *Eudorylaimus circulifer* LOOF) have not been recorded from lowland peat-mosses yet. On comparing the accompanying species we find a very similar state: 3 of the 5 species are common. These proportions indicate a rather considerable divergence of the Nematode assemblage of the peat-mosses in the Kościeliska Valley from those of the other environments examined.

SYSTEMATIC PART

The list of the species collected is given in Table I. Only new species, or rare ones and such as require supplements to their morphological descriptions are discussed here.

Table I

	B	PK	W	KN
<i>Plectus rhizophilus</i>	a	a	a	a
<i>Prismatolaimus dolichurus</i>	a	a	a	a
<i>Eudorylaimus carteri</i>	a	a	a	b
<i>Tylenchus bryophilus</i>	a	b	b	c
<i>T. davainei</i>	a	b	b	
<i>Prionchulus muscorum</i>	c	b	c	a
<i>Aphelenchoides parietinus</i>	b	c	b	
<i>Euteratocephalus crassidens</i>	c	e	c	e
<i>Plectus longicaudatus</i>	c	e	c	
<i>Monhystera vulgaris</i>	c	c		c
<i>Monochus sphagni</i>		b	c	
<i>Iotonchus zschokkei</i>	c	c		
<i>Alaimus primitivus</i>		c	c	
<i>Amphidelus dolichurus</i>		c	c	
<i>Mesodorylaimus bastiani</i>			c	c
<i>Eucephalobus elongatus</i>	c	c		
<i>Teratocephalus terrestris</i>	c	c		
<i>Tylenchus filiformis</i>	c	c		
<i>Aphelenchoides helophilus</i>	c	c		
<i>Criconemooides sphagni</i>	c		c	
<i>Panagrolaimus rigidus</i>		c	c	
<i>Rhabditis</i> sp.	c	c		

Table I cont.

	B	PK	W	KN
<i>Cephalobus nanus</i>		c	c	
<i>Bunonema reticulatum</i>		c		
<i>Macrolaimus crucis</i>		c		
<i>Cephalobus persegnis</i>		c		
<i>C. parvus</i>	e			
<i>Heterocephalobus kaczanowskii</i>		e		
<i>H. basilogodeyi</i>			c	
<i>Eucephalobus striatus</i>		c		
<i>Teratocephalus costatus</i>	e			
<i>Euteratocephalus palustris</i>		c		
<i>Tylenchus leptosoma</i>	e			
<i>T. aberrans</i>	e			
<i>Helionema gracilis</i>	e			
<i>Criconema menzeli</i>	e			
<i>Criconemoides annulifer</i>		c		
<i>Plectus opisthocirculus</i>			c	
<i>P. raabei</i>	e			
<i>P. cirratus</i>	e			
<i>Wilsonema auriculatum</i>	e			
<i>W. otophorum</i>		c		
<i>Prodesmodora circulata</i>		c		
<i>Eudorylaimus ineres</i>		b		
<i>E. silvaticus</i>			c	
<i>E. acuticauda</i>	e			
<i>E. parvus</i>		c		
<i>E. obtusicaudatus</i>		b		
<i>Witoldinema polonica</i>			c	
<i>Actinolaimus macrolaimus</i>		c		
<i>Amphidelus uniformis</i>	e			
<i>Enchodelus macrodorus</i>		e		

Abbreviations: B — Białowieża National Park, PK — Kampinoska Forest, W — vicinity of Warsaw, KN — Kusięta Nowe (Olsztyn Częstochowski district), a — chief species, b — accompanying species, c — casual species.

Rhabditidae

Rhabditis sp. (sensu lato), only larvae.

Cephalobidae

Cephalobus parvus THORNE 1937

Heterocephalobus basilogodeyi BRZESKI 1961

Eucephalobus elongatus (de MAN 1880) THORNE 1937

Acrobeloides bütschli (de MAN 1880) THORNE 1937

Teratocephalidae

Teratocephalus terrestris (BÜTSCHLI 1873) de MAN 1876

T. costatus ANDRASSY 1958

Euteratocephalus crassidens (de MAN 1880) ANDRÁSSY 1958

Tylenchidae

Tylenchus davanei BASTIAN 1865

T. filiformis BÜTSCHLI 1873

T. bryophilus STEINER 1919

T. leptosoma de MAN 1880

T. aberrans (ALTHERR 1952) ANDRÁSSY 1954

Criconematidae

Criconema menzeli (STEFÁNSKI 1924) A. L. TAYLOR 1936

Helionematidae fam. nov.

Helionema gracilis gen. nov., sp. nov.

Aphelenchoididae

Aphelenchoides parietinus (BASTIAN 1865) STEINER 1932

A. helophilus (de MAN 1880) T. GOODEY 1932

Plectidae

Plectus cirratus BASTIAN 1865

P. rhizophilus de MAN 1880

P. raabei BRZESKI 1961

P. longicaudatus BÜTSCHLI

Wilsonema auriculatum (BÜTSCHLI 1873) N. A. COBB 1923

Monhysteridae

Prismatolaimus dolichurus (BÜTSCHLI 1873) de MAN 1880

Monochidae

Prionchulus muscorum (DUJARDIN 1845) ANDRÁSSY 1958

Iotonchus zschokkei (MENZEL 1913) ANDRÁSSY 1958

Dorylaimidae

Eudorylaimus carteri (BASTIAN 1865) ANDRÁSSY 1959

E. acuticauda (de MAN 1880) ANDRÁSSY 1959

Alaimidae

Amphidelus uniformis THORNE 1939

Cephalobus parvus THORNE 1937

Dimensions (1 ♀). Length: 0.37 mm., a: 17.5, b: 3.8, c: 15.2, V: 63.6%.

One female entirely corresponding with THORNE's description (1937) was found. The species described from the Hawaiian Is., hitherto recorded only from Hungary.

Tylenchus leptosoma de MAN 1880

Dimensions (1 ♀). Length: 0.5 mm., a: 28.6, b: 9.53, c: 2.6, V: 46.2%.

Species relatively rare. New to this country.

***Tylenchus aberrans* (ALTHERR 1952) ANDRÁSSY 1954**

Taxonomic position of this species not clear. ANDRÁSSY (1954) suggests in his revision of the genus *Tylenchus* BASTIAN 1865 that *T. aberrans* (ALTHERR) is probably synonymous with *T. minutus* N. A. COBB. He supposes that ALTHERR (1952) did not notice the bursa, gubernaculum, annulation of cuticle and the posterior uterus sac. Since I have found only one female of this species in the material under study, I present the most significant differences between the female of *T. aberrans* (ALTHERR) and that of *T. minutus* N. A. COBB.

	<i>T. aberrans</i>	<i>T. minutus</i>
Cuticle	smooth	annulated
Spear	twice as long as head width	1.25 times as long as head width
Posterior uterus sac	lacking	present

These characters make us suppose that *T. aberrans* (ALTHERR) should be classified in another, new, genus, but to do this it would be necessary to examine a larger number of individuals of both sexes.

So far as I know, *T. aberrans* (ALTHERR) has been hitherto found only in Switzerland.

***Helionematidae* fam. nov.**

Representative of superfamily *Tylenchoidea*(?). Cuticle transversely annulated; lips chitinized but not cut off the rest of body by fissure; stoma spear massive, of *Dorylaimus* DUJARDIN type, without basal knobs; guiding ring single. Orifice of oesophageal gland duct typical of superfamily *Tylenchoidea*. Oesophagus with oblong, muscular median bulb, but without valves. End bulb of oesophagus glandular. Oesophago-intestinal junction similar to that in family *Tylenchidae*. Gonad of female single, prodelphic, short. Vulva displaced caudally. Posterior uterus sac present. Male unknown.

Typical genus: *Helionema* n. gen.

***Helionema* gen. nov.**

Typical representative of family *Helionematidae*. Body slender; cuticle transversely annulated all along body except for lips. At labial base four small, hardly visible papillae. Build of oesophagus typical of the family. Female gonad prodelphic; posterior uterus sac present; female's tail short, with long, acute mucron at end. Male unknown.

Typical species: *H. gracilis* spec. nov.

The family *Helionematidae* here described differs essentially from all remaining families of the superfamily *Tylenchloidea* in the build of the spear

and oesophagus. It must be assigned to the latter superfamily owing to the presence and situation of the oesophageal gland orifice.

The genus described comes close to the genus *Dotylaphus* ANDRÁSSY (*Allantonematidae?*) in respect of the build of spear; on the other hand, it differs from the latter principally in the build of oesophagus. Moreover, the systematic position of the last mentioned genus is also obscure.

The lack of valves in the anterior bulb of oesophagus makes this family similar to *Nothotylenchidae*. The principal difference, however, lies in the build of the spear. Besides, the bulb is in the representatives of this family considerably smaller than it is in the genus *Helionema* gen. nov.

It is possible that the build of the oesophagus and musculature of the spear result from convergency, and then the family *Heliomematidae* should be associated with the superfamily *Dorylaimodea*. We shall be certainly able to tell more when a male has been known. At present the family in question must be classified in the superfamily *Tylenchoidea* in respect of oesophageal glands.

***Helionema gracilis* spec. nov. (Figs. 1—3)**

Dimensions (1 ♀). Length: 0.43 mm., a: 33.0, b: 7.0, c: 7.0, V: 71.4%.
Body relatively slender. Cuticle transversely annulated all along body

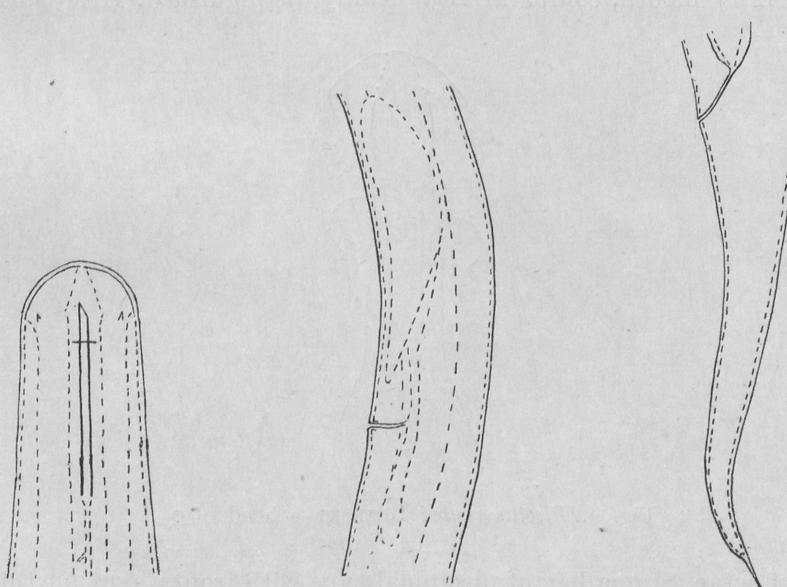


Fig. 1. *Helionema gracilis* n. sp. — head of ♀

Fig. 2. *Helionema gracilis* n. sp. — vulva region

Fig. 3. *Helionema gracilis* n. sp. — tail of ♀

with exception of labial region. Subcuticle smooth. Four small, hardly visible papillae at base of lips.

Stoma spear typical of genus *Dorylaimus* DUJARDIN, thin, with small aperture; spear twice as long as width of labial base. Its maximum width equal

to one-sixth of base of lips. Spear aperture equals one-eleventh of spear length. Anterior third of spear occupied by single guiding ring similarly to that in genus *Dotylaphus* ANDRÁSSY. Spear without basal knobs. Oesophagus with fleshy bulb, nearly four times as long as body diameter at base of lips. Valves absent. Glandular portion of oesophagus joins intestines. This junction is badly visible.

Vulva displaced caudally rather considerably. Female gonad single, prodelphic, short. It is six times longer than body diameter at vulva and bent at two-thirds of its length. Posterior uterus sac short. It is as long as body width at vulva. Vagina short, with thin walls. It occupies one-third of body width at vulva.

Tail of female elongated, tapering, ended with acute mucron.

Three females of this species found in lower layers of dead leaves in a small tuft of peat-moss (*Sphagnum* sp.) (leg. M. BRZESKI, 11. 11. 1959).

Plectus raabei BRZESKI 1961 (Fig. 4)

Dimensions (1 ♀). Length: 0.9 mm., a: 19.4, b: 4.4, c: 8.4, V: 47.2%.

Cuticle thin, very delicately, and subcuticle considerably more distinctly, annulated. Lips smooth, comparatively weakly distinguished. Head surrounded

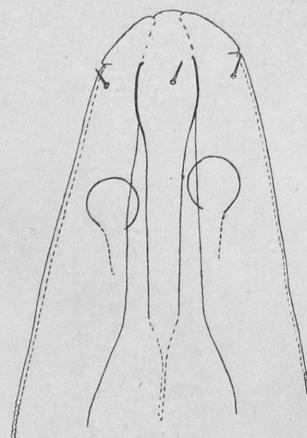


Fig. 4. *Plectus raabei* BRZESKI — head of ♀

with 4 short setae. Stoma bag of plectoidal type with frontal portion thickened. Stoma bag 2 1/2 times longer than body width at base of setae. Amphids in shape of unclosed circlet occupy 29% of body diameter. Oesophageal collar reaches the base of the thickened portion. Oesophagus short, without distinguished isthmus. End bulb with characteristic valves. Lateral fields occupy 10% of body diameter at vulva.

Vulva displaced to frontal half of body, just as in holotype. In all probability it is an important characteristic of this species. Gonad paired, short,

curved; posterior gonad somewhat longer. Rectum shorter than anal diameter of body. Tail of characteristic shape, first tapering rapidly then cylindrical.

P. raabei BRZESKI has been described from the peat-mosses of the Kościeliska Valley on the base of one female and has not been recorded again. This species differs from *P. cirratus* BASTIAN in the build of stoma and oesophageal collar, situation of vulva and shape of tail. It is distinguished from *P. rhizophilus* de MAN by the size of amphids, anterior situation of vulva, shorter oesophagus as well as shape of tail.

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STRESZCZENIE

W niniejszej pracy autor podaje skład gatunkowy nicieni torfowców Białowieskiego Parku Narodowego, porównując go ze składem gatunkowym innych miejscowości Polski środkowej i Doliny Kościeliskiej w Tatrach.

W części systematycznej autor daje opis nowej rodziny *Helionematidae* (*Tylenchoidea?*), nowego rodzaju *Helionema* n. g. i gatunku *H. gracilis* n. sp., dyskutuje pozycję systematyczną *Tylenchus aberrans* (ALTHERR) i daje uzupełnienie opisu morfologicznego *Plectus raabei* BRZESKI.

РЕЗЮМЕ

В настоящей работе автор подает состав видов нематод торфяных мхов. Бяловежского Народного Парка, сравнивая его с составом видов других местностей центральной Польши и Долины Костелиской в Татрах.

В систематической части этой статьи автор подает описание нового семейства *Helionematidae* (*Tylenchoidea?*), нового рода *Helionema* n. g. и вида *H. gracilis* n. sp., обсуждает систематику *Tylenchus aberrans* (ALTHERR) и дает дополнение морфологического описания *Plectus raabei* BRZESKI.

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