

The Trematode Fauna of Rodents and Insectivora (Mammalia) in Hungary. III. The occurrence of *Psilotrema simillimum* and *P. spiculigerum* (Mühling, 1898) (= *P. marki* Skwartzow, 1934 syn. n.) in Rodents

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"The Trematode Fauna of Rodents and Insectivora (Mammalia) in Hungary. III. The occurrence of *Psilotrema simillimum* and *P. spiculigerum* (Mühling, 1898) (= *P. marki* Skwartzow, 1934 syn. n.) in Rodents" - Matskási, I. - Parasit. Hung. 7. 99-110. 1974.

ABSTRACT. Helminthological examination of rodents revealed the occurrence of two *Psilotrema* species, *P. simillimum* (Mühling, 1898) and *P. spiculigerum* (Mühling, 1898) in Hungary. The hosts of *P. simillimum* were *Arvicola terrestris* and *Pitymys subterraneus*, while *P. spiculigerum* parasitized *Ondatra zibethica*. The results of the author's investigations corroborate MERKUSHEVA's statement, namely that *P. pharyngeatum* Grabda, 1954, is the junior synonym of *P. simillimum*. On the basis of the author's examination, *P. marki* Skwartzow, 1934, is the junior synonym of *P. spiculigerum* (Mühling, 1898).

In the course of the helminthological examination of rodents in Hungary, two *Psilotrema* species, *P. simillimum* (Mühling, 1898), and *P. spiculigerum* (Mühling, 1898) were found. Although both species were already known since the end of the last century, and though they have been found by many authors in Europe, their systematical position is still not definitely clarified.

The fluke species belonging to the genus *Psilotrema* Odhner, 1913, are parasites of birds and mammals. *P. oligoon* was described by LINSTOW (1887) from the small intestine of *Gallinula chloropus*. Two further *Psilotrema* species were described by MÜHLING (1898) under the names *P. spiculigerum* and *P. simillimum*.

mum, from the intestine of *Nyroca nyroca*. A new species was reported by SKWORTZOW (1934) from the rodent *Arvicola terrestris*. This species was found later by several authors in aquatic mammals. In Hungary it has been found by SEY (1965a). GRABDA (1954) described a new *Psilotrema* species, parasitizing in the small intestine of *Ondatra zibethica*, under the name *P. pharyngeatum*. Later several authors have also described this species from other aquatic mammals (POJMANSKA, 1957; ERHARDOVÁ, 1958; EDELÉNYI, 1966).

MERKUSHEVA (1958) reported two fluke species, *P. simillimum* and *P. spiculigerum*, parasitizing *Arvicola terrestris*. She stated that the species *P. pharyngeatum* Grabda, 1954, living in rodents, and *P. simillimum* (Mühling, 1898), occurring in birds, represent the same species, so that *P. pharyngeatum* is the junior synonym of *P. simillimum* (MERKUSHEVA, 1959). ANDREJKO, PINCHUK and SKWORTZOW (1963) agree with MERKUSHEVA's opinion. The relationship of *P. spiculigerum* to *P. marki* was not discussed by MERKUSHEVA, although the trematode species living in rodents (*Arvicola terrestris*) was first published by her as *P. spiculigerum*. This species was published earlier only from birds, whereas the species *P. marki*, very similar to *P. spiculigerum*, was reported only from mammals.

BIKHOVSKAYA-PAVLOVSKAYA, RYJIKOV and KHOTENOVSKY (1966), referring to WARTEJUK (1958) regard the fluke *P. spiculigerum* (Mühling, 1898), occurring in Anseriformes, as the junior synonym of *P. oligoon* (Linstow, 1887). WARTEJUK compares the body and organ measurements and the position of organs of his trematode material originating from geese with those described in the literature. In his opinion *P. spiculigerum* differs from *P. oligoon*, according to the original description, by a single characteristic only: the smooth tegument of the former against the spinous one of the latter. According to WARTEJUK (1958) as well as BIKHOVSKAYA-PAVLOVSKAYA et al. (1966) the smooth integument develops artificially under the effect of fixation, hence this characteristic should not be considered for the establishment of a new species. The statement of the above authors is correct

in this respect. However the two species in question can not be considered identical, because of a very important feature neglected in the course of the investigations referred to. The most important and practically the only characteristic to distinguish P. simillimum from P. spiculigerum is the size of the pharynx and the ratio of the measurements of the pharynx to those of the oral sucker. The pharynx of P. simillimum is considerably larger than the oral sucker, whereas the measurements of these two organs of P. spiculigerum shows is inverse ratio. LINSTOW did not discuss the pharynx or its measurements in his description, and did not give a figure of the new species described by him. On the other hand LÜHE's description (1909), following LINSTOW's states that the pharynx is "significantly smaller than the oral sucker". It is not clear from LÜHE's work whether he saw LINSTOW's type specimens or simply described the species on the basis of LINSTOW's paper. This latter seems more likely, therefore he gave no redescription. After LÜHE, WERTEJUK⁺ considered the pharynx of LINSTOW's P. oligoon smaller than its oral sucker, and thus synonymized P. spiculigerum, described later by MÜHLING. The size of the pharynx is the only differentiating feature of the two Psilotrema species described by MÜHLING. Accordingly, the synonymization by WERTEJUK is unfounded, since the relevant feature concerning P. oligoon is lacking from the original description, and thus LINSTOW's description fits the descriptions of both Psilotrema species given by MÜHLING, and vice versa. MÜHLING noted in his paper that he sent the type-specimen of P. spiculigerum to LINSTOW, who, after examining it, assured him that the specimen was not identical with P. oligoon.

On the basis of the above considerations P. oligoon (Linstow, 1887), should be regarded as a "species inquirenda", whereas P. simillimum and P. spiculigerum (Mühling, 1898) are two distinct and valid species.

⁺WERTEJUK does not refer to LINSTOW's original description, and does not list LINSTOW's paper in the references.

Owing to the taxonomical problems and uncertainly in the genus Psilotrema, I give here the measurements of some specimens of both species found in Hungary in comparison with those of the literature.

Psilostomatidae Odhner, 1913
Psilotrema simillimum (Mühling, 1898) - Fig. 1, 2

Hosts: *Arvicola terrestris*; Locality: Dinnyés - Lake Velence, coastal reeds; *Pitymys subterraneus*; Locality: Pilisborosjenő (Com. Pest) marshes.

Localization: small intestine; Intensity: 2-10 exemplars.

Table 1

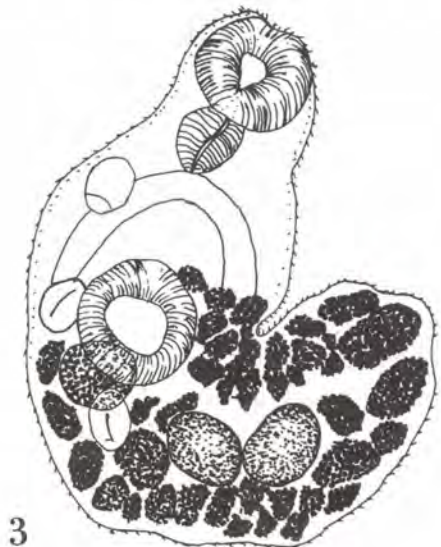
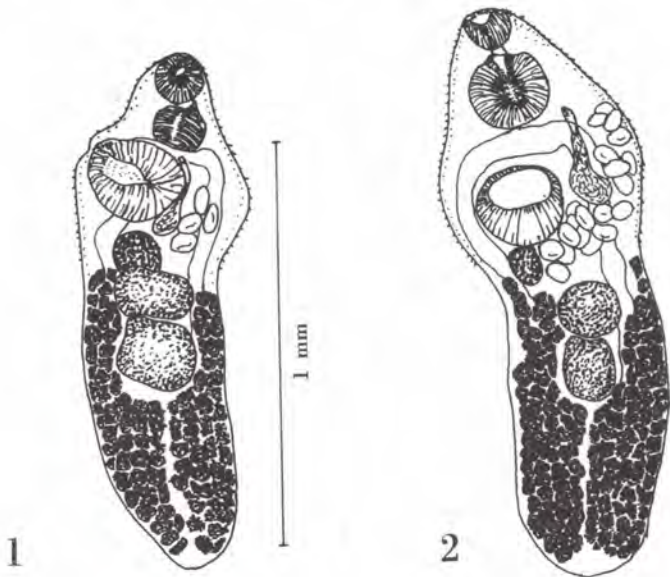
Measurements of *P. simillimum* in μ

Host	Specimens from					
	<i>Arvicola terrestris</i>				<i>Pitymys subterraneus</i>	
Body length	936	1310	1340	1005	1490	1467
Maximum width	280	436	436	440	546	523
Oral sucker	81x74	124x118	131x118	87x93	124x112	124x124
Pharynx	124x102	137x156	140x162	124x102	171x196	137x156
Ventral sucker	230x199	204x171	205x249	237x196	199x230	237x218
Testes	224x149	202x156	205x249	174x230	165x143	170x148
	187x124	202x171	180x187	149x142	176x155	112x109
Ovary	156x124	124x124	131x131	138x102	183x102	113x102
Cirrus	93x43	93x49	96x43	71x37	91x62	89x41
Egg	91x39	91x37	84x49	80x39	90x56	94x61

Fig. 1: *Psilotrema simillimum* from *Pitymys subterraneus* (Orig.)

Fig. 2: *Psilotrema simillimum* from *Arvicola terrestris* (Orig.)

Fig. 3: *Psilotrema spiculigerum* from *Ondatra zibethica* (Orig.)



Integumentum from area of oral sucker to level of front testis covered with spines. Generic feature: the large pharynx, in every case larger than the oral sucker.

In Table 2 data concerning P. pharyngeatum, given by authors not cited in MERKUSHEVA's (1959) work, and data of MÜHLING's (1898) original description of P. simillimum, and those of GRABDA (1954) are compared. ERHARDOVÁ(1958) does not give the exact measurements of the oral sucker, but she remarks that the pharynx is larger than the oral sucker. The measurements of the other organs concur with those of P. simillimum. The identification of the species published by POJMANSKA (1957) under the name P. pharyngeatum Grabda, 1954, is more problematic. According to POJMANSKA the pharynx of this species is smaller than the oral sucker. In this case, the identification of this species as P. pharyngeatum can not be correct, because in GRABDA's original description the ratio of the two organs is inverse. But the figure given by POJMANSKA shows that the pharynx is larger than the oral sucker. The ratio of the pharynx and oral sucker is 2:1 in the figure. Accordingly, it seems highly probable that the fluke species published by POJMANSKA is identical with P. simillimum (syn. P. pharyngeatum).

Also the species published by EDELÉNYI (1966) from Hungary is problematic. Namely, the author publishes neither measurements of the oral sucker, nor the sucker in the figure, but submits only an enlarged kettle-shaped prepharynx. If the muscular oral sucker is in fact lacking, then the fluke, collected from *Microtus agrestis*, can by no means be relegated to the genus Psilotrema, but may perhaps represent a species of the genus Psilostomum (Psilostomum ondatrae ?). Unfortunately, the fluke was found only in one exemplar and it is not available for examination, thus the problem can not be clarified.

Psilotrema spiculigerum (Mühling, 1898) - Fig. 3

Host: *Ondatra zibethica*; Locality: Lake Fertő.

Localization: small intestine; Intensity: 3 specimens.

Table 2

Measurements of *P. simillimum* and *P. pharyngeatum* in μ

	<i>P. simillimum</i>			<i>P. pharyngeatum</i>			
	Mühling	Bikhovskaya-Pavlovskaya		Grabda	Pojmanska	Erhardová	Edelényi
Body length	1400-1900	1160	1130	1870-2126	1340-1370	1100-1700	1290
Maximum width	770	260-570	330-480	610-740	450-490	497-666	310
Oral sucker	108x169	98x100	110x110	117-137x 134-144	194-206x 170-182	< pharynx	-
Pharynx	198	140x140	150x140	250-270x 240-260	109-121x134	156x228	140x70
Ventral sucker	385	220x230	230x270	290-390x 270-390	218-231x219	234-257x 264-298	280x270
Testes		150x160	160x158	200-250x 290-340	146-158x 167-194	194-242x270	105x175
	216			290-340x 280-232	158-182x 167-194	234-351x 220-272	140x180
Ovary	122	72x96	72x96	147x137-147	109-134x 109-146	117x234	90
Egg	90x50	89x49	90x50	98-107x 49-59	70-100x 40-50	85-105x58-70	60x40

Table 3

Measurements of *P. spiculigerum* and *P. marki* in μ

	<i>P. spiculigerum</i>			<i>P. marki</i>	
	Mühling	Bikhovskaya-Pavlovskaya	Author's data	Skwortzow	Sey
Body length	1120	1020-1060	656-1180	1350-1370	1110-1370
Maximum width	710	480-500	299-452	617-675	530-670
Oral sucker	180	116x125	124-143x149-156	140x152	140-160x150
Pharynx	132x90	99x166	99-118x87-99	96x116	-
Ventral sucker	as the oral sucker	165x182	162-199x162-198	192x192	190x160
Testes	195	182x252	124-187x74-187 124-187x78-180	96-115x144-212 135-173x193-231	90-190x140-160
Ovary	144	112x125	99-106x106	115-155x96-164	110-150x90-160
Egg	97x50	76x102	84-99x62-71	84-100x60-72	95x110

In Hungary, the species was first found by SEY (1966) in the small intestine of Ondatra. Unfortunately the measurements of the pharynx and the ratio of the pharynx and the oral sucker were not published in the description, but the figure clearly shows that the pharynx of the species collected by SEY is smaller than the oral sucker. The measurements of the specimens in our collection are given in Table 3. The data given by the various authors of the species P. spiculigerum (Mühling, 1898) and P. marki (Skwortzow, 1934) are summarized in this table. A comparison of the data given in the table shows no significant differences between the body and organ measurements of the two species, described by MÜHLING and SKWORTZOW, respectively. According to SKWORTZOW, the distinction between P. marki and P. spiculigerum is, among others, based on different sizes of the suckers and the cirrus-pouch of the respective species. There are differences also in the spinosity of the tegument, the position of the follicles, the different number of the eggs and the stage of development of the excretory system. If we compare these features with the original description and with those published recently from birds under the name P. spiculigerum (BIKHOVSKAYA-PAVLOVSKAYA, RYJIKOV and KHOTENOVSKY, 1966) one may state that these differences do not exist at all (e.g. the spinosity of the tegument), or they are within the ranges of individual variability (e.g. the size and position of the follicles, the development of the excretory system).

The number of eggs varies between one and 15-20 per exemplar; their greater number cannot therefore be a characteristic feature of P. marki. According to SKWORTZOW, a differentiating feature is the difference between the hosts, but in the knowledge of the life cycle of this fluke species, now we cannot consider this difference as characteristic. The cercariae leaving the water-snail encyst on aquatic plants. Adult worms develop in the gut of the final host, which consume aquatic plants. MATHIAS (cit. WERTEJUK) proved experimentally that also the white mouse can be infected besides the domestic duck, and the adult specimens of P. spiculigerum develop also in mammals. P. marki was described by SKWORTZOW from *Arvicola terrestris*. It

has been found by others (GRABDA, 1954; SEY, 1966) in *Ondatra zibethica*. Both rodents have aquatic habits and they consume considerable amounts of plant food, therefore liable to be infected with *P. spiculigerum*.

P. spiculigerum was published by MERKUSHEVA (1958) without investigating its relation to *P. marki*. On the basis of the comparison of the two species, it is obvious that *P. marki* Skwortzow, 1934, is the junior synonym of *P. spiculigerum* (Mühling, 1898). This species occurs both in birds (Anseriformes, Anatidae) and mammals (Rodentia).

Identification key to *Psilotrema* species

- 1 (2) Oral sucker larger than pharynx, or equal to it. Ratio of oral sucker and pharynx 1:0.5-1

spiculigerum (Mühling, 1898)
(Syn.: *P. marki* Skwortzow, 1934). Hosts: *Arvicola terrestris*, *Ondatra zibethica*, Anseriformes.

- 2 (1) Oral sucker smaller than pharynx. Ratio of oral sucker and pharynx 1:1.4-2

simillimum (Mühling, 1898)
(Syn.: *P. pharyngeatum* Grabda, 1954). Hosts: *Arvicola terrestris*, *Ondatra zibethica*, *Microtus ratticeps*, Anseriformes.

Species inquirenda: *P. oligoon* (Linstow, 1887).

MATSKÁSI, I.: Magyarországi rágcsálók és rovarvők (Mammalia) mételyfaunája. III. A *Psilotrema simillimum* és a *P. spiculigerum* (Mühling, 1898) (= *P. marki* Skwortzow, 1934 syn. n.) előfordulása rágcsálókban

Magyarországi rágcsálók helmintológiai vizsgálata során két *Psilotrema* faj, a *P. simillimum* (Mühling, 1898) és a *P. spiculigerum* (Mühling, 1898) került elő. Az előbbi faj gazdaállata az *Arvicola terrestris* és a *Pitymys subterraneus* volt, míg az

utóbbi Ondatra zibethicaban élősködött. Az előkerült példányok vizsgálata alapján újabb adatokkal lehetett alátámasztani MERKUSHEVA (1959) megállapítását, miszerint a P.pharyngeatum Grabda, 1954 a P. simillimum szinonímája. A P. spiculigerum példányok, valamint az irodalmi adatok elemzése alapján megállapítható volt, hogy a P. marki Skwortzow, 1934 a P. spiculigerum szinonímája. A két, eredetileg madaraktól leírt Psilotrema faj a vízi életmódot folytató rágcsálókba bejutva is ivaréretté fejlődik.

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