

# CONTRIBUTIONS TO KNOWLEDGE OF THE INTERNAL PARASITES OF MUSKRAT (*ONDATRA ZIBETHICA* L., 1776) LIVING ALONG THE RIVER TISZA

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(Received, November 10, 1965.)

The muskrat got into the fauna of Europe more than half a century ago. It was introduced into a domain in Dobruša, Bohemia. The species of great prolificity, of migratory inclination and of good acclimatizing capacity very soon spread in the whole Bohemia and simultaneously it began its European expansion.

In this country the first one got caught in Némethyfalva (county Moson) just half a century ago (1914). At present it is generally known in the whole country and is a fur animal of great value of our fauna.

In its country of origin (North America) its inner parasite fauna had been studied thoroughly. The examinations began at the beginning of our century and go on in these days, as well. In Europe the revelation of its parasites began immediately after its introduction and we can find data referring here to almost in every European country. In this country, however, this is the first contribution about the internal parasites of muskrats.

The parasites found belong to the classes *Trematoda*: *Echinostoma coalitum* Barkes et Beaver, 1915; *E. revolutum* (Fröhlich, 1802), Dietz, 1909; *Psilothrema marki* Skworcow, 1934; *Plagiorchis (P.) proximus* Barkes, 1915. — *Cestoda*: *Aprostotandrya (A.) macrocephala* (Douthitt, 1915) Spassky, 1949; *Cysticercus taenia taeniaeformis* (Batsch, 1789) — *Nematoda*: *Ascaris* sp. (larva).

## Material and method

The material necessary for examinations was obtained from professional collectors of muskrats. I have had a relatively small material at my disposal (Vásárosnamény: 13, Szeged: 12 pieces), so the result obtained cannot raise a claim to completeness being but of informative character in connection with this problem.

At autopsy the following course was kept. The cavity of animal was opened in a dissection-dish, below water. The several organs were put separately into Petri cups, thoracic and abdominal cavities of the animal were examined. Then the organs (brain, heart, lungs, liver, gall-bladder, pancreas, kidney, bladder, intestinal tract) were dissected and examined under microscope. The parasites found were cleaned in isotonic saline solution from possible contaminations.

For fixing, staining, and conserving the parasites I used the generally

employed techniques. The *Trematoda* and *Cestoda* were fixed and preserved in 70. p. c. alcohol. Fixation was carried out under topplate with a mild pressure on parasites where necessary. *Trematoda* were stained in borax-carminic alcoholic solution, *Cestoda*, however, in Grenacher-Delafield's haematoxylin. The stained parasites were differentiated in hydrochloric alcohol, dehydrated in ascending alcohol-series, cleared in clove-oil and closed in Canada balsam. *Nematoda* were fixed and preserved in Barbagallo solution, cleared in lactic acid.

## Faunistic Part

### *Trematoda*:

#### Family I. *Echinostomatidae* Dietz, 1909.

##### 1. *Echinostoma revolutum* (Fröhlich, 1802) Dietz, 1909.

The occurrence of the species is known all over the world. It occurs alike in vertebrates phylogenetically distant. In North America it was described by Leidy (14) from muskrats (*Distomum echinatum* Zeder, 1803). In Europe it is mentioned by J. Grabda (12) from muskrats in Poland. I have found three ones in a unique specimen of test material from Vásárosnamény.

Localization: small intestine.

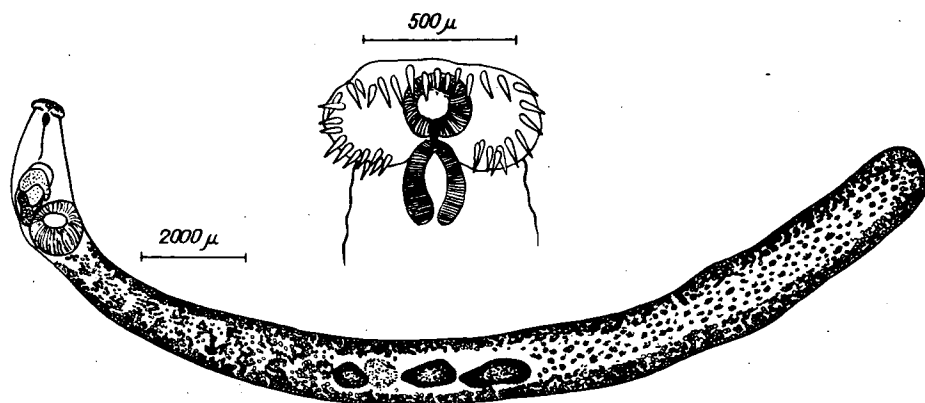
Its hosts: *Canis familiaris*, *Mus musculus*, *Ondatra zibethica*, *Sus scrofa*, *Nycticorax violaceus*, *Gallinula galeata*, *Cresciscus viridis*, *Columba livia*, *Anas platyrhynchos*.

##### 2. *Echinostoma coalitum* Barker et Beaver, 1915.

It got to Europe on the occasion of the introduction of muskrat. In North America it is a common parasite of muskrats. In Europa Tenora (21) wrote the first time about the muskrat in Czecho-Slovakia.

It is a corpulent parasite considerably lengthened. Its bodylength changes between 18—33 mm, its width between 1,3—2,3 mm. On the collar in frontpart of its body 35 spines may be observed. The mouth-sucker is spherical, of terminal location. Measure: 0,2—0,4 mm. The abdominal sucker is well developed, muscular, of 0,9—1,6 mm size. *Pharynx* is well developed, *oesophagus* relatively short. The intestinal branches are simple, reaching until the end of body.

The ovary is 0,2—0,6 mm, egg-shaped or oval. Its rim is normal or mildly wavy. It lies in the forepart of the posterior body-half. Testes are to be found in the middle line of body. Size of the first testis changes between 0,5—1,3 mm, that of the second one between 0,8—1,5 mm. *Cirrus*-pouch is well developed, it is placed before the posterior sucker. The orifice of the genital pore may be observed before the abdominal sucker, run until the end of body and fill the part of body behind the testes, as well. Uterus is well developed, it gets, with transversal tortuosity, into the genital pore. There are numerous oval ova. Their dimension is: 0,06—0,1 × 0,05—0,07 mm.



*Echinostoma coalitum*  
Barker et Beaver, 1915

Localization: small intestine.

Spread: North America, Czechoslovakia, Hungary (Vásárosnamény).

Host: *Ondatra zibethica*, *Apodemus flavicollis*.

Family II: *Psilostomatidae* Odhner, 1913.

1. *Psilotrema marki* Skworcow, 1934.

Skworcow has found this species in the small intestine of *Arvicola terrestris*. From muskrat it is mentioned by Spassky and co-workers the first time in 1949. And from muskrats in Poland the first publication is by J. Granda in 1954.

It is a worm of small body. Hinder bodypart becomes thin in a lesser, the frontal one in a greater degree. Its length is 1,11—1,37 mm, width 0,67 mm. Mouth-sucker is of subterminal location. Size: 0,14—0,16×0,15 mm. The abdominal sucker is round, it can be found in the second quarter of the bodylength. Its diameter is 0,19—0,16 mm. Pharynx is considerably developed, immediately after it the *oesophagus* is divided into two intestinal branches. The intestinal branches are simple, they reach till the end of body.

Ovary is to be found a little right from the middle line of body, between the abdominal sucker and the first *testis*. Size: 0,11—0,15×0,09—0,16 mm. The testes are in the hinder part of body, behind each other. The first *testis* is 0,09—0,19×0,14—0,16 mm, the other one 0,13—0,20×0,16—0,19 mm. The genital pore can be found in height of the *pharynx*. *Uterus* is short, number of ova little. Ova are of a little oval shape. Size: 0,095×0,11 mm. Localization: small intestine.

Spread: Soviet Union, Poland, Hungary (Vásárosnamény).

Host: *Arvicola terrestris*, *Ondatra zibethica*.

Family III: *Plagiorchidae* Lühe, 1901.

1. *Plagiorchis* (*P.*) *proximus* Barker, 1915.

It got to Europe simultaneously with the muskrat. Schultz mentions it from muskrat living in the Soviet Union in 1932, J. Grabda

from Poland in 1954, E r h a r d o v a from Czecho-Slovakia in 1958. Body-shape and size of European ones differ from data published by B a r k e r.

It is a worm of small body. Bodylength 1,30—4,60 mm, width 0,49—1,10 mm. Its mouth-sucker is of subterminal location. Size: 0,08—0,28×0,04—0,17 mm. Abdominal sucker is to be found on the dividing line of the first and second quarters of body, of size 0,06—0,15×0,07—0,14 mm. *Pharynx* is connected immediately to the oral aperture and goes on in the intestinal branches. The intestinal branches are simple, reaching till the end of body.

Ovary is round or oval, a little right from the middle line of body, immediately besides the *cirrus* pouch. Size: 0,095—0,17×0,1—0,3 mm. *Testes* are round or oval, of normal rim. They lie in the forepart of the hinder body-part. The first *testis* is 0,12—0,22 mm, the second one 0,20—0,25 mm. The *cirrus* pouch is well developed, pear shaped, its basic part reaches till the level of ovary. The vitelline glands take place close to one another from the intestinal bifurcation until the end of body.

*Ova* are numerous, of straw-yellow colour. Size: 0,032—0,037×0,016—0,024 mm.

Localization: small intestine.

Spread: North America, Soviet Union, Poland, Czecho-Slovakia, Hungary (Vásárosnamény, Szeged).

Host: *Ondatra zibethica*.

#### Cestoda:

Family I. *Anoplocephalidae* Ch o l o d k o w s k y, 1902.

1. *Aprostotandrya (A.) macrocephala* (D o u t h i t t, 1915) S p a s s k y, 1949.

Worm of middle size. The *scolex* is more or less round. On it round and oval suckers are to be found. The segments go on increasing, departing from *scolex*. Their highest width is to be found at segments containing the matured genitals. Cuticle is rather thin, *parenchyma* muscles are well developed.

There are numerous *testes* (40—100 pieces), taking place at most apolarly. The female genitals are of semicircle structure, lying in the middle of segment. Ovary consists of numerous, club shaped lobes. The vitelline glands take place among the lobes of ovary.

*Ova* are round or oval, their size is: 0,03—0,04 mm.

Localization: small intestine.

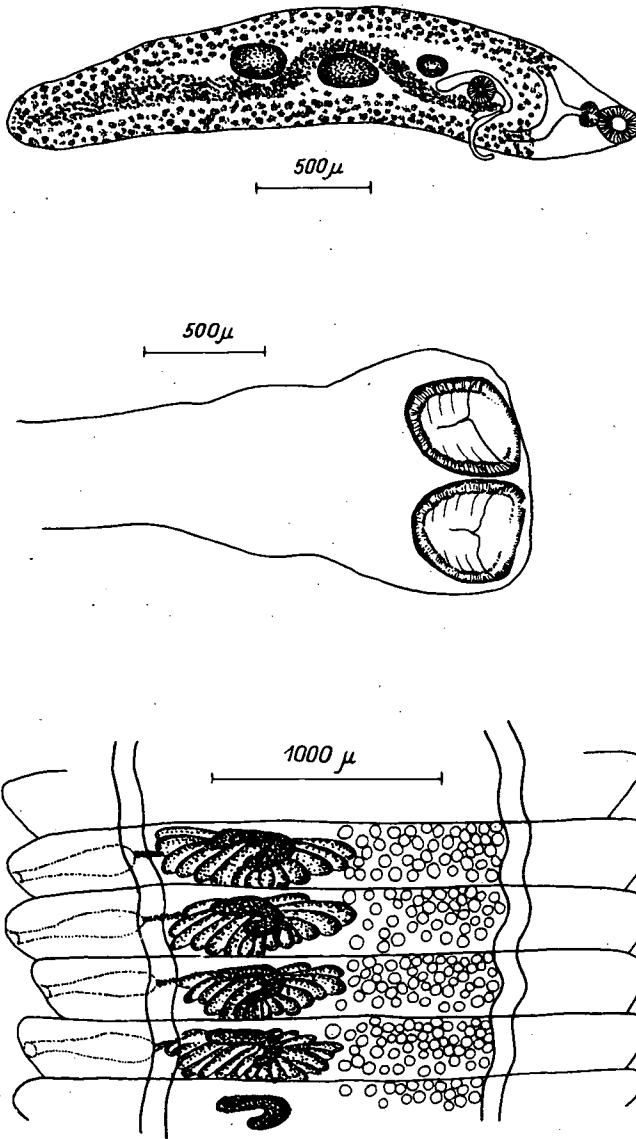
Spread: Soviet Union, Czecho-Slovakia, Hungary (Vásárosnamény), North America.

Host: *Geomys bursarius*, *Microtus arvalis*, *Mus agrestis*, *Microtus oeconomus*, *Clethrionomys glareolus*, *Arvicola terrestris*, *Ondatra zibethica*.

Family II: *Taeniidae* L u d w i g, 1886.

1. *Cysticercus taenia taeniaeformis* (B a t s c h, 1786).

It is a frequent parasite of muskrats. The cysts sometimes covered the surface of liver almost thoroughly. Their number changed, as a rule, between 8—32.



*Aprostatandrya (A.) macrocephala*  
(Douthitt, 1915) Spassky, 1949

The sexually mature worms sponge on the intestinal tract of the species of families *Canidae*, *Felidae*, *Mustelidae*.

Spread: North America, Soviet Union, Great Britain, Poland, Czecho-Slovakia, Hungary (Vásárosnamény, Szeged).

*Nematoda:*

Family I: *Ascaridae* Baird, 1853.

1. *Ascaris* sp. (larva).

We have found a female worm in the intestinal tract of a single animal of the material of examination from Vásárosnamény.

**Summary**

From the relatively small material of examination from the two banks of Tisza (Vásárosnamény, Szeged) we have obtained the following parasites: *Trematoda: Echinostoma coalitum* Barker et Beaver, 1915; *E. revolutum* (Fröhlich, 1802) Dietz, 1909; *Psilotrema marki* Skworcov, 1934; *Plagiorchis (P.) proximus* Barker, 1915; *Cestoda: Aprostandrya (A.) macrocephala* (Duitnitt, 1915) Spassky, 1949; *Nematoda: Ascaris* sp. (larva).

The occurrence of the above species in small mammals and muskrats is generally known in Europe.

After extending the examinations to the whole year and employing a larger material, the number of parasites of muskrats living the vicinity of Tisza will certainly be higher.

**References**

- Barker, F. D. (1915)  
Parasites of the American muskrat (*Fiber zibethicus* L.) *J. Parasites*. Vol. I (4) p. 184—197.
- Barker, F. D. and J. W. Laugblin (1911)  
A new species of Trematode from the muskrat, *Tr. Am. Micr. Soc.* 30. p. 261.
- Barker, F. D. (1913)  
Parasites of the Muskrat, *Science*, 37. p. 268.
- Barker, F. D. (1915)  
Parasites of the Muskrat, *Science*. N. S. 42. p. 570.
- Barker, F. D. (1916)  
A new monostome trematode parasitic in the muskrat, *Tr. Am. Micr. Soc.* 35, p. 175—184.
- Barker, F. D. (1916)  
Parasites of the Muskrat, *Science*, N. S. 43. p. 208.
- Bartik, M.—Pecha, J.—Berdechova, J. (1956).  
Nález motolice *Echinostoma coalitum* njihov oravských ondatr, *Ces. parasit.* III. p. 9—13.
- Baylis, H. A. (1935)  
Some parasitic worms from muskrats in Great Britain. *Ann. Mag. Nat. Hist. London* (10) 15. p. 534—549.
- Chandler, A. C. (1941)  
Helminths of muskrats in Southeast Texas. *J. of Parasites*. Vol. 27, p. 175—181.
- Dawes, B. (1956)  
*The Trematoda with Special Reference to British and other European Forms*. Cambridge.
- Erhardova, B. (1958)  
*Parasiticti cervi blodavcu Ceslovenska*. *Ces. parasit.* V—1. p. 27—103.
- Gra bda, J. (1954)  
*Les parasites internes du rat musque — Ondatra zibethica* L. — des environs

- de Pydgoszcz (Pologne). Act. Parasit. Polon. Vol. 11. F. 1—6. Warszawa, p. 17—36.
- Knigh t, J. M. (1951)  
Diseases and Parasites of the Muskrat (*Ondatra zibethica*) in British Columbia. Canad. Journ. Zool. 29. p. 188—214.
- Leidy, J. (1904)  
Trematodes of the muskrat, Smith, Miscel. Coll. V. 46. p. 281.
- Morel, P. (1949)  
Contribution a l'étude du rat musque en France. p. 1—104.
- Price, E. W. (1931)  
Four new of trematode worms from the muskrat, *Ondatra zibethica*, with key to the trematode parasites of the muskrat. Proc. U. S. Nat. Mus. 79. 4. p. 1—13.
- Rider, C. L. and Macy, R. W. (1947)  
Preliminary survey of the helminth parasites of the muskrats in Northwestern Oregon, with description of *Hymenolepis ondatrae* n. sp. Trans. of the Micr. Sec. V. LXVI. No. 2. p. 176—181.
- Rausch, R. (1946)  
Parasites of Ohio muskrats. J. Wildlife. Mgt. I. p.
- Sweatman, G. K. (1952)  
Endoparasites of muskrats Vicinity of Hamilton.
- Ontaric J.  
Mammals. 33. p. 248—250.
- Tenora, F. — Baruy, V. (1955)  
*Cysticercus taenia taeniaeformis* — vazny cizopaski nasich ondatery. Sbor. Vys. Skoly. zem. a lea, fak. p. 143—148.
- Tenora, F. (1956)  
Prispevek k poznani helmintofauni ondatry pizmone (*Ondatra zibethica*). V. C. R. Sborn. Vys. ak. zem. a les. v. Brno. p. 37—50.
- Sharpylo, L. D. and N. P. Sharpylo (1959)  
A new species of trematode *Stepanoproraoides markewitschi* n. sp. from the muskrat. Dop. Akad. Nauk. USSR (8) p. 923—925.
- Skrjabin, K. I. (1948—58)  
Trematody zhivotnyh i tshelaveka. T. I., XII, XIV. Moscow, Leningrad.
- Serkova, O. P. (1948)  
Parasito fauna ondatry acclimatisi rovannoj v Keralo-Finnskoj S. S. R. Parasit abor. 10. p. 189—193.
- Spassky, A. A. — Romanova, N. R. — Naidenova, N. V. (1951)  
Novye dannye o faune parasititsheskih tshervei ondatry (*Ondatra zibethica*). Trud. helminth. lab. T. V. p. 42—52.
- Spassky, A. A. (1953)  
Anoplocefaljátü T. I. Moscow. O stepenny samostaiatelnosti helmintofauny ondatry. K. 75 leti tud. Akad. Skrjabina. Isn. Akad. Nauk. Moscow. p. 688—693.
- Varenov, I. V. (1963)  
*Macrotestophyes ondatrae* gen. nov. sp. n. — novaia trematoda ondatry. K 85 leti. tud. Akad. Skrjabina. Isd. Akad. Nauk. p. 142—144.
- Vasiliev, E. A. (1939)  
Parasitofauna ondatry. Tp. Karelskogo Ped. Inst. ser. biol. 1. p. 93.