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Parasitology

METACERCARIAE OF THE GENUS *APOPHALLUS* LÜHE, 1909 *(TREMATODA: HETEROPHYIDAE)* IN WESTERN POMERANIA OF POLAND

METACERKARIE Z RODZAJU *APOPHALLUS* LÜHE, 1909 *(TREMATODA: HETEROPHYIDAE)* NA ZACHODNIM POMORZU POLSKI

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Metacercariae of *Apophallus donicus* (Skrjabin et Lindtrop, 1919) Price, 1931 and of *A.muehlingi* (Jägerskiöld, 1899) Lühe, 1909 were found in fishes of Szczecin Firth and Dąbie lake, as a new parasitic fauna of Poland. It was established that *A.donicus* and *A.muehlingi* are specific to perches and cyprinids, respectively. Detailed description and comparison of both species obtained from various hosts are given.

INTRODUCTION

The metacercariae of the genus *Apophallus* Lühe, 1909 had been noted by many authors. The applicable data was that of **Engelbrecht** (1958) who is found *Apophallus muehlingi* (Jägerskiöld, 1899) Lühe, 1909 in fishes of Small Firth and Greifswald Bay. The presence of *A. donicus* (Skrjabin et Lindtrop, 1919) Price, 1931 and *A. muehlingi* were observed by **Odening** (1970) in vicinity of Berlin. These parasites were described by **Ciurea** (1924, 1928), **Markevič** (1951), **Lucky** (1957) and **Odening** (1970). The full life cycle of *A. muehlingi* is studied by **Odening** (1970). **Vojtek** (1959) drew the attention to certain distinguishable features between *A. donicus* and *A. muehlingi.* Nevertheless, there are descripances of identification in some other works.

The aim of this study is the detailed comprehensive description of the metacercariae of genus *Apophallus,* which are newly discovered in Poland, that infesting different fish species.

MATERIAL AND METHOD

The fishes used for this study were obtained from Szczecin Firth and Dąbie lake which is connected with Odra river. The material collected from August to October 1971 and May to July 1972. In this study 658 fishes of 9 species, from which 3 belonging to the family *Percidae* and 6 to *Cyprinidae,* were used (Tabl. 1). From these studied species, *Abramis brama* (L.) and *Abramis ballerus* (L.) were caught in Dąbie lake.

Table 1

Number of examined fishes

Species of fish	Number of examined fishes	Measurements of fishes longitudo corporis/ longitudo totalis w (cm)
Abramis brama (L.)	20	7.8/10.0–32.0/37.0
Abramis ballerus (L.)	25	12.5/15.0–33.5/40.0
Blicca bjoercna (L.)	40	4.0/5.0–23.0/28.0
Vimba vimba (L.)	29	15.0/18.0–23.5/29.0
Alburnus alburnus (L.)	2	9.7/11.9–10.8/12.9
Scardinius erythrophthalmus (L.)	18	12.0/14.8–20.5/25.0
Lucioperca lucioperca (L.)*	14	22.0/25.0–70.0/78.0
Perca fluviatilis L.	455	6.1/7.2–36.0/41.0
Acerina cernua (L.)	55	7.5/9.1–11.5/14.0

*) Material obtained from *Lucioperca lucioperca* received owing to courtesy Dr. Jadwiga Grabda, Institute of Ichthyology. Academy of Agriculture. Szczecin. Poland

The cysts of parasites were observed and measured in living condition, while that of metacercariae were made on fixed preparations mounted in Canada balsam. These trematodes killed by slight heating, fixed without flattening, and stained in acetic carmine. Some observations as situation of excretory system and covering of body were made on alive specimens.

Measurements of *Apophallus donicus* were obtained from *Perca fluviatilis* L. , and *Acerina cernua* (L.), caught in the autumn season. For comparison, the measurements of *A. muehlingi* from four hosts: *Scardinius erythrophthalmus* (L.), *Vimba vimba* (L.), *Blicca bjoercna* (L.) and *Abramis ballerus* (L.) were taken in the same season. From the previously measured cysts, it was found, that 102 of both species possess paired sheath; 95 and 101 cysts of *A. donicus* and *A. muehlingi,* respectively, possess single sheath. The

measurements of 80 metacercariae of *A. donicus* and 96 metacercariae of *A. muehlingi* are given. The number of measured cysts and metacercariae was not the same in every fish species. The minimum number of measured cysts and metacercariae were for *Abramis ballerus* and *Blicca bjoercna* (13 to 25) as well as cysts from *Acerina cernua* (22 and 20). Most measurements were made on materials obtained from *Perca fluviatilis* (80 cysts in paired sheaths and 47 metacercariae).

RESULTS

Two species of metacercariae belonging to the genus *Apophallus* Lühe, 1909 were newly recorded for parasitic fauna of fishes in Poland.

1. *Apophallus donicus* (Skrjabin et Lindtrop, 1919) Price, 1931

Larval forms of this parasite appared in three species of perches, caught in Szczecin Firth and Dąbie lake (Tabl. 2). The extensity of infection in *Perca fluviatilis** is 79.8% and in *Acerina cernua* reached 100%. Although, the extensity of infection in *P. fluviatilis* is lower than in *A. cernua,* but the intensity of infection is oppositely. The higher infection is observed in small and medium specimens of *P. fluviatilis.* Few numbers of larvae are observed in *Lucioperca lucioperca* (L.).

Table 2

Fish infection with metacercariae of the genus *Apophallus* Lühe, 1909

Species of fish	Extensity of infection (%)	Intensity of infection
Apophallus muehlingi (Jägerskiöld, 1899)		
Abramis brama (L.)	55	single – numerous
Abramis ballerus (L.)	96	single – very numerous
Blicca bjoercna (L.)	60	single – numerous
Vimba vimba (L.)	100	single – very numerous
Alburnus alburnus (L.)	+	numerous
Scardinius erythrophthalmus (L.)	88.9	single – very numerous
Apophallus donicus (Skrjabin et Lindtrop, 1919)		
Lucioperca lucioperca (L.)	50	single – rare
Perca fluviatilis L.	79.8	single – mass
Acerina cernua (L.)	100	single – numerous

(single – upto 20 cysts per fish; rare – upto 50; numerous – 100–200; very numerous – upto 500 metacercariae.

*) In 1970 during the investigation of parasitic fauna of P. *fluviatilis* caught off shore lake Resko (Szczecin Province) the extent of metacercariae of *A. donicus* were found to be 22%. The intensity of infection varies from single to numerous parasites.

Encysted metacercariae were found in fins and skin. Most frequently and numerously they were concentrated in caudal and pectoral fins and dorsal side of fishes. The larvae were observed in all fins and whole surface of skin in mass infection. The parasites were situated in fins, mainly close to the fin rays (Fig. 1a).

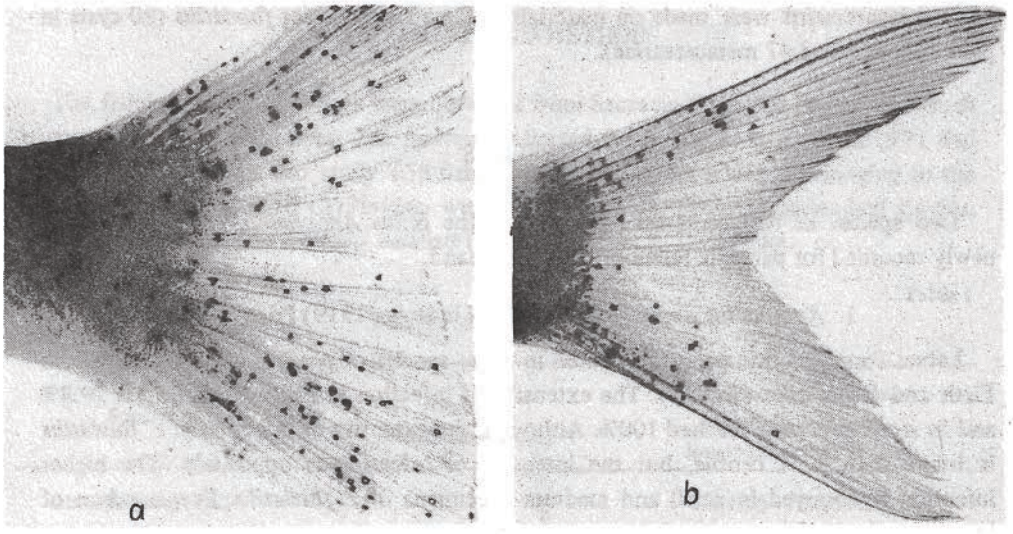

Fig. 1. Metacercariae encysted in caudal fin:
a – *Apophallus donicus* in *Perca fluviatilis*;
b – *A. muehlingi in Blicca bjoercna*

A. donicus is easily identified macroscopically by the black pigment which sometimes completely surrounds the cysts. Diameter of these black spots reached to 0.7 mm. Isolated cysts are of elipsoid form and less frequently of globular form. (Fig.2 a b). Tha wall of cyst is composed of two various sheaths. The outer sheat is relatively thick, frequently upto 60 μm, often with two layers of different structure. Internal sheath is thin, translucent and structureless. Its thickness amounted to 5 μm at sides and ends was slightly larger, reaching sometimes upto 7 μm on the poles. Examining the cysts in living condition, the dark excretory vesicle and other organs of metacercariae can be seen.

Comparing the cysts collected from both fish species slight differences in size were observed. In *Perca fluviatilis* the paired sheated cysts were larger that those in *Acerina cernua*; this is related to thicker outer sheath. The internal sheaths in both hosts are of similar thickness and therefore the cysts in such sheaths were slightly smaller in *Acerina cernua* (Tabl.3).

Metacercariae *A. donicus* are of elongate shape; some of them are slightly wider anteriorly and the other posteriorly (Fig.3,4). The dimensions of the trematodes and its organs are given in Table 3. Similarly as in cysts, the metacercariae from *Perca fluviatilis* are not larger than those in *Acerina cernua.* Also in the measurements of internal organs of metacercariae obtained from *Perca fluviatilis* the small sizes are dominating. The average ratio of length to width of metacercariae amounted to 3.1:1 for both species.

Table 3

Measurements of metacercariae *Apophallus donicus* (Skrjabin et Lindtrop, 1919) in microns

	Perca fluviatilis L.		Acerina cernua (L.)		measurements for all hosts together	
	from – to	average	from – to	average	from – to	average
Cysts in paired sheaths	238–396x 180–295	318.9x 229.6	209–342x 169–238	277.6x 196.4	209–396x 169–295	309.2x 222.4
Thickness of outer sheath	14–60	32.8	13–45	20.6	13–60	29.5
Cysts in single sheaths	187–317x 140–212	247.1x 172.3	198–288x 148–180	241.1x 163.2	187–317x 140–212	245.8x 170.4
Thickness of internal sheath (at side)	2–5	2.8	2–4	3.0	2–5	2.8
Length of body	349–461	385.1	324–418	374.7	324–461	380.8
Width of body	91–194	125.5	96–144	119.2	91–194	122.9
Oral sucker	34–48	39.5	32–41	37.8	32–48	38.8
Prepharynx	0–22	11.3	0–20	10.5	0–22	11.0
Pharynx	20–29x 20–32	24.2x 26.0	20–25x 22–27	23.0x 24.3	20–29x 20–32	23.7x 25.3
Oesophagus	85–116	98.8	76–127	99.8	76–127	99.3
Ventral sucker	22–27x 22–31	24.6x 24.9	22–25x 22–25	23.9x 23.9	22–27x 22–31	24.3x 24.5
Testis I	31–41x 28–44	34.4x 34.2	27–37x 25–37	32.7x 31.5	27–41x 25–44	33.7x 33.1
Testis II	29–50x 29–41	38.0x 35.0	31–46x 25–37	36.5x 31.8	29–50x 25–41	37.4x 33.6
Ovary	17–29x 17–27	21.2x 20.5	17–25x 15–24	20.5x 19.9	17–29x 15–27	20.8x 20.3
Ratio of body length to width	2,3–4,2:1	3,1:1	2.5–3.9:1	3.1:1	2.3–4.2:1	3,1:1

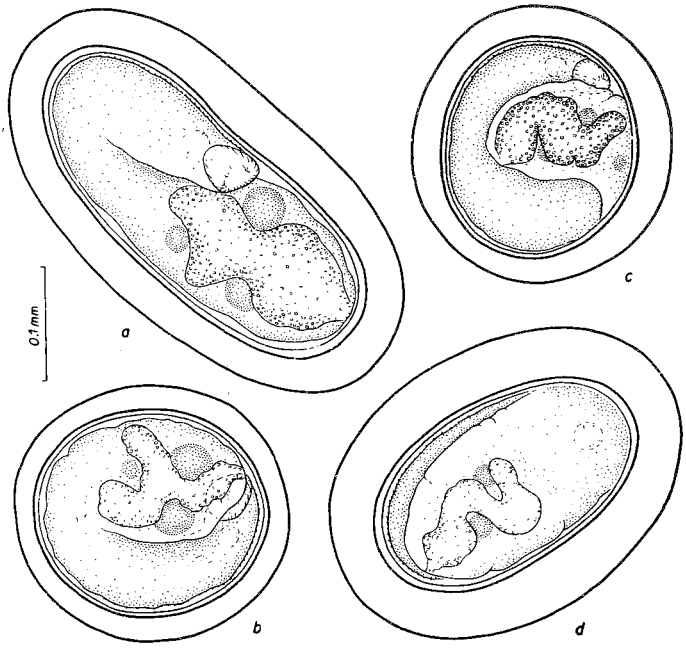

Fig. 2. Cysts of metacercariae:
a, b – *Apophallus donicus* from *Perca fluviatilis;*
c, d – *A. muehlingi* from *Blicca bjoercna*

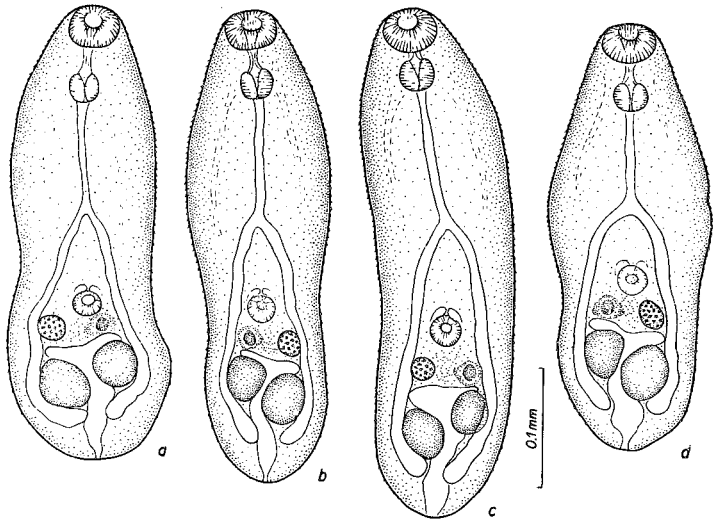

Fig. 3. Metacercariae *Apophallus donicus* from *Perca fluviatilis*
(a, c – from ventral side; b, d – from dorsal side)

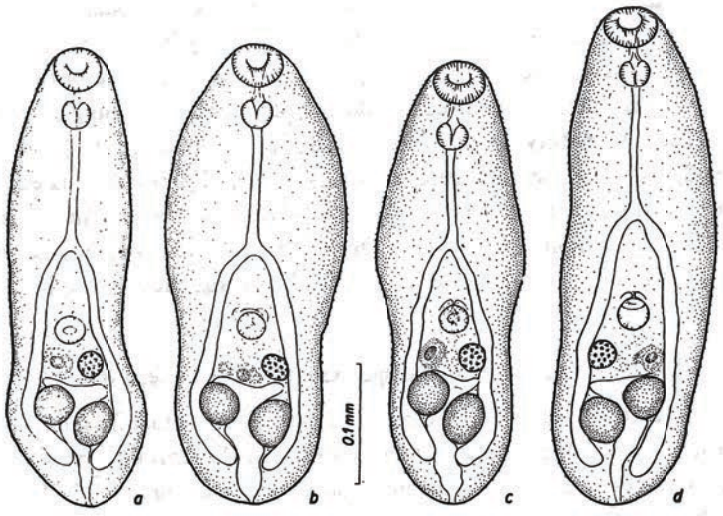

Fig. 4. Metacercariae *Apophallus donicus* from *Acerina cernua*
(a, b, c – from dorsal side; d – from ventral side)

The body of metacercariae is covered with prolate scales which are broaden posteriorly (Fig.5a). The length of body in anterior part (in the pharynx region) amounts to 3–5 μm. Width of the embedded part of the scale is 1–2 μm and the outer part 3–4 μm. The scales at the region of alimentary canal bifurcation decreasing in size toward the hind end of body.

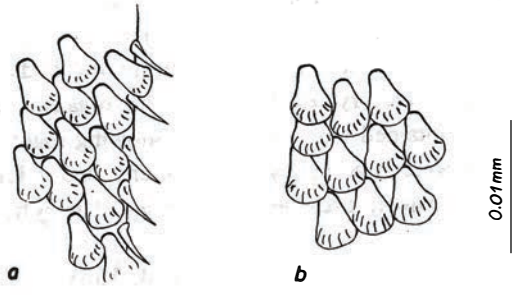

Fig. 5. Scales of metacercariae (at the pharynx region);
a – *Apophallus donicus* from *Acerina cernua;*
b – *A. muehlingi* from *Vimba vimba*

Alimentary canal begins with oral sucker, which is connected to the pharynx by short prepharynx. The pharynx is smaller than the oral sucker. Following the long oesophagus

which bifurcated before middle length of body to two blind intestinal caecae extending to the posterior part of the body. Ventral sucker similar in size to pharynx, is situated in genital recess at short distance from the middle of body length. Two genital papillae are on its frontal margin. At the posterior end of parasite located the excretory vesicle, which is Y-shaped. From its lateral sides diverticulate two main canals running upto the half of oesophagus. The flamatory cells are arranged according to the formula: 2 [(2+3)+(3+2+3)]. The metacercariae possess two rounded testes situated diagonally on both sides of the excretory vesicle. Anterior testis is slightly smaller and always reaching the anterior margin of the second testis. Between the ventral sucker and the second testis, in front of excretory vesicle, there is the spherical or oval-shaped ovary (Fig.3,4).

2. *Apophallus muehlingi* (Jägerskiöld, 1899) Lühe, 1909.

In cyprinid fishes this species of metacercariae was found. Most frequently they were found numerously in *Vimba vimba, Abramis ballerus* and *Scardinius erythrophthalmus* (Tabl.2). The extensity and intensity of infection in *Abramis brama* and *Blicca bjoercna* was relatively high, but lower than in previous fish species. This parasite is also found in one of two examined *Alburnus alburnus* (L.).

The cysts of *A. muehlingi* appeared mainly in caudal and dorsal fins and less frequently in others and on the scales. The parasites were also encountered on gill covers, in superficial layers of muscles close to the intermuscular bones, on gills and occasionally in eyes and heart. In fins they were most frequently located within radial ducts or in the epithelium surrounding the rays (Fig.1b).

The more or less compact pigments formed around the cysts depending upon the living period of metacercariae in host. Diameter of such black spots amounted to 0.45 mm. The cysts were of oval shape, and less frequently, they were spherical (Fig. 2c,d). The cysts were built of relatively thick paired outer sheat, and thin translucent structureless internal sheat. The last one is frequently thicker by about 2 μm at poles than at sides. In the cysts obtained from fresh material it is clearly seen outline of the body of metacercaria in which is distinctly visible the excretory vesicle among other organs.

The dimension of cysts, obtained from four hosts, showing slight deviations (Tabl.4). The cysts in paired sheaths were large in *Vimba vimba* and this is due to slightly thicker outer sheath of parasite in this host, it reaches about 10 μm. The cysts in single sheath are similar in dimensions.

Metacercariae of *A. muehlingi* are strongly elongated. Most frequently, it is slightly broaden at anterior part of the body and narrowed at the region of the bifurcation of the alimentary canal (Fig.6,7). Detailed measurements of these parasites and their organs are given in Table 4. The metacercariae, like cysts, are similar in size. However, metacercariae found in *Vimba vimba* possessed some dimensions slightly larger in comparison to trematodes from other fish species. The ratio of length to width of parasite body from various hosts oscillated negligably in average 5.0–5.8:1.

Table 4

Measurements of metacercariae *Apophallus muehlingi* (Jägerskiöld, 1899) in microns

	Scardinius erythrophthalmus (L.)		Vimba vimba (L.)		Blicca bjoercna (L.)		Abramis ballerus (L.)		Measurements for all hosts together	
	from – to	average	from – to	average	from – to	average	from – to	average	from – to	average
Cysts in paired sheaths	220–324x 162–241	268.8x 205.0	209–360x 180–295	293.3x 225.1	187–320x 162–263	260.4x 207.0	220–291x 180–241	261.5x 208.6	187–360x 162–295	274.2x 212.8
Thickness of outer sheath	11–46	22.6	12–57	34.3	12–42	24.1	11–33	20.6	11–57	26.9
Cysts in singl e sheaths	191–281x 144–227	239.8x 174.2	202–281x 137–202	239.8x 170.1	184–263x 144–180	223.7x 160.3	191–259x 144–194	226.1x 165.2	184–281x 137–227	234.7x 168.9
Thickness of internal sheath (at side)	3–5	3.8	2–5	3.2	2–4	3.1	3–5	3.4	2–5	3.4
Length of body	490–684	576.2	504–756	621.3	497–670	588.7	493–598	555.2	490–756	591.9
Width of body	75–144	110.5	90–176	116.3	83–137	100.6	90–133	111.8	75–176	111.1
Oral sucker	35–48	40.7	37–51	42.9	35–46	40.3	34–48	40.4	34–51	41.4
Prepharynx	0–27	14.9	0–37	20.3	7–31	19.9	5–31	17.1	0–37	18.0
Pharynx	18–27x 17–27	22.3x 24.3	20–28x 22–31	23.9x 25.2	20–27x 22–31	22.6x 24.1	19–25x 20–29	22.2x 23.9	18–28x 17–31	22.9x 24.5
Oesophagus	144–194	171.1	141–221	192.7	166–238	191.0	144–198	172.7	41–238	180.3
Ventral sucker	22–30x 23–30	26.2x 26.0	23–32x 23–32	26.2x 26.4	24–31x 20–31	26.6x 26.2	22–29x 24–31	25.7x 26.7	2–32x 20–32	26.2x 26.3
Testis I	17–27x 18–26	22.0x 21.4	19–27x 17–25	22.8x 22.0	18–27x 19–27	22.1x 23.1	20–27x 20–26	24.1x 22.6	17–27x 17–27	22.5x 22.0
Testis II	20–31x 17–28	24.4x 22.4	20–31x 17–27	24.9x 23.3	22–32x 17–28	25.9x 22.6	20–31x 20–28	27.6x 24.5	20–32x 17–28	25.2x 22.9
Ovary	12–20x 12–15		14–18x 12–15		14–20x 12–20		15–20x 12–15		12–20x 12–20	16.4x 14.2
Ratio of body length to width	4.0–7.0:1	5.2:1	4.0–7.6:1	5.3:1	4.4–8.0:1	5.8:1	4.0–6.3:1	5.0:1	4.0–8.0:1	5.3:1

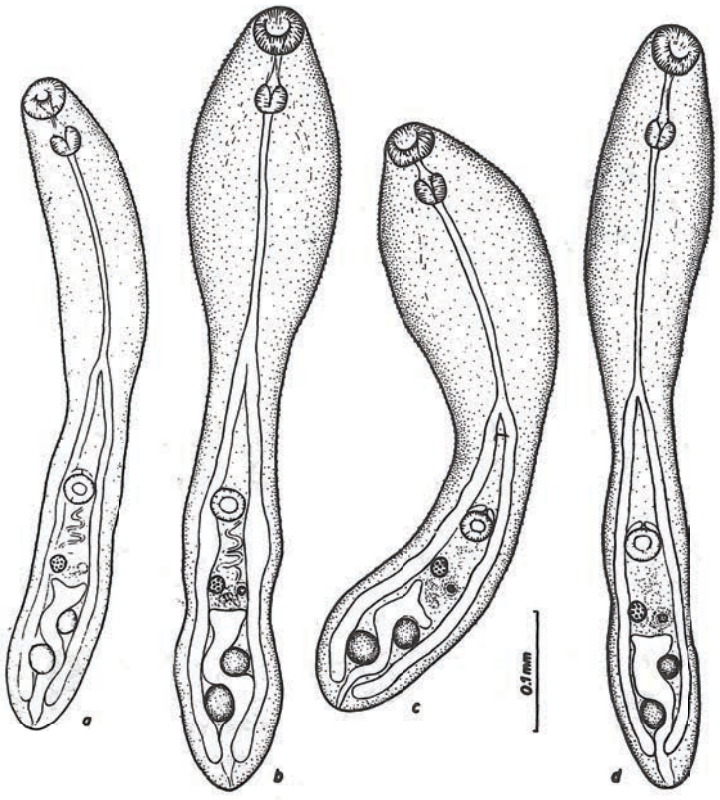

Fig. 6. Metacercariae *Apophallus muehlingi* (from ventral side);
a, b – from *Scardinius erythrophthalmus;*
c, d – from *Vimba vimba*

The body of metacercariae are densely covered with scales, which are prolated and slightly broaden at the posterior edge (Fig. 5b). The measurements of scales in the region of pharynx are as follows: 4–5 μm in length, 1–2 μm the width at the anterior part, about 3 μm at the posterior part. At the origin of intestine the scales are gradually decreasing in size and they are visible upto the level of the first testis.

Large oral sucker connected to the pharynx through a long narrow prepharynx. Then following the pharynx, the oesophagus leading to the bifurcated intestinal caecae, which are started – most frequently – before half of the body length and extended to posterior extreme of the body. Ventral sucker, frequently slightly larger than pharynx, is situated between middle and posterior third of body length, in genital recess. In front of it there are two small genital papillae. In the hind end of body there is the elongated and slightly curved excretory vesicle. From its lateral sides diverticulate two main canals running upto the half of oesophagus. Protonephrydial formula of this species is: 2[(4+5)+(a+a+a)],

where a = 6 or 7. At marginal sides of excretory vesicle are situated diagonally two circular testes, of which the anterior one is slightly smaller than the posterior. The back edge of first testis is not reaching the level of the second one. Over the second testis, above the excretory vesicle situated small ovary which is slightly oval in shape. Between the vesicle and the ventral sucker located the loops of uterus (Fig. 6, 7).

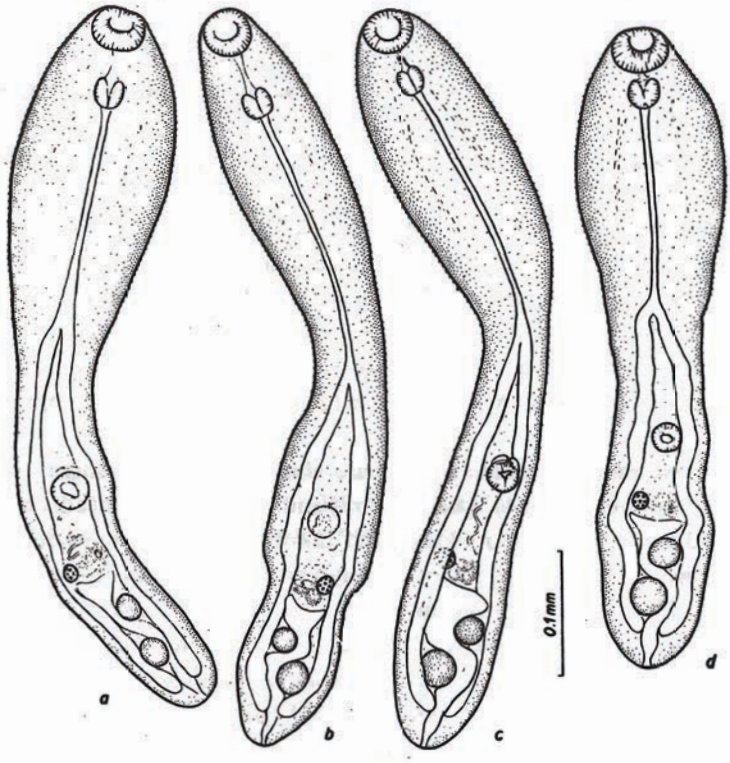

Fig. 7. Metacercariae *Apophallus muehlingi;*
a, b – from *Blicca bjoercna;*
c, d – from *Abramis ballerus*
(a, c, d – from ventral side, b – from dorsal side)

DISCUSSION

An infection of fishes with metacercariae of the genus *Apophallus* had already been noted, but it was found that the degree of their invasion varried widely. Some authors (**Komarova** 1964, **Žitňan** 1966) noted relatively low extensity and intensity of infection. Also, **Engelbrecht** (1958) found *A. muehlingi* in 4% of *Rutilus rutilus* (L.) and in 12% of *Blicca bjoercna* (L.) from the Greifswald Bay, and in 8% of *Rutilus rutilus* (L.) from

Small Firth. OPPOSITELY form the observazions carried out no fishes form Szczecin Firth and Dąbie lake it was found very high extensity of infestation with metacercariae *A. muehlingi*. The results obtained in this study are similar to that of **Vojtek** (1959), who records high extensity of infection of *A. donicus* in perches and with *A. muehlingi* in some species of cyprinids. Amongst the highest extensity was in *Scardinius erythrophthalmus* (89,6%). **Molnár** (1969) reported the possibility of occurrence of 1000 larvae *A. muehlingi* in one fish.

Comparing the measurements of the cysts and morphology of metacercariae isolated from it with that from literature, therefore the following problems require more detailed explanation.

Cysts *A. donicus* in paired sheaths are similar to those described in literature (**Ciurea** 1928, **Vojtek** 1959 and others). However, in the present study large differences in their sizes were noted. The measurements of cysts in single sheath was not encountered in accessible literature. The length of metacercariae and its organs had been proved to be smaller than those noted by **Ciurea** (1928), **Markevič** (1951) and **Vojtek** (1959). This was probably due to the measurements of parasites taken in living condition. **Vojtek** (1959) indicates to the non-proportionality of large ventral sucker, which in turn is similar in size to the oral sucker. This is not in agreement with the results obtained from the present study.

Cysts of *A. muehlingi* in paired sheaths are almost similar, but slightly larger than those described by **Ciurea** (1924), **Lucky** (1957) and others. Three sheaths consisting of fibrin (upto 13 μm), hyalin (upto 43 μm), and thin one (about 3 μm, were reported by **Lucky** (1957); while **Ciurea** (1924) reported only two. Examining the cysts, isolated from the tissue containing the focus of accumulating pigments, it was observed the presence of two layers in the outer sheat. The total thickness of this outer sheath upto 57 μm and that of inner one which is upto 2–5 μm. **Ciurea** (1924) reported the presence of the scales on the body of *A. muehlingi*. **Odening** (1970) give drawings for this scales which not completely in agreement with observations in this study.

The external measurements of *A. muehlingi* are similar to those noted in literature with exception to **Lucky** (1957) who give smaller lower limit of the body length. Also, the size of the sucker are the same with the majority of data present in literature. While in the present study they are smaller than those described by **Lucky** (1957) and **Odening** (1970). According to **Odening**, the parasites possess large pharynx, but certainly this may probably be caused by measuring the specimens in living condition, flattened to a certain extent under the cover. **Odening** in his drawings shows that ovary is oval-shaped, larger than testis, and situated above the excretory vesicle. The size of ovary does not in agreement with that reported by **Ciurea** (1924) and to the present study. There are no measurements in literature for the gonads.

It was seen in this study, that the regions in which the metacercariae *A. donicus* and *A. muehlingi* are present, in agreement with those of other authors.

Next problem is the detailed study of metacercariae found in various hosts. This problem has not been noted by the observations of other authors. The obtained results

indicated that there is no difference in *A. muehlingi* obtained from four hosts: *Vimba vimba, Scardinius erythrophthalmus, Abramis ballerus* and *Blicca bjoercna*. Similarly, no obvious differences noted in metacercariae *A. donicus* from *Perca fluviatilis* and *Acerina cernua*.

Comparing the results obtained from the examination of both *A. donicus* and *A. muehlingi* it was found certain differences. The metacercariae *A. donicus* possess slightly larger cysts and broaden body, while *A. muehlingi* are considerably longer. The ratio of length to width is different to both metacercariae, and its averages are about 3.1:1 and 5.3:1 for A. donicus and *A. muehlingi*, respectively; this was pointed out already by **Vojtek** (1959). Moreover, the digestive system with exception of the pharynx and the ventral sucker are most frequently slightly smaller in *A. donicus*. The important differences were noted in size and arrangement of gonads. This are longer in *A. donicus* as mentioned before by **Ciurea** (1928), **Markevič** (1951) and **Byhovskaja-Pavlovskaja** (1962). Moreover, both species possess different protonephrydial formula. *A. muehlingi*: 2[(4+5)+(a+a+a)], where a = 6 or 7, which is in agreement with that recorded by **Odening** (1970). *A. donicus* has 2[(2+3)+(3+2+3)] according to **Hsü** (1936) and the present study or 2[(2+2)+(3+3+3)] according to **Odening** (1970). It was observed by the naked-eye the large pigment concentrations around the cysts of *A. donicus*, on which **Vojtek** (1959) previously write.

In the present study the metacercariae of *A. donicus* and *A. muehlingi* are present in perches and cyprinids, respectively. The specificity in relation to the hosts had been observed by **Markevič** (1951), **Vojtek** (1959), **Žitňan** (1966), **Odening** (1970) and others. However, an appaarance of *A. muehlingi* in perches is noted by some authors (**Morozov** 1952, **Ševčenko** 1956, **Byhovskaja-Pavlovskaja** 1962, **Komarova**, 1964, **Molnár** 1966, 1969), while *A. donicus* in cyprinids (by **Mödlinger** 1934), would be rather considered as an accidental infection or, probably, because of scale of difficulties, as not so much precised identification of these parasites. Similar conclusion is obtained before by **Odening** (1970). The authors of this work are of the opinion that the specificity of these metacercariae in relation to the hosts is obvious.

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METACERKARIE Z RODZAJU *APOPHALLUS LÜHE*, 1909 *(TREMATODA: HETEROPHYIDAE)* NA ZACHODNIM POMORZU POLSKI

Streszczenie

Badając parazytofaunę ryb Zalewu Szczecińskiego i wód przyległych, w latach 1971–72, stwierdzono dwa gatunki metacerkarii należące do rodzaju *Apophallus Lühe*, 1909. Przywry *A. donicus (Skrjabin et Lindtrop*,1919) *Price*, 1931 znajdowano wyłącznie u ryb okoniowatych, natomiast *A. muehlingi (Jägerskiöld*, 1899) *Lühe*, 1909 występowały tylko u karpiowatych (Tab. II).

Podano szczegółowy opis i porównanie form larwalnych obu gatunków pochodzących z różnych ryb. W czasie badań nie zaobserwowano większych odchyleń u metacerkarii *A. donicus* i *A. muehlingi* w zależności od żywicieli. U omawianych pasożytów wykazano natomiast wyraźne różnice gatunkowe, na co zwracali już uwagę inni autorzy.

Metacerkarie *Apophallus* spotykano w badanym środowisku często bardzo licznie, dotychczas nie notowano ich jednak w polskim piśmiennictwie.

МЕТАЦЕРКАРИИ ИЗ РОДА APOPHALLUS LÜHE, 1909 (TREMATODA: HETEROPHYIDAE) В ЗАПАДНОМ ПРИМОРЬЕ ПОЛЬШИ

Резюме

Исследуя паразитофауну рыб Щецинского залива и прилегающих водоёмов в 1971–72 годах, обнаружили два вида метацеркарий, относящиеся к роду

Apophallus Lühe, 1909. Трематоды A. donicus (Skrjabin et Lindtrop, 1919) Price, 1931 находили исключительно у окуневых рыб, а A. muehlingi (Jägerskiöld, 1899 Lühe, 1909 встречались только у карповых (табл. II).

В работе приводится подробное описание и сравнение личиночных форм обоих видов, встречающихся у разных рыб. Во время исследований не отмечались большие расхождения у метацеркарий A. donicus и A. muehlingi в зависимости от хозяев. У исследуемых паразитов отмечены однако отчётливые видовые различия, на что обращали внимание уже другие авторы.

Метацеркарии Apophallus встречали в исследуемой среде часто в довольно большом количестве, однако до сих пор о них не говорилось в польской научной литературе.

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After having submitted this paper to press. a work by **Malczewski** (1962–1963) was encountered in which, among the other things, the occurrence of adult forms of *Apophallus muehlingi* (Jägerskiöld, 1899) and *A. donicus* (Skrjabin et Lindtrop, 1919) (= *Rossicotrema donicum*) was recorded in *Alopex lagopus* L., *Vulpes vulpes fulvus* Desm. and *Mustela vison* Schreb. fed on fish meat in fur-bearing animal breeding farms in Poland.

(Malczewski A., 1962–1963: On the influence of the diet on the composition of helminth fauna in foxes and minks in farm conditions in Poland. – Helminthologia, 4:312–317).