

Trematodes of herons (Aves: Ciconiiformes) in the Czech Republic

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Summary

A survey of 29 species of trematodes found in the Czech Republic in 530 herons of 8 species: *Ardea cinerea* 436 species examined (21 species of digeneas determined), *A. purpurea* 2 (4), *Egretta alba* 34 (7), *E. garzetta* 2 (3), *Nycticorax nycticorax* 28 (2), *Ixobrychus minutus* 19 (0), *Botaurus stellaris* 8 (5), *Ardeola ralloides* 1 (3) is presented. The species recorded for the first time in the Central Europe – *Clinostomum heluans*, *Nephrostomum ramosum* and *Pygorchis affixus* which has been brought from the wintering grounds in Africa, *Echinochasmus militaris* and *Saakotrema metatestis* brought by juvenile birds from breeding ground in the South Europe. *Ophiosoma patagiatum* and *Posthodiplostomum brevicaudatum* found for the first time in the Czech Republic.

Keywords: distribution; Trematodes; herons; Czech Republic

Introduction

Trematodes parasitizing of herons were studied in the Czech Republic by Sitko *et al.* (2006), previously Škarda (1964) examined the three herons, Ryšavý (1957) and Vojtek (1981) studied in the material from the Slovak Republic. In Slovakia studied helminths of herons Macko (1960a, b, 1964), in Ukraine Smogorzhevskaya (1976) in Bulgaria Kostadinova (1995), Chipev and Kostadinova (1995) and in Russia (previously Soviet Union) Sonin (1985, 1986). Data by other authors in Europe have origin in examination of individual specimens.

Materials and methods

In this paper, results of long-team parasitological examination carried out between 1962 and 2010. Were examined 530 herons of 8 species, *Ardea cinerea* n = 436, *Egretta alba* 34, *Nycticorax nycticorax* 28, *Ixobrychus minutus* 19,

Botaurus stellaris 8, *Egretta garzetta* 2, *Ardea purpurea* 2, *Ardeola ralloides* 1. The birds were dead supplied for preparation into museum collection and to the Station for Rescue of Animals in Bartošovice. The birds came from many localities of the whole Czech Republic. *Ardea cinerea* were hunted by fishermen on product ponds in summer months. Trematodes were fixed by 70 % alcohol, stained by borax-carmin, transferred through alcohol series to xylene and mounted in Canadian balsam. All the given data are in millimetres. Documentary material is deposited in collections of the Comenius Museum at Přerov. There is provided more detailed description for 5 species which has been found for the first time in Central Europe and for other two rarely occurring species, remaining species are only summarized in Table 1. Ecological relationships of trematodes in birds of the Ardeidae family will be subject of a separate study.

Survey of species

Clinostomum heluans Braun, 1899 Fig 1.

Host: *Egretta alba*.

Site: *oesophagus*.

Locality: Strachotín, 7065.

Geographic distribution: Africa, America, Europe.

Remarks: Found in East Russian from *Ardea cinerea* (Sonin, 1985). Described in America from *Ardea cocoi*, *A. goliath*, *Egretta alba*, *E. caerulea*, *Nycticorax nycticorax*, *N. violaceus* (Skrjabin, 1947; Travassos *et al.* 1969; Forrester & Spalding, 2003). In the Central Europe was found the first time.

Specimens deposited: P-P-1865/6.

Description (n = 2). Body 18.500 – 20.600 long, 3.089 – 3.203 wide. Oral sucker oval 0.522 – 0.551 × 0.477 – 0.522. Ventral sucker in first sixth of body, larger oral sucker 0.820 × 0.894. Ratio of lengths suckers 1.62 – 2.57,

Table 1. Survey of digeneans parasitizing herons of the Czech Republic

	<i>Ardea cinerea</i>	<i>Ardea purpurea</i>	<i>Ardeola ralloides</i>	<i>Egretta alba</i>	<i>Egretta garzetta</i>	<i>Botaurus stellaris</i>	<i>Nycticorax nycticorax</i>	<i>Ixobrychus minutus</i>
<i>Apharyngostrigea cornu</i>	+	+	+	+	+	+	–	–
<i>Ascocotyle (Phagicola) longa</i>	+	–	–	–	–	–	–	–
<i>Bilharziella polonica</i>	+	–	–	–	–	–	–	–
<i>Clinostomum complanatum</i>	+	–	–	–	–	–	–	–
<i>Conocephalus urnugerus</i>	–	–	–	–	–	+	–	–
<i>Diplostomum commutatum</i>	+	–	–	–	–	–	–	–
<i>Diplostomum spathaceum</i>	+	–	–	–	–	–	–	–
<i>Diplostomum volvens</i>	+	–	–	–	–	–	–	–
<i>Echinochasmus amphibolus</i>	+	–	–	–	–	+	–	–
<i>Echinochasmus beleocephalus</i>	+	–	–	–	–	–	–	–
<i>Euclinostomum heterostomum</i>	+	–	–	–	–	–	–	–
<i>Gigantobilharzia acotylea</i>	+	–	–	–	–	–	–	–
<i>Ignavia ardeae</i>	–	+	–	–	–	–	–	–
<i>Neutraclinostomum intermedialis</i>	+	–	–	–	–	–	–	–
<i>Opisthorchis longissimus</i>	–	–	–	–	–	–	+	–
<i>Posthodiplostomum cuticula</i>	+	+	+	+	+	–	+	–
<i>Prosthogonimus ovatus</i>	+	–	–	–	–	–	–	–
<i>Pygidiopsis ardeae</i>	+	–	–	–	–	–	–	–
<i>Tylodelphys excavata</i>	+	–	–	–	–	–	–	–
<i>Uroproctepisthmium bursicola</i>	+	+	+	+	–	–	–	–

widths 1.71 – 1.72. Intestine splits into two branches behind oral sucker. Pharynx and oesophagus absent. Smooth walls without significant diverticulus reaches end of body. Vitellarium start in half ventral sucker laterally up end of rear testes and unite behind it, reach end of intestinal branches. Genital organs in tandem intracoecal, medial. Testes lobate, anterior testis $0.522 - 0.685 \times 1.147 - 1.416$, posterior testis $0.641 - 0.685 \times 1.085 - 1.356$. Oval Bursa

cirri between ovary and anterior testis 0.745×1.311 empty lateral of rear edge. Ovary between testes, oval $0.641 - 0.671 \times 0.402 - 0.671$, much smaller than testes. Loops of uterus run from ovary to rear testis, turn forwards, run lateral along testes, do not reach level of ventral sucker turn and run back. Genital pore medial of testes. Eggs $0.139 - 0.145 \times 0.081 - 0.087$.

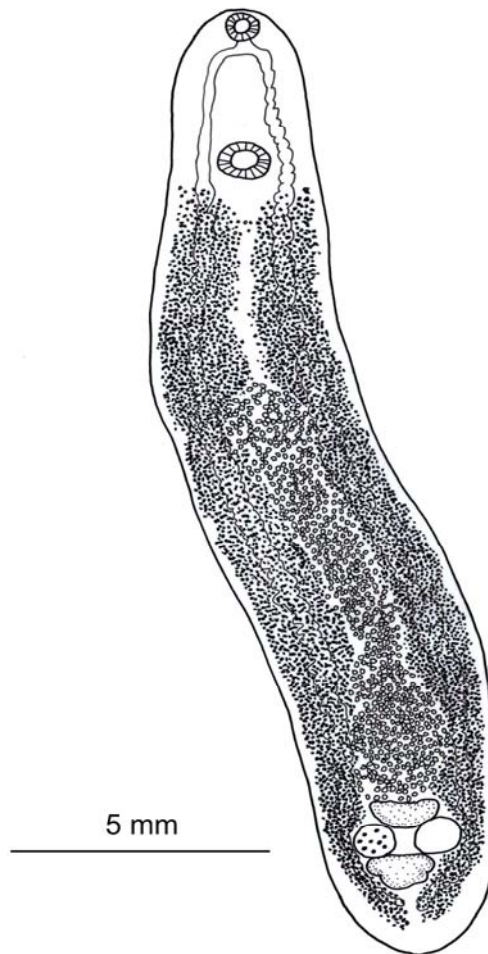


Fig 1. *Clinostomum heluans* Braun, 1899 - ventral view

Nephrostomum ramosum (Sonsino, 1895) Fig 2.

Host: *Ardea cinerea*.

Site: intestine.

Locality: Záhlinice, 6770.

Geographic distribution: Holarctic Region, Africa, America, Asia.

Remarks: Characteristic parasite of herons in tropical zone. In the Europe found in *Ardea cinerea* from Holland only (Sonin, 1985).

Specimens deposited: P-P-1858/37.

Description (n = 2). Body elongate oval 12.340 – 13.680, largest width in mid-uterine level 2.343 – 2.771. Head collar large, with wide ventral notch and shallow dorsal depression 0.800 – 0.914 × 1.486 – 1.571 with 48 spines in single row. Collar spines very small, conical 0.040–0.049 × 0.012 – 0.014 interrupted dorsally, angle spines 2 × 4 similar in size to lateral spines, spines at dorsal depression smallest 0.035 – 0.038 × 0.012 – 0.014. Oral sucker 0.224 – 0.276 × 0.253 – 0.368 globular or oval. Praepharynx absent. Oval shaped pharynx close behind oral sucker, larger than oral sucker 0.294 – 0.313 × 0.286 – 0.324. Oesophagus 0.010 – 0.174. Intestine splits before the bursa cirri and ends blind at end of vitellarium. Ventral sucker well developed, in first fifth of body, globular or broad oval 1.391 – 1.600 × 1.416 – 1.690. Ratio of lengths of

sucker 4.86 – 7.14, of widths 3.85 – 4.86. Testes small, elongate oval, smooth or indented, in third quarter of body, anterior testis 0.820 – 0.865 × 0.522 – 0.580, posterior testis most frequently slightly larger 0.920 – 1.088 × 0.429 – 0.506. Bursa cirri 0.396 – 0.598 × 0.368 – 0.460 between ventral sucker and bifurcation of intestine. Ovary 0.373 – 0.423 × 0.566 – 0.690 transversely oval, smooth, irregular or lobed, median, equatorial. Vitellarium strongly developed, composed of large follicles and reach from half of ventral sucker up to end of body. Uterus long, with numerous intercaecal loops between ovary and ventral sucker. They empty onto surface of body with a female genital opening. It empties onto surface of body with a female genital opening between it and bifurcation of intestine. Eggs 0.110 – 0.116 × 0.058 – 0.070.

Pegosomum saginatum (Ratz, 1898) Fig. 3

Host: *Egretta alba*.

Site: gall bladder.

Localities: Strachotín, 7065, Záhlinice, 6770.

Geographic distribution: Palaearctic Region.

Remark: A characteristic parasite in *Egretta alba*, rarely found in other species of herons in tropical zone (Sonin, 1985).

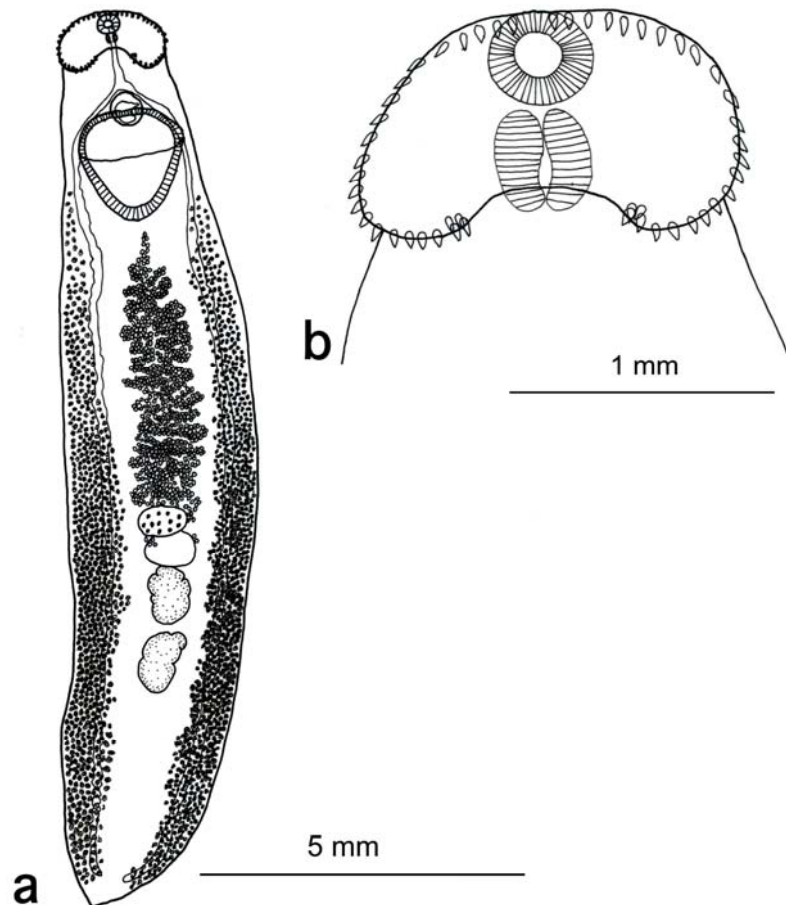


Fig. 2. *Nephrostomum ramosum* (Sonsino, 1895)
a - ventral view, b - head collar

Specimens deposited: P-P-1858/36.

Description (n = 9): Oval body 16.300 – 22.400(mean 17.760) long, largest width of 5.900 – 8.200(7.070) reached in area of ventral sucker, covered by small spines 0.018 – 0.019(0.018) × 0.010 – 0.012(0.012). Head collar 0.184 – 0.480(0.356) × 0.442 – 0.732(0.565) with 27 spines in two rows. Medial spines 0.104 – 0.128(0.114) × 0.029 – 0.041(0.035), lateral 0.075 – 0.104(0.081) × 0.023 – 0.029(0.024). Oral sucker on a microscope slide difficult to see, visible only to live fluke as the ring at terminal end, long 0.184 – 0.276(0.230), high 0.092–0.138(0.115). Praepharinx very short or absent. Pharynx long oval, visible 0.368 – 0.522(0.439) × 0.230 – 0.366(0.287). Oesophagus very long 3.480 – 4.785(3.728). In the first fifth of the body is divided into two intestinal branches, ends blind at end of vitellarium. They have irregular diverticulae and usually three folds. Ventral sucker well developed, in first third of body, globular or broad oval 0.715 – 0.969(0.866) × 0.790 – 0.924(0.864). Testes medially, tandem in second half of body. The shape of testes depends on the age, young fluke are entire, broadly ovate and older fluke are deeply lobed. Anterior testis 1.714 – 2.900(2.532) × 2.170 – 3.480(3.019), posterior testis 1.714 – 3.190(2.569) × 2.714 – 3.480(3.013). Bursa cirri strong, long oval 0.754 – 2.000(1.652) × 0.522 – 1.571(0.895), situated between ventral sucker and bifurcation of intestine.

Cirrus strong, club-shaped 2.000 – 3.480(3.138) × 0.108 – 0.150(0.140). Ovary between uterus and front testis, in young fluke globular, in old specimens oval and deeply lobed. Significantly smaller than testes 0.571 – 0.914(0.782) × 0.571 – 1.000(0.742). Mehlis gland broadly oval between ovary and front testis 0.714 – 0.857(0.786) × 0.571 – 1.000(0.786). Vitellarium strongly developed, composed of large follicles and reach from middle oesophagus to bifurcation of intestine stored in broad stripe in middle body, then place in broad stripe on lateral edges until end of body. Uterus relatively small, between ovary and ventral sucker, loops continues until ventral sucker and bursa cirri. They empty onto surface of body with a female genital opening between it and bifurcation of intestine. Eggs 0.115 – 0.117(0.116) × 0.060 – 0.078(0.070).

***Pegosomum asperum* (Wright, 1879) Fig. 4**

Hosts: *Ardea cinerea*, *Egretta alba*.

Site: gall bladder.

Localities: Strachotin, 7065, Záhlinice, 6770.

Geographic distribution: Palaearctic Region.

Remarks: A characteristic parasite in *Egretta alba*, rarely found in other species of herons, bittern and storks who have returned from their wintering grounds in Africa. Found in *Ardea cinerea*, *A.goliath*, *A.purpurea*, *B. stellaris*, *Ciconia ciconia*, *Egretta garzetta* from Palaearctic

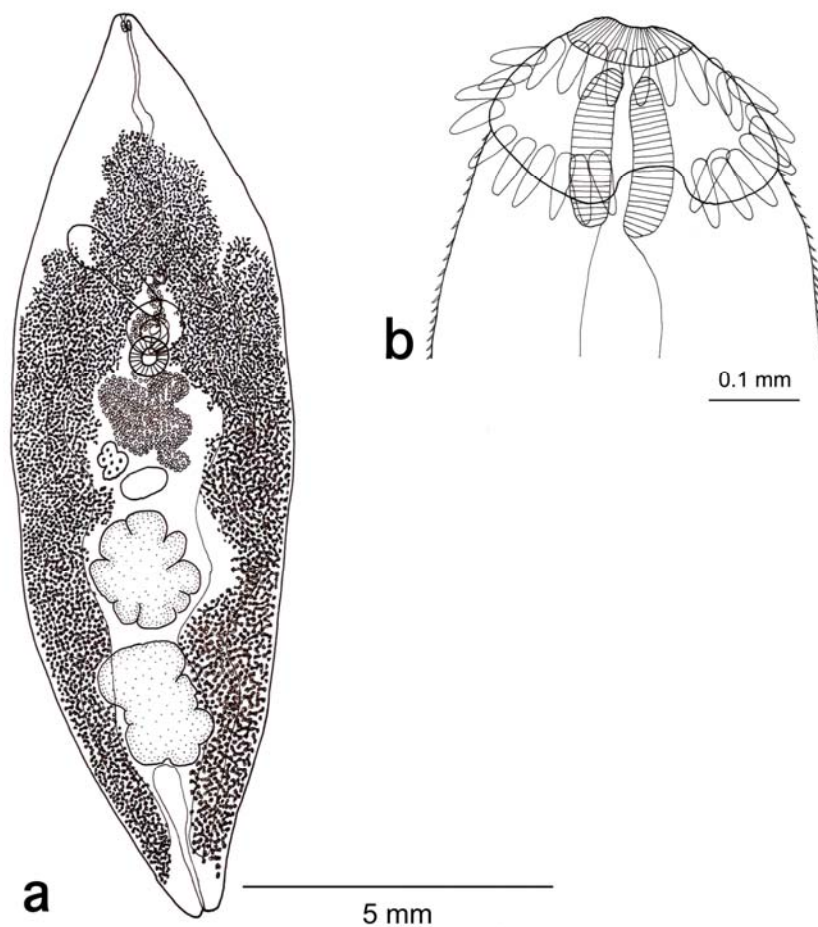


Fig. 3. *Pegosomum saginatum* (Ratz, 1898)
a - ventral view, b - head collar

region and Africa (Sonin, 1985); found also from China (Chen Hsin Tao, 1985) and in Florida from *Botaurus lentiginosus* (Forrester & Spalding, 2003). Specimens deposited: P-P-1858/35.

Description (n = 9): Oval body 10.200 – 24.800 (mean 20.429) long, largest width of 3.100 – 9.400 (6.914) reached in area of ventral sucker, covered by small spines 0.018 – 0.019 (0.018) × 0.010 – 0.012 (0.012). Head collar 0.298 – 0.522 (0.376) × 0.447 – 0.969 (0.675) with 27 spines in two rows. Medial spines 0.099 – 0.128 (0.111) × 0.029 – 0.041 (0.033), lateral 0.075 – 0.104 (0.093) × 0.023 – 0.029 (0.025). Oral sucker on a microscope slide difficult to see, visible only to live fluke as the ring at terminal end, long 0.184 – 0.294 (0.237), high 0.092 – 0.184 (0.142). Praepharynx very short or absent. Pharynx long oval, visible 0.322 – 0.543 (0.431) × 0.230 – 0.340 (0.278). Oesophagus very long, 2.900 – 4.785 (3.788). In the first fifth of the body is divided into two intestinal branches, ends blind at end of vitellarium. They have irregular diverticulae and usually three folds. Ventral sucker well developed, in first third of body, globular or broad oval 0.596 – 0.998 (0.849) × 0.790 – 1.073 (0.928). Testes in second half of body, medially, tandem. The shape of testes depends on the age, in young fluke are entire, broadly ovate and in

older fluke deeply lobed. Anterior testis 1.429 – 3.480 (2.314) × 2.287 – 5.365 (3.572), posterior testis 1.714 – 4.205 (3.046) × 2.143 – 5.075 (3.589). Bursa cirri strong, long oval 0.754 – 2.591 (1.772) × 0.714 – 1.430 (1.010) between ventral sucker and bifurcation of intestine. Cirrus strong, club-shaped 1.043 – 2.000 (1.546) × 0.571 – 0.596 (0.577). Ovary situated between uterus and testis, in young fluke ovary is globular, in old oval deeply lobed. Significantly smaller than testes 0.522 – 1.143 (0.759) × 0.373 – 1.143 (0.709). Mehlis gland broadly oval between ovary and front testis 0.714 – 1.143 (0.857) × 1.000 – 1.571 (1.257). Vitellarium strongly developed, composed of large follicles and reach from middle oesophagus to bifurcation of intestine stored in broad stripe in middle body, then place in broad stripe on lateral edges until end of body. Uterus relatively small, between ovary and ventral sucker, continues until ventral sucker and bursa cirri. They empty onto surface of body with a female genital opening between it and bifurcation of intestine. Eggs 0.115 – 0.117 (0.116) × 0.060 – 0.078 (0.070).

Echinochasmus militaris Leonov, 1958 Fig. 5

Host: *Ardea cinerea*.

Site of infection: Intestine.

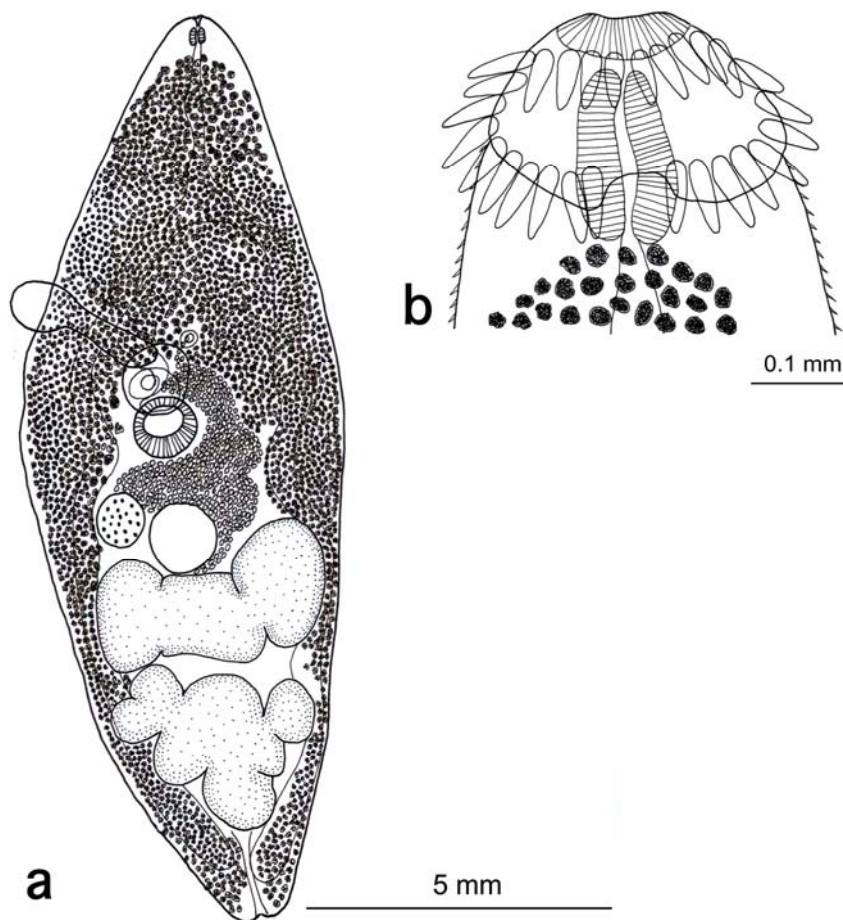


Fig. 4. *Pegosomum asperum* (Wright, 1879)
a - ventral view, b - head collar

Locality: Záhlinice, 6770.

Geographic distribution: Palaearctic Region.

Remarks: According to (Sonin, 1985) are the characteristic fluke of *Ardea cinerea* and *Egretta alba* in the Ukraine (Leonov, 1958), Azerbaidan (Vaidova, 1978) and Kazakhstan (Zhatkanbaeva, 1971). Found and examined specimens from the Czech Republic exhibits typical morphologic signs and dimensions identical to the original description provided by Leonov (1958). Specimen was found for the first time in the Central Europe.

Specimens deposited: P-P-1858/14.

Description (n = 1): Body 2.140 long, 0.326 wide, covered with tiny spines 0.005×0.001 . Head collar kidney shaped 0.120×0.318 with 24 spines in one row. First two medial spines smaller, 0.049×0.013 . Lateral spines slightly larger $0.055 - 0.056 \times 0.015 - 0.016$. Oral sucker terminal, globular 0.060×0.060 . Praepharynx well developed, 0.048 long. Pharynx oval, markedly larger than oral sucker 0.102×0.060 . Oesophagus 0.348. Intestine splits into two branches in region of ventral sucker and ends blind at rear edge of vitellarium. Ventral sucker in middle of body, widely oval 0.450×0.420 , much larger than oral sucker. Ratio of lengths of suckers 7.50, widths 7.00. At last third of body strongly lobate testes, anterior testis 0.120×0.186 ,

posterior much longer 0.216×0.180 . Bursa cirri oval 0.180×0.150 behind bifurcation of intestine reaches in region of ventral sucker. Ovary full edged, long oval 0.132×0.120 in a short distance from rear edge of ventral sucker. Mehlis gland 0.162×0.138 , close behind rear edge of ovary. Vitellarium from small follicles start at rear edge of ventral sucker and reach end body, vitelline pouch small, outlets from both branches unite in area of ovary making. Uterus loops among testes and ventral sucker. They empty onto surface of body behind bifurcation of intestine with a female genital opening. Eggs measured $0.072 - 0.080 \times 0.048 - 0.054$.

Saakotrema metatestis (Saakova, 1952) Fig. 6.

Host: *Egretta garzetta*.

Site: Bursa Fabricii.

Locality: Záhlinice, 6771.

Geographic distribution: Europe, Asia.

Remarks: Characteristic fluke of herons, further found in *Ardea cinerea*, *A. purpurea*, *Egretta alba* (Iskova, 1985). Found in Bulgaria (Janchev *et al.*, 1984), Ukraine (Iskova, 1985), Azerbaidan (Vaidova, 1978), India (Yamaguti, 1971). In the Central Europe was described for the first time. Specimens deposited: P-P-1858/31.

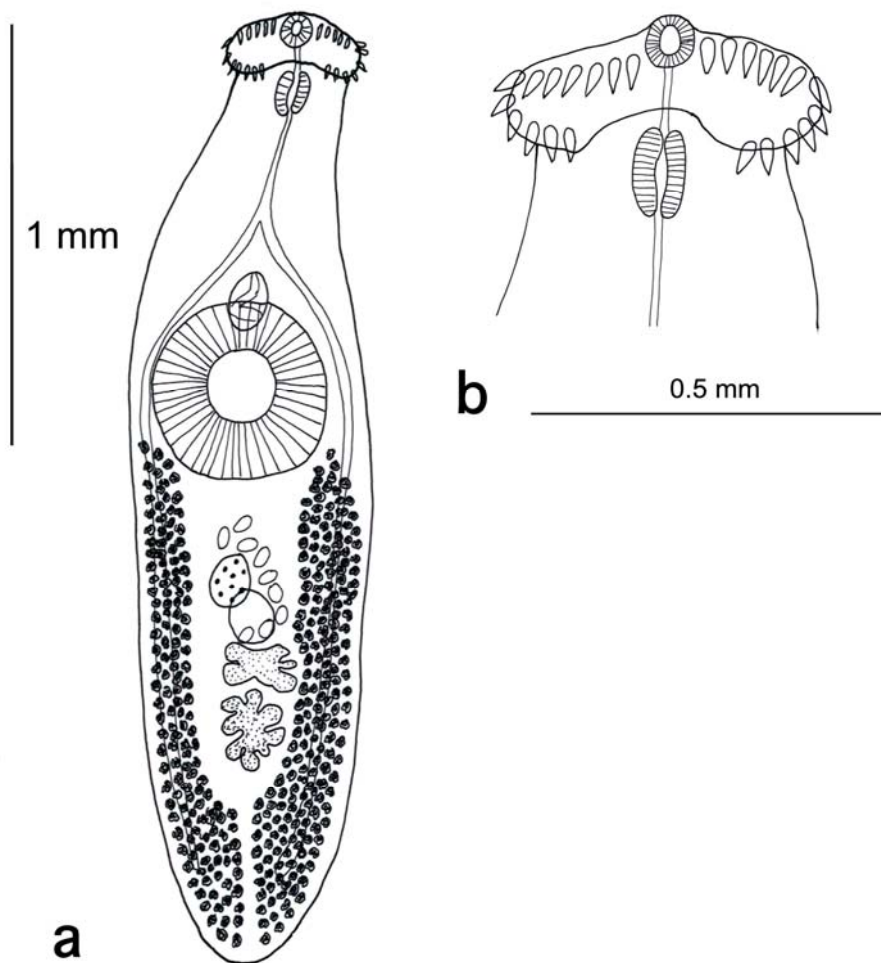


Fig. 5. *Echinochasmus militaris* Leonov, 1958
a - ventral view, b - head collar

Description (n = 4): Oval body 1.600 – 2.286(2.022), largest width of 0.514 – 0.714(0.600) reaches in area of ventral sucker, covered by small spines 0.018 – 0.019(0.018) × 0.010 – 0.012(0.012). Head collar 0.108 – 0.150(0.132) × 0.198 – 0.270(0.220), with 24 spines in two rows. Medial spines 0.040 – 0.049(0.045) × 0.012 – 0.014(0.014), lateral 0.035 – 0.038 (0.036) × 0.012 – 0.014(0.014). Oral sucker 0.078 – 0.120(0.098) × 0.066 – 0.090(0.077), globular or oval. Praepharynx 0.012 – 0.060(0.046). Oval shaped pharynx close behind oral sucker, little larger than oral sucker 0.102 – 0.168(0.128) × 0.060 – 0.072(0.064). Oesophagus 0.100 – 0.174(0.136). Intestine splits in middle of distance between suckers and ends blind at end of vitellarium. Ventral sucker well developed, in first third of body, globular or broad oval 0.252 – 0.300(0.282) × 0.276 – 0.300(0.288). Ratio of lengths of suckers 2.50 – 3.54(2.84), widths 3.27 – 4.18(3.81). Testes medially in tandem, globular or oval form, anterior testis 0.240 – 0.330(0.270) × 0.180 – 0.330(0.225), posterior testis most frequently slightly larger 0.330 – 0.432(0.348) × 0.180 – 0.330(0.225). Bursa cirri 0.116 – 0.126(0.120) × 0.096 – 0.116(0.102) between ventral sucker and bifurcation of intestine. Ovary 0.090 – 0.180(0.138) × 0.108 –

0.150(0.140) globular or oval, significantly shorter than testes. Vitellarium strongly developed, composed of large follicles and reach from pharynx up to end of body. Uterus contains a large number of eggs. Its loops run from ovary along lateral side of testes and create a large cluster between posterior testis and end of body. There they turn and run same way back up to front edge of ventral sucker. They empty onto surface of body with a female genital opening. Eggs 0.076 – 0.081(0.080) × 0.045 – 0.054(0.049).

Pygorchis affixus Looss, 1899 Fig. 7.

Host: *Ardea cinerea*.

Side of infection: Cloaca.

Locality: Záhlinice, 6771.

Geographic distribution: Palaearctic Region.

Remarks. Found in *Corvus cornix*, *Falco tinnunculus*, *Circus aeruginosus*, *Recurvirostra avosetta* in Egypt (Looss, 1899), and *Motacilla alba* in Russia (Bykhovskaya-Pavlovskaya, 1974). *Ardea cinerea* is a new host. In the Central Europe was found and described for the first time.

Specimens deposited: P-P-1870/3.

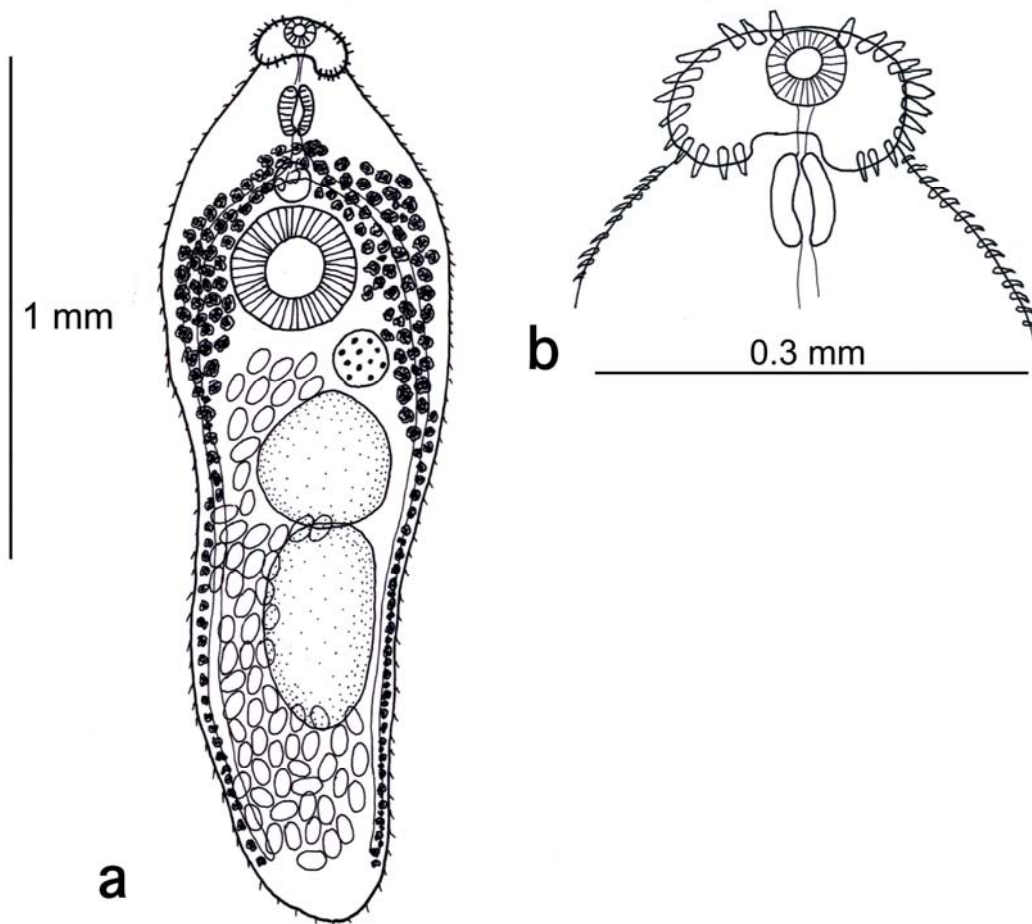


Fig. 6. *Saakotrema metatestis* (Saakova, 1952)
a - ventral view. b - head collar

Description (n = 16): Egg shaped body getting narrow toward front, wider in rear part. Body 1.637 – 2.714(2.102) long and 0.629 – 1.0(0.855) wide. Suckers heavily developed. Oral sucker terminal, broadly oval 0.241 – 0.387(0.317) × 0.253 – 0.462(0.372). A large muscular pharynx 0.204 – 0.323(0.274) × 0.216 – 0.323(0.264) reaches its area. Intestine divides immediately behind pharynx into two branches, which run slant to lateral edge of ventral sucker. Further on, they pass along its edge and come closer slightly behind her up to level of ovary, form a loop around testes and end blind behind they at about a half of its width. Ventral sucker in middle body oval, 0.482 – 0.839(0.658) × 0.482 – 0.860(0.691). Ratio lengths of suckers 1.82 – 2.66(2.08), widths 1.68 – 2.79(1.86). Genital opening medially behind pharynx. Bursa cirri oval, 0.090 – 0.430(0.249) × 0.072 – 0.151(0.113), situated between ventral sucker and pharynx. Testes oblong or globular, situated intracoecally, one beside other at rear end of body, right 0.090 – 0.210(0.138) × 0.072 – 0.150(0.124), left 0.090 – 0.210(0.151) × 0.090 – 0.168(0.129). Ovary 0.090 – 0.116(0.104) × 0.090 – 0.116(0.101) oval or globular. Mehlis gland 0.081 – 0.116(0.090) × 0.081 – 0.116(0.093) oval or globular medially between ovary and testes. Vitellarium consist of 7 –

8 large follicles. It lies on lateral edge of body. In field of ovary cross intestinal branches run medially and connected to testes. Uterus fills whole body behind ventral sucker in and terminates onto surface of body in region of intestine bifurcation. Eggs 0.059 – 0.071(0.068) × 0.035 – 0.037(0.037), contain miracidium with a pigment stain.

***Ophiosoma patagiatum* (Creplin, 1848)**

Host: *Botaurus stellaris*.

Site: Intestine.

Locality: Lednice, 7166.

Remarks: Characteristic parasite of *Botaurus stellaris* and *Ixobrychus minutus*, found in all Europe. Rarely found in *Ardea cinerea* and *Egretta alba*. The findings in *Larus canus*, *L. fuscus* and *L. ridibundus* are less reliable (Dubois, 1968; Sonin, 1986). From Czech Republic reported for the first time.

Specimens deposited: P-P-1474/23.

***Posthodiplostomum brevicaudatum* (Nordmann, 1832)**

host: *Botaurus stellaris*.

Site: Intestine.

Locality: Pohořelice, 7064.

Geographic distribution: Palearctic Region.

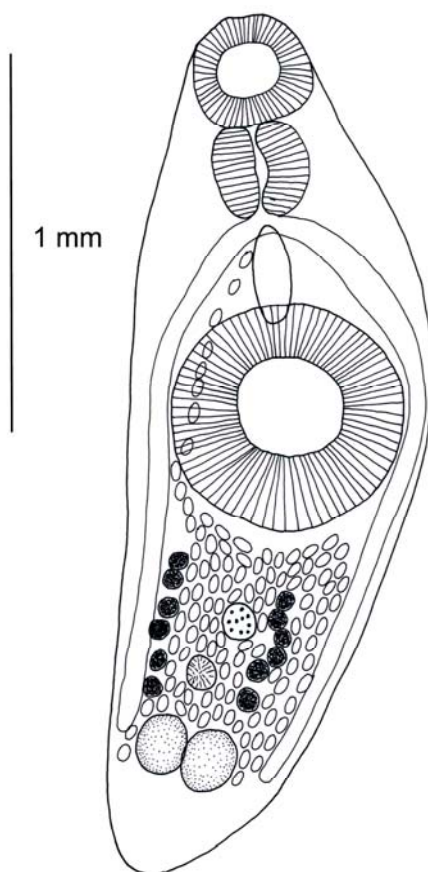


Fig. 7. *Pygorchis affixus* Looss, 1899 - ventral view

Remarks: A characteristic parasite of fish-eating birds. Found in *Podiceps cristatus*, *Botaurus stellaris*, *Ixobrychus minutus*, *Ardea cinerea*, *Egretta alba* and *Larus canus* in all Europe (Sonin, 1986). Metacercariae were found in cyprinid and percoid fishes from the lower part of the Morava and Dyje rivers (Moravec, 2001). Adults reported from Czech Republic for the first time. Specimens deposited: P-P-1875/28.

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