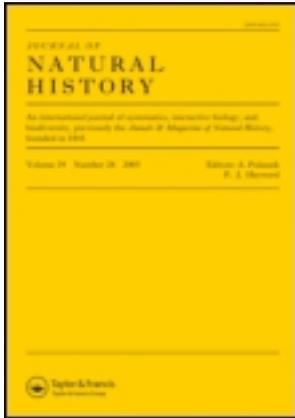


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Svetlana Bondarenko<sup>a</sup> & Vytautas Kontrimavichus<sup>a</sup>

<sup>a</sup> Institute of Ecology, Vilnius University, Lithuania

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## Cestodes of the genus *Aploparaksis* Clerc, 1903 (Cyclophyllidea, Aploparaksidae) reported from gulls, with a description of new species

SVETLANA BONDARENKO & VYTAUTAS KONTRIMAVICHUS

*Institute of Ecology, Vilnius University, Lithuania*

(Accepted 8 November 2006)

### Abstract

Fifteen species of *Aploparaksis* Clerc, 1903 described from gulls or reported to infect gulls are reviewed. The re-examination showed that gulls are parasitised by the following six species: *A. borealis*, *A. brachyphallus*, *A. diagonalis*, *A. rissae*, *A. xemae* and *A. shigini* n. sp. Only the latter species is considered to be a host-specific parasite of gulls, whereas *A. borealis* is recognised as a common parasite of passeriform birds and the other four proved to be common parasites of shorebirds. *Aploparaksis brachyphallos* is redescribed from the skua *Stercorarius longicaudus* of Chukotka, and corrections, as well as supplements, are given for the original descriptions of *A. rissae* and *A. xemae*, based on the study of the type specimens. The new species, *A. shigini*, is described from Holarctic gulls; it was formerly known as *A. larina* Fuhrmann, 1921 sensu Shigin (1961). Synonyms of valid species, a range of definitive hosts, and their geographical distributions based on the results of the present investigation, are provided. Data are presented on the life cycles, intermediate hosts and the morphological types of the metacestodes of all species (except for *A. shigini*).

**Keywords:** *Cestode*, *metacestode*, *Aploparaksis*, *Aploparaksidae*, *Laridae*

### Introduction

Since the genus *Aploparaksis* was established by Clerc (1903), there have been 15 species described or reported to infect gulls. Differences in species composition of cestodes from gulls as presented by Fuhrmann (1932), Yamaguti (1959), Spassky (1963), Smogorzhevskaya (1976) and Schmidt (1986) arise from the authors' views on species validity. Spassky (1963) came to a conclusion that only three of them, i.e. *A. larina* Fuhrmann 1921, *A. rissae* Schiller, 1951 and *A. xemae* Schiller, 1951, could be regarded as valid species. However, he believed that the latter two species, which were described from gulls of Alaska, may be treated as such on certain assumptions. Moreover, while discussing an intricate issue concerning the definition of *Aploparaksis* registered in gulls, Spassky (1963) proposed that it should be simplified in an unusual way: to assign *Aploparaksis* spp.

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Correspondence: S. Bondarenko, Institute of Ecology, Vilnius University, Akademijos 2, Vilnius LT-2600, Lithuania. Fax: (370 5) 272 92 57. Email: v. kontrimavichius@takas.lt

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from gulls of the Palaearctic “temporarily” to one species, *A. larina* Fuhrmann, 1921. By contrast, Smogorzhevskaya (1976) did not even include *A. larina* in a key to the species of *Aploparaksis* of the Ukraine due to discrepancy of data on its morphology. She proposed that a description of specimens should be provided with each report of the species. This uncertainty of identification of the species of *Aploparaksis* from gulls promoted a re-study of available specimens of cestodes of this group.

This paper summarises the results of the morphological re-examination of the type material of *Aploparaksis* originally described from gulls (*A. larina* Fuhrmann, 1921; *A. rissae* Schiller, 1951; *A. sovieticus* Deblock, Capron and Rose, 1960 and *A. xemae* Schiller, 1951) and analyses the species composition of the group. Synonyms of valid species recorded from gulls, a range of definitive hosts, and their geographical distributions based on the results of the present investigation, are provided. Data on life cycles, intermediate hosts and the morphological type of the metacestodes are presented for all species (except for *A. shigini*). A re-description of *A. brachyphallos* (Krabbe 1869) from *Stercorarius longicaudus* Vieillot, from Chukotka and corrections, as well as additions are provided for the original descriptions of *A. rissae* and *A. xemae*. The synonymy of *A. larina* and *A. brachyphallos* is proposed. The new species, *A. schigini*, is described from Holarctic gulls; it was formerly reported as *A. larina* by Shigin (1961). The list of invalid species, and species for which identification in gulls raises doubts, is published, with brief commentaries on each of them.

## Materials and methods

The investigation is based on both the original material and the re-examination of type-materials and voucher specimens from the collections of: the Muséum d’Histoire Naturelle, Geneva (MHNG); United States National Parasite Collection, Beltsville, Maryland, USA (USNPC); Institute of Parasitology, Russian Academy of Sciences, Moscow (INPA) and Zoological Institute, St Petersburg (ZIN), Russia. The material of *Aploparaksis* spp. from the Vrangal Island (East Siberian Sea), Bering (Komandor Islands), Karaginskiy (Bering Sea) and Paramushir (Kurils) Islands was collected by our colleagues from the Far East State University (FESU), Vladivostok, Russia. Moreover, one vial with specimens of *A. schigini* n. sp. from *Larus delawarensis* from North America and one vial from *L. ridibundus* from the Kolyma River (Magadan region) were kindly provided for our investigation by Professor R. Rausch and Mr S. A. Leonov. Other material examined were specimens from the collections of Professor M. M. Belopolskaya, Dr A. A. Shigin and Dr Z. B. Smetanina. Details on collection data of every species are given in the text.

Original material was collected by us from North Siberia (Chukotka, the Ob’ River). The tapeworms were fixed in 70% ethanol, stained with Ehrlich’s haematoxylin, dehydrated in an ascending alcohol series, cleared in clove oil and mounted in Canada balsam. The hooks, armament of cirrus and embryophores of unstained specimens were also studied in specimens mounted in polyvinyl alcohol. Live eggs isolated from cestodes in water were also studied.

## Results

### *Aploparaksis (Aploparaksis) brachyphallos* (Krabbe, 1869) Fuhrmann, 1908 (Figures 1–3)

*Synonyms:* *Aploparaksis diminuens* von Linstow, 1905, pp. 8–9, Figures 29–31.

*Diorchis serpentata* von Linstow, 1905 (in part), p. 7, Figures 23–25.

*Skorikowia clausa* von Linstow, 1905, pp. 10–11, Figures 38–40.

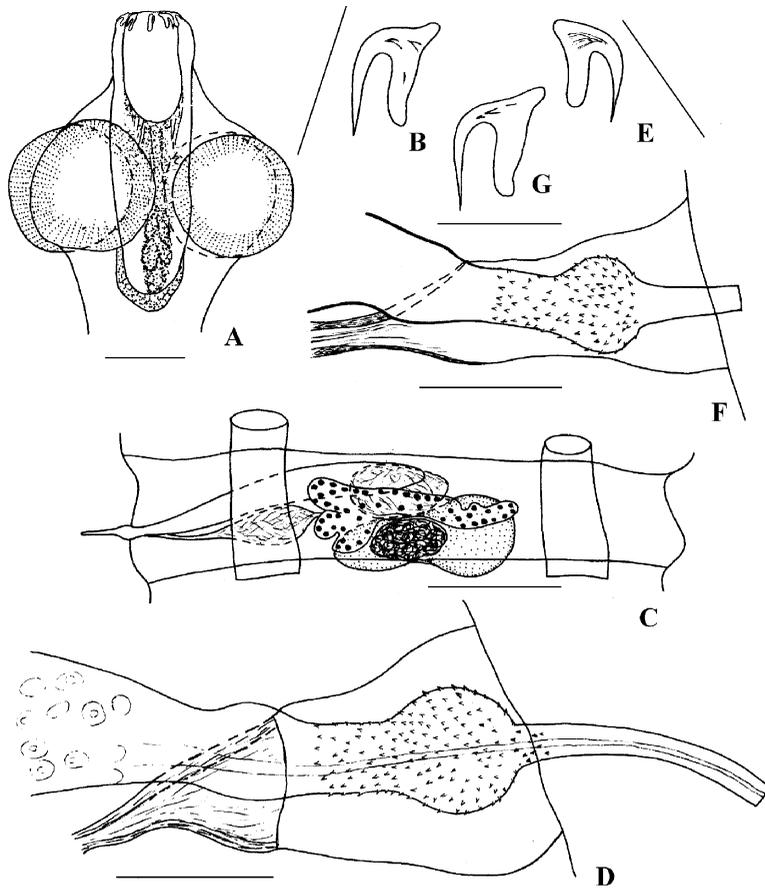


Figure 1. *Aploparaksis brachyphallos* (Krabbe, 1869). Specimen from *Stercorarius longicaudus*, Chukotka: (A) scolex, (B) hook, (C) hermaphroditic proglottis, (D) cirrus. Specimen from *Calidris alpina* from Alaska (R. Rausch collection, slide DWN B-46): (E) hook, (F) cirrus. Specimen from *Xema sabini* from Alaska (R. Rausch's collection, slide 26210): (G) hook. Scale bars: 100  $\mu$ m (A), 50  $\mu$ m (C), 20  $\mu$ m (B, D, E, F, G).

*Aploparaksis larina* Fuhrmann, 1921, pp. 518–520, Figures 114–117, new synonymy.

*Aploparaksis uelcal* Spassky and Yurpalova, 1969, pp. 69–72, Figures 23–25, new synonymy.

*Hosts.* Gulls: *Larus argentatus* Linnaeus, *L. dominicanus* Lichtenstein, *Rissa tridactyla* (Linnaeus), *Stercorarius longicaudus* Vieillot, *Xema sabini* Vigor; other hosts: numerous shorebirds of the genera *Arenaria* Brisson, *Calidris* Merrem, *Heteroscelus* Baird, *Gallinago* Brisson, *Limnodromus* Wied-Neuwied, *Phalaropus* Brisson, *Pluvialis* Brisson and *Tringa* Linnaeus (Charadriiformes) and *Alauda arvensis* Linnaeus (Passeriformes).

*Intermediate hosts.* *Stilodrilus* sp. and *Lumbriculus olgae* Morev (Oligochaeta), natural and experimental infection.

*Metacestode.* Caudate diplocyst (Bondarenko 1973, 1975; Bondarenko & Konrimevichus 1976a, 1976b).

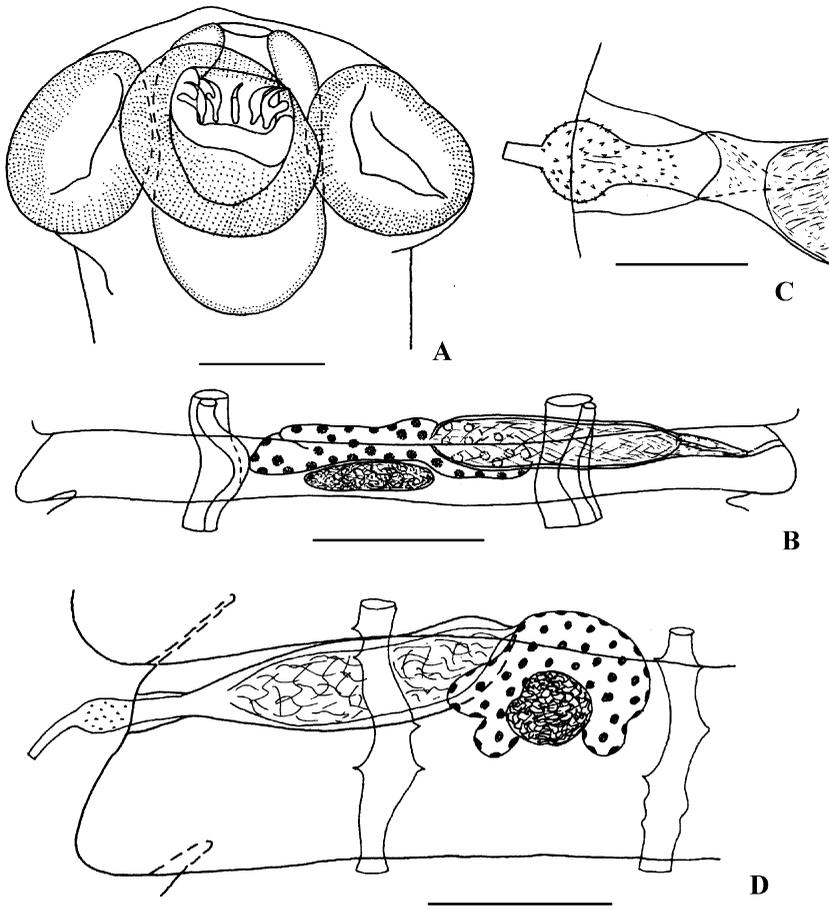


Figure 2. *Aploparaksis brachyphallos* (Krabbe, 1869). Specimen from Iceland (J. Baer's collection, MHNG 121/81): (A) scolex, (B) mature proglottis, (C) cirrus. Specimen from *Arenaria interpres* from the White Sea: (D) mature proglottis. Scale bars: 100  $\mu$ m (B), 50  $\mu$ m (A, D), 20  $\mu$ m (C).

**Localities.** Alaska, Antarctic, Greenland, Iceland, Faroe Islands, Russia (White Sea, Kaliningrad Region, western Taimyr Peninsula, the lowlands of Enisey and Ob' Rivers, Kamchatka, Chukotka, Islands of Wrangel, Bering, Karaginskiy and Paramushir, the coast of the Sea of Okhotsk), Ukraine, Turkmenistan.

**Material studied.** *Aploparaksis rissae* (USNPC 47086, type, *Rissa tridactyla*, Alaska); MHNG: *A. brachyphallos* of Baer (1962) Nos. 121/79–81, *Tringa totanus*, Iceland, 1 specimen and sections; *A. diminuens* Nos. 24/77 and 27/78, types, *Phalaropus fulicarius*, West-Taimyr, sections; *A. larina* Nos. 62/15–19, types, *Larus dominicanus*, No. 17, clarified anterior part of a strobila mounted in For Berlise fluid, Nos. 15, 16, longitudinal and transverse sections of a strobila, and Nos. 18, 19 whole mounted in Canada balsam strobiles; *Diorchis serpentata* Nos. 24/79–81, types, *Calidris maritima*, Enisey (Dickson Island), scolex and sections of strobila; *Skorikowia clausa* Nos. 24/83–85, types, *Calidris* sp., longitudinal and transverse sections; *A. brachyphallos* from Dr R. Rausch's collection, No. 26210, *Xema sabini* of Alaska (Yukon); two mature specimens (ZIN collection, voucher *A. brachyphallos* No. 86 from Kulachkova's collection and voucher No. 131 from

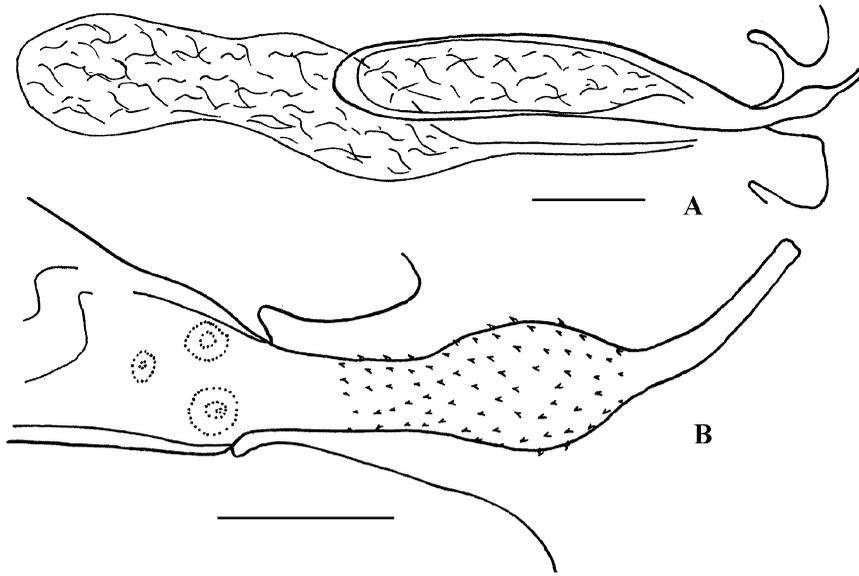


Figure 3. *Aploparaksis larina* Fuhrmann, 1921. Type material from *Larus dominicanus*, Antarctic (MHNG 62/16): (A) longitudinal sections of the strobila showing a male and a female genital ducts, (B) cirrus. Scale bars: 50  $\mu\text{m}$  (A), 20  $\mu\text{m}$  (B).

T. A. Ginetzinskaja's collection (identified as *A. pseudofilum* in parts), both from *Arenaria interpres* from White Sea (Kandalaksha); our material: two specimens from *Stercorarius longicaudus* from Chaun Bay, Chukotka. The description of specimens of *A. brachyphallos* in *Calidris alpina* from Chukotka and its life cycle have been previously published (Bondarenko 1975; Bondarenko & Kontrimavichus 1976a, 1976b). Treatment and clarification of the numerous definitions of *A. brachyphallos* recorded in shorebirds will be published separately.

**Description** (based on two specimens from *S. longicaudus* from Chaun Bay, Chukotka). Length of pre-gravid specimen 38 mm. Maximum width of strobila 0.52 mm at level of last proglottides. Scolex (Figure 1A) with evaginated rostellum  $197 \times 168 \mu\text{m}$ . Suckers round, prominent, 80  $\mu\text{m}$  in diameter. Rostellum  $69 \times 37$ , rostellar sheath  $197 \times 53 \mu\text{m}$ , passes beyond level of posterior margins of suckers. Rostellar gland cluster-shape, located within cavity of rostellar sheath between its proximal part and proximal part of rostellum. Rostellar hooks 10, with thin blade and rudimentary handle (Figure 1B). Total length of hook 16.6–17.4  $\mu\text{m}$  (length of blade 10, length of base with guard 12–14, length of handle about 2  $\mu\text{m}$ ). Strobila flat, proglottides numerous, trapezoidal. Genital pores unilateral; alternation was only marked in one specimen in which the last five proglottides had indiscernible margins. Neck 410  $\mu\text{m}$  long and 61  $\mu\text{m}$  wide immediately posterior to scolex. Diameter of osmoregulatory canals: ventral to 45  $\mu\text{m}$ , dorsal 4–5  $\mu\text{m}$  in hermaphroditic proglottides. Transverse anastomoses not observed.

Testis oval or egg-shaped, rarely slightly lobed, relatively large,  $90\text{--}102 \times 47\text{--}57 \mu\text{m}$ , in centre of median field (Figure 1C), sometimes it is displaced close to antipolar osmoregulatory canals. Cirrus sac cigar-shaped,  $184\text{--}270 \times 25\text{--}37 \mu\text{m}$ , thick-walled, with a well-developed layer of muscular fibres orientated diagonally. In male proglottides, cirrus sac reaching or crossing median line. Internal seminal vesicle fills almost entire cavity of

cirrus sac. External seminal vesicle egg-shaped, to  $80 \times 49 \mu\text{m}$ , opposite antiporal region of cirrus sac or overlapping it dorsally. Fully evaginated cirrus (Figure 1D) small,  $45\text{--}57 \mu\text{m}$  long, with parabasal spherical swelling. Basal part of cirrus  $10\text{--}12 \times 8 \mu\text{m}$  and parabasal swelling  $12\text{--}16 \mu\text{m}$  in diameter covered with dense, small spines; with distal part up to  $29 \mu\text{m}$  long and  $4 \mu\text{m}$  wide at base, and  $3 \mu\text{m}$  at distal part, unarmed.

Ovary bi-winged, lobed, up to  $180 \mu\text{m}$  wide. Each wing of ovary can form two to three lobes. Vitellarium compact or slightly lobed,  $41\text{--}53 \times 25 \mu\text{m}$ , posterior and median to ovary. Seminal receptacle elongate-oval,  $65\text{--}70 \times 29\text{--}37 \mu\text{m}$ . Vagina tubular,  $45\text{--}61 \mu\text{m}$  long; distal end of copulatory part funnel-shaped,  $29 \times 18 \mu\text{m}$ . Young uterus sacciform, lobed, overlaps longitudinal osmoregulatory canals. Proglottides with fully-developed uterus and ripe eggs not available.

*Morphological variability.* A comparison of the morphological features of *A. brachyphallos* from various definitive hosts from various parts of the Holarctic showed certain differences. They relate to the length of rostellar hooks, and size of the testis and the cirrus sac. In specimens from sandpipers (Figure 1E and F) the hooks are  $16\text{--}18.2 \mu\text{m}$  long, whereas their length in *X. sabini* (Figure 1G) is  $19.8\text{--}21 \mu\text{m}$ . The testis in specimens from *Calidris alpina* (Linnaeus), *Limnodromus griseus* (Gmelin), *Phalaropus fulicarius* (Linnaeus) and *Stercorarius longicaudus* is considerably larger than that from *Arenaria interpres* (Linnaeus) (Bondarenko 1975). The specimens with shorter cirrus sac and somewhat different configuration of cirrus (Figure 2D) were also observed by us from the latter host, especially in the White Sea population (see Table I). The base of the cirrus of these specimens is slightly elongated with gradual transition into the parabasal swelling. The cirrus of the specimens from *Larus dominicanus* from Antarctica (Figure 3) has an elongated base of the cirrus too. The cirrus of the specimens from other shorebirds (Figure 2C) is shorter, and the bulbar swelling is clearly expressed (i.e. identical to those described above from *S. longicaudus*).

*Remarks.* *Aploparaksis brachyphallos* is here recorded for the first time in the Laridae. It is one of the *Aploparaksis* spp. most frequently recorded in shorebirds. It was briefly described by Krabbe (1869) as a species of *Taenia* on the basis of material from sandpipers *Calidris maritima* (Brunnich) (Greenland) and *C. alpina* (the Faroe Islands). The description lacks information on the morphology of the proglottides and the armament of the cirrus. The type material of *A. brachyphallos* was not available for our study. Nevertheless, we believe that the spherical swelling on the cirrus and the form and length of the rostellar hooks are characters typical of this species; these features are clearly seen in the Figures 193 and 194 in the original description (Krabbe 1869). Moreover, Baer (1962) recorded *A. brachyphallos* from *Tringa totanus* (Linnaeus) in Iceland, i.e. close to the type localities. Comparison of the morphology of Baer's specimens (MHNG 121/79–81) (Figures 2A–C) with that of the specimens from our collection revealed their identity.

We had the opportunity to re-examine the type-materials of two species allocated by von Linstow (1905) to the genera *Diorchis* Clerc, 1903 and *Skorikowia* von Linstow, 1905, and confirmed that Fuhrmann (1908) was right in regarding both these species as synonymous with *A. brachyphallos*. The specimen of *D. serpentata*, whose transverse sections are present on the slide No. 24/79, is an exception; we identified it as *A. xemae* (Figure 8D).

Examination of the type of *A. rissae* by Bondarenko (1993) showed that the original description (Schiller, 1951b) is composite, and includes the characters of both *A. rissae* and *A. brachyphallos*.

Table I. Metrical and meristic characters of *Aploparaksis brachyphallos* as reported by various authors from different hosts.

Host	<i>Calidris totanus</i>	<i>Calidris alpina</i>	<i>Arenaria interpres</i>	<i>Larus dominicanus</i>	<i>Stercorarius longicaudus</i>	<i>Xema sabini</i>
Locality	Iceland	West Chukotka	White Sea	Antarctic	Chukotka	Alaska
Source	Baer (1962)	Present study	Present study	Fuhrman (1921)	Present study	Present study
Body: size	40 × 0.64	115 × 1.17	39 × 0.55	80 × 0.90	38 × 0.52	31 × 0.50
Scolex: width	137–180	135	114–115	170	168	150
Sucker: diameter	73–114	82–86	49–57	70	80	60–70
Rostellum: size	52 × 50*	75 × 53		40	69 × 37	57 × 40
Rostellar sheath: size	122 × 76*	234 × 102			197 × 53	120 × 74
Rostellar hook:						
total length:	19–20 (16.5–17*)	16.6	18	21.6–23	16.6–17.4	19.8–21
length of blade	8*	8	12		10	15.5
length of base	11*	10	15		12–24	16.5
Cirrus sac:						
length	136–204	184–291	86–188	198**	184–270	171–180
width	23–39	32–41	29–37	26**	25–37	25–31
Cirrus:						
whole length	32*	49–54	49–74	50–66**	45–57	56
base: size	10 × 6*	8–12 × 8	25–29 × 6–8	18–25 × 8–9**	10–12 × 8	28–30 × 7
bulbus: size	12 × 13*	12–13 × 12–13	16 × 9–14	21–25 × 10–16**	12–16 × 12–16	15–17 × 12
distal part: size	5 × 4*	29 × 4	4–37	17–2 × 3–3.8**	29 × 4–3	10–13 × 3
Cirrus: armament	small spines	small spines	small spines	small spines	small spines	small spines
Eggs: size	–	47–57 × 53–70	–	40	–	–
Embryophore: size	30–40 × 23–26*	33 × 34–37	–	–	–	–
Oncosphere: size	15 × 30*	29–33 × 29–33	–	24 × 24	–	–
Embryonic hooks: length	10*	13–14	–	–	–	–

\* present study of Baer's material; \*\*present study of Fuhrmann's material

After re-examination of the type material *A. uelcal* Spassky and Yurpalova, 1969 (INPA from *Phalaropus fulicarius* from Chukotka) and *A. diminuens* Linstow, 1905 (MHNG 24/77-78 from *Ph. fulicarius* from Taimyr), these species were also designated as synonyms of *A. brachyphallos* by Bondarenko and Kontrimavichus (1976a) and Bondarenko (1980).

The comparative study of the morphology of *A. brachyphallos* from shorebirds and Holarctic gulls and specimens of the type-material of *A. larina* from Antarctic *L. dominicanus* (MHNG 62/15-19) gave us good reasons to identify these two species as synonymous. We failed to find differences in the cirrus morphology of the above-described specimens of *A. brachyphallos* (Figures 1 and 2) and Fuhrmann's specimens (Figure 3). Hence we established that *A. brachyphallos* has a bipolar distribution. However, we did not study Prudhoe's (1969) specimens of *A. larina* from Antarctic *L. dominicanus* or those of Johnston (1937) from the same bird, from Marquarie Island.

It should be noted that even after detailed investigation of the material available, the question about morphological variability of *A. brachyphallos* remains unresolved. This species is a rare parasite of gulls. In addition to the records in *L. dominicanus*, from Antarctica and in *S. longicaudus* from Chukotka, East Siberia, we also found *A. brachyphallos* in *L. argentatus* on Paramushyr Island, Kurils and in *X. sabini* from the Yukon River, Alaska (Bondarenko & Kontrimavichus 1999).

#### *Aploparaksis (Aploparaksis) rissae* Schiller, 1951

(Figure 4)

*Synonyms:* *Aploparaksis filiformis* Spassky, 1963, pp.144-146, Figures 37-38 not *Aploparaksis filiformis* of Hromada and Macko, 1995, pp. 59-60, Figure 4.  
*Aploparaksis daviesi* Deblock and Rausch, 1968, pp. 436-437, Figure 4.

*Hosts.* *Rissa tridactyla* (Linnaeus), also shorebirds of the genera *Arenaria*, *Gallinago*, *Limnodromus*.

*Intermediate hosts.* *Styloscolex sokolskayae* Morev (Lumbriculidae), *Rhyacodrilus coccineus* (Vejd) (Tubificidae), *Bryodrilus arcticus* and *Mesenchytraeus* sp. (Mesenchytraeidae), experimentally (Bondarenko 1993).

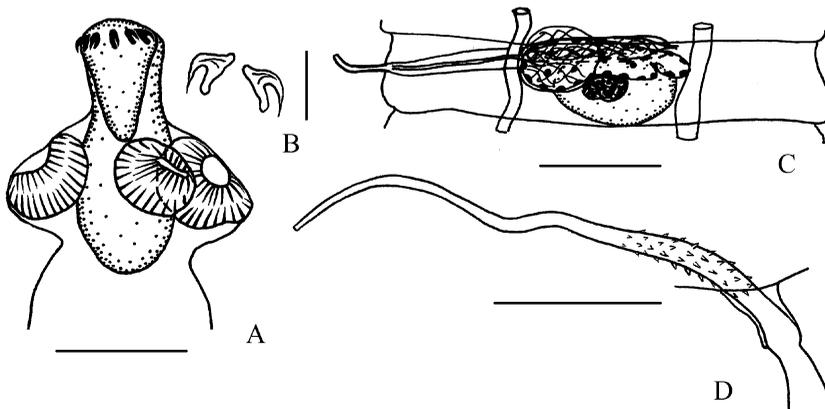


Figure 4. *Aploparaksis rissae* Schiller, 1951, a type from *Rissa tridactyla*, Alaska: (A) scolex, (B) hooks, (C) hermaphroditic proglottis, (D) cirrus. Scale bars: 100  $\mu$ m (A, C), 50  $\mu$ m, (D) 20  $\mu$ m (B).

*Metacestode.* *Ramicercus* (Bondarenko 1993).

*Localities.* Russia (Yakutiya, Chukotka, Kamchatka, the Wrangel Island), USA (Alaska, state Washington).

*Material studied.* Type specimen (USNPC 47086, *Rissa tridactyla*, St. Lawrence Island, Alaska).

*Supplement to the description* by Schiller (1951a), based on the type specimen (Figures 4A–D). Scolex  $200 \times 90 \mu\text{m}$ . Suckers  $70\text{--}80 \mu\text{m}$  in diameter. Rostellum  $90 \times 60 \mu\text{m}$ , rostellar sheath  $200 \times 70 \mu\text{m}$ . Length of hook  $21 \mu\text{m}$  (length of blade 12, length of base with guard  $16 \mu\text{m}$ ); width of hook  $10 \mu\text{m}$ . Testis  $100 \times 60 \mu\text{m}$ , slightly antiporal. Cirrus sac  $205\text{--}230 \times 25\text{--}29 \mu\text{m}$ , crosses median line. Cirrus reaches  $151 \mu\text{m}$  in length, maximum width in proximal part  $8 \mu\text{m}$ . Approximately one-third of cirrus length covered with relatively large sparsely distributed spines. Seminal receptacle oval,  $70 \times 50 \mu\text{m}$ , vagina tubular,  $110 \mu\text{m}$  long. Mature uterine proglottides absent.

*Remarks.* *Aploparaksis rissae* was known for long only from its original description (Schiller 1951a). Re-examination of the type specimen by Bondarenko (1993) shows that the hermaphroditic proglottis of *A. brachyphallos* was described and pictured by Schiller as a proglottis of *A. rissae*. Inaccuracies which have been admitted in the original description of *A. rissae* did not give any reasons for Spassky (1963), in describing *A. filiformis*, and Deblock and Rausch (1968), in describing *A. daviesi* (both species were described from shorebirds), to differentiate them from *A. rissae*. Bondarenko (1975) first believed that *A. daviesi* was a synonym of *A. filiformis*, and later, having investigated type-specimens of both species, came to the conclusion (Bondarenko 1993) that they are similar to *A. rissae*. For the morphology of *A. rissae*, and data about its life-cycle, see Bondarenko (1975, 1993).

***Aploparaksis (Aploparaksis) shigini* Bondarenko and Kontrimavichus n. sp.**  
(Figures 5–7)

*Type host.* *Larus ridibundus* Linnaeus.

*Other hosts.* *Larus canus* Linnaeus, *L. delawarensis* Ord, *Sterna hirundo* Linnaeus, *Larus* sp.

*Site.* Small intestine.

*Type locality.* The Rybinsk Reservoir (Zabolotnoe, Yaroslavskaya oblast', Russia).

*Other localities.* The Urals, Siberia (Yakutiya, the Ob' River, the Kolyma River and Primorskiy Kray, Russia), North America (Madison, Wisconsin, USA).

*Type specimens.* Holotype: INPA, Moscow No 903, from *L. ridibundus*, the Rybinsk Reservoir. Paratypes: INPA, Moscow No. 904, from *L. ridibundus*, the Rybinsk reservoir, No. 905, the Kolyma River, Russia; the Natural History Museum, London (BMNH), No. 2004.7.28.3, from *L. ridibundus*, the Rybinsk reservoir, No. 2004.7.28.4, from *L. ridibundus* from the Kolyma River, Siberia, No. 2004.7.28.5 from *L. ridibundus*, from the Ob' River, Siberia; USNPC, No. 94901, from *L. ridibundus* from the Rybinsk reservoir, No. 94902, from *L. ridibundus* from the Kolyma River, Siberia, No. 94903 (2 slides), from *L. delawarensis* from Madison, Wisconsin, USA. The remaining paratypes are in the collection of S. Bondarenko.

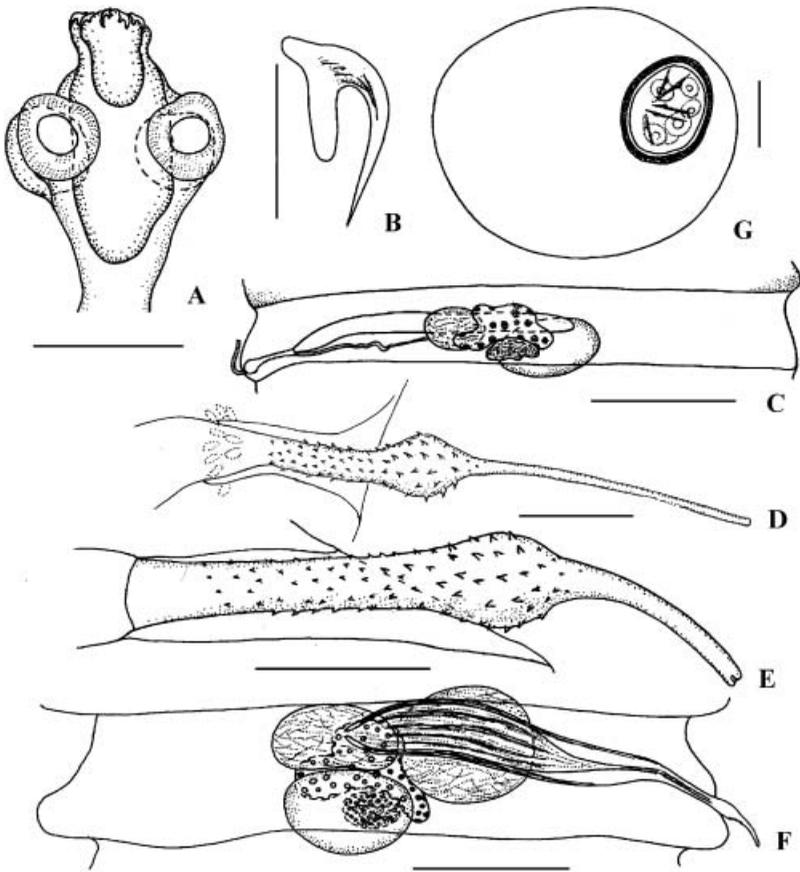


Figure 5. *Aploparaksis shigini* n. sp. Holotype from *Larus ridibundus*, the Rybinsk reservoir, Russia: (A) scolex, (B) hook, (C) hermaphroditic proglottis. (D) Cirrus paratype from *Larus* sp., Yakutiya (Spasskaya's collection, INPA, determinate as *A. fusus* (Krabbe, 1869): (E) cirrus, (F) hermaphroditic proglottis. Paratype from *L. ridibundus* from Kolyma river: (G) egg. Scale bars: 100 μm (A, C, F), 20 μm (B, D, E, G).

**Etymology.** The new species is named in memory of Dr A.A. Shigin who was the first to describe specimens from *L. ridibundus* from the Rybinsk reservoir and kindly provided part of them for our investigation.

**Material studied.** This study is based on both the original material collected from gulls of Siberia, specimens from museum collections (INPA, Moscow), and specimens collected by Dr. A. Shigin in the Rybinsk reservoir from *L. ridibundus* No. 107, 15 May 1953 (Zabolotnoe, Jaroslavskaya Oblast', Russia) and fragments of one specimen collected by Dr. Z. Smetanina in Primorskiy Krai (Lake Hanka) from *L. ridibundus* No. 243, 13 June 1968. One of the Siberian specimens was collected from young *L. ridibundus* in the lower reaches of the Ob' River in 1982 by S. Bondarenko and 20 specimens were collected from the same host in the Kolyma River basin (Ten'ka River, Magadan Region) by Mr. S. Leonov. In addition, we used 11 specimens from one *L. delawarensis* Ord. collected in Madison (Wisconsin, USA, 21 November 1946) by Dr. R. Rausch. The re-examined voucher specimens identified as *A. cirrosa* or *A. fusus* (= *A. larina*) by Spasskaya (1956, 1957) and Spasskaya and Spassky (1960) are in the INPA collection as follows: Nos. 199

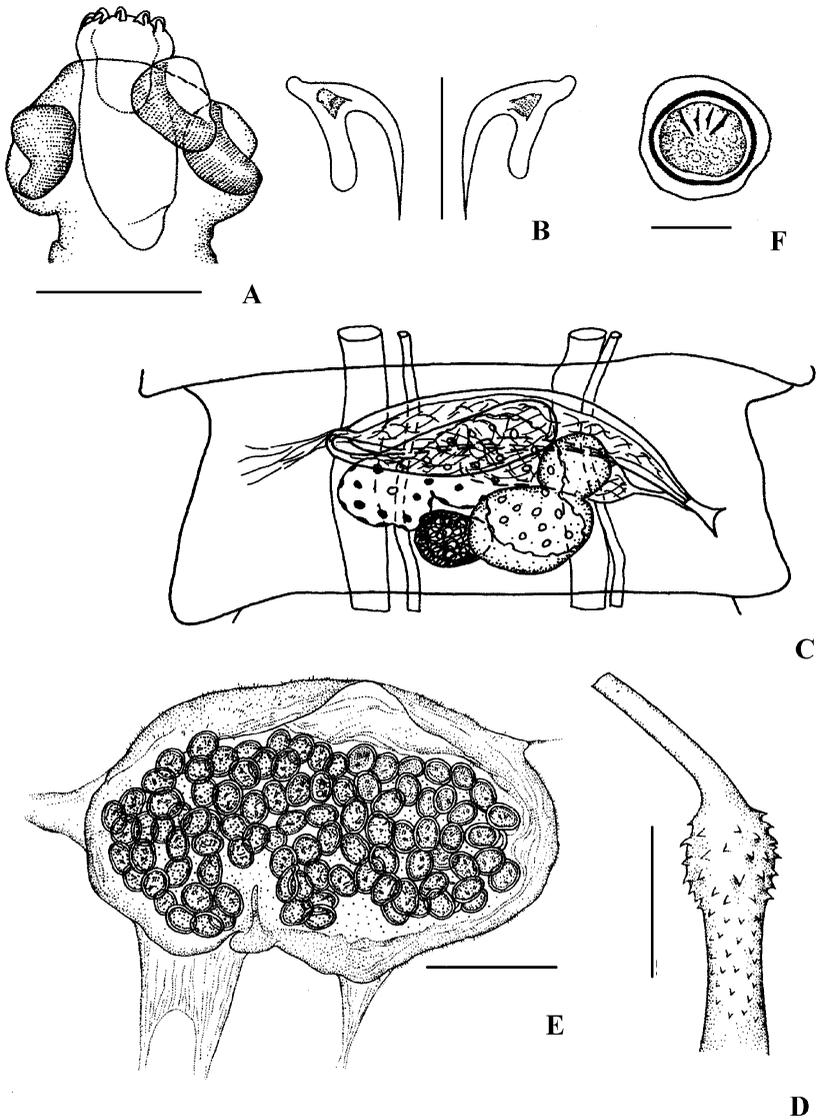


Figure 6. *Aploparaksis shigini* n. sp., paratype from *Larus delawarensis* from Alaska: (A) scolex, (B) hooks, (C) hermaphroditic proglottis, (D) cirrus, (E) egg-packet, (F) egg. Scale bars: 100  $\mu$ m (A, C, E, F), 20  $\mu$ m (B, D).

and 366, *L. canus*; Nos. 82, 86b, 90b, 109, 324a, 366a and 413a, *L. ridibundus*; Nos. 3 and 16, *Larus* sp.; Nos. 159, 162, 163, 206, 210 and 240, *S. hirundo* from Yakutiya.

For a long time *Aploparaksis schigini* n. sp. was reported under different names: as *A. cirrosa* of Clerc (1903), Dubinina (1953), Spasskaya (1957 in part) nec *Taenia cirrosa* Krabbe, 1869; as *A. fusus* of Joyeux and Baer (1928), Skrjabin and Mathevossian (1945), Spasskaya (1956 in part), Spasskaya and Spassky (1960) nec *Taenia fusus* Krabbe, 1869; as *A. larina* of Schigin (1961), Spassky (1963 in part), Spasskaya (1966 in part), nec *A. larina* Fuhrmann, 1921. *Aploparaksis larina* is considered here as a synonym of *A. brachyphallos* (see above).

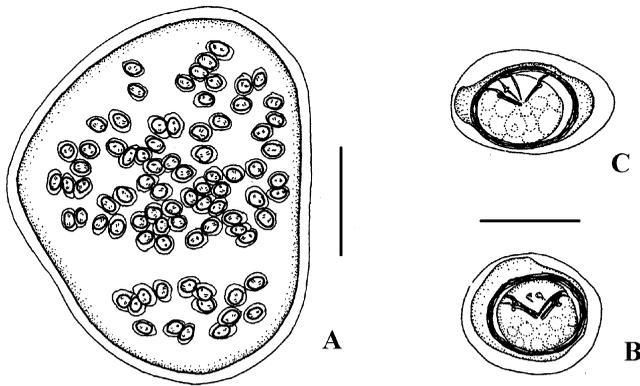


Figure 7. *Aploparaksis shigini* n. sp., paratype from *L. ridibundus*, Siberia: (A) live egg-packet; (B, C) live eggs. Scale bars: 200  $\mu\text{m}$  (A), 30  $\mu\text{m}$  (B, C).

*Description* (the measurements given before the parenthesis are those of the holotype). Length of mature specimen 87 (45–70) mm, maximum width 1.06 (0.54–0.95) mm. Scolex with evaginated rostellum  $180 \times 143$  ( $135\text{--}230 \times 120\text{--}190$ )  $\mu\text{m}$ . Rostellum small,  $65 \times 41$  ( $66\text{--}90 \times 45\text{--}49$ )  $\mu\text{m}$ , rostellar sheath  $143 \times 49$  ( $180\text{--}230 \times 60\text{--}78$ )  $\mu\text{m}$ . Rostellar hooks 10, with typical aploparaksoid shape (Figures 5B and 6B), blade long and thin, significantly longer than guard, handle rudimentary. Total length of hook 23–24 (24.8–25.6)  $\mu\text{m}$ ; length of blade 16–17.6  $\mu\text{m}$ ; length of base with guard 15–16 (14–17)  $\mu\text{m}$ . Suckers prominent, muscular,  $57\text{--}65 \times 53\text{--}57$  ( $62\text{--}90 \times 60\text{--}80$ )  $\mu\text{m}$ . Neck 1. 67 (0.40–0.86) mm long and 45 (60–90)  $\mu\text{m}$  wide immediately posterior to scolex. Internal segmentation observed earlier than external ones, approximately 0.88 mm from scolex. Strobila delicate, band-like. Proglottides numerous (1340 in holotype), first proglottides significantly wider than long. Osmoregulatory canals in hermaphroditic proglottides move towards centre of median field, dividing proglottis approximately into three equal parts, in pre-gravid proglottides it passes laterally; transverse anastomoses not observed. Single testis (Figures 5C, F)  $70\text{--}90 \times 45\text{--}50$  ( $70\text{--}139 \times 45\text{--}82$ )  $\mu\text{m}$ , oval or rounded, sometimes slightly lobed or even divided by transverse septum into two parts; in centre of relaxed proglottides but frequently displaced antiporally in contracted ones. Cirrus-sac cylindrical,  $176\text{--}229 \times 32\text{--}33$  ( $170\text{--}250 \times 33\text{--}45$ )  $\mu\text{m}$ , with powerful muscular walls, crosses median line or reaches antiporal osmoregulatory canals; when muscles in walls contract it becomes cigar-shaped. Cavity of cirrus-sac 21–29  $\mu\text{m}$  in diameter. Internal seminal vesicle  $140\text{--}160 \times 21\text{--}25$   $\mu\text{m}$ , external seminal vesicle  $70\text{--}80 \times 45\text{--}53$   $\mu\text{m}$ , opposite antiporal region of cirrus-sac or overlying its dorsal surface. Evaginated cirrus (Figures 5D, E and 6D) 80–104 (43–79)  $\mu\text{m}$  long, with parabasal swelling 14 (11–16)  $\mu\text{m}$  long and 13 (12–16)  $\mu\text{m}$  wide taking into account length of spines covering it. Basal part of cirrus  $25\text{--}33 \times 6.0\text{--}6.5$  ( $25\text{--}30 \times 6\text{--}8$ )  $\mu\text{m}$ , cylindrical and distal part 50  $\mu\text{m}$  long with diameter at base 3  $\mu\text{m}$ . Basal part and parabasal swelling armed with spines. Spines differ in size, smaller spines cover base of cirrus, and largest one cover surface of swelling where its become triangular-shaped (ca. five to six spines per diagonal row on each side of cirrus). Several very small spines visible at base of distal part of cirrus, rest of surface smooth.

Ovary 143 (120–200)  $\mu\text{m}$  wide, usually trilobed, in centre of median field, ventral to male organs, sometimes, when fully developed, occupies entire median field. Vitellarium compact, oval,  $41 \times 20$  ( $37\text{--}53 \times 21\text{--}49$ )  $\mu\text{m}$ , median, posterior to ovary.

Seminal receptacle elongated-oval or rounded depending on filling by sperm,  $90 \times 41$  ( $45\text{--}120 \times 48\text{--}74$ )  $\mu\text{m}$  (in holotype not well outlined and visible only in gravid proglottides). Vagina  $60\text{--}99$   $\mu\text{m}$  long, thin-walled, tubular, sometimes slightly twisted in conductive part, runs parallel with and dorsal to cirrus sac, under or rarely over it. Copulatory part of vagina  $41\text{--}49 \times 6\text{--}8$   $\mu\text{m}$ , walls weakly sclerotised; conductive part to  $58$   $\mu\text{m}$  long. Uterus first appears in hermaphroditic proglottides as transverse tube and with further maturation it acquires the form of a slightly lobed sac and occupies entire proglottis. Young eggs evenly distributed throughout uterus; with maturation, eggs were enveloped by a layer of substance, forming a package in the centre of the uterus. Eggs with thin outer shell,  $66\text{--}107 \times 49\text{--}82$   $\mu\text{m}$  (Figure 5G). Granular internal envelope is hardly discernible. Embryophore  $29\text{--}33 \times 33\text{--}37$  ( $25\text{--}29 \times 29\text{--}32$ )  $\mu\text{m}$ , wall smooth, about  $1$   $\mu\text{m}$  thick. Oncosphere  $21 \times 25\text{--}27$  ( $23 \times 25$ )  $\mu\text{m}$ , embryonic hooks  $12$   $\mu\text{m}$  long. Packet leaves uterus through rupture of lateral uterine and proglottis walls.

*Morphological variability.* Fragments of the specimen from Smetanina's collection possess a slightly larger testis and a shorter ( $20$   $\mu\text{m}$  long) base of the cirrus. The distal end of the cirrus-sac is surrounded by numerous glandular cells, which are not found in other specimens. Glandular cells are also seen in the uterus wall. The package in a uterus of specimens from *L. delawarensis* looks as if it is hung in the centre of a uterus by filaments attached to walls of the uterus (Figure 6E). Size of packets  $230\text{--}250 \times 340\text{--}370$   $\mu\text{m}$ . Number of eggs in them variable, and can reach 100 and perhaps a little more.

Live eggs (Figure 7) were studied in a specimen from *L. ridibundus* from the Ob' River. The packet from  $0.70 \times 0.59$  to  $1.01 \times 0.73$  mm; number of eggs  $33\text{--}80$ . Outer envelope of egg  $55 \times 38$   $\mu\text{m}$ , granular envelope  $46 \times 27$   $\mu\text{m}$ , embryophore  $27 \times 34$   $\mu\text{m}$ , oncosphere  $21 \times 29$   $\mu\text{m}$ , embryonic hooks of central and lateral pairs identical in shape and length,  $12$   $\mu\text{m}$  long.

The life cycle *A. shigini* is unknown.

### Remarks

The first detailed description of specimens from gulls under the name *A. larina* from the Rybinsk Reservoir was published by Shigin (1961). That description was included in the monographs by Spassky (1963) and Spasskaya (1966). Prudhoe (1969) mentioned this species as recorded in gulls in many regions from the Antarctic to the Arctic. However, any cestodes with a bulbous-like swelling on the cirrus were assigned to *A. larina*, and as a consequence, this species would represent a composite of what may be several independent taxa. The reported host spectrum of *A. larina* is wide and includes 16 species of birds (Tolkatcheva in Ryzhikov et al. 1985).

The re-examination of voucher specimens from gulls of Yakutiya, which were at first determined as *A. cirrosa* by Spasskaya (1957), as *A. fusus* by Spasskaya (1956), Spasskaya and Spassky (1960) and finally as *A. larina* by Spassky (1963) and Spasskaya (1966), and specimens collected by A. Shigin, showed that they were identical, although different to *A. larina* from the Antarctic (see above) described by Fuhrmann (1921). On the basis of the comparison with the present results, we consider the previous records of *A. larina* by Spassky (1963), Spasskaya (1966) and Shigin (1961) as belonging to *A. shigini* n. sp.

*Aploparaksis shigini* belongs to a quite large group of *Aploparaksis* with a parabasal swelling on the cirrus and relatively small hooks, the length of which differs insignificantly. They are: *A. brachyphallos*; *A. clavata* Spasskaya, 1966; *A. gallinagii* Bondarenko, 1979; *A.*

*mamaevi* (Bondarenko, 1966); *A. schilleri* Webster, 1955; *A. sachalinensis* Krotov, 1952 and *A. spinosus* (Bondarenko, 1966).

*Aploparaksis shigini* n. sp. is especially similar to *A. spinosus*, parasitising shorebirds, mainly snipes. One of the most distinguishing characters of the new species is the presence of a single packet (“pseudocapsules”), according to Belopolskaya and Kulachkova (1968), of eggs in the uterus, formed by secretion produced by the uterus walls. Analogous packets, only in larger quantities (two to five), are also present in the uterus of *A. spinosus*, but this species differs by smaller rostellar hooks (18–20 µm long), as compared to those (22–26 µm long) of *A. shigini*, and a larger cirrus (70–126 × 18–21 µm and 61–90 × 12–16 µm, respectively), the armament of the cirrus being similar.

Egg packets are formed in the uterus of *A. mamaevi* also, however their number reaches 10. Moreover, rostellar hooks in this species are smaller (17 µm) and the cirrus, up to 74 µm long, has a bulbous swelling, up to 8–10 µm in diameter, armed with smaller spines.

*Aploparaksis sachalinensis* is also close to the new species in size (20–24 µm) and shape of the hooks and the length of the cirrus (up to 120 µm), but the bulbous-like swelling of the cirrus of the latter is considerably larger (24.6 × 24.6–30 µm), almost spherical, and armed with very fine, evenly and densely distributed spines (our unpublished data). Rostellar hooks of the rest of the above-mentioned species are 17–20 µm long and the cirrus differs in its armament. The study of fragments labelled by Clerc (1903) as *A. cirrosa* (ZIN, vial 312, *Larus* sp., the Urals, 1901) showed that their morphological characters correspond well to the characteristics of *A. shigini* n. sp., therefore, we consider *A. cirrosa sensu* Clerc, 1903 as a synonym of *A. shigini*.

### ***Aploparaksis (Aploparaksis) xemae* Schiller, 1951**

(Figure 8)

*Host.* *Xema sabini*, also shorebirds of the genera *Arenaria*, *Calidris*, *Gallinago*, *Limnodromus*, *Phalaropus* and *Tringa*.

*Intermediate hosts.* *Stylodrilus* sp., *Styloscolex sokolskajae* Morev (Lumbriculidae), coelom, experimentally (Bondarenko 1978, 1979).

*Metacestode:* Typical diplocyst (Bondarenko 1978, 1979).

*Localities.* North America (Alaska), Siberia (the lower reaches of the Ob', Enisey and Lena Rivers, Chukotka).

*Material studied.* MHNG (Collection Neuchâtel) *Diorchis serpentata* 24/79, type, from *Calidris* sp. from West Taimyr (Russia), longitudinal and transverse sections; *Aploparaksis xemae* USNPC 47346, type, from *X. sabini* from Alaska, 1 mature specimen, scolex squashed; *A. xemae* from R. Rausch's collection, slide 26210, *X. sabini*, Alaska, two mature specimens.

*Addition to the Schiller's (1951b) description* (based on type). Strobila lacks gravid proglottides. Scolex squashed, but 10 aploparaksoid hooks, shape and length (25–26 µm) of which correspond well with described ones, are clearly seen. Evaginated cirrus (Figures 8D) short, 20 µm long, with basal swelling armed with dense, fine spines; distal region 10 µm long, unarmed. Ovary bi-winged, weakly lobed, in centre of median field; in hermaphroditic proglottides occupies almost total width of space between poral and

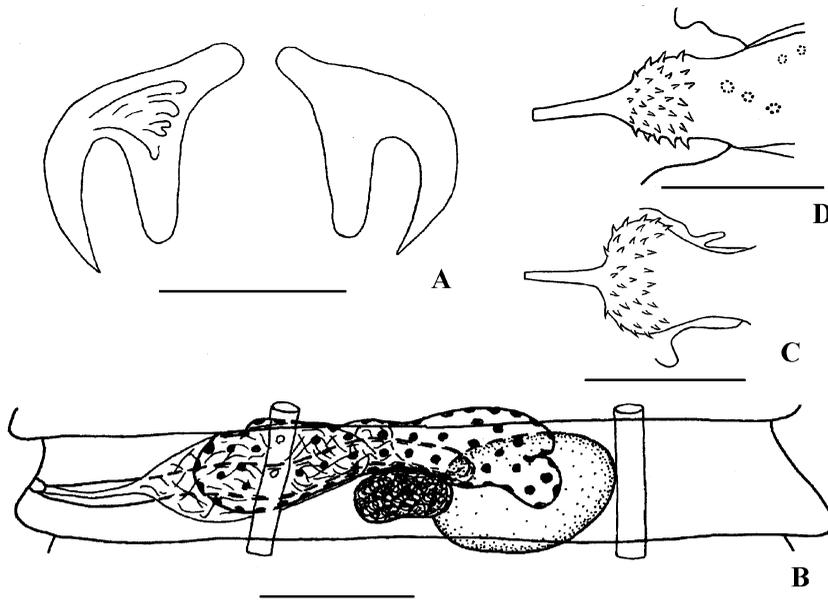


Figure 8. *Aploparaksis xemae* Schiller, 1951. Type-specimen from *Xema sabini*, Alaska: (A) hooks, (B) hermaphroditic proglottis, (C) cirrus. Specimen from a type-series *Diorchis serpentata* von Linstow, 1905 from *Calidris* sp. of Western Taimyr, Russia: (D) cirrus. Scale bars: 100 µm (B), 20 µm (A, C, D).

antiporal osmoregulatory canals. Vitellarium posterior to ovary, under its anatomical centre, ventral to it. Vagina short, does not reach beyond poral osmoregulatory canals.

**Remarks.** Described by Schiller (1951a) on the basis of material from a single *X. sabini* from the Arctic coast of Alaska and was known only from this report. After re-examination of the type-specimen Bondarenko (1979) provided some additional data on the morphology of *A. xemae*, and established certain inaccuracies in the original description, mainly in relation to the topography of female gonads and morphology of the cirrus, which led to a misidentification: from shorebirds *A. xemae* was recorded as *A. andrei* of Belopolskaya (1969), nec *A. andrei* Spassky, 1965; *A. hirsuta* of Belopolskaya (1969, in part), Bondarenko (1966, in part), nec *A. hirsuta* (Krabbe, 1869); *A. orientalis* of Tolkacheva in Ryzhikov et al. (1974, in part), nec *A. orientalis* Spassky and Bobova, 1961; *Aploparaksis* sp. of Bondarenko (1975). These corrections were introduced into the specific diagnosis of *A. xemae*. The elimination of inaccuracies made it possible to transfer the species from the subgenus *Aploparaksis (Tanureria)* where it was placed by Spassky and Yurpalova (1968) to the subgenus *Aploparaksis (Aploparaksis)*. It also turned out that *A. xemae* was first described and pictured as an unidentified species *Aploparaksis* sp. from a few species of shorebirds from Chukotka by Bondarenko (1975). Eggs were single or joined together into packets. Mature single eggs were contained within an additional outer coat; coalescence of the outer coats from multiple eggs results in the formation of a packet (see Figure 17 in Bondarenko 1975).

Re-examination of the type-specimens of *D. serpentata* von Linstow, 1905 (see above) revealed that one of them (MHNG 24/79), belongs to *A. xemae* (see Figure 8D). Bondarenko and Kontrimavichus (1999) recorded *A. xemae* in Alaska (i.e. in “type localities”) from *C. alpina*. It is known in gulls from the first description only.

***Aploparaksis (Tanureria) borealis* Bondarenko and Rausch, 1977**

*Hosts.* *Stercorarius longicaudus* Vieillot, *Anthus cervinus* (Pallas), *Calcarius lapponicus* (Linnaeus), *Emberisa* sp.

*Intermediate hosts.* *Mesenchytraeus* sp. (unpublished experimental data).

*Metacestode.* Autotomicercus (Bondarenko and Kontrimavichus 1976b).

*Localities.* North America (Alaska), Siberia (the lower reaches of the Ob', Enisey and Lena Rivers, Chukotka).

*Remarks.* Bondarenko and Rausch (1977) described this species on the basis of numerous specimens collected in 1966 in one *S. longicaudus* from Seward Peninsula (Alaska) by R. Rausch, and those collected by S. Bondarenko from passeriform birds *A. cervinus* and *C. lapponicus* from Chukotka in 1970–1973. On the basis of the topography of the female gonads, we now transfer the species to the subgenus *Tanureria*. During the present study, we re-examined unidentified specimens from *C. lapponicus* from eastern Chukotka (INPA Nos. 7, 40, 119, 121, 239, 241, 242, 234 and 254). Our observations showed that they belong to *A. borealis*. The results of the current investigation confirm that *A. borealis* is a common parasite of passeriform birds. For the morphology of *A. borealis* see Bondarenko and Rausch (1977).

***Aploparaksis (Tanureria) diagonalis* Spassky and Bobova, 1961**

*Hosts.* Gulls, *Larus argentatus* (nestlings, natural infection and experimentally) and *Xema sabini* (experimentally), also shorebirds of the genera *Arenaria*, *Calidris*, *Gallinago*, *Limnodromus*, *Phalaropus*, *Tringa*, *Pluvialis* (Linnaeus). The nestling of *Sterna paradisea* Pontoppidan could not be infected experimentally.

*Intermediate hosts.* Oligochaeta (Enchytraeidae) *Mesenchytraeus* sp. 1 (? *M. obscurus* Eisen, 1904), natural infection, and *Mesenchytraeus* sp. 2 (? *M. penicillus* Eisen, 1904), experimentally (Bondarenko 1975; Bondarenko & Kontrimavichus 1979).

*Metacestode.* Autotomicercus (after Bondarenko & Kontrimavichus 1976b, 1979)

*Localities.* Russia (Kamchatka, Chukotka, the lower reaches of the Lena River, Ob' Bay, Norilsk Lakes (Keta Lake), the Commandor Islands).

*Remarks.* This species was firstly described as a member of *Aploparaksis* from shorebirds of Kamchatka by Spassky and Bobova (1961). Spassky and Yurpalova (1968) transferred it to the subgenus *Aploparaksis (Tanureria)*. Having discovered cestodes with an antiporally positioned vitellarium in *Larus argentatus* in Chukotka, Bondarenko (1975) first wrongly identified them as *Aploparaksis xemae*. Later, after the diagnosis of *A. xemae* was amended by Bondarenko (1979), Bondarenko and Kontrimavichus (1979) assigned these specimens to *Aploparaksis diagonalis*, and described them on the basis of specimens reared experimentally in young *L. argentatus*. *A. diagonalis* was reported from shorebirds by Belopolskaya (1969) and Spasskaya and Spassky (1971); also as *A. xemae* of Bondarenko

(1966, 1973, 1976), Krasnoshchekov and Bondarenko (1975, 1976), Krasnoshchekov and Nikishin (1979). Bondarenko and Kontrimavichus (1999) have shown that specimens from *Limnodromus griseus* and *Arenaria interpres* recorded in Alaska as *A. diagonalis* by Deblock and Rausch (1968) actually appeared to belong to *A. occidentalis* Prudhoe and Manger, 1966.

Of particular interest is a source of *L. argentatus* infestation with *A. diagonalis*, which was discovered on a small island of a tundra lake in the lower reaches of the Chaun River (Chukotka). Nestlings, but not adults from the colony studied were frequently found infected with this parasite. High intensity infection by the metacestodes of *A. diagonalis* was found in large numbers of enchytraeids living in the litter of nests, and in vegetable remains on the surface of the soil. During the breeding season oligochaetes were the prey of nestling *L. argentatus*. This obstacle explains how *A. diagonalis* can be widespread in nestling gull cestode communities. This is the only known case of gull infection by *A. diagonalis*.

### Key to the species of *Aploparaksis* parasitising gulls

1. (8) Female gonads along the longitudinal axis of proglottis, vitellarium under and ventral to the ovarium . . . . . 2
2. (3) Cirrus cylindrical to conical, length of rostellar hooks 21  $\mu\text{m}$  . . . . . *A. rissae*
3. (2) Cirrus with bulbous swelling. Eggs single or in packets . . . . . 4
4. (5) Eggs enclosed in large, single packet in center of uterus. Cirrus with parabasal swelling 11–16  $\mu\text{m}$  long and 12–16  $\mu\text{m}$  wide; spines larger on bulbous part of cirrus; length of rostellar hooks 23–25.6  $\mu\text{m}$  . . . . . *A. schigini*
5. (4) Eggs single or in numerous packets containing 2–15 eggs in each . . . . . 6
6. (7) Cirrus with parabasal swelling 12–16  $\mu\text{m}$  in diameter; covered with fine, uniform spines on basal part and parabasal swelling; rostellar hooks 16.6–21  $\mu\text{m}$ . Eggs single . . . . . *A. brachyphallos*
7. (6) Cirrus with basal swelling covered with relatively large spines in middle of its length; rostellar hooks 25–26  $\mu\text{m}$ . Eggs single or in packets . . . . . *A. xemae*
8. (1) Female gonads disposed in transverse row in median field of proglottis, vitellarium antiporal to ovarium and ventral to testis . . . . . 9
9. (10) Rostellar hooks 27–29  $\mu\text{m}$  in length; cirrus 100–134  $\mu\text{m}$  long, with poorly developed basal and parabasal swellings; proximal one-third of cirrus covered by small spines . . . . . *A. diagonalis*
10. (9) Rostellar hooks 22.5–25.9  $\mu\text{m}$  in length; cirrus to 86  $\mu\text{m}$  long, cylindrical to conical, maximum 14 wide at base . . . . . *A. borealis*

### Discussion

On the basis of data presented in the literature a total of 16 species of *Aploparaksis* belonging to two subgenera, *Aploparaksis* (*Aploparaksis*) Clerc, 1903 and *Aploparaksis* (*Tanureria*) Spassky and Yurpalova, 1968 have been described or recorded in gulls. Species of the nominotypical subgenus *Aploparaksis* have been characterised by the usual position of the female gonads when the ovarium and vitellarium lie along a longitudinal axis of the proglottis in the centre of the median field; the vitellarium is under and ventral to the ovarium. In contrast, the subgenus *Tanureria* has been characterised by the antiporal position of the vitellarium in relation to the ovary, where both are disposed in the transverse

row in the median field of the proglottis; the vitellarium is ventral to the testis, which also is displaced antiporally.

The investigation carried out showed that only six of the above-described species can truly parasitise gulls, whereas the other 10 species have been identified wrongly. Comments on each of them are provided below.

- (1) *Aploparaksis baeri* Schiller, 1951. A new name for the form described by Joyeux and Baer (1928) from *Larus argentatus* of Europe as *Haploparaksis fusus* (= *Taenia fusus* Krabbe, 1869). After re-examination of Krabbe's material Baer (1956) confirmed that they belonged to the genus *Hymenolepis* and considered *A. baeri* as a synonym of *Hymenolepis fusus*.
- (2) *Aploparaksis caballeroi* Flores-Barroeta, 1953 was described from the gull, *Larus pipixan* Wagler from Panama. The description of Flores-Barroeta (1953) was analysed in detail by Spassky (1956), who came to the conclusion that the species diagnosis does not correspond well with the generic diagnosis of *Aploparaksis*. Therefore, he suspected that *A. caballeroi* could not be regarded as a species of *Aploparaksis*, and he thought it was *Microsomacantus lari* Yamaguti, 1940. Later, Spassky (1963) proposed that the only generic taxon that could include *A. caballeroi* is *Retinometra* Spassky, 1955, a decision with which we agree. However, Schmidt (1986) once again included this species in *Aploparaksis*.
- (3) *Aploparaksis cirrosa* (Krabbe, 1869) Clerc, 1903 from Holarctic gulls of the genera *Larus* Linnaeus and *Sterna* Linnaeus; described by Krabbe (1869) as a species of *Taenia*, later wrongly included in *Aploparaksis* by Clerc (1903). Fuhrmann (1906) established the presence of three testes in *T. cirrosa* and it is treated now as a species of *Wardium* Mayhew, 1925. We had the opportunity to re-examine the specimens recorded by Clerc (1903) as *A. cirrosa* from *Larus* sp. in Urals (ZIN, No. 312) and consider them as belonging to *A. shigini* (see above).
- (4) *Aploparaksis crassirostris* (Krabbe, 1869) Clerc, 1903 described from various shore-birds from several localities. The reported host range is unusually wide and includes 30 species (Belopolskaya 1977). However, the following reports of *A. crassirostris* lack information on the morphology and pictures of the specimens studied, and as it has been recently shown by Bondarenko et al. (2002), *A. crassirostris* is a host-specific species of the snipe, *Gallinago gallinago* L. Therefore, the record from the gull, *Larus argentatus*, in Yakutiya (Russia) (Gubanov & Sergeeva 1971) is doubtful. Some further records of species (Kuklin 2004; Galaktionov et al. 1997) from *L. argentatus* and *Rissa tridactyla* in Murman (Barents Sea) also seem to be doubtful because the determination was made on the basis of juvenile cestodes.
- (5) *Aploparaksis furcigera* (Rudolphi, 1819). A specific parasite of Anatidae, but considered as the species recorded in gulls on the basis of the data of Akhumyan (1966) and Kibakin and Babaev (1964) by Tolkatcheva (in Ryzhikov et al. 1985), which was confirmed neither by illustrations nor descriptions.
- (6) *Aploparaksis fusus* (Krabbe, 1869) Joyeux and Baer, 1928, recorded as a parasite of gulls in Europe. The name originated as a result of an incorrect transfer of the species from *Hymenolepis*, where it was placed by Fuhrmann (1906) to *Aploparaksis* by Joyeux and Baer (1928). The re-examination of Krabbe's original material by Baer (1956) confirmed the attribution of this species to *Hymenolepis*. For new data concerning *H. fusus* see Bondarenko and Kontrimavichus (2004).
- (7) *Aploparaksis haldemani* (Shiller, 1951) Yamaguti, 1959 from *Xema sabini* from Alaska. It was wrongly recognised by Yamaguti (1959) as a species of *Aploparaksis* judging

- from shape of the hooks. Schiller (1951b) indicated that a proglottis contained three testes. Bondarenko and Kontrimavichus (2004) transferred this species to the new genus *Branchiopodataenia*.
- (8) *Aploparaksis larina* Fuhrmann, 1921 from Antarctic gulls. We prefer to regard it as a synonym of *A. brachyphallos* (present study).
  - (9) *Aploparaksis primus* Szidat, 1964 from *Larus dominicanus* from Argentina. This species is known only from a single record (Szidat 1964). The original description and pictures lack information about the scolex and other morphological features. Only the length of the cirrus sac and its relation to that in *A. fusus* of Dubinina (1953) is discussed briefly. For that reason we prefer to regard *A. primus* as a *species inquirenda*.
  - (10) *Aploparaksis sovieticus* Deblock, Capron and Rose, 1960 was a new name for *A. cirrosa* (Krabbe, 1869) Clerc, 1903 of Spasskaya (1957) in gulls from Yakutiya, which was proposed by Deblock et al. (1960) based on cestodes characterised by a single testis and unusual shape of the eggs. Our re-examination of Spasskaya's collection revealed that the description of *A. cirrosa* by Spasskaya (1957) was a composite based on specimens of different genera: these slides contain specimens of both *A. shigini* n. sp. and *Wardium fusus* (Krabbe). Therefore, the name *A. sovieticus* should be considered as invalid in accordance with The International Code of Zoological Nomenclature (1999 Article 49) since this taxon was established based on a misidentification. The specimen from the type series of *A. sovieticus* (= *A. cirrosa* of Spasskaya, 1957) from *Larus* sp., No 16, Yakutiya, vicinity of Suntar, 1954 we designate as a lectotype of *A. sovieticus* (INPA No 949).

We hope that the present study will bring some clarity into the long discussion about the taxonomic status of *Aploparaksis*, parasitising gulls (see Spassky 1963 and Smogorzhevskaya 1976). There are good reasons to suppose that only one species, *A. shigini* n. sp., is a host-specific parasite of gulls. Four other species, *A. brachyphallos*, *A. diagonalis*, *A. rissae* and *A. xemae*, are usually parasites of sandpipers, whereas *A. borealis* is a common parasite of passeriform birds. All of them are rarely found in gulls.

The described case of the steady source of infection by *A. diagonalis* in the breeding colony *L. argentatus* allows us to suppose that a local intraspecific group adapted to infect gulls exists within this species (the question about the possibility of calling it "a population" remains still open). We are inclined to think that the infestation of gulls by other *Aploparaksis* species that are specific parasites of shorebirds and passeriform birds can be accounted for by the same phenomenon; that is, by the existence of local groups of *Aploparaksis*, which are adapted to parasitising Laridae (though these might be cases of an accidental infestation). Nonetheless, the case of *A. diagonalis* testifies to the mechanism of the micro-evolutionary process which is known as "host switching" (in an evolutionary sense). It is also evidence to corroborate the opinion expressed by Bondarenko and Kontrimavichus (2002) that from the evolutionary point of view *Aploparaksis* represents a young tapeworm group that was formed in the Pleistocene and is still undergoing a hostal and territorial expansion.

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