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WARDIUM PONTICUM SP. N. (CESTODA, CYCLOPHYLLIDEA, HYMENOLEPIDOIDEA), A PARASITE OF PRATINCOLE (*GLAREOLA PRATINCOLA*) FROM THE BLACK SEA COAST

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***Wardium ponticum* sp. n. (Cestoda, Cyclophyllidea, Hymenolepidoidea), a Parasite of Pratincole (*Glareola pratincola*) from the Black Sea Coast.** Korniyushin V. V., Georgiev B. B., Greben O. B. — The new species *Wardium ponticum* Korniyushin, Georgiev et Greben, sp. n. (Aploparaksidae Mayhew, 1925) parasitic in pratincole (*Glareola pratincola* Linnaeus, 1766) from Bulgaria and Ukraine is described. The species is characterized by 10 aploparaksoid hooks, 9–10 mm long, and clearly differs from all congeneric species by the shape and armament of the cirrus.

Key words: *Glareola pratincola*, *Wardium ponticum* sp. n., Cestoda Aploparaksidae, Bulgaria, Ukraine.

***Wardium ponticum* sp. n. (Cestoda, Cyclophyllidea, Hymenolepidoidea) — паразит луговой тиркушки (*Glareola pratincola*) Черноморского побережья.** Корнюшин В. В., Георгиев Б. Б., Гребень О. Б. — Приводится описание нового вида цестод семейства Аploпараксиде (Mayhew, 1925) — *Wardium ponticum* Корнюшин, Георгиев et Гребень, sp. n. от луговой тиркушки (*Glareola pratincola* Linnaeus, 1766) по материалу из Украины и Болгарии. Новый вид характеризуется аплопараксоидными крючьями длиной 9–10 мкм, отличается от других представителей рода формой и вооружением цирруса.

Ключевые слова: *Glareola pratincola*, *Wardium ponticum* sp. n., Cestoda Aploparaksidae, Болгария, Украина.

Two cestode species of the family Aploparaksidae are known to parasitize pratincole (*Glareola pratincola* Linnaeus, 1766) on the Black Sea coast: *Glariolepis poralae* (Meggett, 1927) Spassky, 1967 and *Wardium tauricum* Korniyushin et Greben, 2010. Cestode specimens without scolices from the same host were described as *Wardium* (s. l.) sp. in our previous report (Korniyushin and Greben, 2010). The specimens described appeared to be identical to cestodes from pratincole stored in the collection of the Central Laboratory of General Ecology, BAS. We consider them as belonging to a new species, *Wardium ponticum* Korniyushin, Georgiev et Greben, sp. n., which is described herein.

Finally, 3 species of the family Aploparaksidae from pratincole were found on the coast of the Black Sea: *Glariolepis poralae* (Meggett, 1927) Spassky, 1967, *Wardium tauricum* Korniyushin et Greben, 2010 and *Wardium ponticum* sp. n.

In this work we accept the genus *Wardium* Mayhew, 1925 *sensu* Bondarenko et Kontrimavichus (2006), except for we recognize the genus *Glariolepis* Spassky, 1967.

Material and methods

The material from pratincole originated from two birds from the coast of the Black Sea: one collected in Ukraine (Crimea, Bakal Spit) by V. V. Korniyushin in June of 1969, another one collected in Bulgaria (Dobrich Province, Lake Durankulak) by B. B. Georgiev in April of 1978. The tapeworms were fixed in 70 % alcohol, stained with haematoxylin and acetocarmin, dehydrated in an ascending alcohol series, cleared in clove oil and mounted in Canada balsam. Morphology of the scolex and cirrus was studied in Berlese's medium.

All measurements are in micrometers unless otherwise stated.

Results

Order CYCLOPHYLLIDAE van Beneden in Braun, 1900

Superfamily HYMENOLEPIDOIDEA Spassky, 1949

Family APLOPARAKSIDAE Mayhew, 1925

Wardium ponticum Korniyushin, Georgiev et Greben, **sp. n.**

Type host: pratincole, *Glareola pratincola* L., 1766 (Aves: Glareolidae).

Type locality: Bulgaria, Dobrich Province, Lake Durankulak, the Black Sea (43° 42' N; 28° 31' E).

Other locality: Ukraine, Crimea, Bakal Spit (45° 47' N; 33° 10' E).

Type specimens: holotype (CH 33) from *G. pratincola* N 6283, Bulgaria (1 specimen in Berlese's medium); paratype (CP 33. 1), same host (2 specimens without scolices stained with haematoxylin); (CP 33. 2, CP 33. 3) from *G. pratincola* N 651–12 (2 slides contain 1 specimen without scolex stained with acetocarmin and a fragment of the strobila in Berlese's medium).

The type material is stored in the helminthological collection of the Institute of Zoology of the National Academy of Sciences of Ukraine, Kiev.

Etymology: the species name is given after the name of the known area of the species distribution — coast of the Black Sea (in Greek: *Pontos Euxeinos*).

Description. Holotype (fig. 1). General length is 10.5 mm, maximum width — 0.37 mm. Scolex is oval, 190 long and 155 wide at level of suckers. Suckers are rounded, 40–60 x 55–58. Rostellar sac is bag-shaped, 145 x 56. Rostellum is invaginated, with weak muscles, 50 long and 30 wide near the rostellar hooks. Ten hooks are present, aploparaksoid in shape, 9–10 long. Length of the blade is 5–7; length of the base with the guard is 8–9; length of the guard is 5–6; length of the handle is 3.

The neck width is 90. External segmentation begins at 3.5 mm from the scolex. The strobila ends with male proglottids containing fully developed bursa and cirrus. Genital pores are unilateral. Cirrus sac is cigar-shaped, 135–140 x 15–17, reaches or crosses the median line of the proglottid, sometimes it bends near poral osmoregulatory canals.

Partially evaginated cirrus is 20 long. Its basal part is unarmed, 7.5 long and 14 in diameter. The basal part turns into armed dilation 10–13 long and about 15 in diameter, including the length of spines. Spines are large, 3 high; 5 spines are present in each diagonal row (fig. 2). Cirrus is invaginated in most proglottids, and only the rosette of parabasal spines, 8–10 in diameter, is conspicuous.

Copulatory part of the vagina has the shape of short (13–15 long) and wide funnel, 25–27 in diameter. Longitudinal cuticular folds are present in copulatory part of the vagina. Conductive part of the vagina has shape of thin tube, 3.5 in diameter. The rest of the structures are indistinct.

Paratypes (fig. 3). All paratypes are without scolices. Length of one pregravid specimen is about 10 mm; fragments of other two pregravid specimens are 23.5 mm and 30 mm long. Maximum width is 58 at the level of proglottids with female gonads. Proglottids are wider than long. Proglottids with testes and cirrus sacs are 280–380 in width, those with mature female gonads are 440–480 wide. The genital pores are unilateral, open in the middle of lateral edge of proglottids. Genital atrium is simple, up to 20–75 deep. There are two pairs of osmoregulatory canals; transverse anastomoses are present.

Six bundles of inner longitudinal musculature are distinct on the surface of strobila. Proterandry was recognized based on the genital system development. Male genitalia are formed first. Three oval testes, 20–70 x 15–50, are disposed in a transverse row in median field of the proglottid, between the osmoregulatory canals. Female gonads develop after the testes disappear. Cirrus sac is elongated, 120 x 20–215 x 45 in size;

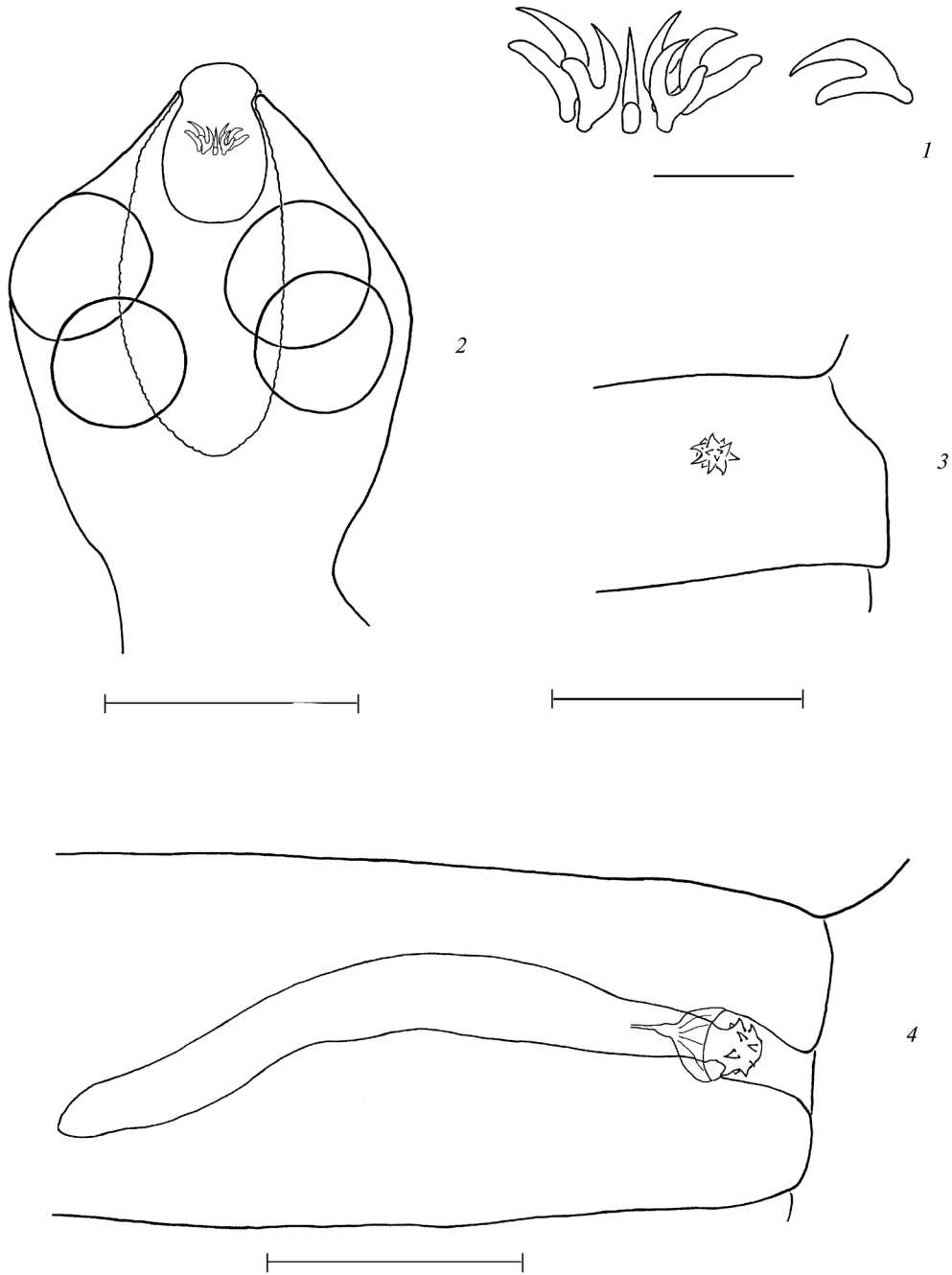


Fig. 1. *Wardium* s. l. *ponticum* sp. n. Holotype: 1 — rostellar hooks; 2 — scolex; 3 — cirrus invaginated; 4 — cirrus sac, cirrus and vagina. Scale bars: 1 — 10 μ m; 2 — 100 μ m; 3, 4 — 50 μ m.

Рис. 1. *Wardium* s. l. *ponticum* sp. n. голотип: 1 — хоботковые крючья; 2 — сколекс; 3 — инвагинированный циррус; 4 — бурса цирруса, циррус и вагина. Масштабные линейки: 1 — 10 мкм; 2 — 100 мкм; 3, 4 — 50 мкм.

wall of the cirrus sac is muscular. In male proglottids the cirrus sac reaches the median line. Internal seminal vesicle occupies almost the whole space of the cirrus sac. External seminal vesicle is filled with sperm, oval, 50–160 x 35–70 in size, situated near the antiporal region of the cirrus-sac or bent on its dorsal side. After testes degrade, the cirrus sac elongates and crosses the median line, but does not reach antiporal osmoreg-

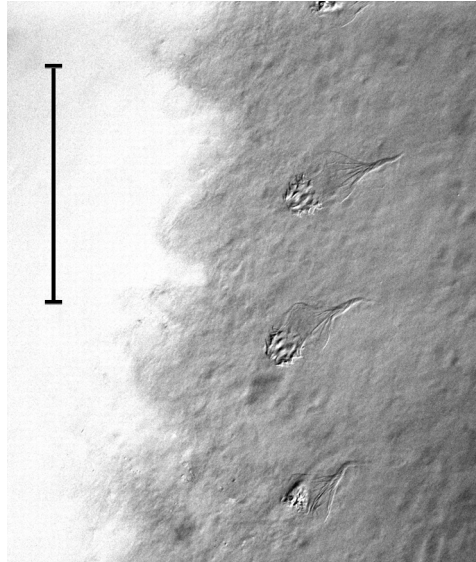


Fig. 2. *Wardium* s. l. *ponticum* sp. n. Paratype: cirrus and vagina. Scale bar 100 μ m.

Рис. 2. *Wardium* s. l. *ponticum* sp. n. паратип: циррус и вагина. Масштабная линейка 100 мкм.

ulatory canals. In this part of the strobila, only the cirrus sac, the external seminal vesicle and the primordia of female genital organs are present. Vagina, in shape of thin tube, and seminal receptacle were observed only in some proglottids. In gravid female proglottids cirrus sac reaches median line. Fully-evaginated cirri were absent in the specimens studied. Maximum cirrus length is 35. Basal part of the cirrus is unarmed, 2.5 long and 13 wide; then the slight constriction, 8 wide is present; parabasal bulb is 12.5–14 long and 11–15 wide, covered with large spines 3 high (4–5 spines in each diagonal row on each side of the cirrus). Distal part of the cirrus is pipette-like, 3 in width, unarmed. On the stained slides, only the rosette of spines, 10 wide, is visible.

Female genitalia are in form of oval primordium. Mature ovary is situated in the middle of the proglottid and has 3–4 lobes; its maximum width is 110. Vitellarium is rounded or oval, 33–45 x 25–30 in size, median, situated posteriorly and ventrally to the ovary. Vagina opens into genital atrium posterior to the male pore. Copulatory part of the vagina is 13–15 long and 20–30 wide. Conductive part of the vagina is tubular, narrow, 120 in length and 2.5 in diameter. Cuticular lining of the copulatory part forms several folds. Uterine proglottids were absent in the material studied.

Differential diagnosis. By the length of the rostellar hooks *Wardium ponticum* sp. n. is similar to several members of the genus *Wardium* parasitizing birds of the order Charadriiformes: *Wardium himantopodis* (Krabbe, 1869) Spassky et Spasskaja, 1954, *Wardium himenolepidoideus* (Deblock et Rose, 1964) Bondarenko et Kontrimavichus, 2006, *Wardium neotropicale* Deblock et Vaucher, 1997, *Wardium hughesi* (Webster, 1947) Mariaux, 1989, *Wardium spasskii* Shigin, 1961, and *Wardium tsengi* (Joueux et Baer, 1940) Spassky et Spasskaja, 1954. All species, except for *W. spasskii*, are parasites of birds of the genera *Himantopus* and *Charadrius*. *Wardium spasskii* is a parasite of the little gull (*Larus minutus* Pall.) and, occasionally, of the common tern (*Sterna hirundo* L.).

Wardium ponticum sp. n. differs from *W. himantopodis* (hooks 8–10 long) by the shape of rostellar hooks, smaller cirrus-sac and the absence of vagina sphincter. *Wardium himantopodis* and *W. ponticum* sp. n. can be distinguished also by the shape of cirrus and vagina. Parabasal cirrus dilation with large spines is characteristic for *W. ponticum* sp. n. but was not described in *W. himantopodis*. Ovaries in *W. himan-*

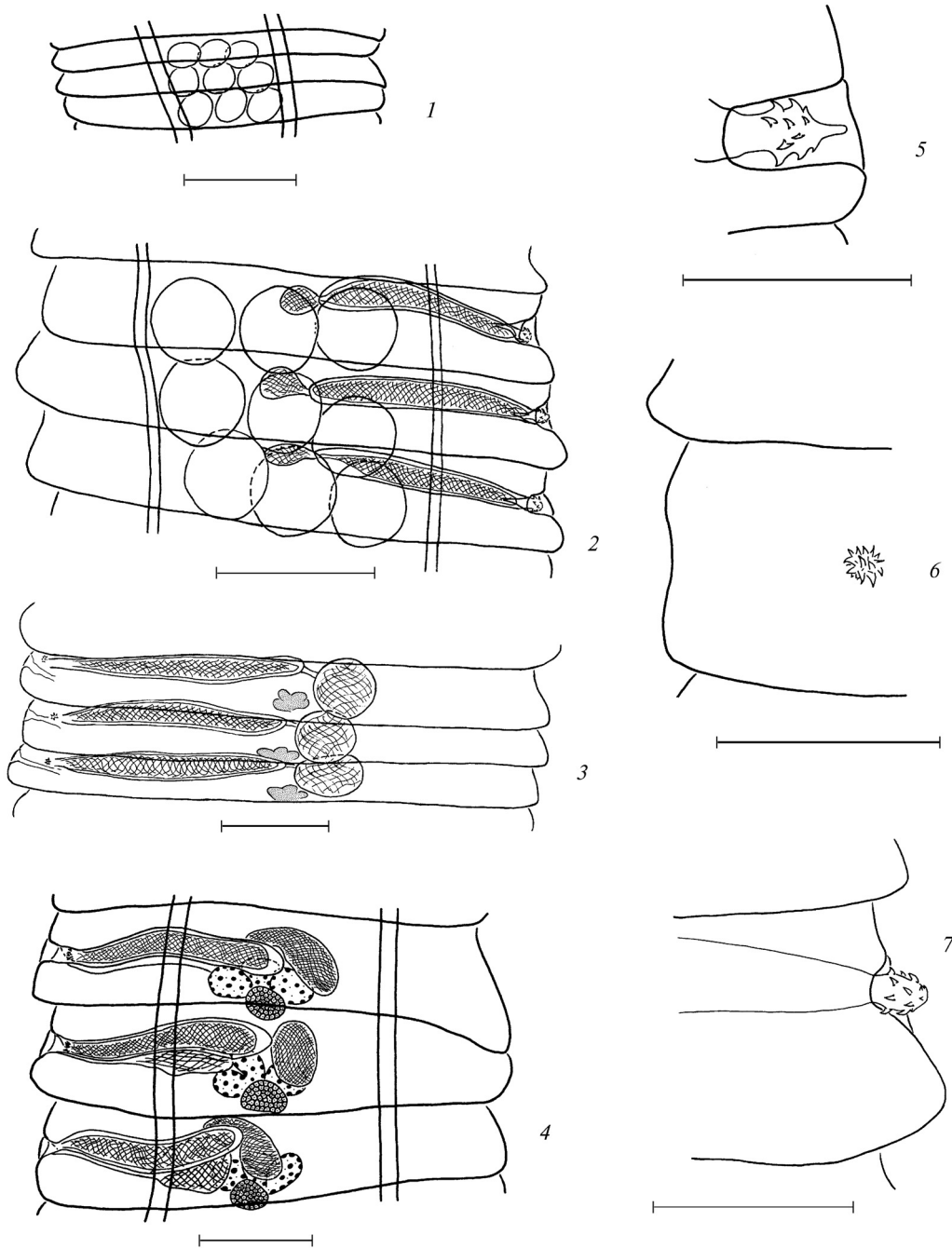


Fig. 3. *Wardium* s. l. *ponticum* sp. n. Paratype: 1, 2 — male proglottid; 3 — proglottids with female anlage; 4 — proglottid with female gonade only; 5 — cirrus; 6 — invaginated cirrus; 7 — cirrus partially evaginated. Scale bars: 1, 2, 3, 4 — 100 μm; 5, 6, 7 — 50 μm.

Рис. 3. *Wardium* s. l. *ponticum* sp. n. паратип: 1, 2 — мужские членики; 3 — членики с женским зачатком; 4 — женские членики; 5 — циррус; 6 — инвагинированный циррус; 7 — частично эвагинированный циррус. Масштабные линейки: 1, 2, 3, 4 — 100 мкм; 5, 6, 7 — 50 мкм.

topodis are weakly lobed (Krabbe, 1869; Bondarenko, Kontrimavichus, 2006), ovaries of *W. ponticum* sp. n. are with distinct lobes.

Wardium ponticum sp. n. differs from *W. himenolepidoideus* and *W. hughesi* by smaller rostellar hooks (hook length 9–10 vs 11.6 and 12, correspondingly). Hook han-

dle is rudimentary in the latter two species. Hermaphroditic proglottides are present in *W. himenolepidoideus* and *W. hughesi*, whereas in *W. ponticum* sp. n. hermaphroditic proglottides are absent. *Wardium ponticum* sp. n. possesses armed cirrus with dilated parabasal part, whereas cirrus in *W. himenolepidoideus* is unarmed, and cirrus in *W. hughesi* is large, leaf-shaped (Webster, 1947; Deblock, Rose, 1962; Bondarenko, Kontrimavichus, 2006).

Wardium ponticum sp. n. differs from *W. neotropicale* (hook length 8–10) by the shape of rostellar hooks and absence of vagina sphincter (Deblock, Vaucher, 1997).

Wardium ponticum sp. n. differs from *W. tsengi* (hook length 10–11) by simple tubular genital atrium, shorter cirrus sac, shape of the cirrus and presence of its armament. *Wardium tsengi* has longer cylindrical cirrus without spines (Joueux, Baer, 1940; Bondarenko, Kontrimavichus, 2006).

Wardium ponticum sp. n. differs from *W. spasskii* (hook length 9) by the shape of rostellar hooks, smaller cirrus sac, position of the testes, shape, size and armament of the cirrus. Hooks of *W. spasskii* are with rudimentary handle; the blade and the guard are of the same size. Cirrus of *W. spasskii* is longer (51–109 vs 35 in *W. ponticum* sp. n.), cylinder-conic, covered with small spines. The testes of *W. ponticum* sp. n. are disposed in a transverse row in median field of the proglottid. One testis of *W. spasskii* is poral and two are aporal (Shigin, 1961; Macko, 1962; Bondarenko, Kontrimavichus, 2006).

Besides, *Wardium tsengi* and *Wardium spasskii* are large tapeworms, 105–135 mm long and 1.7–2.4 mm wide with well developed musculature, whereas in *Wardium ponticum* sp. n. the strobila is narrow and delicate.

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- Bondarenko S. K., Kontrimavichus V. L. Aploparaksidae of wild and domesticated birds. — Moscow : Nauka, 2006. — 443 p. — (Fundamentals of Cestodology; Vol. 14). — Russian : Бондаренко С. К., Контримавичус В. Л. Аploпараксиды диких и домашних птиц.
- Deblock S., Rose F. Les Hymenolepis (sensu lato) de Charadriiformes // Ann. de parasitol. hum. et comp. — 1962. — 37. — P. 767–847.
- Deblock S., Vaucher Cl. Microsomacanthus kaulobolatrioni n. sp. et Wardium neotropicale n. sp. parasites d'Himantopus melanurus du Paraguay // Syst. Parasitol. — 1997. — 37. — P. 127–138.
- Joueux Ch., Baer J. G. Sur quelques cestodes // Rev. suisse zool. — 1940. — 47, N 4. — P. 381–388.
- Kornyushin V. V., Greben O. B. Hymenolepidoid cestodes (Cylophyllidea, Hymenolepidoidea) of Pratincole (Glareola pratincola) from the South of Ukraine // Vestnik zoologii. — 2010. — 44, N 6. — P. 495–507.
- Krabbe H. Bidrag til Kundskab om Fuglenes Bændelorme // Kjøbenhavn vid. Selsk. Skr., 5 Række, natur. og math. — 1869. — Ald. 8, 6. — S. 249–363.
- Macko J. K. Neue Art eines Bandwurms Wardium filamentoovatum sp. n. (Hymenolepididae) aus dem Wirt Larus minutus Pall. // Biologia (Bratislava). — 1962. — 17. — 5. — P. 355–364.
- Shigin A. A. On the helminth fauna of laridine birds of Rybinsk reservoir // Trudy Darvinovskogo Gosudarstvennogo Zapovednika. — 1961. — 7. — P. 309–362. — Russian : Шигин А. А. К гельминтофауне чайковых птиц Рыбинского водохранилища.
- Webster J. D. Studies on the genus Hymenolepis with description of new species // J. Parasitol. — 1947. — 33, N 2 — P. 99–307.