

A new cestode, *Neoskrjabinolepis gvosdevi* (Cyclophyllidea: Hymenolepididae) from the shrew *Sorex tundrensis* Merriam, 1900, in Kazakhstan

Описание нового вида цестод *Neoskrjabinolepis gvosdevi* (Cyclophyllidea: Hymenolepididae) от бурозубки *Sorex tundrensis* Merriam, 1900 из Казахстана

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A cestode, *Neoskrjabinolepis* (*Neoskrjabinolepidoides*) *gvosdevi* sp. nov., is described from the tundra shrew *Sorex tundrensis* Merriam, 1900 in Kazakhstan. The new species has ten rostellar hooks, 0.40–0.43 mm long, with claw-like blade with crooked middle part. It can be distinguished from other species in the subgenus by the cylindrical cirrus short, 0.45–0.50 mm long, and armed with different types of spines; the basal part covered with numerous small, rosethorn-shaped spines, and the middle and distal parts armed with fine, needle-shaped spines.

Цестода *Neoskrjabinolepis* (*Neoskrjabinolepidoides*) *gvosdevi* sp. nov. описана от тундряной бурозубки (*Sorex tundrensis* Merriam, 1900) из Казахстана. Новый вид имеет 10 крючьев, 0.40–0.43 мм длиной, с когтевидным лезвием, изогнутым в его средней части. Этот вид отличается от других известных видов подрода по короткому цилиндрическому циррусу, 0.45–0.50 мм длиной, вооруженному гетероморфными шипами: его базальная часть имеет многочисленные мелкие когтевидные шипики, средняя и дистальная часть — тонкие, игловидные шипы.

Key words: cestodes, shrews, Palaearctic, *Sorex*, Cyclophyllidea, Hymenolepididae, *Neoskrjabinolepis*, new species

Ключевые слова: цестоды, бурозубки, Палеарктика, *Sorex*, Cyclophyllidea, Hymenolepididae, *Neoskrjabinolepis*, новый вид

INTRODUCTION

Cestodes of the genus *Neoskrjabinolepis* Spassky, 1947 (Cyclophyllidea: Hymenolepididae) of shrews (*Sorex*) have a large diversity in the Holarctic. There are ten species of this genus in the Palaearctic (Kornienko et al., 2006, 2007, 2008a, 2008b). Up to date, there were only two *Neoskrjabinolepis* species reported from shrews in Kazakhstan,

namely *N. singularis* (Cholodkovsky, 1912) and *N. schaldybini* Spassky, 1947 (Tkach & Zhumabekova, 1996). We found a new undescribed species of the genus *Neoskrjabinolepis* in the shrew of Bajanaul Nature Reserve (eastern Kazakhstan). This cestode has a particular shape and size of rostellar hooks, the armament of cirrus and the serial strobilation. The serial strobilation gives reason to assign the new species to the sub-

genus *Neoskrjabinolepidoides* Kornienko, Gulyaev & Melnikova 2006 (Kornienko et al., 2006). The description of the new species is presented in this paper.

MATERIALS AND METHODS

The tapeworms were collected in 2008 from the small intestine of *Sorex tundrensis* Merriam, 1900 in Pavlodar Province, Kazakhstan. Cestodes were isolated, washed and relaxed in water, and fixed in 70% ethanol. They were stained in Ehrlich's haematoxylin, differentiated in 3% aqueous solution of ferric ammonium sulphate 12-hydrate, dehydrated in an ascending ethanol series, cleared in clove oil and mounted in Canada balsam. Some of the scoleces and fragments of strobila were mounted in Berlese's medium in order to facilitate the observation on the rostellar hooks and copulatory apparatus. The observations were made using phase-contrast microscope Axiolab. All measurements are given in millimeters. The material is deposited in the Institute of Animal Systematics and Ecology, Siberian Branch of the Russian Academy of Science (ISEA SB RAS), Novosibirsk.

Order CYCLOPHYLLIDEA

Family HYMENOLEPIDIDAE

Subfamily PSEUDHYMENOLEPIDINAE

Tribe PSEUDHYMENOLEPIDINI

Genus *Neoskrjabinolepis* Spassky, 1947

Neoskrjabinolepis

(*Neoskrjabinolepidoides*) *gvosdevi* sp. nov.
(Figs 1–5)

Holotype. **Kazakhstan**, *Pavlodar Prov.*, Bajanaul Nature Reserve, June 2008; leg. V. Gulyaev; ISEA SB RAS, slide No. 18.11.15.1.

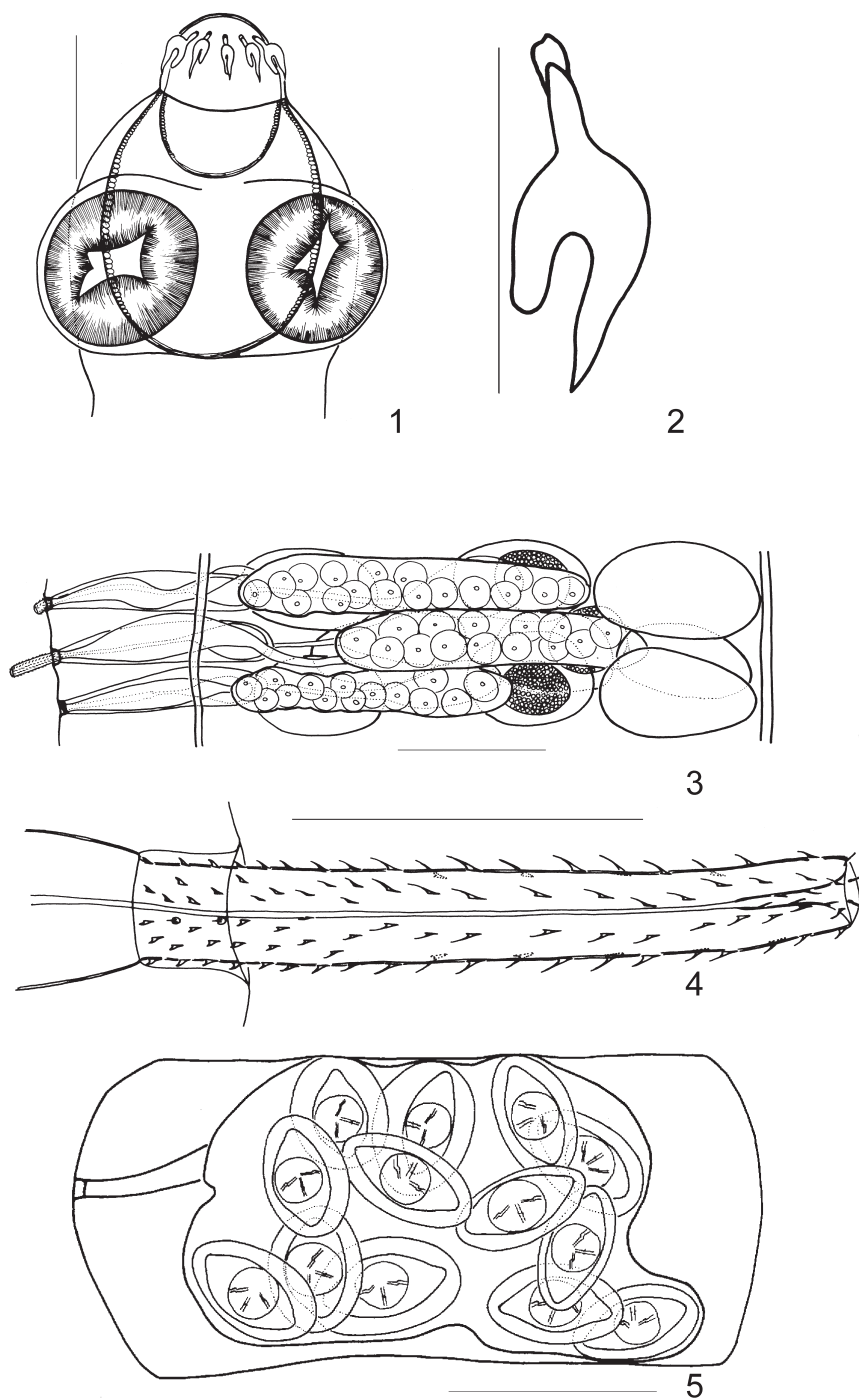
Paratypes. **Kazakhstan**, *Pavlodar Prov.*, Bajanaul Nature Reserve: June 2008; leg. V. Gulyaev; ISEA SB RAS, slides No. 18.11.15.2–6.

Description. Small, slender cestodes. Strobila 4.0–5.0, with about 400 acraspedote proglottides; maximum width 0.26–

0.37 at level of proglottides with young uterus. Strobilation serial: pregravid strobila usually consisting of four series of proglottides, each containing proglottides at same developmental stage (first series of juvenile or premature proglottides; second series of hermaphroditic mature proglottides; third series of postmature proglottides; fourth series of pregravid or gravid proglottides); each series consisting of 70–106 proglottides. Strobillar portions containing juvenile, premature or mature proglottides without external segmentation, proglottides externally distinct at level of postmature ones.

Scolex (Fig. 1) round, with width 0.2–0.22, posterior part of scolex gradually tapering and passing into short neck. Suckers big, oval, muscular, with measurements $0.1–0.12 \times 0.09–0.1$. Rhynchus short, with measurements $0.05–0.062 \times 0.078–0.088$. Rostellum sac-like, with well-developed radial musculature of walls and measurements $0.11–0.12 \times 0.075–0.093$; intensely stained glandular cells presented in its cavity. Rostellar hooks 10, arranged in single row. Each hook (Fig. 2) $0.04–0.043$ long, with claw-like blade, axes of guard and handle almost parallel each other; blade with slightly crooked middle part; handle-tip with small epiphyseal thickening. Rostellar sheath voluminous, passing beyond level of posterior margins of suckers; its walls with well-developed circular musculature; measurements $0.15–0.19 \times 0.14–0.15$; its bottom filled with intensely stained glandular masses. Neck short, with width $0.14–0.16$. Osmoregulatory canals without transverse anastomoses; diameter of ventral canals $0.005–0.007$, diameter of dorsal canals $0.0015–0.002$. Genital pores unilateral. Genital atrium tubular, simple, situated at about middle of lateral proglottis margin, measurements $0.004–0.0049 \times 0.005–0.007$.

Strobila with protandrous development. Mature proglottides wider than long, with measurements $0.012–0.015 \times 0.26–0.32$ (Fig. 3); lateral fields $0.044–0.05$. Testes three, $0.018–0.027 \times 0.030–0.052$; arranged



Figs 1–5. *Neoskrjabinolepidoides gvosdevi* sp. nov., holotype; **1**, scolex; **2**, rostellar hook; **3**, gravid proglottis; **4**, mature proglottides – ventral view; **5**, cirrus-sac; **6**, evaginated cirrus. Scale bar: 0.1 mm (1), 0.04 mm (2), 0.05 mm (3, 5), 0.02 mm (4).

in single row, two antiporal and one poral, divided by external seminal vesicle. Diameter of testes larger than proglottis length and, consequently, dense dorsal testicular field is formed in the mature strobillar portion. Cirrus-sac (Fig. 3) elongate, thin-walled, cigarette-shaped, slightly crossing poral osmoregulatory canals, measurements $0.062\text{--}0.082 \times 0.009\text{--}0.011$. Internal seminal vesicle (Fig. 3) small, $0.016\text{--}0.023 \times 0.008\text{--}0.01$, even entirely filled with sperm does not exceed $1/3$ of cirrus-sac. Evaginated cirrus (Fig. 4) short cylindrical $0.045\text{--}0.05$ in length, armed with different types of spines; its basal part covered with numerous small, rosethorn-shaped spines; middle and distal parts armed with fine, needle-shaped spines. External seminal vesicle (Fig. 3) small, drop-liked, submedian, $0.03\text{--}0.043 \times 0.015\text{--}0.016$, connected with cirrus sac by thin isthmus.

Ovary (Fig. 3) compact, sac-like, transversely elongate, $0.08\text{--}0.11 \times 0.01\text{--}0.015$, situated poral, ventral to testes; occupying about half of median field of proglottis; with major oocytes. Vitellarium (Fig. 3) almost spherical, aporal to ovary, measurements $0.01\text{--}0.015 \times 0.012\text{--}0.023$. Vagina (Fig. 3) thin-walled, passing and opening ventrally to cirrus-sac. Conductive part of vagina gradually enlarging and passing into small, sac-like seminal receptacle, situating close to antiporal lateral proglottis margin.

Young uterus tubular, dorsal to ovary, thin-walled; it fills-up entire median field of proglottis, does not cross osmoregulatory canals. Gravid proglottides (Fig. 5) measurements $0.015\text{--}0.02 \times 0.25\text{--}0.36$; gravid uterus containing usually 12–18 ripe eggs.

Comparison. *Neoskrjabinolepis gvosdevi* **sp. nov.** is characterised by serial strobillar development. Therefore, it belongs to the subgenus *Neoskrjabinolepidoides* of *Neoskrjabinolepis*. At present, the subgenus *Neoskrjabinolepidoides* includes six species: *N. singularis* (Cholodkowsky, 1912), *N. nadtochijae* Kornienko, Gulyaev & Melnikova, 2006, *N. corticirrosus* Kornienko, Gulyaev & Melnikova, 2007, *N. kedrovensis* Kornienko,

Gulyaev & Melnikova, 2007, *N. nuda* Kornienko, Gulyaev, Melnikova & Georgiev, 2008, and *N. merkushevae* Kornienko & Binkienė, 2008.

Neoskrjabinolepis gvosdevi have very similar length of the rostellar hooks of *N. nadtochijae* and *N. nuda*, of the cestodes of the Far East ($0.040\text{--}0.045$ и $0.040\text{--}0.044$ respectively), but new species differ in the shape of the hooks, in the size of the cirrus-sac, of the cirrus and his armament. The hook of *N. nadtochijae* has a blade with a crooked middle part, the hook of *N. nuda* has an almost straight blade. *Neoskrjabinolepis gvosdevi* differs from these species by the significantly smaller cirrus-sac and cirrus also. Measurements of the cirrus-sac and cirrus of *N. nadtochijae* are $0.16\text{--}0.18$ and $0.071\text{--}0.074$ respectively, *N. nuda* — $0.11\text{--}0.12$ and $0.095\text{--}0.1$ respectively.

Judging by the similar size of the cirrus sac and cirrus, *N. gvosdevi* **sp. nov.** resembles *N. corticirrosa* ($0.09\text{--}0.095$ and $0.050\text{--}0.055$ respectively) and *N. singularis*. ($0.70\text{--}0.90$ and $0.040\text{--}0.047$ respectively). However, these two species differ from the new species by their longer rostellar hooks, i.e. $0.048\text{--}0.053$ and $0.056\text{--}0.065$ in *N. corticirrosa* and *N. singularis* respectively, and $0.040\text{--}0.043$ in the new species.

The species *N. kedrovensis* and *N. merkushevae* differ from *N. gvosdevi* **sp. nov.** by smaller rostellar hooks ($0.036\text{--}0.038$ and $0.035\text{--}0.037$ respectively) and by morphology of the male copulatory apparatus. The cirrus-sac of *N. kedrovensis* is long, ($0.1\text{--}0.13$) crosses the poral osmoregulatory canals and usually reaches the median line. In addition to that the smallest rostellar hooks, *N. merkushevae* have the smallest cirrus-sac and cirrus ($0.06\text{--}0.065$ и $0.035\text{--}0.04$) in the genus *Neoskrjabinolepis*.

Moreover, these species differ by the number of eggs in gravid proglottides. The gravid uterus of *N. gvosdevi* contains 9–18 eggs, that of *N. corticirrosa* — 10–20, of *N. singularis* — 34–43, of *N. merkushevae* — 12–16, of *N. nuda* — 15–22, of *N. kedrovensis* — 10–15, of *N. nadtochijae* — 20–46 eggs.

Distribution. **Kazakhstan, Pavlodar Prov.**, Bajanaul Nature Reserve.

Etymology. The species is named after a famous Russian parasitologist, Professor Eugenij Vasilievich Gvosdev, in recognition of his contribution to helminthology.

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