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Integrative redescription of *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931) from Lake Baikal

Интегративное переописание *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931) из озера Байкал

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KEY WORDS: freshwater Harpactidoida, *Canthocamptus* (*Baikalocamptus*), Baikal endemics, scanning electron microscopy, morphology, COI.

КЛЮЧЕВЫЕ СЛОВА: пресноводные Harpactidoida, *Canthocamptus* (*Baikalocamptus*), байкальские эндемики, сканирующая электронная микроскопия, морфология, COI.

ABSTRACT. Based on new material, an illustrated redescription of the female and male of one of the rare species of harpacticoids endemic to Baikal, *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931) is given. Since the type series are lost, we have identified a neotype. For the first time, the morphology of this species was studied in detail using a scanning electron microscope. In terms of the structure of the body and limbs, individuals of *C.* (*B.*) *verestschagini* are most similar to the second representative of the subgenus, *Canthocamptus* (*Baikalocamptus*) *longifurcatus* Borutzky, 1947, but are well distinguished by shorter and thicker caudal rami, and the V seta female rami of *C.* (*B.*) *verestschagini* transformed into a short thick spine; also species differs in the structure of P5. Sequence data for the mitochondrial marker COI are presented. The interspecific distances between the sequences of *C.* (*B.*) *verestschagini* and *C.* (*B.*) *longifurcatus* were 3.2–4.6%.

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РЕЗЮМЕ. На основе нового материала приведено иллюстрированное переописание самки и самца одного из редких эндемичных для Байкала видов гарпактикоид — *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931). Поскольку типовые серии утеряны, нами выделен неотип. Впервые с использованием сканирующего электронного микроскопа подробно изучена морфология данного вида. По строению тела и конечностей особи *C.* (*B.*) *verestschagini* наиболее близки ко второму представителю подрода — *Canthocamptus* (*Baikalocamptus*) *longifurcatus* Borutzky, 1947, от которого хорошо отличаются более короткими и толстыми каудальными ветвями, преобразованной в шип щетинкой V ветвей самок, строением P5. Представлены данные о последовательностях митохондриального маркера COI. Межвидовые генетические расстояния между последовательностями *C.* (*B.*) *verestschagini* и *C.* (*B.*) *longifurcatus* составляют 3.2–4.6%.

Introduction

Currently, six representatives of the genus *Canthocamptus* Westwood, 1836 are known for Lake Baikal, five of which are endemic. The first descriptions of the endemic Baikal *Canthocamptus* are extremely incomplete, and the type material was not identified or was lost [Borutzky, 1952; Okuneva, 1989; Alekseeva *et al*., 2023]. Recently, a revision of the Baikal species of the genus was started — the species *Canthocamptus* (*Baikalocamptus*) *longifurcatus* Borutzky, 1947 and *C.* (*Canthocamptus*) *latus* Borutzky, 1947 were redescribed, and a neotype was identified for *C.* (*C.*) *latus* [Alekseeva *et al*., 2023; Fefilova *et al*., 2022]. The species *C.* (*C.*) *gibba* Okuneva, 1983, based on the original description, was synonymized with *Attheyella* (*Neomrazekiella*) *nordenskioldii* (Lilljeborg, 1902) [Novikov *et al*., 2022] and reliably discovered in Lake Baikal [Fefilova *et al*., 2023]. Two of the six Baikal canthocamptus species belong to the endemic subgenus *Baikalocamptus* Borutzky, 1931. Recently, in the shallow coastal zone of this ancient lake and in a coastal lake not directly connected with Lake Baikal, we discovered the only non-endemic species of the genus — *Canthocamptus* (*Canthocamptus*) *microstaphylinus* Wolf, 1905 [Alekseeva *et al*., 2024]. Despite the accumulated material, the phylogenetic relationships of the endemic Baikal *Canthocamptus* with each other and with the Palaearctic fauna are still unclear. Our work is a continuation of the revision of the unique harpacticoid fauna of Lake Baikal.

Objectives of this work: 1) using modern research methods, to redescribe the morphology of females and males of *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), to identify a neotype; 2) obtain the nucleotide sequences of the COI gene fragment.

Materials and methods

Samples collection. All material was collected in Lake Baikal. The material for morphological analysis was collected in different places on the western coast of the lake:

(1) Maloe More Strait, coastal zone opposite the Sakhyurta Village (53°01′22.9″ N, 106°53′24.7″ E), September 2021, with the help of a Petersen grab sampler as part of an expedition on the scientific vessel “Akademik Koptyug”;

(2) coastal zone opposite the place Chertov Most (51°54′10″ N, 105°09′51″ E), September 2022, with the help of divers as part of an expedition on the scientific vessel “Papanin”;

(3) coastal zone opposite Zolotoy Utes Cape (52°17′57.9″ N, 105°45′13.7″ E), September 2023, depth 5–10 m, using a Petersen grab sampler as part of an expedition on the vessel “Akademik Koptyug”. On the deck of the ship, the bottom soil was stirred up, and a light fraction was passed through a net with a mesh size of 60 µm; then the harpacticoid was selected under an MBS-10 stereomicroscope and fixed in 96% ethanol, or the entire sample was fixed in 40% formalin (making a concentration to 4% solution), then analyzed in the laboratory under the stereomicroscope;

(4) coastal zone opposite Kadilny Cape (51°55′58.8″ N, 105°15′28.8″ E), August 2023, using a small dredge as part of an expedition on the scientific vessel “Professor Treskov”. The sample was washed with a net with a mesh size of 100 µm, the harpacticoid was selected under a Mikromed Atom 20x stereomicroscope and fixed in 96% ethanol, then placed in a freezer and stored at –20°C.

Morphological analysis. In the laboratory, the harpacticoid was dissected, the parts were mounted in Faure-Berlese liquid. The study of the preparations was carried out using Nikon Optiphot-2 and Olympus CX21 microscopes. Identification at the species level was carried out using table keys [Borutzky, 1952; Okuneva, 1989]. All drawings were made using a Nikon Optiphot-2 Drawing Tube microscope. Morphological features were measured using microphotographs using the “Levenhuk Lite” program.

For scanning electron microscopy, samples were prepared as follows: individuals were dehydrated in pure 96% ethanol for 24 hours, then kept in hexamethyldisilazane for 5 min; then the crustaceans were dissected in 96% ethanol and the parts were transferred to a table covered with glue; gold spraying was carried out. Photographs were taken using a FEI Company Quanta 200 scanning electron microscope (SEM).

The description of the appearance is given for fixed individuals. Descriptive terminology (numbering of caudal setae, designation of swimming legs) follows Huys, Boxshall [1991]. Terminology in genital fields follows Moura & Pottek [1998]. Terminology in mandibular structure follows Mielke [1984]. Terminology of maxillary structures follow Ferrari & Ivanenko [2008]. The armature formula of swimming legs is given according to Lang [1934].

Abbreviations used in the text: ae — aesthetasc, acr — acrothek, apo — apophysis, enp-1–enp-3 — first–third segments of endopod; exp-1–exp-3 — first–third segments of exopod, P1–P6 — legs 1–6, swm — sputtering whole mount; wm — whole mount.

All morphological material (including the neotype) is stored in the Laboratory of Biology of aquatic Invertebrates of the Limnological Institute of the Siberian Branch of the Russian Academy of Sciences, Irkutsk.

Molecular Analysis. A fragment of subunit I of mitochondrial cytochrome oxidase (COI mtDNA or COI) gene was analysed. DNA was extracted from ethanol-preserved tissues using protocol by Kochanova *et al*. [2018]. The COI gene was amplified using several primers: H2198-COI (‘TAAACTTCAGGGTGACCAAAAAATCA’) and L1490-COI (‘GGTCAACAAATCATAAAGATATTGG’) [Folmer *et al*., 1994], ZplankF1_t1 (‘TGTAAAACGACGGCCAGTTCTASWAATCATAARGATATTGG’) and ZplankR1_t1 (‘CAGGAAACAGCTATGACTTCAGGRTGRCCRAARAATCA’) [Prosser *et al*., 2013].

Sequencing was carried out in both directions, using the BigDye Terminator v3.1 (Life Technology) reagent kit in an ABI PRISM 310 Genetic Analyzer (Applied Biosystems, Waltham, Massachusetts, USA) in the Syntol Company (Moscow). Original nucleotide sequences were deposited at the NCBI GenBank database.

Estimates of Evolutionary Divergence between Sequences were conducted using the Kimura 2-parameter model [Kimura, 1980]. Codon positions included were 1st+2nd+3rd+Noncoding. All ambiguous positions were removed for each sequence pair (pairwise deletion option). Evolutionary analyses were conducted in MEGA11 [Tamura *et al*., 2021].

Results

Order Harpacticoida Sars, 1903
Family Canthocamptidae Brady, 1880
Genus *Canthocamptus* Westwood, 1836
Subgenus *Baikalocamptus* Borutzky, 1931
Canthocamptus* (*Baikalocamptus*) *verestschagini
(Borutzky, 1931)
Figs 1–17.

MATERIAL. For morphological analysis, 11 individuals (7 ♀♀ 4 ♂♂) were studied, all collected in Lake Baikal. Neotype No. 4 (♀): wm No. H1-190921, dated September 19, 2021, Maloye More Strait, coastal zone opposite the Sakhyurta Village, depth 30 m, silted sand, grab sampler. Specimens No. 1–4 (3 ♀♀ 1 ♂) were collected (September 27, 2022) in coastal zone opposite the place Chertov Most, depth 10 m, gruss and stony bottom soil: No. 1 (♂): wm No. H1-270922; No. 2 (♀): wm No. H2-270922; No. 3 (♀): wm No. H3-270922; No. 4 (♀): wm No. H4-270922. Specimens No. 5–9 (3 ♀♀ 2 ♂♂): swm No. 18331, dated August 6, 2023, coastal zone opposite Kadilny cape, depth 5–7 m,

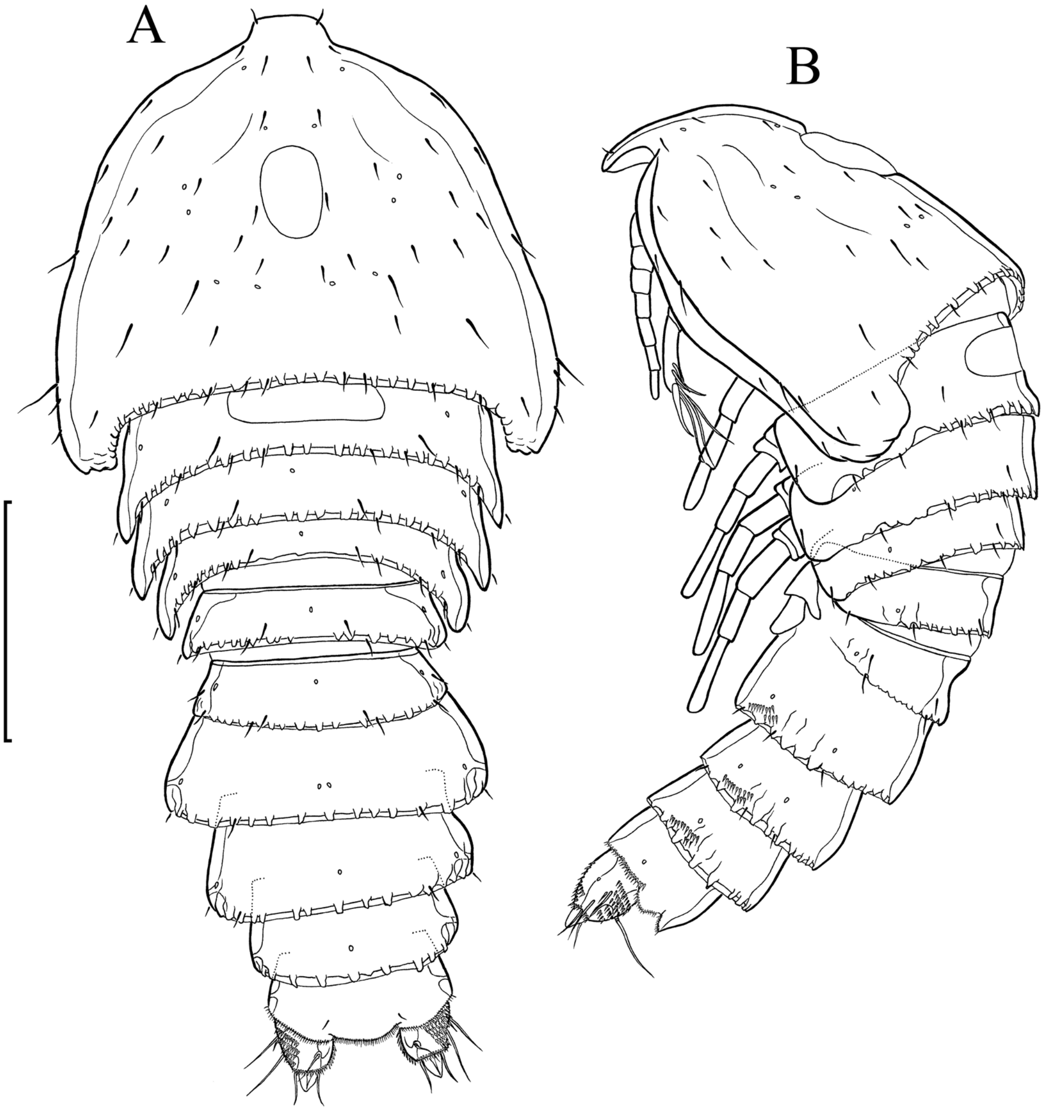

Fig.1. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), female, habitus (relief not drawn): A, dorsally; B, laterally. Scale 200 μm.

Рис. 1. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), самка, внешний вид (рельеф не прорисован): A — дорсально; B — латерально. Масштаб 200 мкм.

stony bottom soil. Specimen No. 10 (♂): swm No. II38, dated September 30, 2023, coastal zone opposite Zolotoy Utes cape, depth 5–10 m, sand mixed with silt. For molecular biological analysis, 7 ♀♀ from the same sample as specimens No. 5–9 were used.

DESCRIPTION. Female. Body flattened dorso-ventrally (Fig. 1A, B); length from tip of rostrum to distal margin of caudal rami 780–910 μm (average 835 μm, n = 5). Colour bright purple. Cephalothorax markedly wider than subsequent somites (Figs 4A; 5A). Nuchal organ located at centre of cephalothorax. Second pedigerous somite with wide dorsal window and lateral pores; subsequent somites with dorsal and lateral pores. Integument has pronounced pitted relief (Fig. 3A), with fine setules over entire surface. Posterior margin of somites on dorsal side with small outgrowths of rectangular or tooth-like shape.

Rostrum (Fig. 4B–D) fused with cephalothorax, square, with one pair of sensillae.

Genital double somite (Fig. 2A–C) trapezoidal, width of its posterior margin equal to that of cephalothorax; posterior lateral corners on ventral surface with spinules. P6 fused with somite, with one pinnate seta (Fig. 4E). Genital field (Fig. 6E) short, located in proximal half of somite, laterally with sieves; copulatory pore located centrally on somite, copulatory duct of equal width throughout, proximally extending into pair of chinised labyrinthine rounded ducts.

Free abdominal somites (Fig. 2A–D). Posterior lateral corners of somites on ventral surface with spinules. Anal somite with ring of spinules on posterior margin and groups of spinules ventrally, anal operculum semicircular with numerous small spinules (Fig. 3E).

Caudal rami (Figs 2A–C; 3B–D) conical, ratio of length to greatest width 4 : 3. Dorso-lateral and ventral-medial surfaces with rows of spinules, distal margin of rami with continuous ring of spinules. Setae I–IV, VI and VII thin and bare, seta VII triarticulated, displaced to medial margin. Seta V in form of strong short conical spine, twice as short as setae IV and VI.

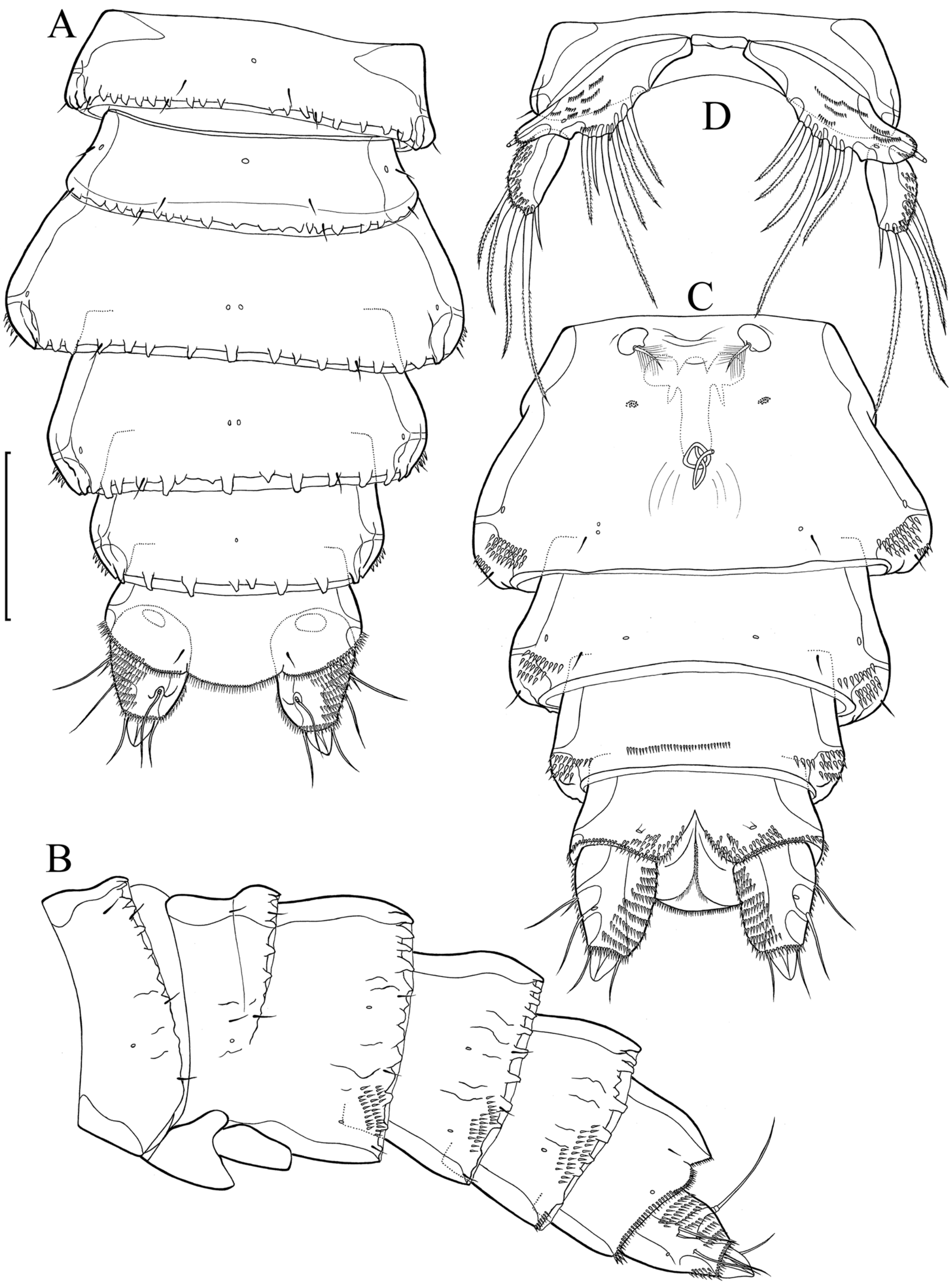

Fig. 2. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), female: A — abdomen with P5-bearing somite, dorsally; B — abdomen with P5-bearing somite, laterally; C — abdomen, ventrally; D — P5-bearing somite, ventrally. Scale 100 μm.

Рис. 2. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), самка: A — абдомен с P5-несущим сомитом, дорсально; B — абдомен с P5-несущим сомитом, латерально; C — абдомен, вентрально; D — P5-несущий сомит, вентрально. Масштаб 100 мкм.

Antennules (Fig. 6A) long, 8-segmented. First segment widest, with one seta and row of spines. Second segment wide, with nine setae. Third segment with four setae. Fourth segment with one free seta and fused bassally seta and aesthetasc. Fifth segment with one seta. Sixth segment with three setae. Seventh segment with two setae. Eighth segment with five setae and acrotek (two setae + aesthetasc). Armature formula: 1-[1], 2-[9], 3-[4], 4-[1+(1+ae)], 5-[1], 6-[3], 7-[2], 8-[5+acr].

Antennae (Fig. 6C). Coxa with two rows of spinules. Allobasis with short row of spinules in proximal part; abexopodal bristles unipinnate. Free endopodal segment with two spinulose spines and two lateral rows of large spinules; distally with two rows of spinules; apically with two spinulose spines, three geniculate setae, and one small accessory seta. Exopod one-segmented with four pinnate setae and short row of spinules.

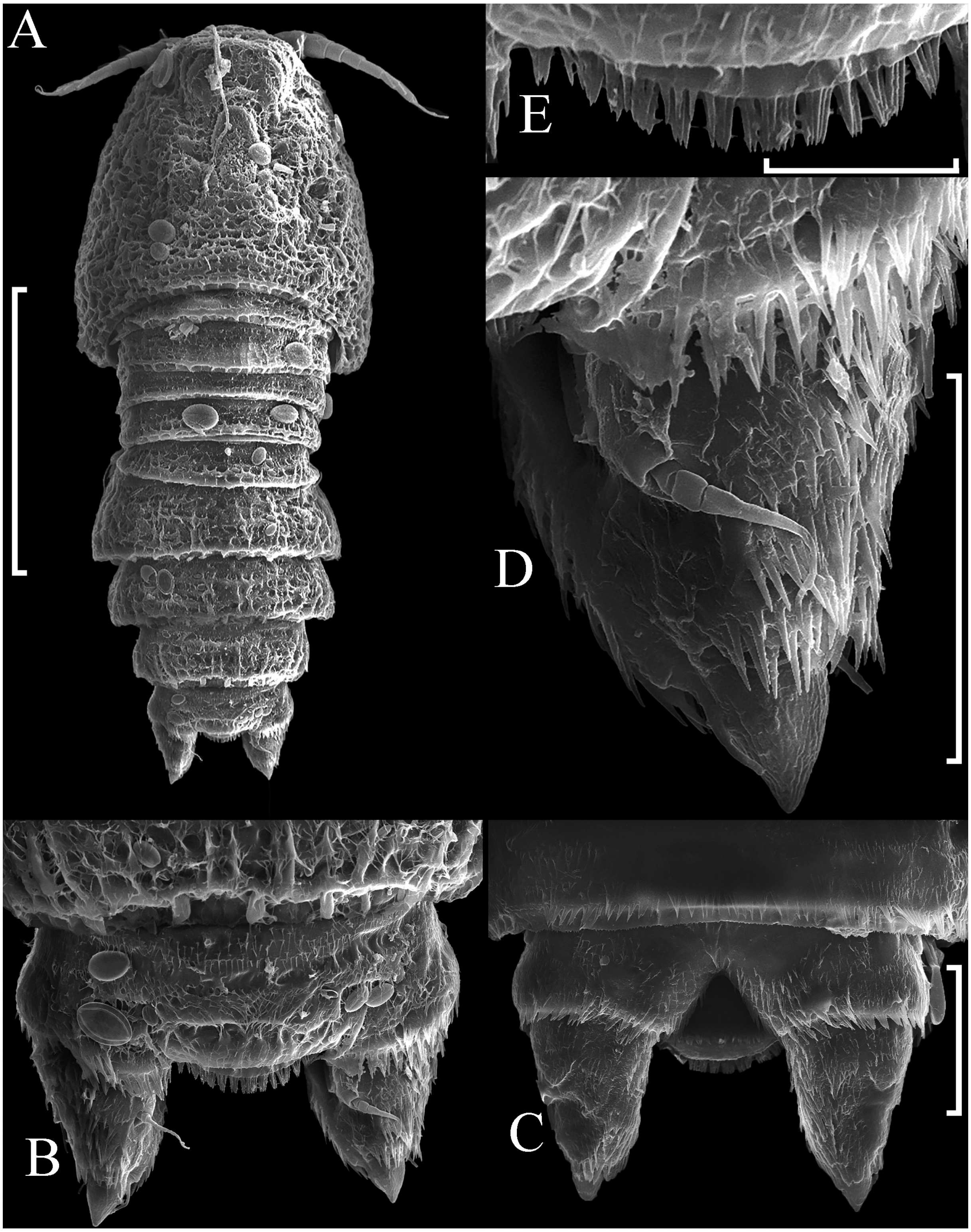

Fig.3. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), SEM photographs of females: A — habitus, dorsally; B — anal somite and caudal rami, dorsally; C — anal somite and caudal rami, ventrally; D — caudal ramus, dorsally: E — anal operculum. Scale, μm: A — 300; B, C — 50; D, E — 40.

Рис. 3. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), СЭМ-фотографии самок: A — внешний вид, дорсально; B — анальный сомит и каудальные ветви, дорсально; C — анальный сомит и каудальные ветви, вентрально; D — каудальная ветвь, дорсально: E — анальная пластинка. Масштаб, мкм: A — 300; B, C — 50; D, E — 40.

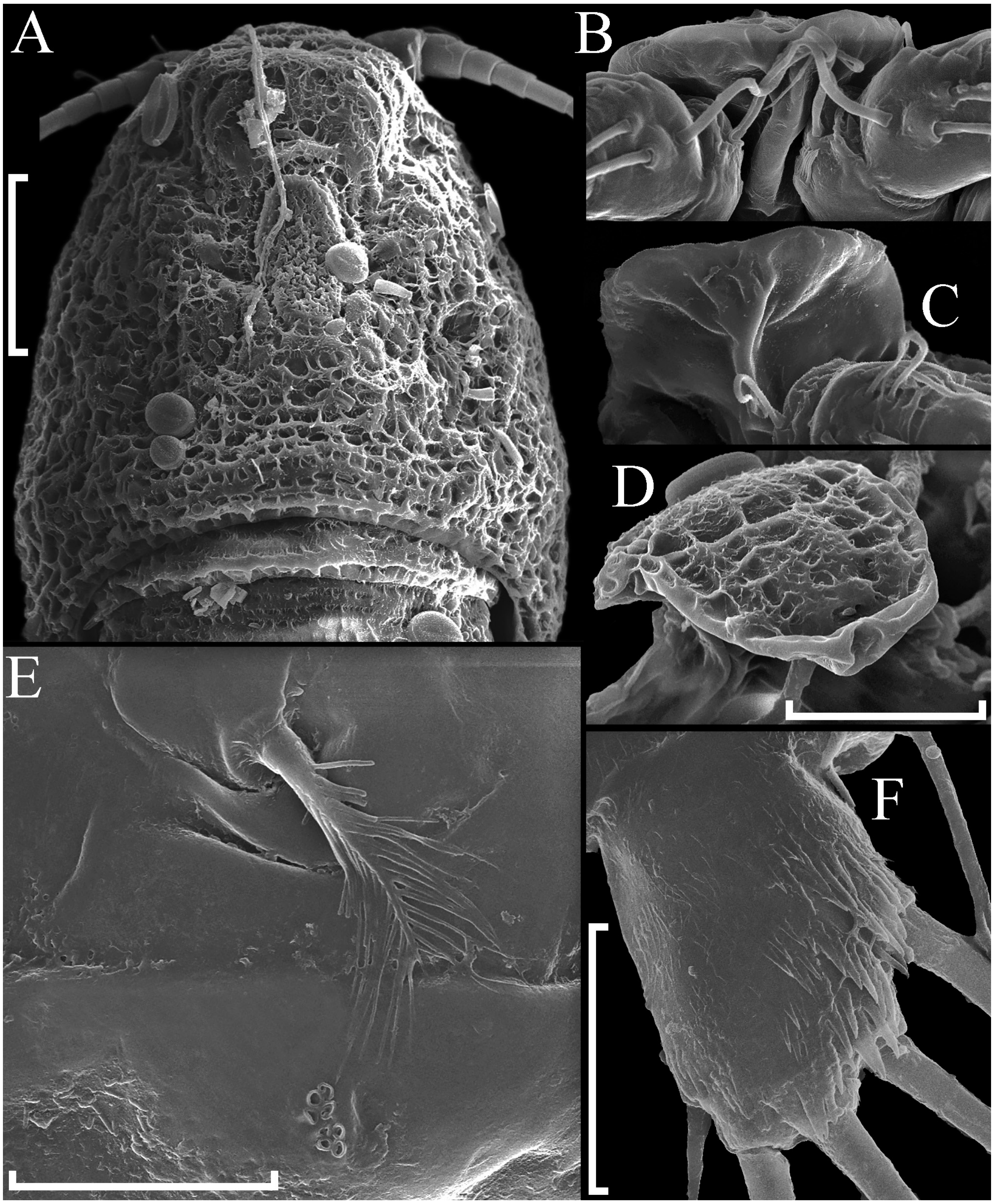

Fig. 4. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), SEM photographs of females: A — cephalothorax, dorsally; B, C — rostrum, ventrally; D — rostrum, frontally: E — P6 and sieves; F — exopod P5, anterior. Scale, μm: A — 100; B, C, D — 40; E — 20; F — 30.

Рис. 4. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), СЭМ-фотографии самок: A — цефалоторакс, дорсально; B, C — рострум, вентрально; D — рострум, фронтально: E — P6 и ситовидные поры; F — экзоподит P5, передняя сторона. Масштаб, мкм: A — 100; B, C, D — 40; E — 20; F — 30.

Lambrum (Fig. 6D) rhomboid, with one pore, groups of spinules on distal corners; inner side with small denticles.

Mandibles (Fig. 7A). Coxa robust with semicircular row of spinules in proximal part; gnathobase with pars incisiva, lacinia mobilis, spines bifurcated at end and unipinnate seta; pars molaris on frontal side. Palp two-segmented; basis with row of spinules on frontal side; endopod with five setae and row of spinules.

Maxillulae (Fig. 7B, C). Precoxa with row of short spines on distal margin. Precoxal arthrite with seven spines (two of them unipinnate) and one unipinnate seta on distal margin; anterior side of arthrite with bare short seta. Coxa with row of

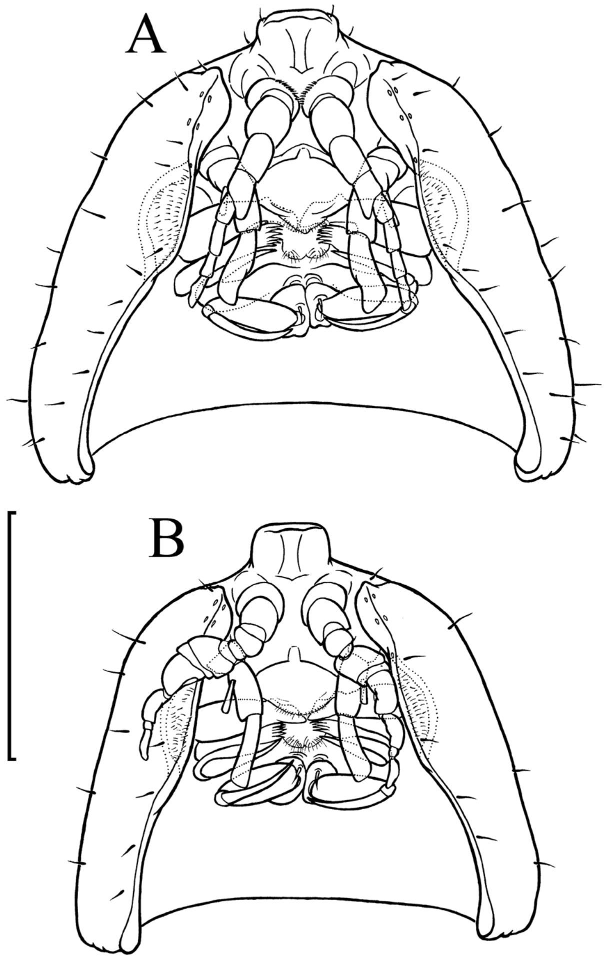

Fig.5. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), cephalothorax and mouth parts of female (A) and male (B), ventrally (without P1). Scale 200 μm.

Рис. 5. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), цефалоторакс и ротовые конечности самки (A) и самца (B), вентрально (без P1). Масштаб 200 мкм.

spines on frontal side; coxal endite with one pinnate, one bare seta and group of spines. Allobasis with two pinnate and one bare seta apically and three seta groups: two proximal, three medial and two distal.

Maxillae (Fig. 7D). Basis with several rows of spinules on outer and inner margins; proximal and distal endites each with two unipinnate and one naked seta. Proximal endopodal segment in form of strong spinulose claw with one seta on frontal side, one unipinnate and one naked seta on caudal side. Distal endopodal segment with three setae.

Maxillipeds (Fig. 7E). Syncoxa with pinnate seta distally and row of spinules. Basis with long row of spinules posteriorly and three transverse outer rows of spinules. Endopod with strong claw and bare seta.

P1 (Fig. 8A). Precoxa with row of spinules on outer margin. Coxa with one row of spinules on outer margin and one row of spinules anteriorly. Intercoxal sclerite broad and thin, extended medially. Basis with inner unipinnate spine and outer bipinnate spine, two rows of setules on inner side, row of spinules and pore on anterior surface and row of spinules at bases of endo- and exopod. Exopod three-segmented, each segment with row of spinules along distal and outer margins; exp-1 with one outer spine; exp-2 with one outer spine, one inner pinnate seta (separately given in Fig. 8A) and row of setules on inner side; exp-3 with one outer spine, one apical spine, two apical geniculate setae, and one row of setules on inner side. Endopod three-segmented, longer than exopod; enp-1 reaching end of exp-3, with one inner seta, row of spinules on outer margin and row of setules on inner margin; enp-2 with row of spinules on outer margin and one inner seta, closely connected to enp-3; enp-3 with row of spinules on outer margin and three armature elements (one inner short seta, one long apical geniculate seta and one apical thick spine).

P2 (Fig. 8B). Precoxa with row of spinules on outer margin. Coxa almost rectangular, with one row of spinules on outer margin. Intercoxal sclerite as on P1. Basis with outer long bipinnate spine, row of spinules and pore at base of exopod and two rows of spinules on inner margin. Exopod three-segmented, each segment with row of spinules along outer margin; exp-1 with one outer spine, spinous outgrowth on distal-outer corner and short row of setules on inner margin; exp-2 with one outer spine, spinous outgrowth on distal-outer corner, pinnate inner seta and row of setules on inner margin; exp-3 with six armature elements: three external spines, two apical setae (with small spine-like outgrowth at base of one of them) and one inner seta. Endopod three-segmented, reaching end of exp-2; enp-1 with one pinnate seta; enp-2 with row of spinules on outer margin, row of setules on inner margin and inner pinnate seta; enp-3 with five armature elements (one outer apical short seta, two apical and two inner setae), row of spinules on outer margin and pore.

P3 (Fig. 9A). Precoxa and protopod as on P2, but basis with outer seta. Intercoxal sclerite trapezoidal. Exopod as on P2, but exp-3 with seven armature elements: three outer spines, two apical and two inner setae. Endopod as on P2, but enp-1 with row of setules on inner and outer margins, and enp-2 with only one row of spinules on outer side.

P4 (Fig. 9B). Precoxa, protopod, intercoxal sclerite and exopod as on P3. Endopod two-segmented, reaching end of exp-1. Enp-1 with short row of spinules on outer margin and inner seta; enp-2 with short row of setules on outer margin and five armature elements (one outer, two apical and two inner setae).

Armature formula of swimming legs presented in Table 1.

P5 (Fig. 9C). Intercoxal sclerite thin, rectangular. Basiendopod and exopod distinctly different. Inner lobe of basiendopod much shorter than exopod, with six setae (second from outer margin short and naked), row of small spinules on anterior surface and three pores; setophore with outer seta and row of spinules at its base. Exopod almost oval, with inner small bare seta, two pinnate apical setae, two outer pinnate setae and numerous spinules on outer surface (Fig. 4F).

Male (Figs 5B; 10A, B; 11A, B). Length from tip of rostrum to distal end of caudal rami 760–850 μm (average 810 μm, n = 4). Spermatophore depicted in Fig. 15G. Body shape, integument, rostrum, antennae, labrum, mandibles, maxillulae, maxillae, maxillipeds, P1, and intercoxal sclerites, precoxae, protopods and exopods P2–P4 as in female.

Abdominal somites (Fig. 12A–C) as in female, but with row of spinules on ventral side.

Caudal rami (Figs 12A–C; 13A–C) conical, ratio of length to greatest width 4 : 2.5. Dorso-lateral and ventral-medial surfaces with rows of spinules, distal edge of rami with spinules only on ventral side. Setae I–IV, VI and VII thin and naked, seta VII triarticulated, displaced to medial margin; seta IV longer than in female. V seta well developed, 4 times longer than caudal rami, with few small spinules.

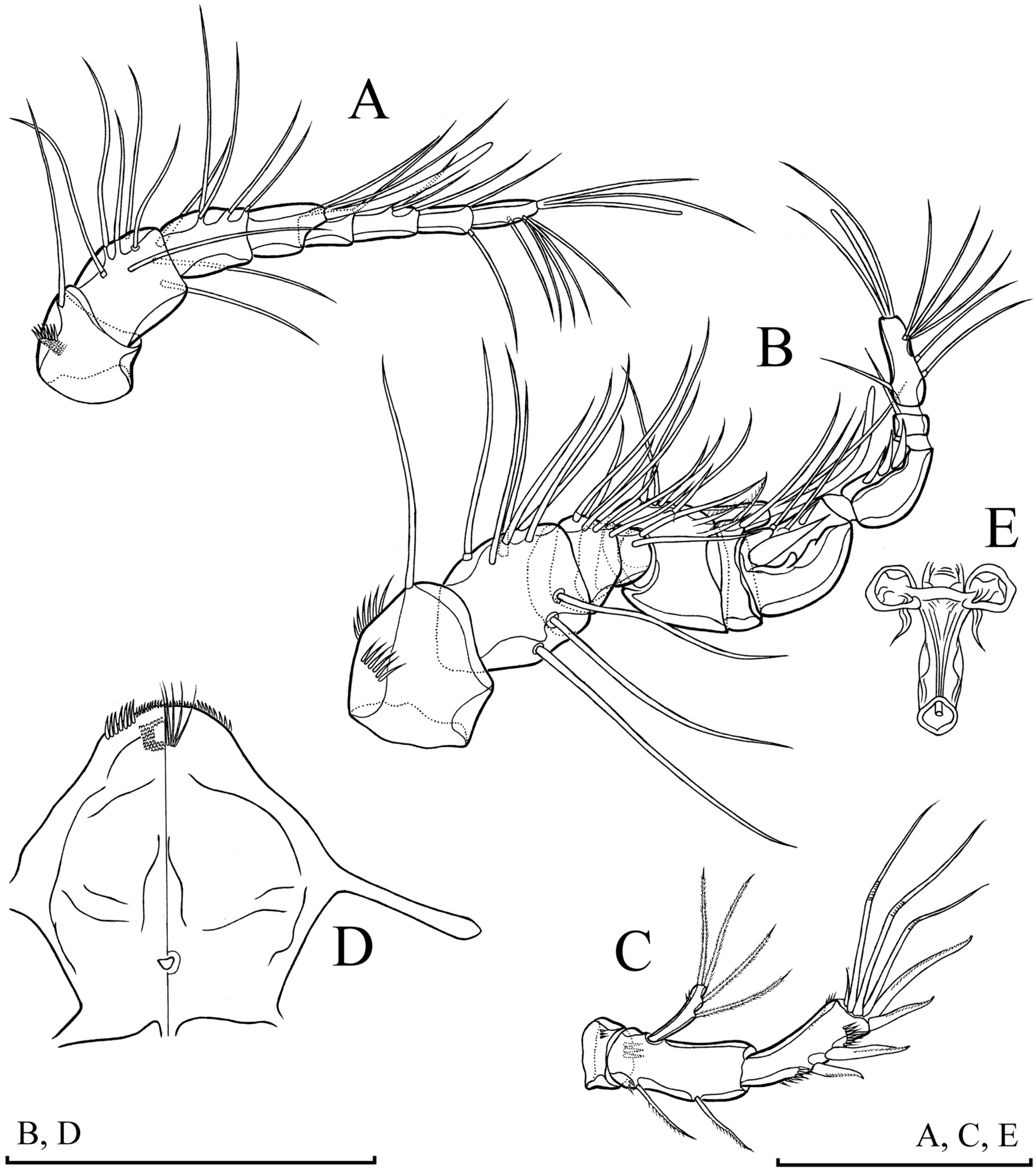

Fig. 6. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), female (A, C, D, E) and male (B): A, B — antennule, dorsally; C — antenna, frontally; D — lambrum, outer (right) and inner (left) sides; E — genital field. Scale 100 µm.

Рис. 6. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), самка (A, C, D, E) и самец (B): A, B — антеннула, дорсально; C — антенна, фронтально; D — ламбрум с внешней (справа) и внутренней (слева) сторон; E — генитальное поле. Масштаб 100 мкм.

Antennules (Figs 6B; 16A–C) 10-segmented, haplocer with geniculation between seventh and eighth segments. First segment with one seta and two rows of spinules. Second segment with nine setae. Third segment with seven setae. Fourth segment small, with two setae. Fifth segment slightly swollen, with seven setae (two of them unipinnate and basally fused to segment) and fused at base seta and aesthetasc. Sixth segment short with two setae, one them short and unipinnate. Seventh segment with two setae, two tooth-like outgrowths of different lengths and depression in centre. Eighth segment with depression in centre and three tooth-like outgrowths. Ninth segment short, with one seta. Tenth segment with seven setae and acrotek (two setae+aesthetasc). Armature formula: 1-[1], 2-[9], 3-[7], 4-[2], 5-[5+2 unipinnate+(1+ae)], 6-[1+1 unipinnate], 7-[2+ 2 modified], 8-[3 modified], 9-[1], 10-[7+acr].

P2 (Fig. 15A). Endopod two-segmented, both segments with row of setules on inner margin and row of spinules on outer margin; enp-1 short, with inner seta; enp-2 with round chitinous thickening on outer side, two inner setae (one of them short and naked), three apical setae and pore.

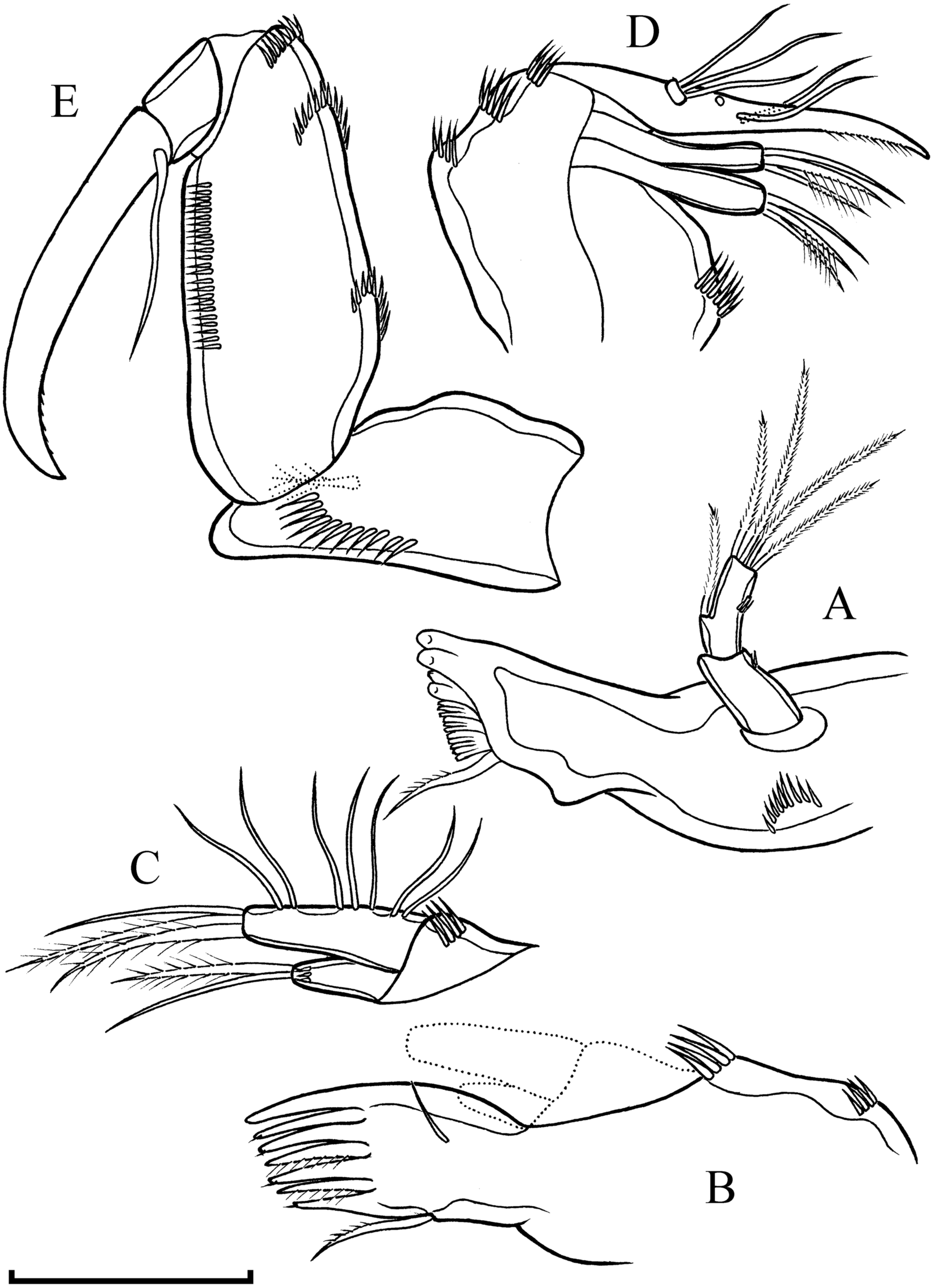

Fig. 7. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), female: A — mandible, frontally; B — maxillule precoxa, frontally; C — maxillule coxa and allobasis, frontally; D — maxilla, caudally; E — maxilliped, caudally. Scale 50 µm.

Рис. 7. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), самка: A — мандибула, фронтально; B — прекокса максиллулы, фронтально; C — кокса и аллобазис максиллулы, фронтально; D — максилла, каудально; E — максиллипед, каудально. Масштаб 50 мкм.

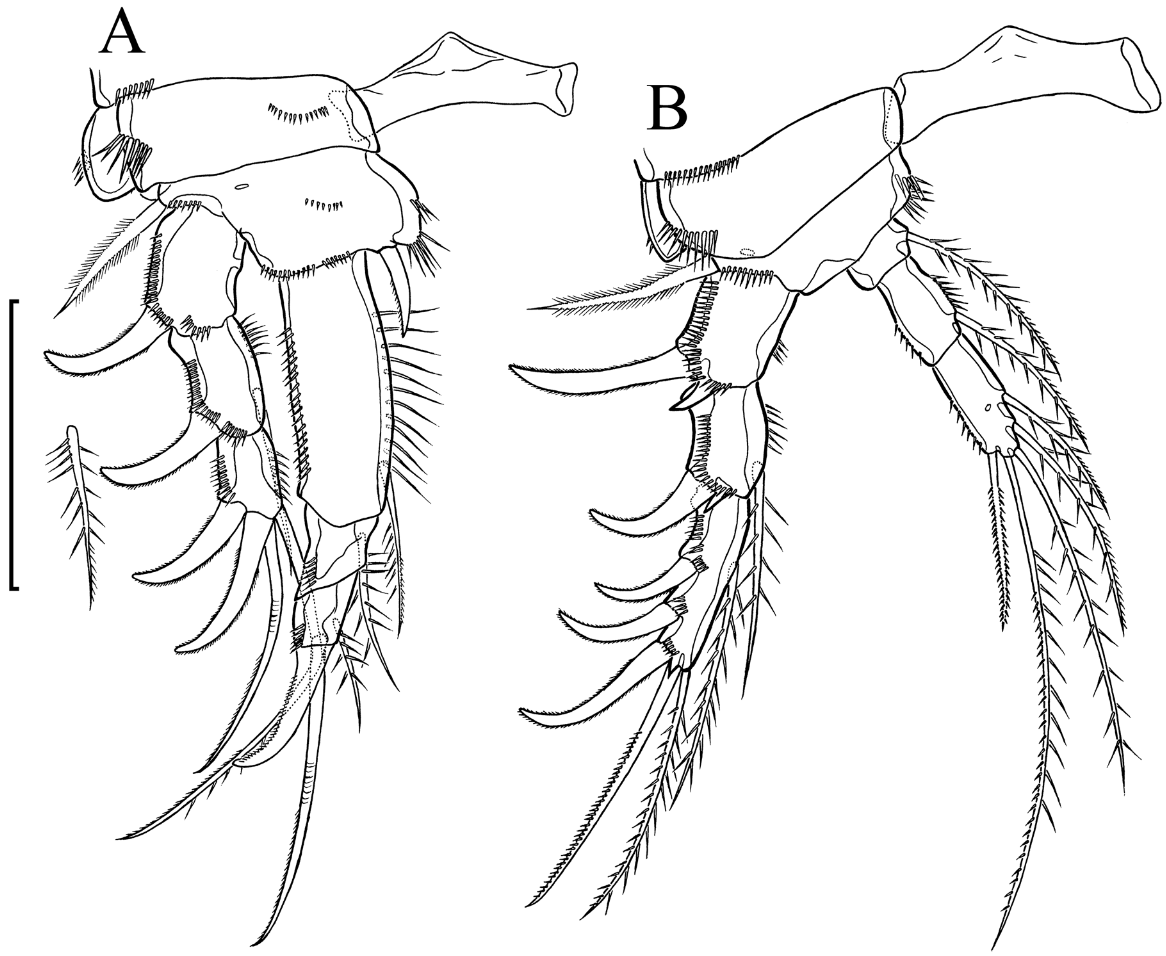

Fig. 8. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), female: A — P1 (inner seta of exp-2 is given next to it), anterior; B — P2, anterior. Scale 100 µm.

Рис. 8. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), самка: A — P1 (рядом дана внутренняя щетинка exp-2), передняя сторона; B — P2, передняя сторона. Масштаб 100 мкм.

Table 1. Armature formula of swimming legs of *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931).
Таблица 1. Формула вооружения плавательных ног *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931).

Leg	Exopod	Endopod ♀	Endopod ♂
P1	0; 1; 0,2,2	1; 1; 1,1,1	1; 1; 1,1,1
P2	0; 1; 1,2,3	1; 1; 2,2,1	1; 2,3
P3	0; 1; 2,2,3	1; 1; 2,2,1	1; 1+apo; 0
P4	0; 1; 2,2,3	1; 2,2,1	1; 2,2,1

P3 (Figs 15B; 16D). Endopod three-segmented; enp-1 short, with inner seta; enp-2 with apophysis (with serrated apical part) on inner distal corner about 2 times longer than basal part of segment and inner small seta on posterior side of segment (Fig. 16A, B); enp-3 oval, bare.

P4 (Fig 15C; 16E). Endopod two-segmented, enp-1 short, with inner seta and row of spinules on outer margin; enp-2 with two inner and two apical setae, one outer spine and short row of spinules on outer margin.

P5 (Figs 14C; 15E; 16F) medially fused, basiendopod and exopod separated. Inner lobe of basiendopod smaller than in female; with two pinnate setae of different length, row of spinules and three pores on anterior surface; setophore with outer seta and short row of spinules at its base. Exopod with two inner setae (innermost pinnate), two apical and two outer pinnate setae and numerous spinules on surface.

P6 (Fig. 15F) fused with somite, each leg with three setae (outer naked seta, inner and medial pinnate setae).

Variability. One of the females has a well-developed V seta as in males (Fig. 17D, E) on at least one caudal ramus; the same seta on the second caudal ramus in the same individual is broken off. Otherwise, this female is morphologically identical to the rest of the studied females.

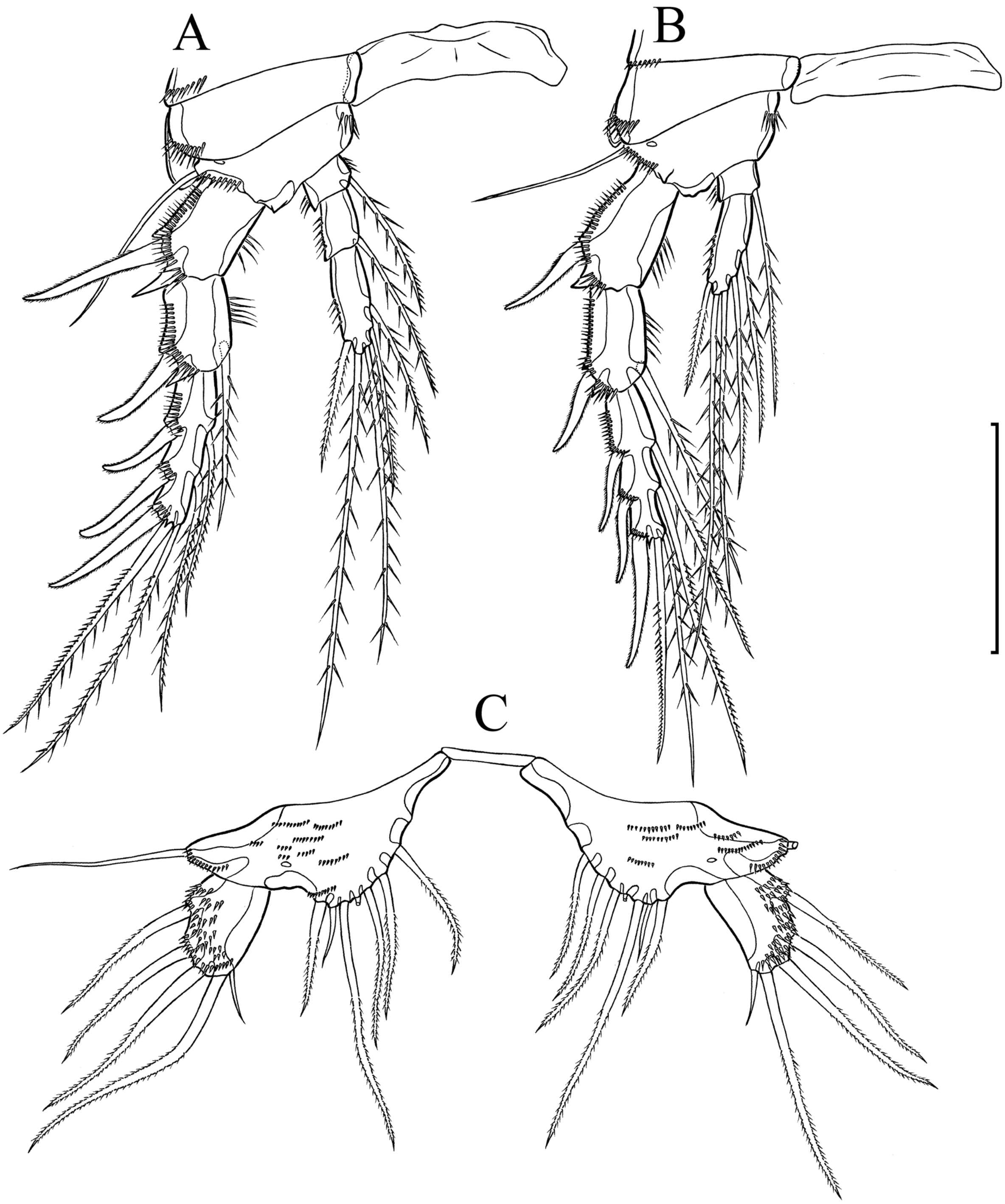

Fig. 9. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), female: A — P3, anterior; B — P4, anterior; C — P5, anterior. Scale 100 μm.

Рис. 9. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), самка: A — P3, передняя сторона; B — P4, передняя сторона; C — P5, передняя сторона. Масштаб 100 мкм.

One inner seta on the enp-2 of one of the P4 endopods of male No. 1 is absent, and the second endopod is normally armed (Fig. 15D). The innermost seta on the exopods P5 of male No. 1 has a different length (Fig. 15E).

REMARKS. After being placed in lactic acid, the individuals change color from purple to crimson (Fig. 17).

The egg sac is absent in all the studied females. Females of *C.* (*B.*) *longifurcatus* also easily reset egg sacs, which is why it is not possible to calculate the average number of eggs in both species.

The specimens studied by us differ from those described firstly in 1931 by E.V. Borutzky in several features. The exopod

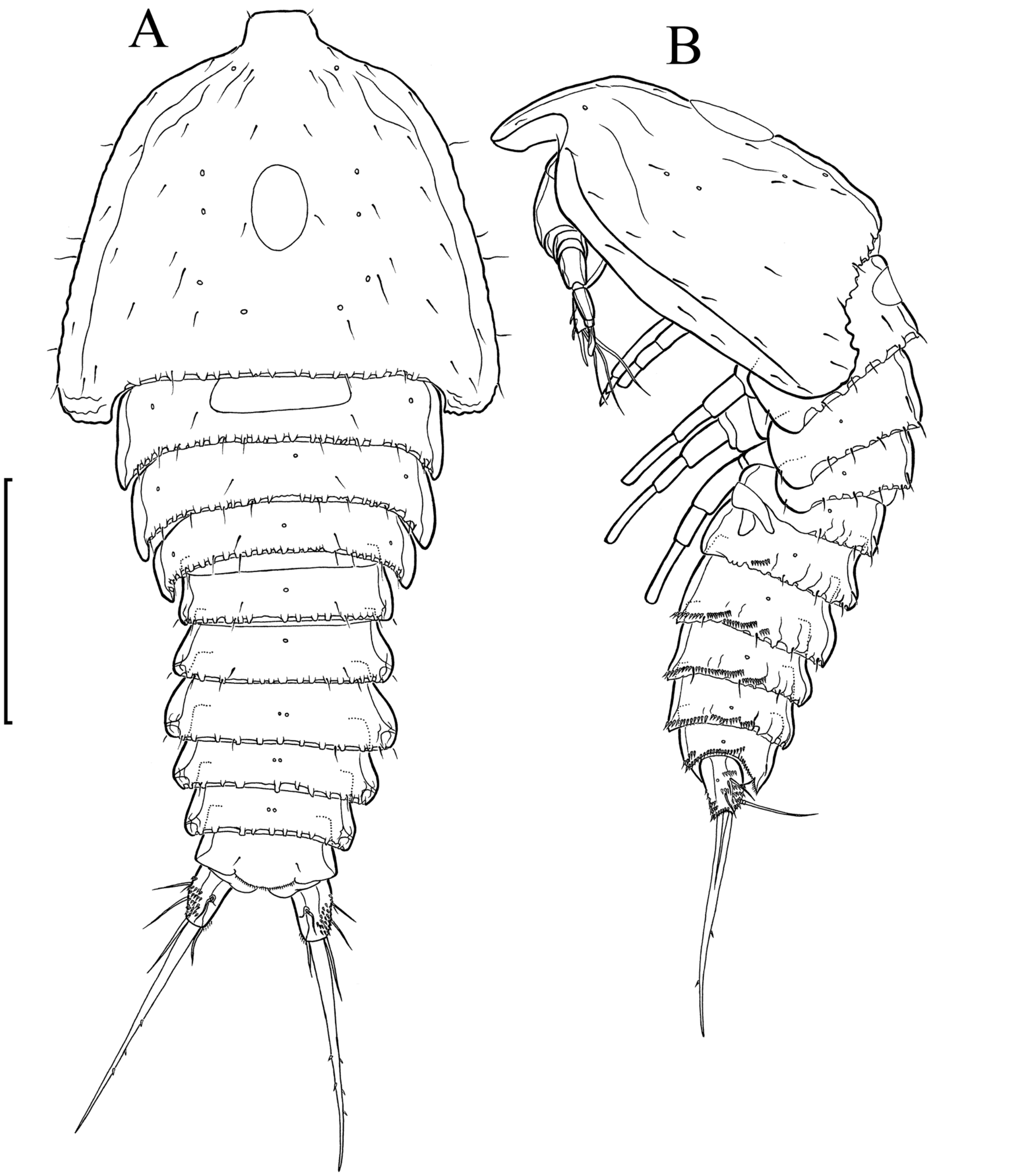

Fig. 10. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), male, habitus (relief not drawn): A — dorsally; B — laterally. Scale 200 μm.

Рис. 10. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), самец, внешний вид (рельеф не прорисован): A — дорсально; B — латерально. Масштаб 200 мкм.

of P1 reaches the end of second segment of endopod (enp-2) [Borutzky, 1931, 1952]; our specimens differ from this description, particularly by the fact that the exopod reaches the end of enp-1. According to the first description, the P4-endopod of the female is one-segmented [Borutzky, 1931], but later the author writes that the endopod is two-segmented [Borutzky, 1952]. Also E.V. Borutzky pointed out that the P5-basiendopod of the female has four long and two short setae [Borutzky, 1931], which in fact is not quite so: one of the short setae is actually a tubular pore, rather much extending beyond the segment boundary, because of which it was probably taken by the author as a seta. E.V. Borutzky refers to paired chitinous outgrowths on the ventral side of the second abdominal somite in males [Borutzky, 1931, 1952], but these formations were not found during our study. The author's monograph [Borutzky, 1952] indicates that the enp-2 of P2 of male with one inner seta, two apical spines and two apical setae. We clearly show that there are three setae and an inner short naked seta inserted in the apical part of enp-

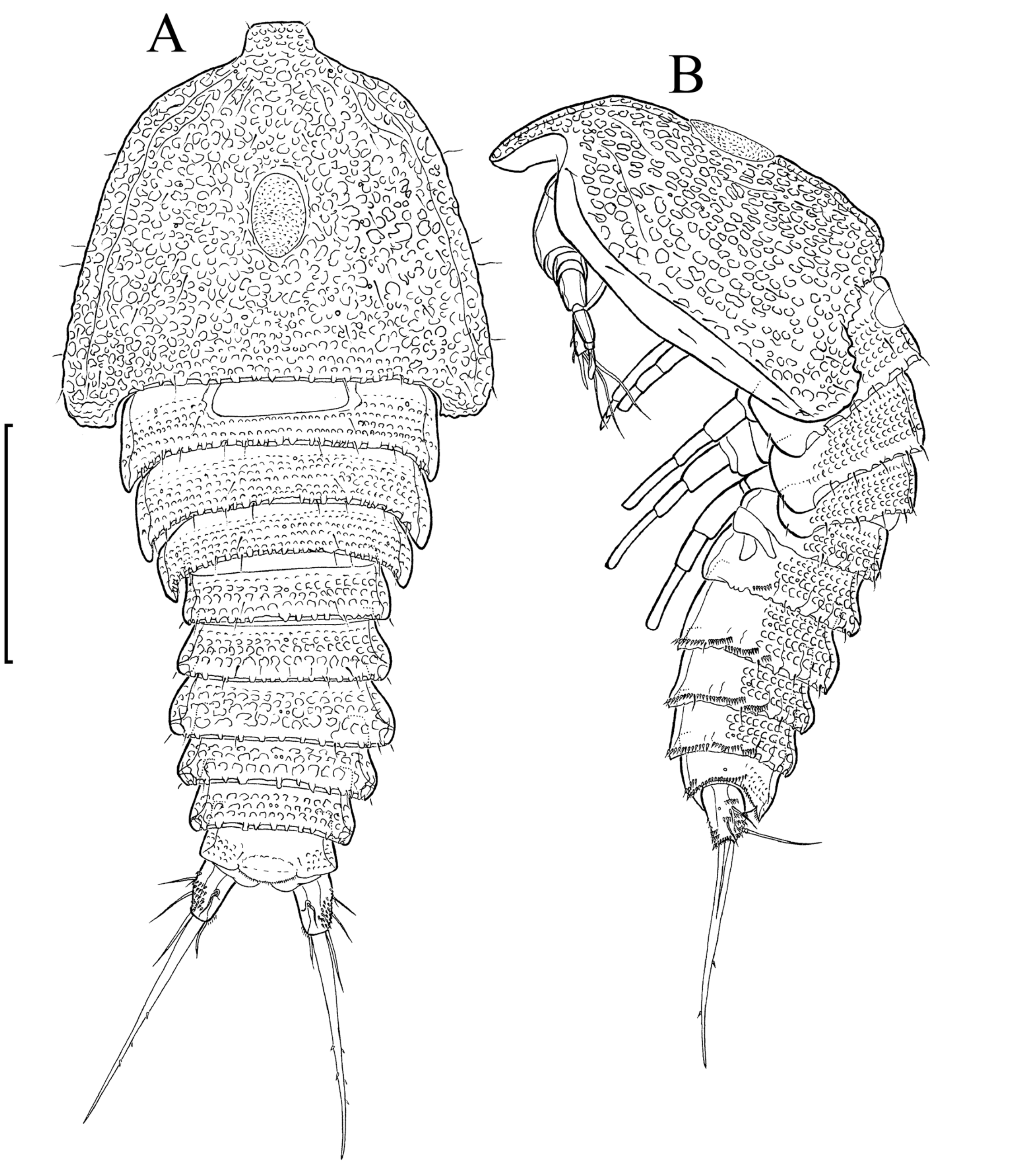

Fig. 11. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), male, habitus with relief: A — dorsally; B — laterally. Scale 200 μm.
Рис. 11. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), самец, внешний вид с рельефом: A — дорсально; B — латерально. Масштаб 200 мкм.

2. It is also mentioned that the apophysis of enp-2 is with blunt end, which is refuted by us.

E.V. Borutzky did not describe the mouth parts and details of structure of males antennules of *C.* (*B.*) *verestschagini*, which was done by us.

GEOGRAPHICAL DISTRIBUTION. According to the literature data, the species is very common in the coastal zone of the Southern and Middle basins of Lake Baikal [Borutzky, 1931, 1952; Okuneva, 1989]; it lives on rocky, stony, sandy and silty bottom soils. We found the species in the Maloe More strait, in the coastal zone opposite the Sakhyurta Village (depth 30 m), opposite the place Chertov Most (near the Bolshye Koty Village, depth 10 m), opposite Cape Kadilny (depth 5–7 m) and opposite Cape Zolotoy Utes (depth 5–10 m). It lives on coarse sand with an admixture of silt, silted sand, gruss, rocky and stony bottom soils.

The five COI sequences of four *C.* (*B.*) *verestschagini* individuals were generated using two primers combinations (LCOI490/ HCO2198 and ZplankF1_t1/ ZplankR1_t1): OR682133–OR682137. Fife sequences with the length 571–599 bp were obtained. Interspecific distances between the sequences of *C.* (*B.*) *verestschagini* were zero. Intraspecific distances between the sequences of this species and another member of the subgenus — *C.* (*B.*) *longifurcatus* [Fefilova *et al*., 2024], varied between 3.2–4.6%.

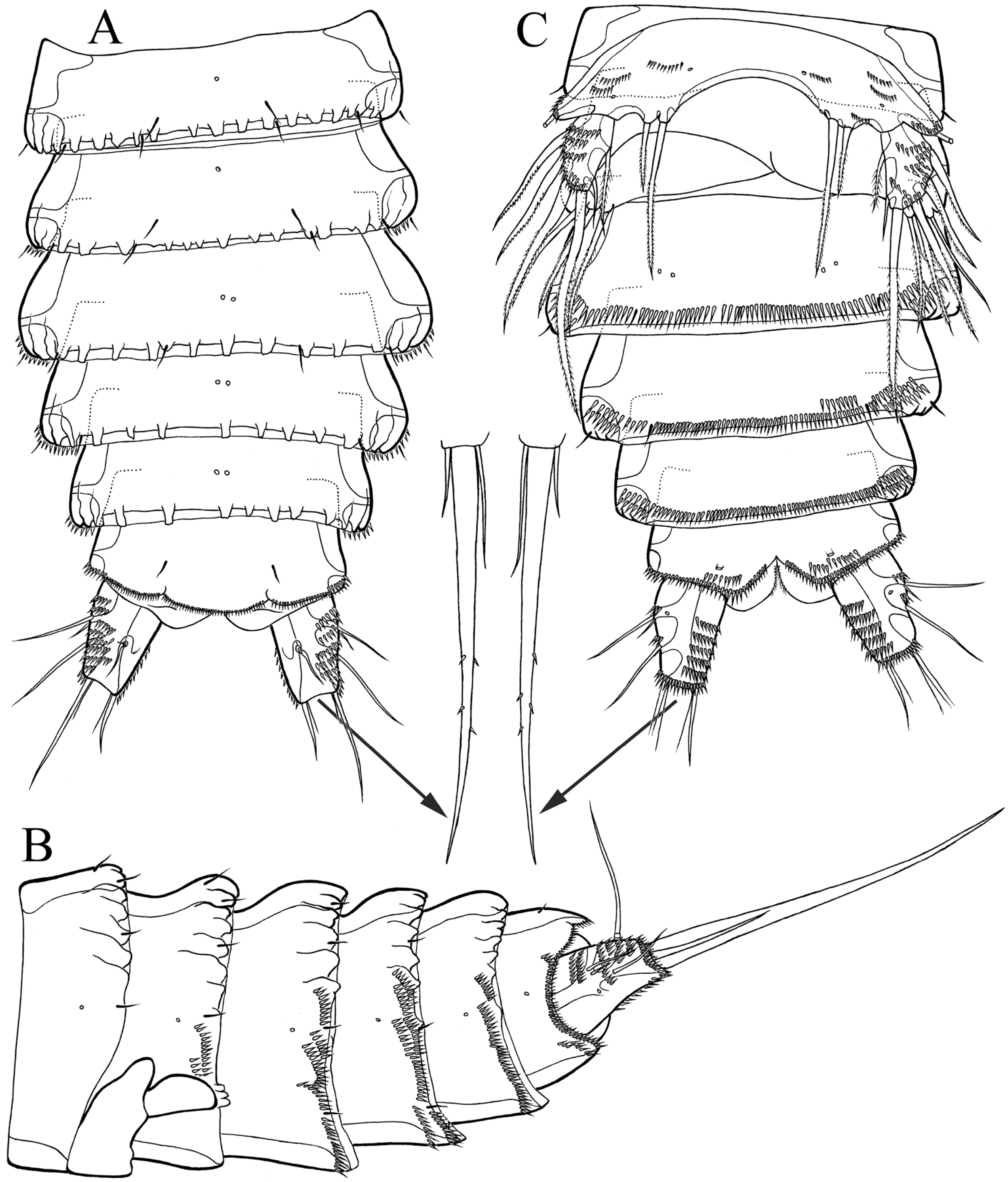

Fig. 12. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), male: A — abdomen with P5-bearing somite, dorsally; B — abdomen with P5-bearing somite, laterally; C — abdomen with P5-bearing somite, ventrally. In A, C, arrows show apical setae of caudal rami. Scale 100 μm.

Рис. 12. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), самец: A — абдомен с P5-несущим сомитом, дорсально; B — абдомен с P5-несущим сомитом, латерально; C — абдомен с P5-несущим сомитом, вентрально. На A, C стрелками показаны апикальные щетинки каудальных ветвей. Масштаб 100 мкм.

Compliance with ethical standards

CONFLICT OF INTEREST: The authors declare that they have no conflict of interest.

Ethical approval: No ethical issues were raised during our research.

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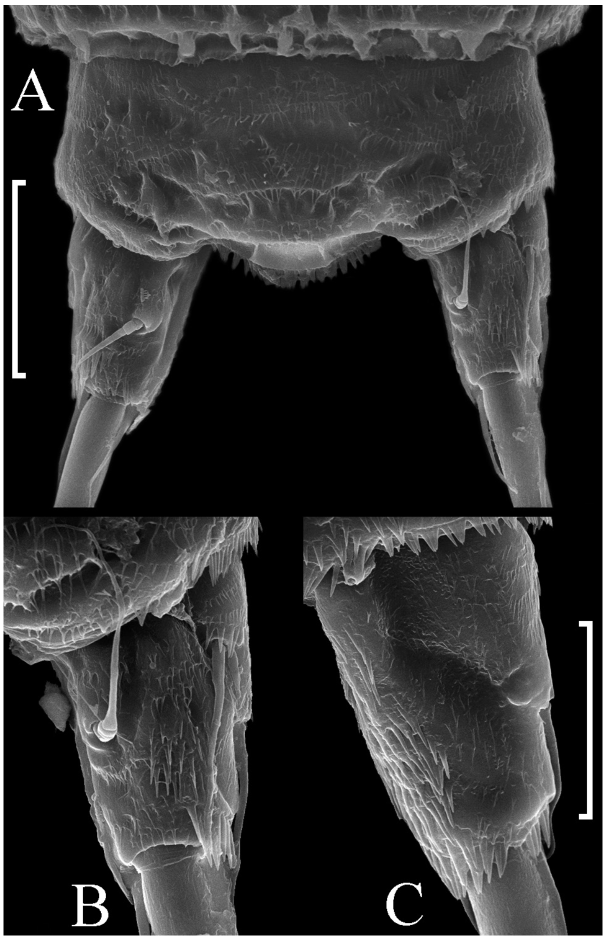

Fig. 13. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), SEM photographs of males: A — anal somite and caudal rami, dorsally; B — caudal ramus, dorsally; C — caudal ramus, ventrally. Scale, μm: A — 50; B, C — 30.

Рис. 13. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), СЭМ-фотографии самцов: A — анальный сомит и каудальные ветви, дорсально; B — каудальная ветвь, дорсально; C — каудальная ветвь, вентрально. Масштаб, мкм: A — 50; B, C — 30.

and the "Papanin", which are part of the scientific fleet of the LIN SB RAS. We express our gratitude to the crew of the scientific vessel "Professor Treskov", part of the fleet of the Baikal Museum of the Siberian Branch of the Russian Academy of Sciences, and the collective use center of this organization for their assistance in collecting material in 2023. We express our gratitude to colleagues from the LIN SB RAS: A.P. Fedotov and S.V. Usov for collecting part of the material.

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Molecular biological research was carried out by employees of the Institute of Biology of the Komi Scientific Center of the Ural Academy of Sciences (Syktyvkar): Fefilova E.B., Golubev

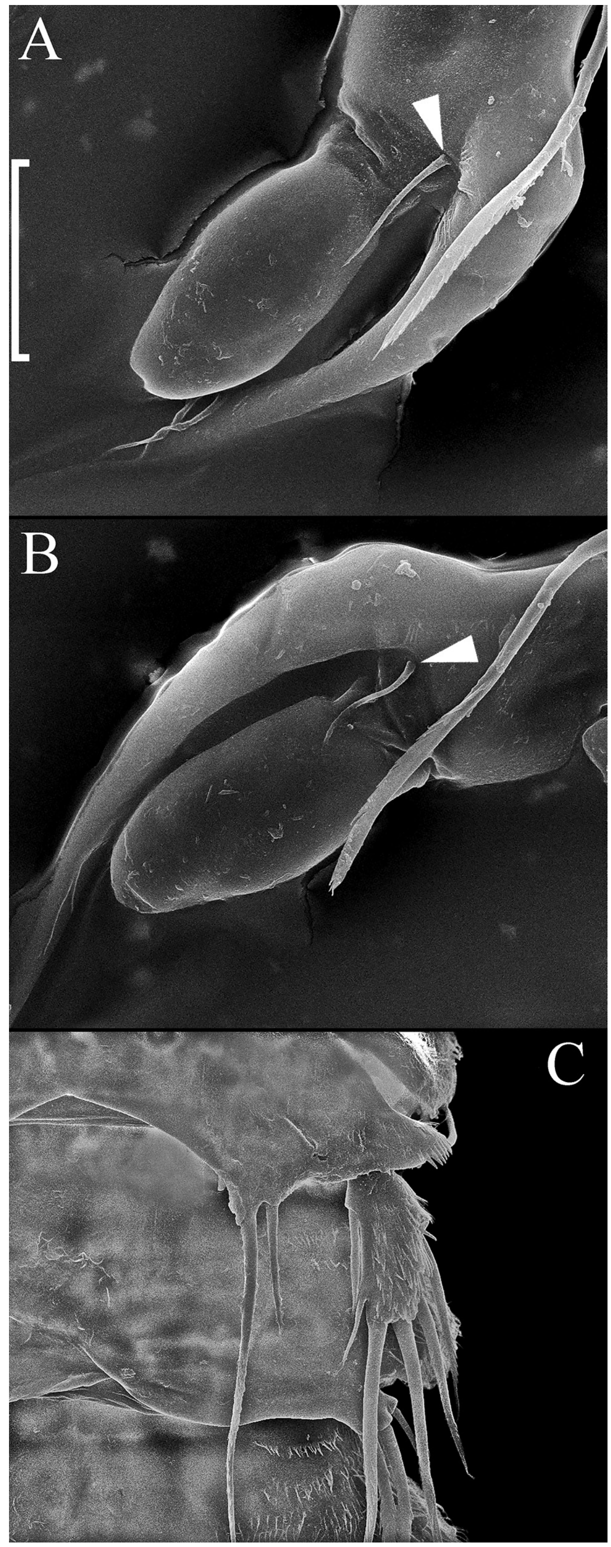

Fig. 14. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), SEM photographs of males: A, B — P3 endopod, posterior; C — P5, anterior. In A, B, arrows show posterior seta on enp-2. Scale, μm: A, B — 20; C — 50.

Рис. 14. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), СЭМ-фотографии самцов: A, B — эндоподит P3, задняя сторона; C — P5, передняя сторона. На A, B стрелками показана задняя щетинка на enp-2. Масштаб, мкм: A, B — 20; C — 50.

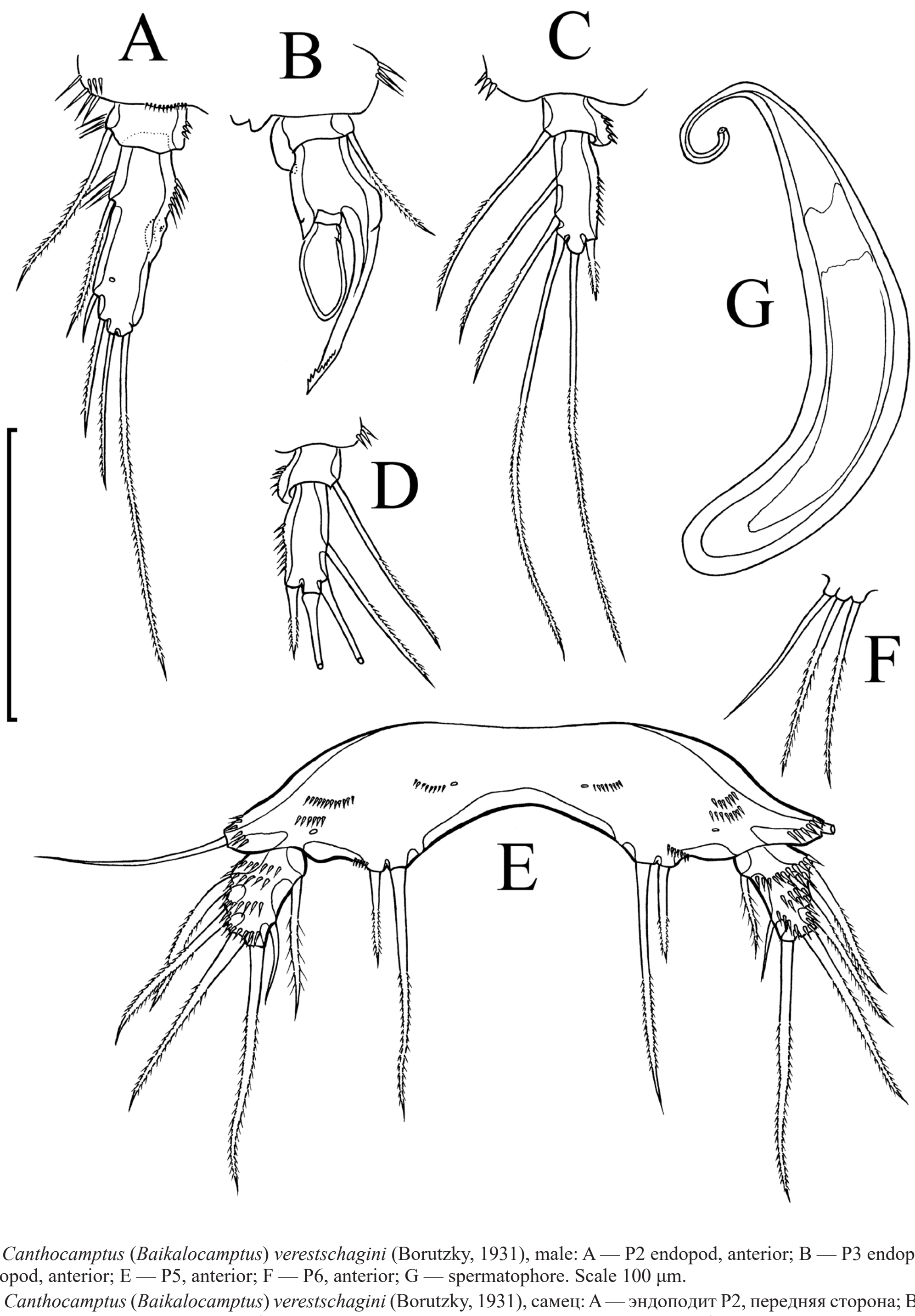

Fig. 15. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), male: A — P2 endopod, anterior; B — P3 endopod, anterior; C, D — P4 endopod, anterior; E — P5, anterior; F — P6, anterior; G — spermatophore. Scale 100 µm.

Рис. 15. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), самец: A — эндоподит P2, передняя сторона; B — эндоподит P3, передняя сторона; C, D — эндоподит P4, передняя сторона; E — P5, передняя сторона; F — P6, передняя сторона; G — сперматофор. Масштаб 100 мкм.

M.A., Bakashkina A.S. within the framework of the scientific research theme (No. 122040600025-2) of the Institute of Biology of Komi Science Center of the Ural Branch of the Russian Academy of Sciences.

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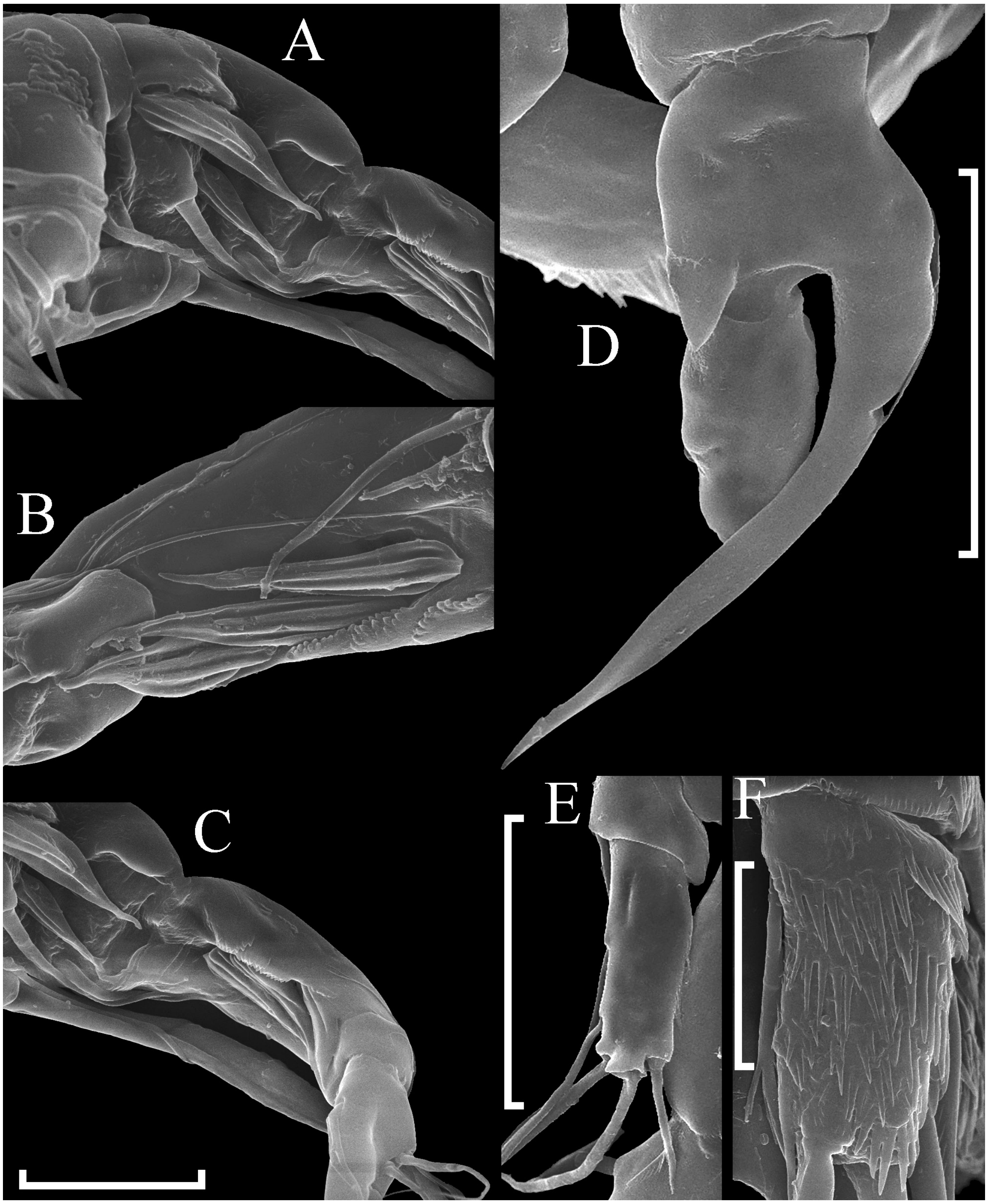

Fig. 16. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), SEM photographs of males: A — 7th antennula segment; B, C — 8th antennula segment; D — P3 endopod, anterior; E — P4 endopod, anterior; F — P5 exopod, anterior. Scale, μm: A, C, F — 20; B — 10; D — 40; E — 50.

Рис. 16. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), СЭМ-фотографии самцов: A — 7-й сегмент антеннулы; B, C — 8-й сегмент антеннулы; D — эндоподит P3, передняя сторона; E — эндоподит P4, передняя сторона; F — экзоподит P5, передняя сторона. Масштаб, мкм: A, C, F — 20; B — 10; D — 40; E — 50.

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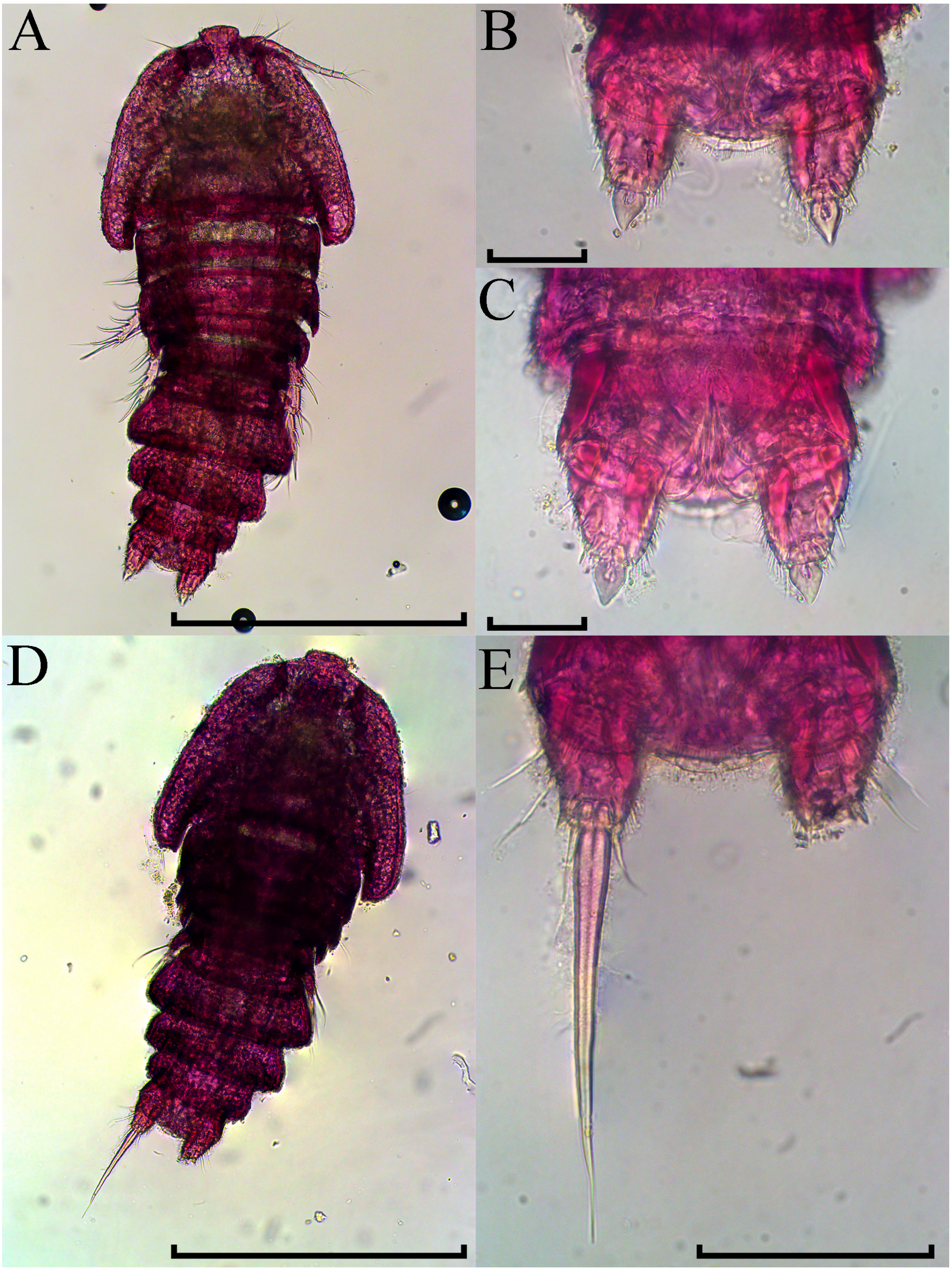

Fig. 17. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), microphotographs, comparison of standard (A–C) and abnormal (D, E) armature of caudal rami of females: A, D — habitus, dorsally; B, E — anal somite and caudal rami, dorsally; C — anal somite and caudal rami, ventrally. Scale, μm: A, D — 500, B, C — 50, E — 100.

Рис. 17. *Canthocamptus* (*Baikalocamptus*) *verestschagini* (Borutzky, 1931), микрофотографии, сравнение стандартного (A–C) и аномального (D, E) вооружения каудальных ветвей самок: A, D — внешний вид, дорсально; B, E — анальный сомит и каудальные ветви, дорсально; C — анальный сомит и каудальные ветви, вентрально. Масштаб, мкм: A, D — 500, B, C — 50, E — 100.

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