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Revision of the genus *Aulacofusus* Dall, 1918 (Gastropoda: Buccinidae)

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ABSTRACT. The genus *Aulacofusus* Dall, 1918 has been revised on the basis of conchological and available anatomical data. Nine previously described Recent species and one subspecies are recognised as valid: *A. brevicauda* (Deshayes, 1832), *A. periscelidus* (Dall, 1891), *A. herendeeni* (Dall, 1899), *A. esychus esychus* (Dall, 1907), *A. esychus shikotanicus* (Golikov et Gulbin, 1977), *A. ombronius* (Dall, 1919), *A. calathus* Dall, 1919, *A. coerulescens* Kuroda & Habe, 1961, *A. hiranoi* (Shikama, 1962), *A. calamaeus* (Dall, 1907). ***A. gulbini* sp. n.** is described, *A. brevicauda fortilirata* (Sowerby, 1913) has been synonymized with *A. periscelidus* (Dall, 1891). For 6 species, detailed descriptions of anatomy are provided. Twenty three species previously referred to *Aulacofusus*, have been excluded from the genus.

Introduction

Aulacofusus was proposed as "group of species, typified by *Fusus spitzbergensis* Reeve that has a special aspect due to the short canal and the prominence of the spiral ribs..." [Dall, 1918]. Thus, the rank of the taxon was not specified, but it is obvious from the context of the description, that Dall considered it even lower than a section of the genus *Colus*. Later, Dall [1921] treated it as subgenus of *Colus*, containing two sections – *Aulacofusus* sensu stricto and *Aulacofusus* (*Limatofusus*). The name *Limatofusus* was first used by Dall in 1918 for description of *Colus* (*Limatofusus*) *tahwitanus*, but without any diagnostic comments. In the paper of 1919, Dall described seven new species as *Colus* (*Aulacofusus*) and two – as *Aulacofusus* (*Limatofusus*). In 1921, he specified that 15 species belong to the subgenus *Colus* (*Aulacofusus*), and 10 species – to the section *Aulacofusus* (*Limatofusus*). In 1925, Dall listed 14 species within *Colus* (*Aulacofusus*) and 2 – in *Colus* (*Limatofusus*), thus the final rank of *Limatofusus* (section or subgenus) remains unclear. Considering *Aulacofusus* as subgenus of *Colus* (although without dividing into sections) has been followed by the majority of recent authors [e.g., Higo *et al*., 1999], but not by some Russian researchers [e.g., Golikov, Gulbin, 1977; Kantor, Sysoev, 2005, 2006]. In 1921 and 1925, Dall listed 25 species within subgenera *Aulacofusus* and *Limatofusus*. Half of listed species have never been found since Dall's description, and needs revision.

The aim of this publication is to revise taxonomic composition of the genus *Aulacofusus* on the basis of conchological, anatomical and radular characters.

Material and methods

Material for the study was obtained from the Russian institutions and museums: Zoological Institute of the Russian Academy of Sciences (ZIN), P. P. Shirshov Institute of Oceanology (IO), Zoological Museum of the Moscow State University (ZMMU), Museum of Institute of Marine Biology (MIMB). Digital photos of the type specimens of species were received from National Museum of Natural History, Smithsonian Institution, USA (USNM) and National Museum of Nature and Science, Japan. In total, 264 specimens were studied, 19 of them dissected.

While processing this material, standard zoological methods were used, such as manual dissection, histology, and scanning electron microscopy for examination of radulae.

The dissected specimens are numbered in *Material* section of species descriptions. Measurements in the descriptions are provided for dissected specimens only.

Abbreviations: adg, opening of anterior duct of digestive gland; AL, aperture length; ao, anterior aorta; aoe, anterior oesophagus; ba, buccal artery; bc, bursa copulatrix; bm, buccal mass; cep.t, cephalic tentacles; cg, capsule gland; cm, columellar muscle; ct, ctenidium; dg, digestive gland; dgl, duct of gland of Leiblein; eye, eye; fo, female orifice; ft, foot; gl, gland of Leiblein; H, height of the shell, h, height of the last whorl; hd, head; hg, hypobranchial gland; int, intestine; kd, kidney; lfl, longitudinal folds on the inner stomach wall; ls, lateral sulcus; mo, mouth opening; mrr, medial radular retractor muscle; n, nerves; nr, nerve ring; odn, buccal nerves; odr, odontophoral retractor muscles; oeo, oesophageal opening; op, operculum; os, osphradium; p, penis; pma, posterior mixing area; poe, posterior oesophagus; pr, proboscis; prp, propodium; prpg,

propodial groove; prr, proboscis retractors; pt, prostate gland; pw, proboscis wall; r, radula; rd, rhynchodaeum; re, rectum; s, siphon; sd, salivary duct; sg, salivary gland; so, seminal orifice; st, stomach; vd, vas deferens; vl, valve of Leiblein.

Abbreviations of depositories and expeditions:

BMNH – Natural History Museum, London, UK;
IO – P.P. Shirshov Institute of Oceanology, Russian Ac. Sci., Moscow, Russia;
KPM – Kanagawa Prefectural Museum of Natural History, Japan;
MIMB – Museum of the Institute of Marine Biology, Russian Ac. Sci., Vladivostok, Russia;
MNHN – Muséum National d'Histoire Naturelle, Paris, France;
SMNH – Swedish Museum of Natural History, Stockholm, Sweden.
USFC – Unites States Fish Commission
USNM – National Museum of Natural History, Smithsonian Institution, Washington DC, USA;
ZIN – Zoological Institute of Russian Ac. Sci., Saint-Petersburg, Russia;
ZMMU – Zoological Museum of Moscow State University, Russia.

Systematics

Order Neogastropoda Wenz, 1938
Family Buccinidae Rafinesque, 1815
Subfamily Colinae Gray, 1857

Genus *Aulacofusus* Dall, 1918

Aulacofusus Dall, 1918: 217.

Type species: *Fusus spitzbergensis* Reeve, 1855 (by original designation) (= *Fusus brevicauda* Deshayes, 1832)

Shell elongated-fusiform, medium-sized, sculptured by wide spiral cords (from 6 to 16 on the penultimate whorl); axial sculpture represented only by incremental growth lines. Last whorl is about $^2/_3$ of shell length, with well-defined, moderately long, straight or slightly curved to left siphonal canal. Aperture not high, less than half of shell length; operculum oval with terminal nucleus. Central tooth of radula consists of wide rectangular plate with normally three short thick sharp cusps, of which intermediate one the longest. Lateral teeth bear three cusps with the shortest intermediate one; teeth rows not overlapping. Proboscis very long (its length sometimes more than shell height), several times coiled within thin-walled rhynchodaeum; the buccal mass is 4-5 times shorter than proboscis length. Salivary glands large, not fusing beneath rhynchodaeum; salivary ducts thick-walled, with additional external layer of longitudinal muscle fibres [see Kosyan, Kantor, 2009, Fig. 21, lm]. Stomach large as compared to proboscis, narrow, with extremely long posterior mixing area, comprising half of stomach length.

Aulacofusus may be distinguished from other Colinae genera conchologically, by the radular structure and stomach anatomy. The extremely long posterior mixing area of the stomach is a unique character, not found in any other Colinae species. The radula of *Aulacofusus* is differing from the similar radulae of *Plicifusus*, *Latisipho* and *Colus* in the bases of the cusps of the central teeth which are situated further from the posterior edge of the basal plate than in the other genera (usually in middle part of basal plate). From *Plicifusus*, *Aulacofusus* differs in the absence of axial ribs on the shell; from *Latisipho* – in elongated shell shape with rather long siphonal canal and the foregut with extremely long proboscis; from *Mohnia*, *Retimohnia*, *Retifusus* and *Pararetifusus* – in larger sizes, the shell sculpture, the operculum with a terminal nucleus and the radula morphology.

Aulacofusus brevicauda (Deshayes, 1832) (Figs. 1, 2, 3, 4, 5 A-D)

Fusus brevicauda Deshayes, 1832: 159.
Tritonium (*Fusus*) *schantaricum* Middendorff, 1849: 475.
Fusus spitzbergensis Reeve, 1855: 395, pl. 32, figs 6a-b.
Neptunea (*Sipho*) *terebralis* Gould, 1860: 326.
Fusus lividus Mörch, 1862: 36.
Tritonofusus (*Plicifusus*) *spitzbergensis*. – Dall, 1902: 526, pl. 36, fig. 7.
Aulacofusus spitzbergensis. – Dall, 1918: 217. – Golikov, Gulbin, 1977: 184.
Colus (*Aulacofusus*) *spitsbergensis*. – Dall, 1921: 93. – Abbott, 1974: 209, fig. 2288.
Aulacofusus schantarica kurilensis Golikov, Gulbin, 1977: 183, fig. 4. **syn. nov**.
Colus spitzbergensis. – Tiba, Kosuge, 1981 (8): 25-26.
Neptunea brevicauda. – Bouchet, Warén, 1985: 202.
Colus brevicauda. – Alexeev, 2003: 84, pl. XXIX, fig. 3.
Aulacofusus brevicauda brevicauda. – Kantor, Sysoev, 2005: 129. – Kantor, Sysoev, 2006: 179, pl. 88 D-E.
Aulacofusus brevicauda kurilensis. – Kantor, Sysoev, 2005: 129. – Kantor, Sysoev, 2006: 179, pl. 88 G-H.

Type localities: *Fusus brevicauda* – Kamchatka; *Fusus spitzbergensis* – Spitzbergen; *Tritonium* (*Fusus*) *schantaricum* – Saint Paul Island (Bering Sea) and the Schantar islands; *N.* (*Sipho*) *terebralis* – the Arctic Ocean; *F. lividus* – Novaya Zemlya; *Aulacofusus schantarica kurilensis* – Paramushir, the Kurile Islands, 130-145 m.

Types: syntype of *Fusus brevicauda* – MNHN 6465; holotype of *F. spitzbergensis* – BMNH 1976054; syntypes of *Tritonium schantaricum* – ZIN 13749; holotype of *Aulacofusus schantarica kurilensis* – ZIN 28230

Distribution: from Maine and northwards along the North American Arctic coast, to the state of Washington, the Barents and the Laptev seas, the New Siberian Islands, the East-Siberian, Chukchi and the Bering seas, the Aleutian Islands, Kamchatka, the Sea of Okhotsk, the Kurile Islands, Sakhalin, the Sea of Japan (Tatar Strait and Peter the Great

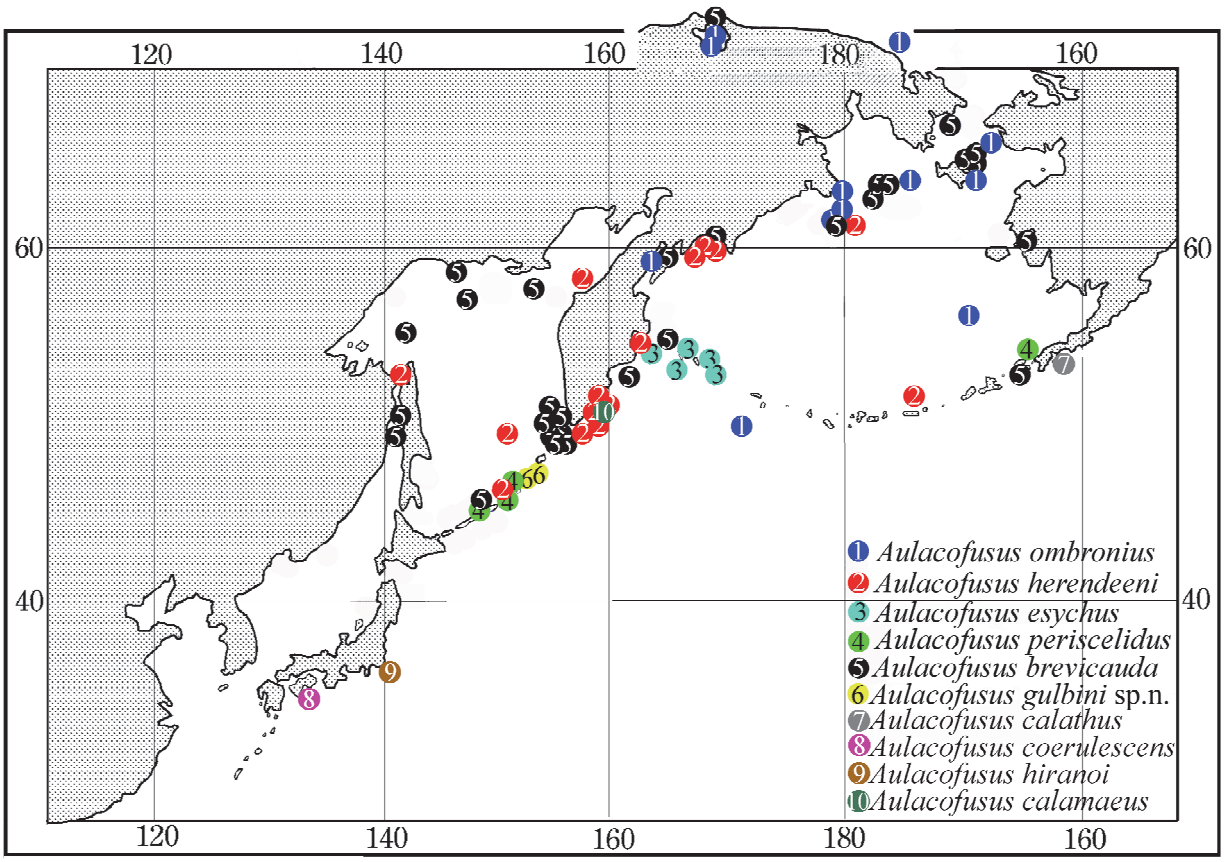


FIG. 1. Distribution of *Aulacofusus*. Stations are marked, from which studied material collected, except for 7 lots with *A.brevicauda* from western Arctic and northern Atlantic. For *A. calathus*, *A. coerulescens*, *A. hiranoi* and *A. calamaeus* type localities are given.

РИС. 1. Распространение *Aulacofusus*. Отмечены все точки, откуда собран исследованный материал, кроме 7 проб с *A. brevicauda* из западной Арктики и северной Атлантики. Для *A. calathus*, *A. coerulescens*, *A. hiranoi* и *A. calamaeus* отмечены типовые местонахождения.

Bay), 12-1000 m [Macpherson, 1971; Golikov, Gulbin, 1977; Golikov, Scarlato, 1985; Higo *et al*., 1999; Golikov, Sirenko, 2004, Sirenko, 2009, and our data] (Fig. 1).

Material examined: 35 lots (94 spm) examined. ZIN 55555, Russian-polar expedition of 1900–1903 years, Northwestern part of Kotelny Island, 75°50'N, 21 m, stones (specimens nos. 1-2 dissected). ZMMU, R/V *Plastun*, 64°09'N, 174°09'W, 74 m, t = 10.96 °C, small stones, 10.09.1931 (specimen no. 3 dissected). MIMB uncataloged, South-west of Atlasov Island, sta. 16(31), 50°50'N, 155°26'E, 250 m, muddy sand, 17.07.93 (specimen no. 4 dissected). IO, R/V *Vityaz*, Sea of Okhotsk, sta. 1831, 56°57'N, 145°57'E, 196 m (spm. no. 5 dissected). ZIN uncataloged, F/V *Pelamida*, Bering Sea, sta. 118, 65°17'N, 170°10'W, 38 m, 26.09.1972 (20 spm). ZIN uncataloged, F/V *Pelamida*, Bering Sea, sta. 198, 59°40'N, 164°00'E, 45 m, 16.10.1972 (1 spm). ZIN uncataloged, R/V *Okhotsk*, Tatar Strait near De Castri Bay in 5 miles from the shore line, 120 m, 20.09.1909 (15 spm). ZIN uncataloged, R/V *Blukher*, Tatar Strait, sta. 38, 49°N, 140°47'E, 75 m, 17.07.1933 (2 spm). ZIN uncataloged, F/V *SRTM8.452*, North part of Sea of Okhotsk, sta. 78, 59°06'N, 146°24.5'E, 78 m, 13.06.1975. IO, R/V *Vityaz*, Sea of Okhotsk, sta. 32, 58°25'N, 154°14'E, 196 m, 18.08.1948 (1 spm). IO, R/V *Vityaz*, Bering Sea, sta. 526, 55°32'N, 165°8'W, 126 m, 18.08.1950 (1 spm). IO, R/V *Vityaz*, sta. 554, 64°15'N, 174°41'W, 36 m, 30.08.1950 (1 spm). IO, R/V *Vityaz*, sta. 556, 63°49'N, 175°17'W, 01.09.1950 (2 spm). IO, R/V *Vityaz*, sta. 558, 62°59'N, 178°16'W, 95 m, 01.09.1950 (3 spm). IO, R/V *Vityaz*, Bering Sea, sta. 1006, 63°59'N, 177°38'W, 87 m (5 spm). IO, R/V *Vityaz*, Bering Sea, Olutorsky Bay, sta. 1594, 59°53'N, 166°41'E, 96 m (1 spm). IO, R/V *Academic Shuleikin*, Karaginsky Bay, sta. 121, 350-500-350 m, 15.09.1956 (nearest known sta. – 118, 59°25.1'N, 166°25'E, 195 m). ZIN 28411, R/V *Lebed*, Paramushir Island, sta. 90, 108-200 m, 18.07.1954 (1 spm). ZIN 28409, R/V *Lebed*, Paramushir Island, sta. 136, 118 m, 03.08.1954 (1 spm). ZIN 28410, R/V *Lebed*, Paramushir Island, sta. 165, 107-98 m, 08.08.1954 (2 spm). ZIN 28408, R/V *Lebed*, Paramushir Island, sta. 173, 94-96 m, 09.08.1954 (1 spm). ZIN 49146, R/V *Poseydon*, Sea of Okhotsk, Iona's Island, sta. 149, 80 m, 31.07.1978 (1 spm). ZIN 53772, East-Siberian Sea, cape Pevek, 12-13 m, 15.08.1978 (1 spm). ZIN 55552, R/V *Academic Oparin*, South East Kamchatka, 50°24.8'N, 156°53.7'E, sta. 93, 132 m, 15.08.1986 (2 spm). ZIN 55562, R/V *Ermak*, sta. 44, 74°00'N, 45°25'E, 275 m, 24.06.1901 (1 spm). ZIN 55941, F/V *Sevastopol*, sta. 2840, 52°12'N, 53°56'W, 357-395 m, 24.06.1960 (1 spm). ZIN 55942, F/V *Sevastopol*, sta. 3016, 46°16'N, 47°W, 124-140 m, 28.07.1960 (2 spm). ZIN 55943, F/V *Sevastopol*, sta. 3149, 46°28-25'N, 59°35'W, 72-110 m, 19.08.1960 (1 spm). ZIN 55988, *Vaygach*, Arctic Ocean, between St. Andrey and Samuil Islands, 37 m, 13/26.08.1913 (1 spm). ZIN 55552, R/V

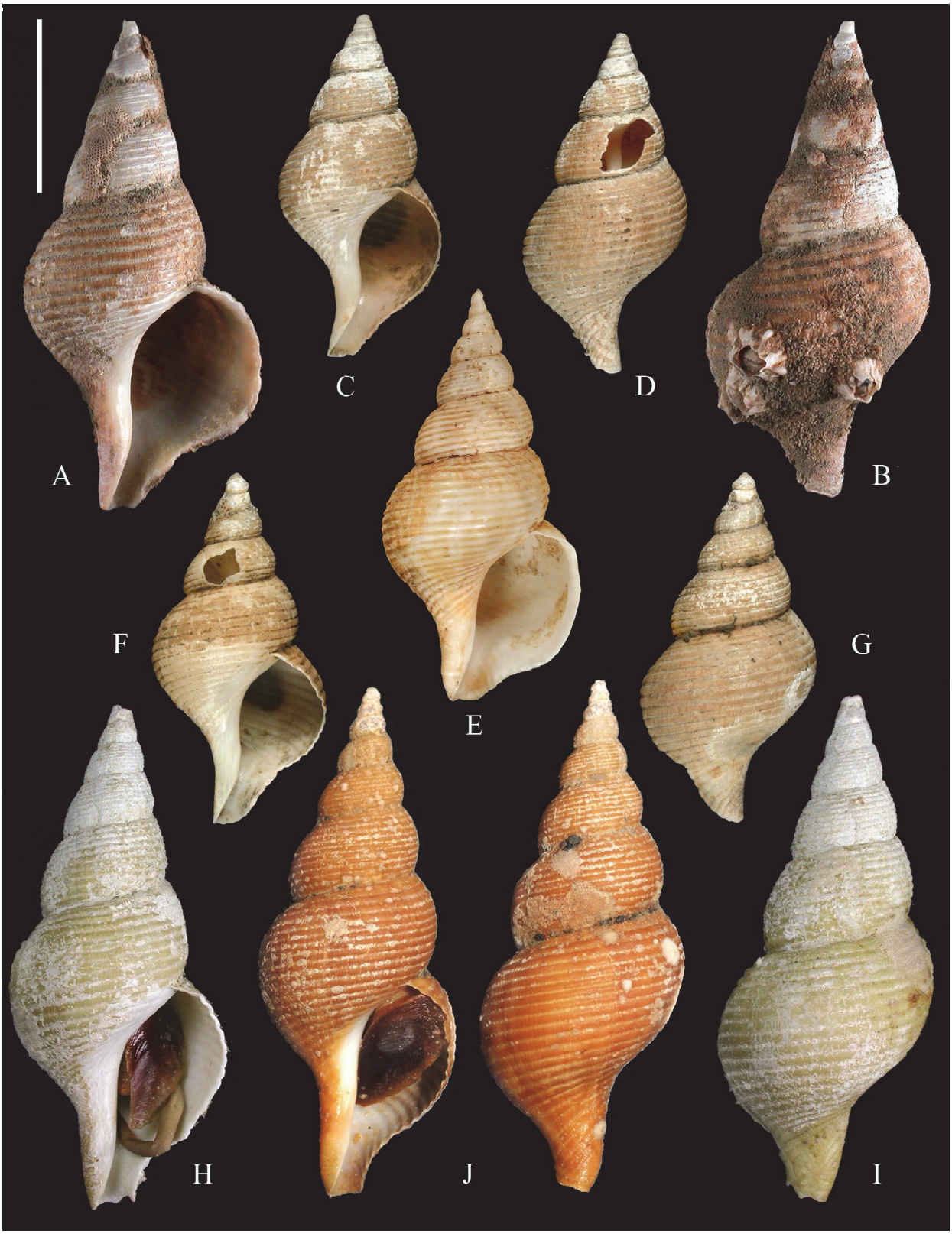


FIG. 2. Shells of *Aulacofusus brevicauda*: A-B – no. 3 (radula – Fig. 5A-B), C-D – no. 1 (anatomy – Fig. 4, radula – Fig. 5D), E – syntype, courtesy of MNHN; F-G – no. 2, H-I – holotype of *A. schantaricus kurilensis* ZIN, J – no. 4. Scale bar – 2 cm.

РИС. 2. Раковины *Aulacofusus brevicauda*: A-B – № 3 (радула – Рис. 5A-B); C-D – № 1 (анатомия – Рис. 4, радула – Рис. 5D); E – синтип, с разрешения MNHN; F-G – № 2; H-I – голотип *A. schantaricus kurilensis* ZIN; J – № 4. Длина масштабного отрезка – 2 см.

Academic Korolev, Bering Sea, 65°13.8'N, 169°21.2'W, sta. 89, 45 m, 20.08.1986 (1 spm). ZIN 58070, R/V *Academic Oparin*, Aleutian Islands, 54°35.8'N, 165°51.6'W, sta. 32, 422 m, 16.08.1991 (3 spm). ZIN 58071, R/V *Academic Oparin*, Bering Sea, 54°37.9'N, 165°38.7'W, sta. 33, 337 m, 16.08.1991 (11 spm). ZIN 58073, R/V *Academic Oparin*, 50°38.1'N,

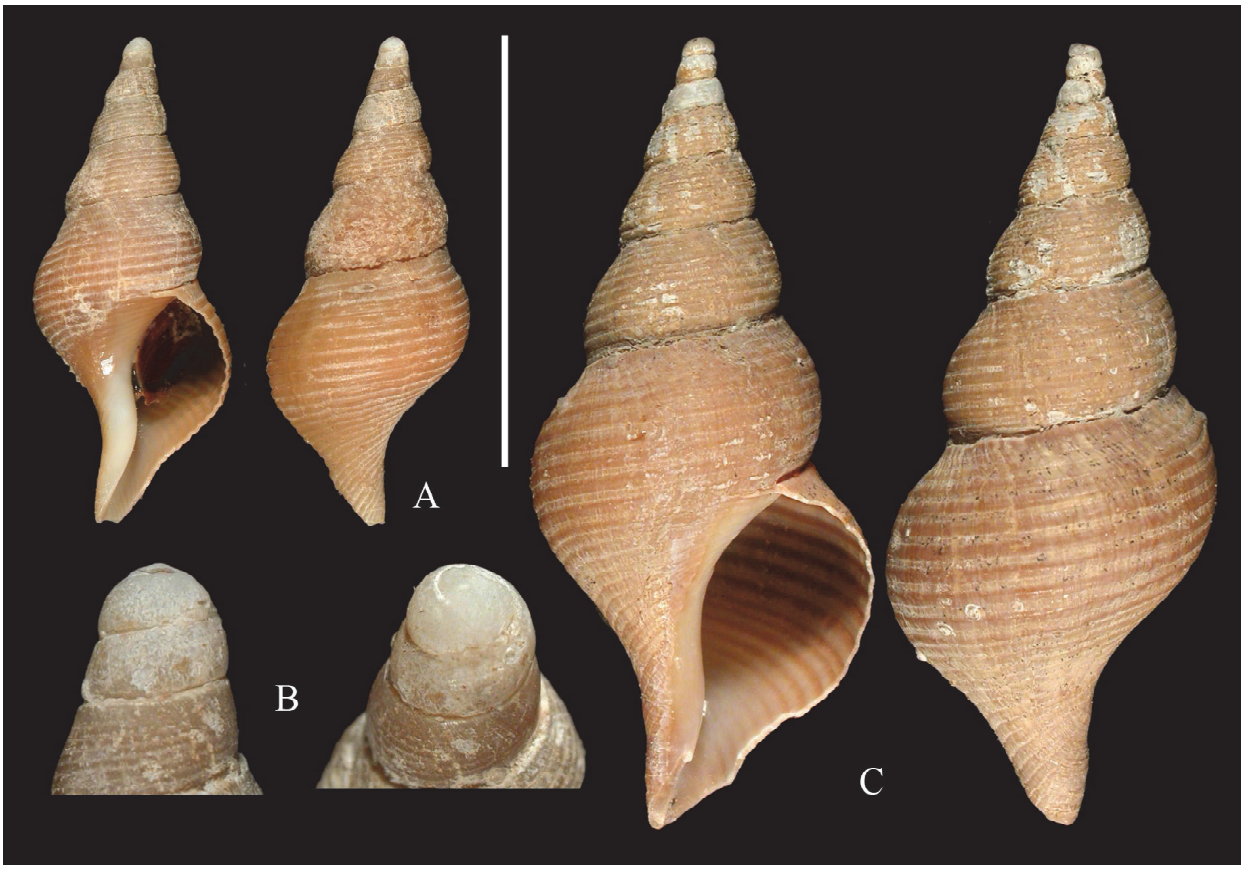


FIG. 3. *Aulacofusus brevicauda*: A – shell and B – protoconch of juvenile spm. (R/V *Vityaz* sta. 1006, 63°59' N, 177°38' W, 87 m); C – no. 5 (radula – Fig. 5C). Scale bar – 3 cm.

РИС. 3. *Aulacofusus brevicauda*: A – раковина и B – протоконх ювенильного экз. («Витязь», ст. 1006, 63°59' N, 177°38' W, 87 м); C – № 5 (радула – Рис. 5C). Длина масштабного отрезка – 3 см.

156°50.5'E, sta. 61, 80 m, 03.09.1991 (1 spm). ZIN 58796, R/V *Academic Oparin*, 45°39'N, 148°18-17'E, sta. 19, 235-240 m, 26.07.1986 (1 spm). ZIN 58640, R/V *Ekvator*, 62°12.6'N, 179°51.4'E, sta. 71, 105 m, 04.07.1969 (1 spm).

Description. Shell elongated-fusiform, thick or thin-walled, with quickly increasing whorls diameter, covered with light-beige to brownish periostracum, abrading with age (Figs. 2-3). Protoconch (Fig. 3B) consists of 2+ smooth whorls, teleoconch of 5+ whorls. Siphonal canal well defined, usually straight or sometimes slightly curved to left. Aperture wide, sometimes width exceeds height. Spiral sculpture consists of low rounded cords, separated by twice narrower deep grooves. 9-11 cords on penultimate whorl. Axial sculpture represented by incremental lines. Measurements: **no. 1**. H 41 mm, h 28.9 mm, AL 19.9 mm; **no. 2**. H 38.3 mm, h 27 mm, AL 20 mm; **no. 3**. H 51.5 mm, h 37.6 mm, AL 29.2 mm; **no. 4**. H 55.8 mm, h 36.7 mm, AL 25.6 mm; **no. 5.** H 55.7 mm, h 39.1 mm, AL 29.1 mm.

Soft body comprises 3.5 whorls: mantle spans one whorl, kidney – 0.25, digestive gland and gonad – two whorls (Fig. 4 B-C). **Head** short, with large thick tentacles. Eyes not large, black, sitting on lobes in the middle of tentacles length. **Foot** folded transversely, propodium very wide. **Operculum** large, oval, with terminal nucleus. **Mantle** square, ctenidium slightly wider, but equal in length to osphradium, consisting of high triangular lamellae (Fig. 4 E). Siphon long; rectum situated on inner side of capsule gland, short, anus opens at the distance of 0.6 mantle length. Capsule gland opens in the middle of mantle length by long slit-like female orifice (Fig. 4 E, **fo**).

Digestive system. Proboscis long (Fig. 4D, **pr**), coiled within rhynchodaeum. Proboscis retractor muscles (**prr**) start from proboscis base and attach to bottom of body haemocoel. Anteriorly, several thin muscle tufts attach rhynchodaeum to lateral walls of body haemocoel. Each proboscis retractor is divided into two bands (Fig. 4A, **prr**). These four bands after fusing with proboscis wall divide several times into thinner tufts which follow forward as tall longitudinal muscle folds on inner proboscis wall. Approximately at base of odontophore, folds further split into thin fibres, completely covering inner surface of proboscis wall. Buccal mass (**bm**) occupies 0.3 proboscis length (0.25 in no. 2). Specimen **no. 3** has radula of 12.5 mm long and 500 μm wide (1.71% of AL), consisting of 112

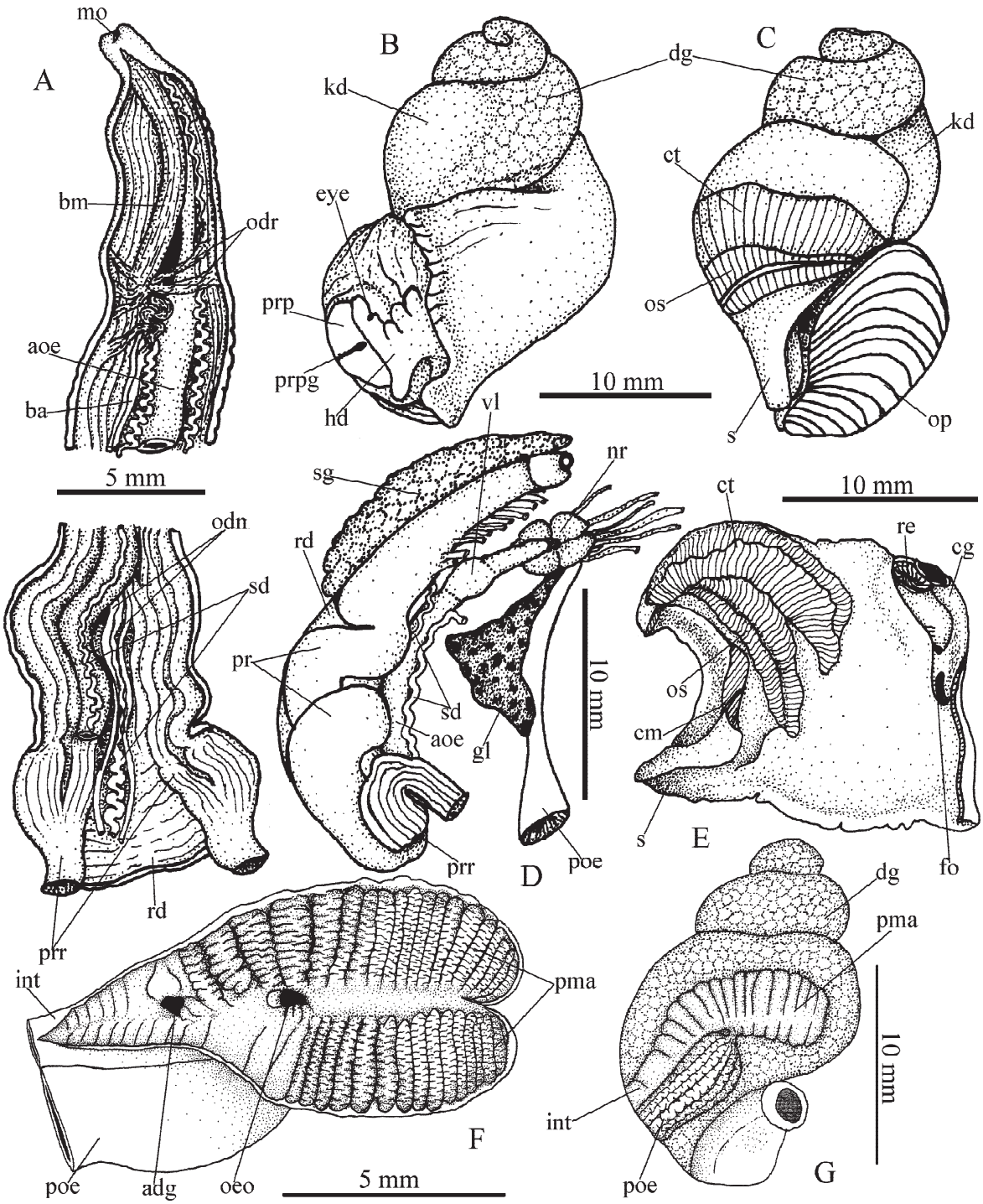


FIG. 4. Anatomy of *Aulacofusus brevicauda* no. 1 (shell – Fig. 2C-D, radula – Fig. 5D): A – proboscis, opened dorsally; B – soft body, dorsal view; C – soft body, ventral view; D – foregut; E – mantle; F – opened stomach; G – stomach, general view.

РИС. 4. Анатомия *Aulacofusus brevicauda* № 1 (раковина – Рис. 2C-D, радула – Рис. 5D): A – хобот, вскрытый с дорзальной стороны; B – мягкое тело, вид с дорзальной стороны; C – мягкое тело, вид с вентральной стороны; D – передний отдел пищеварительной системы; E – мантия; F – вскрытый желудок; G – общий вид желудка.

teeth rows, with 8 forming (Fig. 5A-B). Rachidian bears three cusps on rectangular basal plate, with the median cusp slightly longer than others. Lateral teeth tricuspid with smallest intermediate cusp. Radula of **no. 2** is 9 mm long consisting of 125 teeth rows (22 forming) (Fig. 5D). Rachidian bears only two unequal cusps; lateral teeth the same as above described. Radula of **no. 5** (Fig. 5C) is 400 μm wide (1.37% of AL). Bases of three thin cusps of rachidian brought nearer to each other than in other specimens, lateral teeth the same. Medial retractor muscle long and wide, beginning from radular sac

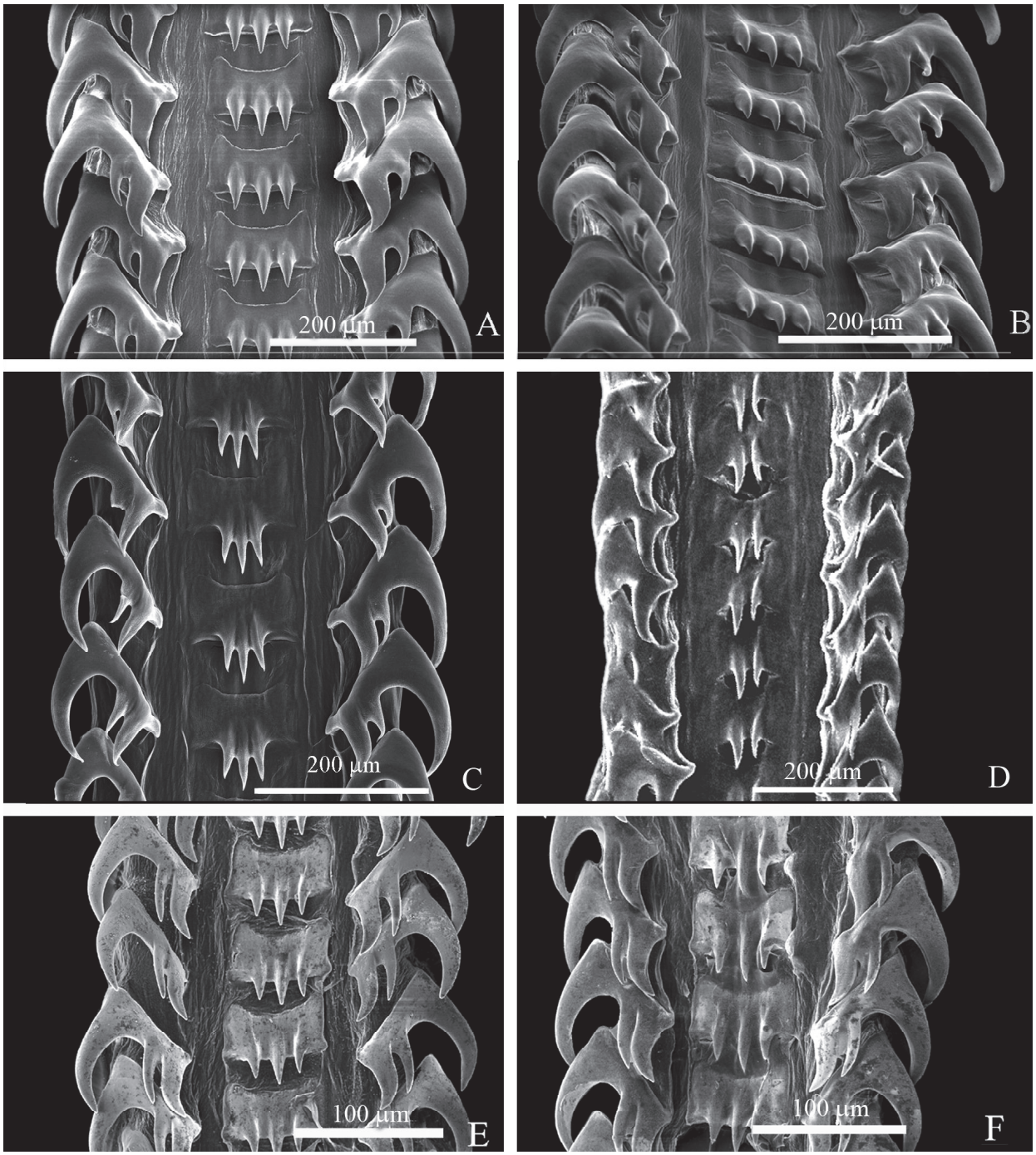


FIG. 5. Radulae of *Aulacofusus*: A-B – *A.brevicauda* no. 3 (shell – Fig. 2A-B), C – *A.brevicauda* no. 5 (shell – Fig. 3C), D – *A.brevicauda* no. 1 (shell – Fig. 2C-D, anatomy – Fig. 4), E-F – *A. periscelidus* no. 1 (shell – Fig. 6A, anatomy – Fig. 7).

РИС. 5. Радулы *Aulacofusus*: A-B – *A.brevicauda* № 3 (раковина – Рис. 2A-B), C – *A.brevicauda* № 5 (раковина Рис. 3C), D – *A.brevicauda* № 1 (раковина – Рис. 2C-D, анатомия – Рис. 4), E-F – *A. periscelidus* № 1 (раковина – Рис. 6A, анатомия – Рис. 7).

base and growing into longitudinal folds of proboscis retractors. Odontophore attached to proboscis wall by multiple short tufts of retractor muscles (Fig. 4A, **odr**). Two thick buccal nerves (**odn**) with buccal artery between them (**ba**) start at buccal mass base. Anterior oesophagus after coming out of proboscis, follows ventrally forwards and turns into small swollen valve of Leiblein (Fig. 4D). Rather thick coiled salivary ducts follow on both sides of anterior oesophagus to long and narrow salivary glands near valve of Leiblein. Brownish gland of Leiblein situated immediately posterior to nerve ring; duct of gland not traced. **Stomach** spans $^1/_3$ of whorl (Fig. 4F). Posterior mixing area comprises more than half of stomach length (Fig. 4G, **pma**), lined with numerous high transverse folds. Oesopha-

geal opening not large, rounded, situated ventrally. Lateral sulcus absent, but there is rounded deepening in its area. Opening of anterior duct of digestive gland (**adg**) very large, situated not far from oesophageal opening. Area between anterior duct and oesophageal opening lined with low oblique folds. Opening of posterior duct of digestive gland not traced. The rest part of stomach walls lined with low transverse folds.

Differential diagnosis. The spiral sculpture of broadly spaced cords is somewhat similar to *A. ombronius*, but the cords in the latter species are sharp and more numerous. Juvenile specimens of *A. ombronius* possess rounded cords and thus may be confused with small *A. brevicauda*, but the shell shape and number of spiral ribs are different.

Remarks. We prefer not to consider *A. brevicauda kurilensis* as a separate subspecies due to lack of significant differences in the shell shape and sculpture from the type of *A. brevicauda*. The number of typical *A. brevicauda* specimens are found around Northern Kurile Islands, thus the area of distribution of *A. brevicauda* includes the type locality of *A. schantaricus kurilensis*.

Aulacofusus periscelidus (Dall, 1891) (Fig. 5 E-F, 6, 7)

Chrysodomus periscelidus Dall, 1891: 187. – Dall, 1894: 708, pl. 27, fig. 6. – Kosuge, 1991: pl. 15, fig. 5.

Cominella fortilirata Sowerby, 1913: 557-558, pl. 9, fig. 1, **syn. nov**.

Colus (*Aulacofusus*) *periscelidus*. – Dall, 1921: 93. – Abbott, 1974: 209, fig. 2297.

Aulacofusus spitzbergensis sensu Habe, 1968 (non *Fusus spitzbergensis* Reeve, 1855): 91, pl. 29, fig. 11,

Colus (*Aulacofusus*) *spitzbergensis* sensu Okutani, 2000 (non *Fusus spitzbergensis* Reeve, 1855): 465, pl. 231, fig. 55.

Aulacofusus periscelidus. – Golikov, Gulbin, 1977: 182. – Kantor, Sysoev, 2005: 130. – Kantor, Sysoev, 2006: 180, pl. 89 G-H.

Colus periscelidus. – Tiba, Kosuge, 1981 (8): 21-22.

Colus (*Aulacofusus*) *spitzbergensis fortilirata*. – Higo *et al*., 1999: 229, – Higo *et al*., 2001: 73, fig. G2580.

Aulacofusus brevicauda fortilirata. – Kantor, Sysoev, 2005: 129. – Kantor, Sysoev, 2006: 179, pl. 88 F.

Type localities: *Chrysodomus periscelidus* – off coast of Akutan Island, the Aleutians, Alaska, *Albatross* sta. 2842, 72 fms; *Cominella fortilirata* – Urup, Kurile Islands.

Types: lectotype (Tiba, Kosuge, 1981 by indication "type", which is a valid designation) of *Chrysodomus periscelidus* – USNM 122643; holotype of *Cominella fortilirata* – BMNH 1914.1.7.289.

Distribution: the Kurile, Commander and the Aleutians Islands, 50-380 m [Golikov, Gulbin, 1977; Higo *et al*., 1999, and our data] (Fig. 1).

Material: 4 lots (4 spm). ZIN 55945, Urup Island, Kitovy cape, probe 3, 50 m, rocks, 22.10.1973 (spm no. 1, dissected). ZIN 55944, Shikotan Island, sta. 68, 43°37.7'N, 146°50'E, 125-130 m, 11.09.1972 (1 spm). ZMMU LC-25639, Okhotsk Sea, Kurile Islands, Onekotan Island, 80-104 m (1 spm). MIMB, uncataloged, Kurile Islands, Simushir, Sea of Okhotsk, rock Utes, cape Sivuch, 46°58.0'N, 151°56.8'E, 280-380 m (1 spm).

Description. Shell elongated-fusiform, with high spire and attenuated short to medium long siphonal canal, covered with yellowish or light-olive periostracum; protoconch mammilate (Fig. 6). Spiral sculpture consists of widely spaced high cords, relatively narrow and rounded in young specimens, broad and rectangular in adults, separated by deep grooves equal in width or wider than cords. Deep grooves on interior of shell correspond to cords, so that latter in some specimens can be hollow (Fig. 6D). There are 5-6 cords on penultimate whorl. On last whorl cords are most pronounced and broadly spaced on shell periphery, becoming lower and more closely spaced on canal. Axial sculpture represented only by incremental lines. Aperture not high, semi-oval, comprising less than half of H, slightly higher in young specimens. Measurements: **no. 1**. H 25.4 mm, h 15.6 mm, AL 9.3 mm.

Soft body: Two whorls extracted. Mantle spans one whorl, kidney – 0.25, digestive gland and gonad – rest part of visceral mass (Fig. 7A-B). **Head** large, with short thick tentacles. **Foot** folded transversely, wide propodium separated be deep propodial groove. **Operculum** oval, with terminal nucleus. **Mantle** similar to that of *A. brevicauda*.

Digestive system. Long coiled proboscis half inverted into rhynchodaeum. Paired proboscis retractors separate from rhynchodaeum in its middle part and attach to bottom of body haemocoel (Fig. 7C-D, **prr**). Buccal mass occupies one third of proboscis length. **Radula** 220 μm wide (2.37% AL) and consists of 102 rows, 10 forming (Fig. 5E-F). Rachidian teeth rather wide, tricuspid, with longest median cusp. Lateral teeth bear three cusps with smallest median cusp. Salivary glands elongated, comprising slightly more than one third of rhynchodaeum length and situated on both sides of rhynchodaeum (Fig. 7C-D, **sg**). Salivary ducts thick, slightly coiled, running parallel to anterior oesophagus. Valve of Leiblein large, swollen; gland of Leiblein well developed, opening by short duct (**dgl**) immediately posterior to small nerve ring. **Stomach** spans half of visceral whorl and situated parallel to its longitudinal axis (Fig. 7Å). Posterior mixing area long, comprising half of stomach length (Fig. 7F, **pma**), lined with high transverse epithelial folds. Opening of posterior duct of digestive gland not found; opening of anterior duct (**adg**) wide and rounded, situated on inner stomach wall before beginning of intestine; oesophageal opening narrow. Area between two openings lined with longitudinal folds, rest of inner stomach wall lined with transverse folds. Outer stomach wall lined with high transverse folds.

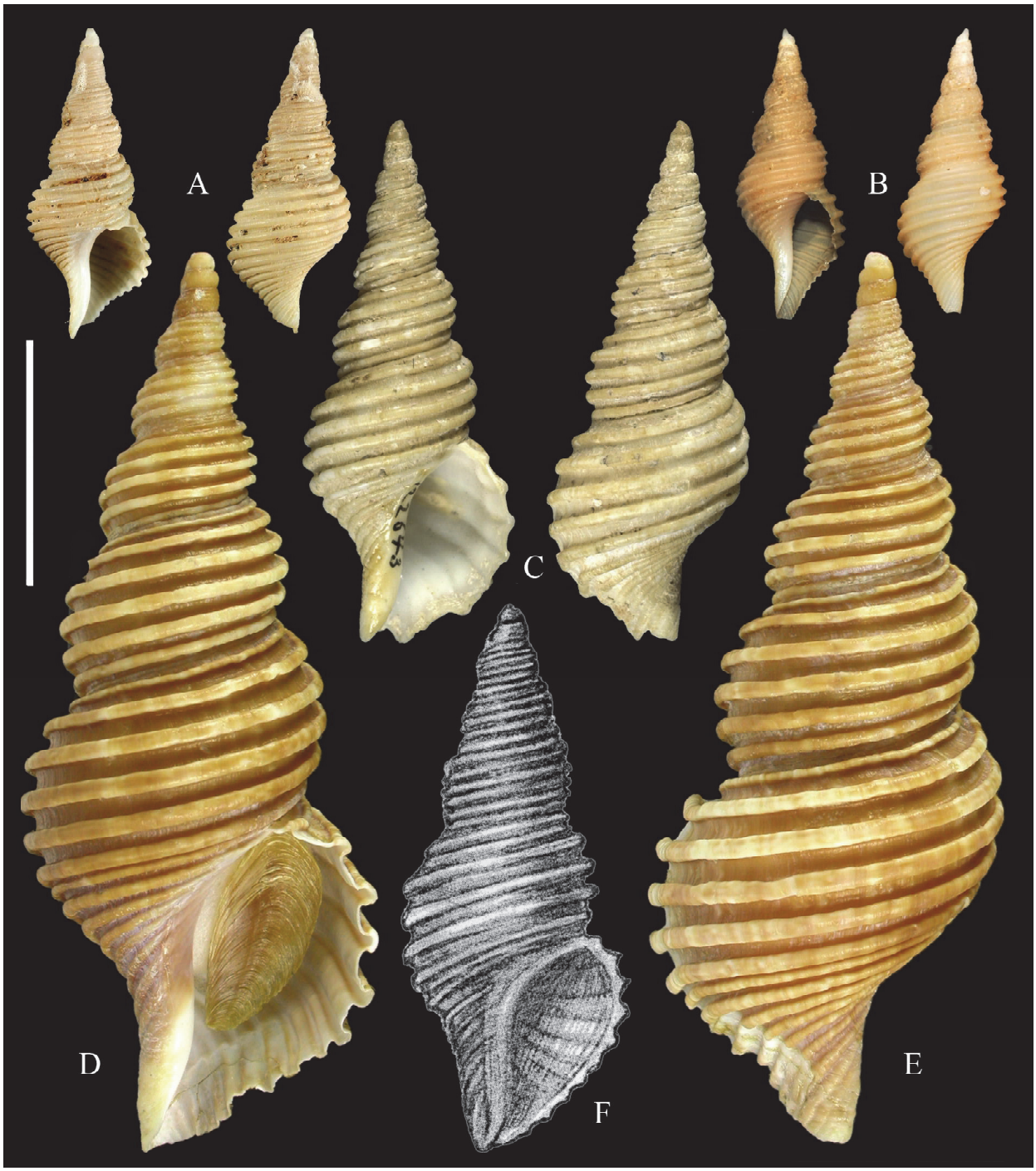


FIG. 6. Shells of *A.periscelidus*: A – № 1 (anatomy – Fig. 7, radula – Fig. 5E-F), B – spm. from Simushir Island, 46°58.0' N, 151°56.8' E, 280-380 m, C – holotype of *A.periscelidus*, courtesy of USNM; D-E – ZMMU LC-25639, F – holotype of *Cominella fortilirata* (fig. from Sowerby, 1913). Scale bar – 2 cm.

РИС. 6. Раковины *A.periscelidus*: A – № 1 (анатомия – Рис. 7, радула – Рис. 5E-F), B – экз. с о-ва Симушир, 46°58.0' N, 151°56.8' E, 280-380 м, C – голотип *A.periscelidus*, с разрешения USNM; D-E – ZMMU LC-25639, F – голотип *Cominella fortilirata* (рис. из Sowerby, 1913). Длина масштабного отрезка – 2 см.

Differential diagnosis. The species is easily distinguishable due to characteristic spiral sculpture of high cords, separated by deep interspaces. From close *Aulacofusus coerulescens* and *A*. ***gulbini*** differs in fewer and higher spiral cords; from similarly sculptured *Pararetifusus kosugei* and *P. kantori* differs in larger shell size and different anatomy [Kosyan, 2006b].

Remarks. *Cominella fortilirata* (Fig. 6F), previously considered as the subspecies of *A. brevicauda*, has a characteristic sculpture of the type of *A. periscelidus* and is reduced here to its junior synonym.

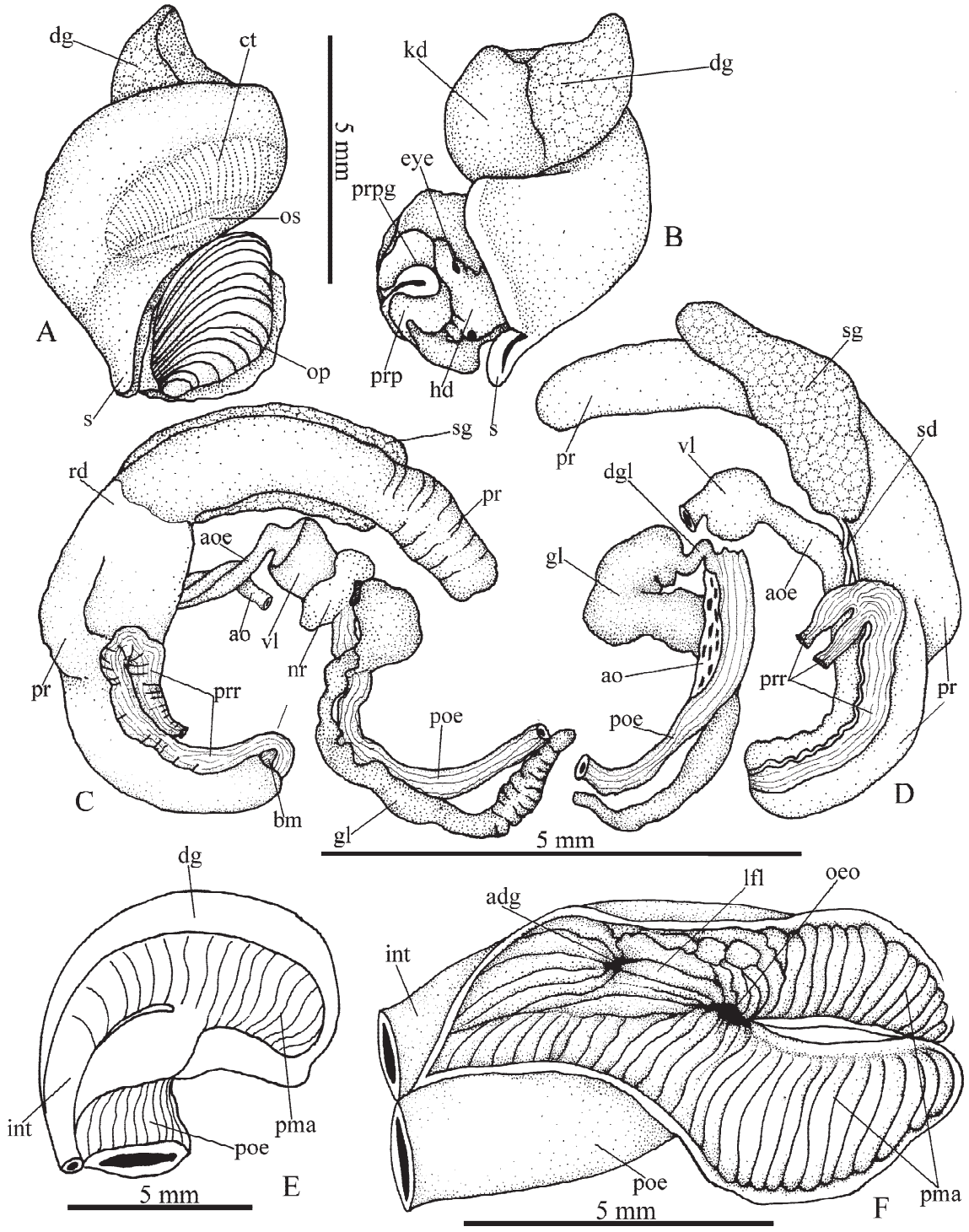


FIG. 7. Anatomy of *Aulacofusus periscelidus* no. 1 (shell – Fig. 6A, radula – Fig. 5E-F): A-B – soft body, ventral (A) and dorsal (B) view; C-D – foregut, right (C, right salivary gland removed) and left (D) view; E – stomach, general view; F – opened stomach.

РИС. 7. Анатомия *Aulacofusus periscelidus* № 1 (раковина – Рис. 6A, радула – Рис. 5E-F): A-B – мягкое тело, вид с вентральной (A) и дорзальной (B) стороны; C-D – передний отдел пищеварительной системы справа (C, правая слюнная железа удалена) и слева (D); E – общий вид желудка; F – вскрытый желудок.

Aulacofusus herendeeni (Dall, 1899) (Figs. 8, 9, 10, 11 A-G)

Sipho herendeeni Dall, 1899: 543. – Kosuge, 1991: pl. 15, fig. 4.
Colus (*Aulacofusus*) *nobilis* Dall, 1919: 315; 1921: 94, pl. 10, fig. 5. – Dall, 1925: 13, pl. 5, fig. 4. – Abbott, 1974: 209.
Colus (*Aulacofusus*) *herendeeni*. – Dall, 1921: 527, pl. 8, fig. 4.
Colus herendeeni. – Matsukuma *et al*., 1991: 83, pl. LXXXI, fig. 10.
Aulacofusus nobilis. – Golikov, Gulbin, 1977: 182.
Colus nobilis. – Tiba, Kosuge, 1981 (8): 19-20.
Aulacofusus herendeeni. – Kantor, Sysoev, 2005: 130. – Kantor, Sysoev, 2006: 180, pl. 89 B.

Type localities: *Aulacofusus herendeeni* – Be-

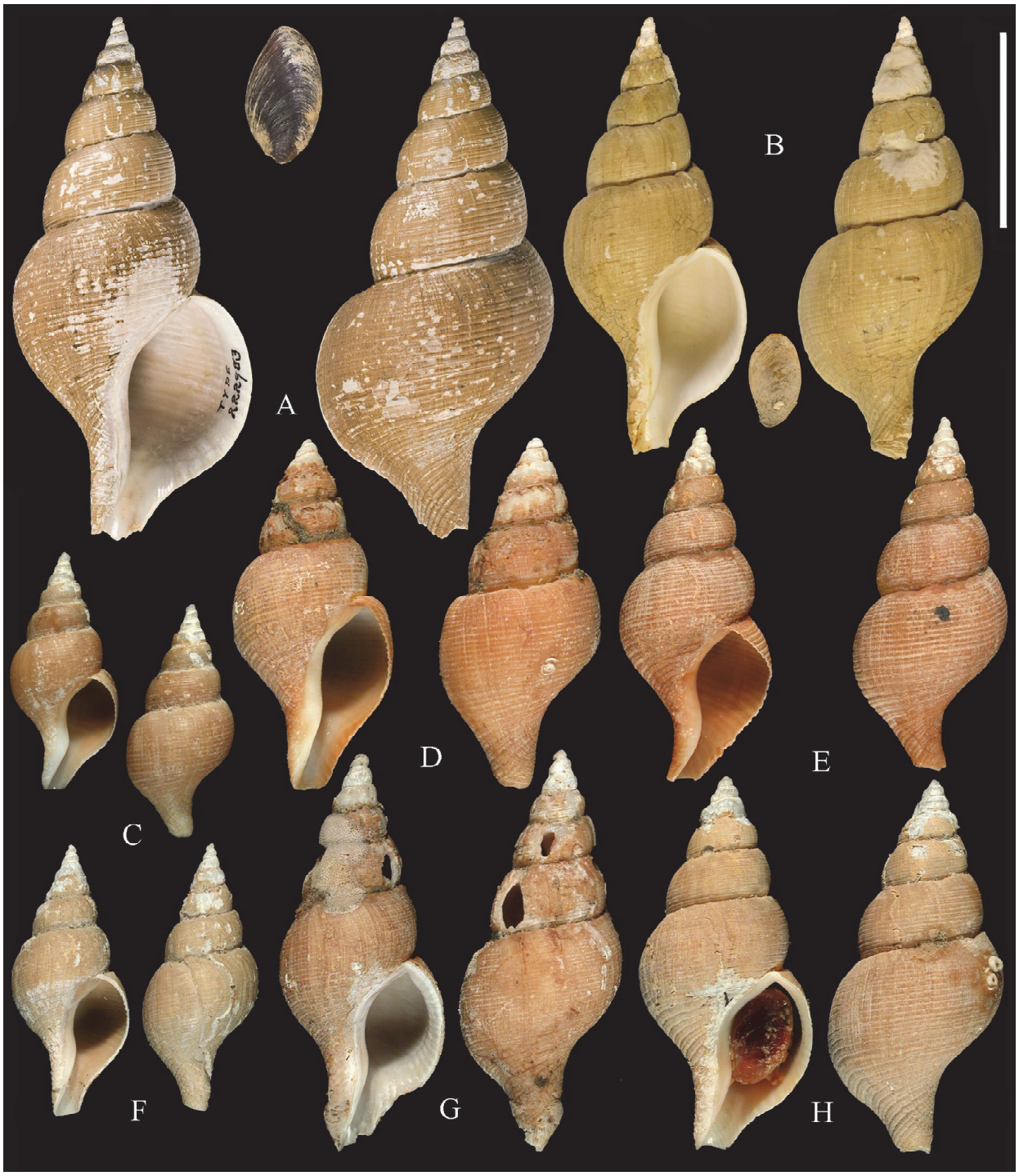


FIG. 8. Shells of *Aulacofusus herendeeni*: A – holotype of *Aulacofusus nobilis* Dall, 1919; B – holotype of *Sipho herendeeni* Dall, 1899; C – no. 4 (radula – Fig. 11F), D – no. 3 (radula – Fig. 11A), E – no. 1 (anatomy – Fig. 10, radula – Fig. 11C-D), F – ZMMU LC 18581, G – no. 5 (radula – Fig. 11E), H – no. 2 (radula – Fig. 11B). Scale bar – 3 cm.

РИС. 8. Раковины *Aulacofusus herendeeni*: A – голотип *Aulacofusus nobilis* Dall, 1919; B – голотип *Sipho herendeeni* Dall, 1899; C – № 4 (радула – Рис. 11F), D – № 3 (радула – Рис. 11A), E – № 1 (анатомия – Рис. 10, радула – Рис. 11C-D), F – ЗМ МГУ LC 18581, G – № 5 (радула – Рис. 11E), H – № 2 (радула – Рис. 11B). Длина масштабного отрезка – 3 см.

ring Sea, near Pribilof Islands, USFC sta. 3540, 56°27'00"N, 166°08'00"W, 93 m, *Aulacofusus nobilis* – near Pribilof Islands, Bering Sea, USFC sta. 3484,. 57°18'00"N, 171°54'00"W, 110 m.

Types: holotype of *Aulacofusus herendeeni*: USNM 107006, holotype of *Aulacofusus nobilis*: USNM 222983.

Distribution: the Chukchi, Bering Seas, the Sea of Okhotsk, Kamchatka, the Aleutian Islands, the Kurile islands, Moneron Island, Tatar Strait, 16-920 m [Golikov, Gulbin, 1977; Golikov, Gulbin, Sirenko, 1987; Golikov, Sirenko, 1998; Golikov *et al*., 2001, Sirenko, 2009, and our data] (Fig. 1).

Material examined: 15 lots (38 specimens). IO, R/V



FIG. 9. *Aulacofusus herendeeni*. A – R/V *Vityaz,* sta. 523; B – R/V *Vityaz,* sta. 529; C-G – Olutorsk Bay of the Bering Sea (ZMMU LC 14811) (C– spm. no. 6, radula – Fig. 11G). Scale bar – 2 cm.

РИС. 9. *Aulacofusus herendeeni*. A – «Витязь» ст. 523; B – «Витязь» ст. 529;. C-G –Олюторский залива Берингова моря (ZMMU LC 14811)(C – № 6, радула на Рис. 11G). Длина масштабного отрезка – 2 см.

Vityaz, Eastern Kamchatka, sta. 523, 56°16'N, 163°30'E, 105 m, 16.08.1950 (1 empty spm). IO, R/V *Vityaz*, Bering Sea, Commander Islands, sta. 529, 54°25'N, 168°16'E, 110 m, 19.08.1950 (1 empty spm). IO, Bering Sea, R/V *Vityaz*, sta. 1517, 62°30.1'N, 179°42.7'W, depth 113 m, 14.06.1952 (3 spms, no. 1 dissected). ZIN 55969/31, SE Kamchatka, 50°24.8'N, 156°53.7'E, 134 m (2 spms). IO, R/V *Vityaz*, sta. 1579, 60°08.8'N, 168°23.3'E, 140 m, 25.06.1952 (3 spms). IO, R/V *Vityaz*, sta. 1321, South-Eastern Kamchatka, 143 m, 15.05.1952 (1 spm). IO, R/V *Vityaz*, sta. 1329, 51°40'N, 158°30'E, 285 m, 16.05.1952 (5 spms). IO, R/V *Vityaz*, sta. 1330, 51°49'N, 158°19'E, 130 m, 16.05.1952 (5 spms., no. 2 dissected). IO, R/V *Vityaz*, sta. 1331, 51°50'N, 158°13'E, 86 m, 16.05.1952 (2 spms). IO, R/V *Academic Shuleikin*, Kamchatsky Bay, sta. 12, 55°20'N, 161°56'E, 140 m, 07.08.1956 (2 spms). IO, F/V *SRT-4348*, sta. 38, western coast of Kamchatka, 145 m, 07.06.1958 (1 spm., spm. no. 3 dissected). ZMMU LC 18182, R/V *Popov*, Sakhalin Bay, dredge 8, 54°25'N, 140°44'E, 62 m, 15.07.1985 (1 spm., spm. no. 4 dissected). ZMMU LC18581, R/V *Gidrobiolog*, Bering Sea, Olutorsky Bay, dredge 15, 95-100 m, 17.09.1982 (2 spms). ZMMU LC 17676, R/V *Gidrobiolog*, Simushir Island, 47°03.4'N, 152°14.8'E, 102-105 m, 1982 (3 spms., no. 5 dissected). ZMMU LC14811, R/V *Gidrobiolog*, Bering Sea, Olutorsky Bay, TS 27, 60°04.3'N, 168°44.4'E, 127-130 m, 11.08.1988 (6 spms, no. 6 dissected).

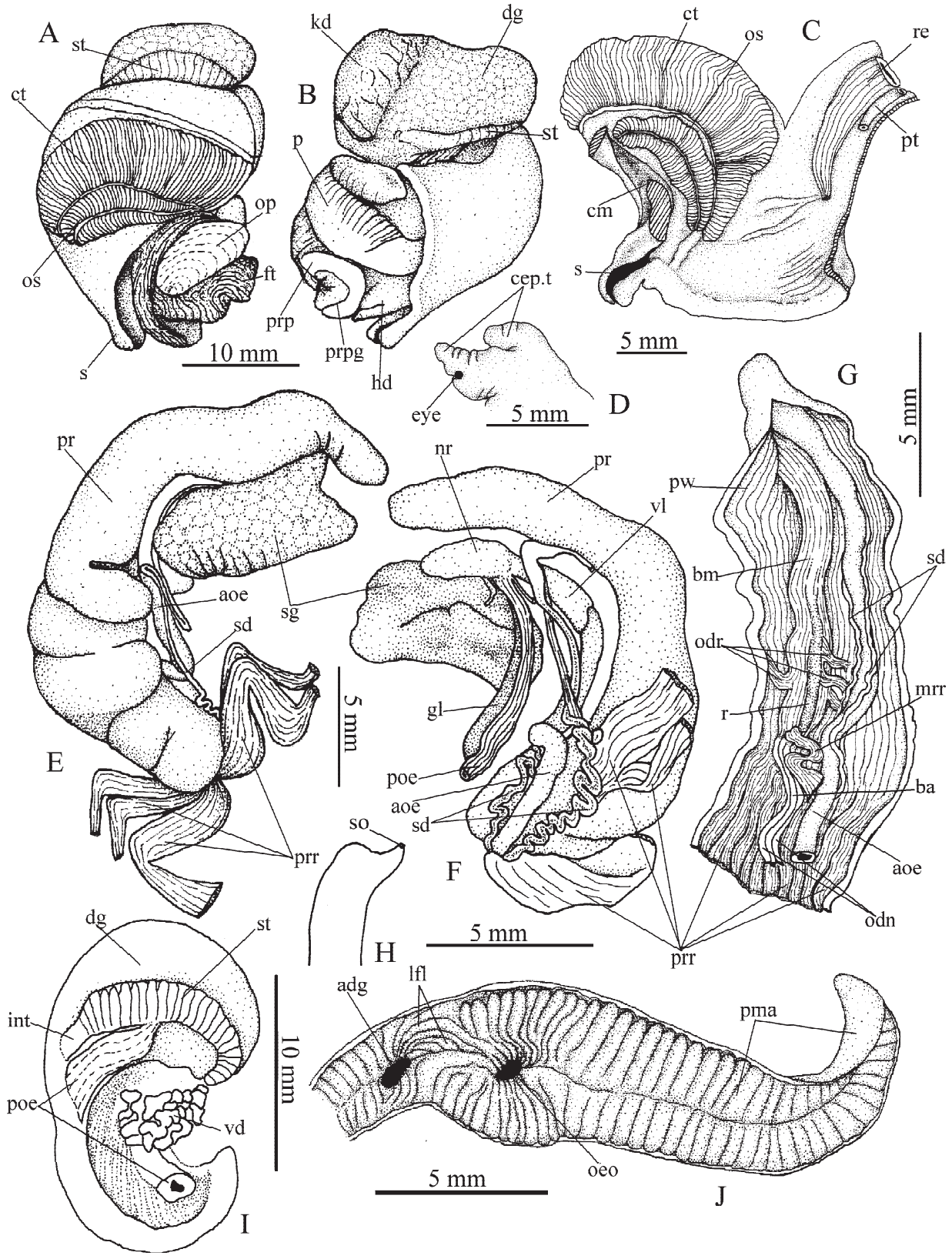


FIG. 10. Anatomy of *Aulacofusus herendeeni* no. 1 (shell – Fig. 8E, radula – Fig. 11C-D): A – soft body, ventral view; B – soft body, dorsal view; C – mantle; D – head; E-F – foregut, right and left (left salivary gland removed) views; G – proboscis, opened dorsally; H – apical part of penis (scale as in Figs. A-B); I – stomach, general view; J – opened stomach.

РИС. 10. Анатомия *Aulacofusus herendeeni* № 1 (раковина – Рис. 8E, радула – Рис. 11C-D): A – мягкое тело, вид с вентральной стороны, B – мягкое тело, вид с дорзальной стороны, C – мантия, D – голова, E-F – передний отдел пищеварительной системы, вид справа и слева (левая слюнная железа удалена), G – хобот, вскрытый с дорзальной стороны, H – апикальная часть пениса (масштаб – как на Рис. A-B), I – общий вид желудка, J – вскрытый желудок.

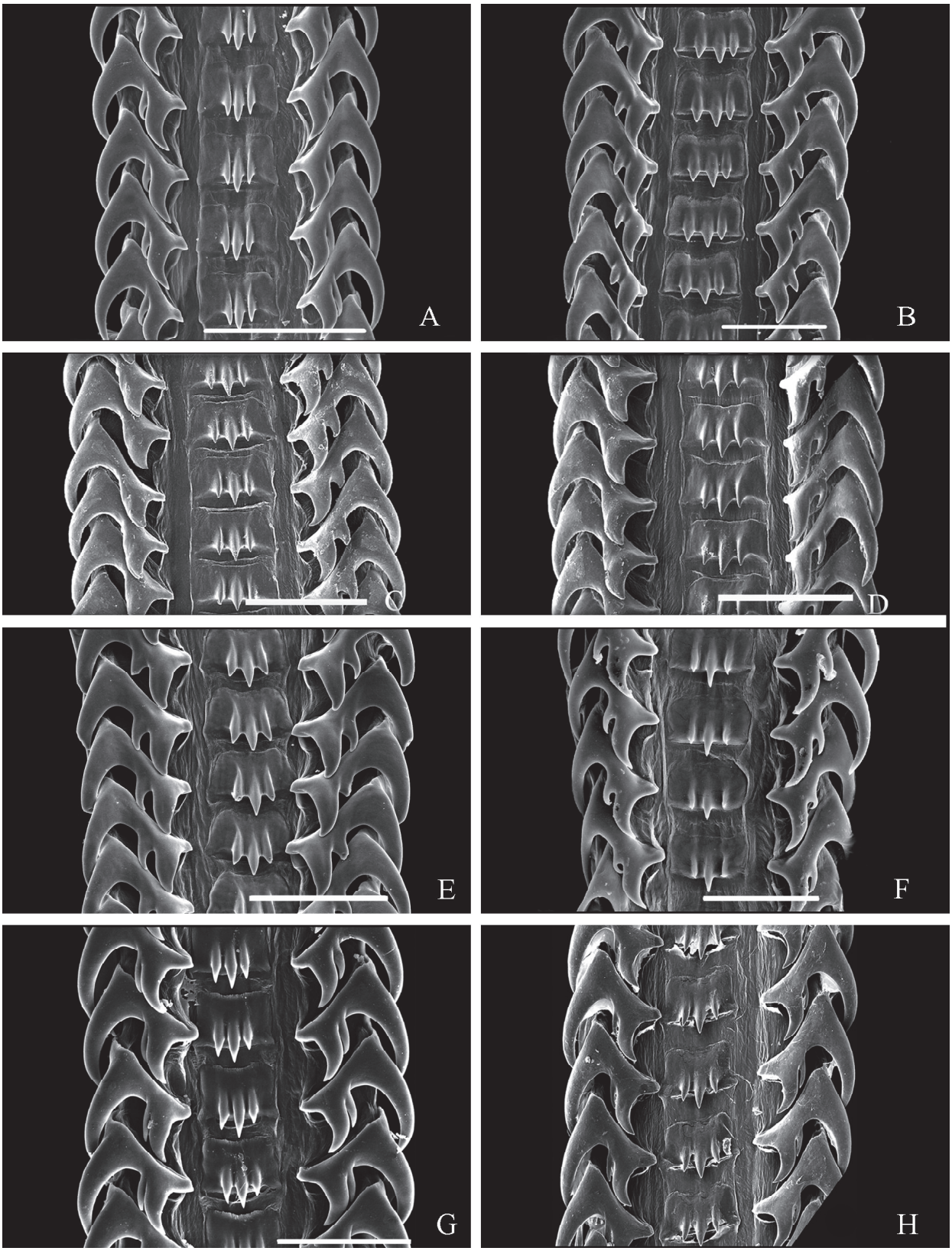


FIG. 11. Radulae of *Aulacofusus*. A-G – *A. herendeeni*: A – no. 3 (shell – Fig. 8D), B – no. 2 (shell – Fig. 8H), C-D – no. 1 (shell – Fig. 8E, anatomy – Fig. 10), E – no. 5 (shell – Fig. 8G), F – no. 4 (shell – Fig. 8C), G – no. 6 (shell – Fig. 9C). H – *A. esychus* no. 1 (shell – Fig. 12D, anatomy – Fig. 13). Scale bar 200 μm.

РИС. 11. Радулы *Aulacofusus*. A-G – *A. herendeeni*: A – № 3 (раковина – Рис. 8D), B – № 2 (раковина – Рис. 8H), C-D – № 1 (раковина – Рис. 8E, анатомия – Рис. 10), E – № 5 (раковина – Рис. 8G), F – № 4 (раковина – Рис. 8C), G – № 6 (раковина – Рис. 9C). H – *A. esychus* № 1 (раковина – Рис. 12D, анатомия – Рис. 13). Масштаб 200 мкм.

Description. Shell thick or thin-walled, elongate-fusiform, with distinct long narrow canal, turned to the left, covered with yellow-brownish or olive periostracum (Figs. 8-9). Spiral sculpture of well defined flattened cords (up to 20 on penultimate whorl), separated by narrow grooves and covering entire shell surface. Sometimes ribs subdivided by shallow longitudinal grooves. On canal cords more prominent and broader spaced than on periphery. Axial sculpture represented by incremental lines. Aperture oval, rather high, its height with canal slightly exceeds half of shell height. Measurements: **no. 1** (male): H 51.7 mm, h 36 mm, AL 27 mm; **no. 2**: H 53 mm, h 35.9 mm, AL 25.6 mm; **no. 3**: H 48.4 mm, h 34.3 mm, AL 25.8 mm; **no. 4**: H 35.4 mm, h 24.3 mm, AL 18.3 mm; **no. 5**: H 56.4 mm, h 37.6 mm, AL 27.4 mm; no. 6: H 42.3 mm, h 30 mm, AL 20.9 mm.

Soft body: two whorls extracted. Mantle spans one whorl, kidney – 0.2, digestive gland and gonad – the rest part of visceral mass (Fig. 10A-B). **Foot** folded transversely, with wide propodium, separated by deep propodial groove. **Operculum** oval with terminal nucleus. **Head** small, with adpressed to each other short contracted tentacles (Fig. 10D). Eyes small, black, on lobes in middle of tentacles. **Mantle** length exceeds width (Fig. 10C), with thickened muscular edge. Ctenidium large, occupying almost 0.3 of mantle width, crescent-shaped, consisting of numerous, tightly adpressed lamellae. Osphradium shorter and narrower than ctenidium. Siphon rather long. Rectum situated from inner side of narrow prostate gland, opening by small anal orifice at middle of mantle length. Penis with small seminal papilla not surrounded by fold of skin (Fig. 10H).

Digestive system. Long proboscis coiled within thin-walled rhynchodaeum (Fig. 10A, **pr**). Proboscis retractors start from its base and attach to bottom of body haemocoel (Fig. 10E-F, **prr**); anterior part of rhynchodaeum attached by multiple thin tensors to bottom and walls of body haemocoel. Fibers of proboscis retractors continue within proboscis wall and well seen on inner side of proboscis wall as longitudinal muscular folds. Buccal mass is three times shorter than proboscis. **Radula** of **no. 1** is 13 mm long and 520 μm wide (2.03% AL), consisting of 112 rows, 15 forming (Fig. 11C-D). Rachidian tricuspid, the median cusp the longest. Lateral teeth bear three cusps in a right row and two – in the left. Radula of **no. 2** (Fig. 11B) is 500 μm wide (1.95% AL), similar to no.1, but has tricuspid lateral teeth in both longitudinal rows. Radula of **no. 3** (Fig. 11A) is 320 μm wide (1.24% AL), possess rachidian with three cusps brought very near to each other; lateral teeth as above. Radula of **no. 4** (Fig. 11F) is similar to no. 2 but narrower (200 μm wide, 1.09% AL). Radula of **no. 5** (Fig. 11E) is 420 μm wide (1.53% AL) and differs from others by slightly connivent bases of rachidian cusps. Radula of no. 6 (Fig. 11G) is 400 μm wide (1.91% of AL); the structure is as described above. Medial radular retractor muscle originates at radular sac base, with its other end attaching to proboscis wall slightly posterior to odontophore base (Fig. 10G, **mrr**). Odontophore retractors, pair of buccal nerves and buccal artery also start from of odontophore base. Thick and rather convoluted salivary ducts follow along anterior oesophagus and open into large and bean-shaped salivary glands (Fig. 10E-G, **sd**). Valve of Leiblen long and poorly developed. The length of salivary glands is less than half of proboscis length. Gland of Leiblein (**gl**) is poorly developed, follows parallel to posterior oesophagus as a narrow whitish band. Duct of the gland not found. **Stomach** occupies half a whorl, long posterior mixing area comprises 0.75 of its length (Fig. 10H), lined with high transverse folds (Fig. 10I, **pma**). Oesophageal opening (**oeo**) situated ventrally in a deepening. The rest of stomach walls are lined with smaller transverse folds. There is only one opening of duct of digestive gland found, situated ventrally close to oesophageal opening. Beginning of intestine is covered with low transverse folds.

Differential diagnosis. *Aulacofusus herendeeni* differs from other species of the genus (except *A. esychus*) in spiral sculpture of multiple flattened cords. The shell shape is very variable even in the specimens from one lot (see Fig. 9). For comparison with *A. esychus* see the remarks on the species.

Aulacofusus esychus esychus (Dall, 1907) (Figs. 11H, 12 A-E, 13)

Tritonofusus esychus Dall, 1907: 159. – Kosuge, 1991: pl. 26, fig. 8.

Colus (*Aulacofusus*) *esychus*. – Dall, 1921: 94, pl. 10, fig. 8.

Aulacofusus esychus. – Kantor, Sysoev, 2005: 129. – Kantor, Sysoev, 2006: 179, pl. 89 E-F.

Colus esychus. – Abbott, 1974: fig. 2303. – Tiba, Kosuge, 1981, 8: 7.

Type localities: *Tritonofusus esychus*: off Bering Island, the Commander Islands, USFC sta. 4792, 54°36'15"N, 166°57'15"E, 132 m.

Types: lectotype of *Tritonofusus esychus* (Tiba, Kosuge, 1981 by indication "type", which is a valid designation) – USNM 110479.

Distribution: the Bering Sea, the Commander Islands, eastern Kamchatka, 105-300 m (Fig. 1).

Material: 5 lots (6 specimens). MIMB 5155, I cruise MIMB-PINRO, R/V *Krylatka*, Bering Sea, sta. 132, probe 361, Mednyj Island, depth 200-130 m, 16.09.1973 (specimen no. 1 dissected). MIMB 5156, I cruise MIMB-PINRO, R/V *Krylatka*, Bering Sea, sta. 74, probe 409, Bering Island, depth 150-300 m, 23.09.1973 (specimen no. 1 dissected). IO, R/V *Vityaz*, Bering Sea, Commander Islands, sta. 529, 54°25'N, 168°16'E, 110 m, 19.08.1950 (1 empty spm). ZMMU LC



FIG. 12. Shells of *Aulacofusus esychus.* A-E – *Aulacofusus esychus esychus*: A – holotype of *Tritonofusus esychus* Dall, 1907, courtesy of USNM; B – R/V *Vityaz*, sta. 529, C – no. 2, D – no. 1 (anatomy – Fig. 13, radula – Fig. 11H), E – shell from Olutorsk Bay of the Bering Sea (ZMMU LC 14811). F – holotype of *Aulacofusus esychus shikotanicus* Golikov et Gulbin. Scale bar – 2 cm.

РИС. 12. Раковины *Aulacofusus esychus.* A-E – *Aulacofusus esychus esychus*: A – голотип *Tritonofusus esychus* Dall, 1907, с разрешения USNM; B – H/C *Витязь*, ст. 529; C –№ 2, D –№ 1 (анатомия – Рис. 13, радула –11H), E – раковина из Олюторского залива Берингова моря (ZMMU LC 14811). F – голотип *Aulacofusus esychus shikotanicus* Golikov et Gulbin. Длина масштабного отрезка – 2 см.

15166, F/V *Donchak*, sta. 22, 49°35.8'N, 154°39'E, 200 m, 05.08.1987 (2 spms.). ZMMU LC14811, R/V *Gidrobiolog*, Bering Sea, Olutorsky Bay, TS 27, 60°04.3'N, 168°44.4'E, 127-130 m, 11.08.1988 (1 spm),

Description. Shell medium-thick, narrow fusiform, whorls slightly convex, flattened adapically, whorl profile nearly flat or even concave subsuturally; covered with pale-yellowish or light-olive periostracum (Fig. 12 A-E). Spiral sculpture of well defined flattened cords (up to 25 on penultimate

whorl), separated by narrow grooves. Each rib is subdivided by more shallow groove in two. Aperture rather narrow oval, its height with canal slightly less than half of shell height. Axial sculpture represented by incremental lines. Operculum oval with terminal nucleus. Measurements: **no. 1**. H 27.4 mm, h 14.8 mm, AL 9.3 mm.

Soft body. Head wide with short contracted tentacles; morphology of foot and mantle like in *A. herendeeni*. Proboscis long, coiled within rhynchodaeum (Fig. 13A, pr); odontophore and radula occupy approximately one third of proboscis length. **Radula** (Fig. 11H) is very similar to that of *A.herendeeni*. In **no. 1**, it is 6 mm long and 200 µm wide (2.15% AL), consisting of 98 teeth rows with 5 forming (Fig. 11H). Rachidian tricuspid, median cusp longest; lateral teeth bear three cusps in each row. Salivary glands very large, elongated; salivary ducts thick, especially when leaving salivary gland, slightly convoluted. **Stomach** spans almost 0.75 of whorl, with extremely long posterior mixing area (Fig. 13B, pma). Internal structure not studied because of improper fixation.

Differential diagnosis. *Aulacofusus esychus esychus* is most similar to *A. herendeeni*. Both species are described from the Bering Sea and share very similar pattern of spiral sculpture, formed by flattened spiral cords, some of which are subdivided by shallower groove. Types of both species are rather distinct in the profile of whorls and suture: while in *A. herendeeni* the whorls are strongly and evenly convex and suture is deeply impressed to nearly canaliculate, in *A. esychus esychus* the whorls are less convex and subsutural portion can be flattened or slightly concave. The suture is much shallower. Nevertheless these differences are rather subtle when a large series of specimens is analyzed. Some of the specimens are somewhat intermediate and can be attributed to species with difficulties, while there are stations, where the shells, corresponding to both species are found together (eg. off Commander Islands, R/V *Vityaz*, st. 529) (Fig. 9 B and 12 B). No significant differences in radulae or anatomy were found. At the moment we consider *Aulacofusus esychus esychus* as a separate subspecies, although more specimens and probably molecular data are necessary for final decision.

Higo *et al*. [1999] and Okutani [2000] recorded the species from northern Japan. Nevertheless, the specimen, illustrated in the latter publication (pl. 230, fig. 53) differs from the typical specimens from the Bering Sea in much less pronounced and more numerous spiral cords as well as in more slender shell. We can not finally conclude whether the species is distributed southward until Japan and presently exclude Japan and southern Kuriles from the distribution of the species.

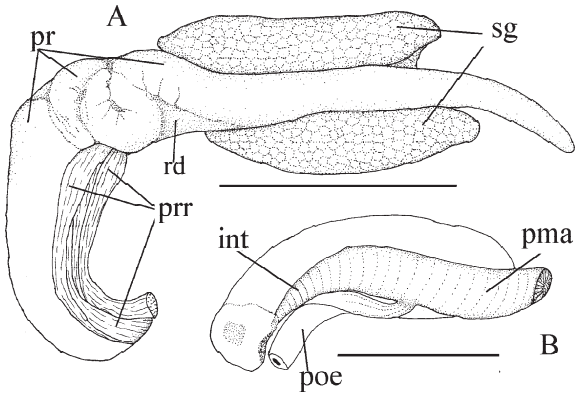


FIG. 13. Anatomy of digestive system of *A. esychus esychus* no. 1 (shell – Fig. 12D, radula – Fig. 11H). A – foregut, dorso-lateral view, B – stomach.

РИС. 13. Анатомия пищеварительной системы *A. esychus esychus* № 1 (раковина – Рис. 12D, радула – Рис. 11H). A – передний отдел, вид с дорзо-латеральной стороны; B – желудок.

Aulacofusus esychus shikotanicus (Golikov et Gulbin, 1977) (Fig. 12F)

Sipho (*Sipho*) *esychus shikotanicus* Golikov, Gulbin, 1977: 181, Fig. 3.

Aulacofusus esychus shikotanicus. – Kantor, Sysoev, 2006: 180, pl. 89 F.

Type locality: Shikotan Island, South Kurile Islands, 44°02.2'N, 147°29.2'E, 181-188 m.

Holotype: ZIN 28252.

Distribution: type locality.

Remarks. *A. esychus shikotanicus* is known from the single dead-collected holotype. It differs from *A. esychus* in a more elongated and attenuated shell and the character of spiral sculpture consisting of very flat spiral ribs (producing appearance of the shell, covered by shallow spiral grooves) that are not subdivided by narrower grooves in two. The status of this (sub)species is not straightforward. It was collected far from the type locality of the nominative subspecies and may represent either geographic subspecies or separate valid species.

Aulacofusus ombronius (Dall, 1919) (Figs. 14, 15, 16 A-C)

Colus (*Aulacofusus*) *ombronius* Dall, 1919: 315-316. – Dall, 1921: 94. – Dall, 1925: 13, pl. 3, fig. 5. – Kosuge, 1991: pl. 11, fig. 2.

Aulacofusus ombronius. – Kantor, Sysoev, 2005: 130. – Kantor, Sysoev, 2006: 180, pl. 89 C-D.

Type locality: between Bristol Bay and Pribilof Islands, Bering Sea, USFC sta. 3252, 57°22'20"N, 164°24'40"W, 55 m.

Holotype: USNM 213239.

Distribution: the East-Siberian, the Chukchi and the Bering seas, the Aleutian Islands, North and

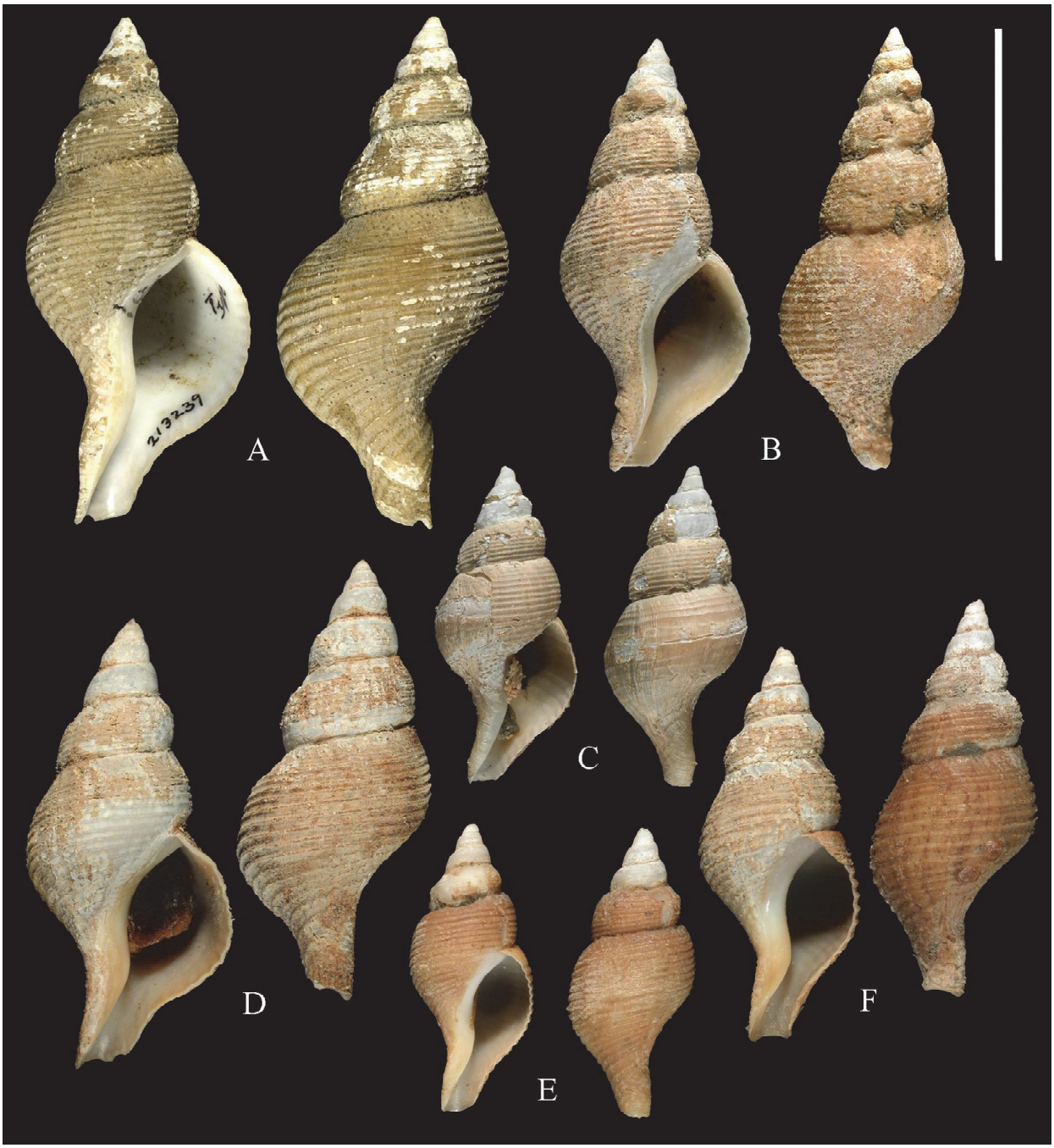


FIG. 14. Shells of *Aulacofusus ombronius*: A – holotype, courtesy of USNM; B-C – ZIN 56939 (B – no. 1, anatomy – Fig. 15, radula – Fig. 16A-B), D-F – "Vityaz" sta. 556 (D – no. 2, radula – Fig. 16C). Scale bar – 2 cm.

РИС. 14. Раковины *Aulacofusus ombronius*: A – голотип, с разрешения USNM; B-C – ZIN 56939 (B – № 1, анатомия – Рис. 15, радула – Рис. 16A-B), D-F – «Витязь» ст. 556 (D – № 2, радула – Рис. 16C). Длина масштабного отрезка – 2 см.

Middle Kurile Islands, 35-400 m [Golikov, Gulbin, 1977, and our data] (Fig. 1).

Material examined: 11 lots (120 specimens). ZIN 56939, R/V *Academic Korolev*, sta. 100, 68°22.55'N, 169°10.9'W, 38 m. 22.08.1988 (5 spms, no. 1 dissected). ZIN 60847, R/V *Professor Khromov*, Chukchi Sea, sta. 20, 69°00.27'N, 168°51.6'W, 54.3 m, 14.08.2004 (3 spm). ZIN 60849, R/V *Professor Khromov*, Chukchi Sea, sta. 85 B, 72°18.95'N, 175°29.54'W, 54.3 m, 21.08.2004 (1 spm). ZIN 55954, R/V *Academic Korolev*, sta. 67, 66°57.4'N, 166°47.1'W, 35 m. 14.08.1988 (11 spm). ZIN 55955, R/V *Academic Korolev*, sta. 100, 64°22.55'N, 169°10.9'W, 38 m, 22.08.1988 (3 spm). IO, R/V *Vityaz*, sta. 556, 63°49'N, 175°17'W, 77 m, 1.09.1950 (90 spm). IO, R/V *Vityaz*, sta. 577, 63°16'N, 179°57'E, 35 m, 8.09.1950 (1 spm). IO, R/V *Vityaz*, Bering Sea, sta. 584, 62°13'N, 179°8'E, 136 m, 11.09.1950 (1 spm). IO, R/V *Vityaz*, Bering Sea, sta. 1525, 63°24'N, 179°13'W, 79 m, 15.06.1952 (1 spm). IO, R/V *Academic Shuleikin*, Karaginsky Bay, 51 m, 10.09.1956 (1 spm). IO, R/V *Zhemchug*, Bering Sea, sta. 34, 54°38'N, 165°46.3'W, 400 m, 16.08.1963 (3 spm).

Description. Shell thick, elongated-fusiform, with slowly increasing whorls diameter and well-

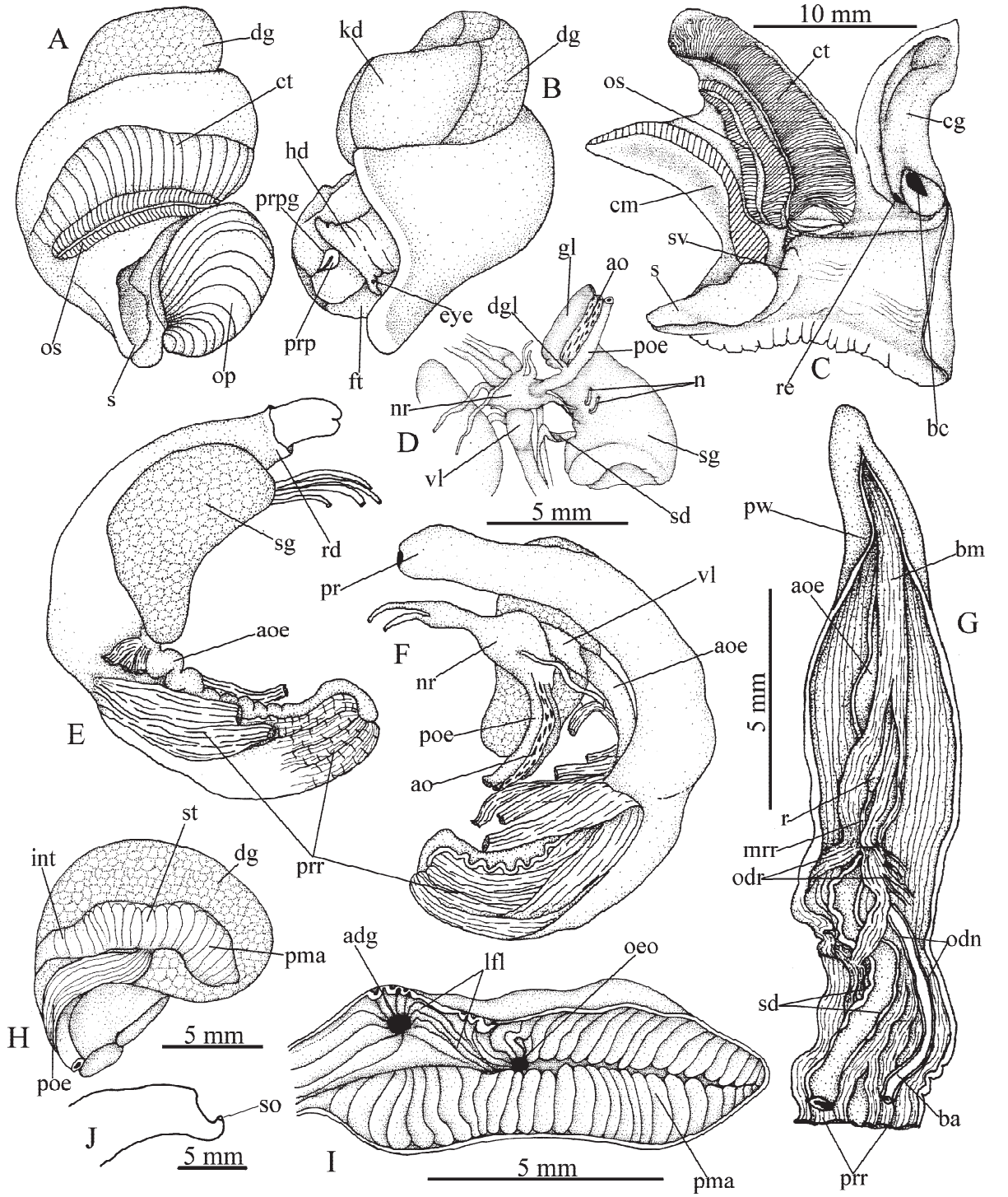


FIG. 15. Anatomy of *Aulacofusus ombronius* no. 1 (shell – Fig. 14B, radula – Fig. 16A-B): A – soft body, ventral view; B – soft body, dorsal view; C – mantle; D – nerve ring; E-F – foregut, right and left (left salivary gland removed) views; G – proboscis, opened dorsally; H – stomach, general view, I – opened stomach, J – apical part of penis.

РИС. 15. Анатомия *Aulacofusus ombronius* № 1 (раковина – Рис. 14B, радула – Рис. 16A-B): A – мягкое тело, вид с вентральной стороны, B – мягкое тело, вид с дорзальной стороны, C – мантия, D – окологлоточное нервное кольцо, E-F – передний отдел пищеварительной системы, вид справа и слева (левая слюнная железа удалена), G – хобот, вскрытый с дорзальной стороны, H – общий вид желудка, I – вскрытый желудок, J – апикальная часть пениса.

defined long siphonal canal, turned to left (Fig. 14). Periostracum olive or brownish. Spiral sculpture of sharp cords, separated by deep grooves, similar in width; to cords, 7 to 12 cords on penultimate whorl. Axial sculpture represented by incremental lines. Aperture narrow oval, its height with canal slightly exceeds half of shell height (up to 0.6 H).

Measurements: **no. 1**. H 42.2 mm, h 30.7 mm, AL 22.9 mm, female; **no. 2**. H 55.0 mm, h 39.2 mm, AL 29.4 mm, male.

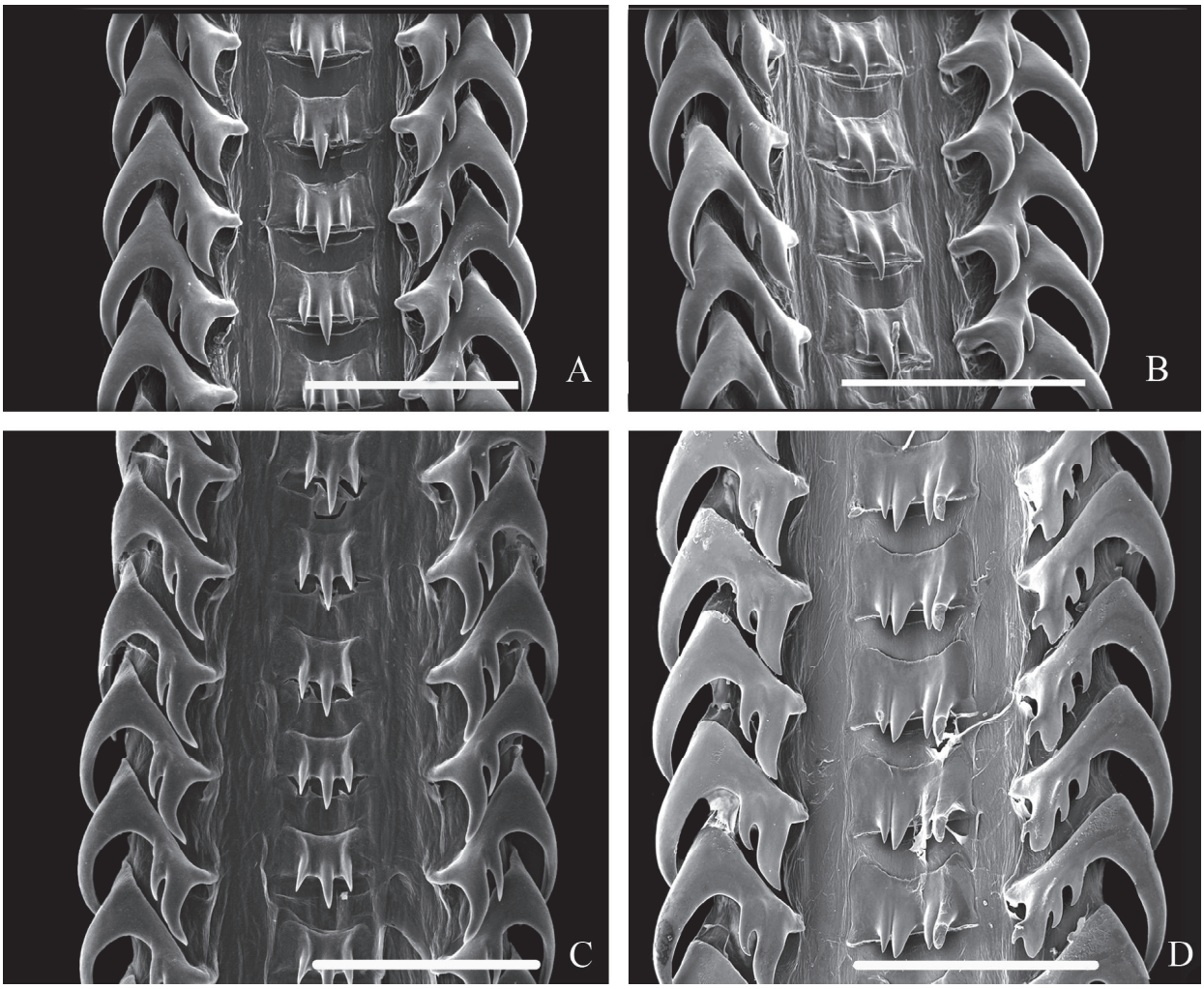


FIG. 16. Radulae of *Aulacofusus*: A-B – *A. ombronius* no. 1 (shell – Fig. 14B, anatomy – Fig. 15), C – *A. ombronius* no. 2 (shell – Fig. 14D), D – *A.* ***gulbini*** sp. n (shell – Fig. 17B, anatomy – Fig. 18). Scale bar – 200 μm.

РИС. 16. Радулы *Aulacofusus*: A-B – *A. ombronius* № 1 (раковина – Рис. 14B, анатомия – Рис. 15), C – *A. ombronius* № 2 (раковина – Рис. 14D), D – *A.* ***gulbini*** sp. n. (раковина – Рис. 17B, анатомия – Рис. 18). Длина масштабного отрезка 200 мкм.

Soft body: Two and a half whorls extracted. Mantle spans one whorl, kidney – 0.33, digestive gland and ovary – rest part of visceral mass (Fig. 15A-B). **Head** wide, with strongly contracted short tentacles with small black eyes at base. **Foot** folded transversely, propodium wide. **Operculum** oval with terminal nucleus slightly dislodged to left. **Mantle** length 1.5 times exceeds width (Fig. 15C), siphon moderately long. Osphradium long and slightly asymmetric, occupies 0.5 mantle length. Osphradium lamellae rather thick, brown, sitting on wide axis. Ctenidium occupies 0.7 mantle length, of multiple wide triangular lamellae. The width of ctenidium gradually diminishing from mantle edge inward (Fig. 15C, ct). Rectum covered with strongly developed capsule gland, opening with wide elongated female orifice at middle of mantle length (Fig. 15C, cg). Penis with small seminal papilla lacking fold of skin around it (Fig. 15J).

Digestive system. Long proboscis coiled within thin-walled rhynchodaeum (Fig. 15E-F, **pr**). Two proboscis retractors (**prr**) situated ventro-laterally approximately in middle of rhynchodaeum. Muscular fibers of proboscis retractors follow inside proboscis wall as in *A. brevicauda* and *A. herendeeni* (see above). Buccal mass comprises one third of proboscis length (Fig. 15G, bm). **Radula** of **no. 1** (Fig. 16A-B) is 400 μm wide (1.75% of AL). Rachidian teeth with rectangular base plate, tricuspid, median cusp longest, its base emanate closer to posterior margin than bases of median cusps, which emanates close to anterior margin of base. Lateral teeth tricuspid, with shortest middle cusp, similar to other species. Radula of **no. 2** is 400 μm wide (1.36% of AL); similar to no. 1 (Fig. 16C). Anterior oesophagus wide, flattened, following along ventral side of rhynchodaeum. Valve of Leiblein small, similar in diameter to oesophagus, distinguished by lighter coloration (Fig. 15F, **vl**). Yellowish and dense salivary glands (**sg**) situated on both sides of nerve

ring. Pair of nerves from nerve ring penetrate right salivary gland tissue from ventral side (Fig. 15D). Salivary ducts wide and thick-walled, slightly convoluted, following along anterior oesophagus (Fig. 15D-F, sd). Gland of Leiblein narrow tubular, small, opening by short duct into oesophagus immediately posterior to nerve ring (Fig. 15D, **dgl**). **Stomach** spans half of visceral whorl (Fig. 15H). Posterior mixing area comprises more than half of total stomach length (Fig. 15I, **pma**). Inner stomach structure is like in *A. periscelidus*. Opening of posterior duct of digestive gland not found.

Differential diagnosis. The species is closest to *A. brevicauda* and *A. herendeeni*, from which differs in longer siphonal canal and sharper spiral ribs, as well as rachidian tooth morphology (base of median cusp is shifted towards posterior margin of tooth base plate).

Aulacofusus ***gulbini*** sp. n.
(Figs. 16D, 17A-B, 18)

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Type material: Holotype (dissected): ZMMU Lc 17676, R/V *Gidrobiolog*, trawl 68, 47°03.4'N, 152°14.8'E, Simushir Island, depth 102-105 m, 1982. Paratype (dissected) – MIMB 27916, Lovushka rocks, sta. 13(25), 48°26.0'N, 153°51.8'E, depth. 490 m, rubbles, 09.07.1993.

Type locality: Simushir Island, 47°03.4'N, 52°14.8'E, depth 102-105 m.

Distribution: Middle Kurile Islands, 102-490 m.

Description. **Shell** large, rather thin-walled and fragile, narrow-fusiform, with high spire, of 9+ convex whorls (Fig. 17 A-B). Protoconch of 2+ smooth convex whorls, mamillate. Spiral sculpture of wide elevated and rounded spiral cords, regularly (in holotype) or irregularly (paratype) alternating in width and height on spire whorls and upper part and periphery of last whorl, 15 on penultimate whorl. On canal cords more narrow and equal in width, about 10-12. Axial sculpture of incremental lines. Aperture low, about 0.4 of SL, elongate oval, strongly constricted on passing to siphonal canal. Outer lip convex, slightly flattened in middle part (more pronounced in paratype). Siphonal canal medium-long for the genus, narrow straight. Columellar margin weakly concave, nearly straight. Columellar and parietal margins with narrow callus. Shell colored rose-beige in holotype and whitish in paratype, covered with thin yellowish periostracum. Operculum with terminal nucleus, comprising about 0.6 aperture length.

[Диагноз. Раковина крупная, довольно тонкостенная и хрупкая, узко веретеновидная, с высоким завитком, состоящая из 9+ выпуклых оборотов (Рис. 17 A-B). Протоконх состоит из 2+ гладких оборотов, сосковидный. Спиральная скульптура представлена широкими приподнятыми и закругленными ребрами, правильно (у голотипа) или неправильно (у паратипа) чередующимися с невысокими узкими ребрами на оборотах завитка и в средней части последнего оборота; общее число спиральных элементов на предпоследнем обороте около 15. На сифональном канале ребра становятся одинаковыми по ширине и степени выпуклости, число их на канале 10-12. Осевая скульптура представлена линиями роста. Устье невысокое, около 0,4 высоты раковины, удлиненно-овальное, сильно сужающееся при переходе в сифональный канал. Наружная губа устья выпуклая, слегка уплощенная в средней части (более выражено у паратипа). Сифональный вырост умеренно длинный для рода, узкий, прямой. Колюмелярный край устья слабо вогнутый, почти прямой. Колюмеллярный и париетальный края устья с узким каллусом. Раковина голотипа розовато-бежевая, паратипа – беловатая, покрыта тонким желтоватым периостракумом. Крышечка с терминальным ядром, занимает около 0,6 высоты устья.]

Measurements: **holotype**: H 73.7 mm, h 42.9 mm, AL 29.2 mm; **paratype**: H 60.9 mm, h 38.2 mm, AL 26.6 mm.

Soft body. **Head** wide with thick contracted tentacles, foot folded transversely, with wide propodium (Fig. 18A). **Mantle** nearly square in form (Fig. 18B), osphradium slightly wider and shorter than ctenidium. Capsule gland large, occupying slightly over half of mantle length; female orifice large. Hypobranchial gland represented by low epithelial folds.

Digestive system. Proboscis long, coiled within rhynchodaeum (Fig. 18C). Buccal mass occupies slightly over one third of proboscis length. Proboscis retracrors paired, attach at base of proboscis. **Radula** of paratype is 400 μm wide (1.5% of AL). Rachidian teeth with broad basal plate and four unequal cusps. Lateral teeth are different in left and right longitudinal row: on left side tricuspid, with smallest median cusp; on right side with five cusps, four major ones and one additional small on innermost major cusp (Fig. 16D). Radula of holotype 400 μm wide (1.37% of AL), all teeth tricuspid like in other representatives of *Aulacofusus*. Salivary glands macerated, salivary ducts thick and strongly coiled, passing parallel to anterior oesophagus (Fig. 18C, **sd**). Gland of Leiblein moderately developed; valve of Leiblein small, rounded, swollen. **Stomach** spans half of whorl, with long posterior mixing area comprising half of stomach length. Posterior mixing area lined with high transverse folds. Anterior duct of digestive gland opens close to oesophageal opening, area between oesophageal and anterior duct openings lined with several low longitudinal folds. Lateral sulcus is present on inner stomach wall.

Etymology. The species is named in honor of Russian malacologist and collector of paratype specimen Dr. Vladimir V. Gulbin (Institute of Marine Biology).

Differential diagnosis. *A.* ***gulbini*** is most similar to *A. coerulescens* and *A. hiranoi* (beneath



FIG. 17. Shells of *Aulacofusus*: A – holotype of *A.* ***gulbini*** sp. n., B – paratype of *A.* ***gulbini*** sp. n. (anatomy – Fig. 18, radula – Fig. 16D); C – holotype of *A. coerulescens* Kuroda et Habe, 1961 in Habe, 1961; D – holotype of *Colus calameus hiranoi* Shikama, 1962; E – holotype of *Tritonofusus calamaeus* Dall, 1907; F – holotype of *Colus* (*Aulacofusus*) *calathus* Dall, 1919. Scale bar – 3 cm.

РИС. 17. Раковины *Aulacofusus*: A – голотип *A.* ***gulbini*** sp. n., B – паратип *A.* ***gulbini*** sp. n. (анатомия – Рис. 18, радула – Рис. 16D); C – голотип *A. coerulescens* Kuroda et Habe, 1961 in Habe, 1961; D – голотип *Colus calameus hiranoi* Shikama, 1962; E – голотип *Tritonofusus calamaeus* Dall, 1907; F – голотип *Colus* (*Aulacofusus*) *calathus* Dall, 1919. Длина масштабного отрезка – 3 см.

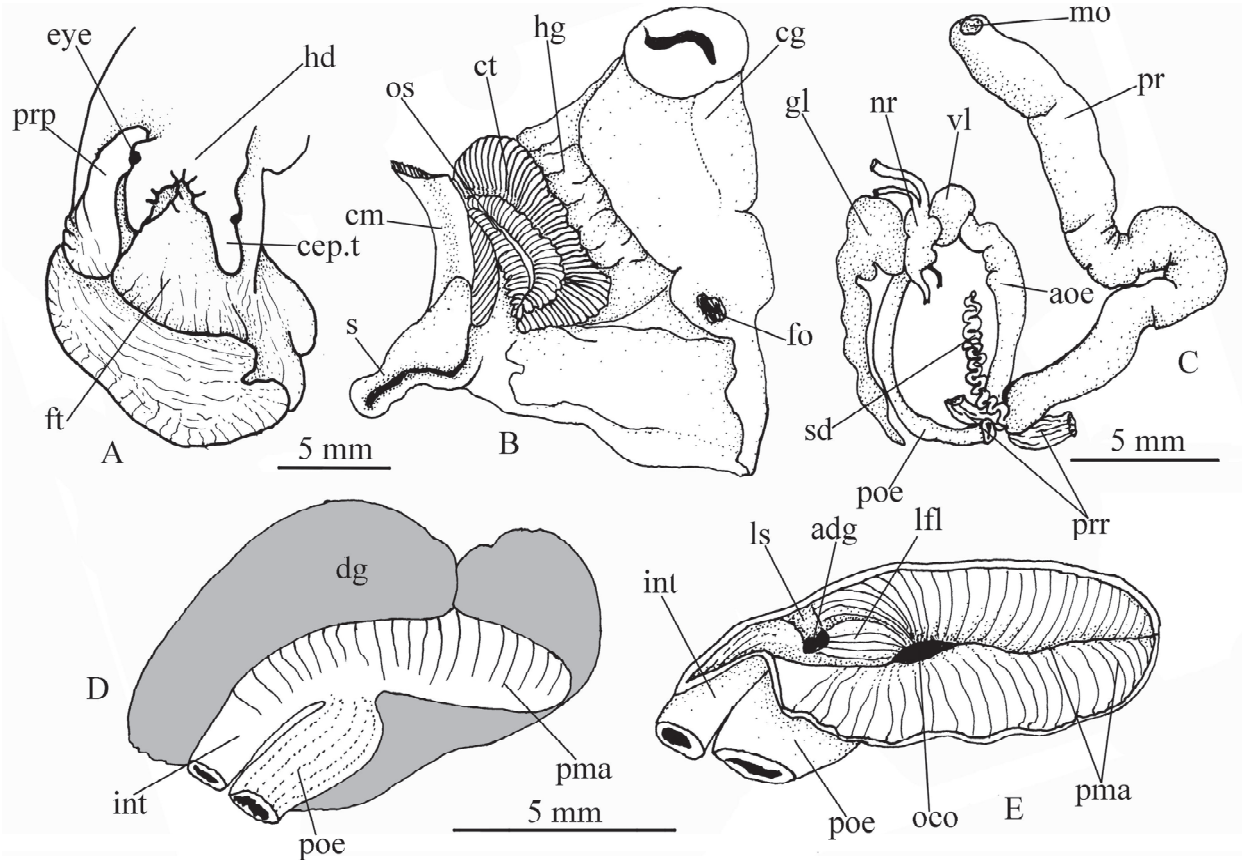


FIG. 18. Anatomy of *Aulacofusus* ***gulbini*** sp. n., paratype (shell – Fig. 17B, radula – Fig. 16D): A – cephalopodium, front view; B – mantle; C – foregut (salivary glands not shown); D – stomach, general view; E – opened stomach.

РИС. 18. Анатомия *Aulacofusus* ***gulbini*** sp. n., паратип (раковина – Рис. 17B, радула – Рис. 16D): A – цефалоподиум, фронтальный вид; B – мантия; C – передний отдел пищеварительной системы (слюнные железы не изображены); D – общий вид желудка; E – вскрытый желудок.

described). Both species possess a similar character and number of the spiral cords on the shell, but lower spire, and achieve smaller adult size than *A*. ***gulbini***. They are subtropical, while *A*. ***gulbini*** is known from Middle Kurile Islands. The new species is also close to *A*. *periscellidus* in possessing high spiral cords, but in *A*. ***gulbini*** they are more numerous, lower and irregularly situated.

Aulacofusus calathus Dall, 1919 (Fig. 17F)

Colus (*Aulacofusus*) *calathus* Dall, 1919: 317. – Dall, 1921: 94, pl. 8, fig. 2. – Kosuge, 1991, pl. 10, fig. 6.

Type locality: USFC sta. 2853, near the Shumagin Islands, Alaska, 56°00'00"N, 154°20'00"W, 291 m.

Holotype: USNM 106684.

Distribution: type locality.

Remark. The species is not present in our material and neither anatomy nor radula were studied. Conchologically it seems to be rather similar to *Aulacofusus coerulescens* and *A*. ***gulbini*** sp. n., but the type of *A*. *calathus* is dead collected and has strongly worn shell, hampering identification. The species attains 26 mm in height (holotype) that makes it the smallest known *Aulacofusus*. In the absence of the data on radula and anatomy we consider it conventionally as *Aulacofusus*.

Aulacofusus hiranoi (Shikama, 1962) (Fig. 17D)

Colus calameus hiranoi Shikama, 1962: 43-44, pl. 2 figs. 4 a-b.
Colus calamaeus Dall. – Habe, Ito, 1965: pl. 14, fig. 15 (sensu Habe, Ito, 1965, non Dall, 1907).
Colus hiranoi. – Tiba, Kosuge, 1981: 13-14.
Colus (*Aulacofusus*) *hiranoi*. – Higo *et al*., 1999: 229. – Higo *et al*., 2001: 74, fig. G2584.
Aulacofusus hiranoi. – Hasegawa, 2009: 299, figs. 202-203.

Type locality: off Choshi (Chiba prefecture, central Honshu).

Holotype: KPM-NG0103982.

Distribution: central and northeastern Honshu to northern Hokkaido, 200-1650 m [Higo *et al*., 1999; Hasegawa, 2009].

Remarks. The species is not present in our material; although seems to be not very rare [Hasegawa, 2009] within its range. Contrary to other

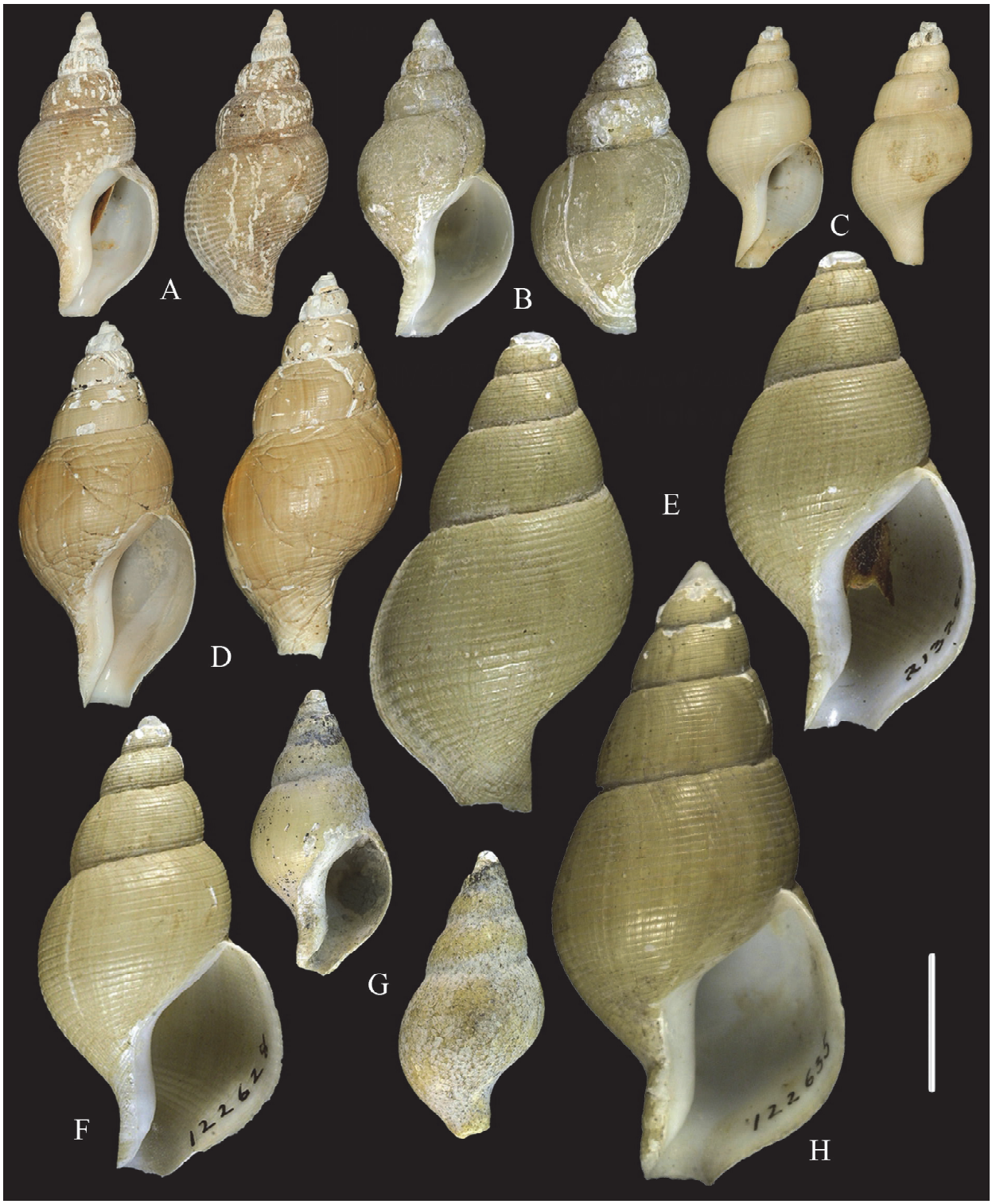


FIG. 19. Species excluded from *Aulacofusus*: A – holotype of *Colus* (*Aulacofusus*) *barbarinus* USNM 334438; B – holotype of *Colus* (*Aulacofusus*) *bristolensis* USNM 213254; C – holotype of *A.* (*Limatofusus*) *dimidiatus* USNM 213338; D – holotype of *Aulacofusus* (*Limatofusus*) *morditus* USNM 222599; E – holotype of *Colus* (*Aulacofusus*) *halidonus* USNM 213250; F – holotype of *Aulacofusus* (*Limatofusus*) *trophius* USNM 122628; G – holotype of *Aulacofusus* (*Limatofusus*) *halimeris* USNM 207192. H – lectotype of *Chrysodomus* (*Sipho*) *acosmius*, USNM 122635. Photos – courtesy of USNM. Scale bar – 1 cm.

РИС. 19. Виды, исключенные из состава *Aulacofusus*: A – голотип *Colus* (*Aulacofusus*) *barbarinus* USNM 334438; B – голотип *Colus* (*Aulacofusus*) *bristolensis* USNM 213254; C – голотип *A.* (*Limatofusus*) *dimidiatus* USNM 213338; D – голотип *Aulacofusus* (*Limatofusus*) *morditus* USNM 222599; E – голотип *Colus* (*Aulacofusus*) *halidonus* USNM 213250; F – голотип *Aulacofusus* (*Limatofusus*) *trophius* USNM 122628; G – голотип *Aulacofusus* (*Limatofusus*) *halimeris* USNM 207192; H – лектотип *Chrysodomus* (*Sipho*) *acosmius*, USNM 122635. Фото публикуются с разрешения USNM. Длина масштабного отрезка – 1 см.

species of *Aulacofusus*, *A. hiranoi* possess rather thick periostracum with characteristic axial lamellae (although retaining usually in the interspaces between spiral cords). Hasegawa [2009] mentioned, that "juvenile specimens smaller than ca 1.5 cm SL were found attached to pieces of sunken-wood, and similar ecology has been observed in *A. coerulescens* (Kuroda and Habe in Habe, 1961)". The spiral sculpture pattern is similar to many species of *Aulacofusus* and in the absence of the data on its anatomy and radula we tentatively treat the species as a member of the genus. It worth mentioning that *A. hiranoi* also bears resemblance to wood-associated species, that are presently included in the genus *Eosipho* Thiele, 1929, for example with *Eosipho aldermenensis* (Powell, 1971). It differû from other *Eosipho* species in the absence of axial ribs on early teleoconch whorls.

Aulacofusus coerulescens Kuroda et Habe, 1961 in Habe, 1961 (Fig. 17C)

Aulacofusus coerulescens Kuroda et Habe, 1961 in Habe, 1961: 91, pl. 29, fig.10.
Colus (*Aulacofusus*) *coerulescens*. – Higo *et al*., 1999: 229. – Higo *et al*., 2001: 74, fig. G2582. – Okutani, 2000: 465, pl. 231, fig. 57.

Type locality: off cape Ashizuri, southwestern Shikoku; 100-200 m.

Holotype: National Museum of Nature and Science, NSMT-Mo 49776.

Distribution: Tosa Bay (southern Shikoku), off Kii peninsula, Enshu-nada (off Shizuoka prefecture), 100-200 m [Higo *et al*., 1999].

Remarks. The species is not present in our material; it is close to *A. hiranoi* in a shell shape and a spiral sculpture character. We attribute it to *Aulacofusus* pending examination of anatomy.

Aulacofusus calamaeus (Dall, 1907) (Fig. 17E)

Tritonofusus calamaeus Dall, 1907:158. – Kosuge, 1991, pl. 12, fig. 6.
Colus (*Aulacofusus*) *calameus*. – Dall, 1921: 94, pl. 10, fig. 5 (misspelling).
Colus (*Aulacofusus*) *calamaeus* – Higo et al., 1999: 229.
Colus calamaeus. – Kantor, Sysoev, 2005: 130. – 2006: 182, pl. 90 I-J.

Type locality: USFC, R/V *Albatross* sta. 4797, off Avacha Bay, Kamchatka, 52°37'30"N, 158°50'E, 1247 m.

Syntypes: USNM 110478.

Distribution: Tosa Bay (700-720 m), northeastern Honsu and northwards, southeastern Kamchatka, the Kurile Islands, the Okhotsk Sea, 200-1300 m [Higo *et al*., 1999].

Remarks. The species is not present in our material. The spiral sculpture of *A. calamaeus* is close to that of *A. herendeeni*, but there are fewer ribs on the penultimate whorl, and height of the last whorl is relatively higher. In the absence of the data on radula and anatomy we consider it conventionally as *Aulacofusus*.

Excluded species

In this section we enumerate and briefly comment on species that were either described, or ever attributed to *Aulacofusus*. The species are listed chronologically under original binomen.

Chrysodomus roseus Dall, 1877

Chrysodomus roseus Dall, 1877: 2.
Colus (*Aulacofusus*) *roseus*. – Dall, 1919: 24. – Dall, 1921: 94. – 1925: 13, pl. 26, fig. 2.
Aulacofusus roseus. – Kantor, Sysoev, 2005: 130. – Kantor, Sysoev, 2006: 181, pl. 89 I-J.

Type locality: Chukchi Sea, Alaska, Cape Lisburne, 18-27 m.

Holotype: USNM 108985.

Distribution: the Chukchi, the Bering, the Okhotsk and the Japan seas, Kamchatka, the Kurile Islands, Sakhalin, 42-400 m.

Remark. The species is transferred to *Retifusus* [Kosyan, 2007; Kosyan, Kantor, 2009].

Chrysodomus (*Sipho*) *acosmius* Dall, 1891 (Fig. 19 H)

Chrysodomus (*Sipho*) *acosmius* Dall, 1891: 188.
Colus (*Aulacofusus*) *acosmius*. – Higo *et al*., 1999: 229.
Anomalosipho acosmius. – Kantor, Sysoev, 2006: 178, pl. 87G.

Type locality: USFC, R/V *Albatross* sta. 3329, Unalaska Island, Bering Sea, 53°56'50"N, 167°08'15"W, 730 m.

Lectotype [Oldroyd, 1927]: USNM 122635.

Distribution: Bering Sea; 145-800 m [Higo *et al*., 1999; Golikov *et al*., 2001].

Remarks. Higo *et al*. [1999] attributed the species to *Aulacofusus*. The species strongly differs from typical *Aulacofusus* in much broader thin shell with weaker spiral sculpture. The generic position of the species remains unclear. It is also conchologically similar to two deep-water species described by Dall [1919]: *halidonus* and *trophius* (see below). These species share rather broad thin-walled shell with slightly attenuated narrow canal, reflected outer aperture lip and similar pattern of spiral sculpture of low but distinct cords, covering entire shell surface. Nothing is known on the anatomy of the species, and it (together with other mentioned species) may belong to separate still unnamed genus.

Colus (*Limatofusus*) *tahwitanus* Dall, 1918 (Fig. 20B)

Colus (*Limatofusus*) *tahwitanus* Dall, 1918: 228. – Dall, 1921: 95.

Type locality: USFC, R/V *Albatross* sta. 3076, off Tahwit Head, Washington, 47°46'00''N, 125°10'00"W, 326 m.

Lectotype: USNM 122632A.

Distribution: type locality.

Remark. The species is most likely related to *Latisipho* due to characteristic shell shape with short canal and low spire. This is a type species of *Limatofusus,* thus the name is the junior subjective synonym of *Latisipho* Dall, 1916.

Plicifusus (*Aulacofusus*) *rhyssoides* Dall, 1918

Plicifusus (*Aulacofusus*) *rhyssoides* Dall, 1918: 227.

Plicifusus rhyssoides. – Kantor, Sysoev, 2006: 198, pl. 101 I-J.

Plicifusus rhyssus (Dall, 1907): Kosyan, Kantor, 2012: 77-79, Figs. 1, 15 C-F, 17; 18, 19.

Type locality: Rikuzen, Japan.

Syntypes: USNM 274069, one syntype in Hirase collection.

Distribution: the Bering Sea, the Sea of Okhotsk, Kurile Islands, Northern part of the Sea of Japan; Eastern coast of Japan, 52-500 m.

Remark. The species is a junior synonym of *Plicifusus rhyssus* [Kosyan, Kantor, 2012].

Colus (*Aulacofusus*) *barbarinus* Dall, 1919 (Figs. 19A-B)

Colus (*Aulacofusus*) *barbarinus* Dall, 1919: 316. – Dall, 1921: 94. – Dall, 1925: 12, pl. 2, fig. 5. – Kosuge, 1991, pl. 11, fig. 1.

Colus (*Aulacofusus*) *bristolensis* Dall, 1919: 316. – Dall, 1921: 94. – Dall, 1925: 12, pl. 2, fig. 8. – Kosuge, 1991, pl. 11, fig. 3. **syn.nov.**

Type localities: *Aulacofusus barbarinus* – USFC, R/V *Albatross* sta. 3282, Bering Sea, off Khudubine Island, 56°30'45"N, 161°50'15"W, 97 m; *Aulacofusus bristolensis* – USFC, R/V *Albatross* sta. 3252, Bering Sea, between Bristol Bay and Pribilof Islands, 57°22'20"N, 164°24'40"W, 54 m.

Types: holotype of *Aulacofusus barbarinus* – USNM 334438; holotype of *Aulacofusus bristolensis* – USNM 213254.

Distribution: type localities.

Remark. The species is differnig from typical *Aulacofusus* by less elongated shell shape, shorter siphonal canal and smaller adult size. In the absence of the data on radula and anatomy we consider it conventionally as *Colus*.

Type specimens of *A. barbarinus* and *A. bristolensis* possess very similar shell shape and sculpture, so we consider them as synonyms.

Aulacofusus (*Limatofusus*) *dimidiatus* Dall, 1919 (Fig. 19C)

Aulacofusus (*Limatofusus*) *dimidiatus* Dall, 1919: 319-320. – Dall, 1921: 95.

Colus (*Aulacofusus*) *dimidiatus*. – Dall, 1925: 12, pl. 2, fig. 3.

Type locality: USFC, R/V *Albatross* sta. 3346, off Tillamook Bay, Oregon, 45°30'00''N, 124°52'00"W, 1437 m.

Holotype: USNM 213338.

Distribution: type locality.

Remark. The species possess small adult sizes and differs from typical *Aulacofusus* by shell shape. Dall noted, that spiral sculpture consisting of peculiar crenulated grooves disposed irregularly on shell surface, "is different from that of any other of the group I have been able to examine" [1919, p. 320]. It is possibly related to *Mohnia*.

Colus (*Limatofusus*) *halidonus* Dall, 1919 (Fig. 19E)

Aulacofusus (*Limatofusus*) *halidonus* Dall, 1919: 318. – Dall, 1921: 94.

Colus (*Aulacofusus*) *halidonus*.– Dall, 1925: 13, pl. 1, fig. 12.

Type locality: USFC, R/V *Albatross*, sta. 3343, off Destruction Island, Washington, 47°40'40"N, 125°20'00"W, 944 m.

Holotype: USNM 213250.

Distribution: type locality and the Aleutian Trench (53°45.5'N, 163°38'W), 800-944 m (our data).

Remark. We found several specimens of *A. halidonus* in the collections of IO and were able to make dissections. Based on anatomical and radular data (unpublished), we exclude it from *Aulacofusus*. The generic position is unclear [see remarks to *Chrysodomus* (*Sipho*) *acosmius*].

Aulacofusus (*Limatofusus*) *halimeris* Dall, 1919 (Fig. 19G)

Aulacofusus (*Limatofusus*) *halimeris* Dall, 1919: 320. – Dall, 1921: 95.

Colus (*Aulacofusus*) *halimeris*.– Dall, 1925: 13, pl. 2, fig. 7.

Colus (*Limatofusus*) *halimeris*. – Kosuge, 1991, pl. 12, fig. 4.

Type locality: USFC, R/V *Albatross* sta. 4248, in Eastern Passage, near the Stikine River, southeastern Alaska, 55°33'00"N, 132°24'00"W, 128 m.

Holotype: USNM 207192.

Distribution: type locality.

Remark. The species possesses small adult sizes and differs from typical *Aulacofusus* by shell shape and sculpture of inconspicuous spiral ribs; possibly related to *Colus*.

Aulacofusus (*Limatofusus*) *morditus* Dall, 1919 (Fig. 19D)

Aulacofusus (*Limatofusus*) *morditus* Dall, 1919: 319. – Dall, 1921: 95. – Dall, 1925: 13, pl. 1, fig. 1.

Type locality: USFC, R/V *Albatross* sta. 4198, in the Gulf of Georgia, 366 m.

Holotype: USNM 222599.

Distribution: type locality.

Remark. The species differs from typical *Aulacofusus* by shell shape with short siphonal canal and low spire. Conchologically it is similar to *Latisipho hallii*, widely distributed in northern Pacific, including American Coast (type locality). In the absence of available material we tentatively place the species in *Latisipho*.

Aulacofusus (*Limatofusus*) *trophius* Dall, 1919 (Fig. 19F)

Aulacofusus (*Limatofusus*) *trophius* Dall, 1919: 319. – Dall, 1921: 95, pl. 10, fig. 9.

Colus (*Aulacofusus*) *trophius*. – Dall, 1925: 14, pl. 1, fig. 10.

Type locality: USFC, R/V *Albatross* sta. 3071, off Sea Lion Rock, coast of Washington, 47°29'00"N, 125°33'30"W, 1253 m.

Holotype: USNM 213332.

Distribution: type locality.

Remark. The species strongly differs from typical *Aulacofusus* by much broader thin shell with very poorly pronounced spiral sculpture. The generic position of the species remains unclear [see remarks to *Chrysodomus* (*Sipho*) *acosmius*].

Aulacofusus (*Limatofusus*) *pulcius* Dall, 1919 (Fig. 20C-D)

Fusus (*Sipho*) *turritus* Aurivillius, 1885, non *Sipho turritus* Schafhäutl, 1863: 365-366, 379-380, pl. 13, figs. 4, 5, 13.

Aulacofusus (*Limatofusus*) *pulcius* Dall, 1919: 318. – Dall, 1921: 95.

Colus (*Aulacofusus*) *pulcius*. – Dall, 1925: 13, pl. 3, fig. 1.

Colus (*Aulacofusus*) *capponius* Dall, 1919: 317. – Dall, 1921: 94. – Dall, 1925: 12, pl. 3, fig. 2. – Kosuge, 1991, pl. 10, fig. 2. **syn.nov.**

Aulacofusus pulcius. – Kosuge, 1991, pl. 10, fig. 8.

Colus pulcius. – Kantor. Sysoev, 2005: 131. – Kantor, Sysoev, 2006: 184, pl. 91 E-E'.

Aulacofusus capponius. – Kantor, Sysoev, 2005: 129. – Kantor, Sysoev, 2006: 179, pl. 88 I-I'.

Type localities: *Colus* (*Aulacofusus*) *pulcius* – Arctic Ocean, North of Bering Strait; *Colus* (*Aulacofusus*) *capponius* – Bering Strait, near Port Clarence.

Types: holotype of *F.* (*S.*) *turritus* – SMNH Type-1559; holotype of *C.* (*A.*) *pulcius* – USNM 223799; holotype of *C.* (*A.*) *capponius* – USNM 108980.

Distribution: northern Bering and souhern Chuckhi seas.

Remark. The species was considered as *Colus* by Kantor and Sysoev [2005, 2006]; our data on anatomy and radula morphology support this opinion. Type specimens of *C.* (*A.*) *pulcius* and *C.* (*A.*) *capponius* possess similar shell shape and sculpture and originate from one region, so we consider them as synonyms.

Colus (*Aulacofusus*) *sapius* Dall, 1919 (Fig. 20E)

Colus (*Aulacofusus*) *sapius* Dall, 1919: 317. – Dall, 1921: 94. – Dall, 1925: 14, pl. 2, fig. 10, pl. 26, fig. 9. – Kosuge, 1991, pl. 15, fig. 6.

Type locality: USFC, sta. 2859, southwest of Sitka, Alaska, 55°20'00"N, 136°20'00"W, 2869 m.

Holotype: USNM 122597.

Distribution: type locality and off Unimak Island, the Aleutians (53°29.6'N, 163°21.9'W), 2869-2930 m.

Remarks. The species possesses small shell (about 20 mm) and operculum with spiral nucleus. We dissected several specimens from the collections of IO, and found the anatomy and radula structure strongly differing from all ever studied representatives of *Aulacofusus*. The species more likely belongs to *Pararetifusus* due to small size, operculum, shell sculpture and anatomy.

Aulacofusus (*Limatofusus*) *severinus* Dall, 1919 (Fig. 20A)

Aulacofusus (*Limatofusus*) *severinus* Dall, 1919: 320. – Dall, 1921: 95.

Colus (*Aulacofusus*) *severinus*. – Dall, 1925: 14, pl. 1, fig. 11.

Type locality: USFC, R/V *Albatross* sta. 3669, Bay of Monterey, California, 36°47'00''N, 122°11'00"W, 508 m.

Holotype: USNM 225225.

Distribution: type locality.

Remark. The species is most likely related to *Latisipho* due to characteristic shell shape with short canal, high aperture and low spire.

Aulacofusus (*Limatofusus*) *timetus* Dall, 1919 (Fig. 20G)

Aulacofusus (*Limatofusus*) *timetus* Dall, 1919: 318. – Dall, 1921: 95.

Colus (*Limatofusus*) *timetus*. – Dall, 1925: 12, pl. 1, fig. 2.

Colus (*Limatofusus*) *timetus*. – Kosuge, 1991, pl. 23, fig. 4.

Type locality: USFC, R/V *Albatross* sta. 3333, off Iliuliuk Harbor, Captains Bay, Unalaska, Aleutian Islands, 53°53'35"N, 166°30'15"W, 35 m.

Holotype: USNM 213337.



FIG. 20. Species excluded from *Aulacofusus*: A – holotype of *Aulacofusus* (*Limatofusus*) *severinus* USNM 225225; B – holotype of *C.* (*L.*) *tahwitanus* USNM 122632A; C – holotype of *Aulacofusus*(*Limatofusus*) *pulcius* USNM 223799; D – holotype of *Colus* (*Aulacofusus*) *capponius* USNM 108980; E – holotype of *Colus* (*Aulacofusus*) *sapius* USNM 122597; F – holotype of *A.* (*L.*) *trombinus* USNM 213332; G – holotype of *Aulacofusus* (*Limatofusus*) *timetus* USNM 213337. Photos – courtesy of USNM. Scale bar – 2 cm.

РИС. 20. Виды, исключенные из состава *Aulacofusus*: A – голотип *Aulacofusus* (*Limatofusus*) *severinus* USNM 225225; B – голотип *C.* (*L.*) *tahwitanus* USNM 122632A; C – голотип *Aulacofusus*(*Limatofusus*) *pulcius* USNM 223799; D – голотип *Colus* (*Aulacofusus*) *capponius* USNM 108980; E – голотип *Colus* (*Aulacofusus*) *sapius* USNM 122597; F – голотип *A.* (*L.*) *trombinus* USNM 213332; G – голотип *Aulacofusus* (*Limatofusus*) *timetus* USNM 213337. Фото публикуются с разрешения USNM. Длина масштабного отрезка – 2 см.

Distribution: type locality.

Remark. The species is probably related to *Latisipho* due to characteristic shell shape with short canal and low spire.

Colus (*Aulacofusus*) *adonis* Dall, 1919

Colus (*Aulacofusus*) *adonis* Dall, 1919: 316.

Colus (*Anomalosipho*) *adonis*. – Dall, 1925: 11, pl. 1 fig. 8.

Type locality: USFC, R/V *Albatross* sta. 5053, in Suruga Gulf, Japan, mud, 34°49'20''N, 138°40'15"E, 919 m.

Holotype: USNM 205212.

Remark. This species is a type species of *Kanamarua* Kuroda, 1951.

Aulacofusus (*Limatofusus*) *trombinus* Dall, 1919 (Fig. 20F)

Aulacofusus (*Limatofusus*) *trombinus* Dall, 1919: 321. – Dall, 1921: 94. – Dall, 1925: 14, pl. 2, fig. 6.

Aulacofusus trombinus. – Kosuge, 1991, pl. 11, fig. 7.

Type locality: USFC, R/V *Albatross* sta. 3253, in Bering Sea, off the Pribilof Islands, 57°05'50"N, 164°27'15"W, 66 m.

Holotype: USNM 122597.

Distribution: type locality.

Remarks. The species possesses rather distinct axial folds and is probably related to *Retifusus* or *Retimohnia*.

Colus (*Aulacofusus*) *georgianus* Dall, 1921

Colus (*Aulacofusus*) *georgianus* Dall, 1921: 95, pl. 8, fig. 3 [section *Limatofusus*].

Colus georgianus. – Abbot, 1974: 211, fig. 2318. – Tiba, Kosuge, 1981: 9.

Aulacofusus georgianus. – Kosuge, 1991, pl. 24, fig. 1. – Golikov, Gulbin, 1977: 182.

Colus (*Aulacofusus*) *georgianus*. – Golikov, Sirenko, 1998: 114, pl. 8, fig. F.

Latisipho georgianus. – Kantor, Sysoev, 2005: 132. – Kantor, Sysoev, 2006: 185, pl. 92 A-B.

Type locality: USFC, R/V *Albatross*, sta. 2863, Gulf of Georgia, Canada, 48°58'00''N, 123°10'00"W, 123 m.

Holotype: USNM 122633.

Distribution: the Kurile Islands, the Sea of Okhotsk, the Bering Sea, from Alaska to northern California; 2-1112 m.

Remark. The species is reduced to a junior synonym of *Latisipho hallii* Dall [Kosyan, 2006a].

Volutopsius minor Dall, 1925

Volutopsius minor Dall, 1925: 30-31, pl. 32, fig. 3; – Kosuge, 1991, pl. 26, fig. 5.

Helicofusus minor. – Okutani *et al*., 1988: 106.

Plicifusus (*Helicofusus*) *minor*. – Higo *et al*., 1999: 231.

Colus minor. – Alexeev, 2003: 84.

Aulacofusus minor. – Kantor, Sysoev, 2005: 139. – Kantor, Sysoev, 2006: 180, pl. 89 A.

Type locality: USFC, R/V *Albatross* sta. 5009.Aniwa Bay, Sakhalin Island, Okhotsk Sea, 46 m,

Lectotype (Tiba, Kosuge, 1981 by indication "type", which is a valid designation): USNM 110779.

Distribution: Sea of Okhotsk, Sakhalin, northern part of the Sea of Japan, 46-260 m.

Remark. The species was considered in genus *Aulacofusus* by Kantor and Sysoev [2005, 2006], and in *Colus* by Alexeev [2003]. Based on anatomical and radular morphology, the species was transferred to *Colus* [Kosyan, 2007].

Colus (*Aulacofusus*) *mitrellaformis* Nomura, 1940

Colus (*Aulacofusus*) *mitrellaformis* Nomura, 1940: 110, pl. 1, figs. 1a, b.

Type locality: off Ubara, Boso peninsula; 130-177 m.

Distribution: Boso peninsula and southwards, 100-200 m [Higo *et al*., 1999].

Remark. The species belongs to the genus *Daphnella* Hinds, 1844 (Conoidea, Raphitomidae).

Colus kujiana Tiba, 1973

Colus kujiana Tiba, 1973: 65-68, pl. 6, figs. 6-8. – Tiba, Kosuge, 1981: 17-18.

Colus (*Colus*) *esychus kujiana*. – Higo *et al*., 1999: 228.

Colus kujianus. – Kantor, Sysoev, 2006: 183, pl. 91 D.

Type locality: off Kuji, Iwate prefecture, northeastern Honshu; approx. 400 m, sandy mud

Holotype: Rikuzentakata City Museum, UKM 29529 (R09545).

Distribution: from northern Honshu to northern Japan Sea, South Kurile Islands, the Okhotsk Sea; 222-2000 m [Golikov, Sirenko, 1998; Golikov *et al*., 2001].

Remarks. Higo *et al*. [1999] treated the species as subspecies of *Colus esychus*, which we consider as a member of *Aulacofusus*. Nevertheless, the shell sculpture, and digestive system anatomy characterized by a short proboscis and a stomach lacking the posterior mixing area preclude including it in *Aulacofusus*, and we retain the species in *Colus* [Kosyan, 2007].

Colus hayashii Shikama, 1971

Colus hayashii Shikama, 1971: 31, pl. 3, figs. 9-10. – Higo *et al*., 2001: 74, G2587 (holotype illustrated).

Type locality: from Ensyu-nada (about 100 f. deep) (Enshu-nada, off Shizuoka prefecture, central Honshu).

Holotype: KPM NG0103866.

Distribution: recorded only from type locality

Remarks. Shikama [1971] compared the species with *A. hiranoi* and *A. coerulescens*. The spe-

cies differs from the mentioned ones by the presence of well pronounced axial ribs on upper teleoconch whorls. Conchologically it is similar to several species, that are attributed to the genus *Eosipho* Thiele, 1929, especially *E. poppei* Fraussen, 2001 and *E. aldermenensis* (Powell, 1971). The species of this group are associated with the sunken wood. Without examination of the radula it is not possible to clarify the final generic placement of *C. hayashii*, although it is already attributed to *Eosipho* in WORMS [World Register of the Marine Species – http://www.marinespecies.org/aphia.php?p=taxdetails&id=490981]

Aulacofusus insulapratasensis Okutani et Lan, 1994

Aulacofusus insulapratasensis Okutani, Lan, 1994: 1-3, figs 1-4.

Phaenomenella insulapratasensis. – Fraussen, Hadorn, 2006:106, Figs. 10-13, 22.

Type locality: Pratas Islets (Reef), South China Sea, 300 m deep.

Distribution: Vietnam [Fraussen, Hadorn, 2006].

Remarks. The species was attributed to the genus *Phaenomenella* Fraussen et Hadorn, 2006 [Fraussen, Hadorn, 2006].

Colus (*Aulacofusus*) *tashiensis* Lee et Lan 2002

Colus (*Aulacofusus*) *tashiensis* Lee, Lan, 2002: 30, Fig. 1.

Type locality: 400-500 m around Kue-shan Is., NE Taiwan.

Holotype: National Museum of Natural Science, Taichung, Taiwan, NMNS3903001.

Distribution: type locality.

Remarks. Conchologically the species is very similar to several species, that are attributed to the genus *Eosipho* Thiele, 1929, especially *E. aldermenensis* (Powell, 1971) and probably should be included in this group, although final decision can be done after the radula investigation. It is already attributed to *Eosipho* in WORMS [World Register of the Marine Species – http://www.marinespecies.org/aphia.php?p=taxdetails&id=490983]

Discussion

Validity, anatomy and variability of Aulacofusus

Aulacofusus was rarely considered as a full genus, but more often as a subgenus of *Colus* Röding, 1798. This is a combined result of several factors: very brief original diagnosis, rather variable shell, in many respects similar to different *Colus* spp., and partially because of unclear boundaries of the latter genus, which still remain poorly studied anatomically and has never been examined by molecular techniques. As a result, *Colus* at the moment is rather loosely defined group, in which many buccinid species with elongate-fusiform shell are included. The future studies will eventually clarify the status and species composition of *Colus*, which may end up as a collection of several genera.

Besides, considerable conchological similarity of species of *Aulacofusus* to species attributed to *Colus* (particularly in the shape and sculpture of the shell); both genera are similar in some anatomical details. For example, extremely long, coiled proboscis typical for *Aulacofusus*, is also present in some *Colus*, for example in *C. gracilis* and *C. jeffreysianus* (personal unpublished data). Bouchet and Warén [1985] reduced *Aulacofusus* to a junior synonym of *Neptunea*, although this was not followed by subsequent authors. The presence of several autapomorphies of *Aulacofusus*, including stomach structure with extremely long posterior mixing area, that is unique in the entire subfamily Colinae, and the histological structure of the wall of the salivary ducts with additional layer of longitudinal muscle fibers [Kosyan, Kantor, 2009] suggest that it is a separate genus.

Since species of *Aulacofusus* possess significant anatomical and radular similarity, differentiation may be based only on conchological characters. In species *A. brevicauda*, *A.* ***gulbini*** sp. n., *A. coerulescens* and *A. periscelidus*, spiral sculpture is represented by fewer (not more than 8 on the penultimate whorl), somewhat elevated spiral cords. The cords are the lowest in *A. brevicauda*, a bit higher – in *A.* ***gulbini*** sp. n., *A. hiranoi* and *A. coerulescens*, and the highest – in *A. periscelidus*. In species *A. herendeeni*, *A. esychus* and *A. calamaeus* spiral sculpture consists of frequent flattened ribs, separated by narrow and shallow grooves. In *A. ombronius* number of spiral ribs is the most variable, and they are distinctively sharp.

Several species we attributed here to *Aulacofusus* conventionally, since the anatomical material on them is unavailable to us. At the same time numerous species, that were at some point attributed to *Aulacofusus* were excluded by us.

Composition of the genus

In the result of current revision we recognize 10 valid (sub)species of the genus *Aulacofusus*:

A. brevicauda (Deshayes, 1832) – from Maine and northwards along the North American Arctic coast, to the state of Washington, the Barents and the Laptev seas, the New Siberian Islands, the East-Siberian, the Chukchi and the Bering seas, the Aleutian Islands, Kamchatka, the Sea of Okhotsk, the Kurile Islands, Sakhalin, the Sea of Japan (Tatar Strait and Peter the Great Bay), 12-1000 m.

A. periscelidus (Sowerby, 1913) – the Kurile Islands, the Commander Islands, Alaska, 50-380 m.

A. herendeeni (Dall, 1899) – the Chukchi and the Bering seas, the Sea of Okhotsk, Kamchatka, the Aleutian Islands, the Kurile islands, Moneron Island, Tatar Strait, 16-920 m.

A. esychus esychus (Dall, 1907) – the Bering Sea, the Commander Islands, eastern Kamchatka, 105-300 m;

A.esychus shikotanicus Golikov et Gulbin, 1977 – Shikotan Island, South Kurile Islands, 181-188 m.

A. ombronius (1919) – the East-Siberian, Chukchi and Bering seas, the Aleutian Islands, North and Middle Kurile Islands, 35-400 m.

*A. **gulbini*** sp. n. – Middle Kurile Islands, 102-490 m.

A. calathus (Dall, 1919) – near the Shumagin Islands, Alaska, 291 m.

A. coerulescens Kuroda & Habe, 1961 in Habe, 1961 – Shikoku and south of Honshu, 100-200 m.

A. hiranoi (Shikama, 1962) – central and northeastern Honshu to northern Hokkaido, 200-1650 m.

A. calamaeus (Dall, 1907) – Shikoku, northeastern Honshu, the Kurile Islands and southeastern Kamchatka, 200-1300 m.

The majority of species are Pacific boreal ones, except two broadly distributed *A.brevicauda* and *A.ombronius*. The first one is circumpolar and reaches the Japan Sea (Tatar Strait) in the Pacific. Protoconch of the species (Fig. 3) suggests direct development, as in other cold-water Buccinidae. Therefore the extremely broad distribution of *A.brevicauda* may indicate the presence of a complex of conchologically similar species,. Nevertheless at the moment we are not able to demonstrate clear distinctions between Arctic, north Atlantic and Pacific specimens and consider *A. brevicauda* as a single highly variable species. *A. brevicauda* reaches the Laptev Sea in the Arctic and not found southwards from the Aleutian region. The species is highly variable and sometimes found in high numbers (90 spms. per lot).

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Ревизия рода *Aulacofusus* Dall, 1918 (Gastropoda: Buccinidae)

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РЕЗЮМЕ. На основе анатомических данных проведена ревизия рода *Aulacofusus* Dall, 1918. В состав рода включены 9 ранее описанных рецентных видов и два подвида: *A. brevicauda* (Deshayes, 1832), *A. periscelidus* (Dall, 1891), *A. herendeeni* (Dall, 1899), *A. esychus esychus* (Dall, 1907), *A. esychus shikotanicus* (Golikov et Gulbin, 1977), *A. ombronius* (Dall, 1919), *A. calathus* Dall, 1919, *A. coerulescens* Kuroda & Habe, 1961, *A. hiranoi* (Shikama, 1962), *A. calamaeus* (Dall, 1907). Описан новый для науки *A.* ***gulbini*** sp. n. *A. brevicauda fortilirata* (Sowerby, 1913) сведен в синоним~~ы~~ *A. periscelidus* (Dall, 1891). Для 6 видов приведены подробные анатомические описания. 23 вида исключены из состава рода *Aulacofusus*.