

Review of the Shell-bearing Gastropods in the Russian Waters of the East Sea.

I. Patellogastropoda, Vetigastropoda, Cocculiniformia

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ABSTRACT

Based on investigation of collections at the A. V. Zhirmunsky Institute of Marine Biology of the Far-Eastern Branch of the Russian Academy of Sciences (Vladivostok) and Zoological Institute of the Russian Academy of Sciences (Saint-Petersburg), as well as on the analysis of published data, the species composition of shell-bearing gastropod mollusks of the Russian waters of the East Sea, consisting of 331 species and subspecies, has been identified. Each species is assigned to a biogeographic grouping in the study area. Its type locality and habitat (depth and substrate) are also documented. The first part of this review includes 55 species from Patellogastropoda, Vetigastropoda and Cocculiniformia.

Keywords: Gastropoda, East Sea, faunal

Introduction

Because of investigations by Japanese and Korean malacologists (Higo *et al.*, 1999, 2001; Okutani, 2000, Je, 1990, Min *et al.*, 2004, and others), the mollusk fauna of the southern and south-eastern parts of the East Sea has been well-studied. Until recently, the gastropod mollusk fauna of the Russian waters of the East Sea had been studied only in some areas (Golikov and Scarlato, 1967; 1985; Gulbin, 1980; 1990; 2004; 2006; Golikov *et al.*, 1987 a, b; 1993; Gulbin and Shulmina, 1981; Gulbin and Semenenko, 1987). Those individual studies were included in compiled reports by Golikov (Golikov *et al.*, 2001) and Kantor and Sysoev (2005; 2006). Unfortunately, some reports contain a number of contradictions and discrepancies. The basic purpose of this paper is to unify the separate faunal lists, to identify the species composition of shell-bearing gastropods, and to reveal the local

distribution of species, with their depth, and habitat.

Collections at the A.V. Zhirmunsky Institute of Marine Biology FEB RAS (IMB, Vladivostok) and Zoological Institute RAS (ZIN, Saint-Petersburg) provided material for our work. These collections have been assembled from the 1920s to the present time. Within this 80-year period, ZIN and IMB have collected a rich assortment of molluscan material consisting of more than 5000 samples, covering supra-littoral, littoral, sub-littoral, and partially bathyal down to 1500 m in depth. Samples were collected using drags, trawls, dredges, and SCUBA diving. The maximum number of samples was collected at depths from the littoral zone down to 400 m. Part of this material, from several areas, was examined, resulting in several publications: (Golikov and Scarlato, 1967; 1985; Gulbin, 1980; 1990; 2004; 2006; Golikov *et al.*, 1987 a, b; 1993; Gulbin and Shulmina, 1981; Gulbin and Semenenko, 1987). Also, certain taxonomic groups were studied earlier: Trochidae (Galkin, 1955), Buccinidae (in part, Golikov, 1963; 1980; Kantor, 1990 Kosyan, 2007), Turritellidae (Golikov, 1986), Naticidae (Golikov and Syrenko, 1988), Turridae (Oenopotinae) (Bogdanov, 1990), Turridae (Antiplanes, Kantor and Sysoev,

Received April 2, 2010; Accepted June 4, 2010
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1225-3480/24343

1991), Velutinidae (Gulbin and Golikov, 1997; 1998; 1999; 2000; 2001), Patellogastropoda (Chernyshev and Chernova, 2005), Opisthobranchia (in part, Minichev, 1971, 1976; Chaban, 1996; 2000; Martynov, 1997; 2006; Chaban and Martynov, 1998, 1999, 2006; Martynov and Chaban, 1998; 2006; Shkoldina and Pogodin, 2000), and some other groups of a lower taxonomic rank.

An examination of this extensive material reveals that the shell-bearing gastropod fauna of the Russian waters of the East Sea comprises 331 species and subspecies: 306 prosobranchs, 24 opisthobranchs, and 1 pulmonate.

For ease of reference, the entire studied area was divided into 8 faunal zones (fig. 1).

Continental coast (from south to north):

Zone I: Peter the Great Bay from the mouth of Tumannaya River (42°17' - 130°41') to Povorotniy Cape (42°40' - 133°02').

Zone II: to the north of Povorotniy Cape to Belkin Cape (45°49' - 137°41').

Zone III: to the north of Belkin Cape to Suyrkum Cape (50°06' - 140°41').

Zone IV: to the north of Suyrkum Cape to Lazarev Cape (52°07' - 141°30').

Sakhalin coast (from south to north):

Zone V: from Pogibi Cape (52°13' - 141°38') to Lamanon Cape (48°47' - 141°49').

Zone VI: to the south from Lamanon Cape to Slepikovsky Cape (47°18' - 141°58').

Zone VII: to the south from Slepikovsky Cape to Krilyon Cape (45°54' - 142°05').

Zone VIII: Moneron Island (46°15' - 141°14').

The classification of gastropod mollusks is now under intensive review. Bouchet and Rocroi (2005) undertook the attempt to reorganize data collected in this field. Their system of common taxa contains taxa up to the superfamily rank. Higher than superfamilies they use the term "clade", which has no taxonomic rank, and which integrates monophyletic taxa, "informal groups", and "groups", which combine paraphyletic and polyphyletic taxa as well as taxa in which monophyly has not been studied. In the present paper only taxa up to superfamily rank have been used. Also, for convenience of presentation, all

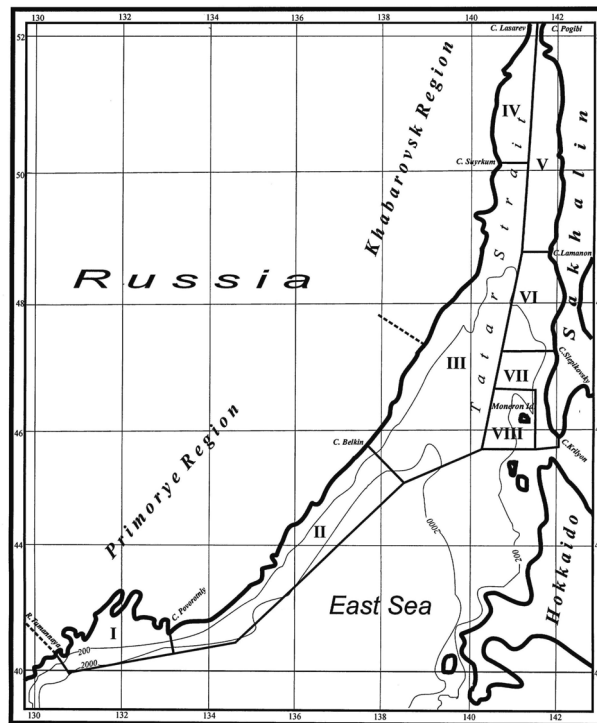


Fig. 1. The faunal zones in the Russian Waters of the East Sea.

shell-bearing gastropod mollusks have been divided into the large groups of Patellogastropoda, Vetigastropoda, Cocculiniformia, Caenogastropoda and Heterobranchia, without assigning them a taxonomic rank. Subordinate taxa within a higher rank taxon are listed, as a rule, in alphabetical order. Subgenera were not distinguished.

For each species a brief synonymy is given, including the original description, and reference to the most complete faunal reports on the mollusks of Korea (Min *et al.*, 2004), Japan (Higo *et al.*, 1999), and Russia (Kantor and Sysoev, 2006). Its type locality is also listed, as well as its distribution. The distribution includes its biogeographic grouping, the specific faunal zones (Fig. 1) where it was obtained in the Russian waters of the East Sea (Roman numerals), and a general statement of its relative abundance. Its habitat is also listed, and includes data on depth and substrate which refer only to its distribution in the Russian waters of the East Sea.

Depending on the nature of their geographic distribution, all species are placed within the following biogeographic groupings:

- (a) Boreal-arctic species, distributed in the boreal waters of the Pacific and Atlantic Oceans and along the entire Arctic coast.
- (b) Pacific high-boreal species occurring mostly in the Sea of Okhotsk (excluding the southern part), and in the Pacific from the middle and northern Kurile Islands to the North American coast.
- (c) Pacific boreal species, inhabiting boreal waters near the Pacific coasts of Asia and America.
- (d) Asian boreal species, inhabiting boreal waters only near the Asian coasts.
- (e) Asian low-boreal species, inhabiting only low-boreal waters mainly around northern Japan, in the northern East Sea, and in the southern Sea of Okhotsk (down to Terpeniya Cape and Iturup Island).
- (f) Asian subtropical-low-boreal species inhabiting subtropical and low-boreal waters in the Yellow and East Seas, around Japan, and extending to the warmest low-boreal area.
- (g) Asian subtropical species, inhabiting only tropical and subtropical waters near the Asian coasts.

The Pacific boreal waters includes the area from the East Sea, north-eastern Honshu, Hokkaido Island, and California north to the Bering Strait: high-boreal waters – from the Sea of Okhotsk (except the southern part) and Vancouver Island north to the Bering Strait; low-boreal waters – from the southern border of boreal waters up to the southern border of high-boreal waters. Such a system of zonality is generally accepted in biogeographical literature, and is the most frequently used (Golikov *et al.*, 1993; Gulbin, 2005, and others).

SYSTEMATICS

Patellogastropoda

Superfamily Acmaeoidea Forbes, 1850

Family Lepetidae Dall, 1869

Genus ***Cryptobranchia*** Middendorff, 1851

Type species: *Patella (Cryptobranchia) caeca* var. *concentrica* Middendorff, 1851

1. ***Cryptobranchia kuragiensis*** (Yokoyama, 1920)

[*Acmaea kuragiensis* Yokoyama, 1920: 100, pl. 6, fig.

9; *Lepeta kuragiensis*: Higo *et al.*, 1999: 32; Min *et al.*, 2004: 77, fig. 24; *Cryptobranchia kuragiensis*: Kantor and Sysoev, 2006: 15, pl. 1 F]

Type locality: Kuragi district, Yokohama (fossil)

Distribution: Asian low-boreal species; I-VI, VIII; common

Habitat: 1–89 m; gravel, stones, sand, muddy sand

Genus ***Lepeta*** Gray, 1847

Type species: *Patella caeca* Müller, 1776

2. ***Lepeta caeca*** (O. F. Müller, 1776)

[*Patella caeca* Müller, 1776: 237; *Lepeta caecoides*: Higo *et al.*, 1999: 32; *Lepeta caeca pacifica*: Min *et al.*, 2004: 77, fig. 25; *Cryptobranchia alba*: Min *et al.*, 2004: 77, fig. 26; *Lepeta caeca*: Kantor and Sysoev, 2006: 16, pl. 1 D-E, 2 A-B]

Type locality: not designated

Distribution: Boreal-arctic species; I-IV, VI, VII; common.

Habitat: 200–520 m; gravel, stones, sandy mud.

Genus ***Limalepeta*** Moskalev, 1977

Type species: *Lepeta lima* Dall, 1918

3. ***Limalepeta lima*** (Dall, 1918)

[*Lepeta lima* Dall, 1918: 233; *Limalepeta lima*: Higo *et al.*, 1999: 32; Min *et al.*, 2004: 77, fig. 27; Kantor and Sysoev, 2006: 16, pl. 2 C]

Type locality: Nemuro, Hokkaido

Distribution: Asian low-boreal species; I-VII; common

Habitat: 4–120 m; various substrates, mainly rock and stones, and pebble and gravel

Family Lottiidae Gray, 1840

Subfamily Patelloidinae Chapman and Gabriel, 1923

Genus ***Erginus*** Jeffreys, 1877

Type species: *Patella rubella* Fabricius, 1780

4. ***Erginus moskalevi*** (Golikov and Kussakin, 1972)

[*Problacmaea moskalevi* Golikov and Kussakin, 1972: 290–292, figs. 5, 6, 7F; Higo *et al.*, 1999: 35; *Erginus moskalevi*: Kantor and Sysoev, 2006: 17, pl. 3 C]

Type locality: Bolshoi Shantar Island, Sea of Okhotsk

Distribution: Pacific boreal species I, III, VI, VIII rare

Habitat: 10–36 m stones and sandy mud, also with stones and pebbles

5. ***Erginus puniceus*** Lindberg, 1988

[*Erginus puniceus* Lindberg, 1988: 3-4, pl. 1, figs. B-D
Kantor and Sysoev, 2006: 18, pl. 3 D; *Problacmaea
moskalevi*: Min *et al.*, 2004: 81, fig. 40]

Type locality: Tomari (Honshu, East Sea)

Distribution: Pacific boreal species I-III, VI-VIII, common
Habitat: Intertidal -50 m; mainly rock and stones and
sandy gravel

6. ***Erginus sybaritica*** (Dall, 1871)

[*Collisella sybaritica* Dall, 1871 : 257, pl. 17, fig. 34;
Problacmaea sybaritica: Higo *et al.*, 1999: 35; Min *et
al.*, 2004: 81, fig. 41; *Erginus sybaritica*: Kantor and
Sysoev, 2006: 18, pl. 3 F]

Type locality: St. George's Point, Pribilof Islands, Alaska

Distribution: Pacific boreal species I-III, VI-VIII common
Habitat: Intertidal -60 m; various, mainly rock and stones
Genus ***Niveotectura*** Habe, 1944

Type species: *Patella pallida* Gould, 1859: 162.

7. ***Niveotectura pallida*** (Gould, 1859)

[*Patella pallida* Gould, 1859: 162; *Acmaea pallida*: Higo
et al., 1999: 35; Min *et al.*, 2004: 83, fig. 47; *Niveotectura
pallida*: Kantor and Sysoev, 2006: 21, pl. 6 E]

Type locality: Hakodate, Hokkaido

Distribution: Asian subtropical-low-boreal species;
I-VIII common

Habitat: intertidal -80 m; various, mainly rock and stones

Subfamily Lottiinae Gray, 1840

Genus ***Lottia*** Gray, 1833

Type species: *Lottia gigantea* Sowerby, 1834

8. ***Lottia angusta*** Moskalev in Golikov and Scarlato, 1967

[*Collisella angusta* Golikov and Scarlato, 1967: 19, pl.
1, (12) *Lottia angusta*: Kantor and Sysoev, 2006: 18,
pl. 4 A]

Type locality: Possiet Bay (Peter the Great Bay, East Sea)

Distribution: Asian low-boreal species; I, II; rare
Habitat: Intertidal -20 m; muddy sand, less frequently
-stones and gravel, usually on leaves of eelgrass

9. ***Lottia dorsuosa*** (Gould, 1859)

[*Acmaea dorsuosa* Gould, 1859: 162; *Lottia dorsuosa*:
Higo *et al.*, 1999: 34; Min *et al.*, 2004: 79, fig. 33;
Kantor and Sysoev, 2006: 19, pl. 4 C]

Type locality: Hakodate, Hokkaido

Distribution: Asian subtropical-low-boreal species; I,
VIII; rare

Habitat: Intertidal -4 m rock and stones

10. ***Lottia kogamagoi*** Sasaki and Okutani, 1994

[*Lottia kogamagoi* Sasaki and Okutani, 1994: 256,
figs. 2 b-d, 3 b, 4 b, 5 c-h, 6 b, 8 b, pl. 2, figs. a-d, pl.
3, figs. a-d; Higo *et al.*, 1999: 34 Min *et al.*, 2004: 79,
fig. 35; Kantor and Sysoev, 2006: 19, pl. 4 D]

Type locality: Boso Peninsula, central Honshu

Distribution: Asian subtropical-low-boreal species; I,
II, III, VIII common

Habitat: Intertidal -0.3 m; rock and stones

11. ***Lottia ochracea*** (Dall, 1871)

[*Collisella patina* var. *ochracea* Dall, 1871: 249, pl. 17,
fig. 35; *Collisella patina*: Higo *et al.*, 1999: 34; *Lottia
ochracea*: Kantor and Sysoev, 2006: 19, pl. 4 E]

Type locality: Monterey Bay

Distribution: Pacific boreal species I-VIII common

Habitat: Intertidal -63 m various, mainly rock and stones

12. ***Lottia pelta*** (Rathke, 1833)

[*Acmaea pelta* Rathke, 1833: 19; *Lottia cassis*: Higo *et
al.*, 1999: 34; Min *et al.*, 2004: 79, fig. 32; *Lottia pelta*:
Kantor and Sysoev, 2006: 19, pl. 5 A]

Type locality: Sitka Island, Alaska

Distribution: Pacific boreal species; I-VIII common

Habitat: Intertidal -10 m; various, mainly rock and
stones

13. ***Lottia persona*** (Rathke 1833)

[*Acmaea persona* Rathke 1833: 20; *Lottia radiata*:
Higo *et al.*, 1999: 34; *Lottia persona*: Kantor and
Sysoev, 2006: 19, pl. 5 B]

Type locality: Sitka Island, Alaska

Distribution: Pacific boreal species; I-VIII common

Habitat: Intertidal -15 m; various, mainly rock and stones

14. ***Lottia tenuisculpta*** Sasaki and Okutani, 1994

[*Lottia tenuisculpta* Sasaki and Okutani, 1994:
260-263, figs. 2 e, 3 c, 4 c, 5 i-j, 6 c, 8 c-g; pl. 4, fig.
a-d; Higo *et al.*, 1999: 34 Min *et al.*, 2004: 79, fig. 36;
Kantor and Sysoev, 2006: 20, pl. 5 C]

Type locality: Miura Peninsula, Honshu

Distribution: Asian subtropical-low-boreal species; I, II, V common

Habitat: Intertidal -0.2 m; rock and stones

15. ***Lottia versicolor*** Moskalev in Golikov and Scarlato, 1967

[*Collisella versicolor* Golikov and Scarlato, 1967: 18-19, pl. 1 (11) Kantor and Sysoev, 2006: 20, pl. 5 D]

Type locality: Possiet Bay (Peter the Great Bay, East Sea)

Distribution: Asian low-boreal species; I, II, VI common

Habitat: Intertidal -17 m; rock and stones

Genus ***Nipponacmaea*** Sasaki and Okutani, 1993

Type species: *Patella schrenckii* Lischke, 1868

16. ***Nipponacmaea moskalevi*** Chernyshev and Chernova, 2002

[*Nipponacmaea moskalevi* Chernyshev and Chernova, 2002: 19-22, figs. 1 A-D, 2 A-f Kantor and Sysoev, 2006: 20, pl. 6 A; *Nipponacmaea concinna concinna*: Higo *et al.*, 1999: 35]

Type locality: Sukhoputnaya Bay (Peter the Great Bay, East Sea)

Distribution: Asian low-boreal species; I, II; rare

Habitat: Intertidal -1 m; mainly rock and stones, less frequently pebbles and muddy sand with gravel

Superfamily Patelloidea Rafinesque, 1815

Family Nacellidae Thiele, 1891

Genus ***Cellana*** H. Adams, 1891

Type species: *Nacella (Cellana) cernica* H. Adams, 1869

17. ***Cellana toreuma*** (Reeve, 1855)

[*Patella toreuma* Reeve, 1855: pl. 27, sp. 69; *Cellana toreuma*: Higo *et al.*, 1999: 32; Min *et al.*, 2004: 77, fig. 23; Kantor and Sysoev, 2006: 22, pl. 7 C]

Type locality: "Monterey Bay, California" (error)

Distribution: Asian tropical-subtropical species; I one record only.

Habitat: storm drift

Vetigastropoda

Superfamily Fissurelloidea Fleming, 1822

Family Emarginulidae Gray, 1827

Genus ***Puncturella*** Lowe, 1827

Type species: *Patella noachina* Linnaeus, 1771.

18. ***Puncturella cucullata kawamurai*** Habe, 1961

[*Puncturella kawamurai* Habe, 1961: 4-5, pl. 2, fig. 19; Higo *et al.*, 1999: 41; Kantor and Sysoev, 2006: 26, pl. 11 A; *Puncturella cucullata*: Kantor and Sysoev, 2006: 26, pl. 10 B]

Type locality: off Choshi, Honshu

Distribution: Asian low-boreal species; VIII; rare

Habitat: 20–68 m; rock, stones and shells

19. ***Puncturella fastigiata*** A. Adams, 1853

[*Puncturella fastigiata* A. Adams, 1853: 228; Higo *et al.*, 1999: 42; Min *et al.*, 2004: 89, fig. 68; Kantor and Sysoev, 2006: 26, pl. 9 F]

Type locality: Eastern seas

Distribution: Asian subtropical-low-boreal species; I, II, III, IV, VIII single records only

Habitat: 30–1400 m; stones, pebbles and shells, muddy sand

20. ***Puncturella* aff. *noachina*** (Linne, 1771)

[*Patella noachina* Linnaeus, 1771: 551; *Puncturella noachina*: Kantor and Sysoev, 2006: 27, pl. 10 C-D]

Type locality: unknown

Distribution: Boreal-arctic species; I, III, V, VI single records only

Habitat: 43–131 m; pebbles and sand, muddy sand

Note. East Sea samples differ slightly from typical ones and probably represent a separate subspecies.

21. ***Puncturella nobilis*** (A. Adams, 1860)

[*Cemoria nobilis* A. Adams, 1860: 422; *Puncturella nobilis*: Higo *et al.*, 1999: 41; Min *et al.*, 2004: 89, fig. 67; Kantor and Sysoev, 2006: 27, pl. 10 A]

Type locality: Okushiri, Hokkaido

Distribution: Asian low-boreal species; I, V, VI, VIII common

Habitat: 2–50 m; stones, rock, gravel and pebbles

22. ***Puncturella raricostata*** Golikov and Sirenko, 1980

[*Puncturella raricostata* Golikov and Sirenko, 1980: 105-106, fig. 1; Kantor and Sysoev, 2006: 27-28, pl. 9 H]

Type locality: Moneron Island, East Sea

Distribution: Asian low-boreal species; VIII one record only

Habitat: 65–70 m; stones

Genus *Scelidotoma* McLean, 1966

Type species: *Emarginula bella* Gabb, 1865

23. *Scelidoma gigas* (Martens, 1881)

[*Subemarginula gigas* Martens, 1881: 103, pl. 19; *Tugalina gigas*: Higo *et al.*, 1999: 41; Min *et al.*, 2004: 87, fig. 63; *Tugali gigas*: Kantor and Sysoev, 2006: 28, pl. 10 F]

Type locality: northern Honshu

Distribution: Asian low-boreal species; I, II, VIII; rare

Habitat: 1–75 m; rock (mainly), sand and stones, muddy sand

Superfamily Haliotoidae Rafinesque, 1815

Family Haliotidae Rafinesque, 1815

Genus *Haliotis* Linne, 1758

Type species: *Haliotis asinina* Linnaeus, 1758

24. *Haliotis discus* Reeve, 1846

[*Haliotis discus* Reeve, 1846, fig. 31; Kantor and Sysoev, 2006: 28, pl. 11 E; *Nordotis discus discus*: Higo *et al.*, 1999: 37; Min *et al.*, 2004: 859, fig. 53; *Nordotis discus hannai*: Min *et al.*, 2004: 85, fig. 54]

Type locality: Japan

Distribution: Asian subtropical-low-boreal species; I, II, VIII; rare

Habitat: 1–13 m; rock

Superfamily Scissurelloidae Gray, 1847

Family Scissurellidae Gray, 1847

Genus *Anatoma* Woodward, 1859

Type species: *Anatoma crispata* Fleming, 1832

25. *Anatoma crispata* Fleming, 1832

[*Scissurella crispata* Fleming, 1832: 385, pl. 6, fig. 3; *Anatoma crispata*: Kantor and Sysoev, 2006: 24, pl. 9 A]

Type locality: Noss Island, Scotland

Distribution: Boreal-arctic species; VIII; dead shells only

Habitat: 30–70 m; pebbles and shells

26. *Anatoma disciformis* Golikov and Sirenko, 1980

[*Scissurella disciformis* Golikov and Sirenko, 1980: 107, fig. 2; Kantor and Sysoev, 2006: 24, pl. 9 B-C]

Type locality: Moneron Island, East Sea

Distribution: Asian low-boreal species; VIII; one record only (dead shells)

Habitat: 65–70 m; pebbles and shells

27. *Anatoma obtusata* Golikov and Gulbin, 1978

[*Scissurella obtusata* Golikov and Gulbin, 1978: 171–172, fig. 2, 3; Kantor and Sysoev, 2006: 24, pl. 9 D-E]

Type locality: Chirpoi Island, Middle Kurile Islands

Distribution: Asian boreal species VIII; dead shells only

Habitat: 20–70 m; stones, pebbles and shells

Superfamily Trochoidea Rafinesque, 1815

Family Calliostomatidae Thiele, 1924

Genus *Calliostoma* Swainson, 1840

Type species: *Trochus conulus* Linnaeus, 1758

28. *Calliostoma consor* (Lischke, 1872)

[*Trochus consor* Lischke, 1872: 104; *Calliostoma consors*: Higo *et al.*, 1999: 62; Min *et al.*, 2004: 105, fig. 134; *Benthastelena consor*: Kantor and Sysoev, 2006: 28]

Type locality: Tokyo Bay, eastern Honshu

Distribution: Asian subtropical-low-boreal species; VIII; rare

Habitat: 15–75 m; rock

Family Trochidae Rafinesque, 1815

Genus *Lirularia* Dall, 1909

Type species: *Margarita lirulata* Carpenter, 1864

29. *Lirularia iridescens* (Schrenck, 1863)

[*Trochus iridescens* Schrenck, 1863: 512; *Lirularia iridescens*: Higo *et al.*, 1999: 65; Min *et al.*, 2004: 107, fig. 139; Kantor and Sysoev, 2006: 36, pl. 16 D]

Type locality: Sangar Strait, southern Hokkaido

Distribution: Asian low-boreal species; I, II, VI, VIII; common

Habitat: Intertidal -93 m various substrates, mainly muddy sand and pebbles and shells usually on eelgrass and algae

30. *Lirularia minima* (Golikov in Golikov and Scarlato, 1967)

[*Lirularia minima* Golikov and Scarlato, 1967: 11–12, fig. 5; Kantor and Sysoev, 2006: 36, pl. 16 B-C]

Type locality: Patrokl Bay (Peter the Great Bay, East Sea)

Distribution: Asian low-boreal species; I, VIII; single records only

Habitat: Intertidal –20 m; sandy gravel, rock, usually in algae and eelgrass

31. *Lirularia picturata* (Golikov in Golikov and Scarlato, 1967)

[*Margarites picturata* Golikov and Scarlato, 1967: 8-9, fig. 3; *Margarites picturatus*: Kantor and Sysoev, 2006: 36, pl. 15 G-G']

Type locality: Possiet Bay (Peter the Great Bay, East Sea)

Distribution: Asian low-boreal species; I, VIII; single records only

Habitat: from 3–30 m; sand, sandy gravel, rock, usually in algae and eelgrass

Genus *Lischkeia* Fisher in Kiener and Fischer, 1880

Type species: *Trochus moniliferus* Lamarck, 1818

32. *Lischkeia crumpii* (Pilsbry, 1893)

[*Calliostoma crumpii* Pilsbry, 1893: 105-106, pl.2, fig. 3; *Ginebis crumpii*: Higo *et al.*, 1999: 54; *Lischkeia crumpii*: Kantor and Sysoev, 2006: 31]

Type locality: Japan

Distribution: Asian subtropical-low-boreal species. [This species is absent in collections of the Zoological Institute of the Russian Academy of Sciences and Institute of Marine Biology of the Far-Eastern Branch of the Russian Academy of Sciences. According to Egorov's data (2000), was found in Tatar Strait.]

Genus *Margarites* Gray, 1847

Type species: *Turbo helicina* Phipps, 1774

33. *Margarites angulatus* Galkin, 1955

[*Margarites (Margarites) vahlii* var. *angulata* Galkin, 1955: 102, fig. 55-57; *Margarites vahlii angulata*: Higo *et al.*, 1999: 55 *Margarites angulatus*: Kantor and Sysoev, 2006: 31, pl. 13 F]

Type locality: none designated

Distribution: Asian boreal species I, II; rare

Habitat: 92–200 m; sand with pebbles and mud

34. *Margarites costalis* (Gould, 1841)

[*Trochus costalis* Gould, 1841: 252 *Margarites striata cinerea*: Higo *et al.*, 1999: 55; *Margarites striatus striatus*: Higo *et al.*, 1999: 55; *Margarites costalis*: Kantor and Sysoev, 2006: 32, pl. 14 A]

Type locality: Massachusetts Bay

Distribution: Boreal-arctic species; I, II, III, IV, V, VI single records only

Habitat: 6–390 m; muddy sand, pebbles

35. *Margarites derjugini* (Bartsch in Galkin, 1955)

[*Margarites rossicum derjugini* Galkin, 1955: 93-95, fig. 43, 44; *Margarites rossicus derjugini* Kantor and Sysoev, 2006: 35, pl. 14 G-G']

Type locality: Povorotnyi Cape, East Sea

Distribution: Asian boreal species I, II, III, IV, VI, VII; single records only

Habitat: 50–528 m; sand, sandy mud

36. *Margarites giganteus* (Leche, 1878)

[*Margarita argentata* var. *gigantea* Leche, 1878: 43, pl. II, fig. 11 a-c *Margarites giganteus*: Kantor and Sysoev, 2006: 32-33, pl. 12 B]

Type locality: Kara Sea

Distribution: Boreal-arctic species; I, III, IV, V, VI, VII; common

Habitat: 25–120 m; sand, muddy sand

37. *Margarites helicinus* (Phipps, 1774)

[*Turbo helicinus* Phipps, 1774: 198; *Margarites helicinus*: Kantor and Sysoev, 2006: 34, pl. 13 H]

Type locality: Spitzbergen

Distribution: Boreal-arctic species; I-V, VII, VIII; common

Habitat: Intertidal –45 m; various substrates, mainly rock and stones, usually in seaweed

38. *Margarites koreanicus* (Dall, 1919)

[*Solariella koreanica* Dall, 1919 : 362; *Margarites koreanicus*: Kantor and Sysoev, 2006: 34, pl. 15 D]

Type locality: Korea

Distribution: Asian low-boreal species; I, VI, VII; rare

Habitat: 40–120 m; sand, muddy sand

39. *Margarites olivaceus marginatus* Dall, 1919

[*Margarites marginatus* Dall, 1919: 367; Kantor and Sysoev, 2006: 36, pl. 13 H]

Type locality: Adakh Island, Aleutian

Distribution: Boreal-arctic species; VI, VII; rare

Habitat: 15–131 m; boulders and muddy sand with pebbles

40. ***Margarites pilsbryi*** Kuroda and Habe, 1952
[*Margarites pilsbryi* Kuroda and Habe, 1952: 113, pl. 4, fig. 29, 30; Kantor and Sysoev, 2006: 34, pl. 13 G; *Margarites helicinus pilsbryi*: Higo *et al.*, 1999: 54; Min *et al.*, 2004: 99, fig. 108]
Type locality: Kushiro, Hokkaido
Distribution: Asian low-boreal species; II - IV, V, VII, VIII; abundant
Habitat: Intertidal -10 m; mainly rock and stones, usually in seaweed

41. ***Margarites rossicus*** (Dall, 1919)
[*Pupillaria rossica* Dall, 1919 : 365; *Margarites rossicus rossicus*: Kantor and Sysoev, 2006: 34-35, pl. 14]
Type locality: Aniwa Bay, Sakhalin
Distribution: Asian boreal species I, II, III; single records only
Habitat: 70-320 m; mud, muddy sand

42. ***Margarites schantaricus*** (Middendorff, 1849)
[*Trochus schantaricus* Middendorff, 1849: 413-414; *Margarites schantaricus*: Higo *et al.*, 1999: 55; Kantor and Sysoev, 2006: 35, pl. 14 E]
Type locality: Shantar Islands, Sea of Okhotsk
Distribution: Asian boreal species I-VIII; common
Habitat: 19-200 m; mainly sand with pebbles and gravel, often with silt

43. ***Margarites vahlii*** (Møller, 1842)
[*Miargarita vahlii* Møller, 1842: 81; *Margarites vahlii*: Kantor and Sysoev, 2006: 35-36, pl. 15 H]
Type locality: Southwest Greenland
Distribution: Boreal-arctic species; III, VIII rare
Habitat: 30-70 m; muddy sand with shells

44. ***Margarites vorticiferus*** (Dall, 1873)
[*Margarita vorticifera* Dall, 1873: 59, pl. II, fig. 4 a, d; *Omphalomargarites vorticifera*: Higo *et al.*, 1999: 54; *Margarites vorticiferus*: Kantor and Sysoev, 2006: 36, pl. 12 H]
Type locality: Unalaska, Aleutian Islands
Distribution: Pacific boreal species; II, III, VI; rare
Habitat: 43-104 m; muddy sand with pebbles

Genus ***Solariella*** Wood, 1842

Type species: *Solariella maculate* Wood, 1842

45. ***Solariella delicata*** Dall, 1919
[*Solariella delicata* Dall, 1919: 362; Higo *et al.*, 1999: 64; Min *et al.*, 2004: 107, fig. 137; Kantor and Sysoev, 2006: 37, pl. 16 E]
Type locality: Sangar Strait, southern Hokkaido
Distribution: Asian subtropical-low-boreal species; VII, VIII; rare
Habitat: 100-250 m; sandy gravel with shells, sometimes silted

46. ***Solariella obscura*** (Couthouy, 1838)
[*Turbo obscurus* Couthouy, 1838: 100, pl. 3, fig. 12; *Solariella obscura*: Kantor and Sysoev, 2006: 37, pl. 16 I]
Type locality: Massachusetts.
Distribution: Boreal-arctic species; I-VIII; common
Habitat: 30-295 m; muddy sand with pebbles

47. ***Solariella varicosa*** (Mighels and Adams, 1842)
[*Margarita varicosa* Mighels and Adams, 1842: 46, pl. IV, fig. 14; *Solariella varicosa*: Higo *et al.*, 1999: 64; Kantor and Sysoev, 2006: 37-38, pl. 17 C]
Type locality: Gulf of St. Lawrence (eastern Canada)
Distribution: Boreal-arctic species; I-VIII; common
Habitat: 40-300 m; muddy sand with pebbles

Genus ***Tegula*** Lessopn, 1835

Type species: *Tegula elegans* Lesson, 1835

48. ***Tegula lischkei*** Tapparone-Canefri, 1874
[*Chlorostoma lischkei* Tapparone-Canefri, 1874 : 63-64, fig. 4; Higo *et al.*, 1999: 51; Min *et al.*, 2004: 95, fig. 94; *Tegula lischkei*: Kantor and Sysoev, 2006: 38, pl. 17 A]
Type locality: Yokohama.
Distribution: Asian subtropical species; I; rare
Habitat: Intertidal -3 m sand

49. ***Tegula rustica*** (Gmelin, 1790)
[*Trochus rusticus* Gmelin, 1791: 3572; *Omphalius rusticus rusticus*: Higo *et al.*, 1999: 51; Min *et al.*, 2004: 97, fig. 97; *Tegula rustica*: Kantor and Sysoev, 2006: 38-39, pl. 17 B]
Type locality: "in Sina" (China)
Distribution: Asian subtropical-low-boreal species; I; common
Habitat: Intertidal -50 m; muddy sand (mainly), rock (rarely)

Genus *Umbonium* Link, 1807

Type species: *Trochus vestiarius* Linnaeus, 1758

50. *Umbonium costatum* (Kiener, 1834)

[*Rotella costata* Kiener, 1838-1839: 10, tabl. 2, fig. 5; *Umbonium costatum*: Higo *et al.*, 1999: 66; Min *et al.*, 2004: 109, fig. 144; Kantor and Sysoev, 2006: 39, pl. 17 G-H]

Type locality: Japan

Distribution: Asian subtropical-low-boreal species; I, II, III, V; common

Habitat: Intertidal -31 m; muddy sand, sometimes with stones.

51. *Umbonium thomasi* (Crosse, 1863)

[*Globulus thomasi* Crosse, 1863: 384, pl. XIII, f. 8; *Umbonium thomasi*: Higo *et al.*, 1999: 66; Minet *et al.*, 2004: 107, fig. 142-143; Kantor and Sysoev: 2006: 39, pl. 17 F]

Type locality: Sangar Strait, Hokkaido

Distribution: Asian subtropical species; II; single specimen only

Habitat: 12-25 m; sand

Superfamily Turbinoidea Rafinesque, 1815

Family Turbinidae Rafinesque, 1815

Genus *Homalopoma* Carpenter, 1864

Type species: *Turbo sanguineum* Linnaeus, 1758

52. *Homalopoma amussitata* (Gould, 1861)

[*Turbo amussitata* Gould, 1861: 22; *Homalopoma amussitata*: Higo *et al.*, 1999: 46; Min *et al.*, 2004: 91, fig. 78; Kantor and Sysoev, 2006: 42, pl. 18 I]

Type locality: Izu Peninsula (central Honshu)

Distribution: Asian low-boreal species; I, II, VIII; abundant

Habitat: 0-75 m mainly rock and stones, usually on eelgrass

53. *Homalopoma maculata* Golikov and Gulbin, 1978

[*Homalopoma maculata* Golikov and Gulbin, 1978: 181-182, fig. 7, 2: 7; Higo *et al.*, 1999: 46; Kantor and Sysoev: 2006: 42, pl. 18 F-G]

Type locality: Ekarma Island (Middle Kurile Islands)

Distribution: Asian boreal species; VIII; rare

Habitat: 7-115 m; sand with pebbles and shells

54. *Homalopoma sangarense* (Schrenck, 1867)

[*Turbo sangarense* Schrenck, 1867: 363-365, Taf, 16, Fig. 6-11; *Homalopoma sangarense*: Higo *et al.*, 1999: 46; Min *et al.*, 2004: 91, fig. 79; Kantor and Sysoev, 2006: 42, pl. 18 H]

Type locality: Sangar Strait (South Hokkaido)

Distribution: Asian low-boreal species; I, II, VIII; abundant

Habitat: Intertidal -23 m; mainly rock and stones, usually on eelgrass

Cocculiniformes

Superfamily Cocculinoidea Dall, 1882

Family Cocculinidae Dall, 1882

Genus *Cocculina* Dall, 1882

Type species: *Cocculina rathbuni* Dall, 1882

55. *Cocculina japonica* Dall, 1907

[*Cocculina japonica* Dall, 1907: 169; Kantor and Sysoev, 2006: 43, pl. 21 D; Higo *et al.*, 1999: 71; *Cocculina japonica uncinata*: Higo *et al.*, 1999: 71; *Cocculina japonica japonica*: Min *et al.*, 2004: 111, fig. 156]

Type locality: Sado Islands (Eastern Sea)

Distribution: Asian low-boreal species; II; rare

Habitat: 250-510 m; sand, wood

ACKNOWLEDGEMENTS

This study was supported by grants from Far Eastern Branch Russian Academy of Sciences, grant number DVO-1 N 09-I-P23-01 and DVO-1 N 09-I-P15-03.

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