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 investigations 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 313 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,
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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 monophyletism has not been studied. In the present paper only taxa up to superfamily rank have been used. Also, for convenience of presentation, all 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:

Fig. 1. The faunal zones in the Russian Waters of the East Sea.
(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 Eastern 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 Acmaeoidae Forbes, 1850

Family Lepetidae Dall, 1869

Genus Cryptobranchia Middendorff, 1851

Type species: Patella (Cryptobranchia) coeca var. concentrata 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. Muller, 1776)
   [Patella caeca Muller, 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 moskalei 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

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

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 Sasakiand 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 Golikovand 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 moscalevi 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: 32; Min et al., 2004: 77, fig. 23; Kantor and Sysoev, 2006: 22, pl. 7 C]
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 **Fissurelloidae** Fleming, 1822
Family **Emarginulidae** Gray, 1827
Genus **Puncturella** Lowe, 1827
Type species: *Patella noachina* Linnaeus, 1771.

18. **Puncturella cucullata kawamura** Habe, 1961
[Puncturella kawamura 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

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

20. **Puncturella aff. noachina** (Linne, 1771)
[Patella noachina Linnaeus, 1771: 551; Puncturella noachina: 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

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 single records only
Habitat: 43-131 m; pebbles and sand, muddy sand

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; Tugalinia 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 Haliotoidea 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: 85, 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


(*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)

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 sub-tropical-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; Benthastelena consor: 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: Patrolk 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.


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)


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)


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; IV, V, VII; 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; *Margarites olivaceus marginatus*: 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)


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* (Möller, 1842)

*Margarita vahlii* Möller, 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: 51; Min et al., 2004: 95, fig. 94; *Tegula lischkei*: Kantor and Sysoev, 2006: 38, pl. 17 A

Type locality: Yokohama.

Distribution: Boreal-arctic species; I-VIII; common

Habitat: 40-300 m; muddy sand with pebbles

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: 51; Min et al., 2004: 97, fig. 97; *Tegula lischkei*: Kantor and Sysoev, 2006: 38-39, pl. 17 B

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: Pacific boreal species; II, III, VI; rare

Habitat: 43-104 m; muddy sand with pebbles

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; rare

Habitat: 43-104 m; muddy sand with pebbles

Genus *Solariella* Wood, 1842

Type species: *Solariella maculate* Wood, 1842

42. *Margarites rossicus* (Dall, 1919)

*Papillaria 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

43. *Margarites vahlii* (Möller, 1842)

*Margarita vahlii* Möller, 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
Genus *Umbonium* Link, 1807
Type species: *Trochus vestiarium* 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; Min 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: 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 Golikovand 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 Cocculinoidae 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

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