Annotated list of beringian freshwater molluscs

L.A. PROZOROVA

Institute of Biology and Soil Science, Far East Branch, Russian Academy of Sciences, Vladivostok 690022, Russia

A review of literature and original data on gastropods and bivalves, inhabiting freshwaters of both Asian and American parts of Beringia is given. The annotated list of molluscs within the Beringian area, including 87 species and 3 subspecies, in 20 genera, and 11 families of *Gastropoda* and Bivalvia is presented.

Аннотированный список берингийских пресноводных моллюсков

Л.А. ПРОЗОРОВА

Биолого-почвенный институт ДВО РАН, Владивосток, 690022, Россия

На основе анализа литературных данных и изучения имеющихся коллекций и собственных сборов составлен видовой список пресноводных брюхоногих и двустворчатых (исключая представителей подсемейства *Euglesinae*) моллюсков. Список насчитывает 87 видов и 3 подвида, принадлежащих 20 родам и 11 семействам. Двадцать семь видов являются общими для северо-востока Азии и северо-запада Северной Америки. В дополнение к этому еще 20 видов и 1 подвид, вероятно, в дальнейшем будут найдены на обоих континентах.

В азиатской части Берингии отмечены 65 видов и 3 подвида пресноводных моллюсков, 13 видов найдены здесь впервые. Сорок девять видов (12 указываются впервые) обнаружены в североамериканской части Берингии. Еще 19 азиатских видов моллюсков могут быть найдены на Аляске и Юконе в ближайшем будущем.

Приведены данные по синонимике и распространению всех перечисленных видов, а также краткий обзор основных литературных источников.

INTRODUCTION

Bering Land Bridge is well known to connect Asia and North America in the past. For this reason the biotas of Northeastern Asia and Alaska have much in common. Russian and American investigators have noted considerable resemblance between freshwater malacofauna of these regions as well [Dall, 1905; Starobogatov, 1982; Prozorova, 1986; Prozorova, Foster, 1995 and others].

There is a problem with the geographic boundary of Beringia. We propose to include Chukotka (westward up to the Chaun Lowland),

Kamchatka, and Alaska on the basis of malacofaunal data. Chereshnev [1996] distinguished a Beringian biogeographic region on the basis of freshwater fishes distributions in Chukotka and Alaska. Endemic species and genera of these freshwater organisms were found on Beringian territories [Chereshnev, 1996, and others]. This information is well coordinated with malacofaunal data. However, Chereshnev [1996] did not include Kamchatka in this region, but we do because of a considerable resemblance of malacofauna between Kamchatka and the Yukon River basin.

Data in recent literature are probably inadequate to compare reliably the malacofauna of the Asian and North American parts of Beringia, because the taxonomy of Asian freshwater mollusks, gastropods especially, has been studied more thoroughly taxonomically than Alaskan ones. Russian workers have noted the presence of 19 species, in 5 gastropod families (*Lymnaeidae, Physidae, Planorbidae, Valvatidae* and *Kolhymamnicolidae*) in the Chukotka Peninsula, Koryak mountains, Chaun Lowland, Anadyr and Amguema River basins [Starobogatov, Streletskaya, 1967; Starobogatov, Budnikova, 1976; Prozorova, 1986; Starobogatov et al., 1989]. Later, 6 gastropod species were added to this list [Prozorova, Foster, 1995], and the most recent revision of *Planorbidae* and *Valvatidae* of the Russian northern Far East resulted in the addition of 9 species to the list of gastropods from Norteastern Asia [Prozorova, Starobogatov, 1996; Prozorova, Starobogatov, 1997].

It is more difficult to make a comparable list for Alaska because data on non-marine molluscs are not sufficient. Recently we have attempted to do this on the basis of Dall's [1905] work, some fragmentary reports and publications, Baxter's [1987] list, and an unpublished compilation by Richard Reger [Prozorova, Foster, 1995]. The compilation consisted of 26 species, in 4 families of *Gastropoda (Lymnaeidae, Physidae, Planorbidae* and *Valvatidae)*. The total list for both Alaska and Asian North-East counted 36 species, in 5 families of freshwater gastropods, fifteen of which are in common [Prozorova, Foster, 1995]. Analysis of other literature [Baker, 1911, 1945; Burch, 1989; Clarke, 1981 and others] and preliminary study of gastropod samples from the Yukon River basin have resulted in the more complete Beringian list presented below.

It is difficult to determine the affinity of Asian and American faunas on the basis of the Bivalvia. Only 3 species of bivalves *Beringiana beringiana, B. youkonensis* and *Lacustrina dilatata)* [Starobogatov, 1982] are well known to be in common for these regions. Reliable distributions of other bivalve molluscs, especially small species in the superfamily *Pisidioidea*,

can be discussed only after fundamental faunistic and taxonomical study.

The presence of 19 species, in 3 families of small bivalves (*Sphaeriidae, Pisidiidae* and *Euglesidae*) were noted in the Asian part of Beringia [Starobogatov, Streletskaya, 1967; Prozorova, 1988; Dolgin, Korniushin, 1994]. Twenty four species of small bivalves in superfamily *Pisidioidea* were listed by Dall [1905] for Alaska and Yukon. Unfortunately, the original diagnoses and illustrations published for some old species are not adequate for identification. Later a few additional small bivalve species were added to Alaskan list [Sterki, 1918, 1922; Odhner, 1939, and various others]. Burch [1975a] reported on 15 Alaskan pisidiids. He considered many of the species on Dall's [1905] list to be synonyms. The most modern, and most complete data on Alaskan small bivalves were presented by Baxter [1987]. He listed 18 species from the State of Alaska and adjacent territories. Our first attempt to list Beringian bivalves on the base of preliminary analysis of literature [Dall, 1905; Burch, 1975a, b; Clarke, 1981; Baxter, 1987] and original data lists 14 Beringian species, in 5 genera (*Dahurinaia, Beringiana, Sphaerium, Musculium* and *Lacustrina*). We excluded variable representatives of subfamily *Euglesinae* in the meanwhile because of the inaccessibility of species types and contradictions in the literature data on Alaskan small bivalves.

Analysis of literature data and collections in the Zoological Institute (Sankt-Petersburg, Russia) and in the University of Alaska Museum (Fairbanks, USA) resulted in new mollusc records in both North East Asia and Alaska. As a result, the list of Beringian freshwater bivalves and gastropods presented here includes 87 species and 3 subspecies, in 20 genera, and 11 families. Twenty-seven species are in common for North-eastern Asia and North America, and an additional 20 species and 1 subspecies probably are in common as well.

Taxonomic and geographic data presented here are preliminary only because of the deficiency of faunistic study on Alaskan freshwater molluscs. Further investigation of Beringian malacofauna will lead to more full and precise data.

LIST OF SPECIES

Class Gastropoda

Subclass *Pulmonata*

ORDER *LYMNAEIFORMES* FERUSSAC, 1821

SUPERFAMILY *LYMNAEOIDEA* RAFINESQUE, 1815

Family *LYMNAEIDAE* RAFINESQUE, 1815

Genus *Lymnaea* Lamarch, 1797

Subgenus *Lymnaea s. str.*

SECTION LYMNAEA S. STR.

1. *Lymnaea (Lymnaea) fragilis fragilis* (Linnaeus, 1758)

Syn.: *Helix fragilis* Linnaeus, 1758

Locality - North Europe, Siberia eastward up to Kolhyma River basin.

2. *L. (L.) stagnalis stagnalis* (Linnaeus, 1758)

Syn.: *Helix stagnalis* Linnaeus, 1758; *L. stagnalis ssorensis* W. Dybowski, 1903.

Locality - Europe and North Asia (ponds), in Russian Northeast inhabits Kolhyma River basin except upper reaches, Koryak mountains, East Kamchatka; possible introduced into North America.

3. *L. (L.) jugularis* Say, 1817

Syn.: *L. stagnalis apressa* Say, 1818; *L. elodes* Say, 1821; *L. (Stagnicola) reflexa* Say, 1821 in Dall [1905]; *Stagnicola impedita* Baker, 1934; *S. elodes* (Say, 1821) in Clarke [1981]; *S. elodes form reflexa* (Say, 1821) in Burch [1989].

Locality - Alaska, Canada.

4. *L. (L.) lepida* Gould, 1847

Syn.: *Stagnicola newfoundlandensis* Baker et Brooks, 1935 in Burch [1989].

Locality - Alaska.

Subgenus *Polyrhytis* Meek, 1876

SECTION DALLIRHYTIS KRUGLOV ET STAROBOGATOV, 1989

5. *L. (Polyrhytis) atkaensis* Dall, 1884

Syn.: *L. ovata var. atkaensis* Dall, 1884; *L. randolphi* Baker, 1904; *Galba atkaensis* (Dall, 1984) in Baker [1911].

Locality - in Northeastern Asia inhabits Amguema River basin, Koryak mountains and western part of Chukotka Peninsula; in North America - Alaska.

6. *L. (P.) petersi* Dall, 1905

Syn.: *L. alascensis* Baker, 1911; *L. scalaris* Westerlund, 1883.

Locality - in Northeastern Asia inhabits Koryak mountains and western part of Chukotka Peninsula; in North America - Alaska.

SECTION PSEUDISIDORA THIELE, 1931

7. *L. (P.) nuttaliana* Lea, 1841

Syn.: *L. palustris var. nuttalliana* Lea, 1841 in Dall [1905].

Locality - in Northeastern Asia distributed in Koryak mountains and East Kamchatka including Tumrok Range; western North America.

8. *L. (P.) kurenkovi* Kruglov et Starobogatov, 1989

Locality - Southeastern Kamchatka (thermal springs of Tumrok area).

9. *L. (P.) asabatschensis* Kruglov et Starobogatov, 1989

Syn.: *L. leai* Baker, 1907 (part.).

Locality - in Asia found on Southeastern Kamchatka; in North America - Middle and Lower Yukon and Kuskokwim River basins.

10. *L. (P.) falsipalustris* Kruglov et Starobogatov, 1989

Syn.: *L. leai* Baker, 1907 (part.); *Stagnicola wyomingensis* (Baker, 1827) in Burch [1989].

Locality - in Asia occurs on Southeastern Kamchatka; in North America - Yukon River basin and Western Canada.

Subgenus *Sibirigalba* Kruglov et Starobogatov, 1985

11. *L. (Sibirigalba) sibirica* (Westerlund, 1885).

Syn.: *L. truncatula var. sibirica Westerlund, 1885; L. truncatula* (Muller, 1774) in Dall [1905]; *L. (Fossaria) truncatula* (Muller, 1774) in Baxter (1987); *Fossaria truncatula* (Muller, 1774) in Clarke [1981] and in Burch [1989].

Locality - Siberia, Russian Far East, Northern Japan; in Alaska known as *L. truncatula* (Muller, 1774).

Subgenus *Radix* Monfort, 1810

SECTION RADIX S. STR.

12. *L. (Radix) auricularia* (Linnaeus, 1758)

Syn.: *Helix auricularia* Linnaeus, 1758; *L. lanuginosa* W. Dybowski, 1903.

Locality - Europe, Siberia, in Northeastern Asia inhabits Kolhyma and Anadyr River basins, Kamchatka; widely introduced but of spotty occurence in North America [Burch, 1989].

13. *L. (R.) psilia psilia* (Bourguignat, 1862)

Syn.: *Limnaea psilia* Bourguignat, 1862.

Locality - Europe, Siberia, in Northeastern Asia found on West Kamchatka.

SECTION THERMORADIX KRUGLOV ET STAROBOGATOV, 1989

14. *L. (R.) hadutkae* Kruglov et Starobogatov, 1989

Locality - East Kamchatka (thermal springs).

15. *L. (R.) thermokamtschatica* Kruglov et Starobogatov, 1989

Locality - East Kamchatka (thermal springs).

16. *L. (R.) chereshnevi* Kruglov et Starobogatov, 1989

Locality - West Kamchatka; in North America probably occurs on Yukon.

17. *L. (R.) schelekhovi* Kruglov et Starobogatov, 1989

Locality - in Northeastern Asia inhabits Penzhyna and Yana River basins; in North America found in Canada and Yukon River basin.

Subgenus Peregriana Servain, 1881

SECTION PEREGRIANA S. STR.

18. *L. (Peregriana) zazurnensis* Mozley, 1934

Locality - Northern Siberia and Far East, in Russian Northeast inhabits Kolhyma River basin.

SECTION KAMTSCHATICANA KRUGLOV ET STAROBOGATOV, 1984

19. *L. (P.) kamtschatica* (Middendorff, 1851)

Syn.: *Lymnaeus kamtschaticus* Middendorff, 1851.

Locality - in Northeastern Asia distributed in Chaun Lowland, Chukotka Peninsula and East Kamchatka; may be found on Alaska.

20. *L. (P.) jacutica* Starobogatov et Streletzkaja, 1967

Locality - Northern Siberia, in Northeastern Asia inhabits Kolhyma River basin, Chaun Lowland, East Kamchatka and western shores of the Okhotsk Sea; may be found on Alaska.

21. *L. (P.) middendorffi* (W. Dybowski, 1903)

Syn.: *L. peregra var. middendorffi* W. Dybowski, 1903.

Locality - Kolhyma River basin, East Kamchatka, western shores of the Okhotsk Sea: may be found on Alaska.

22. *L. (P.) aberrans* (Westerlund, 1897)

Syn.: *L. ovata var. aberrans* Westerlund, 1897.

Locality - Chaun Lowland, East Kamchatka, western shores of the Okhotsk Sea; may be found on Alaska.

Subgenus *Stagnicola Leach* in Jeffreys, 1830

23. *L. (S.) emarginata* Say, 1821

Syn.: *Stagnicola emarginata* (Say, 1821) in Burch [1989].

Locality - Yukon River basin, Canada.

24. *L. (S.) arctica* Lea, 1864

Syn.: *L. youkonensis* Baker, 1934; *Stagnicola arctica* (Lea, 1864) in Clarke [1981] and in Burch [1989].

Locality - Alaska, Canada.

Subgenus *Pacifimyxas* Kruglov et Starobogatov, 1985

25. *L. (Pacifimyxas) magadanensis* Kruglov et Starobogatov, 1985

Locality - Upper Kolhyma River basin and northwestern shores of the Okhotsk Sea; Yukon River basin in North America.

26. *L. (P.) streletzkajae* Kruglov et Starobogatov, 1985

Locality - Upper Kolhyma River basin and northwestern shores of the Okhotsk Sea; Yukon River Basin in North America.

27. *L. (P.) perpolita* Dall, 1905

Syn.: *Fossaria (Bakerlymnaea) perpolita* (Dall, 1905) in Burch [1989].

Locality - Alaska; probably will be found on Chukotka Peninsula.

Subgenus *Orientogalba* Kruglov et Starobogatov, 1985

SECTION ORIENTOGALBA S. STR.

28. *L. (Orientogalba) tumrokensis* Kruglov et Starobogatov, 1985

Locality - Southestern Kamchatka (thermal springs); may be found on Alaska.

SUPERFAMILY PHYSOIDEA FITZINGER, 1883

Family *PHYSIDAE* FITZINGER, 1833

Subfamily *Physinae* Fitzinger,1833

Genus *Physella* Haldeman, 1843

29. *Physella nuttalli* (Lea, 1864)

Syn.: *Physa nuttallii* Lea, 1864; *Physella propinqua nuttalli* (Lea, 1864) in Burch [1989]; *Physa propinqua* Tryon, 1865 in Dall [1905].

Locality - Alaska, British Columbia; in Asia found on the shores of the Krest Bay.

30. *Ph. gyrina* (Say, 1821)

Syn.: *Physa gyrina* Say, 1821 in Dall [1905] and in Baxter [1987].

Locality - Yukon River basin, Canada.

31. *Ph. ampullacea* Gould, 1855

Syn.: *Physella gyrina ampullacea* Gould, 1855; *Physa ampullacea* (Gould, 1855) in Dall [1905].

Locality - Yukon River basin, Canada.

Genus *Costatella* Dall, 1870

32. *Costatella integra* (Haldeman, 1841)

Syn.: *Physa integra* Haldeman, 1841; *Physodon integra* (Haldeman, 1841) in Starobogatov et Budnikova [1976]; *Physella (Costatella) integra integra* (Haldeman, 1841) in Burch [1989].

Locality - Northern part of North America; wide introduced in Asia, in Northeastern Asia found on northwestern shores of the Okhotsk Sea.

Genus *Physa* Draparnaud, 1801

Subgenus *Physa s. str.*

33. *Physa (Physa) streletzkajae* Starobogatov et Budnikova, 1976

Locality - Kolhyma and Anadyr River basins, northwestern shores of the Okhotsk Sea.

Subgenus *Beringophysa* Starobogatov et Budnikova, 1976

34. *Ph. (Beringophysa) chukchensis* Starobogatov et Budnikova, 1976.

Syn.: *Physa ampullacea chukchensis* Starobogatov et Budnikova, 1976.

Locality - Chaun Lowland, Amguema River basin, northwestern Alaska.

35. *Ph. (B.) jennessi* Dall, 1919

Locality - Northwestern North America; in Asia inhabits Lower Kolhyma River basin and Chaun Lowland.

36. *Ph. (B.) skinneri* Taylor, 1954

Syn.: *Physa jennessi skinneri* (Taylor, 1954).

Locality - Northwestern North America; in Asia found in Chaun Lowland and Lower Anadyr River basin.

37. *Ph. (B.) tei* Starobogatov et Prozorova, 1989

Syn.: *Ph. skinneri*, large unnamed morph in Burch [1989].

Locality - Canada; in Northeastern Asia inhabits Lower Anadyr River basin.

38. *Ph. (B.) kuvaevi* Starobogatov et Prozorova, 1989

Locality - Lower Anadyr River basin; may be found on Alaska.

Subfamily *Aplexinae* Starobogatov, 1967

Genus *Sibirenauta* Starobogatov et Streletzkaja, 1967

39. *Sibirenauta elongata* (Say, 1821)

Syn.: *Physa elongata* Say, 1821; *Ph. hypnorum depressior* Middendorff, 1851; *Ph. hypnorum polaris* Westerlund, 1877; *Aplexa hypnorun* (Linnaeus, 1758) (part.) in Dall [1905] and in Baxter [1987]; *Aplexa elongata* (Say, 1821) (part.) in Burch [1989].

Locality - Wide spread in both North Asia and North America.

40. *S. sibirica* (Westerlund, 1876)

Syn.: *Physa hypnorum sibirica* Westerlund, 1876. *Ph. hypnorum picta* Krause, 1883; *Aplexa hypnorum* (Linnaeus, 1758) (part.) in Dall [1905] and in Baxter [1987]; *Sibirenauta picta* (Krause, 1883) in Starobogatov et Budnikova [1976] and in Starobogatov et al., [1989]; *S. elongata* (Say, 1921) (part.) in Burch [1989].

Locality - Northeastern Asia westward up to Enissei River; Alaska, Canada.

SUPERFAMILY *PLANORBIDEA* RAFINESQUE, 1815

Family *PLANORBIDAE* RAFINESQUE, 1815

Subfamily *Planorbinae* Rafinesque, 1815

Triba *Planorbini* Rafinesque, 1815

Genus *Anisus* Studer, 1820

Subgenus *Bathyomphalus Agassiz* in Charpentier,1837

41. *Anisus (Bathyomphalus) crassus* (Da Costa, 1778)

Syn.: *Planorbis crassus* Da Costa, 1778.

Locality - Europe, Siberia eastward up to Kolhyma River basin.

Subgenus *Gyraulus Agassiz* in Charpentier, 1837

42. *Anisus (Gyraulus) stroemi* (Westerlund, 1881)

Syn.: *Planorbis stroemi* Westerlund, 1881; *Gyraulus angasolensis* W. Dybowski, 1913; *G. gredleri stroemi* (Westerlund, 1881) in Shadin [1952].

Locality - Northern Europe, Siberia, in Northeastern Asia inhabits Chaun Lowland and northwestern shores of the Okhotsk Sea.

43. *A. (G.) kamtschaticus* (Westerlund, 1897)

Syn.: *Planorbis kamtschaticus* Westerlund, 1897; *Anisus filiaris* (Gredler, 1885) in Starobogatov et Streletskaya [1967].

Locality - Northeastern Asia westward up to Kolhyma River basin; may be found on Alaska.

44. *A. (G.) centrifugus* (Westerlund, 1897)

Syn.: *Planorbis centrifugus* Westerlund, 1897.

Locality - Kolhyma River basin except upper reaches.

45. *A. (G.) substroemi* Starobogatov et Budnikova, 1976

Locality - Anadyr River basin, shores of the Okhotsk Sea; may be found on Alaska.

46. *A. (G.) infraliratus* (Westerlund, 1876)

Syn.: *Planorbis infraliratus* Westerlund, 1876; *P. polaris mh. Geh.*

Locality - Enissei and Kolhyma River basins, Chukotka Peninsula; may be found on Alaska.

47. *A. (G.) sibiricus* (Dunker, 1848)

Syn.: *Planorbis sibiricus* Dunker, 1848.

Locality - East Siberia, Northern Far East; probably Northwestern North America.

48. *A. (G.) kussakini* Prozorova et Starobogatov, 1997

Locality - in Northeastern Asia from Chukotka and Kamchatka west to Kolhyma; may be found in American part of Beringia.

49. *A. (G.) chereshnevi* Prozorova et Starobogatov, 1997

Locality - Eastern Chukotka (thermal springs); may be found on Alaska.

50. *A. (G.) thermochukchensis* Prozorova et Starobogatov, 1997

Locality - Eastern Chukotka (thermal springs); may be found on Alaska.

51. *A. (G.) deflectus* (Say, 1824)

Syn.: *Planorbis deflectus* Say, 1824; *P. hirsutus* Gould, 1839; *P. virens* Adams, 1840; *P. obliquus* De Kay, 1843; *G. deflectus obliquus* (De Kay, 1843) in Baker [1945]; *G. hirsutus* (Gould, 1839) in Baker [1945]; *G. deflectus* (Say, 1824) in Clarke [1981], Baxter [1987] and Burch [1989].

Locality - Alaska including Yukon River basin, Canada.

Subgenus *Torquis* Dall, 1905

52. *A. (Torguis) circumstriatus* (Tryon, 1866)

Syn.: *Planorbis circumstriatus* Tryon, 1866; *Gyraulus circumstriatus* (Tryon, 1866) in Baker [1945], Clarke [1981] and Burch [1989].

Locality - Alaska, Canada.

53. *A. (T.) hornensis* (Baker, 1934)

Syn.: *Gyraulus (Torguis) hornensis* Baker, 1934 in Baker [1945] and Burch [1989].

Locality - Alaska, Canada.

54. *A. (T.) parvus* (Say, 1817)

Syn.: *Planorbis parvus* Say, 1817; *P. elevatus C.B.* Adams, 1840; *P. billingsi* Lea, 1866; *Gyraulus parvus* (Say, 1817) in Baker [1945], Clarke [1981], Baxter [1987] and Burch [1989].

Locality - Alaska, Canada.

Genus *Armiger* Hartmann, 1840

55. *Armiger evrasiaticus* Prozorova et Starobogatov, 1996

Syn.: *Planorbis nautileus auct.* non Linnaeus, 1867 (part.); *P. crista var. inermis* Lindholm, 1926 (part.); *Armiger crista* (Linnaeus, 1758) in Starobogatov et Streletskaya [1967]; *Planorbis crista* Linne, 1758 (part.) Dall [1905]; *Armiger crista* (Linnaeus, 1758) (part.) in Baxter [1987]; established as new name for *Armiger crista* Burch, 1989: p. 196, non Linnaeus, 1758.

Locality - Holarctic, in Northeastern Asia inhabits Kolhyma River basin and Chaun Lowland; in North America found on Yukon.

56. *A. bakeri* Prozorova et Starobogatov, 1996

Syn.: *Planorbis crista* Linne, 1758 (part.) in Dall [1905]. *Armiger crista* (Linnaeus, 1758) (part.) in Baxter [1987]; established as new name for *Armiger crista* Clarke, 1973: p. 406, non Linnaeus, 1758.

Locality - Alaska, Canada.

Tribe *Segmentinini F.C.* Baker, 1945

Genus *Kolhymorbis* Starobogatov et Streletzkaja, 1967

57. *Kolhymorbis shadini* Starobogatov et Streletzkaja, 1967

Locality - Kolhyma and Anadyr River basins, Chaun Lowland.

Genus *Polypylis* Pilsbry, 1906

Subgenus *Sibiripolypylis* Starobogatov in Bogatov et Zatrawkin, 1987

58. *Polypylis likharevi* Starobogatov et Streletzkaja, 1967

Locality - Kolhyma and Upper Zeya River basins.

Subfamily *Planorbulinae* Pilsbry, 1934

Genus *Menetus* H. et A. Adams, 1855

59. *Menetus cooperi* Baker, 1945

Locality - Alaska south to California.

60. *M. opercularis* (Gould, 1847)

Syn.: *Planorbis opercularis* Gould, 1847; *P. planulatus* Cooper, 1859; *P. centervillensis* Tryon, 1872.

Locality - Alaska south to Alberta and California.

61. *M. callioglyptus* (Vanatta, 1895)

Syn.: *Planorbis callioglyptus* Vanatta, 1895; *Menetus cooperi callioglyptus* (Vanatta, 1895) in Baker [1945].

Locality - Alaska, British Columbia.

Genus *Promenetus F.C.* Baker, 1935

62. *Promenetus exacuous* (Say, 1821)

Syn.: *Planorbis exacuous* Say, 1821; *P. exacutus* Gould, 1841.

Locality - Alaska, Canada; in Northeastern Asia found in Anadyr River basin.

63. *P. umbilicotellus* (Cockerell, 1887)

Syn.: *Planorbis umbilicotellus* Cockerell, 1887; *Gyraulus umbilicatus* (Cockerell, 1887) in Baker (1945).

Locality - Alaska south to Oregon, Canada.

Family *BULINIDAE* HERRMANSEN, 1846

Subfamily *Helisomatinae* Baker, 1928

Genus *Planorbella* Haldeman, 1842

64. *Planorbella subcrenata* (Carpenter, 1857)

Syn.: *Planorbis subcrenatus* Carpenter, 1857; *Helisoma kolymense* Lindholm, 1932; *Helisoma (Pierosoma) subcrenatum subcrenatum* (Carpenter, 1857) in Baker [1945]; *H. trivolvis subcrenatum* (Carpenter, 1857) in Clarke [1981].

Locality - Yukon River basin, British Columbia, south to California, east to Colorado; in Northeastern Asia found in Lower Kolhyma River basin (subfossil).

65. *P. trivolvis* (Say, 1817)

Syn.: *Planorbis trivolvis* Say, 1817; *Helisoma (Pierosoma) trivolvis trivolvis* (Say, 1817) in Baker [1945].

Locality - Alaska, Arctic Canada, southward to Tennessee and Missouri; may be found on Chukotka.

66. *P. horni* (Tryon, 1867)

Syn.: *Helisoma (Pierosoma) horni* (Tryon, 1867) in Baker [1945].

Locality - Alaska uncluding Yukon River basin, British Columbia; in Northeastern Asia inhabits Lower Ahadyr River basin.

Subclass Pectinibranchia

ORDER VIVIPARIFORMES SITNIKOVA ET STAROBOGATOV, 1982

Suborder Valvatoidei Sitnikova et Starobogatov, 1982

Family *VALVATIDAE* GRAY, 1840

Subfamily *Valvatinae* Gray, 1840

Genus *Cincinna* Ferussac, 1821

Subgenus *Sibirovalvata* Starobogatov et Streletzkaja, 1967

67. *Cincinna (Sibirovalvata) helicoidea* (Dall, 1905)

Syn.: *Valvata lewisi var. helicoidea* Dall, 1905; *Valvata (Sibirovalvata) helicoidea* Dall, 1905 in Starobogatov et Budnikova [1976].

Locality - Yukon River basin, British Columbia; in Northeastern Asia on Chukotka Penunsula.

68. *C. (S.) kamchatica* Prozorova et Starobogatov, this issue

Locality - Lower Kolhyma River basin, Kamchatka.

69. *C. (S.) sibirica* (Middendorff, 1851)

Syn.: *Valvata sibirica* Middendorff, 1851.

Locality - Siberia, in Northern Far East inhabits Upper Kolhyma River basin and northwestern shores of the Okhotsk Sea.

70. *C. (S.) ssorensis* (W. Dybowski, 1886)

Syn.: *Valvata ssorensis* W. Dybowski, 1886.

Locality - Northern Siberia and Far East from Enissei River basin to Chukotka and Kamchatka.

71. *C. (S.) confusa* (Westerlund, 1897)

Syn.: *Valvata confusa* Westerlund, 1897; *V. stelleri* W. Dybowski, 1903.

Locality - Northern West Siberia east to Chukotka and Kamchatka; may be found on Alaska.

72. *C. (S.) chereshnevi* Bogatov, Zatrawkin et Starobogatov, 1990

Locality - Khatyrka River basin (Koryak mountains).

73. *C. (S.) mergella* (Westerlund, 1883)

Syn.: *Valvata mergella* Westerlund, 1883.

Locality - Alaska including Yukon River basin.

ORDER RISSOIFORMES SLAVOSHEVSKAJA, 1983

SUPERFAMILY BITHYNIOIDEA GRAY, 1857

Family *BITHYNIIDAE* GRAY, 1857

Subfamily *Parafossarulinae* Starobogatov et Sitnikova, 1983

Genus *Boreoelona* Starobogatov et Streletzkaja, 1967

74. *Boreoelona sibirica* (Westerlund, 1886)

Syn.: *Bithynia troscheli sibirica* Westerlund, 1886.

Locality - Siberia from Enissei to Kolhyma River basins, in Northern Far East inhabits Upper Anadyr River basin and Kamchatka.

75. *B. contortrix* (Lindholm, 1909)

Syn.: *Bithynia contortrix* Lindholm, 1909; *Bithynia gravida borealis* Westerlund, 1897 (non *B. borealis* Parreys in Frauerngeldt, 1862).

Locality - Lena, Enissei and Kolhyma (except upper reaches) River basins.

Family *KOLHYMAMNICOLIDAE* STAROBOGATOV IN STAROBOGATOV ET SITNIKOVA, 1983

Genus *Kolhymamnicola* Starobogatov et Budnikova, 1976

76. *Kolhymamnicola kolhymensis* (Starobogatov et Streletzkaja, 1967)

Syn.: *Amnicola kolhymensis* Starobogatov et Streletzkaja, 1967.

Locality - Zeya, Bureya, Kolhyma and Anadyr River basins, northwestern shores of the Okhotsk Sea.

Class Bivalvia

SUPERFAMILY UNIONOIDEA RAFINESQUE, 1820

Family *MARGARITIFERIDAE* HENDERSON, 1929

Subfamily *Margaritiferinae* Henderson , 1929

Tribus *Heudeanini* Starobogatov, 1970

Genus *Dahurinaia* Starobogatov, 1970

77. *Dahurinaia middendorffi* (Rosen, 1926)

Syn.: *Margaritana middendorffi* Rosen, 1926.

Locality - Kamchatka.

78. *D. falcata* (Gould, 1850)

Syn.: *Alasmodon falcata* Gould, 1850; *A. yubaensis* Trask, 1855; *Margaritana margaritifera var. falcata* (Gould, 1850) in Dall [1905]; *M. falcata* (Gould, 1850) in Burch [1975b], Clarke [1981] and Baxter [1987].

Locality - Southern Alaska, south to California, British Columbia.

Family *Unionidae* Rafinesque, 1820

Subfamily *Anodontinae* Rafinesque, 1820

Tribe *Anodontini* Rafinesque, 1820

Genus *Beringiana* Starobogatov et Zatrawkin, 1983

79. *Beringiana beringiana* (Middendorff, 1851)

Syn.: *Anodonta cellensis beringiana* Middendorff, 1851; *A. beringiana* Middendorff, 1851 (part.) in Shadin [1952]; *Anodonta beringiana* Middendorff, 1851 in Burch [1975b], Clarke [1981] and Baxter [1987].

Locality - Chukotka, Kamchatka, Aleutian Islands, Alaska including Yukon River basin, south to Washington and Oregon.

80. *B. youkonensis* (Lea, 1867)

Syn.: *Anodonta youconensis* Lea, 1867; *A. youkanensis* Lea, 1868; *A. beringiana* Middendorff 1851 (part.), in Shadin [1952].

Locality - Chukotka, Kamchatka, Aleutian Islands.

81. *B. kennerleyi* (Lea, 1862)

Syn.: *Anodonta kennerleyi* Lea, 1862.

Locality - Southern Alaska, south to Oregon, British Columbia, western Alberta.

ORDER LUCINIFORMES STOLICZKA, 1871

SUPERFAMILY PISIDIOIDEA GRAY IN TURTON, 1857

Family *SPHAERIIDAE JEFFREYS, 1862*

Subfamily *Sphaeriidae* Jeffreys, 1862

Genus *Sphaerium* Scopoli, 1777

Subgenus *Parasphaerium* A limov et Starobogatov, 1968

82. *Sphaerium (Parasphaerium) rectidens* Starobogatov et Streletzkaja, 1967

Syn.: *Sphaerium nitidum* Odhner, 1921 (part.) in Shadin [1952]; *S. suecicum* Westerlund, 1881 (part.) in Starobogatov et Korniushin [1986].

Locality - Northern Palearctic. It is found throughout in northern Russian Far East from Kolhyma to Chukotka and Kamchatka including northern shores of the Okhotsk Sea; may be found in North America.

Subgenus *Nucleocyclas* Alimov et Starobogatov, 1968

83. *S. (Nucleocyclas) rhomboideum* (Say, 1822)

Syn.: *Cyclas rhomboida Say, 1922; C. elegans* Adams, 1840.

Locality - Northern United States, British Columbia.

Subgenus *Sibirisphaerium* Slugina et Starobogatov in Slugina, Starobogatov et Korniushin , 1994

84. *S. (Sibirisphaerium) capiduliferum* Lindholm, 1909

Syn.: *Sph. corneum var. capiduliferum* Lindholm, 1909 in Kozhov [1936].

Locality - Siberia, in northearn Russian Far East found in Kolhyma River basin, Chaun Lowland and Kamchatka; may be found on Alaska.

85. *S. (S.) westerlundi* Clessin in Westerlund, 1873

Syn.: *Sph. corneum f. westerlundi* Clessin, 1877 (part.) in Shadin [1952]; *S. ssorense* Dybowski, 1902; *Sph. corneum var. westerlundi* Clessin in Westerlund, 1873 in Kozhov [1936].

Locality - Northern Palearctic, in northern Russian Far East in Kolhyma River basin, Chaun Lowland and Kamchatka; may be found in North America.

Subfamily *Musculiinae* Starobogatov in Stadnichenko, 1984

Genus *Musculium* Link, 1807

Subgenus *Parvimusculium* Starobogatov et Korniushin, 1986

86. *Musculium (Parvimusculium) creplini* (Dunker, 1845)

Syn.: *Cyclas creplini* Dunker, 1845; *Sphaerium (Musculium) lacustre* (Muller, 1774) (part.) in Shadin [1952].

Locality - Northern Eurasia, in northern Russian Far East inhabits Kolhyma and Upper Anadyr River basins, Chaun Lowland and Kamchatka.

Subgenus *Morimusculium* Starobogatov in Starobogatov et orniushin, 1986

87. *M. (M.) tenue* (Prime, 1851)

Syn.: *Cyclas tenuis* Prime, 1851; *Sphaerium (Musculium) tenue* (Prime, 1851) in Dall [1905]; *Musculium lacustre* (Muller, 1774) (part.) in Burch [1975a] and Clarke [1981]; *Sphaerium (Musculium) lacustre* (Muller, 1774) (part.) in Baxter [1987].

Locality - Alaska, Yukon and Mackenzie River basins.

88. *M. (M.) hannai* (Sterki, 1918)

Syn.: *Pisidium hannai* Sterki, 1918; *Musculium lacustre* (Muller, 1774) (part.) in Burch [1975a] and Clarke [1981]; *Sphaerium (Musculium) lacustre* (Muller, 1774) (part.) in Baxter [1987].

Locality - Chukotka, Kamchatka, Aleutian Islands, Pribilof Islands.

Family *EUGLESIDAE PIROGOV ET* STAROBOGATOV, 1974

Subfamily *Lacustrininae* Korniushin, 1989

Genus *Lacustrina* Sterki, 1916

89. *Lacustrina dilatata* (Westerlund, 1897)

Syn.: *Pisidium dilatatum* Westerlund, 1897; *P. maculatum* Dybowski, 1902; *P. subtellastrium* Lindholm, 1909; *P. carelicum* Odhner, 1926; *P. amnicum var. subtellastrium* Lindholm, 1909 in Kozhov [1936]; *P. (Eupisidium) subtellastrium* Lindholm, 1909 in Shadin [1952]; *(?) P. idahoense* Roper, 1890.

Locality - North of East Europe and Siberia, in northern Russian Far East from Kolhyma River basin to Chukotka Peninsula; probably in North America known as Pisidium idahoense.

90. *L. chukchensis* (Prozorova, 1988)

Syn.: *Pisidium chukchensis* Prozorova, 1988.

Locality - Chaun Lowland, Amguema and Upper Anadyr River basins.

References

Baker F.C. 1911. The *Lymnaeidae* of North and Middle America. Recent and fossil. Chicago: Chicago Sciences Academy. 539 p. (Academy Special Publications; V. 3).

Baker F.C. 1945. The molluscan family *Planorbidae*. Urbana: University of Illinois Press. 530 p.

Baxter R. 1987. Mollusks of Alaska. Bayside, California: Shells and Sea Life. 101 p.

Burch J.B. 1975a. Freshwater *Sphaeriacean clams (Mollusca: Pelecypoda)* of North America. Hamburg; Michigan: Malacological Publications. 96 p.

Burch J.B. 1975b. Freshwater *Unionacean clams (Molluska: Pelecypoda)* of North America. Michigan; Australia. 204 p.

Burch J.B. 1989. North American freshwater snails. Hamburg; Michigan: Malacological Publications. 365 p.

Dolgin V.N. Korniushin A.V. 1994. Obzor vidov podroda *Euglesa (Cyclocalyx) (Mollusca, Bivalvia, Pisidioidea)* Severnoi Evrazii [Review of the species of the subgenus *Euglesa (Cyclocalyx) (Mollusca, Bivalvia, Pisidioidea)* from Northern Eurasia] // Zoologicheskiy zhurnal [Zoological Journal]. V. 73, No. 12. P. 9-18. (In Russian, English abstract).

Dall W.H. 1905. Land and FreshWater Molluscs of Alaska and Adjoining regions. Washington: Doubleday, Page & Company. 171 p. (Harriman Alaska expedition; V. 13).

Chereshnev I.A. 1996. Biologicheskoe raznoobrazie presnovodnoy ikhtiofauny severo-vostoka Rossii [Biological diversity of freshwater fish fauna in the Russian North-East]. Vladivostok: Dalnauka. 198 p. (In Russian).

Clarke A. H. Jr. 1981. The freshwater *Mollusca* of Canada. Ottawa: National Museums of Canada. 439 p.

Kozhov M.M. 1936. Mollyuski ozyera Baikal [Mollusks of the Baikal Lake]. 320 p. Moscow; Leningrad. (Trudy Baikal'skoi limnologicheskoi stantsii [Transactions of the Baical limnological station]; V. 8). (In Russian).

Odhner N. H. 1939. Sphaeriids from the Aleutian Islands // Nautilus. V. 52, No. 3. P. 79-84.

Prozorova L.A. 1986. Sostav i biogeograficheskaja kharakteristika malakofauny brukhonogikh Chaunskoy nizmennosti [Specific contentand biogeographical characteristics of freshwater gatropods of the Chaun Lowland // Donnye organizmy presnykh vod Dal'nego Vostoka [Freshwater benthos of the Russian Far East]. Vladivostok: Dalnauka. P. 39-47. (In Russian).

Prozorova L.A. 1988. Molluscs of the family *Pisidiidae* from the Chaun Lowland // Zoologicheskiy zhurnal [Zoological Journal]. V. 57, No. 10. P. 1576-1580. (In Russian, English abstract).

Prozorova L.A. Foster N.R. 1995. Freshwater malacofauna of Alaska and Northeastern Asia // Western Society of Malacologists Annual Report. V. 28. P. 9-10.

Prozorova L.A., Starobogatov Ya.I. 1996. Genus Armiger Hartmann, 1840 (family *Planorbidae*) // Ruthenica (Russian Malacological Journal). V. 5, No. 2. P. 167-175

Prozorova L.A., Starobogatov Ya.I. 1997. New species of the subgenus *Gyraulus* of the genus *Anisus* and *Gyraulus*-similar forms from Asiatic Russia (with notes on the classification of the genera *Anisus* and *Choanomphalus (Gastropoda Planorbidae)* // Ruthenica. V.7, No. 1. P. 39-50.

Shadin V.I. 1952. Mollyuski pryesnykh i solonovatykh vod SSSR [Fresh and Brackishwater molluscs of the USSR]. Moscow; Leningrad: Izdatel'stvo AN SSSR. 346 p. (Opredeliteli po faune SSSR [Guides to the USSR fauna]; V. 46.) (In Russian).

Starobogatov Ya.I. 1982. Connections between malacofaunas of East Asia and North America // The Arctic Ocean and its coast in Cenozoic Era. New Delhy: American Publishing Co. P. 544-546.

Starobogatov Ya.I., Budnikova L.L. 1976. O faune presnovodnykh brukhonogikh molluskov Krainego Severo-Vostoka SSSR [To the fauna of freshwater gastropods of the Soviet Extreme Far East] // Presnovodnaja fauna Chukotskogo poluostrova [Freshwater fauna of the Chukotka Peninsula]. Vladivostok: Dalnauka. P. 72-88. (In Russian).

Starobogatov Ya.I., Korniushin A.V. 1986. Osobennosti yaycezhivorozhdeniya i sistematica sferiid *(Bivalvia Pisidioidea Sphaeriidae)* [The characteristics of the ovovivipary and the taxonomy of fingernail clams *(Bivalvia Pisideoidea Sphaeriidae)*] // Transactions of the Zoological Institute [Trudy Zoologichiskogo Instituta Akademii nauk SSSR, Leningrad]. V. 152. P. 30-40. (In Russian, English abstract).

Starobogatov Ya.I., Streletskaya E.A. 1967. Sostav i zoogeograficheskaja kharacteristika presnovodnoy malakofauny Vostochnoy Sibiri i Severa Dal'nego Vostoka [Composition and zoogeographical characteristics of freshwater malacofauna of the East Siberia and Northern Part of the Far East] // Ibid. V. 57. P. 221-268. (In Russian, English abstract).

Starobogatov Ya.I., Prozorova L.A., Zatravkin M.N. 1989. Sostav semeystva *Physidae (Gastropoda, Pulmonata, Lymnaeiformes)* Sibiri i Dal'nego Vostoka SSSR (s zamechanijami o evropeyskikh fizidakh) [Composition of the *Physidae* Family *(Gastropoda, Pulmonata, Lymnaeiformes)* from Siberia and the Far East of the USSR (with noteson European physidaes] // Byulleten' Moskovskovo obshestva ispytateley prirody [Bulletin Moscow society of naturalists]. V. 94, No. 1. P. 62-76. [In Russian; English abstact].

Sterki V. 1918. A new mollusk of the genus *Pisidium* from Alaska, with field notes by G. Dallas Hanna // Proceedings U.S. National Museum. V. 51, No. 2160. P. 475-477.

Sterki V. 1922. Some notes on Sphaeriidae with descriptions of new species // Annals of the Carnegie Museum. V. 13, No. 3/4. P. 425-439.