Ruthenica, 2005, 14(2): 107-118.

A preliminary analysis of biodiversity of molluscs of Russia and adjacent territories

Yuri I. KANTOR[1], A. V. SYSOEV[2]

[1]*A.N. Severtzov Institute of Ecology and Evolution, Russian Academy of Sciences, Leninski prospect 33, Moscow 117071, RUSSIA*
[2]*Zoological Museum of Moscow State University, B. Nikitskaya Str. 6, Moscow 109009, RUSSIA*

ABSTRACT. The analysis is based on the catalogue of molluscs of Russia and former republics of the USSR. The total fauna consists of 3674 species from 6 classes; marine molluscs are represented by 1744 species, the land snails by 736 species and freshwater molluscs by 1194 species. Faunal composition of different areas (marine and land habitats) is briefly discussed. Basing on the comparison of the size-structure of the molluscs of Russian Far-East seas with that of other regions in tropical, subtropical and boreal zones, the conclusion is made that a large number (150-500) of species of micromolluscs can likely be found in Russian waters. Generally, the biodiversity of marine molluscs in Russian waters is rather low in comparison with adjacent areas (Japan, Mediterranean, and others).

Assessment of global biodiversity, as well as of biodiversity of particular groups and territories is the high priority task in these days. Molluscs is the second largest phylum of animals and the most diverse in marine environments [Bouchet et al., 2002]. Currently the inventory of the molluscan faunas of different regions of the planet is quickly progressing. Quite naturally, it has started from the best studied faunas (e.g., marine and terrestrial molluscs of North America, Europe, and Japan), though gathering information on such immense and obviously insufficiently studied fauna as that of the Indo-Pacific is also under way.

Two somewhat different approaches can be mentioned. One consists in development of a computer-based databases with a free on-line access. The most well-known examples are the *Database of Indo-Pacific Marine Molluscs* (http://data.acnatsci.org/obis/findmollusc.php; currently containing 66,527 names), the *CLEMAM (European Marine Mollusca) Database* (http://www.somali.asso.fr/clemam/index.clemam.html) with 17,000 names (3,500 valid), and the *Western Atlantic Gastropod Database* (Malacolog version 3.2.4.) currently including 4870 species.

The other approach is to prepare essentially the same kind of database as a paper-based publications. The examples are numerous and varying in scope and content, and include checklists and catalogues of the Mediterranean [Sabelli et al., 1992], British [Smith, Heppell, 1991] and Japanese [Higo et al., 1999] marine molluscs, as well as of the terrestrial fauna of Europe [France — Falkner et al., 2002; CLECOM — Falkner et al., 2001], not to mention the others.

In terms of geography, there are still large areas with comparatively well studied faunas and in need for general inventory of molluscs. Clearly, one of such areas is Russia (or, in a broader sense, the republics of the former USSR [RFU]). It possesses a huge territory and a very long coastal line, and connecting at the same time the well studied faunas of Europe and Japan together with the North Pacific. Despite more than 230 years of investigations of Russian molluscs (since P.S. Pallas' pionereering work of 1771), and the publication of revisions or reviews of many taxonomic and ecological groups, nobody has tried to compile even a complete list of them. In recent years, some regional checklists and guides to identification were, however, published [gastropods and bivalves of Northwest Pacific — Golikov et al., 2001; Kafanov, 1991; freshwater molluscs of Russia — Starobogatov et al., 2004; freshwater molluscs of Russian Far East — Bogatov, Zatrawkin, 1992; Zatrawkin, Bogatov, 1988; and others].

In the recent literature, there was only one attempt to estimate the total richness of molluscan fauna of Russia and adjacent territories (Scarlato et al., 1994). It was based on expert estimates of specialists in different molluscan groups and resulted in the figure of 2753 species for the former USSR (Aplacophora — 20, Polyplacophora — 52, Monoplacophora — 1, Gastropoda — 2000, Scaphopoda — 10, Bivalvia — 600). An elaboration of that attempt can presently be seen at http://www.zin.ru/projects/zooiut-r/zi2.htm. In the latter version, the total fauna of Russia contains 2863 molluscan species. As it will be shown below, in

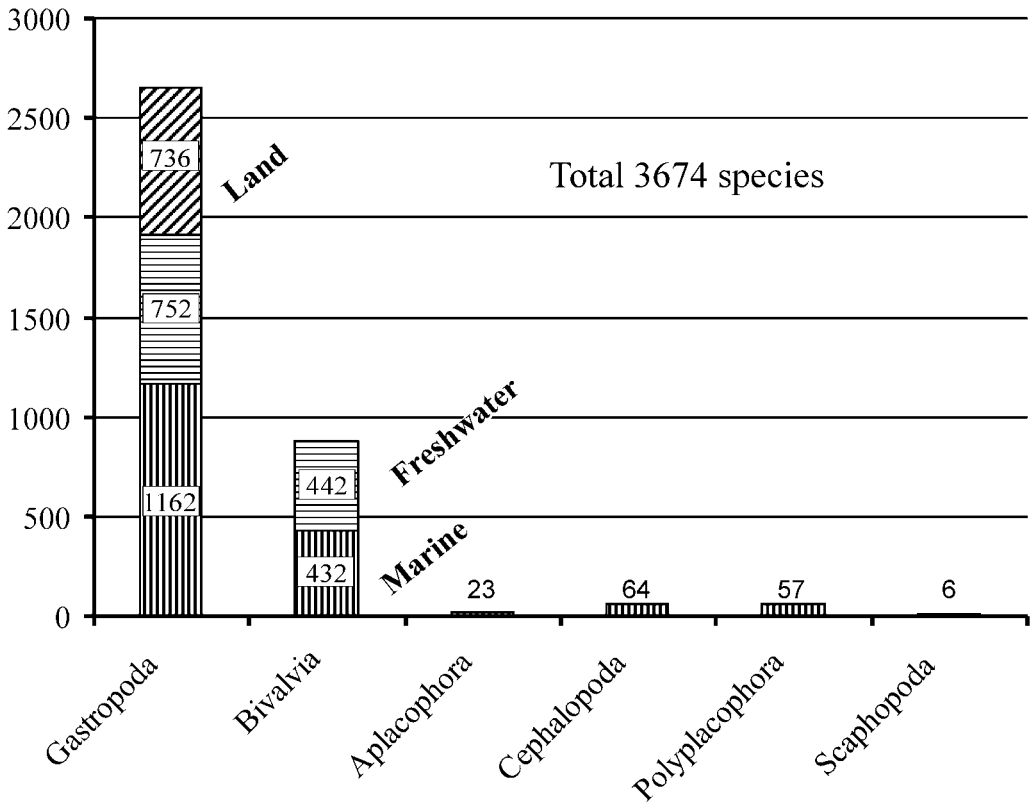

FIG. 1. Composition of marine, freshwater and land malacofauna of Russia and adjacent territories.

РИС. 1. Состав морской, пресноводной и наземной малакофауны России и сопредельных территорий.

both cases the fauna was strongly (by about 25-30%) underestimated.

With the help of several colleagues we prepared the complete catalogue of marine, freshwater and terrestrial molluscs of RFU. Below we try to analyse the structure of biodiversity of molluscs.

Methods

The current analysis is based on the catalogue, compiled on the basis of published records (including several most recent publications of 2004), and in several cases on the collection specimens. Marine territories were analysed within the borders of Russian economic zone, the land — within the borders of the former USSR. The reason for choosing these geographic limits was mainly historical: during the existence of the Russian Empire and the former USSR, the fauna of these formations was studied as a whole, and the collections were primarily accumulated in central Russian institutions and museums.

For the purposes of the analysis we treated species and subspecies equally, and they are regarded as "species" below.

In the analysis of size structure we utilised the maximal published dimensions for the species. We used 6 size classes: less than 1 mm, 1-5 mm, 5.1-9.9 mm, 10-49 mm, 50-109 mm, 110 mm and more. These size classes were selected subjectively for the convenience of the analysis. In fact the maximal size for the species (better to say the maximal known size) theoretically is smaller than the actual one (there is always possibility that a larger specimen can be found). Besides, we were not able to find the dimensions for some species and we used the size of the closely related ones. Therefore the larger size classes reduced the effect of these uncertainties. Moreover, the size structure was used by us for mere comparison of different faunas, but not for finding of biological regularities.

Results and discussion

Taxonomic and faunal composition

To the moment the total fauna of the area under analysis consists of 3674 species of molluscs.

Marine (including species penetrating brackish waters) molluscs are represented by 1744 species from 6 classes*: Gastropoda — 1162, Bivalvia — 432, Aplacophora — 23, Cephalopoda — 64, Polyplacophora — 57, Scaphopoda — 6 species (Fig. 1).

*There is also one undescribed species of Monoplacophora from northwestern Pacific in Russian fauna (L. Moskalev, D. Ivanov, pers. comm.).

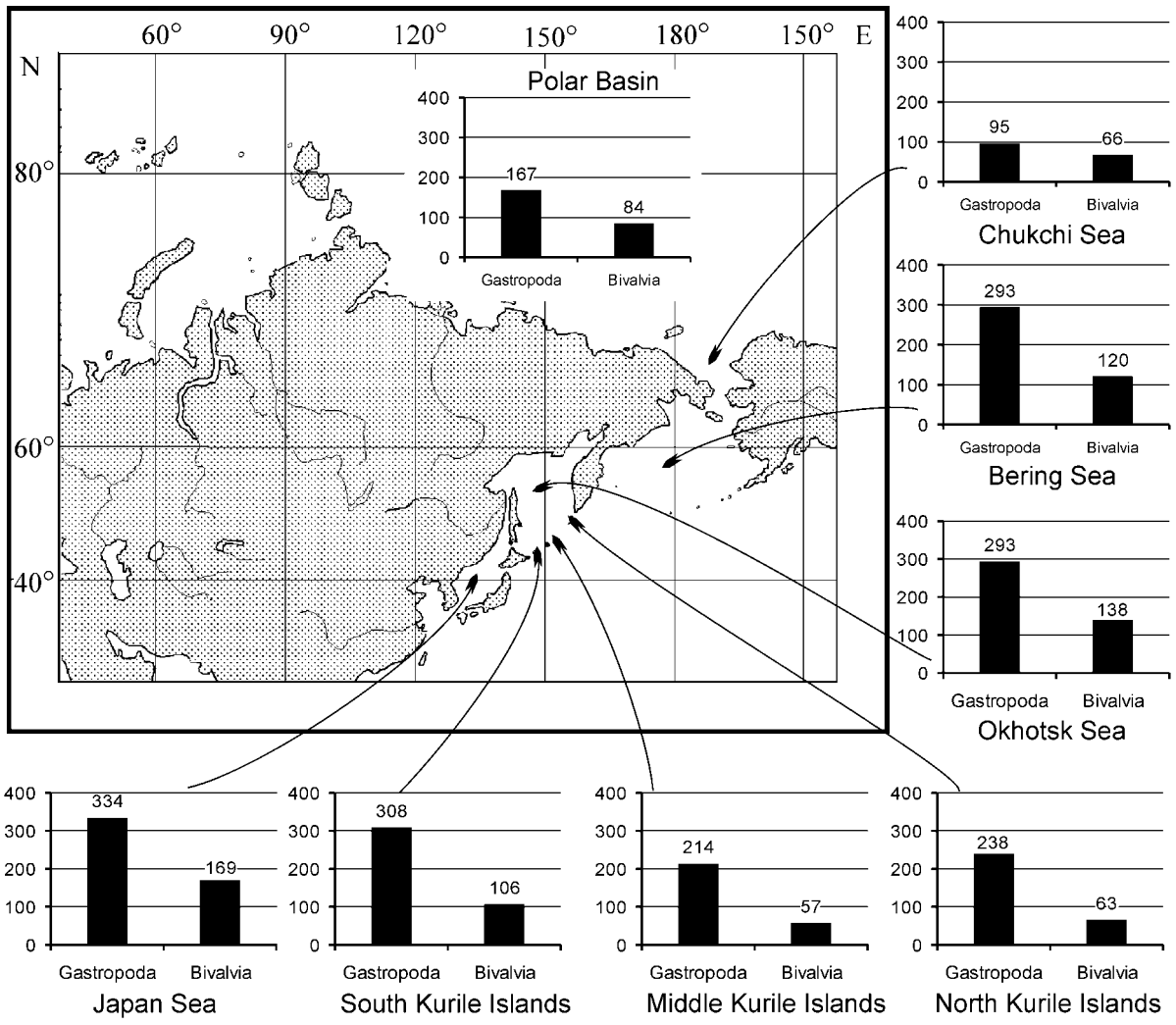

FIG. 2. Distribution of gastropod and bivalve marine molluscs in the Far-East seas of Russia.

РИС. 2. Распределение числа видов брюхоногих и двустворчатых морских моллюсков в дальневосточных морях России.

Gastropoda and Bivalvia represent the vast majority of total biodiversity (95.9% of total species number). Therefore below we will mostly concern with the analysis of these two groups.

The richest of the full salinity seas is the southernmost (and at the same time the best studied) Japan Sea. Its malacofauna is represented by 553 species (Gastropoda — 334; Bivalvia — 169; Aplacophora — 4; Polyplacophora — 22; Cephalopoda — 24) (Fig. 2). In general, the seas of the northern Pacific are richer in molluscs than the north Atlantic ones (Fig. 3).

The richest European sea is the Barents, where 320 species were recorded (Gastropoda — 208; Bivalvia — 90; Aplacophora — 7; Polyplacophora — 5; Scaphopoda — 5; Cephalopoda — 5).

Low-salinity seas are characterized by much less diverse faunas with 149 species and subspecies of Gastropoda and 61 of Bivalvia in the Black Sea (including strongly freshened firths) and, correspondingly, 92 and 35 in the Caspian Sea.

The land snails are represented by 736 species (Fig. 1). As typical of this group, the highest diversity is recorded in low-latitude mountainous areas, like Caucasus and ranges of Central Asia, whereas vast areas of lowland European part and Siberia are rather poor in molluscan species and spatially monotonous (see below).

Freshwater molluscs are represented by 1194 species: Gastropoda — 752, Bivalvia — 442 (Fig. 1). Distribution of the number of species in the main zoogeographical areas (which are here selected following Starobogatov, 1970) is presented on Fig. 4. The richest fauna is recorded in European-Siberian subregion (276 species of Gastropoda and 188 species of Bivalvia). Eastern-Siberian subregion is much more poor, with 113 species of Gastropoda and 50 species of Bivalvia. Amur-Japanese subre-

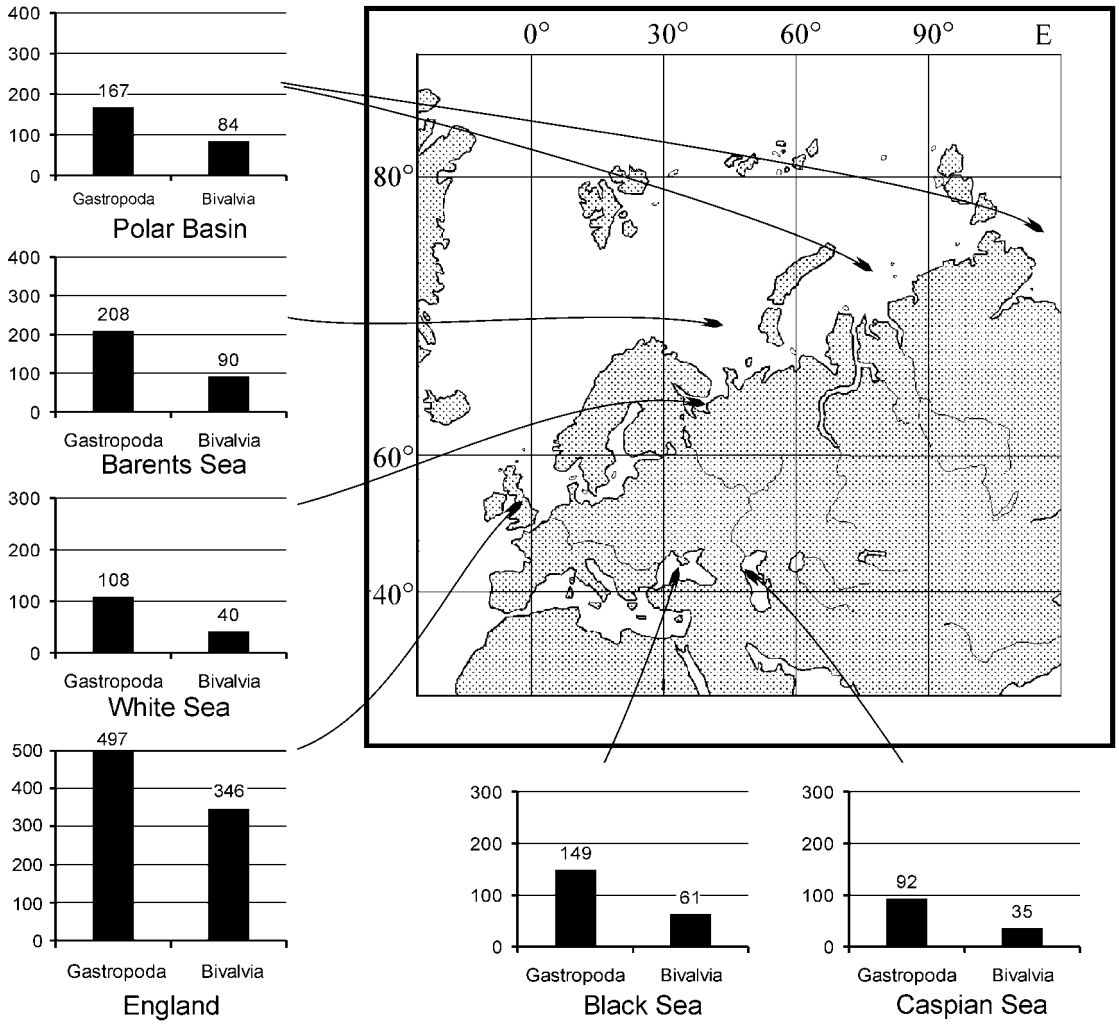

FIG. 3. Distribution of gastropod and bivalve marine molluscs in the European seas of Russia.

РИС. 3. Распределение числа видов брюхоногих и двустворчатых морских моллюсков в европейских морях России.

gion has similar number of Gastropods (112), but more than twice higher number of Bivalvia (129). Baikal Lake is characterized by exceptionally high diversity of molluscs (173 species and subspecies of Gastropoda and 50 species and subspecies of Bivalvia).

Of a special interest may be the analysis of the relationship between the number of species of major molluscan groups (i.e., Gastropoda and Bivalvia) in faunas of different geographic regions. In general, the Gastropoda/Bivalvia ratio is 2.69 for the marine fauna and 1.70 for freshwater molluscs. However, if we consider the faunas of different areas, this ratio appears to vary strongly. In the marine fauna, gastropods strongly prevail (by up to 3.81 times) in North and Middle Kurile Islands, whereas in the Chukchi Sea fauna the share of bivalves is much higher (the ratio is 1.44) (Fig. 2). Even more drastic differences occur in freshwater faunas: the Gastropoda/Bivalvia ratio varies from 3.46 in Baikal Lake to 0.45 in Kurile Islands, and bivalves generally prevail in southern Asian faunas (Fig. 4). The causes of this phenomenon are unclear and, besides probable difference in the completeness of knowledge of these groups in respective areas, may also reflect the difference in the environment and the history of the fauna formation.

Biodiversity of marine molluscs

Comparison of the total number of marine species in Russia with that in other regions (Table 1) reveals a rather low diversity. This is especially clear in comparison of the number of gastropods and bivalves from Russian seas with that in adjacent regions (e.g., Japan and the Mediterranean). Thus, the total number of species in the Far-East seas (Japan, Okhotsk, and Bering seas) is only 1069. The richest are the Japan Sea (503 species) and southern Kurile Islands (414 species). The richest area of the

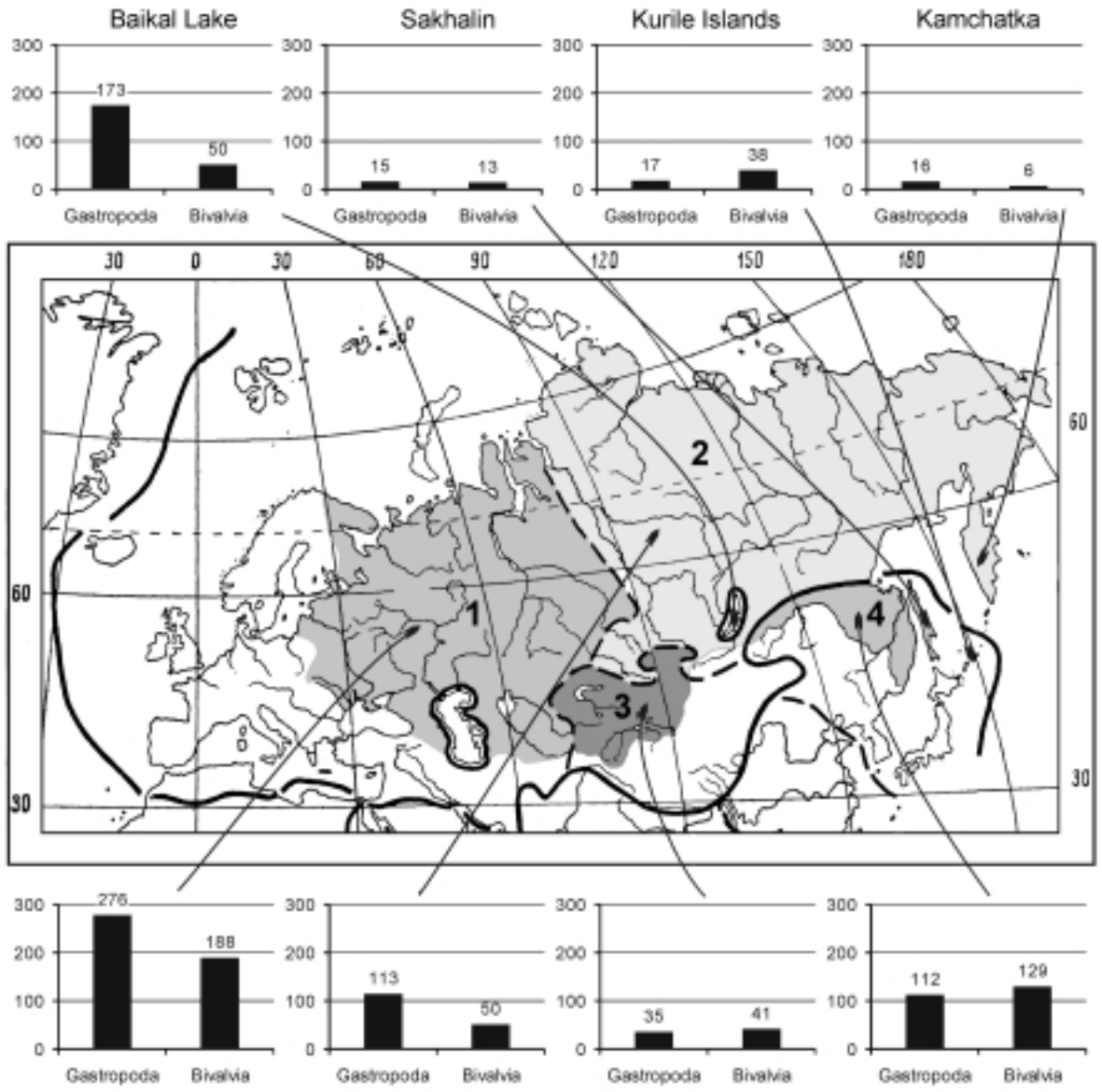

FIG. 4. Distribution of gastropod and bivalve freshwater molluscs in Russia and adjacent territories. Zoogeographic borders in bold and dashed lines, analyzed area is highlighted by different shadows of gray. 1 – European-Siberian subregion; 2 – Eastern-Siberian subregion; 3 – Mountain-Asian subregion; 4 – Amur-Japanese subregion.

РИС. 4. Распределение числа видов брюхоногих и двустворчатых пресноводных моллюсков в России и на сопредельных территориях. Зоогеографические границы отмечены толстыми сплошными и пунктирными линиями, проанализированные территории выделены различными оттенками серого. 1 – Европейско-Сибирская подобласть; 2 – Восточно-Сибирская подобласть; 3 – Нагорно-Азиатская подобласть; 4 – Амуро-Японская подобласть.

Japan Sea is the Posjet Bay (at least 184 species — Golikov, Scarlato, 1967), which is characterized by dominations of low-boreal (46%) and subtropical (36%) species. It should be mentioned that Posjet Bay fauna is well documented in comparison with other regions, due to the expeditions of the Zoological Institute in the 1960s.

At the same time along the coastline of the Japan archipelago 6465 shelled gastropods and bivalves were recorded [Higo et al., 1999], which 3.7 times exceeds the entire marine fauna of Russia and 12.9 times exceeds the number of species in Russian part of the Japan Sea.

Northern and European seas are far less rich in molluscs and even in the richest Barents Sea the number of species is 2.7 times less than in the British area (Fig. 3). The Mediterranean Sea fauna 1.16 times exceeds the entire Russian marine malacofauna.

The size of any faunistic list depends on both objective and subjective reasons. Among objective reasons we can mention the actual biodiversity of the region and the degree of knowledge of the biodiversity (the presence of the collections, degree of their processing, presence of the published data, etc.). The actual biodiversity depends on many natural factors and practically cannot be estimated or

Table 1. Composition of the marine malacofauna in some regions of the World Ocean.

Region	Bathymetric range	Species number	Source	Analysed groups
Russia	intertidal to hadal	1744	This study	all groups
Japan	intertidal to hadal	6683	Higo et al., 1999	shelled
Okinawa	intertidal to subtidal	1853	Kay, Scott, 1987	all groups
Koumac site (New Caledonia)	intertidal to subtidal	2738	Bouchet et al., 2002	all groups except for cephalopods
Mediterranean	intertidal to bathyal	2024	Sabelli et al., 1992	all groups
Florida (Keys)	intertidal to subtidal	1400	Mikkelsen, Bieler, 2000	all groups
South Africa	intertidal to bathyal	2788	Kilburn, Herbert, 1999	all groups
United Kingdom	intertidal to hadal	843	Smith, Heppell, 1991	Gastropoda + Bivalvia

predicted. One can observe very general tendencies, such as impoverishment of the faunas with the shift to higher latitudes. Such an impoverishment can be demonstrated in the western Pacific seas of Russia — from 503 species of Gastropoda and Bivalvia in the Japan Sea to 431 species in Okhotsk and Bering seas and a sharp drop to 161 species in the Arctic Chukchi Sea. Nevertheless, the reduction of the number of species is much more gradual than observed between Japan and Russian part of the Japan Sea. This led us to conclusion, that at least partially the phenomenon is the result of less sufficient studies. Therefore we made an attempt to evaluate the completeness of the studies of Russian malacofauna.

The starting point was the recent publication devoted to the biodiversity of tropical southwestern Pacific Koumac site (New Caledonia) [Bouchet et al., 2002], where, besides all, the size structure of 2582 found species of shelled molluscs was presented. The authors used size classes different from adopted here. The range of sizes was from 0.4 to 450 mm, with the mean size 17 mm, but with the median 8 mm and with the mode of only 3 mm. The graph recalculated from the original data is presented on Fig. 7. The important conclusion was that majority of molluscs in general, and Gastropoda in particular are small animals, what is usually considered as "micromolluscs". As is seen from the graph, the molluscs with the maximal size less than 10 mm constitute 53.83%, while for Gastropoda this value is even higher — 59.22%. The "macromolluscs" with the shell length more than 50 mm constitute only 7.41%.

Such a high percentage of "micromolluscs" at the Koumac site can be explained in the first turn by very meticulous collecting and sorting procedures, which were specially focused on small forms and described in details in the publication [Bouchet et al., 2002].

This arouse several questions: whether such percentage of "micromolluscs" is merely the result of the collecting efforts; whether it is a characteristic of tropical marine environment, or reflects the general regularities of molluscs distribution.

We calculated the size structure of 1016 shelled molluscs of the Russian Far-East seas (Fig. 5), as well as of several well studied faunas, for which monographic publications or checklists are available and which are situated in different climatic conditions (Japan: Okutani, 2000; Higo et al., 1999; tropical west America: Keen, 1971; Hawaii: Kay, 1979; British Isles: Smith, Heppell, 1991) (Figs. 5-7).

Analysis of size structure of Russian molluscs revealed that all major size classes are present in our fauna — from less than 1 mm (three species of the family Omalogyridae) to 210 mm [*Neptunea constricta* (Dall, 1907), Buccinidae].

Comparison of the graphs of the size structure of Russian molluscs with those of other analysed regions revealed that the percentage of "micromolluscs" with the shell length <1 mm is lower in Russian waters for both Gastropoda and Bivalvia: correspondingly 12.3 and 11.9% less in comparison with Japan; 23.3 and 0.95% in comparison with tropical west America; 12.9 and 12.8 in comparison with Hawaii. Even more strikingly is the difference between Russian fauna and British and Koumac ones: correspondingly 35.4 and 19.0% for British Isles and 37.4 and 19.2% for Koumac.

It is important to emphasize that our results allow assuming that the share of "micromolluscs" seems to reflect the completeness of studies rather than geographical position of the area. Indeed, the size structure of tropical and tropical-subtropical Japan, western America and Hawaii are much less similar to that of Koumac than the size structure of very well studied molluscan fauna of boreal British Isles. It is possible that the size structure of malacofaunas (at least in tropical, subtropical and boreal zones) should be similar and reflect the actual biological phenomenon based on sharing the resources.

Based on this assumption, we tried to calculate the possible number of "micromolluscs" still "missing" in our fauna. If we suggest that the "macromolluscs" are completely studied in Russian fauna

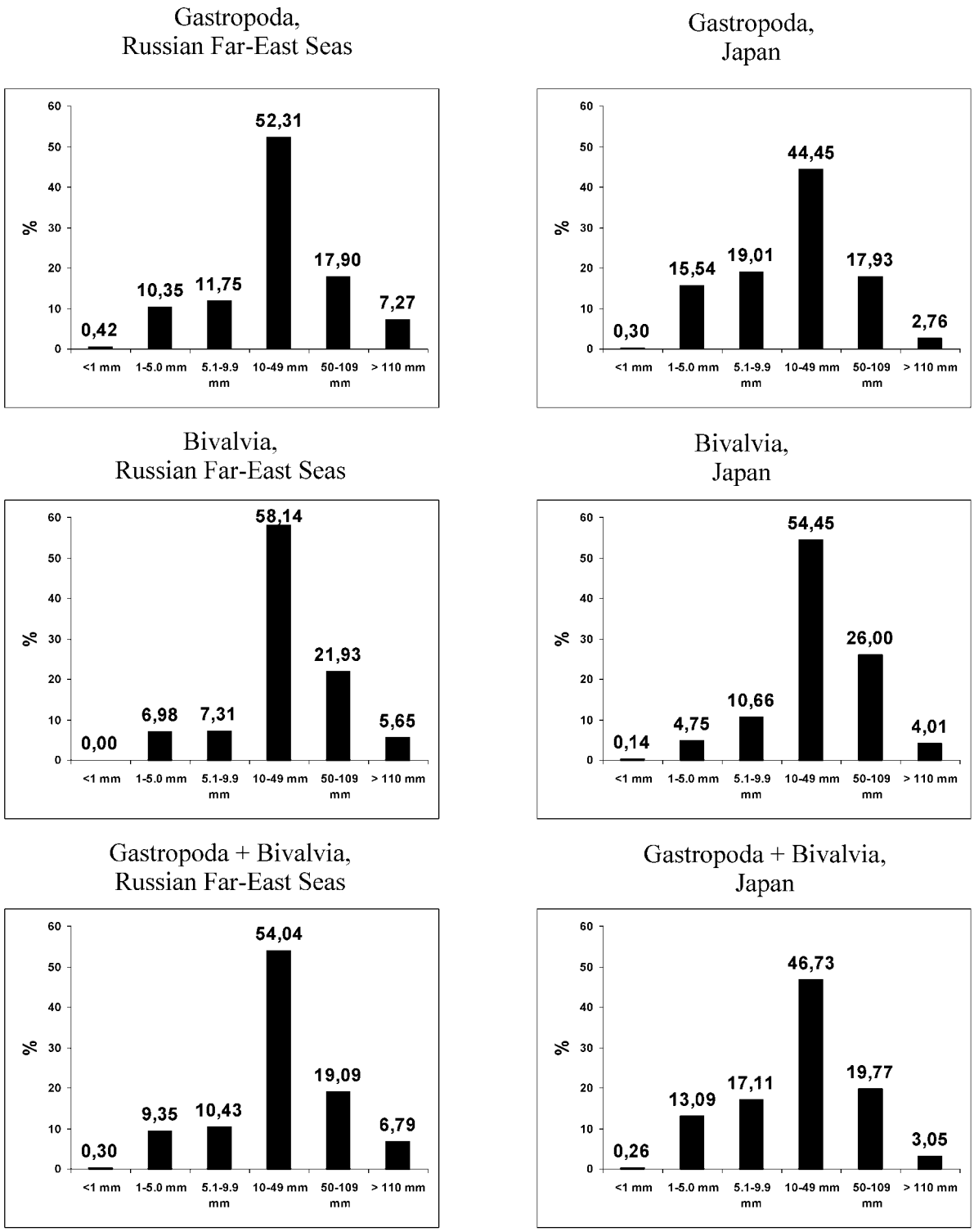

FIG. 5. Size-structure of molluscs in Far-East seas of Russia and Japan.

РИС. 5. Размерная структура моллюсков в дальневосточных морях России и Японии.

(which is definitely an overestimate), then we are short of from 150 species (comparing to Japan) to 300 species (comparing to tropical west America), 540 (comparing to British Isles) and up to 760 species comparing with New Caledonia. Even excluding southwestern Pacific, we still can predict that 150-500 species are likely to be found in Russian Far-East seas. This will bring the total number of marine molluscs to 1900-2240 species and in the Far-East seas to 1220-1570. This number is still low

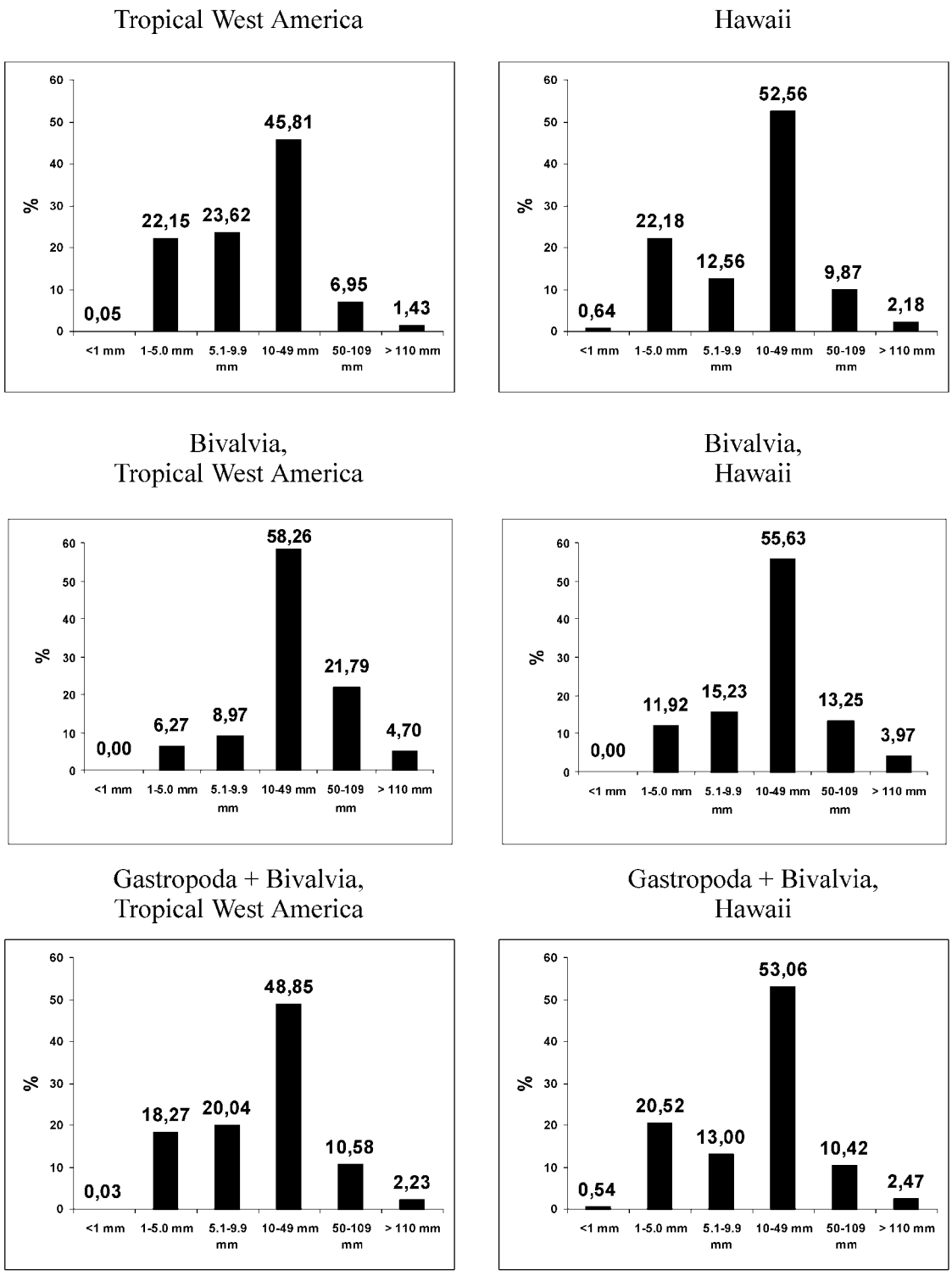

FIG. 6. Size structure of molluscs in tropical west America and Hawaii.

РИС. 6. Размерная структура моллюсков в тропической западной Америке и у Гавайских островов.

comparing to adjacent territories but seems more realistic to us.

As was mentioned above, these calculations were based on the underestimation of the biodiversity of "macromolluscs". At the same time, every regional survey or taxonomic revision brings to light new species of molluscs, either new to science, or the first time recorded in our waters. For example, the publication of Golikov and Sirenko [1998] devoted to gastropods of the continental slope of Kurile Islands revealed that 13% of species (15 out of 113) were not previously recorded in our fauna.

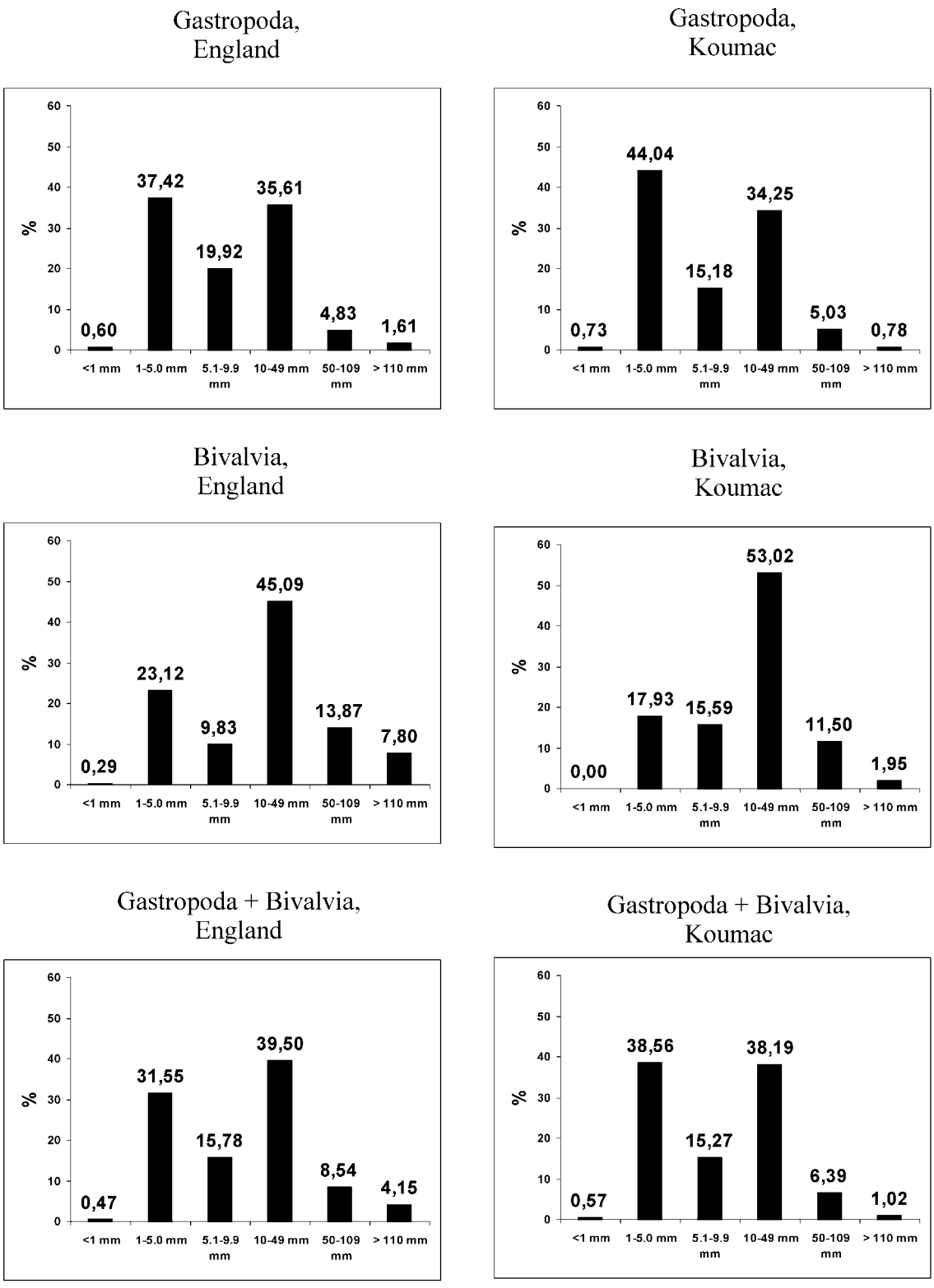

FIG. 7. Size-structure of molluscs in British Isles and Koumac site.

РИС. 7. Размерная структура моллюсков у Британских островов и на Кумаке.

In order to estimate the total number of molluscs in our marine fauna we used the data on biological rarity of species at Koumac site [Bouchet et al., 2002]. There the number of molluscs, found only in 1-5 specimens constituted 48% (Fig. 8). In order to estimate the rarity of molluscs in our fauna we analyzed several monographs, particularly Golikov [1963, 1980], Bogdanov [1990], Kantor [1990], and Scarlato [1981]. The main reason for selecting these particular publications is that they were based mainly

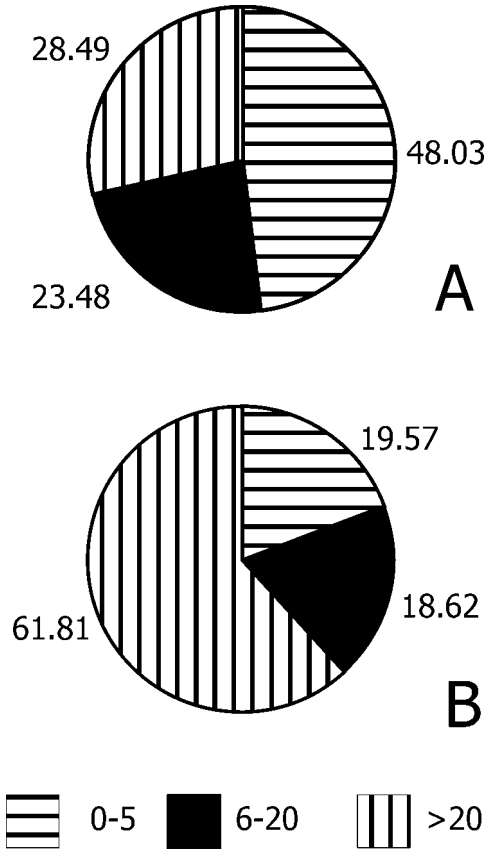

FIG. 8. Rarity of marine molluscs at Koumac site (A) and in Russian seas (B).

РИС. 8. Соотношение редкости морских моллюсков на Кумаке (A) и в морях России (B).

on the collections of the Zoological Institute of Russian Academy of Sciences, which were accumulated for over 150 years and definitely are the most representative in Russia. Therefore the rarity of the species in the collections should to some extent represent the actual rarity of the species in nature*. The resulting data are presented on Fig. 8 B (based on 419 species). Clearly, the percentage of rare species is much lower in Russian malacofauna is 19.6% *vs* 48.0%. If one supposes that the share of rare molluscs should be the same in different faunas, then the total number of species in Russian Far-East seas should be around 2200 species. Although it is a rather rough assumption (since the environmental heterogeneity in tropical marine environments are definitely much higher than in higher latitudes, and therefore the percentage of rare species, that are those having narrow ecological niches, is higher), the fact of receiving very similar figures using two totally different methods of assessment, is remarkable.

*Indeed, the number of samples for the two compared faunas is very different: 42 stations were made at Koumac site, whereas the mentioned monographs were based on 550 [Kantor, 1990] to 9700 [Scarlato, 1981] samples. However, taken into account the huge difference in the area covered (295 km^2 in Koumac and some 6,500,000 km^2 for Russian northern and Far-East seas], the fauna of Koumac seems to be even much better studied.

Biodiversity of extramarine malacofauna

Analysis of terrestrial malacofauna of the RFU is more complicated, since except Europe there are no available checklist of land and freshwater molluscs of adjacent territories.

As it was said above, terrestrial molluscs are characterized by the highest diversity in mountainous areas. Among terrestrial pulmonates, the richest fauna is that of Caucasus, with its 287 species (40% of the total faunal list) and the high degree of endemism (88% of the species are known only for Caucasus). The second in richness fauna is that of Central Asia mountains: 179 species (90% found exclusively in that area). Other mountainous regions are poorer: 59 species in the Carpathians, 49 species in Crimea and 21 species in mountains of southern Siberia. The huge territory of East European Plain and Siberia is inhabited by only 102 species (mostly Palearctic or widely distributed), and 69 species live in the Far East area (including the Kuriles and Sakhalin).

The list of non-marine molluscs of Europe (CLECOM) [Falkner et al., 2001] includes 745 species and subspecies of land snails (727 in our fauna) and 405 freshwater molluscs (1035 in our fauna). Therefore the ratio between freshwater and land molluscs is 0.54 in European fauna and 1.39 in the Russian. This remarkable difference led us to the attempt of analysis of the freshwater fauna.

One of the important subjective reasons of the size of the faunistic list is the evaluation of the morphological intraspecific variability, and therefore the number of species recognized by the researcher. Speaking in other words, “lumper” will produce shorter list than “splitter”.

The achievements in the studies of freshwater fauna in our country are to large extent connected with the researches of Ya.I. Starobogatov (Zoological Institute of Russian Academy of Sciences) and his scientific school. One of the main method of species recognition of Starobogatov is based on the comparison of shell’s outlines.

We compared the species lists of CLECOM with that of our European-Siberian subregion. Additional problem is that the CLECOM does not mention the synonyms and therefore the direct comparison is impossible.

For European part of Russia 222 freshwater species of Gastropoda were recorded, out of which only 43 species are endemic for our territory (and therefore absent in CLECOM list). From remaining 179 species, which were described from western Europe,

only 46 (25.6%) were common with CLECOM. The remaining are either considered as synonyms or distributed in European regions not covered by CLECOM (e.g., Italy, Spain, or the Balkan countries). For the bivalves 166 species were recorded in European Russia, with 43 endemics. From the remaining 123 species only 37 (30.1%) are common with CLECOM.

Thus the very high diversity of Russian freshwater molluscs may seem to be explained by a higher degree of "splitting" than in western European malacological school.

On the other hand, the total number of freshwater species in European Russia is only 55% of the CLECOM area, whereas the respective territories are quite comparable (about 4 million km^2 in the first case and 3.3 million km^2 covered by the CLECOM project). Moreover, the freshwater fauna has a geographic pattern of diversity different from that in terrestrial one. While more than 2/3 of land pulmonates were recorded in European part (in a broad sense, including the whole Caucasus), with Far East region adding less than 10% of the fauna, freshwater molluscs of Asian regions contribute greatly in the total diversity (Fig. 4), with Far East species comprising about 1/3 of the total faunal list, not to mention highly endemic Baikal Lake.

Therefore, at present we have no clear idea whether methodological aspects affect representation of the actual biodiversity of freshwater molluscs, or the pattern of their diversity reflects rather some natural causes.

Acknowledgements

Many colleagues helped us in preparing the catalogue of molluscs of the RFU. We want to especially thank D.L. Ivanov and A.V. Martynov (Zoological Museum of Moscow State University), B.I. Sirenko and E.M. Chaban (Zoological Institute of Russian Academy of Sciences). The late K.N. Nesis helped in compiling the list of Cephalopoda. We also want to thank Ph. Bouchet and P. Lozouet (Museum National d'Histoire Naturelle, Paris) for providing us with the original data on the molluscs of the Koumac site. The study was supported by the grant of RFBR 01-04-48134 ["Biodiversity of the molluscs of Russia and adjacent territories (inventory of the fauna)].

References

Bogatov V.V., Zatrawkin M.N. 1990 [1992]. *Gastropod molluscs of fresh and brackish waters of the Far East of the USSR. A guide*. Vladivostok: 169 p. [In Russian].

Bogdanov I.P. 1990. Molluscs of the subfamily Oenopotinae (Gastropoda, Pectinibranchia, Turridae) of seas of the USSR. *Fauna of USSR, Published by Zoological Institute of Academy of Sciences of USSR. Leningrad, Nauka, Mollusks*, 5(3), 223 p. [In Russian].

Bouchet Ph., Lozouet P., Maestrati Ph., Heros V. 2002. Assessing the magnitude of species richness in tropical marine environments: exceptionally high numbers of molluscs at a New Caledonia site. *Biological Journal of the Linnean Society*, 75: 421-436.

Falkner G., Bank R.A., von Proschwitz T. 2001. Check-list of the non-marine molluscan species-group taxa of the States of Northern, Atlantic and Central Europe (CLECOM I). *Heldia*, 4(1/2): 1-76.

Falkner G., Ripken T.E.J., Falkner M. 2002. Mollusques continentaux de France. Liste de Référence annotée et Bibliographie. *Patrimoines naturels*, 52: 350 p.

Golikov A.N. 1963. Gastropods of the genus *Neptunea* Bolten. *Fauna of USSR, Published by Zoological Institute of Academy of Sciences of USSR. Leningrad, Nauka, Mollusks*, 5(1): 217 p. [In Russian].

Golikov A.N. 1980. Molluscs Buccinidae of the World Ocean. *Fauna of USSR, Published by Zoological Institute of Academy of Sciences of USSR. Leningrad, Nauka, Mollusks*, 5(2): 466 p. [In Russian].

Golikov A.N., Scarlato O.A. 1967. Molluscs of the Posjet Bay (the Sea of Japan) and their ecology. *Molluscs and their role in biocoenoses and fauna formation. Trudy Zoologicheskogo Instituta AN SSSR*, 42: 5-154 [In Russian].

Golikov A.N., Sirenko B.I. 1998. Prosobranch gastropods of the continental slope of the Kurile Islands. *Ruthenica*, 8(2): 1-45 [In Russian].

Golikov A.N., Sirenko B.I., Gulbin V.V., Chaban E.M. 2001. Checklist of shell-bearing gastropods of the northwestern Pacific. *Ruthenica*, 11(2): 153-174.

Higo S., Callomon P., Gotô Y. 1999. *Catalogue and bibliography of the marine shell-bearing Mollusca of Japan*. Elle Scientific Publications, Osaka, 749 pp.

Kafanov A.I. 1991. *Shelf and continental slope bivalve mollusks of the Northern Pacific Ocean: A check-list.* Vladivostok, Far Eastern Branch, USSR Academy of Sciences, 200 p. [In Russian].

Kantor Yu.I. 1990. *Gastropods of subfamily Volutopsinae of the World Ocean*. Moscow, Nauka, 178 pp. [In Russian].

Kay E.A. 1979. Hawaiian marine shells. Reef and shore fauna of Hawaii, Section 4: Mollusca. *Bernice P. Bishop Museum, Special Publication*, 64(4): 653 pp.

Kay E.A., Scott S. 1987. Mollusca of Enewetak. In: Devaney D.M., ed. *The natural history of Enewetak atoll.* Vol. 2. *Biogeography and systematics.* US Department of Energy, Office of Scientific and Technikal Information, Oak Ridge: 105-146.

Keen A. M. 1971. *Seashells of Tropical West Amer*ica. Stanford University Press, 1064 pp.

Kilburn R. N., Herbert D.G. 1999. Mollusca. In: Gibbons M. J., ed. "The taxonomic richness of South Africa's marine fauna: a crisis at hand". *South African Journal of Science,* 95: 8-12.

Mikkelsen P. M., Bieler R. 2000. Marine bivalves of the Florida Keys: discovered biodiversity. In: Harper E.M., Taylor J.D., Crane J. A., eds. *The evolutionary biology of the Bivalvia.* London: Geological Society Special Publications, 177: 367-387.

Okutani T. (ed.) 2000. *Marine mollusks in Japan.* Tokyo, Tokai University Press, 1174 pp.

Pallas P.S. 1771. *Reise durch verschiedene Provinzen des Russischen Reiches*. Bd. 1. St.-Petersbourg, 480 pp.

Sabelli B., Gianuzzi-Savelli R., Bedulli D. 1992. *Catalogo annotato dei molluschi marini del Mediterraneo*. Libreria Naturalistica Bolognese, 3 vols., 781 pp.

Scarlato O.A. 1981. Bivalve molluscs of temperate latitudes of western part of the Pacific. *Opredeliteli po faune SSSR, izdavaemye Zoologicheskim institutom AN SSSR*, 126: 480 p. [In Russian].

Scarlato O.A., Starobogatov Ya.I., Lobanov A.A., Smirnov I.S. 1994. Databases on zoological systematics and the data on higher taxa of animals. *Zoologicheskij Zhurnal*, 73(12): 100-116 [In Russian].

Smith S.M., Heppell D., 1991. Checklist of British Marine Mollusca. *National Museums of Scotland Information Series*, No. 11, 114 pp.

Starobogatov Ya.I. 1970. *Fauna of molluscs and the zoogeographic zoning of continental waterbodies of the globe*. Leningrad, Nauka, 372 pp. [In Russian].

Starobogatov Ya.I., Prozorova L.A., Bogatov V.V., Saenko E.M. 2004. Molluscs. In: *Key to freshwater invertebrates of Russia and adjacent lands*. Vol. 6. Molluscs, polychaetes, nemerteans. SPb: Nauka: 9-491 [In Russian].

Zatrawkin M.N., Bogatov V.V. 1987. *Large bivalve molluscs of the fresh and brackish waters of Far East of the USSR: A guide.* Vladivostok, DVO AN SSSR, 152 pp. [In Russian].

●

Предварительный анализ биоразнообразия моллюсков России и сопредельных территорий

Ю. И. КАНТОР[1], А. В. СЫСОЕВ[2]

[1]*Институт проблем экологии и эволюции им. А.Н.Северцова РАН, Ленинский просп. 33, Москва 119071;*
[2]*Зоологический музей МГУ, Б. Никитская, 6, Москва 109009*

РЕЗЮМЕ. Анализ базируется на составленном каталоге моллюсков России и сщпредельных территорий. Фауна состоит из 3674 видов, относящихся к 6 классам. Морские моллюски представлены 1744 видами, наземные брюхоногие 736 видами, а пресноводные моллюски 1194 видами. Кратко обсуждается состав фауны различных регионов (морских и наземных местообитаний). На основе сравнения размерной структуры моллюсков российских дальневосточных морей с таковой других регионов Мирового океана в тропической, субтропической и бореальной зонах, сделан вывод, что размерная структура в большой степени зависит от степени исследования региона. Судя по размерной структуре, в российских дальневосточных водах можно ожидать нахождения большого числа (150-500 видов) микромоллюсков, не отмеченных ранее. В целом, биоразнообразие морских моллюсков в России низко по сравнению с близлежащими областями (Япония, Средиземное море, и др.).