

IX INTERNATIONAL CONGRESS ON MEDICAL AND APPLIED MALACOLOGY

Theme: Molluscs and Human Health

ABSTRACT BOOK

会议摘要集

October 17-20, 2006

Qingdao, China

Organized by

International Society for Medical and Applied Malacology
Chinese Society of Malacology, China Zoological Society
Chinese Society for Oceanology and Limnology
Institute of Oceanology, Chinese Academy of Sciences
Qingdao Society of Fisheries

Co-organized by

Bureau of International Co-operation, Chinese Academy of Sciences
Qingdao Association for Science and Technology

Sponsored by

Dalian Zhangzidao Fishery Group Co., Ltd.
Ningbo Ocean and Fisheries Academy
Zhejiang Mariculture Research Institute

SESSION 5-5

14:30-14:50 19 Oct 2006

**FRESHWATER MALACOFUNA OF SAKHALIN ISLAND AND KURIL
ARCHIPELAGO (ORIGIN PATTERNS, BIODIVERSITY AND BIOGEOGRAPHY)**

L.A. PROZOROVA* and V.V. BOGATOV and S.K. KHOLIN

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

159, Pr. 100 let Vladivostoku, Vladivostok 690022, Russia

*E-mail: prozorova@ibss.dvo.ru

Based on a long-term study of fauna and taxonomy of freshwater mollusks of the Russian Far East a detailed data on specific content and distributional patterns of malacofauna of both insular and adjacent mainland regions are provided.

As the first stage, biodiversity and biogeography of the Kuril Archipelago malacofauna was studied. In a total, the Archipelago is characterized by very diverse but not relict malacofauna (endemism – 7 %) originated from two sources: a southern south by way of Sakhalin and Hokkaido and a northern source by way of Kamchatka. Interesting, that 6 from 7 endemic species of Kuril freshwater mollusks occur on the Iturup Island (south group), where endemism of malacofauna reaches 15 %. The Bussol Strait in the central Kurils was designated as the main biogeographical boundary that divides the chain into northern and southern parts (Prozorova et al., 2002; Bogatov et al., 2003; Pietsch et al., 2003).

The second stage of the study is large continental Sakhalin Island, having very complicated geological and paleogeographical history. Sakhalin is characterized by rich and diverse (98 species) but also not relict freshwater malacofauna spread from adjacent mainland and insular territories. Endemic species account for only 8 % of species known to inhabit the Island. From the north the Sakhalin Island was colonized by freshwater malacofauna occurring in both Low Amur River and Tatar Strait continental drainages. Hokkaido is southern insular source of the Sakhalin malacofauna.

Diversity and distribution of freshwater malacofauna of Sakhalin Island strongly depend on reiterated isolations and junctions with Hokkaido and mainland, considerable longitudinal extension of the Island, its relief diversity, differences in climatic conditions, and presence of warm and cold sea currents (Bogatov et al., 2006). As a result of impact of these factors freshwater malacofauna of northern, central and southern parts of the Sakhalin Island differ each from other significantly. Northern Sakhalin Plain is mainly inhabited by malacofauna spread from freshwater drainages of continental part of Tatar Strait shore. Malacofauna of central Sakhalin drained by both Tym and Poronai Rivers is primary Amurian in origin. Malacofauna of central region differs from northern that by presence of more endemics and some Japanese taxa too. Southern part of the Sakhalin Island southward eastern macroslope of the Western Sakhalin Mountains (Schmidt line) is mainly inhabited by malacofauna of Japanese source. Malacofauna of southern Sakhalin was found to be closely related with that of Hokkaido. Freshwater mollusk diversity of Hokkaido is estimated on the base of both literature data and study of specimens collected in 2001.

Thus, on the base of previous faunal study 9 distinguished regions inhabited by 228 freshwater mollusks species were designated: Low Amur River drainage downstream

Bogorodsky Range (96 species), northern Sakhalin (43 species), central Sakhalin (45 species), southern Sakhalin (43 species), freshwater drainages of continental part of Tatar Strait shore (40 species), Kuril Islands southward Bussol Strait (68 species), Kuril Islands northward Bussol Strait (30 species), Hokkaido (85 species) and south extremity of Kamchatka Peninsula (23 species). The 10-th region is small Moneron Island (7 species) located between Sakhalin and Hokkaido.

To illustrate and verify our conclusions UPGMA cluster analysis of similarities of 228 freshwater mollusk species among these 10 regions is conducted (Fig. 1). Faunal similarities between regions were evaluated by using Jaccard's coefficient of community: $S = a/(a+b+c)$, where a is the number of species common to both regions and b and c are the number of species occurring on each of the region (see Legendre & Legendre, 1998). The similarity matrix resulting from pair-wise calculations was then subjected to single and complete linkage clustering as well as unweighted arithmetic average clustering (UPGMA; NTSYS program, version 2.0, Exeter Software, Setauket, NY). The results obtained by these approaches being all very similar, we constructed dendrogram using UPGMA. The accuracy of each cluster was estimated by bootstrap analysis using statistical program FreeTree (Pavlicek et al., 1999). A dendrogram was deduced from 1000 bootstrap samples.

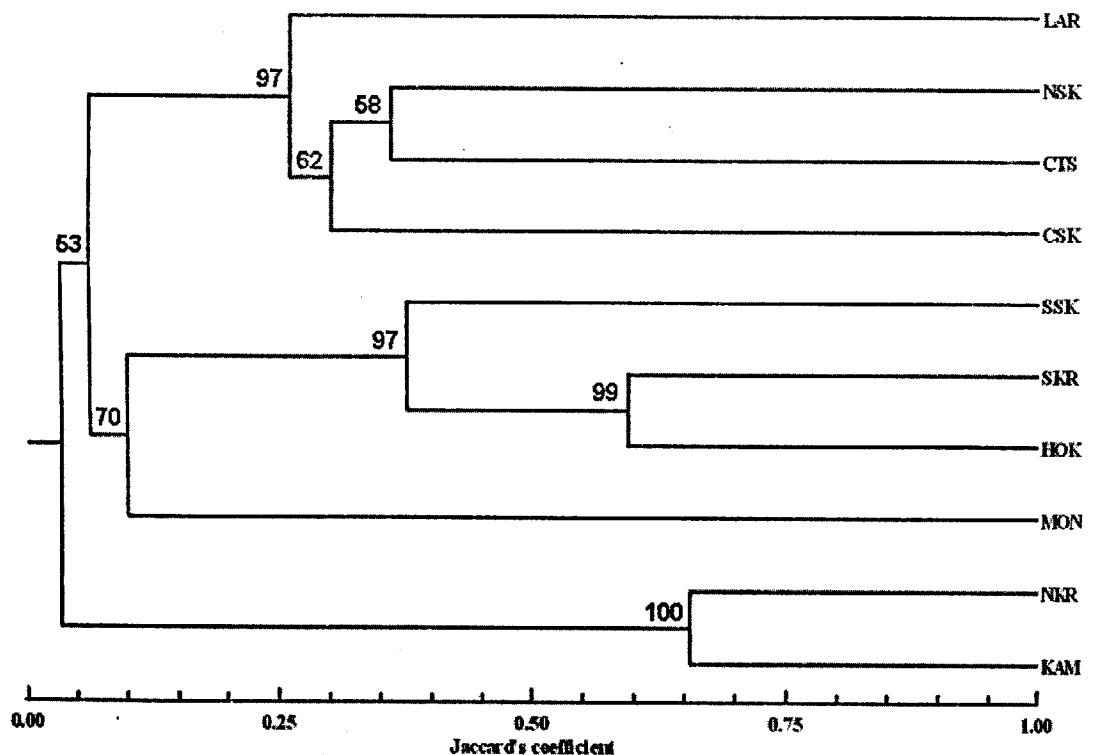


Fig. 1. Similarity of 228 species of freshwater mollusks among 10 regions of studied area: Lower Amur River downstream Bogorodsky Range (LAR), northern Sakhalin (NSK), central Sakhalin (CSK), southern Sakhalin (SSK), Moneron Island (M), continental part of Tatar Strait shore (CTS), Kuril Islands southward Bussol Strait (NKR), Kuril Islands northward Bussol Strait (SKR), Hokkaido (HOK), south extremity of Kamchatka Peninsula (KAM).

Bootstrap probabilities (expressed in percentage) are indicated at the node of each cluster.

UPGMA cluster analysis shows two major assemblages (Fig. 1): Northern Kurils restricted by Bussol Strait and rest territories with a similarity index very close to zero. The deepest Bussol Strait known as the most significant biogeographical boundary within the Kuril Archipelago (Bogatov et al., 2003; Pietsch et al., 2003) is designated also as the boundary between the Palaearctic and Sino-Indian malacogeographical regions (Prozorova, 2001; Prozorova et al., 2002). Inside southern cluster two main groups are visible (Fig. 1). The first group includes drainages of Lower Amur River, northern Sakhalin, continental part of Tatar Strait shore and central Sakhalin. The second group consists of southern Sakhalin, Southern Kuril Islands, Hokkaido and Moneron Island. Regions of the first group which predominantly inhabited by Amurian in origin freshwater malacofauna are part of Amurian Subregion of Sino-Indian Region according to subdivision of Ya.I. Starobogatov (Kruglov & Starobogatov, 1993). Regions of the second group which mainly inhabited by Japanese in origin freshwater malacofauna belong to Japanese Subregion of Sino-Indian Region (also according to subdivision of Ya.I. Starobogatov). Thus, results of UPGMA cluster analysis of similarities of freshwater malacofauna specific content of the Sakhalin Island, Kuril Archipelago and adjacent territories confirm the regions are distinguished correctly and correlate well with the scheme of malacogeographical division of these territories (Bogatov et al., 2006; Prozorova, 2001; Prozorova et al., 2002).