THE KOREAN JOURNAL OF QUATERNARY RESEARCH Vol. 21, No. 2, p. 59-61 (December. 2007)

Quaternary Ostracods of Mongolia and Their Environments

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1. Introduction

Ostracods are microscopic bivalved crustaceans. They are common in most types of aquatic environment including lakes, ponds, springs, streams and oceans. The Ostracoda have the most complete fossil record of any extant group of arthropods, largely due to two factors: the presence of calcified, bivalved shells in most of them and their small size. Calcite shells have a high potential for preservation in sedimentary deposits, while their small size (length c 1 mm or less) means that the resulting fossils can be recovered from sedimentary rocks in large quantities with relative ease, using standard micro-palaeontological processing techniques.

Non-marine ostracoda shells are often well preserved in Quaternary sediments and belong to three main lineages Darwinuloidea, Cytheroidea and Cypridoidea. Among them Cypridoidea have radiated widly in non-marine habitats and the Cyprididae are the most diverse ostracod family in continental waters.

We report the first results of the analysis of the ostracod assemblages found from lakes, rivers and springs of the studied area and their taxonomy and paleo-environmental differences. Also an identification of fossil ostracods from bottom sediments of Khyargas lake and surrounding ancient localities in order to determine the age of these sediments are discussed.

2. Material and methods

During 2004 and 2005, a joint expedition of Mongolian, American and Belgian scientists has collected diatoms, chironomids and ostracods from more than 100 lakes and springs and detailed water chemistry analyses were also performed.

Over 200 ostracod samples were taken in West Mongolian lakes, springs, pools and streams. This was done using a hand net with mesh size of 250μm. For an identification the valves were removed from the soft parts using dissecting needles, and the appendages were put on microscopical slides to compare and draw. Scanning electron microscopical (SEM) images were made for the valves and drawings were made for the soft parts.

3. Results

We have identified about 40 species in total belonging to 20 genera including some new species.

Ostracod assemblages from lakes are represented by *Candona candida, C.negleta, C.improvisa, C.angulata, Pseudocandona albicans, Ps.hartwigi, Fabaeformiscandona sp, Paracandona sp.nov, Candonopsis sp, Cypria ophtalmica, Limnocythere inopinata, Cytherissa lacustris, Cypridopsis vidua, Heterocypris sp.nov., Cyclocypris laevis, C.ovum, Ilyocypris getica, I. bradyi, Cypris pubera, Fabaeformiscandona hyalina, F.caudata(?), Amphocypris sp.nov, Trajancypris laevis, Dolerocypris fasciata, Plesiocypridopsis newtoni, Koencypris sp.,* and

Potomacypris arcuata. The lakes were alcaline with pH= 8,3-10.4 and have high salinity.

In contrast, *Candona candida, C.meerfeldiana(?), Schellencandona sp?, Ilyocypris getica, I.monstifica, Heterocypris incongruens, Tonnacypris estonicus, Potamocypris villosa, Cypria sp, Pseudocandona rostrata* were dominated in springs and rivers. The springs and rivers showed less content of salts and have low PH=7.38-7.81.

Thus, the composition of ostracods found from the lakes and springs have noted some similarities (in both *Candona candida* and *Ilyocypris getica* were found), but in terms of dominant species are substantially different from each other..

To compare the assemblages of fossil ostracods and to determine the age of these sediments, the ostracodes from bottom sediments of Khyargas lake and two surrounding ancient localities were investigated.

The Khyargas Nuur is located in Uvs province of Western Mongolia and elevated by 1028m above the sea level. It is an ancient lake of tectonic origin. The average depth of the lake is about 47m and water volume of 66034 million/M^3. General mineralisatian is 8.4g/l in the surface and 8.50g/l in the depth of 50 m containing mosltly sulphate-chlorine and natrium salt.

Ostracods found in 2004 from the core samples of the bottom claystone in 7m depth of the Khyargas lake were consist of Limnocythere inopinata, Candona candida and Cypridies. Among these species L.inopinata was dominant. All these species tolerate a wide range of environmental conditions. The are distributed in Holarctic region and known from Pleistocene to resent. Probably, the Khyargas lake is an ancient lake and have Pleistocene age.

In 2005, the samples from ancient sediments distributed in the northern and the south-western parts of Khyargas lake were collected and analyzed. The northern part of the lake consists of white sands, silstone, claystone, marl and the thickness of sediments is 20m. From this section Cyprideis torosa were found. The south-western part was mainly consists of sands, siltstone, claystone, marl and has the thickness of 30m. The composition of ostracods found from this part is rich in species of Ilyocypris manasensis, Limnocythere, Eucypris vidua and Cyprideis torosa. A comparison of the compositions of ostracods with the ostracods of same age from South Kazakhstan reveals middle-Upper Pliocene age. The Plieocene sediments' structure showed that the climatic conditions at that time were warm, sometimes draughts may combined with soft damp climate / Khosbayar, 2005/.

4. Conclusion

1. The investigations of the Khyargas lake in the two consequetive years during 2004 and 2005, showed substantial changes in the lake' characteristics. While remained the same PH= 9.13, conductivity showed from 8600μs,cm to 9400μs,cm. It means that salinity has increased by 10% and an increase of the lake temperature by 1°C (20°C to 21°C) occurred in a single year.
2. The climate during these years was dominated by dry, draught conditions and lack of rain caused in a significant evaporation of lake waters resulting in lowering of the lake levels, an increase of salinity.
3. We observed substantial pollution of springs, rivers and lakes by human activities and by cattle.
4. A detailed investigation of morphology and taxonomy of modern ostracods is needed. Further investigation of ostracods environment and climatic conditions are required to make the compositional comparisons with lake ostracods spread in other continents.
5. This work sets the begining of thorough investigation of differences and similarities of ostracods' structures and composions from ancient lakes and provides a general developmental trends of modern lake ostracods in Mongolia.

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