

Spore-Pollen Specters of Deed Turuu Lake Terrace, Darkhad Depression, Mongolia*

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ABSTRACT

Pollen and spores as well as their morphological characteristics are biological stability materials in which contains historical information about vegetation and climate changes. As noted researcher Neishtadt in 1971, the lake and swamp deposits were developed only in Holocene period.

The geological history of Darkhad depression which is situated in the Northern end of Mongolia from ancient time become under scientific interest of many researchers. Our investigation was focused on pollen analysis of lake sediment of Darkhad depression which caused bottom of paleolake. In Mongolia the palynology science is beginning to develop since 1990 and in 2000 the laboratory of palynology was established at the department of Biology, State Pedagogical University of Mongolia. Researchers from this laboratory working on pollen morphology of present flora in order to classify plants taxonomy.

Another part of our investigation is mellitopalynology, which is studying of pollen grains in a honey. Although, this research has been extending by pollen analysis of sediment and lake deposits in past few years on the basis of high sensitive microscope and modern technology.

Keyword : Palynology, pollen grain, spore, pollen analysis, aperture, pora, ora, colpi, exine, sculpture

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Materials and Methods

Since 2002, joint Mongolian-Japan biological expedition have been organized in Darkhad depression. I was one of the team member of this expedition as a charge of botanist. During the field work we are collected 8 samples from 40 cm deep soil horizon of Deed Turuu lake terrace, in 22 August 2002. Deed Turuu lake is located at N 50° 59' 776'' and E 99° 21' 14.4'' and an altitude of 1570 masl in the

Darkhad depression.

The samples are treated in the laboratory of sediment analysis and biostratigraphy of MOLARE centre at National University of Mongolia with cooperation prof. W. Walther from Germany and an assistant MSc. Ch.Narantsogt. In order to distinguish pollen specters we are used Erdman's (1943) method and microscope preparation for pollen morphology did by ways Kupriyanova (1973), and G.Punsalpaamuu (1999).

The soil samples divided into following horizon

: A- soil surface horizon, A1- humus horizon, B- accumulated horizon. From each A, A1 samples counted 100 pollens and spores and 50 pollens and spores from B horizon using a method Sladkov (1963), and microscope SWIFTx400. Pollen and spores pictures took by RA-4 machine on SUPERTEK microscopex400, and for morphological characteristic of them used the HITACHI S-570x 1000-4000 electronic microscope.

Results

The pollen and spore contents of Deed Turuu lake terrace soil horizon were classified into following parts: tree pollen grains, herbal pollen grains and spores (Table 1).

An each soil horizon contains 5 types of tree pollen with percentage range within 25-43% and were determined 13 family of 15 types herbal pollen grains in which Chenopodiaceae Vent., Caryophyllaceae Juss., Poaceae Bart., Fabaceae Juss., Asteraceae Dumort types are dominated (30%). Also Pinnaceae Lindl. especially, Larix sp., Pinus sp. types (23-43%) of tree pollen types are common and spore types quantity is (5-6%). Content of all spore and pollen types decreasing from top to down. The morphological characteristic of pollen grains such as aperture, pora, ora. Colpi, exine, sculpture are determined (Fig. 1.). During the laboratory analysis we were determined 19 families of 22 types plants pollen and spores. As shows our results the Deed Turuu lake paleo-terrace soil horizon contains Sphagnum sp., Polypodium sp. and Ephedra sp., Artemisia sp. plants pollen which means that in past geological period in territory of Darkhad depression climate situation was periodically changed from dry to humid and in forest composition was dominated Pinaceae Lindl., Larix sp., Pinus sp.

I agree with an opinion that the vegetation cover completed also in Holocene in Darkhad depression which compared to researchers, Pollen analysis in

soil of Central Mongolia /Malgina, 1970/ and Pollen analysis in soil of Kherlen and Buir in East Mongolia/ Golubeva, 1976/

Table 1. Result of pollen analysis of soil horizon Deed Turuu

| Types of pollen and spores | Contents / Quantity, Percent / | | | |
|----------------------------|--------------------------------|---------------------|--------------------|---------|
| | A horizon 5-10 cm | A1 horizon 10-31 cm | A horizon 31-40 cm | |
| | | | Quantity | Percent |
| 1. tree pollen | 43 | 30 | 13 | 26 |
| Larix sibirica Ldb. | 15 | 11 | 4 | |
| Pinus sibirica Ldb. | 10 | 7 | 2 | |
| Picea obovata Ldb. | 6 | 4 | 3 | |
| Betula sp. | 9 | 6 | 3 | |
| Salix sp. | 3 | 2 | 1 | |
| 2. herbal pollen | 47 | 49 | 23 | 46 |
| Poaceae Bart. | 4 | 3 | 2 | |
| Cypreaceae Bart. | 3 | 1 | 3 | |
| Ephedraceae Dum. | - | 1 | 2 | |
| Iridaceae Juss. | 3 | 2 | | |
| Liliaceae Juss. | | | | |
| Allium sp. | - | 3 | 2 | |
| Typhaceae Juss. | 2 | 2 | | |
| Chenopodiaceae Vent. | 8 | 12 | 4 | |
| Caryophyllaceae Juss. | 9 | 11 | 5 | |
| Rosaceae Juss. | | | | |
| Potentilla sp. | 3 | 3 | | |
| Fabaceae Juss. | 5 | 3 | 1 | |
| Ericaceae Juss. | 3 | 2 | - | |
| Lamiaceae Juss. | 2 | 1 | 1 | |
| Asteraceae Dumort. | 5 | 4 | 2 | |
| Artemisia sp. | | | | |
| Aster sp. | | | | |
| 3. spores | 5 | 5 | 6 | 12 |
| Lycopodiaceae Rich. | 2 | 2 | 4 | |
| Selaginellaceae Medt. | 2 | 2 | - | |
| Sphagnum sp. | 1 | 1 | 2 | |
| 4. indet | 5 | 16 | 8 | |
| Total | 100 | 100 | 50 | |

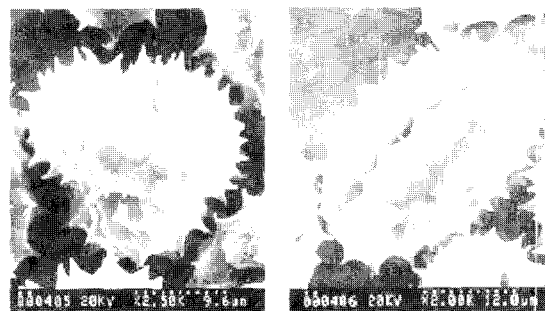


Fig. 1. Asteraceae Dumort. Aster alpinus L. (x2000-2500)

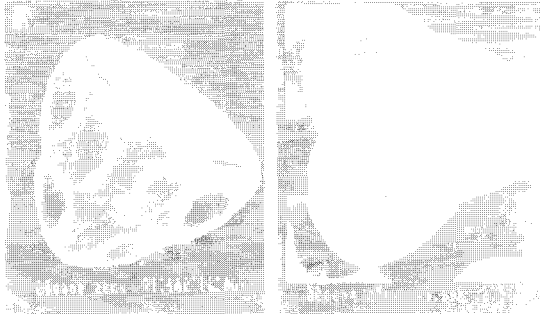


Fig. 2. Ericaceae Juss.
Rhododendron dahuricum L. (x1500)

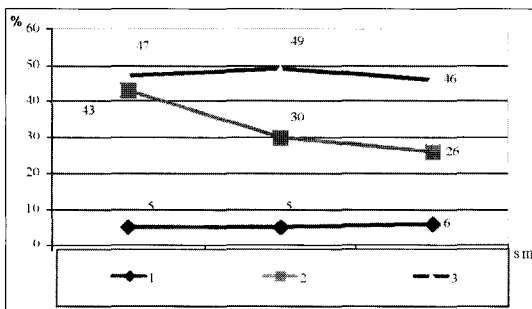


Fig. 3. The connection between pollen and spores content in to soil / A, A1, B/ depth
spores 2. tree pollen grains 3. herbal pollen grains

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