

POLLEN AND SPORES *IN SITU*

This PhD thesis is a compilation of published or accepted papers, which concern reproductive organs of plants and their pollen and spores: "pollen and spores *in situ*".

Thirteen taxa of Cenozoic, Cretaceous, and Carboniferous flora have been analyzed. Eight species, two genera, and one family have been established and described.

Palynological studies focused on pollen and spores *in situ* are important not only for comparison between macrofloristic remains and dispersed spore-pollen associations but also for accurate evaluation of fossil assemblages.

Main approaches and aims of this study may be summarized as follows:

- „whole plant concept“ (reconstruction of fossil plants)
- paleoecological significance of complex fossil associations studies
- quantitative classification of palynological associations

Summaries of the main results are given below:

SEZNAM PUBLIKACÍ S ABSTRAKTY:

- 1) KVAČEK, Z., DAŠKOVÁ, J., ZETTER, R. (2004): A re-examination of Cenozoic *Polypodium* in North America. - Review of Palaeobotany and Palynology, 128: 219–227.

Abstract: The sterile holotype of *Polypodium fertile* MACGINITIE 1937 was re-examined together with other fertile type specimens from the Miocene Weaverville Formation at Redding Creek (California, western USA). In its leaf morphology, venation and *in situ* spores *Polypodium fertile* MACGINITIE 1937 matches the extant *Polypodium vulgare* LINNAEUS 1753 complex. The spores belong to the verrucose type. In view of discrepancies between the original description and the real morphology of the sterile frond of '*Polypodium*' *alternatum* PABST 1968 from the Chuckanut Formation of northwestern Washington (Eocene), this fern must be excluded from the record of *Polypodium* LINNAEUS 1753.

- 2) DAŠKOVÁ, J. (2000): *Nyssa* - pollen *in situ* (Most Basin, Lower Miocene). - Scripta Fac. Sci. Nat. Univ. Masaryk. Brun., Geology, 30: 119–122. Brno.

Abstract: Such a research has been carried out on recent and fossil pollen of the genus *Nyssa* LINNAEUS 1753; the fossil male inflorescence originates from the so called "Horizon No 30" in the roof of the main lignite seam in the Bílina Mine (Most Basin) of the Early Miocene age. The so far obtained data from the comparison of the fossil and extend species allow too much the fossil pollen grains with those of *Nyssa sinensis* OLIVER 1891 (Eastern Asia) and *Nyssa ogeche* W. BARTRAM EX MARSHALL 1785 (Eastern North America). Both extends species differ in other respect (leaf anatomy, fruits, male inflorescence) from the fossil representatives. There for our example is similar to some others Tertiary Europe's plants in which characters of extend representatives are combine. This investigation is a part of the complex study focused on the genus *Nyssa* LINNAEUS 1753 from the Mine Bílina. The goal of this study is to try to combine information on all organs occurring in the same assemblage, in optimal case, coming from the same plant (in progress).

- 3) DAŠKOVÁ, J. (v tisku): *In situ* pollen of *Alnus kefersteinii* (GOEPPERT) UNGER (Bechlejovice, Tertiary, Czech Republic). - Journal of the National Museum (Prague), Natural History Series.

Abstract: The male catkins *Alnus kefersteinii* (GOEPPERT 1838) UNGER 1847 contain pentaporate pollen grains of *Alnipollenites verus* (POTONIE 1931) POTONIE 1960. Isolated pollen grains verify the taxonomical classification of catkins assigned to *Alnus kefersteinii* (GOEPPERT 1838) UNGER 1847 occurring in Bechlejovice locality. This conclusion is in agreement with previous determinations based on gross morphology.

- 4) KVAČEK, J., DAŠKOVÁ, J., PÁTOVÁ, R. (2006): A new schizaeaceous fern, *Schizaeopsis ekrtii* sp. nov., and its *in situ* spores from the Upper Cretaceous (Cenomanian) of the Czech Republic. - Review of Palaeobotany and Palynology, 140 (1–2): 51–60.

Abstract: A new fern, *Schizaeopsis ekrtii* sp. nov., is described from the Peruc-Korycany Formation (Cretaceous, Cenomanian) of the Czech Republic based on the morphology of its leaves and

reproductive structures. It is compared to the similar, previously published fossil taxa. It is characterized by finely segmented, 4–5 times divided fronds. Each terminal segment bears one fertile tip. The tip is entire-margined, containing a single row of sporangia. *Schizaeopsis ektii* sp. nov. is very similar to the extant genus *Schizaea* SMITH 1973 in gross morphology, but differs in its spore morphology. Extant *Schizaea* SMITH 1973 has monolete spores, whereas the *Schizaeopsis* BERRY 1911 has trilete spores. The spores of *Schizaeopsis ektii* sp. nov. are assigned to the *Appendicisporites* WEYLAND et KRIEGER 1953 - *Plicatella* MALYAVKINA 1949 complex.

- 5) **KVAČEK, J., DAŠKOVÁ, J. (2007): Revision of the type material in the genus *Nathorstia* HEER (Filicales). - *Journal of the National Museum (Prague), Natural History Series*, 176 (7): 117–123.**

Abstract: *Nathorstia angustifolia* HEER 1880 from the Lower Cretaceous of Greenland has been revised and the true status of the genus *Nathorstia* HEER 1880 has been verified. *Nathorstia* HEER 1880 is redefined here as a morphogenus of fern foliage recalling the family Matoniaceae, but lacking diagnostic characters of this family: sori consisting of radially arranged sporangia having *Matoniaceae* spores *in situ*. All the type material has been restudied and documented, including unsuccessful attempts in sampling for spores *in situ*. The lectotype of *Nathorstia angustifolia* HEER 1880 is designated and its status is discussed.

- 6) **KVAČEK, J., FALCON-LANG, H., DAŠKOVÁ, J. (2005): A new Late Cretaceous ginkgoalean reproductive structure *Nehvizdyella* gen. nov. from the Czech Republic and its whole-plant reconstruction. - *American Journal of Botany*, 92 (12): 1958–1969.**

Abstract: During the Mesozoic Era, ginkgoaleans comprised a diverse and widespread group. Here we describe ginkgoalean fossils in their facies context from the Late Cretaceous (Cenomanian) Peruc-Korycany Formation of the Czech Republic and present a reconstruction of tree architecture and ecology. Newly described in this study is the ovuliferous reproductive structure, *Nehvizdyella bipartita* gen. et sp. nov. (Ginkgoales). Monosulcate pollen grains of *Cycadopites* WODEHOUSE 1933 are found adhering to the seeds. Facies analysis of plant assemblages indicates that our Cretaceous tree occupied a water-stressed coastal salt marsh environment. It therefore represents the first unequivocal halophyte among the Ginkgoales.

- 7) **LIBERTÍN, M., BEK, J., DAŠKOVÁ, J. (2005): Two new species of *Kladnostrobus* nov. gen. and their spores from the Pennsylvanian of the Kladno-Rakovník Basin (Bolsovian, Czech Republic). - *Geobios*, 38: 467–476.**

Abstract: A new lycopsid family Kladnostrobaceae is proposed, based on the type of sporangia, their attachment by a pedicel and the type of reticulate spores enclosed. All these characteristics distinguish the Kladnostrobaceae from all other lycopsid families. A new lycopsid genus *Kladnostrobus* nov. gen., consisting of two new species *Kladnostrobus clealii* nov. sp. and *Kladnostrobus psendae* nov. sp., is described from the Kladno-Rakovník Basin (Lower Bolsovian) of the central and western Carboniferous continental basins of the Czech Republic. Helically arranged distal laminae and pedicels are relatively primitive, suggesting that *Kladnostrobus* may represent a new, primitive type of lycopsid cone produced by some unknown, probably arborescent lycopsid parent plant. Spores of *Kladnostrobus* are about 90–100 µm in diameter, and possess reticulate sculpture. The proximal contact area of spores is laevigate. *In situ* spores can resemble some dispersed species.

- 8) **BEK, J., DRÁBKOVÁ, J., DAŠKOVÁ, J., LIBERTÍN, M. (v tisku): The sub-arborescent lycopsid genus *Polysporia* NEWBERRY and its spores from the Pennsylvanian (Bolsovian-Stephanian B) continental basins of the Czech Republic - *Review of Palaeobotany and Palynology*.**

Abstract: About fifty compression specimens belonging to four species of *Polysporia* (NEWBERRY 1873) DiMICHELE, MAHAFY et PHILLIPS 1979 from the Kladno-Rakovník Basin of the central and western Bohemian Carboniferous continental basins and Intra-Sudetic Basin of the Czech Republic were studied macromorphologically and for *in situ* spores. Their stratigraphic range is from the Bolsovian to the Stephanian B. *Polysporia rothwellii* sp. nov., *P. drabekii* sp. nov. and *P. radvanicensis* sp. nov. are proposed as new species. *Polysporia* (NEWBERRY 1873) DiMICHELE, MAHAFY et PHILLIPS 1979 is reconstructed as a sub-arborescent plant with a principal axis with sterile and fertile apical portions. *P. rothwellii* sp. nov. and *P. drabekii* sp. nov. are preserved only as clusters of micro- and megasporophylls on specimens not in connection to an axis, and their identification and classification is based mainly on *in situ* spores.