

# **ADVANCES IN PALEOBOTANY**

RECOGNIZING THE CONTRIBUTIONS OF DAVID L. DILCHER AND  
JACK A. WOLFE ON THE OCCASION OF THEIR 70TH YEAR

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## **Program and Abstracts**

**Paramount Plaza Hotel, Gainesville, Florida, USA**

**March 12-15, 2006**

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Organizing committee: Steven Manchester, Robert Spicer, Hongshan Wang,

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Cover Photo: David L. Dilcher and Jack A. Wolfe in San Marcos, Texas, 1998

**RECOGNIZING THE ALBIAN–CENOMANIAN (OAE1D) SEQUENCE BOUNDARY  
USING PLANT CARBON ISOTOPES: DAKOTA FORMATION,  
WESTERN INTERIOR BASIN, USA**

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Analysis of bulk sedimentary organic matter and charcoal from an Albian–Cenomanian fluvial-estuarine succession (Dakota Formation) at Rose Creek Pit (RCP), Nebraska, reveals a negative excursion of ~3‰ in late Albian strata (oceanic anoxic event 1d – OAE1d). Overlying Cenomanian strata have  $\delta^{13}\text{C}$  values of –24‰ to –23‰ that are similar to pre-excursion values. The absence of an intervening positive excursion (as exists in marine records of the Albian/Cenomanian boundary and OAE1d) likely results from a depositional hiatus. The corresponding positive  $\delta^{13}\text{C}$  event and proposed depositional hiatus are concordant with a regionally identified stratigraphic sequence boundary in the Dakota Formation (D<sub>2</sub>), as well as a major regressive phase throughout the globe at the Albian/Cenomanian boundary. Data from RCP confirm suggestions that some positive carbon-isotope excursions in the geologic record are coincident with regressive sea-level phases, and that OAEs do not always occur during transgressive phases. We estimate using isotopic correlation that the D<sub>2</sub> sequence boundary at RCP was on the order of 0.5 Myrs in duration. Several other sections including outcrop and cores have also been analyzed indicating that a similar duration is evident for the region. Therefore, interpretations of isotopic events and associated environmental phenomena, such as oceanic anoxic events, in the shallow-marine and terrestrial record may be influenced by stratigraphic incompleteness. Further investigation of terrestrial  $\delta^{13}\text{C}$  records may be useful in recognizing and constraining sea level changes in the geologic record.

**A REMARKABLE PLANT ASSEMBLAGE FROM THE PLEISTOCENE OF  
NORTHEAST THAILAND**

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A remarkable assemblage of plant and animal fossils has recently been discovered in Nakhon Ratchasima province in Northeast Thailand. The fossils were deposited in a fluvial system thought to be Middle Pleistocene in age. Plant remains include fruits, leaves, wood, rhizomes, amber, and pollen. The most common fruit type is preserved either as an elliptic endocarp with three valve-like structures arranged around the equator, or as a whole fruit with mesocarp and exocarp present and with a circular ridge surrounding the peduncle. This type shows affinity to *Ziziphus* (Rhamnaceae). A second fruit type consists of a globose fruit surrounded by five rather narrow wings and is similar to *Dipterocarpus* (Dipterocarpaceae), especially *D. alatus* and *D. costatus*. A third fruit type is an elliptic endocarp with five elongate ridges and a central cavity apical to the locules. The endocarp dehisces at least partly into five valves. The fruit type is consistent with *Melia* (Meliaceae). A fourth fruit type consists of a fragment of a lenticular endocarp showing affinity to *Dracontomelon dao* (Anacardiaceae). Rhizomes have also been recovered that are similar to rhizomes of Cyperaceae. Clear amber, as well as very well preserved leaves and wood, has also been found. The above specimens suggest the presence of a deciduous or a mixed evergreen-deciduous forest. In addition to plant fossils, a number of vertebrate fossils have also been recovered from the site, including bones or teeth of a fish, soft-shelled and other turtles, gavials, bovids, deer, *Stegodon*, and a hyena.

## THE FLORA OF THE TARD CLAY FORMATION AND ITS PALAEOGEOGRAPHIC IMPLICATIONS

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The Palaeogene Tard Clay Formation comprises a rich and well-preserved fossil flora, both leaves with preserved cuticle and fruits. In Hungary layers of the formation were recorded in the Buda and Bükk Tectonic units, both providing a rich fossil flora. The fossiliferous sediments were deposited during the Kiscellian and based on nannoplanktons belong to the zone NP23. Both tectonic units formed a part of a Palaeogene basin that included Slovenian Palaeogene sediments. In addition to the tectonics of the area, palaeomagnetic measurements and results of other geological studies the similar character of the fossil flora corroborates the close palaeogeographic position of these units during the Early Oligocene. Some taxa were recorded exclusively from these areas, e.g. *Tetrapterys harpyiarum*, *Ailanthus tardensis*. The floras of the Bükk and Buda units share most taxa and show a high similarity with the flora of the Slovenian Early Oligocene.

In addition to the great number of ferns (*Acrostichum*, *Blechnum*, *Osmunda*, *Pteris*) and gymnosperms (*Tetraclinis salicornioides*, *T. brachiodon*, *Calocedrus suleticensis*, *Doliodendron taxiformis* var. *hungaricus*, *Chamaecyparites hardtii*, Taxodiaceae) angiosperms are dominant: *Laurophyllum* div. sp., *Daphnogene* sp., *Eotrigonobalanus furcinervis*, *E. andreanszkyi*, *Quercus lonchitis*, *Zizyphus zizyphoides*, *Engelhardia orsbergensis*, *E. macroptera*, *Sloanea elliptica*, *S. eocenica*, *Hooleya hermis*, *Ailanthus tardensis*, *Raskya vetusta*, *Tetrapteris harpyiarum*, *Cedrelospermum flichei*, *C. aquense*, *Platanus neptuni*,