

## Palaeo-geographical and -historical implications of pollen taxa (e.g., *Sarcandra*, *Phyllanthus*, *Fagus*, *Juglans*, *Lagerstroemia*, *Mortonioidendron*, *Cornus*, *Nyssa*, *Symplocos*; *Iodes*) from the lower Bartonian Chanchang Formation (Hainan, South China) investigated by LM and SEM

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Lower Bartonian samples of the Changchang Basin were palynologically analysed with LM and SEM. The samples are characterized by up to 80% of Quercoidae and other angiosperms that occur in low numbers. Gymnosperms and ferns are rare. The botanical affiliations of the pollen taxa reveal new implications for their palaeo-geographical distribution during the Paleogene: We present the first occurrence of *Sarcandra* (Chloranthaceae), and show that *Laurelia* pollen on Hainan give further evidence for the wide geographical range of this family. *Flueggea* (Phyllanthaceae), that was present in Europe (Lower Eocene) also occurs on Hainan, pointing towards a Eurasian origin of this genus. In contrast, *Phyllanthus* subgen. *Eriococcus* is here described for the first time and, so far, seem to be only Asian in occurrence. The *Fagus*-type from Hainan resembles the extant *F.* “subgen. *Engeriana*” and the Lower Eocene *Fagus* pollen described from NW Canada. This, together with other *Fagus* fossils suggest an amphipacific distribution of an ancient *F.* “subgen. *Engleriana*” lineage during the Eocene. The *Juglans*-type resembles *Juglans* taxa from section *Cardiocaryon* (Asian butternuts), and was contemporaneous with diaspores of *J.* section *Rhysocaryon* from the United States, therefore pushing the divergence-time within this genus further back in time. The *Lagerstroemia*-type is currently the oldest occurrence and closely resembles the Miocene *L. cathayensis* from China and the extant deciduous *Lagerstroemia* taxa from China/Korea. Of the Malvaceae pollen found, the two *Mortonioidendron*-types shed light on an unknown palaeo-geographical history: Today, *Mortonioidendron* is restricted to Central America and Miocene pollen have also been encountered in Central America. However, Lower and mid-Eocene pollen from Europe and now from Hainan, indicate a far wider distribution of this genus prior to the early Oligocene global cooling event. Two dipterocarp pollen types (*Dipterocarpus* and *Dryobalanops*) are here described for the first time and corroborate the findings of dipterocarp biomarkers in nearby oil source rocks. The *Cornus*-type belongs to the “blue-or-white-fruited clade” and, together with fossil data from Europe, suggests a Eurasian origin of this clade, that was contemporaneous with the “cornelian cherry clade” in the U.S.A.. Thus the divergence time within *Cornus* must have been earlier than previously estimated. The *Nyssa*-type closely resembles the extant *N. sinensis* and Eocene *Nyssa* pollen from Europe, but not the ones from the Americas, implying that there was an ancient Eurasian *Nyssa sinensis* lineage stretching from Europe to eastern Asia. The three *Symplocos* type pollen are all related to the deciduous *Symplocos* subgenus *Palura*, an early diverging clade within the Symplocaceae. Upper Eocene *Symplocos* pollen from Germany also belong to this clade and suggests a Eurasian origin for this subgenus. Three Icacinaceae of the *Icacina*-group have been distinguished; two *Iodes* types, one resembling African/Madagascar taxa and one resembling a Melanesian taxon and suggest that the Old World disjunction of *Iodes* in Africa/Madagascar and SE Asia is a Paleogene relict, with the members of this genus previously much more widely distributed. The third Icacinaceae taxon resembles two genera: *Mappia* (today Central America) and *Nothapodytes* (today SE Asia), both members of the *Mappia/Nothapodytes* clade that also must have been widespread in the boreotropical realm during the Eocene.