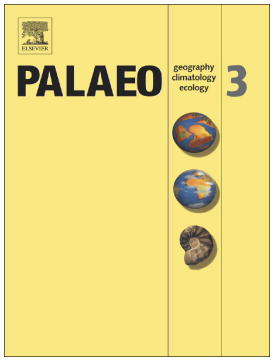

Functional leaf traits and leaf economics in the Paleogene — A case study for Central Europe

Anita Roth-Nebelsick, Michaela Grein, Christopher Traiser, Karolin Moraweck, Lutz Kunzmann, Johanna Kovar-Eder, Jiři Kvaček, Susann Stiller, Christoph Neinhuis

PII: S0031-0182(16)30514-4
DOI: doi: 10.1016/j.palaeo.2017.02.008
Reference: PALAEO 8193

To appear in: *Palaeogeography, Palaeoclimatology, Palaeoecology*

Received date: 26 September 2016
Revised date: 31 January 2017
Accepted date: 6 February 2017

Please cite this article as: Anita Roth-Nebelsick, Michaela Grein, Christopher Traiser, Karolin Moraweck, Lutz Kunzmann, Johanna Kovar-Eder, Jiři Kvaček, Susann Stiller, Christoph Neinhuis , Functional leaf traits and leaf economics in the Paleogene — A case study for Central Europe. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Palaeo(2017), doi: 10.1016/j.palaeo.2017.02.008

Functional leaf traits and leaf economics in the Paleogene – A case study for Central Europe

Anita Roth-Nebelsick[a,*], Michaela Grein[a], Christopher Traiser[a], Karolin Moraweck[b], Lutz Kunzmann[b], Johanna Kovar-Eder[a], Jiři Kvaček[c], Susann Stiller[b], Christoph Neinhuis[d]

[a] State Museum of Natural History Stuttgart, Rosenstein 1, 70191 Stuttgart, Germany, michaela.grein@smns-bw.de, johanna.eder@smns-bw.de, anita.rothnebelsick@smns-bw.de, traiser@smns-bw.de

[b] Senckenberg Natural History Collections Dresden, Königsbrücker Landstr. 159, 01109 Dresden, Germany, lutz.kunzmann@senckenberg.de, Karolin.Moraweck@senckenberg.de

[c] National Museum Prague, Václavské nám. 68, 115 79 Praha, Czech Republic, jiri_kvacek@nm.cz

[d] Technical University of Dresden, Zellescher Weg 20b, 01069 Dresden, Germany, christoph.neinhuis@tu-dresden.de

*Corresponding author: State Museum of Natural History Stuttgart, Rosenstein 1, 70191 Stuttgart, Germany, email: anita.rothnebelsick@smns-bw.de

Keywords: leaf size, leaf mass per area, palaeoclimate, palaeoecology, Paleocene, Eocene, Oligocene

ABSTRACT

Numerous data based on extant vegetation reveal global patterns of relationships between functional leaf traits and climate. Leaf life span (LLS), i.e. evergreen vs. deciduous leaves, represents a central parameter linking functional traits related to the global leaf economics spectrum. Paleogene climate transitions are therefore expected to be reflected by functional leaf traits and leaf economics. In this study, fossil floras from six sites in Central Europe dating back to the Paleocene, Late Eocene, Early and Late Oligocene are studied, addressing the following questions: 1) How does leaf economics and LLS change through the Paleogene? 2) How do various functional leaf traits change through the Paleogene, and how do they relate to leaf economics? 3) Are changes in leaf functional traits consistent with climate reconstructions from proxy data? As a proxy for LLS change, leaf mass per area (LM_A) was determined indirectly. The results show the Late Eocene site to stand out from all other sites, by tending towards lower leaf size/width, higher leaf mass per area (LM_A), a tendency towards untoothed leaf margins, a high frequency of looped secondary veins, an almost complete absence of lobed leaves, and a low proportion of toothed pinnate leaves with non-looped secondaries. The LM_A peak at the Eocene site is caused by untoothed leaf