[1] Senckenberg Forschungsinstitut und Naturmuseum Frankfurt, Senckenberganlage 25, 60325 Frankfurt am Main, Germany

[2] Senckenberg Centre for Human Evolution and Palaeoecology, Institut für Geowissenschaften, Universität Tübingen, Sigwartstraße 10, 72076 Tübingen, Germany, e-mail: dieter.uhl@senckenberg.de

[3] Programa de Pós-Graduação em Ambiente e Desenvolvimento da UNIVATES (PPGAD/UNIVATES), Centro Universitário Univates, Rua Avelino Tallini, 171 – CEP 95.900-000, Lajeado, RS, Brasil

[4] Staatliches Museum für Naturkunde, Rosenstein 1, 70191 Stuttgart, Germany

Freies Thema

On the origin of manatees: a still speculative history?!

Manja Voss[1]

The genus *Trichechus* known from the Pliocene to Recent is represented by three taxa inhabiting the coastal rivers and estuarines to both sides of the Atlantic. Whereas the West Indian manatee (*Trichechus manatus*) and the West African manatees (*Trichechus senegalensis*) occur in both marine and freshwater environments, the smallest of all Sirenia, the Amazon manatee (*Trichechus inunguis*), is restricted to the freshwater systems of the Amazonian basin. Within the Trichechidae, the manatees belong to the subfamily Trichechinae, whose earliest member is probably *Potamosiren* from the middle Miocene of Columbia. This sea cow still has three molars lacking the continuous horizontal tooth replacement specific for the later Trichechinae. This indicates that aquatic plants belonging to the true grasses and constituting the principal diet of trichechines had not yet become an important part of *Potamosiren*'s diet.
The evolution of supernumerary molars horizontally replaced throughout life appears in *Ribodon* from the Mio-Pliocene of Argentina for the first time. This type of tooth replacement is understood as an adaptation to feed on silicate-rich and therefore abrasive sea grasses in South American rivers caused by the late Miocene uplift of the Andean orogeny. It is assumed that this process has stimulated the growth of aquatic macrophytes and, subsequently, the evolution of the manatees. Whereas the fork-tailed dugongines as seagrass specialists died out in this region, the manatees are more adapted to floating or emergent and submerged aquatic plants.
According to phylogenetic studies, the clade Trichechidae is expanded to include also the members of the previous subfamily Miosireninae, *Anomotherium* from the late Oligocene of Westphalia (Germany), and *Miosiren* from the early Miocene of Belgium. These taxa are supposed to be aberrant in their diet compared to all other Sirenia in possessing heavily reinforced palates possibly adapted to shellfish-crushing. Their diet would be consistent with their comparatively high-latitude occurrence in northwestern Europe, where they might have compensated seasonal deficiencies of nutrients in the available sea-grasses. The closer relationship between the Miosireninae and Trichechinae is also well supported in the cladistic analysis presented here. Differences to hitherto published hypotheses refer to the interrelationships of the manatees indicating a more recent ancestor for the West Indian and Amazon manatee than supporting a sister grouping of the West Indian with the West African manatee. However, the main discrepancies of the herein presented data to previous studies concern the origin of the trichechids. Currently, this clade is assumed either to have been derived from late Eocene or early Oligocene dugongids or from protosirenids. However, this study reveals a more recent origin, which corresponds well with their evolution primarily in South America.

[1] Museum fuer Naturkunde, Leibniz-Institut für Evolutions- und Biodiversitätsforschung an der Humboldt-Universität zu Berlin, Invalidenstraße 43, 10115 Berlin, Germany, e-mail: manja.voss@mfn-berlin.de

Paläobotanik und Palynologie

Green food through time

Torsten Wappler[1]

Pflanzen und Insekten haben im Lauf der Evolution eine überaus große Formenvielfalt entwickelt. Älteste Nachweise reichen weit bis in das früheste Erdaltertum zurück. Beide Gruppen bilden hinsichtlich ihrer Artenzahlen zusammen ca. 75% des heute existierenden Artenreichtums. Vor allem die engen biologischen Beziehungen zwischen Pflanzen und Insekten haben sich als wichtiger „Motor" für den enormen Artenreichtum heutiger terrestrischer Ökosysteme herausgestellt. Das Funktionieren von Pflanzen-Insekten Interaktionen ist für die langzeitliche Erhaltung der Biodiversität in jedem Ökosystem von großer Wichtigkeit. Deshalb ist das Verstehen, aber auch die Erfassung der zeitlichen Entwicklung von Pflanzen-