SYSTEMATICS preserved?

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1.-2. Dezember 2011

Haus der Natur Salzburg

NETWORK OF BIOLOGICAL SYSTEMATICS AUSTRIA

SALZBURG 2011 NOBIS 5 AUSTRIA

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Systematics – preserved?

Haus der Natur Salzburg

(see http://www.hausdernatur.at/anreise.html)

Robert Lindner

Haus der Natur Salzburg

Andreas Tribsch

Department of Organismic Biology, University of Salzburg

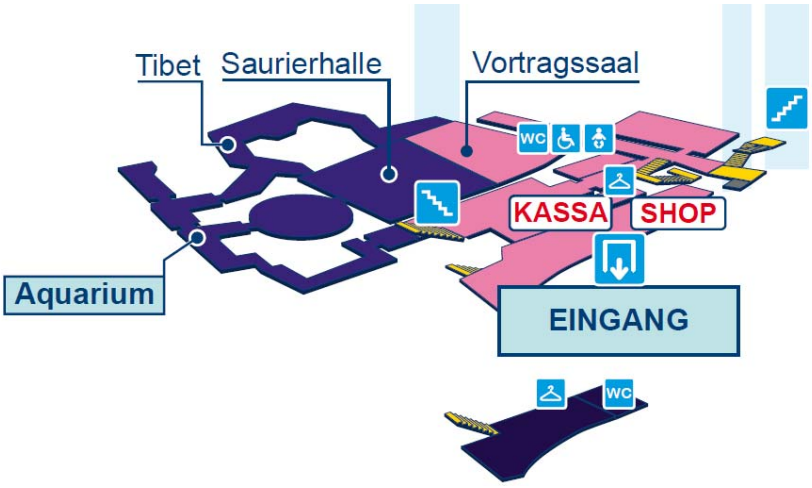
HAUS DER NATUR SALZBURG

UNIVERSITÄT SALZBURG

Veranstaltungsort Das Haus der Natur liegt in Mitten der Salzburger Altstadt am linken Salzachufer: Museumsplatz 5, 5020 Salzburg

Alle Teilnehmer sollen sich bitte an der Hauptkassa des Hauses der Natur als Teilnehmer des NOBIS Treffens melden. Sie erhalten dann eine Gästekarte für das Haus der Natur.

Eine Anreisebeschreibung zum Haus der Natur findet man auf **http://www.hausdernatur.at/anreise.html.** Dort findet sich auch ein Link zur Fahrplanauskunft der Salzburger Verkehrsbetriebe und des Salzburger Verkehrsverbundes.



Vorträge Redezeit: 15 Minuten + 5 Minuten Diskussion

Sprache Deutsch oder Englisch

Poster Format: A0

Tagungsbeitrag NOBIS-Mitglieder € 30.-; andere Teilnehmer € 50.-
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Für Interessierte besteht im Anschluss an die Tagung noch die Möglichkeit an einer Führung durch die Sammlungen des Hauses der Natur teilzunehmen.

Treffpunkt 17:30 im Vortragsaal

Dauer: ca. 1 Stunde

SALZBURG 2011 NOBIS AUSTRIA 5

Programm

Donnerstag – 01. 12. 2011

Haus der Natur Salzburg - Vortragssaal

18:00 – 21:00 **Icebreaker**

Freitag – 02. 12. 2011

Haus der Natur Salzburg- Vortragssaal

08:30 **Registrierung und Kaffee**

08:50 **Begrüßung** *N. Winding,* Direktor des Hauses der Natur Salzburg
A. Tribsch, Universität Salzburg
M. Harzhauser, Präsident von NOBIS Austria

09:10 ***G. Aubrecht***
Initiative zur Kooperation von Museen und Universitäten in Österreich auf dem Gebiet der biologischen Taxonomie und Systematik

09:20 – 10:40 **Vorträge 1** **Chair: *A. Tribsch***

09:20 – 09:40 ***Haszprunar, G.**, Balke, M., Hendrich, L., Schmidt, S., Melzer, R. & Hausmann, A.*
DNA-Barcoding einer mitteleuropäischen Fauna: Erfolge, Probleme, Überraschungen

09:40 – 10:00 ***Zachos, F. E.***
Vom "Kategorischen Imperativ" und Heiligen Kühen in der Systematik: Die negativen Konsequenzen der Linnéschen Taxonomie

10:00 – 10:20 ***Essl, F.**, Dullinger, S. & Rabitsch, W.*
Legacies of socio-economic change on European species diversity

10:20 – 10:40 ***Kroh, A.** & Nichterl, T.*
Opening up – making collection data available via the internet

10:40 – 11:00 **Pause**

11:00 – 12:20 **Vorträge 2** **Chair: *G. Tarmann***

11:00 – 11:20 ***Zimmermann, D.**, Randolf, S. & Aspöck, U.*
Head anatomy and its value for unveiling phylogeny and evolution in Neuroptera

11:20 – 11:40 ***Foissner, W.**, Stoeck, T., Agatha, S. & Dunthorn, M.*
Morphologic and molecular evolution of the ciliate class Colpodea: classification problems

11:40 – 12:00 ***Kropf, M.**, Plenk, K., Göd, F. & Kriechbaum, M.*
AFLP variation and pollination of seasonal cohorts – results from *Gentianella bohemica* (Gentianaceae) in Lower Austria

12:00 – 12:20 *Vicent Fernández, M. &* ***Tribsch, A.***
Phylogeography of *Thalictrum foetidum* (Ranunculaceae) confirms recent expansion of Central Asian steppes to Europe.

12:20 – 13:30 **Mittagspause**

12:20 – 13:30 **Treffen der Arbeitsgruppe „Kooperation von Museen und Universitäten"**
(Besprechungszimmer im 4. Stock)

13:30 – 15:10 **Vorträge 2** Chair: *M. Harzhauser*

Beiträge für den NOBIS-Preis für herausragende Forschung

13:30 – 13:50 ***Jaksch, K.**, Sattmann, H., Kruckenhauser. L., Duda, M., Harl, J. & Haring, E.*

Nomen est omen: *Clausilia dubia* (Gastropoda: Pulmonata: Clausiliidae) and its dubious subspecies classification

13:50 – 14:10 ***Moosbrugger, M.**, Schwaha, T. & Ostrovsky, A. N.*

The placental analogue and the pattern of oogenesis in the cheilostome bryozoan *Bicellariella ciliata* (Bryozoa, Cheilostomata)

14:10 – 14:30 ***Neubauer, T. A.**, Harzhauser, M., Mandic, O., Pavelić, D. & Vranković, A.*

Morphological evolution in Middle Miocene freshwater gastropods from the Dinaride Lake System: shifting optima on the adaptive landscape

14:30 – 14:50 ***Zinssmeister, C.**, Soehner, S., Facher, E., Keupp, H. & Gottschling, M.*

The need for clarifying taxonomic identities in calcareous dinophytes (Thoracosphaeraceae, Peridiniales) such as *Scrippsiella trochoidea* (F.Stein) A.R.Loebl.

14:50 – 15:10 ***Zopp, L.**, Kruckenhauser, L., Haring, E., Schileyko, A. & Sattmann, H.*

Does the hermaphroditic land snail *Cylindrus obtusus* (Draparnaud, 1805) always use the same mode of reproduction? (Gastropoda: Helicidae)

15:10 – 15:50 **Poster-Präsentation – Kaffeepause**

Beschlussfassung durch die Jury

15:50 – 16:00 ***J. Walochnik,*** Vizepräsidentin von NOBIS-Austria

Zuerkennung des NOBIS-Preises

16.00 – 17.00 **Vorträge 3** Chair: *W.E. Piller*

16:00 – 16:20 ***Gomez-Berning, M.***

Applied taxonomy: mollusks and water quality assessments

16:20 – 16:40 ***Schneider, S.***

Fossil and extant freshwater mussels of SE Asia – a puzzle game

16:40 – 17:00 ***Walochnik, J.**, Poeppl, W., Burgmann, H.. Auer, H., Mooseder, G.*

Leishmania (Viannia) guyanensis in Europe?

NOBIS-Preis für herausragende Forschung

NOBIS Austria hat beschlossen einen Preis für herausragende wissenschaftliche Leistungen am Gebiet der biologischen Systematik zu stiften. Er wird ausschließlich an Studierende vergeben (Master, PhD) und soll junge WissenschafterInnen unterstützen. Bedingung ist die Mitgliedschaft bei NOBIS Austria bei der Einreichung. Der Preis wird nun erstmals im Rahmen der diesjährigen Salzburg-Tagung vergeben und ist mit € 500.- dotiert.

Studierende waren aufgefordert ihre Arbeiten in Form eines Abstracts einzusenden. Aus den Einsendungen wurden durch Vorstand und Beirat 5 KandidatInnen ausgewählt und zur Tagung eingeladen. Im Anschluss an die Vorträge wird der beste Vortrag durch eine Jury ermittelt und der Preis zuerkannt.

Jury 2011:

Erna Aescht
Biologiezentrum Linz

Gerhard Haszprunar
Zoologische Staatssammlung München

Robert Lindner
Haus der Natur Salzburg

Martin Zuschin
Universität Wien

Im Folgenden werden die die 5 Abstracts der KandidatInnen präsentiert:

Nomen est omen: *Clausilia dubia* (Gastropoda: Pulmonata: Clausiliidae) and its dubious subspecies classification

Jaksch, K.[1, 3], Sattmann, H.[1], Kruckenhauser. L.[2], Duda, M.[1], Harl, J.[2] & Haring, E.[2, 3]

[1] Third Zoological Department, Museum of Natural History, Burgring 7, 1010 Vienna, Austria
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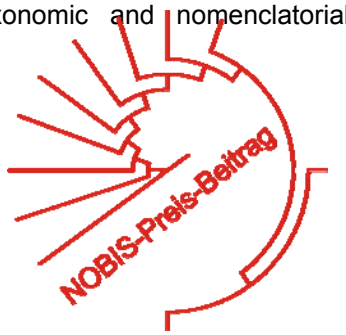
Among many clausilid species numerous subspecies have been described in the past which is partly a consequence of their patchy distribution and their complex morphology. Especially the clausilial structures in the aperture are highly differentiated. In case of *Clausilia dubia* (DRAPARNAUD, 1805) 16 subspecies are listed solely for Austria.

In the present project morphological data (various shell characters) and molecular data (partial sequences of the mitochondrial gene for COI) were for the first time investigated in parallel to assess phylogeographic patterns. It was our aim to evaluate whether the described subspecies are genetically and/or morphologically differentiated. Moreover we wanted to find out whether the morphological and the genetic results are in accordance. We analyzed 150 individuals of *Clausilia dubia*, collected at 55 sampling sites in the eastern part of the Northern Calcareous Alps of eastern Austria. In this area 12 subspecies are expected to occur. Of these 12 subspecies only ten could be differentiated morphologically, but due to their similarities they can be merged in four morphogroups. In the NJ-tree derived from the DNA sequence data at least five highly supported clades become apparent. However, none of these clades corresponds solely to any of the described subspecies or morphogroups. Though these data are still preliminary, final taxonomic and nomenclatorial consequences will be proposed when the data set is complete.



The placental analogue and the pattern of oogenesis in the cheilostome bryozoan *Bicellariella ciliata* (Bryozoa, Cheilostomata)

Moosbrugger, M.[1], Schwaha, T.[1] & Ostrovsky, A. N.[2,3]

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Matrotrophy or extraembryonic nutrition is widely spread across the animal kingdom. Its most elaborate form is placentation that is predominantly known in mammals, whereas only few invertebrates are known to possess placental analogues. Among those, matrotrophy is unusually common in the Bryozoa - a group of sessile, colonial filter-feeders (LEVIN & BRIDGES 1995). In addition representatives of all three major classes of this phylum possess extraembryonic nutrition (OSTROVSKY 2008A, OSTROVSKY ET AL. 2009). Brooding mechanisms evolved numerous times in the phylum (OSTROVSKY & TAYLOR 2005) which also suggests multiple evolution of matrotrophy itself. Matrotrophic evolution obviously led to a shift in oogenesis resulting in an overall change in reproductive patterns (OSTROVSKY ET AL. 2009). Consequently, bryozoans represent a unique phylum for studying the convergent evolution of extraembryonic nutrition and its influence to the reproductive effort in general.

Since oogenesis and matrotrophic structures have only been studied in few bryozoans, and placental structure has been investigated just in a single species (see REED 1991), my diploma thesis focuses on the reproduction of the matrotrophic cheilostome bryozoan *Bicellariella ciliata*, a representative of the familiy Bugulidae. This species possesses macrolecithal eggs that after fertilization are transferred to a brood chamber, the ovicell, where embryos are incubated during their embryogenesis. In this chamber the mother animal develops a nutritive epithelium, the embryophore that nourishes the embryo during gestation. Nutrients seem to be delivered as mucous material that is ingested by endocytosis of the embryo. Ultrastructure of this embryophore shows a high degree of cell activity noticeable by its high extent of cell organelles such as endoplasmatic reticulum. Additional signs of the high activity are visible by a progressive increase of the surface at the contact zone between mother and embryo seen by numerous membrane infoldings. The current study shows similarities, such as the surface increase, to the previously studied species, but additional species of the family require study to analyse the convergent evolution of this phenomenon.

SALZBURG 2011 NOBIS AUSTRIA 5

Morphological evolution in Middle Miocene freshwater gastropods from the Dinaride Lake System: shifting optima on the adaptive landscape

Neubauer, T. A.[1], Harzhauser, M.[1], Mandic, O.[1], Pavelić, D.[2] & Vranković, A.[2]

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A pattern of morphological evolution is reported from Middle Miocene freshwater gastropods of the Dinaride Lake System. The upper 100 m of a succession in the Sinj basin is studied comprising two astronomically tuned limestone-coal cycles. Within two short-term intervals of enhanced accumulation of organic matter simultaneous morphological shifts are observed in four gastropod species, two of each *Melanopsis* and *Prososthenia*. Both periods are characterized by warming events and productivity peaks as documented by the pollen record and isotope signatures. In all four lineages the morphotypes evolve increased sculpture during both events. In two species also dramatic size increases occur.

The independent evolution of similar morphological traits in even two unrelated genera argues for a pattern of directional selection. The contemporaneous climatic shifts documented by environmental proxies emphasize the influence of extrinsic factors on evolution. In terms of the adaptive landscape this is expressed as rapid and intense shifts of adaptive optima. In consequence of a rising temperature enhanced carbonate precipitation facilitated the development of larger and highly sculptured shells. Also, a changing climate had effect on lake level and thus habitat distribution along the shoreface. Possibly the new morphological traits are a mechanical adaptation to new substrate conditions.

Subsequently, these new traits are subject to stabilizing selection as the morphological changes persist into post-warming periods. Aside from the two events no net change in the morphologies occur (stasis) due to a constant or only slightly fluctuating adaptive optimum.

The need for clarifying taxonomic identities in calcareous dinophytes (Thoracosphaeraceae, Peridiniales) such as *Scrippsiella trochoidea* (F.Stein) A.R.Loebl.

Zinssmeister, C.[1,2], Soehner, S. [1,2], Facher, E.[1], Keupp, H.[2] & Gottschling, M.[1]

[1] LMU Munich, Systematic Botany and Mycology, GeoBio-Center, Menzinger Str. 67, 80638 Munich, Germany

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The correct use of scientific names is challenging in unicellular and character poor organisms such as the dinophytes because of multiple sources of ambiguity. Frequently, original (including type) material associated with a validly published name is vague and cannot be identified for purposes of the precise application of the name of a taxon. To collect living material from the type locality that is consistent with the protologue then appears as a sensible approach for an adequate, state of the art morphological and molecular re-investigation.

We collected, isolated, and cultivated various members of calcareous dinophytes (Thoracosphaeraceae, Peridiniales) from sediment and water tow samples of numerous sites across Europe, including type localities associated with several dinophyte names. For identifications and descriptions, we applied a combination of molecular methods (i.e., sequencing of selected loci) and morphological approaches (by using light, scanning electron, and fluorescence microscopy).

As a first result, we were able to establish a strain from the type locality of *Scrippsiella trochoidea* (F.Stein) A.R.Loebl. from the Kiel Fjord. The morphology of the thecate cells is consistent with the protologue of this species firstly described in 1883.

We have designated an epitype for *S. trochoidea* that has high importance for proper species identification, since the name has been used widely for a species complex exhibiting a large heterogeneity of ribotypes among numerous species with similar morphologies. We aim at a comprehensive revision of taxonomic names in calcareous dinophytes in our future studies.

Zinssmeister, C., Soehner, S., Facher, E., Kirsch, M., Meier, K. J. S., Gottschling, M. 2011. Catch me if you can: the taxonomic identity of Scrippsiella trochoidea (F.Stein) A.R.Loebl. (Thoracosphaeraceae, Dinophyceae). *Syst Biodiv* 9: 145–157.

Does the hermaphroditic land snail *Cylindrus obtusus* (Draparnaud, 1805) always use the same mode of reproduction? (Gastropoda: Helicidae)

Zopp, L.[1,2], Kruckenhauser, L. [1] , Haring, E. [1,2], Schileyko, A. [3] & Sattmann, H. [4]

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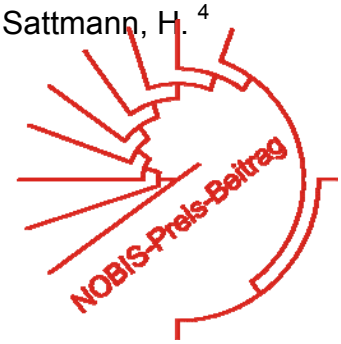

In a preliminary investigation of the genital tract of the Austrian endemic land snail *Cylindrus obtusus* (Draparnaud, 1805) a geographical pattern regarding the length of the mucus glands was observed (Schileyko et al. 1997). Individuals from Gesäuse, central Austria, showed pair wise mucus glands of equal size whereas in populations from Schneeberg, eastern Austria, these glands were quite variable, conspicuously shortened and asymmetrical to different degrees. Subsequently a microsatellite analysis by Kruckenhauser et al. (2010) also revealed two geographically distinct groups of *C. obtusus*. The populations of this species could be divided into a western group, where the genotype frequencies are in Hardy-Weinberg equilibrium, and an eastern group, where a significant excess of homozygotes at all loci could be observed. The coincidence of these findings indicates an altered mode of reproduction in eastern populations of *C. obtusus*. The present study was conducted to further elucidate the reproduction mode of *C. obtusus*: 67 individuals, from which the genotype has been determined, were also used to conduct a statistical analysis on the length of the distal female genital tract, comprising the two mucus glands and the stylophore. A highly significant correlation between the genetic and the anatomical results was observed. To assess the functionality of these anatomical structures a histological investigation of the mucus glands was performed for both groups, but no clear differences were found so far.

Furthermore, the presence of a love-dart was examined. A love-dart was absent in some individuals of the western populations, while it existed in all individuals of the eastern populations. Finally, the inner pennial structure was inspected. Although this structure appeared to be variable it displayed no geographical pattern. In summary, while in some anatomical features eastern and western populations are clearly distinct, others provide ambiguous results. Thus, clear evidence for a changed mode of reproduction in *C. obtusus* is still missing and further analyses are necessary.

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Tagungsbeiträge

Updating the “Catalogue of the generic names of ciliates (Protozoa, Ciliophora)” focused on type species and type specimens

Aescht, E.

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A precise, non-ambiguous terminology, e.g. concerning various spellings, synonymy and homonymy, together with three subsequent nomenclatural stages, viz. availability, allocation and validity (Dubois 2011 and references therein), provide an efficient tool for the computerization of databases of nomina and references to be implemented in the “Species 2000” Catalogue of Life. Apart from updating the “Catalogue of the generic names of ciliates (Protozoa, Ciliophora)” published in 2001, name-bearers were checked in more detail and a first evaluation of type material is provided. A detailed logonymic list allows a connection between the different historical stages of the ciliate taxonomy and highlights persisting problems, viz. concerning unresolved homonyms, problematic designations of type species and “forgotten” senior synonyms. Following *Vorticella* in 1767, 3179 generic names have been proposed based on 2129 type species. A slight majority of the 230 genera made available since 2001 were based on new species discoveries (viz. 120), while 110 resulted from new combinations of species. Only about 14 % of type species proposed are substantiated by holo-, syn- or neotypes. Consequently, a shift from concepts (diagnoses, though increasingly improved) to the (re-) investigation and deposition of specimens, which are the objective and permanent link between the world of organisms and the world of language, is urgently needed. Two monographs embracing “all” ciliate taxa were published in Russian by Jankowski in 2007 and in English by Lynn in 2008, however, only 1298 genera (apart from 36 established later) are listed in both, while about 795 genera are inconsistently mentioned.

Aescht, E. 2001. Catalogue of the generic names of ciliates (Protozoa, Ciliophora), Denisia, 1, 1–350.

Dubois, A. 2011. The International Code of Zoological Nomenclature must be drastically improved before it is too late, Bionomina, 2, 1–104.

Jankowski, A. V. 2007. [Phylum Ciliophora Doflein, 1901—Part] Review of taxa. In: M. V. Krylow & A. O. Frolov (ed.), Protista: Handbook on Zoology, Part 2, St. Petersburg (Nauka), 415–976. [In Russian].

Lynn, D. H. 2008. The Ciliated Protozoa—Characterization, Classification, and Guide to the Literature. 3rd edition, Springer, 1–605.

High-resolution taxonomic analysis of an Karpatian (upper Burdigalian) upwelling site in the Central Paratethys

Auer, G.[1], Piller, W.E. [1], Harzhauser, M.[2], Ćorić, S.[3], Grunert, P.[1]

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[2]Naturhistorisches Museum Wien, Geologisch-Paläontologische Abteilung, Burgring 7, A-1014 Wien, Austria, mathias.harzhauser@nhm-wien.ac.at

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Herein we present taxonomic data focussing on Early Miocene (late Burdigalian - 17.2-16.5 Ma) deposits of the eastern North Alpine Foreland Basin. From this area local, wind-driven upwelling was reported especially from sediments of the Waschberg-Zdanice Unit. In the present work a high-resolution analysis was conducted on these upper Burdigalian sediments focussing on small-scale changes in ocean conditions at the onset of the Middle Miocene Climate Optimum. Based on integrated proxy records from calcareous nannoplankton, geochemistry and sedimentology variations in water-column stratification, primary productivity, organic matter flux and bottom-water oxygenation have been evaluated on a sub-Milankovitch scale.

100 samples with a resolution of ~1cm were taken from finely laminated clays and clayey sands of the Karpatian (= upper Burdigalian) Laa Formation at a clay pit near Laa/Thaya (Lower Austria). Coccolith assemblages are poor to moderately well preserved and correspond to the upper Burdigalian nannoplankton zones NN4 (Martini, 1971) and MNN4a (Fornaciari et al., 1996) respectively. The total floral record consists of 132 taxa. Out of these 32 taxa are considered as autochthonous, whereas 100 taxa are exclusively allochthonous, originating from Cretaceous (59 taxa) and Paleogene (41 taxa) sediments. The Karpatian assemblages show a bulk-diversity in coccolith taxa comparable to Mediterranean assemblages during that time. High-resolution analysis of the samples shows five dominant taxa in varying abundances, 27 accessory taxa are highly variable in abundance.

Fornaciari, E., Di Stefano, A., Rio, D., & Negri, A. 1996. Middle Miocene quantitative calcareous nannofossil biostratigraphy in the Mediterranean region. *Micropaleontology , 42* (1), 37-63.

Martini, E. 1971. Standard Tertiary and Quaternary calcareous nannoplankton zonation. In A. Farinacci (Ed.), *Proceedings of the Second Planktonic Conference Roma 1970. 2*, pp. 739-785. Roma: Edizioni Tecnoscienza.

Double profit of vouchers: Combining Non-destructive DNA extraction and Confocal Laser Scanning Microscopy in Diplura and Protura

Bartel, D.[1], Böhm, A.[1], Szucsich, N. U.[1], Timelthaler, G.[1] & Pass, G.[1]

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In many minute arthropods, such as Diplura and Protura, unambiguous species determination demands for clearing and slide mounting of specimens. Consequently scientists which conduct molecular research are confronted with an awkward dilemma, since conventional DNA extraction entails destruction of the whole specimen. Single individuals than can either be used to obtain molecular data or for determination purposes. The resulting molecular data sets are dependent on determination of co-habitant specimens, leaving entries in GenBank highly prone to misidentifications. To overcome this problem, we applied an adapted non-destructive DNA extraction method. This already established method allows to use the same specimen for both extractions and determination. The resulting gain concerning more accurate species identifications can even be increased, since the resulting vouchers can subsequently be used for confocal autofluorescence imaging. Thus cuticular characters can be analyzed and documented on the same specimens used for molecular studies. Our results show that the used non-destructive extraction method results in completely clear cuticular remainings, where the autofluorescence properties are highly useful to visualize, reconstruct and quantify structures of both taxonomic and phylogenetic importance.

Phylogeny of South-African Lacertidae

Engleder, A.[1, 2], Haring, E.[2, 3] & Mayer, W.[4]

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[3]First Zoological Department, Museum of Natural History, Burgring 7, 1010 Vienna, Austria, e-mail: elisabeth.haring@nhm-wien.ac.at
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Eremiadinae are one of three lacertid lizard subfamilies. They are predominantly distributed throughout Asia and Africa. Preivious studies tried to reconstruct a plausible phylogeny but did not result in a highly supported topology. In our analyses we focused on one group of Eremiadinae which was called “the South-African clade” because of its geographical distribution. This clade includes the genera *Pedioplanis, Meroles, Ichnotropis, Tropidosaura* and *Australolacerta*. To draw a more complete picture we also included some representatives of East-African Eremiadinae (genera *Nucras, Heliobolus* and *Latastia*) and some distantly related genera like *Atlantolacerta* and *Ophisops* as well as *Lacerta agilis* as an outgroup. In particular we wanted to find out the state of the genera *Meroles, Ichnotropis* and *Tropidosaura.* In our analyses we employed mitochondrial as well as nuclear markers. Thus we sequenced fragments of the widely used mitochondrial genes for *16s rRNA*, *12s rRNA* and *cytochrome b* as well as the nuclear genes *c-mos* and *rag1*. To obtain additional sequence information we also test four new nearly unknown nuclear markers which were already used for other reptiles: *PRLR, KIF24, EXPH* and *rag2*. If all marker sequences turn out to be suitable, this would sum up to a sequence information of 6000 bp which should provide enough phylogenetic information to evaluate the cladogenesis of lacertid lizards of Southern Africa and the relationships between the genera.
First results provide clear evidence that *Tropidoaura* is a monophyletic group. We could also show that *Meroles* and *Ichnotropis* cluster together. Moreover, we could show that the genus *Australolacerta* is paraphyletic as the two species (*A. australis* and *A. rupicola*) are not sister taxa but placed in quite distinct clades in the phylogenetic tree.

Legacies of socio-economic change on European species diversity

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Human pressure increasingly alters the distribution of biota on an unprecedented scale. Native species` ranges are reduced, isolated and fragmented and finally species are facing extinction, whereas, on the contrary, alien species invasions are rapidly increasing. In contrast to native species diversity, these contractions and expansions of species distributions are predominantly driven by human socio-economic activities. It is known that the impact of these activities on the distribution of species often exhibits a considerable time lag in the cause-effect relationships. Regarding species invasions, this lag would mean that the seeds of future invasions have already been sown and can best be described as an 'invasion debt'. Extinction risks of native species, however, as assessed in national Red lists, might be underestimated and best described as an 'extinction debt'.

Here, we show that across a wide range of taxonomic groups (vascular plants, bryophytes, fungi, birds, mammals, reptiles, amphibians, fish, terrestrial insects and aquatic invertebrates) in >20 European countries, current numbers of alien species established in the wild are indeed more closely related to indicators of socio-economic activity from the year 1900 than to those from 2000. We further show that risks of extinction bear a similar historic signal indicating that invasion and extinction debt due to changing and increasing socio-economic activity is a wide-spread phenomenon on a coarse (i.e. national) scale.

Our results suggest that the consequences of the current high levels of socio-economic activity on the future fate of species biodiversity will probably not be completely realized until several decades into the future.

Essl F., Dullinger S., Rabitsch W., Hulme P.E., Hülber K., Jarosik V., Kleinbauer I., Krausmann F., Kühn I., Nentwig W., Vilá M., Genovesi P., Gherardi F., Desprez-Loustau M.-L., Roques A. & Pysek P. (2011) Socio-economic legacy yields an invasion debt. Proceedings of the National Academy of Sciences 108: 203-207.

Morphologic and molecular evolution of the ciliate class Colpodea: classification problems

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The Colpodea embrace about 200 species distributed in about 65 solid genera. They are defined by having a so-called Left Kinetodesmal Fibre associated with the basal bodies. In 1993, Foissner revised the class, summarizing the taxonomic and ecological knowledge, and presenting a evolutionary scenario in that the Colpodea show a basal split into two subclasses.
When molecular tools became available, it turned out that Foissner's classification, mainly based on the silverline and nuclear pattern, could be wrong. Over the years, the small subunit of the nuclear rDNA has been reported for 30 genera and about 50 species. Using this data set, we analysed evolution and classification of the Colpodea (Foissner et al. 2011). This disproved Foissner's (1993) classification at large and in many details. Further, a curious molecular phenomenon emerged: many of the about 30 *Colpoda* species did not form a single clade but were distributed throughout the Colpodea tree. Even species, that appeared very similar in the light microscope, were found in different molecular subclades, producing pronounced paraphylies. Thus, we suggest that *Colpoda* performed an intense adaptive radiation, and most species then evolved independently, forming new taxa without changing significantly the stem species. In other words, many Colpodas did not evolve by "cladistic splits", but by budding processes in which the parental branch continued essentially unchanged (Mayr and Bock 2002). Such radiations have been described in many multicellular organisms but we could not find a suggestion for classification. Basically, three ways are possible: (i) establishing a new taxon for, e.g., the clade containing *C. henneguyi*, *Bresslaua*, and *Bresslauides*, including in some way the *Colpoda*-like stem species; (ii) as (i) but excluding the *Colpoda*-like stem species, or (iii) creating a new genus for each *Colpoda* stem species and including the new taxon in some way in the diagnosis of a new or existing family. We would prefer the second way because it appears otherwise impossible to make meaningful taxon circumscriptions. Please inform us if you know classification examples.

Foissner, W., Stoeck, T., Agatha, S., Dunthorn, M. 2011. Intraclass evolution and classification of the Colpodea (Ciliophora), J. Eukaryot. Microbiol. (in press)
Foissner, W. 1993. Colpodea (Ciliophora), Fischer, Stuttgart, Protozoenfauna, 4:i-x + 798 p.

Some remarkable soil algae from the Culture Collection of Algae at the Botanical Institute, University of Innsbruck, Austria (ASIB)

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The Culture Collection of Algae at the Botanical Institute of the University of Innsbruck (Austria) has specialized in the cultivation of soil-, airborne-and lichen algae for more than fifty years. Among about 1500 strains are interesting soil algae from high alpine areas, for example members of green and heterokont algae.

Some examples of green algae from the family Chlorellaceae like *Coelastrella, Scotiellopsis* and others are characterized by their unique extracellular sculpture, as it is shown on some SEM-fotos. Strictly found in terrestrial habitats are multinucleate coccal green algae like *Macrochloris* and *Deasonia* isolated new for Tyrolean Alps, but less is known about their worldwide distribution. All strains of the ASIB Collection are cultivated in agar slants and available for scientific research.

Applied taxonomy: mollusks and water quality assessments

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The European Union Water Framework Directive of 2000 declares water as a “heritage which must be protected, defended and treated as such“. According to this directive, member states have to analyze the characteristics of each river basin. Since Roldán (2003), these guidelines have been implemented in Colombia in order to study the ecological status of river basins with economic importance either for electricity generation or drinking water.

It is well known that the composition of macroinvertebrate communities reflects the quality of aquatic ecosystems. Evaluation methods based on macroinvertebrates as indicators of water quality have been widely developed and used in Europe, but the evaluation system applied in each country depends on the level of knowledge of its aquatic fauna. Since knowledge of the macroinvertebrate fauna in Colombia is still poor, the use of a modified Monitoring Working Party method (BMWP/Col), which is based on organisms’ identification at family level, was proposed for the country (Roldán, 2003). However, this method is only a rapid assessment protocol and its informative value limited, whereas much better results are achieved when data from lower taxonomic levels are used.

In Colombia, mollusks have been sampled since the early 1970’s during a number of ecological studies, without having been identified below family level nor related to the physicochemical water conditions. In this work, freshwater molluscs from 11 limnological collections from major institutes/universities in Colombia were identified to species level whenever possible. Also, the physicochemical characteristics of the water they inhabited were recorded, aiming at testing if substantial changes in the BMWP/Col scores are found using mollusks determined to species level and associated with water variables. Additionally, lothic and lenthic ecosystems from Eastern Antioquia, where the water quality was previously known, were used as a control. With these data, uni- and multivariate statistical analyses were carried out, establishing numerical ranges that correspond to the BMWP/Col scores. From more than 1500 samples analyzed, great differences were found both between the scores proposed by Roldán (2003) and the scores obtained in this work, and between the scores at family and species level. Therefore, the outcome of this project significantly refines and improves the informative value of the BMWP/Col method in Colombia.

European Union Water Framework Directive. 2000. Directive 2000/60/Ec of the European Parliament (…). Official Journal of the European Communities. 72 pp.

Roldán, G. A. 2003. Bioindicación de la calidad del agua en Colombia. Uso del método BMWP/Col. 170 pp.

A late Burdigalian bathyal mollusc fauna from the Vienna Basin (Slovakia)

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This is the first record of a bathyal mollusc fauna from the late Early Miocene of the Central Paratethys. The molluscs were collected at Cerová-Lieskové locality in the Slovak Republic. The outcrop is situated at the western slope of the Malé Karpaty Mts. which forms the eastern margin of the central Vienna Basin. The succession comprises massive, locally laminated calcareous clay and clayey silt bearing thin tempestite layers. The age of the Cerová section is middle-late Karpatian (~16.5 Ma) according to the regional stratigraphic scheme, corresponding to the late Burdigalian.

The mollusc assemblage consists of 14 bivalves, 15 benthic and 1 pelagic gastropods and 3 scaphopods. More than 85% of the benthic gastropods are carnivores, scavengers or parasites. In total numbers, the carnivorous tonnoideans, naticids and conaceans predominate along with nassariids which are scavengers and/or predators. Herbivores such as *Calliotropis*? sp. are extremely rare. Among the bivalves, two carnivorous (*Parvamussium* and *Cardiomya*), four chemosymbiotic (*Lucinoidea* and *Solemya*), four detritus (Nuculoidea and Tellinidae) and four suspension feeding (others) bivalves are represented. The nassariid gastropod *Nassarius janschloegli* Harzhauser and the naticid gastropod *Polinices cerovaensis* Harzhauser are known exclusively from this locality.

The faunal composition indicates a deposition in the aphytal zone and a low contribution by transported taxa from shallower settings. The endemism is seemingly high, with 3 species (18%) among the gastropods and 4 species (29%) among the bivalves, but should be considered with care in respect to the poor knowledge on Miocene deep water faunas. Within the scaphopods, no endemism is observed as all taxa are also known from the Mediterranean area.

The assemblage shows clear affinities to coeval faunas of the Turin Hills in the Mediterranean area and the Aquitaine Basin in France. The overall biostratigraphic value of the assemblage is hard to estimate due to the general very poor knowledge on Miocene bathyal faunas. Several species, however, are known from deep water deposits of the Middle Miocene Badenian stage as well. This implies Early Miocene roots of parts of the Middle Miocene deep water fauna and suggests a low turnover for bathyal mollusc communities at the Early-Middle Miocene boundary.

DNA-Barcoding einer mitteleuropäischen Fauna: Erfolge, Probleme, Überraschungen

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DNA-Barcoding hat sich vielfach als schnelle, universell anwendbare und kosteneffektive Alternative zur Artenidentifizierung und taxonomischen Überprüfung bewährt. Seit Beginn 2009 läuft an der Zoologischen Staatssammlung München (ZSM) das Projekt „Barcoding Fauna Bavarica“, das erste europäische Projekt zur Erfassung der Gesamtfauna eines Landes, in Zusammenarbeit mit dem Biodiversity Institute of Ontario im Rahmen des International Bacode of Life Project (iBOL: http://ibol.org/) und wird derzeit durch ein 5-Jahres-Programm des Bay. Wissenschaftsministeriums finanziert. Die Aktivitäten umfassen neben hauseigenen Kräften ein breites Netz an privaten Sammlern, angeschlossenen Fachgesellschaften, Nationalparks und weitere Institutionen. Die ZSM-eigene DNA-Bank lagert die verbleibenden DNA-Extrakte für spin-off Forschung ein.

Mit Oktober 2011 sind COI-Barcodes für ca. 8.000 von ca. 35.000 bayerischen Tierarten verfügbar, Details siehe unter www.faunabavarica.de. Dabei sind mittlerweile die Macrolepidoptera nahezu komplett, ebenso die aculeaten Hymenoptera, Orthoptera, Herpetofauna und Fische. Mehr als 50% aller Arten sind bei Symphyten, Formicidae, Syrphidae sowie der makroskopischen Aquafauna erfasst, Microlepidoptera und Coleoptera stehen bei 40%. Die bisherigen Validierungen haben gezeigt, dass COI-Barcoding fast 99% aller Arten in Bayern eindeutig identifizieren kann – dies gilt generell für alle, bislang häufig unbestimmbare Lebensstadien. Im Zuge der Arbeiten wurden mehrere unerwartete Faunenelemente identifiziert, ebenso Synonymien (vor allem mit nordamerikanischen Arten) und kryptische Arten. In Fällen, wo gesamteuropäische oder globale Daten gleicher oder nah verwandter Arten verfügbar sind, ist dieser „taxonomische Impact“ noch ausgeprägter.

Das BFB-Projekt wird voraussichtlich ab 2012 in Kollaboration mit dem Zoologischen Forschungsmuseum A. König und anderen deutschen Museen auf ganz Deutschland ausgedehnt, auch in der Schweiz werden Vorbereitungen zu einem Swiss-Barcoding getroffen.

Hausmann, A., Haszprunar, G., Hebert, P.D.N. 2011 DNA Barcoding the geometrid fauna of Bavaria (Lepidoptera): Successes, surprises, and questions. PLoS ONE 6(2): 9 pp. e17134.

Hausmann, A., Haszprunar, G., Segerer, A.H., Speidel, W., Behounek, G., Hebert, P.D.N. 2011. Now DNA-barcoded: the butterflies and larger moths of Germany (Lepidoptera: Rhopalocera, Macroheterocera). Spixiana 34: 47-58 + S1 (28 pp) + S2 (25 pp). Supporting information: <www.zsm.mwn.de/spixiana/toc.htm>.

Phylogeography *of Pyramidula pusilla*: a big mystery about a tiny snail (Gastropoda: Pulmonata: Pyramidulidae)

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The small-sized pulmonate land snail *Pyramidula pusilla* (VALLOT, 1801) is a member of the monotypic family of Pyramidulidae. It is a common species and by far the most widespread among the European representatives of this genus. Its distribution ranges from the Mediterranean area to Western and Central Europe. *P. pusilla* inhabits sunlit calcareous rocks from lowlands up to high altitudes (above 2200m asl in Austria). In this study, we wanted to examine the phylogeography of Alpine populations of *P. pusilla*. Therefore, a DNA sequence analysis was performed. For this purpose we sequenced a ~650 bp fragment of the *cytochrome c oxidase subunit 1* gene (COI). So far we investigated 203 individuals of *P. pusilla* from 77 different sampling sites. Most of them were located in Austria in the Eastern Alps and a few in the Carpathians and Southern Europe. Based on the sequence data a neighbour-joining tree was calculated. The principal finding of the present study is, that the researched population of *P. pusilla* is split into two distinct clades, each with several subclades. There is no obvious geographic pattern, and in some cases individuals from the same locality are found within different clades. On the other hand, there are individuals from distant localities sharing the same haplotype. Whether the partitioning into two mitochondrial clades indicates the existence of two distinct species or merely expresses a high degree of genetic variation within the Alpine populations of *P. pusilla*, cannot be answered by now and requests further genetic and morphological investigations.

Pollen-based climatic estimates report a missing of the Indian monsoon during the Burdigalian (Lower Miocene)

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The Neogene vegetation and climate history of India is still sparsely, mainly due to the lack of suitable outcrops. Exceptions are the late Burdigalian to Middle Miocene sediments along the south-west Indian coast of Kerala province, where a sedimentary succession suggests frequent oscillations of coastal and wetland environments caused by fluctuations of the relative sea level. At least six sequences from coastal marine to backwater settings are detected at the Varkala section, where out of dark colored clayey beds pollen-samples were collected.

Analyses show highly diverse tropical vegetation assemblages. Mangroves, such as different genera of Rhizophoraceae, *Avicennia*, *Sonneratia*, *Xylocarpus* as well as the palm genus *Nypa*, grow along the seaside. These are followed by mangrove-associated and back-swamp vegetation, both with a high amount of different Arecaceae. Within the backwater area, freshwater indicate additionally either river influence or fresh water ponds. This azonal flora is followed by an evergreen hinterland forest, which alternates into higher elevation by an increasing number of deciduous elements.

Despite a high similarity of these Miocene assemblages with the modern vegetation in SW-India, distinct differences are the presence of *Nypa* and *Calamus* within the low-land environment and the absence of any gymnosperms in all the samples.

To reveal and quantify the paleoclimatic parameters, we applied the Coexistence Approach. It suggests a mean annual temperature ranged around 22.2–26.6°C, which is comparable to modern values. A major difference, however, is the lower mean annual precipitation, which was 33% drier than in modern Kerala and indicates 40% less rainfall during the wettest month. Although this precipitation values still represent tropical to subtropical conditions, these data clearly suggest the absence or not fully establishment of the Indian monsoon system in the Indian Ocean area during the late Burdigalian to Middle Miocene.

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Opening up – making collection data available via the internet

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The collections of the Department of Geology and Palaeontology at the Natural History Museum Vienna contain a wealth of data on fossil biota. Due to historical reasons, there is a strong focus on material from Central and Eastern Europe, with many specimens coming from long-abandoned open cast mines throughout the former Austro-Hungarian Empire. While details on these specimens were registered in inventory books since the early 19th century, these data were generally not available to the scientific community, except upon request for particular information. Around the mid 1980ies IT-aided registration was started and a first database created. This database was relatively simple, non-relational and developed in dBase. The data were soon transferred to a new system – MicroIsis – with increased possibilities. It was at that time that a first effort was made to make data on type-specimens available to the public, both in form of printed type catalogues and in a nation-wide collaboration of geoscientific institutions under a contract by the Austrian Academy of Science's Commission for the Palaeontological and Stratigraphical Study of Austria – the OeTyp-Project. Data on palaeontological type specimens housed in Austrian collections became thus available via a joint web-platform allowing researchers to rapidly locate repositories of holotypes, syntypes, figured and reference specimens, as well as the contact details for the curators responsible. In 2005 the data of the Department of Geology and Palaeontology were migrated to a new, windows-based software: WinIsis. Due to size limitations and other problems the data were again migrated to a new system in 2009 – MS Access.

Realizing that the content in the database represents valuable palaeobiodiversity data, a decision was made in 2010 to make these data available online. Thus rather than just being used for housekeeping of the collection the database now acts as a central repository for all data related to specimens kept in the palaeontological collections of the NHMW. The data are available via the GeoCASe (Geosciences Collection Access Service) portal (www.geocase.eu), which makes use of the BioCASe (Biological Collection Access Service) provider software and the XML-based ABCD ("Access to Biological Collection Database") schema, both of which are also employed by GBIF (Global Biodiversity Information Facility). Since the ABCD schema does not cover all the data relevant to geoscientific objects, the extended ABCDEFG ("ABCD Extended for Geosciences") schema is used by the GeoCASe portal. The usage of the same software and protocols as used in biosciences allows exploitation of pre-existing infrastructures which are already in place, saving costs and providing for easier implementation of future projects.

Fossil brittle stars from the Paratethys (Miocene, Europe) – state of the art

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The Paratethys was a large sea that formed during the Eocene and was separated from the Mediterranean by the rise of the alpidic mountain chains. This shallow epicontinetal sea is one of the best investigated fossil basins. Being easily accessible in abundant artificial and natural outcrops, its deposits were intensely studied by 19th and 20th century palaeontologists. Yet some taxonomic groups received considerably less attention than others. Brittle stars which are common in equivalent modern settings were largely ignored so far. In part this may be explained by their multi-element skeleton which tends to fall apart rapidly after death. Here we present the current state of knowledge on Cenozoic brittle star assemblages of the Paratethys. Articulated specimens are exceedingly rare, only few localities have delivered whole individuals. In most cases these specimens are embedded in silt and clay and appear to have been killed by obruption. Isolated ossicles are much more common, but tend to be restricted to a specific time slice during the Middle Miocene. In this interval tropical conditions prevailed, providing for abundant and diverse habitats ranging from soft bottoms to coral reefs. A survey of the ophiuroid species described from these deposits shows that most are in serious need of taxonomic re-assessment, often being placed indiscriminately in a few genera (mostly Amphiura and Ophiura). Detailed analysis of topotypic material, however, shows a rich diversity similar to analogous modern environments (e.g. the Caribbean).

AFLP variation and pollination of seasonal cohorts – results from *Gentianella bohemica* (Gentianaceae) in Lower Austria

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Gentianella bohemica is endemic to the Bohemian Massif with occurrences – representing decreasing population numbers – in the Czech Republic, Austria, Germany, and Poland. Populations are basically restricted to extensively used grasslands. Given the recent decline of respective grasslands, the remaining populations of *G. bohemica* are considered as at least critically endangered at the national level. Moreover, the species is protected by the EU Habitats (FFH) Directive. Besides the conservation issue, this gentian is of evolutionary interest due to its seasonal differentiation with two phenologically non-overlapping cohorts flowering end of June and middle of September. Interestingly, early-flowering populations are currently only known from our study area, the Lower Austrian Waldviertel.

Within the Waldviertel we studied all known populations of *G. bohemica*, i.e. four early- and eleven late-flowering populations. We investigated differences in breeding system, pollination, and AFLP constitution to elucidate the origin, taxonomic and conservation status of the two seasonal cohorts. Field observations with respect to flowering time periods indicated a tendency of longer blooming in late-flowering populations. Moreover, successful pollinator observations were restricted to the late-flowering plants: here, more than two-thirds of flower visitors were bumblebees representing five different species. However, the most frequent species, *Bombus wurflenii*, was only observed as nectar robber. Bagging experiments testing the breeding system (80 June and 135 Sept. flowers) showed differential reproductive fitness based on the various treatments.

The AFLP data of 290 individual plants representing 15 populations showed the four early-flowering populations forming a discrete lineage; thus, supported the idea of a taxonomically independent entity. However, the degree of AFLP differentiation between the early-flowering lineage and late-flowering populations from the same regional part of the study area was similar to the degree of differentiation among other regional groups of late-flowering populations (AMOVA with 5 groups [incl. one early-flowering group]: 17.4%). Where both seasonal cohorts co-occur, the among-population variation (hierarchical AMOVA) reflected primarily the among-cohort component. Genetic diversity values based on basically neutral AFLP markers indicated some differences among populations. The early-flowering populations – although representing varying population sizes – were generally characterised by lower diversity values (e.g. Nei's gene diversity). Therefore, our AFLP and pollination analyses stress the independent conservation significance of the early-flowering lineage of *G. bohemica*.

No voucher specimens – no certainty

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The present contribution is a plea for a better accessible and more representative documentation of plants and fungi in public herbaria, not only for taxonomic research. Like many other herbaria of comparable size, our herbarium GZU is an archive of biodiversity with a worldwide scope. It holds more than 1 million specimens, including approximately 10,000 types. In spite of the very limited funds for research on plant and fungal systematics, the demand for and the pressure on type material has increased considerably. It is pivotal to take this rather destructive pressure off the types, and to maintain them intact as long as possible (e.g. Huhtinen 1994). GZU participates in the Global Plant Initiative (GPI) project by digitizing all our type material. Images, label data and annotations are placed at the disposal of the scientific community world-wide, reducing the number of type loans, and enhancing our integration in international scientific networks.

Without any doubt, type specimens are the most valuable possessions of a public herbarium, but there is also an increasing demand for other data, which need to be verified or documented by voucher material. Taxonomists do not only require type material to delimit a species, but also a representative number of specimens from the whole area of distribution, enabling them to assess its variability. Similarly, an undergraduate student doing a vegetation study for a master thesis needs a reliable range of correctly identified material to check his identifications. Ecologists, plant pathologists and many others require distribution data based on accurately defined localities. Such projects document, e.g., the spread of neophytes, or try to predict the migration of harmful allergens like *Ambrosia artemisiifolia* under different climatic scenarios (Nature Bureau, EU project). For all those purposes, recently collected representative material (in some cases preferably identified by approved monographers), should be added to public herbaria whenever possible.

Herbaria are also reservoirs for the discovery of new species. It is suggested that more than half of all plant species still to be described have already been collected and stored in herbaria (BEBBER et al 2010). E.g., the Acanthaceae collection of Nees von Esenbeck (1776-1858) in GZU includes a considerable number of specimens bearing unpublished manuscript names.

Bebber, D.P., *et al.* 2010. Herbaria are a major frontier for species discovery, Proceedings of the National Academy of Science of the United States of America, 107 (51), 22169-22171.

Huhtinen, S. 1994. Anyone for oligotypes? Taxon, 43, 441-443.

Fossil and extant freshwater mussels of SE Asia – a puzzle game

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Southeast Asia, well known as a modern biodiversity hotspot, is today inhabited by more than 100 species of Unionidae, but our knowledge of the freshwater mussels from this area is still relatively poor. The initial descriptions, mostly provided by French workers in the 19th century, were often based on small specimen lots, and several of the species have never been re-sampled. Since then, several taxa locally have disappeared or are in decline due to alteration and pollution of inland waters and collection of mussels for food. As a result, reliable distribution data are largely lacking and have to be adopted from the literature and classic museum collections. Adding the few data on fossil Unionidae recorded from East Asia, a general evolutionary pattern becomes obvious. Fossil shells from the Late Eocene/Early Oligocene of northern Vietnam show that several modern genera had already undergone a first radiation by that time, and thus likely originated from the early Palaeogene. Since then, SE Asia's unionid fauna has developed from two major stocks, the first one confined to the Mekong, Chao Phraya, and Salween catchment areas, the second one restricted to the flow systems of the Yangtze, Pearl, and Red rivers. Further diversification in the latter rivers likely co-occurred with major tectonic movements during the Neogene.

Although in severe taxonomical and systematic disorder, the roughly 25 nominal species assembled in the genera *Lamprotula* and *Sinolamprotula* represent a salient example of these developments. Several of these species have been subjected to landmark and outline analyses to assess morphologic disparity. As a result, members of the two genera formerly thought to differ only in anatomy and molecular features, can be confidently identified by morphology. Both genera are dispersed over major parts of East Asia, including the catchment areas of the Red, Pearl, Yangtze, and Huang rivers, and have attained their actual diversity by local radiations.

An entirely different evolutionary pattern is displayed by the northern hemisphere freshwater pearly mussels of the Margaritiferidae. The currently recognized 13 species of the genus *Margaritifera* s. lat. occupy disparate areas in Europe, N Africa, SE Asia, NE Asia, and N America, suggesting early radiation dating back to at least the Middle Jurassic. Based on new material of *Margaritifera laosensis*, the phylogenetic relationships in the family are currently revised using molecular data from different genes and loci.

Modern-type coral-associated brittle-star fauna in the Middle Miocene of Central Europe

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Echinoderms are a key component of coral reef invertebrate communities, and although brittle stars are probably among the least conspicuous representatives of this group, they are highly abundant and diverse in modern coral reefs. Here, we report a brittle-star assemblage from the middle Miocene of Austria. The assemblage consists of numerous dislocated skeletal plates, including the highly diagnostic spine-bearing lateral arm plates, retrieved from sediment infillings within a coral patch reef of the Central Paratethys. Preservation of the plates is such that a detailed comparison with the corresponding plates of modern relatives is possible. The middle Miocene assemblage is strikingly similar to modern coral-reef brittle-star communities on family level, and in most cases even on genus level. Almost all of the groups typically found in present-day coral-associated brittle-star communities could be unequivocally identified in the Miocene assemblage. Remarkably, even the relative abundances of the groups in the Miocene fauna are comparable to those found in modern equivalent communities. These observations imply that coral-associated brittle-star communities have remained largely unchanged since the last 15 Ma. In the light of recent hypotheses conferring a leading role to coral reefs in producing evolutionary innovation, the conservatism of brittle-star communities is puzzling and suggests that the mechanisms favouring high origination rates affect individual groups in different ways.

The Herbarium of the University of Salzburg (SZU).

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The Herbarium SZU is a small, but well preserved plant collection consisting mainly of vouchers from European areas. The herbarium is stored physically in a well-planned and climatically controlled room within the faculty building of Natural Sciences. Apart from the vascular plant collection (ca. 60000 vouchers) the herbarium hosts lichens (ca. 20000) and bryophytes (ca. 9000). Moreover, in collaboration with the Botanical Garden of the University of Salzburg a carpological collection (ca. 4000) and a collection of orchid material with focus on the genus *Bulbophyllum* (ca. 750) is curated. Recently the collection was complemented by a DNA bank associated with several research projects. Only approximately 50 % of the material is of Austrian, less than 30% of Salzburgian origin. Up to now data of approximately 30 % of the collection (vascular plants & bryophytes) is freely available at GBIF portals (www.gbif.at; http://data.gbif.org), but digitization is under good progress.

The vascular plant collection was founded during the 1930s by Heinrich Wagner whose vouchers are still the fundament (more than one third) of the herbarium. Later on collections from (Johann Peter Gruber, e.g. from Pakistan), Apollonia Mayr (= A. Siebenbrunner), Christian Eichberger (Mediterranean areas), Helmut Wittmann, Peter Pilsl, Andreas Tribsch, and Walter Strobl were added. Several donations and acquisitions, e.g., Herbar Schnarf (ca. 1000 vouchers), Hb. Wunder (ca. 600), Hb. Leopoldinger (ca. 3000), Hb. Üblagger (ca. 300), Hb. Ruschal (ca. 500), Hb. Gutternigg (ca. 200), and Hb. Hautzinger (ca. 300) complement the collection. The lichen collection was mainly built up by Roman Türk and includes partly worldwide collections. The collection of bryophytes is mainly the work of Robert Krisai, but also includes collections, e.g., from Johann Peter Gruber, Andreas Tribsch, Herbert Hagel, Markus Höper, Peter Pilsl, Christian Schröck, Walter Strobl, and Heinrich Wagner. The carpological collection is related to the collections of seeds for seed exchange of the Botanical Garden and is based on collections from Johann Peter Gruber and Apollonia Mayr. The (mainly) wet collection of tropical orchids, which was related to research from Gunter Fischer and Hans Peter Comes is managed together with the living collection of *Bulbophyllum* of the Botanical Garden. Collection of silica samples and DNA extracts was done in collaboration with the molecular laboratory of the AG Ecology and Diversity of Plants (A. Tribsch) and includes, e.g., *Saponaria pumila*, *Pedicularis* spp., *Silene acaulis* s.l., *Thalictrum* spp., *Helleborus* spp., *Oxytropis* spp., *Nigella* spp., *Globularia* spp., *Gentiana* spp. (European sections), *Galeopsis* spp. and many others..

Phylogeography of *Thalictrum foetidum* (Ranunculaceae) confirms recent expansion of Central Asian steppes to Europe.

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Fossil data show that cold steppe species have had a very dynamic biogeographical history because of the Ice Ages. Due to colder average temperatures and reduced annual precipitation, vast areas in Eurasia were covered either with ice sheets, tundra vegetation, tundra steppes or cold temperate steppes. Guthrie (2001) coined the term “mammoth steppes” and pointed out that the main vegetation type between ice sheets and arctic desert in the north and forest ecosystems and mountain ranges in the south was a grass dominated steppe that enabled large grazing and now extinct mammals like the mammoth to migrate as far west as the Iberian Peninsula. Nowadays there are many widespread plant species that still show a distribution pattern similar to the presumed historical distribution of the ‘mammoth steppes’, but are highly scattered as only few areas especially in Europe provide a climate suitable for steppe ecosystems that somehow resemble Ice Age steppes. One of these is *Thalictrum foetidum* L., a wind pollinated herb of the Ranunculaceae that has nowadays its main distribution in Central Asia and highly disjunct occurrences in European mountains. In Austria few populations are known from Upper Austria (Thayatal), Styria (Hochlantsch area), and Tyrol (Ötztal). Scattered occurrences are also found in the Western Alps. Using a phylogeographic approach using AFLP fingerprinting and 21 populations we test the mammoth steppe hypothesis and ask the question if *Thalictrum foetidum* has only recently immigrated to Europe from Central Asia. In this case despite pronounced disjunctions in Europe no phylogeographical pattern would be expected. Our preliminary results confirm the hypothesis as no phylogeographical pattern in Europe was found that hints towards long-term survival in European refugia. Gene diversity of populations was reduced in isolated populations compared to Western Alpine ones and highest in Central Asia. Genetic rarity of markers was in line with a recent expansion out of Asia. Thus, the disjunct distribution of steppe species is a result of recent, postglacial fragmentation from a former (sub-) continuous late glacial distribution and long term refugia for *Thalictrum foetidum* and probably many other steppe species are cold steppe areas in and around the Central Asian Mountains.

Guthrie, R. D. 2001. Origin and causes of the mammoth steppe: a story of cloud cover, woolly mammal tooth pits, buckles, and inside-out Beringia. Quaternary Science Reviews, 20, 549-574.

Leishmania (Viannia) guyanensis in Europe?

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Leishmania spp. are transmitted by phlebotomine sandflies of the genera *Phlebotomus* (Old World) and *Lutzomyia* (New World). Depending on species and host factors, infections with *Leishmania* can manifest as visceral or several forms of cutaneous diseases or remain without symptoms. *Leishmania* species endemic in Europe are several sero/genotypes of the *Leishmania* (*Leishmania*) *donovani* complex, commonly referred to as *L. infantum*, and *L. (L.) tropica*, both occurring mainly in the Mediterranean region. The New World *Leishmania* species infecting humans are subdivided into three species complexes, the *Leishmania (L.) mexicana* complex, the *L. (Viannia) braziliensis* complex and *the L. (V.) guyanensis* complex, all three limited to Central and South America. Leishmaniasis is an emerging disease in Europe, but the risk of introducing exotic *Leishmania* species into Europe is considered to be low because of the absence or scarcity of proven vectors and reservoir hosts. We present data that indicate the at least temporary occurrence of non-European *Leishmania* species in Europe. Infection with *Leishmania (Viannia) guyanensis* was detected in an asymptomatic Austrian soldier without travel history to Central or South America and without history of blood transfusions. Lifetime travel history included Italy, Spain, Greece, Germany, Croatia, New York city, and a previous military assignment in the Kosovo. The present observation puts up for discussion the transmission of non-European *Leishmania* species in Europe.

Vom “Kategorischen Imperativ” und Heiligen Kühen in der Systematik: Die negativen Konsequenzen der Linnéschen Taxonomie

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Die LINNÉsche Klassifikation soll theoretisch und im Hinblick auf ihre praktischen Konsequenzen untersucht werden. Die Zuordnung von Taxa zu einer bestimmten systematischen Kategorie geschieht willkürlich, was auch von den Verfechtern der LINNÉschen Hierarchie zugestanden wird. Letztere erkennen jedoch nicht an, dass dies die Reproduzierbarkeit und damit die Überprüfbarkeit von vorgeschlagenen Klassifikationen einschränkt, sondern sehen die Willkür als subjektiven Spielraum des Systematikers, unvollständiges Wissen um Verwandtschaftsbeziehungen mit persönlichen Bewertungen zu verbinden. Es werden Beispiele aus der paläontologischen und biologischen Praxis erläutert, die zeigen, dass das Verwenden LINNÉscher Kategorien zu Verzerrungen führt, wenn vergleichende Analysen auf der Basis supraspezifischer Kategorien durchgeführt werden, weil die Willkür der Rangabgrenzung jeglichen quantitativen Ansatz unterminiert.

Durch die Abschaffung der LINNÉschen Kategorien würde die biologische Systematik an theoretischer Konsistenz gewinnen und gleichzeitig weniger anfällig für das Entstehen taxonomischer Artefakte werden.

Head anatomy and its value for unveiling phylogeny and evolution in Neuroptera

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Head anatomical characters have provided informative characters for reconstructing phylogenies in various insect orders. This inspired us to study these structures in Neuroptera, a rather small but highly heterogeneous insect order, mainly with respect to classification on family level.
We have imaged head capsules of representatives of all neuropteran families using X-ray microtomography (microCT). Hitherto we have reconstructed and compared the inner head skeleton and all muscles attaching on it. In order to test the value of the tentorial characters for phylogenetic reconstruction, we scored 20 qualitative differences and added them to a large published matrix based on characters of larvae (Beutel et al. 2010).
The addition of our characters to the larval matrix causes a basad shift of one family, the Sisyridae. This corroborates the results of an analysis of genital sclerites by Aspöck & Aspöck (2008). Moreover, the combined holistic view of inner and outer structures provides a better understanding of functional adaptations and helps unveiling non-homologies.
While cuticular structures can be studied in any collection material, musculature is often only preserved in well-curated alcohol material. However, also in dry collections muscles are maintained if the material is processed carefully, as i.e. through critical-point-drying.

Beutel, R.G., Friedrich, F., Aspöck, U. 2010. The larval head of Nevrorthidae and the phylogeny of Neuroptera (Insecta), Zoological Journal of the Linnean Society, 158, 533-562.
Aspöck, U., Aspöck, H. 2008. Phylogenetic relevance of the genital sclerites of Neuropterida (Insecta: Holometabola), Systematic Entomology, 33, 97-127.

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