Tropical Diversity in the Anthropocene

20th Annual Meeting of the Society for Tropical Ecology

21-25 February 2007

Zoological Research Museum Alexander Koenig Bonn

Conference Program & Abstracts

Federal Ministry of Education and Research

nees institut für Biodiversität der Pflanzen Universität Bonn

Forschungsmuseum KOENIG

Leibniz Gemeinschaft

Tropical Diversity in the Anthropocene
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In cooperation with

Nees Institute for Biodiversity of Plants
University of Bonn
Meckenheimer Allee 170
53115 Bonn

Federal Ministry of Education and Research

Acknowledgments

Funds for this meeting were provided by following supporters

University of Bonn
Federal Ministry of Education and Research (BMBF)
Alexander Koenig Society (AKG)
Volksbank Rhein-Sieg
DSAR- Travel Agency, Bonn
Francis & Taylor Publ. Company, UK

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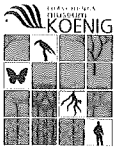
KOENIG

Dear Participants,

Since I can attend only the final days of the 20th Annual Meeting of the Society for Tropical Ecology, I'd like to welcome you with this letter. The Zoologische Forschungsmuseum Alexander Koenig (ZFMK) is proud to house this important meeting, which is in line with the general purpose of our own research activities. Our focus is to inventory and understand terrestrial biodiversity, and we work mainly in the tropical regions. While our own expertise is species-based (taxonomy, autecology, biogeography), we are just one link in a large network of research activities and information flow, increasing our abilities to manage biodiversity.

Taxonomists have learnt in the past two decades that they must participate in the dialogue between pure science and applications, and that they are responsible for the supply of user-friendly tools needed by non-specialists to identify species. They have also learnt that most of our contemporary scientists in other fields, and also the majority of the population, are not aware of the fact that biologists are unable to distinguish most species, that a single expert can only survey a small fraction of the diversity found in a biotope, that the number of specialists is too low, and that we are far from understanding how complex ecosystems function. It is therefore necessary to present this information to the general public. And this is the opportunity we have with our exhibitions. In Bonn, we have started with a new type of exhibition; we want to show species in the context of their natural habitats. The cycle of exhibitions "Our Blue Planet; Life in a Network" is still not completed, but I hope you will nevertheless enjoy the exhibits during the coffee breaks.

You may be curious which organization is responsible for our institute. The ZFMK is an independent institute of the federal state of Nordrhein-Westfalen, which is responsible for infrastructure and staff. However, our basic research is also strongly supported by the German government via the "Beauftragter für Kultur und Medien" [Commissioner for Culture and Media]. We are a member of the Leibniz Gemeinschaft, a network of

independent research and service institutes that has special funds to develop new fields of research. Institutes remain in this network as long as their excellence is confirmed at regular intervals by an evaluation committee. Despite this support we depend to a high degree on extramural funding raised for single projects.

In the name of our team I wish you an eventful and agreeable stay in Bonn.

Johann-Wolfgang Wägele,

Director of the Zoological Research Museum
Alexander Koenig

February, 2007

Society for Tropical Ecology (gtö)

20th Anniversary Conference

Tropical Diversity in the Antrhopcene Bonn, 21–25, February 2007

On behalf of the Society for Tropical Ecology, the organization team warmly welcomes all conference participants to the Zoological Research Museum Alexander Koenig (ZFMK) in Bonn.

Conference Location

The ZFMK is located on Adenauerallee (no.160), close to the center of Bonn. The museum can easily be reached by public transportation. All underground lines service our institution. If you arrive at the central train station in Bonn, take one of the southbound lines (direction Bad Godesberg) and get off the underground at the fourth stop: exit "Museum Koenig". Those who arrive by car may use the museum parking lot. Parking in the streets around our institution is possible but often limited to two hours.

Registration

The registration desk, in the entrance hall of the museum, will be opened on Wednesday, 21 February, 4 pm. We maintain it serviced throughout the meeting. Feel free and contact us whenever you need direct help or additional information.

Program

General

The schedule for all presentations is provided on the following pages (conference program). We have used the following codes: KN for keynotes, O for all other orals besides keynotes, and P for posters.

The first number after each abbreviation identifies the lecture room, the second the sequence of order within the program – e.g., KN1.03: keynote in Lecture Room 1, third keynote within the program; O2.09: oral presention in Lecture Room 2, ninth oral within the sessions held in Lecture Room 2. Posters may be

installed in the gallery, 2nd floor, as early as Wednesday, 21 February, 2 pm. Place your poster beneath your ID number which you will find in the conference program under "Abstracts, Poster Presentations." Posters must be removed on Sunday, 25 February, 12 noon.

Orals and Posters

Four Keynote Lectures and five Symposia have been selected for the main program, together with a wide spectrum of talks listed under General Topics. In addition, 55 posters have been accepted. Talks will be presented in Lecture Room1, 2, or 3 (1st and 2nd floor), Poster Exhibits are displayed in the gallery on the 2nd floor, next to Lecture Room 2. Signs will indicate these locations.

Contributing Authors

Authors are kindly requested to strictly follow the program time schedule to allow conference participants to leave for presentations in other lecture rooms.

Make sure that your PowerPoint presentation is submitted in time (one day ahead of time) at the registration desk (USB sticks, CDs, etc.). Please remember to pick up your device there again at the end of each talk session.

Internet

We provide daily Internet access during 12–2 pm (lunch break). This service will be provided on the 2nd Floor (Seminar Room 1).

Merian Prize

In honor of Maria Sibylla Merian the best three oral presentations and posters will be awarded a prize. Eligible candidates are students and PhDs who finished their dissertation less than three years ago. Orals and posters participating in this competition will be marked with an "M" in the program displayed in front of each Lecture Room. You will find your ballot paper in your conference bag.

Meals

Lunch and dinner are served daily in our social area next to the bistro (1st Floor). A buffet is available for € 12 per person. On Wednesday, 21 February, we invite you to an icebreaker party (with live music) at 8 pm in the main hall of the museum. On Friday, 23 February, at 8 pm, a candlelight Conference Dinner with live jazz music will be a special social highlight of the Meeting. Reservations are possible until noon on Thursday, 22 February, at the registration desk.

Book Shop

Books on tropical ecology are on sale during the meeting (1st Floor).

Conference Program


KOENIG

Conference Program

Wednesday, 21 February 2007

13:00	Ecuador Study Group, Lecture Room 1
16:00-21:00	Registration, Museum Hall
17:00-20:00	Board and Council Meeting (gtoe), Seminar Rooms, 2nd Floor
20:00-open end	Icebreaker Party

Thursday, 22 February 2007

08:30-12:00	Registration
09:00-09:45	**Opening Ceremony** W. Böhme (Representative of the Museum Koenig, Bonn) W. Löwer (Representative of the University of Bonn) P. Finger (Major of the City of Bonn) K. E. Linsenmair (President of the Society for Tropical Ecology)
09:45-10:15	***Coffee Break***

Lecture Room 1

Convener K. Riede

Symposium **Cooperation between Multilateral Environmental Agreements, Secretariats, and the Scientific Community**

10:15-10:20	Nickel Opening remarks	**O1.01**
10:20-10:35	Riede Halt of biodiversity loss: can we reach the 2010 targets in the tropics?	**O1.02**

Thursday, 22 February 2007

Lecture Room 1

10:35-10:50	Niekisch Sustainability in the tropics: do we need a New paradigm?	**O1.03**
10:50-11:05	Häuser International conventions and tropical diversity research: opportunities and challenges	**O1.04**
11:05-11:20	Salvador Role of the FSC in the tropics	**O1.05**
11:20-11:35	Ndegwa Ndiang'ui The contribution of UNCCD to the Conservation of Tropical Diversity	**O1.06**
11:35-12:00	Wantzen, Parolin Brazilian-German cooperation in ecological research and conservation planning: some case studies	**O1.07**

12:00-14:00 ***Lunch (Bistro ZFMK)***

Lecture Room 1

Convener E. Heymann

Symposium **Primate-Plant Interactions**

14:00-14:15	Lambert Plant chemical defense and primate counter strategies: relative liver size and how primates cope with toxic diets	**O1.08**
14:15-14:30	Ratiarison, Forget Frugivory in *Virola michelii* and *Virola kwatae* in French Guiana	**O1.09**
14:30-14:45	Kunz Who feeds when: the role of primates and other frugivores on seed dispersal of a W-African tree (*Lannea acida*, Anacardiaceae)	**O1.10**

Thursday, 22 February 2007

Lecture Room 1

14:45-15:00	Knogge, Zinner, Heymann Spatial patterns of seed dispersal by sympatric tamarins	**O1.11**
15:00-15:15	Culot, Huynen Secondary dispersal by dung beetles of seeds primary dispersed by tamarins (*Saguinus fuscicollis* and *S. mystax*)	**O1.12**
15:15-15:30	Heymann, von der Lage Primate nectarivory, florivory, andpollination – a review	**O1.13**
15:30-15:45	Huynen, Latinne, Bernard, Savini First assessment of home range and ecology of a semi-habituated roop of pigtail macaques (*Macaca nemestrina*) in the Khao Yai National Park, Thailand	**O1.14**

16:00-16:30 ***Coffee Break***

Lecture Room 1

Convener F. Herder

General Topics

16:30-16:45	Pfaender, Herder, Schliewen Trophic ecology and morphology of an adaptive radiation: "sharpfin"sailfin silversides (Teleoste: Atheriniformes: Telmatherinidae) in Lake Matano, Sulawesi, Indonesia	**O1.15**
16:45-17:00	Barquero, Kalko Vocalization patterns and social interactions in a colony of proboscis bats (*Rhynchonycteris naso*, Emballonuridae) in Costa Rica	**O1.16**

Conference Program

Thursday, 22 February 2007

Lecture Room 2

Convener P. Mullen

General Topics

14:30-14:45	Rudolph, Parolin, Bartel, Junk Comparison of genetic population structures of two water hyacinths:the invasive *Eichhornia crassipes* (Mart.) Solms and the closely related *E. azurea*	**O2.01**
14:45-15:00	Lincoln, Pinard, Smith Stand dynamics and carbon accumulation during dipterocarp forest recovery from reduced-impact logging in Sabah, Malaysia	**O2.02**
15:00-15:15	Beck Determinants of geographic range size: a cross-species comparison in SE-Asian sphingid moths	**O2.03**
15:15-15:30	Schmidt, Kalko Habitat fragmentation and haemoparasite infection in two Neotropical bat species, *Artibeus jamaicensis* and *A.lituratus*, in Panama	**O2.04**
15:30-15:45	Lyons Blood biochemistry of the black sea turtle, *Chelonia mydas agassizii*, as a means of a health assessment in Baja California Sur, Mexico	**O2.05**
15:45-16:00	Teichert, Gottsberger Pollination of *Unonopsis stipitata* (Annonaceae) by scent-collecting male euglossine bees in Nouragues, French Guiana	**O2.06**

16:00-16:30 ***Coffee Break***

Thursday, 22 February 2007

Lecture Room 2

Convener S. Porembski

General Topics

16:30-16:45 Hagen **O2.07**
Influence of landscape structure on plant-pollinator interactions in an E-African agriculture-forest mosaic

16:45-17:00 Bergsdorf **O2.08**
Forest fragmentation and plant-pollinator interactions in W-Kenya

Lecture Room 2

Convener K. Riede

17:45-19:00 **Plenary Discussion**

Conservation of tropical diversity: from science to implementation

Participants: K.-E-. Linsenmair (University of Wuerzburg) Christoph Häuser (Staatl. Museum f. Naturkund, Stuttgart), Manfred Niekisch (University of Greifswald), Francisco Rilla (CMS), Dorothea Groth (BMZ), Jaqueline Garcia-Yi (ZEF), Stefan Salvador (FSC)

Conference Program

Friday, 23 February 2007

Lecture Room 1

Convener K.-L. Schuchmann

08:45-09:30 **Keynote**

Price **KN1.O1**
Mountains in the tropics as engines of speciation

Lecture Room 1

Convener W. Freund

General Topics

09:30-09:45 Gerold **O1.17**
Cooperation for development of a Bolivian university institution

09:45-10:00 Wesener **O1.18**
Diversity and biogeography of the millipedes of Madagascar (Myriapoda, Diplopoda)

10:00-10:15 Zompro **O1.19**
The last insect Order, Mantophasmatodea: phylogeny, taxonomy, biology, and ecology

10:15-10:30 Riss, Gutiérrez, Ospina **O1.20**
Structures, processes, and biodiversity – a conceptual approach to the Andean streams of Colombia, S- America

10:30-11:00 ***Coffee Break***

Conference Program

Friday, 23 February 2007

Lecture Room 1

Convener H. Hofer

Symposium	**Emerging infectious diseases in tropical ecosystems**	
11:00-11:15	Sauerborn Human Malaria in the anthropocene: the impact of climate and land use changes	**O1.21**
11:15-11:30	Leendertz The ecology and epidemiology of Anthrax in chimpanzees	**O1.22**
11:30-11:45	Nunn Pathogens and primates: comparative ecological and evolutionary perspectives	**O1.23**
11:45-12:00	Formanty Ecology of Ebola infections	**O1.24**
12:00-12:15	Hofer Ecology and evolution of avian influenza in wildlife populations: the good, the bad, the ugly	**O1.25**
12:15-14:00	***Lunch (Bistro ZFMK)***	
14:00-15:00	**Poster Session (2nd Floor)**	

Friday, 23 February 2007

Lecture Room 1

Convener G. Peters

General Topics

15:00-15:15	Wilting A rigorous track classification method to Estimate the population density of secretive clouded leopards in a tropical rainforest	**O1.26**
15:15-15:30	Rex Species richness and structure of three Phyllostomid bat assemblages	**O1.27**

Friday, 23 February 2007

Lecture Room 1

15:30-15:45	Rothenwöhrer Habitat use and activity of the flower-visiting bat *Glossophaga commissarisi*	**O1.28**
15:45-16:00	Pino Garay, Kessler, Hölscher, Janovec Distribution and habitat preferences of Lecythidaceae in the Rio los Amigos uplands, SW-Amazonian, Peru	**O1.29**

16:00-16-30 ***Coffee Break***

Lecture Room 1

Convener G. Peters

General Topics

16:30-16:45	Wantzen, Nunes da Cunha, Sollinger, Siqueira Small streams– large effects: a sustainable management And conservation scheme for small catchments in the *cerrado* of Central Brazil	**O1.30**
16:45-17:00	Lakatos Characteristics of lichens in the understory of tropical lowland rainforests	**O1.31**

Friday, 23 February 2007

Lecture Room 2

Convener J. H. Sommer

General Topics

09:30-9:45	Küppers, Horna, Zimmermann Stomatal control of water flux and photosynthesis of palm swampspecies of the Amazon lowlands, SE-Peru	**O2.09**

Friday, 23 February 2007

Lecture Room 2

09:45-10:00	Zimmermann, Horna, Vasquez, Küppers Water use and photosynthesis of evergreen and deciduous dry forest species in N-Peru	**O2.10**
10:00-10:15	Küppers, Ohlemacher,. Zimmrmann, Motzer, Schmitt, Horna, Küppers, Mette Neotropical tree and stand transpiration from Montane to Páramo vegetation, S-Ecuador and N-Perú	**O2.11**
10:15-10:30	Becker, Rothenwöhrer, Tschapka Economy of frugivory in a nectar-feeding bat	**O2.12**
10:30-11:00	***Coffee Break***	

Lecture Room 2

Convener J. H. Sommer

General Topics

11:00-11:15	Todt Long term pattern in throughfall in Kakamega Forest, W-Kenya	**O2.13**
11:15-11:30	Mitchell, Schaab Creating a disturbance index for Kakamega Forest, Kenya, taking account of accumulated historical forest use via GIS	**O2.14**
11:30-11:45	Jung, Kalko Neotropical bat activity around street lights	**O2.15**
11:45-12:00	Schleuning, Huaman, Matthies Factors shaping the population dynamics of the rainforest understory plant *Heliconia metallica*	**O2.16**
12:15-14:00	***Lunch (Bistro ZFMK)***	

Friday, 23 February 2007

Lecture Room 2

Convener J. Mutke

15:00-15:30 **Keynote**

Tuomisto **KN2.02**
How much beta diversity is there in the Amazonian rainforest and what difference does it make for ecology?

Lecture Room 2

Convener J. Mutke

General Topics

15:30-15:45 Sommer, Küper, Barthlott **O2.17**
Global change: the future of Africa's plant diversity

15:45-16:00 Wayne **O2.18**
What determines plant invasion success? Testing traits with tropical trees in the Amani Botanic Garden, Tanzania

16:00-16:30 ***Coffee Break***

Lecture Room 2

Convener J. Mutke

General Topics

16:30-16:45 Kreft, Jetz **O2.19**
Global patterns and determinants of vascular plant diversity

16:45-17:00 Abele, Rohwer **O2.20**
Phylogenetic evaluation of the genus *Masdevallia* Ruiz & Pav. (Orchidaceae) based on ITS nrDNA sequences and morphological data

Friday, 23 February 2007

Lecture Room 2

17:00-17:15	Kiefer, Fischer, Barthlott Structure, floristic composition, and conservation status of a Didiereaceae forest in S-Madagascar	**O2.21**
18:00-19:30	**Annual Meeting of the Society for Tropical Ecology (members only)**	
20:00-open end	**Conference Dinner**	

Conference Program

Saturday, 24 February 2007

Lecture Room 1

Convener J. Adis

08:45-09:30 **Keynote**

Erwin **KN1.03**
Monitoring changes in canopy arthropod populations through time in the western Amazon Basin, Yasuni area, Ecuador

Lecture Room 1

Convener G. Pohland

General Topics

09:30-09:45 Knuth, Günther, Boy, Alt, Geissler, Valarezo, Wilcke **O1.32**
Impact of natural forest management on nutrient cycling in a tropical montane forest of S-Ecuador

09:45-10:00 Kirika **O1.33**
Trees, frugivores, and forest regeneration along a human disturbance gradient in E-Africa

10:00-10:15 Niemann, Behling **O1.34**
Human impact and vegetation development during the late Holocene of the area between Loja and Zamora in the SE-Ecuadorian Andes

10:15-10:30 Rüger, Williams-Linera, Huth **O1.35**
Secondary tropical montane cloud forests in central Veracruz, Mexico, have high potential for provision of ecosystem services

10:30-11:00 ***Coffee Break***

Saturday, 24 February 2007

Lecture Room 1

Convener G. Pohland

General Topics

11:00-11:15	Burslem, Maycock, Ghazoul, Nilus Positive density dependent recruitment in a tropical tree population	**O1.36**
11:15-11:30	Treydte, van Beeck, Heitkönig, Prins, Ludwig Is a tree to be? Large trees enhancing sub-canopy grass quality in African savannas	**O1.37**
11:30-11:45	Fahr, Barnikel, Penner, Wegmann, Kalko, Rödel Mountains, mining, and threatened species – a deadly cocktail for the long-term conservation of a global biodiversity hotspot	**O1.38**
11:45-12:00	Farwig Human impact diminishes seedling species richness in Kakamega Forest, Kenya	**O1.39**

12:00-14:00 ***Lunch (Bistro ZFMK)***

Saturday, 24 February 2007

Lecture Room 1

Convener W. Zech

Symposium	**Ecological Studies in E- Africa: Focus on Mt Kilimanjaro**	
14:00-14:15	Hemp, A. Ecological studies in E-Africa: focus on Mt Kilimanjaro	**O1.40**
14:15-14:30	Broesike, A. Hemp, Herold, Zech Nutrient supply and natural ^{15}N abundance in forested soils along an altitudinal transect at Mt Kilimanjaro	**O1.41**
14:30-14:45	Stanley, Rogers Small mammals along an elevational gradient on Mt Kilimanjaro	**O1.42**
14:45-15:00	Heller, C. Hemp Endemism and speciation in flightless, singing bush-crickets at Mt Kilimanjaro, Mt Meru, and some Eastern Arc Mts (Insecta: Orthoptera: Tettigonioidea)	**O1.43**
15:00-15:15	Voje High mountains and climatic fluctuations as a motor for speciation in E-African Phaneropterinae (Orthoptera:Tettigoiidae)?	**O1.44**
15:15-15:30	Hemp, C. Climatic fluctuations as a motor for speciation processes in flightless Saltatoria (Insecta: Orthoptera)	**O1.45**
15:30-15:45	Verschuren Post-glacial climate history of equatorial E-Africa: wet-dry cycles at decadal to millennial time scales	**O1.46**
15:45-16:15	***Coffee Break***	

Saturday, 24 February 2007

Lecture Room 1

Convener A. Hemp

Symposium **Ecological Studies in E- Africa: Focus on Mt Kilimanjaro (continued)**

16:15-16:30	Hoerold, Zech, Broesike, Glaser, A. Hemp Mt Kilimanjaro: reconstruction of younger Quaternary climate fluctuations deduced from paleosoils	**O1.47**
16:30-16:45	Zech, A. Hemp, Hoerold, Broesike, Asharige, Abate, Bussert Late Quaternary environmental changes in E-African highlands: palaeoecological studies in Ethiopia, Rwanda, and Tanzania	**O1.48**
16:45-17:00	Platts, Lovett, McClean, Marchant, Ahrends, Burgess, Finch, Jump Wetter or drier? Past, present, and future impacts of climate change-induced ecosystem shifts within a tropical African biodiversity hotspot	**O1.49**

Saturday, 24 February 2007

Lecture Room 2

Convener W. Barthlott

General Topics

09:30-09:45	Ibisch Conservation science, policy and action – are we hitting the right targets?	**O2.22**
09:45-10:00	Kahnum Positive aspect of weed for agro-biodiversity conservational priorities	**O2.23**
10:00-10:15	Wilfert, Kaib, Brandl, Durka Population differentiation in *Schedorhinotermes lamanianus* - a biogeographic analysis	**O2.24**
10:15-10:30	Ghazoul The paradox of ecosystems services: ecology, economics, and the pollination crisis	**O2.25**

10:30-11:00 ***Coffee Break***

Saturday, 24 February 2007

Lecture Room 2

Convener W. Barthlott

General Topics

11:00-11:15	Grohmann, Peterson, Gröngröft, Linsenmair Termite induced soil turnover: preliminary results from the central Nambian Savanna	**O2.26**
11:15-11:30	Pfeiffer www.antbase.net a myrmecological networking platform	**O2.27**
11:30-11:45	Riede, Häuser European Instititute of Distributed Taxonomy: a new initiative to overcome the taxonomic impediment	**O2.28**
11:45-12:00	Schaab, Zimmer The BIOTA E-Africa project in a multimedia presentation: overview and detail to inform and animate	**O2.29**

12:00-14:00 ***Lunch (Bistro ZFMK)***

Lecture Room 2

Convener M. Peters

General Topics

14:15-14:30	Freymann, de Visser, Olff Resource competition between termites and dung beetles in the Serengeti National Park, Tanzania	**O2.30**
14:30-14:45	Kasina Species richness of bees visiting crop flowers in the farmlands surrounding Kakamega Forest, Kenya	**O2.31**
14:45-15:00	Dambacher, Jarau, Twele, Aguilar, Francke, Ayasse Nest specificity in the trail pheromone of a stingless bee, *Trigona corvine* (Apidae: Meliponini)	**O2.32**
15:00-15:15	Attignon Diversity and socio-cultural role of termites in the Lama forest reserve in S-Benin	**O2.33**

Saturday, 24 February 2007

Lecture Room 2

15:15-15:30	Konaté Social insects as biological indicators in the tropics: diversity of termites and ants along gradients of land use type in Côte d'Ivoire	**O2.34**
15:30-15:45	Erpenbach, Rahelivololona, Barthlott, Fischer Floral ecology of Madagascan *Impatiens* (Balsaminaceae) a first assessment	**O2.35**

15:45-16:15 ***Coffee Break***

Lecture Room 2

Convener A.-A. Weller

General Topics

16:15-16:30	Peters Effects of habitat fragmentation and degradation on African ant-following birds	**O2.36**
16:30-16:45	Mullen Distribution of ultraviolet plumage patches in birds	**O2.37**
16:45-17:00	Pohland Fluorescence in avian plumage - an underestimated Phenomenon	**O2.38**
19:00-19:30	Convener R. van den Elzen	
	Kalko, Schmidt-Loske The wondrous world of tropical nature: life and work of Maria Sibylla Merian	**O2.39**

19:30-20:15 ***Coffee Break***

Convener K.-L. Schuchmann

20:15-21.00 **Public Evening Lecture (in German)**

Heymann

Primaten in tropischen Ökosystemen
(Primates in Tropical Ecosystems)

Sunday, 25 February 2007

Lecture Room 1

Convener P. Ibisch

09.00-09:45 **Keynote**

Adis, Erwin, Marques **KNO4**
Canopy arthropods in Brazilian Amazonia and the Pantanal

Lecture Room 1

Convener P. Ibisch

Symposium **Canopy Research**

09:45-10:00 Freund **O1.50**
Effects of fragmentation of an Afrotropical rainforest on the diversity structure of canopy dwelling arthropods

10:00-10:15 Wagner **O1.51**
Canopy arthropods along an altitudinal gradient in E-African forests

10:15-10:30 Köster **O1.52**
Maintenance of epiphyte diversity in an anthropogenically transformed landscape in the Ecuadorian Andes

10:30-10:45 Werner, Gradstein **O1.53**
Seedling establishment of vascular epiphytes on isolated trees in Andean pastures

10:45-11:00 ***Coffee Break***

Lecture Room 1

Convener P. Ibisch

General Topics

11:15-11:30	Albrecht, Kalko Breakdown of a keystone resource – a 30-year survey of fig trees on Barro Colorado Island, Panama	**O1.54**
11:30-11:45	Boy, Knuth, Valarezo, Wilcke Climatic extremes and the element of a budget of a tropical montane rainforest in Ecuador	**O1.55**
11:45-12:00	Kaiser Island invaders: the role of introduced mutalists in pollination on Mauritius	**O1.56**
12:00-12:15	Stellmacher, Denich, Gatzweiler, Hedden-Dunkhorst The conservation of wild coffee in human-transformed landscapes in Ethiopia	**O1.57**
12:15-12:45	**Merian Prize**	
12:45-13:00	Congress resume by Prof. Linsenmair, gtoe President	
13:00	***Lunch (Bistro ZFMK)***	


KOENIG

Abstracts – Oral Presentations


KOENIG

Abstract of Symposium and Plenary Discussion

O1.01-O1.07
Symposium: Cooperation between Multilateral Environmental Agreements, Secretariats, and the Scientific Community

Plenary Discussion: Conservation of Tropical Diversity: from Science to Implementation

Convener K. Riede
Natural History Museum Stuttgart, Germany

During the last two decades, loss of tropical diversity has raised considerable concern in the public and the scientific community. International and national projects were launched, including large-scale research programs (for Germany: BIOTA, SHIFT, and PPG7). Though scientists and the gtoe participated in these projects, the outcomes and lessons learnt were not always well communicated to the public or implemented in the field. This session brings together scientists, politicians, and representatives from international organisations such as UNEP-CMS, UNCCD, and the Forest Stewardship Council. They will present their distinct approaches and explore future possibilities of improving the science/policy interface during the Plenary Discussion.

O1.08
Plant chemical defense and primate counter strategies: relative liver size and how primates cope with toxic diets

J. E. Lambert
University of Wisconsin, Madison, U.S.A.

Plants are variably toxic, and primate counter strategies to chemical defense are poorly known. Since most species rely on detoxifying enzymes, here I evaluate liver mass (L): body mass (B) allometry. Data from 10,000 h of primate feeding in Kibale, Uganda, indicate that small-bodied cercopithecine monkeys consume a more diverse, fibrous, and chemically defended diet than larger apes. However, L:B (23 species) analyses indicate unexpectedly similar ratios between apes (0.022) and monkeys (0.021), suggesting some mechanism other than relatively large livers facilitates the more chemically-defended monkey diet.

O1.09
Frugivory in Virola michelii and Virola kwatae in French Guiana

S. Ratiarison, P.-M. Forget.
Muséum National d'Histoire Naturelle, Brunoy, France

Consumer visitation and seed fate in tree crown was studied in two nutmeg *(Virola* spp.) species at Nouragues, French Guiana. Results are compared with data from the literature in Panama, Peru, and Equator. Overall, spider monkeys (*Ateles paniscus*) were the main primate consumers in *Virola* at all sites but one, Panama. Difference in visitation between monkeys and toucans is likely related to seed size and aril:seed volume ratio, or to level of past disturbance.

O1.10
Who feeds when: the role of primates and other frugivores on seed dispersal of a W-African tree (Lannea acida, Anacardiaceae)

B. Kunz
University of Wuerzburg, Germany

Though the Guinea-Savanna is rich in woody plant species producing fruit for dispersal by animals, data on plant-frugivore interactions are still relatively sparse. In the common W-African tree species *Lannea acida* we found a succession of different frugivores feeding at the tree. Unusually, birds were mainly acting as seed predators, feeding on fruits when crops were still unripe. By contrast, primates preferred maturing fruits and dispersed viable seeds.

O1.11
Spatial patterns of seed dispersal by sympatric tamarins

C. Knogge[1], D. Zinner[2], E. W. Heymann[2]
[1]Helmholtz Centre for Environmental Research, Leipzig, Germany
[2]German Primate Center Göttingen, Germany

We examined the spatial pattern of the dispersal of seeds from *Anomospermum grandifolium* (Menispermaceae) and *Parkia panurensis* (Fabaceae) by the tamarins *Saguinus fuscicollis* and *Saguinus mystax* (Callitrichidae). Dispersal curves show a leptokurtic distribution, with most seeds deposited between 50-100 m from the maternal tree. Tamarin sleeping and resting sites are focal areas of seed dispersal, resulting in a patchy distribution of dispersal events within the tamarins' home range.

O1.12
Secondary dispersal by dung beetles of seeds primary dispersed by tamarins (*Saguinus fuscicollis* and *S. mystax*)

L. Culot, M.-C. Huynen
University of Liège, Belgium

Most previous studies focused on the post-dispersal fate of seeds dispersed by large primates. Our research aimed at investigating the importance and the characteristics of the secondary dispersal by dung beetles of seeds dispersed by a small primate like the tamarin. Given that the small quantity of faecal matter and the small amount of seeds inside tamarins' faeces, we expected seed fate variations from what is found in larger primate faeces. As tamarins use primary and secondary forests, dung beetle communities and secondary dispersal rates were compared between these two habitats.

O1.13
Primate nectarivory, florivory, and pollination - a review

E. W. Heymann, F. von der Lage
German Primate Center Goettingen, Germany

Most frugivorous and folivorous primates feed opportunistically on nectar and flowers. For smaller primate species (<1 kg body mass), nectar and/or flowers may become an important food resource during periods of reduced fruit availability. Flower treatment ranges from gentle to complete consumption or destruction. Evidence for a role of primates as pollinators is rare, but a few plant species may actually depend on primate pollinators.

O1.14
First assessment of home range and ecology of a semi-habituated troop of pigtail macaques (*Macaca nemestrina*) in the Khao Yai National Park, Thailand

M. C. Huynen[1], A. Latinne[1], H. Bernard[1], T. Savini[2]
[1]University of Liège, Belgium
[2]University of Thonburi, Thailand

As part of a project comparing *Macaca nemestrina* in various habitats, we studied pigtail density, population structure, home range and feeding ecology in human managed and remote forest areas of Khao Yai (Thailand). The pigtail troop followed for 4 months had a 1 km^2 home range, which 15 ha core area included the Park tourist centre. Diet mostly consisted in fruits, but also in mushrooms, insects, eggs, nestlings, and a lot of human food. Census in the remote forest area did not provide a valid density index, suggesting comparative data could better be obtained by identifying another troop.

O1.15
Trophic ecology and morphology of an adaptive radiation: "sharpfin" sailfin silversides (Teleostei: Atheriniformes: Telmatherinidae) in Lake Matano, Sulawesi, Indonesia

J. Pfaender[1], F. Herder[1], U. Schliewen[2]
[1]Zoological Research Museum Alexander Koenig, Bonn, Germany
[2]Zoologische Staatssammlung München, Germany

Recent studies introduced the radiation of sailfin silversides in the Malili Lakes of Central Sulawesi as a new model system for the analysis of speciation processes. "Sharpfins" endemic to Lake Matano are the most diverse group of sailfin silversides and exhibit a variety of characters potentially related to different feeding strategies. Shape of body and jaws are discussed as key adaptive characters in fish radiations and are analyzed here with regard to stomach contents. Food items are not distributed randomly with regard to morphological traits, supporting the idea of adaptive divergence in this isolated tropical ancient lake.

O1.16
Vocalisation patterns and social interactions in a colony of proboscis bats (*Rhynchonycteris naso*, Emballonuridae) in Costa Rica

K. Barquero, E. Kalko
University of Ulm, Germany
Smithsonian Tropical Research Institute, Panama

Acoustic signals play a major role in social interactions of bats. *Rhynchonycteris* naso (Emballonuridae) typically forms small colonies on exposed surfaces, with variable group composition. We observed a colony in Costa Rica, with ultrasound and video recording devices to understand the characteristics of their communication signals and their importance within the colony dynamics. We describe their vocal repertoire and the usage of high-frequency vocalizations during their social interactions, comparing our results with the white-lined bat, *Saccopteryx bilineata*.

O2.01
Comparison of genetic population structures of two Water hyacinths: the invasive *Eichhornia crassipes* (Mart.) Solms and the closely related *E. azurea* (Sw.) Kunth

B. Rudolph[1], P. Parolin[2], S. Bartel[2], W. J. Junk[2]
[1]University of Hamburg, Germany
[2]Max-Planck-Institute for Limnology Plön, Germany

Molecular population dynamics of two water hyacinths both native to S-America but using two different reproduction types were compared. AFLP data show that their different reproduction strategies create different population structures: (a) No populations were separated within the invasive and mainly asexually reproducing *E.crassipes*. (b) *E. azurea* regenerates sexually and shows a differentiation of populations from north to south. Some *E. azurea* cluster within *E. crassipes* but not vice versa, suggesting a possible introgression of genes from *E. azurea* into *E.crassipes*.

O2.02
Stand dynamics and carbon accumulation during dipterocarp forest recovery from reduced-impact logging in Sabah, Malaysia

P. Lincoln, M. A. Pinard, P. Smith
University of Aberdeen, Scotland, U.K.

Damage to tropical forest during logging causes elevated CO_2 release due to decomposition. This may be mitigated by the adoption of Reduced Impact Logging (RIL). As the disturbed forest recovers its biomass, carbon fixation by the vegetation increases and in time exceeds losses from decomposition (a transition from source to sink). This study compares the stand dynamics and carbon balance of dipterocarp forest in Sabah recovering after conventional and RIL logging. Preliminary results indicate that the transition to sink occurs more quickly after RIL.

O2.03
Determinants of geographic range size: a cross-species comparison in SE-Asian sphingid moths

J. Beck
University of Basel, Switzerland

I used range maps for the sphingid moths of Southeast Asia and the Malay Archipelago to investigate whether variation in range sizes and inter-island dispersal can be understood on the basis of species traits. I found that range sizes are related to the phylogeny of species, i.e. they have a heritable component. Using multivariate, phylogenetically controlled models to test for independent effects of a number of morphological, life-history- or niche-related parameters, I found that larval diet breadth is the best predictor of range sizes as well as inter-island dispersion, confirming the importance of niche breadth on the geographic ranges of species. A number of other factors are shown to have additional impact on predictions of range size or inter-island dispersal ability.

O2.04
Habitat fragmentation and haemoparasite infection in two Neotropical bat species, Artibeus jamaicensis and A. lituratus, in Panama

V. Schmidt[1], E. Kalko[1,2]
[1]University of Ulm, Germany
[2]Smithsonian Tropical Research Institute, Panama

Anthropogenic influence on ecosystems, such as habitat fragmentation, impacts upon species diversity and interactions. There is growing evidence that degradation of ecosystems favours disease. We assessed the haemoparasite load of two fruit bat species and found trypanosome and Litomosoides infections. Trypanosome incidence was significantly higher in bats from forest fragments, here man-made islands in Lake Gatun, than in bats captured in continuous forest. We attribute this to the loss of species diversity in forest fragments and specific characteristics of the fragments.

O2.05
Blood biochemistry of the black sea turtle, *Chelonia mydas agassizii*, as a means of a health assessment in Baja California Sur, Mexico

E. Lyons
Center for Tropical Marine Ecology, Bremen, Germany

Baseline blood biochemistry values were determined for black sea turtles, also known as Eastern Pacific green turtles, *Chelonia mydas agassizii*, from the region of Baja California Sur, Mexico. Blood samples were collected from February-October 2004 (n = 40), and in March 2005 (n = 10) for a baseline health evaluation of the population. Twelve plasma parameters were selected based on their relevance for assessing health and the availability of background information from their previous use by researchers working with wildlife. Furthermore, it was hypothesized that there are size class differences and diurnal fluctuations in blood plasma parameters. Mean plasma parameter values obtained were compared with values from healthy green and loggerhead sea turtles, as well as green turtles suffering from the pollution-related disease, fibropapillomatosis. Results from the present study were very similar to previously reported blood reference values from clinically healthy green and loggerhead sea turtles. These comparisons imply that the health parameters of the studied wild black turtles from Baja California Sur are within the scope of those normally observed for sea turtles. When compared to green turtles with fibropapillomatosis (FP) [Tumour Severity = 3, on a scale of 0 (none) to 4 (most severe)], higher values of mean total protein, cholesterol, triglycerides, and alkaline phosphatase (AP) were found. In addition, both hypotheses failed to be rejected, with mean alanine aminotransferase (ALT), alkaline phosphatase (AP), creatinine, potassium, total protein, and uric acid showing significant fluctuations according to capture time (afternoon, evening and night), and mean potassium, creatinine, triglycerides, and total protein showing significant differences according to size class (45 - smallest to 75 -largest). These blood reference values are vital for future research and for the monitoring of the health status and recovery of this endangered species. Moreover, they are the first blood biochemistry profiles for a natural population of black sea turtles in the geographic region.

O2.06
Pollination of *Unonopsis stipitata* (Annonaceae) by scent-collecting male euglossine bees in Nouragues (French Guiana)

H. Teichert , G. Gottsberger
University of Ulm, Germany

The present study is one of the first descriptions of pollination by scent-collecting male euglossine bees in the archaic family Annonaceae. Observations proved that the main flower visitors of *Unonopsis stipitata* are male euglossine bees (*Euglossa cf. imperialis* and *Eulaema bombiformis*) attracted by floral odor. Analyses of scent volatiles showed that the odor bouquet of *U. stipitata* is similar to that of other euglossine bee pollinated plants. The flower morphology of *U. stipitata* and pollinator behavior is correlated. The presence and the scent collecting time of the two bee species during floral anthesis differed significantly. The observations clearly indicate that *U. stipitata* is being pollinated by male euglossine bees, which adds a further pollination syndrome for the New World Annonaceae, which otherwise are largely pollinated by beetles.

O2.07
Influence of landscape structure on plant-pollinator interactions in an E-African agriculture-forest mosaic

M. Hagen
University of Bielefeld, Germany

Pollination, one of the most important ecosystem services, is highly endangered by the worldwide loss of natural habitats caused by human land-use and -management. Habitats created by man often do not provide the majority of bees with suitable nesting sites and foraging grounds. Only a network of natural, semi-natural and agricultural ecosystems may support a maximally rich bee fauna in agricultural landscapes.

In this project we analyse the influence of different landscape structures on the diversity and abundance of solitary and social bees and on the mutualistic interactions between flower-visiting bees and non-crop and crop plants. The study is carried out in Western Kenya, at the Kakamega Forest area and its surroundings, which is known to be one of the most densely populated areas of Kenya. We selected 38 study sites differing in structural parameters and, thus, complexity, ranging from closed rainforest over bushlands, grasslands and structurally poor mo-

notonous farmlands to a highly structured farmland mosaic. We especially focus on the parameters distance to forest, type of vegetation, and number of honeybee colonies. So far concentrating on *Justicia flava* (Acanthaceae), an entomophilous perennial herb common in East Africa, we measured the diversity of flower-visiting insects (mainly bees), their visiting frequency, and the resulting fruit and seed set of the plants. Preliminary results show that study sites highly differ in plant diversity, bee diversity and bee species composition. In forest sites, plant as well as bee diversity was highest. Distance to forest appears to influence the diversity and abundance of bees visiting *Justicia flava* only at certain spatial scales. While diversity of bees is highest inside the forest, lowest diversity is found at the forest edge, which is usually considered a hotspot of diversity. Diversity and abundance of flower visiting bees in the farmland are highly variable, irrespective of the distance from forest. Similarity measurements (Morisita-Horn Index) showed only few overlaps/relationships in terms of flower visitors between the sites, especially inside the forest, indicating the high diversity of bees also on bigger spatial scales in this diverse habitat.

This study is part of BIOTA East Africa and supported by the German Ministry of Education and Research.

O2.08
Forest fragmentation and plant-pollinator interactions in W-Kenya

T. Bergsdorf
University of Bielefeld, Germany

Rain forest fragmentation can affect plant-pollinator interactions and the reproductive success of plant species. Understanding these consequences is a crucial component of conserving vulnerable ecosystems. In general, a higher mean visitation frequency and mean seed set was found inside the surrounding forest fragments compared to the main forest. In contrast to this, the primary pollination success and fruit set varied with respect to the different plant species. Only regarding the *A. eminens* campaign 2003, a higher number of visits by the pollinating *Xylocopa* bees inside the forest fragments consequently caused a higher number of pollen on stigmas and increased fruit and seed set. Thus, a pollinator and/or pollen limitation in the patchy distributed *A. eminens* population might have occurred in 2003. Due to the generally lower primary pollination success inside the forest fragment populations of all other plant species, one essential factor of the higher seed set might be an increase of the long-distance cross-pollination ratio owing to the higher visitation frequency, shown for *A. pubescens* and *H. diervilleoides*. Even a temporarily higher genetic variation could

be postulated. Nevertheless, for longer periods a reduction in population size and an increase in isolation due to fragmentation may lead to limited gene flow, increased inbreeding, loss of genetic variation, decreased individual fitness, and consequently to an increased risk of population extinction.

KN1.01
Mountainous regions in the tropics as engines of speciation in birds

Trevor Price
University of Chicago

In this talk I investigate patterns of speciation in birds. First, I note that more species are found in some places of the world than others. For birds in the Sahara, a square the size of about 12,000 square kilometers typically holds about 20 breeding bird species. At the other extreme many squares in the tropical rainforests contain more than 400 species, and tropical mountainous regions (Andes, East Africa, and Eastern Himalayas) are particularly diverse: a remarkable square in Ecuador has a world record 845 species. The obvious difference between deserts and rainforests is rainfall, with associated plant productivity. Tropical mountains also contain a diversity of habitats, from lush tropical forest to tundra above treeline. If environmental factors such as productivity and habitat diversity limit species numbers they may also limit speciation. Based on the original formulation of Mayr, I describe three essential steps in speciation: range fragmentation, divergence in allopatry, and subsequent expansion of ranges by sister species. Each of these processes may be limited by resource availability, but I suggest that difficulties of range expansions are the ultimate cause of limitations on speciation and species diversity in different locations. In this reasoning, range expansions are easier in tropical mountainous regions because different species can partition resources along multiple ecological dimensions (e.g., some are found at higher elevations than others).

O1.17
Cooperation for development of a Bolivian university institution

G. Gerold, S. Beck
University Goettingen, Germany

In 1978 the Instituto de Ecologia (IE) has been founded by the National University of La Paz (UMSA) thanks to the vision of Prof. Heinz Ellenberg, who initiated the partnership with the University of Goettingen. The IE since the beginning has focused its activities in applied research in the main ecosystems of Bolivia, besides training of students and docents. There will be shown and analyzed some examples of cooperation with different foreign institutions supporting the sustainable use of natural resources.

O1.18
Diversity and biogeography of the millipedes of Madagascar (*Myriapoda, Diplopoda*)

T. Wesener
Zoological Research Museum Alexander Koenig, Bonn, Germany

The millipede fauna of Madagascar is virtually unknown. Despite this obstacle, do Malagasy millipedes display numerous, for diplopods unique or unusual ecological adaptations like (female?) gigantism, tree climbing, dwarfism, presence of stridulation organs in the male and female or the adaptation to dry surroundings. How do such adaptations influence the species-richness and local endemism of a group? Can millipedes be useful tools for conservation planning on Madagascar?

O1.19
The last insect order, Mantophasmatodea: phylogeny, taxonomy, biology, and ecology

O. Zompro, J. Adis
Max- Planck-Insitute for Limnology, Ploen, Germany

The hemimetabolous insect order Mantophasmatodea, described as recently as 2002, was first known from fossils in Baltic amber. The discovery of living specimens allowed to study the biology and behavior. In the meantime the inter- and intraordinal relationships have been researched, based on new fossils and further collectings in Namibia and RSA. These collectings indicate that possibly dozens of new species await their discovery. It is still not known whether this group is restricted to the southern half of Africa or has a further distribution.

O1.20
Structures, processes, and biodiversity - a conceptual approach to the Andean streams of Colombia, S-America

H.W. Riss[1], J.D. Gutiérrez[2], R. Ospina[2]
[1]University of Muenster, Germany
[2]National University of Colombia

Ecological concepts for running waters suppose definite relations between import of particular organic matter, primary production, and hydraulic disturbance as the decisive factors which determine the structure of the benthic communities. The majority of the concepts has been deduced from streams and rivers of the temperate latitudes. In the tropics only few analogous studies have been put into action up to date, owing to the relatively high demand for experimental input and the knowlegde in taxonomy and autecology of benthic biota. In the present study is intended as a conceptual approach on different spatial scales. (1) An ecological typology was developed for the running water of the state of Cundinamarca (Bogotá) in collaboration with the governmental authorities. The data basis comprised eleven thematic layers included into a GIS. By logical intersection a three by three matrix of ecological types was obtained for several hundred running waters. The orthogonal factors were a) the intensity of metabolism (matter processing and turnover) and b) the physical stability (resistance of the stream channel against erosion during high runoff). Highest variability of stream types ocurred under dif-

ferent levels of hydraulic disturbance, specifically on the steep flanks towards the Magdalena river and Llanos lowlands. (2) A two-year study took place in a first order stream of the Eastern Cordillera. Functional units (mesohabitats) were characterized by the spatial and temporal variability of community metabolism. Results from field and laboratory experiments were extrapolated on the entire stream section. The relations both of the community production versus respiration and coarse versus fine organic matter showed a pattern strongly modulated by the hydraulic properties of the stream. Nevertheless, both criteria fairly corresponded to the predictions of the common concept. However, considering the feeding types of the benthic community, a relative dominance in biomass of collectors (feeding on detritus) was found which may be discussed as a specific feature of tropical mountain streams: the different and specific composition and breakdown of particular organic matter.

Abstract of Symposium

O1.21-O1.25
Emerging infectious diseases in tropical ecosystems

Convener H. Hofer
Leibniz Institute for Zoo and Wildlife Research, Berlin, Germany

Amongst top-down processes, predation and herbivory are well studied but pathogens have been neglected, particularly in tropical ecosystems. Tropical ecologists should be interested in pathogens for at least four reasons. Currently, new pathogens and emerging diseases, particularly those with the potential to transfer to people (zoonoses), originate primarily in the tropics. Secondly, a perception that free ranging animal populations are hosts to highly virulent strains and through their movements may spread these viruses may lead to the control of wildlife host populations out of concern for public health, thus potentially threatening the viability of wildlife populations or species of conservation concern. Thirdly, pathogens provide a powerful example of how rapidly evolution can proceed and what the ecological impact of such rapid evolution might be on species and guilds of species. And fourthly, increased exploitation of tropical ecosystems and contact between people and wildlife may lead to the transfer of pathogens from people to free-ranging populations. Prominent amongst susceptible species in tropical ecosystems are birds and mammals that are flagship species for conservation purposes. In this symposium several contributions will explore the rapidly in-

creasing knowledge on pathogens in the tropics, using high-profile pathogens such as anthrax, ebola or avian influenza, and key host species such as primates, particularly chimpanzees, bats, and water fowl as outstanding examples.

O1.26
A rigorous track classification method to estimate the population density of secretive clouded leopards in a tropical rainforest

A. Wilting
University of Wuerzburg, Germany

Various non-invasive methods have been used to determine the status of top-carnivore populations most of which are costly in terms of equipment and time. We showed that the technique to identify individuals using a thorough quantitative track survey is a feasible method to estimate population sizes and densities of even secretive cats in tropical rainforests. The population size of clouded leopards (*Neofelis nebulosa*) in the 56 km² research area in Sabah, Malaysia was estimated to be 5 individuals, based on a capture-recapture analysis of 4 animals differentiated by their tracks.

O1.27
Species richness and structure of three phyllostomid bat assemblages

K. Rex
IZW Berlin, Germany

We compared the assemblages of phyllostomid bats in three Neotropical rainforests and suggested a method to validate estimates of species richness for Neotropical bat assemblages based on mist-netting data. The fully inventoried bat assemblage at La Selva Biological Station (LS, 100 m elevation) in Costa Rica was used as a reference site to evaluate various estimators of species richness. The Jackknife 2 method agreed best with the known bat species richness and thus was used for extrapolation of species richness for an Amazonian bat assemblage (Tiputini Biodiversity Station, TBS, 200 m elevation) and an Andean pre-montane bat assemblage (Podocarpus National Park, BOM, 1000 m elevation) in Ecuador. Our results suggest that more than 100 bat species live sympatrically at TBS and about 50 bat species coexist at BOM. TBS harbors one of the most species-rich

bat assemblages known, including a highly diverse phyllostomid assemblage (Shannon diversity index: 3.04). Taxonomic diversity within the phyllostomid family was high at all sites (Φ_{LS} = 2.59, Φ_{TBS} = 2.65, Φ_{BOM} = 2.51). Our analysis of assemblage structure of the three phyllostomid assemblages reflected differences in patterns of floral diversity. At the Andean site, where understory shrubs and epiphytes exhibited the highest diversity, the phyllostomid assemblage was mainly composed of understory frugivorous and nectarivorous species. By contrast, canopy frugivorous were most abundant at the Amazonian site, coinciding with the high abundance of canopy fruiting trees. Assemblage patterns of other taxonomic groups may very likely reflect the geographical distribution patterns of floral elements in the Andean and Amazonian regions.

O1.28
Habitat use and activity of the nectarivorous bat *Glossophaga commissarisi* (Phyllostomidae: Glossophaginae)

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We studied home range size and activity patterns in the flower-visiting bat *Glossophaga commissarisi* in a lowland rainforest of Costa Rica by means of radio-telemetry, and correlated habitat use to the locally available plant resources. Mean home range size of the bats was 12.5 ± 6.7 ha. Foraging areas covered on average 3.0 ±1.0 ha, while the core areas comprised 9.5 ± 3.4% thereof. The bats showed a bimodal activity pattern and flew on average 59.6% of the night. Within their foraging areas we found for most of the animals a significantly increased use of areas offering high resource densities.

O1.29
Distribution and habitat preferences of Lecythidaceae in the Rio los Amigos uplands, SW-Amazonia, Peru

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This study was carried out at the CICRA research station (274 m asl) in the Los Amigos watershed, Madre de Dios, Peru. We evaluated the distribution of Lecythidaceae, which are predominantly canopy tree species, based on their preference for certain habitats on uplands (i.e. 'terra firme'), with a special focus on soils. We intended to explore the questions: (i) Are the Lecythidaceae species particularly habitat dependent? (ii) Do individual species show preferences for certain soil properties? Our results demonstrate that soil factors play an important role for habitat specialization and hence influence the spatial distribution of the Lecythidaceae species.

O1.30
Small streams - large effects: a sustainable management and conservation scheme for small catchments in the Cerrado of Central Brazil

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Cerrado vegetation originally covered 20% of the Brazilian territory. The high plains are incised by a dense net of low order streams and their valleys. In spite of their small individual size, they form an enormous extension in total. Many valleys harbor narrow but long strips of seasonal to permanent hillside wetlands, so called veredas. Here we present data on carbon concentrations in natural soils, effects of erosion on the integrity of the plant cover and soil carbon, and show a multi-use management and conservation scheme for this globally important biome

O1.31
Characteristics of lichens to survive in the understory of tropical lowland rainforests

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In tropical lowland forests, corticolous crustose green algal lichens are abundant and highly diverse. This may be related to adaptation to prevailing microenvironmental conditions. In the understory of a tropical lowland rain forest in French Guiana, we found that the combination of several characteristics (water-repellence, sunfleck induction, mycobiont reduction) enables corticolous lichens to implement specific morphological and physiological strategies, which favour growth in the limiting understory habitat (Lakatos *et al.* 2006, New Phytol 172).

O2.09
Stomatal control of water flux and photosynthesis of palm swamp species and *Mauritia flexuosa* L. in the Amazon lowlands, SE-Peru

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Despite the Neotropical palm *Mauritia flexuosa* dominates extensive areas of Amazon floodplains, very little is known about the edaphic and climatic habitat requirements of this important palm and associated palm swamp species. Virtually no information is available on the water use and carbon assimilation of palm swamps (Aguajales). We studied the stomatal control of carbon assimilation and water use of *Mauritia* and associated species and the diurnal and annual water uptake patterns of adult *Mauritia*. The study was conducted in an Aguajal located at 250m asl. near the Los Amigos Research Centre in Madre de Dios, S-Peru. Large daily gradients of air temperature and air humidity were encountered. Air temperature varied between 35°C and less than 12°C and bog water temperature below 10 cm depth is constant at 10.5°C. Swamp water level varies by c. 50 cm relative to the mineral soil during the year.

O2.10
Water use and photosynthesis of evergreen and deciduous dry forest species in N-Peru

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The foothills of the Cordillera in S-Ecuador and N-Peru are covered by open, deciduous dry forests. The precipitation regime is strictly seasonal and very variable. Thus dry forests species must have developed morphologic features and ecophysiological strategies to survive water scarcity over long periods. We studied how and when water is used in dry forest plants by monitoring site climate, soil humidity and xylem sap flux of deciduous and evergreen tree species for two years at three sites. We also studied photosynthetic carbon uptake capacity during the short rain season in March 2006.

O2.11
Neotropical tree and stand transpiration from montane to páramo vegetation in S-Ecuador and N-Perú

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Tree and stand transpiration have been measured for an entire year along a catena of forest sites from 1400 to 3060m asl. in the east Andean cordillera of S-Ecuador and N-Peru with Amazon climate influence. Our objective was to quantify (evapo-) transpiration of different altitudinal vegetation types and to characterize species-specific water losses from representative individuals. Leaf gas exchange was measured using CO_2- and H_2O-porometry and tree and liana transpiration via xylem sap flux sensors. Different morphological, allometric and

site physiognomic characteristics allowed up-scaling to stand transpiration. With respect to water loss lianas and trees do not differ on the leaf level, very likely because woody vines are in these tropical montane environments at their upper altitudinal limit. Vines have generally much higher sap flow densities than trees. Species-specific characteristics are less important than life-form of a plant (vine, tree), association with a functional group (pioneer, mid- or late-successional) and its social position (co-dominant with large canopy, sub-dominant in the understory). Without exception and irrespective of vegetation type the total tree water consumption is linearly related to individual plant size (here: basal diameter). However, the relationship may be affected by vegetation type: Slope forests and stunted forests follow the same relationship but differ from all others. In the S-Ecuadorian montane forests highest stand transpiration is observed for gully forests, intermediate for slope and lowest for stunted forests. At the Cerro Tambo site in N-Peru lowest stand transpiration is found despite the occurrence of the tallest trees: However, here the canopy is less dense, leaf area index is lower and the stand is generally dryer. Measured annual stand evapo-transpiration in slope forests is low considering the generally high relative air humidity and permanent cloud cover: It consumes 70 % of the available energy, 26% of precipitation. Interception is low for the same microclimatic reasons: 15% of evapo-transpiration, 10% of the available energy. Consequently, most precipitated water leaves the ecosystem via run-off or as sub-surface flow.

O2.12
Economy of frugivory in a nectar-feeding bat

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I compared the economy of frugivory between the primarily nectar-feeding bat *Glossophaga commissarisi* and the obligatory frugivorous bat *Carollia brevicauda* by means of feeding experiments and chemical analysis of faeces and fruits. During seasonal nectar shortages the nectarivorous *G. commissarisi* is known to switch to a predominantly frugivorous diet at La Selva Biological Station, Costa Rica. Through this time the species feeds on fruit of the genus *Vismia* and *Piper* and overlaps in diet temporally with *Carollia brevicauda*. For comparing the feeding behavior I analysed feeding sequences of both bat species, noting feeding duration and employment of four different bite types (precanine bilateral, precanine unilateral, postcanine bilateral, and postcanine unilateral; from least to most efficient). Although both *G. commissarisi* and *C. brevicauda* used almost all bite types, I found in both bat species a shift to more unilateral and postcanine bites when feeding on the harder *P. auritum* fruit. In spite of the pronounced employment of very efficient bite types, the feeding efficiency (mg fruit eaten per second) of *Glossophaga commissarisi* was significantly lower than that of *C. brevicauda* when feeding on *P. auritum* and only marginally not significant during a *V. macrophylla* diet, even after standardization for different body size. The digestive efficiency of both bats was measured by the amount of potentially useable residual sugar found in the faeces. Although there was no significant difference in the amount of sugars both species defecated during a *P. auritum* diet, *C. brevicauda* showed significantly higher concentrations of sugar in the faeces than *G. commissarisi* when on a *V. macrophylla* diet. This could be explained by the feeding habits of both bat species, since *C. brevicauda* actually consumed most of a fruit while *G. commissarisi* mainly consumed just the fruit juices. Therefore *G. commissarisi* could absorb the sugar from the fruit juice almost as efficient as from nectar, its main diet. *G. commissarisi* used its adaptations to nectarivory effectively during a frugivorous diet and thus treated fruits as "nectar in fruit form." Taking another point of view, the quality of *G. commissarisi* as seed disperser is probably low in comparison to *C. brevicauda*, because of the significantly lower number of seeds ingested.

My study showed that while feeding on the same fruits, *G. commissarisi* and *C. brevicauda* demonstrated obviously different feeding behaviours. Despite the morphological adaptations to nectarivory *G. commissarisi* showed a distinct shift

of its trophic niche towards frugivory, which has consequences for the co-evolved plant species like *P. auritum* or *V. macrophylla* in respect to seed dispersal and reproductive success but also for the co-existing bat species regarding niche partitioning.

O2.13
Long term pattern in throughfall in Kakamega Forest, W-Kenya

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Throughfall was measured on a rain event basis during a 5-year field campaign. It is discussed if patterns in throughfall occur, how these patterns can be described, how these patterns arise and if they are persistent. Factors influencing these patterns are discussed. According to our hypothesis, throughfall is a main factor determining water and nutrient transfer from the canopy to soil. Thus it is an important abiotic factor in creating niches in which different tree seedlings germinate and establish.

O2.14
Creating a disturbance index for Kakamega Forest, Kenya, taking account of accumulated historical forest use via GIS

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Indices of long-term forest disturbance are created to enable ecological studies to be carried out against a disturbance gradient in Kakamega Forest. GIS is used to integrate historic data derived from satellite imagery, aerial photography, logging records, maps, and local interviews, together spanning the 20th century. Forest changes are thus tracked both spatially and chronologically and proximate causes of change are brought to light. Due to local variation, indices of commercial and local level disturbance and forest cover change are created for defined spatial units.

O2.15
Neotropical bat activity around steet lights

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Often aerial insectivorous bats forage around street lights profiting from concentrations of prey attracted by the light. With acoustic monitoring we studied composition and dynamics of bats foraging around street lights in a small village surrounded by tropical rainforest in Panama. We assessed (1) which species of the surrounding undisturbed forest move into the village to hunt around street lights, (2) which species prefer certain street light settings, (3) whether they establish species-specific foraging microhabitats, and (4) whether and how bats react to different light conditions.

O2.16
Factors shaping the population dynamics of the rainforest understory plant *Heliconia metallica*

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H. metallica is a widespread clonal plant of Neotropical rainforests. Despite its abundance in the understory, the factors determining its population dynamics are largely unknown. We analyzed effects of habitat dynamics, i.e., canopy closure and inundation, on stage structure and growth of 16 populations of *H. metallica* in a Peruvian floodplain forest. Flowering probability increased with canopy openness and population growth with inundation frequency. We conclude that reproduction is mainly affected by canopy dynamics, whereas clonal growth and survival of plants depend on disturbance.

KN2.02
How much beta diversity is there in the Amazonian rainforest and what difference does it make for ecology?

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Amazonian rain forests are famous for their high alpha diversity, but there is no consensus on the degree and determinants of beta diversity (differences in species composition between sites). Opinions range from widespread uniformity to highly heterogeneous patchiness, with random vs. deterministic factors being emphasised to different degrees. Such different views lead to different recommendations for conservation planning.

O2.17
Global Change: the future of Africa's plant diversity

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In addition to habitat fragmentation, climate change will further increase the pressure on African plants. In the frame of the BMBF BIOTA Programme, environmental niche models for more than 4500 plant species were generated and projected to future climate (IPCC scenarios). Most species ranges may markedly decrease in size by 2100, and a large proportion of habitats may get lost. However, there may remain refuges.

O2.18
What determines plant invasion success? Testing traits with tropical trees in Amani Botanic Garden, Tanzania

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Naturalisation of non-native species planted in the Amani Botanic Garden (Tanzania) offers an opportunity to test for invasive plant traits and quantify threats to surrounding rainforest. Life-history traits can be tested in relation to historical data on residence time and introduction effort. Research findings may contribute to invasive species management.

O2.19
Global patterns and determinants of vascular plant diversity

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We investigate the global-scale species richness pattern of vascular plants and examine environmental and historical determinants. Across 1,032 geographic regions worldwide, potential evapotranspiration, number of wet days, and habitat heterogeneity emerge as core predictors. Residual differences across the major floristic kingdoms are minor, with the exception of the uniquely diverse Cape Region, highlighting the important role of historical contingencies. Our model explains 70% of the global variation in plant richness and fully accounts for the latitudinal gradient.

O2.20
Phylogenetic evaluation of the genus *Masdevallia* Ruiz & Pav. (Orchidaceae) based on ITS nrDNA sequences and morphological data

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The genus *Masdevallia* comprises ~ 500 species characterized by callous petals. Up to date no satisfactory classification has been published due to the homoplasy rife in morphological features. Aims of this study are (1) to address the infrageneric relationships using molecular data; and (2) to find morphological synapomorphies for clades well supported by molecular data. Four major clades were found showing clear morphological synapomorphies. Subgenera *Cucullatia*, *Fissia*, and *Meleagris* are monophyletic, whereas *Masdevallia*, *Polyantha*, and *Pygmaeia* are polyphyletic.

O2.21
Structure, floristic composition, and conservation status of a Didiereaceae forest in S-Madagascar

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Madagascar is a hotspot in terms of species diversity and endemism. However, habitat destruction and species extinction is advancing rapidly. The Spiny Forest Ecoregion in S-Madagascar shows over 85 % endemism in vascular plants. It is dominated by members of the endemic family Didiereaceae *s. str.* This is the first comprehensive study which compares *Alluaudia ascendens* (Didiereaceae) woodlands inside and outside protected areas. The study was conducted among four different sites under various degrees of anthropogenic disturbance. The results emphasize the urgent need for further protection of the world's unique spiny Forest.

KN1.03
Monitoring changes in canopy arthropod populations through time in the western Amazon Basin, Yasuni area, Ecuador

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O1.32
Impact of natural forest management on nutrient cycling in a tropical montane forest in S-Ecuador

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Sustainable management strategies for conservation of the high plant diversity of mountain forest ecosystems are still unknown. Therefore we aim at assessing the impact of experimental forest management on nutrient cycling. We studied a tropical montane forest in Ecuador between 1900 and 2450 m above sea level on the east-exposed slope of the eastern cordillera of the N-Andes in S-Ecuador between the cities of Loja and Zamora. Nutrient cycling was monitored in two microcatchments (MC2 and MC5). The experiment consisted of three different treatments: undisturbed reference forest, surrounding of a favored potential crop tree in the managed catchment and gap in the managed catchment. All samples were collected between May 2003 and May 2006 in weekly intervals. There were no significant differences between the natural reference (MC2) and managed forest (MC5) in pH and electrical conductivity of incident precipitation (MC2: mean conductivity 10 $\mu S\ cm^{-1}$ and pH 4.7, MC5: mean conductivity 12 $\mu S\ cm^{-1}$ and pH 4.7) and throughfall (MC2: mean conductivity 42 $\mu S\ cm^{-1}$ and pH 5.8, MC5: mean conductivity 55 $\mu S\ cm^{-1}$ and pH 5.9). Thus, both catchments received a similar electrolyte input and showed a similar response of the electrolyte concentrations during the passage through the canopy resulting in an increase of the electrical conductivity because of the wash-off of dry deposition and the leaching of elements from plant tissue. The electrical conductivity was clearly lower in the stream water of MC5 (mean conductivity 13 $\mu S\ cm^{-1}$) than of MC2 (mean conductivity 22 $\mu S\ cm^{-1}$) while pH was not different (pH 6.3). This was already the case before the natural forest management experiment was started in June 2004 in-

dicating a smaller export of ions from MC5 than from MC2. The management measure did not result in a change of the pH and electrical conductivity of the stream water. Although ion inputs are similar among both catchments and ion output is even lower in MC5 than in MC2, the higher electrical conductivity of the litter leachates in MC5 (79 $\mu S\ cm^{-1}$) than in MC2 (62 $\mu S\ cm^{-1}$) at similar pH (MC2: pH 4.5, MC5: pH 4.4) implies a higher nutrient availability for the PCTs. Thus, the objective of improving growing conditions for PCT seemed to be reached without changing the overall forest functioning as indicated by the element budget. If our preliminary data were confirmed, this would indicate that the forest management measure can be considered as sustainable with respect to the element cycle.

O1.33
Trees, frugivores, and forest regeneration along a human disturbance gradient in E-Africa

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Tropical forest mutualisms are threatened by increased rate of forest degradation. We investigated the effect of human disturbance on animal dispersed tree species, frugivores, and seedling establishment in three E-African tropical rainforests. In each forest, trees, frugivores and seedlings were counted. Disturbance slightly enhanced animal-dispersed tree species richness. Richness of animal-dispersed trees had a positive influence on frugivore density. The density of frugivores significantly increased the species richness of animal-dispersed seedlings.

O1.34

Human impact and vegetation development during the late Holocene of the area between Loja and Zamora in the SE-Ecuadorian Andes

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In order to understand the landscape history including vegetation and fire dynamics as well as human impact, we studied sediment cores in the area between Loja and Zamora (2200-3200 m elevation) by pollen, spore and charcoal analysis. Results from cores of undisturbed mountain rainforest (2200-2600 m elevation) indicate that fires were common in the past. Frequent fires, together with the relatively high occurrence of grasses and some corn plantations, document past human activities in this area pointed out so far as natural and undisturbed. Past fires have markedly influenced the floristic composition of the mountain rainforest and vegetation changes are found after the decrease or absence of burning in this area after about 800-600 years ago. The absence of the human activity during the last centuries might be related to the reduction of the human population. The history of the area between Loja and Zamora gives answers of the reason of this decrease. In the middle of the 15th century the Inka occupied southern Ecuador, defeated by the Spanish conquests about 80 years later. About 100 years later the Spanish conquests lost the control of this area in fights with the indigenous population. After some centuries with low human activity a resettling starts in the mid of 20th century by Mestizes Colonos, settlers from other parts of Ecuador. Many parts of the regenerated mountain rainforest were disturbed by slash and burn farming and for pasture during the last decades.

O1.35
Secondary tropical montane cloud forests in central Veracruz, Mexico, have high potential for provision of ecosystem services

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The area of secondary forests is increasing throughout the tropics. Secondary forests can supply important ecosystem services. We apply the process-based forest growth model FORMIND to simulate the regeneration of tropical montane cloud forest in central Veracruz, Mexico, and to study the potential of the secondary forests for fuelwood harvesting. Simulation results show that forest characteristics that affect water capture from clouds and soil protection have recovered after 40 years of forest regeneration and that up to 13 m^3/ha fuelwood can be harvested annually from the forests.

O1.36
Positive density dependent recruitment in a tropical tree population

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Positive and negative density dependent processes may contribute to tree recruitment and the maintenance of species diversity in tropical forests. For a population of the canopy dipterocarp *Parashorea tomentella* growing in Sabah we demonstrate positively density dependent pre-dispersal seed survival and post-dispersal seed and seedling survival. We conclude that satiation of seed predators plays an important role in determining the early recruitment success of this mast-fruiting species.

O1.37
Is a tree to be? Large trees enhancing sub-canopy grass quality in African savannas

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Large trees in African savannas, threatened by deforestation, improve soil quality but their impact on the herbaceous vegetation is unclear. We studied the grass layer beneath and outside of canopies in different eastern and southern African savanna systems over season. Grass leaf nitrogen and phosphorus contents were up to 25% higher beneath than outside canopies in the site of lowest rainfall and soil fertility. Grass structure and species composition differed strongly beneath and outside of trees. Hence, large trees should be protected to maintain sustainable grass resources.

O1.38
Mountains, mining, and threatened species - a deadly cocktail for the long-term conservation of a global biodiversity hotspot

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Mountainous regions in W-Africa's rainforest zone are extremely limited in extent but harbour exceptional biodiversity (both species richness and endemism). Our study on Mt Nimba and the surrounding forest region combines remote sensing and biodiversity data. Almost 50% of Guinea's remaining humid forests are contained within a few weakly protected areas in that region (representing a mere 1 % of the country's surface). Distributions of threatened bat and frog species are highly concordant and overlap with recent mining projects that target these last strongholds of biodiversity.

Funded by BMBF, project BIOTA-West

O1.39
Human impact diminishes seedling species richness in Kakamega Forest, Kenya

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Forest fragmentation and other kinds of human disturbance can reduce the diversity of plant and animal species. To evaluate the impact of fragmentation and small-scale disturbance on forest regeneration, we assessed species richness and total abundance of adult trees in comparison with seedlings in Kakamega Forest, Kenya. Neither fragmentation nor small-scale disturbance had an impact on adult tree species or total abundance. In contrast, fragmentation and especially disturbance significantly reduced seedling species richness, particularly of late-successional species.

O1.40
Ecological studies in E-Africa: focus on Mt Kilimanjaro

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Flora and vegetation of Kilimanjaro are considered to be well investigated. However, until recently only in the alpine zone more detailed plant ecological studies were undertaken. Since 1996 several DFG-founded projects were carried out on the mountain. Based on 1400 vegetation plots a vegetation map of the whole mountain was produced, the altitudinal zonation of the forests and in particular of Pteridophytes was studied. Land cover changes, partly due to climate change and their ecological impacts were another topic as well as biogeographical questions, such as the relation of Kilimanjaro to the Eastern Arc Mts or the missing bamboo zone of Kilimanjaro. In an ongoing project correlations between soil, climate and forest vegetation are investigated as well as palaeobotanic aspects.

O1.41
Nutrient supply and natural ^{15}N abundance in forested soils along an altitudinal transect at Mt Kilimanjaro

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TOC, N, S, pH, Ca, K, Mg, Na, P, Al, and ^{15}N were analyzed in soils of Mt. Kilimanjaro under different forest ecosystems between 750 and 4000 m asl. One aim of this study was to find out, if nutrient supplies, besides climatic factors, might be responsible for the appearance of vegetation belts. In addition we tried to characterize the N-cycle by analyzing ^{15}N. Soil ^{15}N was significantly correlated with altitude ($r = -0,68$, $P < 0,01$), indicating that below 1800 m asl the N-cycle is more open than at higher altitudes.

O1.42
Small mammals along an elevational gradient on Mt Kilimanjaro

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Mt Kilimanjaro is the highest mountain in Africa, yet very little is known about the natural history of much of the biota that occurs on this unique mountain. Small mammals (shrews and rodents) are particularly poorly known and knowledge of the ecology of this fauna would contribute significantly to our understanding the montane organisms of Mt Kilimanjaro. In a survey conducted in July - August, 2003, we used two different trapping techniques (snap traps and pitfall buckets) to systematically sample small mammals at five different elevations on the southeastern slope of Mt Kilimanjaro. The elevational range that was sampled ranged from 2043 to 4000 m and included submontane and montane forest, ericaceous and heathland habitats. Six species of shrews representing three genera and 9 species of rodents representing eight genera were documented within this gradient. In general, the forest habitats exhibited much greater mammalian diversity than the habitats above tree line. While some species such as *Sylvisorex granti* and *Otomys tropicalis* spanned most of the elevational range sampled, others such as *Rhabdomys pumilio* and *Crocidura allex* were restricted to alpine zones, or to forest (*Praomys delectorum* and *Crocidura hildegardeae*). The only endemic mammal on the mountain (*Myosorex zinki*) was observed at four of

the five sites ranging from 2470 to 4000 m. The small mammal fauna of Kilimanjaro has fewer endemics than some of the neighboring Eastern Arc Mountains (EAM) and many small mammal species found on Mt Kilimanjaro are also found in the EAM. One notable exception is *Hylomyscus arcimontensis*, a mouse endemic to the Eastern Arc and Mt Rungwe, but absent on Mt Kilimanjaro. Comparisons between the Kilimanjaro survey and similar surveys in other montane areas of E-Africa are discussed.

O1.43

Endemism and speciation in flightless, singing bush-crickets at Mt Kilimanjaro, Mt Meru, and some Eastern Arc Mts (Insecta: Orthoptera: Tettigonioidea)

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In E-Africa, the relatively young (< 2 million years old) volcanoes Mt Meru and Mt Kilimanjaro are situated directly adjacent to the much older Eastern Arc mountains. Both areas harbour many endemic species. In a joint project we compare ecology, genetics and behavior of some *Orthoptera genera* (*Phlesirtes*, *Amytta*, *Aerotegmina*) to obtain information about speciation mechanisms in both areas. Here we will present first data about the acoustic behavior, an essential part of the mate recognition system of tettigoniids.

O1.44
High mountains and climatic fluctuations as motor for speciation in E-African Phaneropterinae (Orthoptera: Tettigoniidae)?

K. L. Voje
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Certain volcanoes and mountainous areas in E-Africa, and especially the geological old mountain chain of the Eastern Arcs, are well known as hot spots of biodiversity and endemism. A number of genera of the katydid subfamily Phaneropterinae are represented with arrays of closely related species on these mountanous areas, but not much research has been done so far on these endemic groups. Focus was laid on the genera *Horatosphaga*, *Peronura*, and *Monticolaria* and phylogenies have been constructed for species of these and other genera of Phaneropterinae. Preliminary results indicate that especially a group combined as Acrometopae should taxonomically be revised. Thus, e.g., the genus *Horatosphaga* showed a high molecular diversity which is also reflected in its morphology and ecology of the investigated species. On base of the distribution of species belonging to a certain group possible migration ways and further relationships of the Saltatoria fauna are discussed.

O1.45
Climatic fluctuations as a motor for speciation processes in flightless Saltatoria (Insecta: Orthoptera)

C. Hemp
University of Bayreuth, Germany

E-Africa is known for its high degree of endemism, especially in the old basaltic rock mountains like the Eastern Arcs. Many genera of Saltatoria have radiated in montane areas, especially from the families with flightless members like Lentulidae, Eumastacidae, Acrididae and Tettigoniidae. In every nowadays isolated montane area different species are present. Their narrow ecological demands do not allow dispersion under the present climatic conditions. Their distribution pattern makes a reconstruction of the former climate (and thus the vegetation cover) possible when a spreading of common ancestors occurred and also corridors get apparent through which these ancestors originated. An overview of the projects dealing with different groups of flightless Saltatoria and first results are given.

O1.46
Post-glacial climate history of equatorial E-Africa: wet-dry cycles at decadal to millennial time scales

D. Verschuren
University of Gent, Belgium

The magnitude and reach of human impact on the Earth's biosphere has increased rapidly over the last 200-300 years, and rates attained in the last three decades are unprecedented. To help marry economic development with biodiversity conservation and natural ecosystem functioning, climate and natural-resource modelers need both spatially and temporally explicit databases of historical land use. More specifically, we need to know the timing and magnitude of both ancient and modern human impact on regional landscapes and their relation to natural, climate-driven ecosystem changes at the relevant time scale. This is certainly true for E-Africa, where population growth is among the highest in the world, and where developing economies strongly depend on scarce water resources and other goods and services provided by natural ecosystems. In humid temperate regions such as NW- Europe and North America, human disturbance of ecosystems and landscapes tends to be evaluated against historical or reconstructed pre-impact conditions that are presumed to be relatively stable with modest amplitude of long-term variability. A similar paradigm has long been applied to E-Africa, based on an assumption of rather insignificant climate-driven environmental change during the late Holocene compared to the great climatic upheavals characterising the Last Glacial Maximum and the early-Holocene Humid Period. Recent paleoclimate studies with good time resolution and age control are beginning to reveal that semi-arid to sub-humid E- Africa experienced major climatic instability over the last 3-4000 years and at all time scales from decades to millennia, with significant effects on both aquatic and terrestrial ecosystems. The resulting amplitude of natural long-term ecosystem variability render it ill-advised to define a single pre-impact natural state of local ecosystems and ecotones as benchmark or reference point for conservation efforts.

O1.47
Mt Kilimanjaro: reconstruction of younger quaternary climate fluctuations deduced from paleosoils

C. Hoerold., W. Zech, C. Broesike, B. Glaser, A. Hemp
University of Bayreuth, Germany

The Andosols of Kilimanjaro reveal buried Ah-horizons. Our hypothesis is that these fossil horizons document a downhill shift of afro-alpine grassland associated with *Erica* during Quaternary climate fluctuations (Early Holocene, Younger Dryas, LGM, MIS 3, 4). Recently *Erica* is found 3000m asl, fossil horizons regularly appear above 2250m. With the analysis of n-alkanes we can distinguish between horizons developed under montane rain forest and under *Erica*. Reconciliation with ^{14}C-ages from charcoal, pollen analysis and comparison to data from several lacustrine sediment cores from E-Africa support our theory.

O1.48
Late quaternary environmental changes in E-African highlands: paleoecological studies in Ethiopia, Rwanda, and Tanzania

W. Zech[1], A. Hemp[2], C. Hörold[1], C. Broesike[1], Y. Ashagrie[1], A. Abate[1], R. Bussert[2]
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[2]TU Berlin, Germany

Soils and sediments in the E-African Highlands frequently reveal buried dark colored layers. Using multiproxy geochemical analyses (e.g. stable isotopes, n-alkanes, lignin etc.) and numeric dating (^{14}C) it could be shown that in southern Ethiopia (Munessa Forest) the savanna (= C4) moved upwards during dry periods, whereas in Rwanda and at Mt Kilimanjaro the afro-alpine grasslands (= C3) associated with Ericaceae descended to about 2000 m asl especially during the Late Glacial and LGM.

O1.49

Wetter or drier? Past, present, and future impacts of climate change-induced ecosystem shifts within a tropical African biodiversity hotspot

P. Platts, J. Lovett, C. McClean, R. Marchant, A. Ahrends, N. Burgess, J. Finch, A. Jump
University of York, Heslington, UK

Understanding ecosystem response to environmental variability, how this impacts on ecosystem dynamics, and how this may develop over the past, present and an uncertain future requires novel approaches. Although information is available to demonstrate the responsive nature of tropical montane ecosystems to climate change, principally from pollen, biogeographical data and / or future model scenarios, this is generally not available from the same location, and rarely in a format suitable for policy development. For the Eastern Arc Mountains of Tanzania and Kenya, an area regarded as one of the world's hotspots of plant biodiversity, the York Institute of Tropical Ecosystem Dynamics (york.ac.uk/res/kite/index.html) is combining palaeoecological information on past ecosystem sites with a biogeographic phylogeographic analysis to constrain a modelling framework on ecosystem response to climate and environmental change. Here we focus on the impact of changing moisture levels on the Eastern Arc Mountain ecosystems in particular investigating the anomaly of future Global Climate Model predictions indicating a wetter environment for Eastern Africa, whereas long term hydrological data suggest a drier climate. In addition to understanding ecosystem functioning, KITE is fostering new international relationships by encouraging knowledge transfer between Europe and East Africa. Such research carries increasing importance as forecasts of climate-induced impacts on ecosystem functioning are becoming widely used as platforms for conservation initiatives.

O2.22
Conservation science, policy, and action - are we hitting the right targets?

P. Ibisch
FH-Eberswalde, Germany

One motive for carrying out tropical ecology research always has been to provide a solid scientific basis for biodiversity conservation. The 20th anniversary meeting of the GTÖ is an appropriate reason for reflecting about the impacts of conservation science, policy and action since 1987. Important policy milestones, as well as ever increasing evidence on accelerating global change processes, especially progressing biodiversity loss and rather drastic projections for the future are important facets of the last two decades' history. Conservation scientists seem to play the role of archivists who document what once had been and why it vanished rather than being proactive and influential advisors guiding the course of global governance. Is there any chance for biodiversity conservation to become effective?

O2.23
Positive aspect of weed for agro-biodiversity conservational priorities

R. Kahnum
Museum of Natural History, Pakistan

Weed control measures and policies often view weedy plants as problem species that interfere with agricultural productivity. This results in these plants being eradicated sometimes indiscriminately without regard for their other economic importance. In rural areas of Punjab Pakistan however, people are turning to use of traditional medicinal plant species that include important weeds. This study analyzed the use of weed species in contemporary traditional medicine in rural Punjab areas. A total of 59 respondents were interviewed, (these included males and females) using a semi-structured questionnaire, detailed personal discussions with the local people and regular systematic walk in the fields to identify plants and collect Ethnobotanical specimens. On the basis of the total number of specimens used for health purpose of each family, their percentage of the healthway use has calculated which indirectly shows their importance.

The results showed that 27 species in 17 plant families are used as sources of traditional medicine for 41 ailments (despite of small area for this study as it only

encompasses some areas of Pothohar- Punjab, region). These weed species therefore deserve to be considered as important plants when a government is legislating problem plants species. This shows that traditional medicine in this region may be undergoing changing patterns as far as medicinal plant utilization is concerned. The medicinal weed species used for the treatment of ailments, need to be incorporated in agroecosystems in this region as domesticated plants or plants in the process of domestication.

O2.24
Population differentiation in *Schedorhinotermes lamanianus* - a biogeographic analysis

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[2]University of Marburg, Germany
[3]Center for Environmental Research Halle/Saale, Germany

African humid forests are divided by an arid corridor for about 10 my. Several forest species occur in both, eastern Africa forests and the Guineo-Congolian forest block. Using a termite as model species and applying molecular markers and morphometrics we evaluate from a biogeographic viewpoint the possibility that such species may have crossed the arid corridor along a route through the Kenyan highlands and down the eastern drainages during climatologically favourable periods in the past.

O2.25
The paradox of ecosystem services: ecology, economics, and the pollination crisis

J. Ghazoul
ETH Zurich, Switzerland

Ecosystem services are increasingly used to justify conservation initiatives based on the assumption that maintaining such services delivers net benefits to human welfare. Yet management initiatives for ecosystem services have been largely ignored by land managers and agriculturalists. I argue that this is due to the failure of conservationists to account for trade-offs and opportunity costs inherent in land management, and to retain credibility conservationists must recognize these constrains.

O2.26
Termite induced soil turnover: preliminary results from the Central Namibian Savanna

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Termites and ants are the most important soil ecosystem engineers in arid areas. We present data on rain induced soil erosion from mounds of the termite *Macrotermes michaelseni* (Sjöstedt), 1914 which show a high variability between different mounds and rain events. In own preceding studies, a higher nutrient status of mound material compared to the matrix soil was found. Combining these findings with distribution data of mounds, the impact of *M. michaelseni* on the small scale pedodiversity of the focal ecosystem will be discussed.

O2.27
www.antbase.net - a myrmecological networking platform

M. Pfeiffer
University of Ulm, Germany

Taxonomists and ecologists have a growing demand for easy access to and exchange of species information. For rapid species assessment, invasive species monitoring and calculations of beta diversity, reliable species information has to be available within short time. Funded by the DFG, www.antbase.net, a web-based information network for ant researchers and museums from over 20 countries in Europe and Asia provides digital resources. The trilingual website includes a library, species keys, ant movies, a poster exhibition and digital images of currently more than 400 ant species.

O2.28
European Institute of Distributed Taxonomy (EDIT): a new initiative to overcome the taxonomic impediment

K. Riede, C. Häuser
State Museum of Natural History, Stuttgart, Germany

The taxonomic impediment is particularly severe in the tropics: lack of taxonomist expertise and concentration of resources outside of megadiversity countries hampers comprehensive inventories of tropical biodiversity. The European Distributed Institute of Taxonomy (EDIT) is an EU-funded Network of Excellence of 27 leading European, North American, and Russian institutions, aiming to reduce fragmentation in European taxonomic expertise and to coordinate an integrated initiative aimed at improving society's capacity for biodiversity conservation. Our workpackage within EDIT demonstrates the importance of taxonomy for conservation by „All Taxa Biodiversity Inventories" (ATBIs) at sites of conservation interest. The underlying database scheme uses specimen-based identification codes with high-precision geo-referencing and will be connected to the „Global Biodiversity Facility" (GBIF), providing immediate web access to inventories through GBIF search tools.

O2.29
The BIOTA E-Africa project in a multimedia presentation: overview and detail to inform and animate

G. Schaab, H. Zimmer,
University of Karlsruhe, Germany

At the Museum Koenig in Bonn an exhibition on BIOTA Africa is planned. In this context subproject E02 decided to create a multimedia presentation on the BIOTA E-Africa project. The presentation is offering different routes through the information, both for adults and children. Grown-ups can navigate through a page of information per subproject and in addition the topics capacity building, partners, and geodata are covered. Of these only 'Geodata' is also accessed by children, to whom we also provide 'Xtras' as a playful doorway to biodiversity research in E-African rainforests.

O2.30
Resource competition between termites and dung beetles in the Serengeti National Park, Tanzania

B. P. Freymann, S. N. De Visser, H. Olff
University of Groningen, The Netherlands

While the importance of dung beetles for the decomposition of mammalian dung in tropical ecosystems has been studied in detail, the role of termites in this context has not. We report the results of a field experiment, showing that these two feeding guilds follow behavioral competition avoidance strategies. Given their presumably differentiated functional position in the nutrient cycling dynamics of tropical savannas and their potentially differentiated response to climate factors, we expect global climate change to impact this competitive balance.

O2.31
Species richness of bees visiting crop flowers in the farmlands surrounding Kakamega Forest, Kenya

M. J. Kasina
Centre for Development Research (ZEF), Bonn, Germany

This study was done to determine the influence of Kakamega Forest, Kenya on bee species richness visiting crops in the surrounding farmland. A transect was made in north and south of the forest from the forest edge to 8 km into the farmlands. Observation of bee flower visitors was done for 5600 minutes each at 28 sites in 2005 and 2006. Key results show that carpenter bee (*Xylocopa calens*) was the most abundant solitary bee and was highly influenced ($P < 0.05$) by the distance from the forest. Individual numbers of bees was low in the farmland, indicating reduced flower visitation rate to crops.

O2.32
Nest specificity in the trail pheromone of a stingless bee, *Trigona corvina* (Apidae, Meliponini)

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The stingless bee, *Trigona corvina*, uses labial gland secretion to mark food recruitment scent trails. The trail pheromone was identified to be a mixture of esters, whose relative amounts significantly differed in labial glands from foragers of three different nests. Furthermore, bees followed artificial trails made of their parental nest's labial gland extract, but not trails composed of foreign gland compounds. Our findings demonstrate for the first time a nest specificity in trail pheromones of stingless bees, which probably avoids intraspecific competition for food sources.

O2.33
Diversity and socio-cultural role of termites in the Lama Forest reserve in S-Benin

S. E. Attignon
University of Abomey - Calavi, Benin

Termite diversity in agriculture and forest ecosystems and the socio-cultural role of termites were assessed in the Lama forest reserve in S-Benin.

Termite assemblages were species-poor. Mean species richness was not significantly different in habitats but mean termite encounters was significantly lower in maize field than in the forest habitats. Farmers consider different termites caste and size as species and termite mound appear to have agro-ecological, food, medicinal, and magico-therapeutic use illustrated by proverbs, songs, and tales.

O2.34
Social insects as biological indicators in the tropics: diversity of termites and ants along gradients of land use type in Côte d'Ivoire

S. Konaté
University of Abobo-Adjamé, Côte d'Ivoire

Termites and ants are of high economic and ecological importance in tropical regions and may be ideal indicators for human impact. We studied the diversity of termites and ants across a land use gradient in savannah and forest ecosystems in Côte d'Ivoire with a combined termite/ ant transect protocol. Termite abundance, biomass and species richness are generally reduced when natural ecosystems are disturbed. Some functional termite groups and ant subfamilies showed more sensitivity to disturbance and seemed to be good candidates as biological indicators for biodiversity loss.

This study has been supported by the BMBF in the framework of BIOTA-West.

O2.35
Floral ecology of Madagascan *Impatiens* (Balsaminaceae): a first assessment

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[2]Zoologique de Tsimbazaza, Madagascar
[3]University of Koblenz-Landau, Germany

Madagascar has one of the most exciting floras in the world. The Genus *Impatiens* (Balsaminaceae) is the most species rich angiosperm genus on the island, 230 spp. are recognized (of wich 90 spp. are currently in description). It is thought that pollination ecology is a driving force of radiation and evolution. We present a first critical assessment of hypothetical pollinator diversity on basis of field studies, studied living material and herbarium specimens.

O2.36
Effects of habitat fragmentation and degradation on African ant-following birds

M. Peters
Zoological Research Museum Alexander Koenig, Bonn, Germany

One of the most impressive phenomena encountered in Neotropical and Afrotropical rainforests is the massive swarm-raiding of army ants attended by a community of ant-following birds. While ant-following birds were intensively studied in the American tropics little is known on the ecology of African species and their response to habitat fragmentation and degradation. We analyzed the response of an ant-following bird community to anthropogenic habitat alteration (habitat fragmentation, habitat degradation) in a highland tropical rainforest in Western Kenya. We detected a high diversity of 56 bird species following the swarm-raids of Dorylus (Anomma) army ants (N = 95 observed swarm-raids). Species composition of bird flocks was significantly altered in small habitat fragments and in secondary forest habitat. Mean bird diversity at swarm raids was lower in small than in mid-size and large forest fragments and it was higher in morning hours than at midday or afternoon. Using a quantitative approach we identified five bird species as professional ant-followers. Their probability to be present at ant-following bird flocks and, consequently, the total diversity of professional ant-following birds

decreased with increasing level of habitat fragmentation and degradation. In contrast, the diversity of opportunistic (non-professional) ant-followers at swarm-raids was not affected by habitat fragmentation or degradation but increased with an increasing diversity of professional ant-following birds.

O2.37
Distribution of ultraviolet plumage patches in birds

P. Mullen
Zoological Research Museum Alexander Koenig, Bonn, Germany

968 bird species covering all Avian orders were studied in search of distinctive ultraviolet reflections. The colored plumage regions in particular exhibited high proportions of UV reflections. A significant positive correlation was found between bird orders with species which are believed to possess VS cone types, and orders in which most species had their UV maxima between 380-399 nm. Orders with species which are assumed to have UVS cone types correlated significantly with orders in which most species had their UV maxima between 300-379 nm respectively. My study supports evidence that birds of many more groups may see UV light than have been studied to date.

O2.38
Fluorescence in avian plumage- an underestimated phenomenon

G. Pohland
Zoological Research Museum Alexander Koenig, Bonn, Germany

A diversified analysis involving the distribution of fluorescence in avian plumage revealed that fluorescent plumage occurs notably often in different bird taxa. 181 bird species in 14 families with fluorescent plumage parts have been confirmed. Analysis of a potential dependency of either, light environment or biogeographical region suggest an ecological rather than a phylogenetic cause of fluorescence, even though possible ecological reasons cannot be ascribed to particular context, as yet.

O2.39
The wondrous world of tropical nature: life and work of Maria Sibylla Merian

E. Kalko, Schmidt-Loske (Abstract not received)

KN1.O4
Canopy arthropods in Brazilian Amazonia and the Pantanal

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About 1.75 mio organisms are presently described, of which 20% are synonymous names. About 20% are plant species and about 80% animal species (3/4 of the latter are invertebrates). About 960,000 insect species are known, 50% are beetles - most of them inhabit the tropics, in particular tree canopies. Only 5% of the biomass on earth are consumers, representing about 81% of the total species, whereas 90% of the plant biomass (producers) represents solely 4% of all species described. This makes clear why human activities (e.g., deforestation) and possible climatic changes (resulting in the increase of deserts) will impact tropical animal species on earth dramatically. Each tropical insect (invertebrate, animal) species has a specific function in its habitat, however this is unknown in most cases. The aim of this presentation is to provide insight into the hyperdiversity of arthropods in canopies of Amazonia and the Pantanal and how to discover general patterns, processes, and functions. Another aim is to highlight those scientific studies presently needed to evaluate consequences of external disturbances.

O1.50
Effects of fragmentation of an Afrotropical rainforest on the diversity structure of canopy dwelling arthropods

W. Freund
Zoological Research Museum Alexander Koenig, Bonn, Germany

E-African forests are particularly diverse and endangered but are still little-known ecosystems. Habitat fragmentation, reduction of fragment size, increasing isolation of fragments, and their distance the main forest affect diversity, abundance and the risk of extinction of populations. At five different study sites in Kakamega Forest, the canopy dwelling arthropod fauna of two common tree species was collected, using the insecticide fogging method. The effects of fragmentation and degradation on the diversity structure of arthropods, especially of beetles, were analysed.

O1.51
Canopy arthropods along an altitudinal gradient in E-African forests

T. Wagner
University of Koblenz-Landau, Germany

A review on diversity changes of arthropod assemblages and beetle diversity with altidute in East African forest is given. Data obtained by insectidical tree fogging are available from lowland forests (Semliki Forest, 650 m) to upper montane Podocarpus-forests (Mt Elgon, Mt Kenya, 3000 m). Intensive studies have been carried out in the submontane rainforests of Budongo and Kakamega (1200-1700 m). Arthropod canopy faunas in lowland forests are dominated by ants. Both, ant dominance and beetle diversity strongly decrease with altitude. Ant activity might have strong influcence on the distribution patterns other arthropods.

O1.52
Maintenance of epiphyte diversity in an anthropogenically transformed landscape in the Ecuadorian Andes

N. Köster
University of Bonn, Germany

This study compares vascular epiphyte diversity between a continuous primary cloud forest in the Ecuadorian Andes (Reserva Otonga; 2000 m asl) and isolated remnant trees, primary forest fragments, and secondary forests within surrounding pastures. Epiphyte diversity was highest in the primary reserve followed by forest fragments, and lowest in secondary forests but increased considerably with age of the latter. Isolated trees decreased distinctly in epiphyte diversity with time since isolation and may thus serve for recolonisation of secondary forests only for a short time.

O1.53
Seedling establishment of vascular epiphytes on isolated trees in Andean pastures

F. A. Werner, R. Gradstein
University of Goettingen, Germany

We removed all vascular epiphytes from the trunk bases of c. 100 *Piptocoma discolor* trees growing isolated in pastures and in adjacent forest respectively. After 2 years, reestablishment of epiphytes was significantly reduced on isolated trees concerning abundance, taxon richness, and density. Seedling abundance and taxon density on isolated trees was not correlated with the distance to forest but instead with bryophyte cover. Our results suggest that local declines in vascular epiphyte abundance and richness are chiefly caused by microclimatic deterioration.

O1.54
Breakdown of a keystone resource - a 30-year survey of fig trees on Barro Colorado Island, Panamá

L. Albrecht, E. Kalko
University of Ulm, Germany
Smithsonian Tropical Research Institute, Panama

Figs are keystone resources for many frugivores, as they are fruiting asynchronously year-round. More than 1100 fig trees of 16 species with about 3/4 free-standing figs and the rest stranglers were recorded on the 1564 ha Barro Colorado Island in Panamá. A 30 ha area was censused about every 5 years since 1976. More than three quarter of the fig trees in this area have died naturally of old age during this period. New recruitment is very low and almost only observed for strangler figs. We discuss possible consequences of the break-down of this keystone resource for the associated fauna.

O1.55
Climatic extremes and the element budget of a tropical montane rainforest in Ecuador

J. Boy[1], J. Knuth[1], C. Valarezo[2], W. Wilcke[1]
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[2]Universidad Nacional de Loja, Ecuador

We evaluated possible implications of extreme climate conditions to tropical montane rain forest in S-Ecuador (May 1998-May 2003). "Dry" extremes lead to higher inputs of NO_3 and H (biomass burning) or Ca, Mg, and S (dust transport). "Wet" extremes like storm events caused more than 50% of the total export of nitrogen and metal species from the catchment by forcing lateral flow in the soil organic layer. We conclude that further changes in the global climate are likely to cause a drift of remote, tropical ecosystems to a new, unknown ecological state.

O1.56
Island invaders: the role of introduced mutualists in pollination on Mauritius

C. Kaiser
ETH Zurich, Switzerland

Island ecosystems are particulary vulnerable to the effects of alien species, which can result in disruption of native mutualisms. We compared plant-pollinator communities in a restored and an invaded site on Mauritius. Both communities were dominated by a few introduced super-abundant species, which affected native plant richness and abundance, suggesting habitat restoration may be crucial for maintaining functional ecosystem integrity.

O1.57
The conservation of wild coffee in human-transformed landscapes in Ethiopia

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In the montane rainforests of Ethiopia occur wild populations of *Coffea arabica* that originally formed the basis of current coffee varieties grown worldwide. Yet, due to increasing deforestation, wild coffee populations are under severe threat. An interdisciplinary research project investigates the ecological and socio economic aspects of wild coffee in the south western parts of Ethiopia. Findings point to the urgent need to protect the remaining wild coffee sites. This can be done, however, only in dialogue with all stakeholders, particularly the local communities, who partly depend on wild coffee for their livelihoods. The presentation shows how a research project can bridge the gap between science and conservation as well as development activities.

Abstracts – Poster Presentations


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P01

Amphibian communities in forest islands – a case study from the Côte d'Ivoire

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Studies from the Taï National Park (Côte d'Ivoire) showed that amphibian communities are altered between primary and secondary forest as well as forest fragments. Fragment size was not important, possibly due to the buffering effects of the surrounding forests. However, when these buffers are missing fragment size should be a major factor for amphibian communities. Our study tested this hypothesis in a savanna forest transition zone in central Côte d'Ivoire.

P02

Determinants of geographic range size: a cross-species comparison in SE-Asian sphingid moths

J. Beck
University of Basel, Switzerland

I used range maps for the sphingid moths of SE-Asia and the Malay Archipelago to investigate whether variation in range sizes and inter-island dispersal can be understood on the basis of species traits. I found that range sizes are related to the phylogeny of species, i.e. they have a heritable component. Using multivariate, phylogenetically controlled models to test for independent effects of a number of morphological, life-history- or niche-related parameters, I found that larval diet breadth is the best predictor of range sizes as well as inter-island dispersion, confirming the importance of niche breadth on the geographic ranges of species. A number of other factors are shown to have additional impact on predictions of range size or inter-island dispersal ability.

P03
BIOTA West in the third project phase: products and exit strategies for the African partners

M. Boutros
University of Wuerzburg, Germany

Scientific projects with an applied aspect working in developing countries are faced with the problem of maintaining the built up capacities after the end of funding. To mitigate this problem the third phase of BIOTA West will focus on the development of different products in close co-operation with stakeholders at all levels (e.g., universities, GOs, and NGOs). This includes inter alia thematic maps on different aspects (e.g., species distribution and diversity patterns), zoological and botanical collections, and databases, but also the establishment of a network of locally protected areas and methods for soil restoration.

Study supported by the BMBF in the framework of BIOTA West.

P04
The nine zonobiomes of the globe

S.-W. Breckle
University of Bielefeld, Germany

The main climatic zones are the reason for distinct vegetation and ecosystems, which can be classified in 9 zonobiomes, according to zonal climates. It is shown that these 9 zonobiomes exhibit typical climate (characterized by climate diagramms), typical vegetation types and ecosystems, and typical soils. Seasonality of precipitation and temperature regime is governing this worldwide typification of zonobiomes. Nutrient balance, salt budget, and soil dynamics follow the moisture availability in the zonal ecosystems.

P05

Large scale study of cacao agroecosystems in central Sulawesi – linking biodiversity, ecosystem processes, and productivity

Y. Clough
University of Goettingen, Germany

Cacao cultivation has a huge impact on livelihoods and landscapes at the margins of the Lore Lindu NP, Sulawesi, Indonesia. Currently, production is being intensified, with an increase in pesticide and fertiliser use, and a reduction of shade tree cover. At the same time pest and disease pressure strongly reduces yields. We study how management practices affect the components of the cacao ecosystem, with direct and indirect effects on productivity-determining factors and biodiversity, with a large scale survey of cacao agroecosystems supplemented by manipulative experiments.

P06

Biodiversity consequences of human-induced alteration of food web structure in tropical savannas: ideas and prospects

S. De Visser
University of Groningen, The Netherlands

The consequences of human-induced disturbances on the structure and complexity of an aboveground savanna food web are predicted to have species-specific and body size-specific effects. By combining theoretical with observational methods from the field an integrated view of human changes on wildlife will be generated. Serengeti National Park and surrounding areas (Tanzania, Kenya) with its diverse wildlife and land-use tenures gives the opportunity to conduct a natural experiment studying the historically increasing effect of human settlement on a natural food web structure.

P07
Seed dispersal of shea trees and their conservation in N-Benin, W-Africa

B. A. Djossa, J. Fahr, E. Kalko, B. Sinsin
University of Ulm, Germany

Many tropical plants depend on seed-dispersing animals for their natural regeneration. In the Pendjari Region, fruits of shea trees (*Vitellaria paradoxa*) constitute a keystone resource for flying foxes (Chiroptera: Pteropodidae), the latter altering seed shadow and increasing germination success of the former. Our study revealed that seed dispersal is crucial for the long-term maintenance of this socio-economically important plant species, which is not yet cultivated by local populations.

P08
Biodiversity degradation in fragmented rainforests of Côte d'Ivoire

S. Dugay, W. Küper, J. H. Sommer, W. Barthlott, G. Menz
University of Bonn, Germany

The biodiversity degradation in Côte d'Ivoire was quantified on the basis of individual plant species by integrating information from natural history collections and remote sensing. The potential distribution ranges of 55 species restricted to primary rainforests were mapped applying the MAXENT modeling technique on the basis of climate data. The habitat fragmentation was assessed using landscape metrics as patch area, shape and contrast using the program FRAGSTATS v.3.3. 12% of the potential habitat of all studied species in the Côte d'Ivoire is still intact, whereas 79% are heavily fragmented. Under the common assumption that the degradation of distribution areas affects the probability of occurrence of species, the degradation-integrated species richness map suggests that we can expect a drastic decrease of the species number in south Côte d'Ivoire.

P09
The Zambian Biodiversity Project

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The Zambian Biodiversity Project of the ZFMK operates under the umbrella of "Luangwa Wilderness e.V." in the Luangwa-Valley in E-Zambia. It aims are to establish biodiversity research including systematics and molecular methods as a basis for nature conservation issues. Two monitor projects on cats – Serval (*Leptailurus serval*) and leopard (*Panthera pardus*) in Luambe National Park – are the starting point for a long term monitoring of vertebrates in the Luangwa valley.

P10
Monkeys, dung beetles, and soil seed bank structuring

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Laboratoire d'Ecologie Générale, Brunoy, France

Howler monkeys (*Alouatta seniculus*) are the dominant frugivorous primate living in the rainforest at the Nouragues research station (French Guiana). Their social groups defecate mainly in clump pattern creating an accumulation of dung and dispersed seeds. Faeces are strongly attractive to invertebrate fauna, in particular dung beetles which bury the dung into the soil, thus dispersing secondarily the seeds previously ingested by howler monkeys. We studied the impact of faeces accumulation under sleeping sites, combined with dung beetle activity on composition and structure of the soil seed bank. Soil samples up to a depth of 6 cm were analysed for small seeds (up to 5 mm) on defecation sites and control sites. Globally seed abundance was greater in defecation sites than in control sites but high differences were recorded between sites most likely related to the frequency of use of sleeping sites by monkeys. No difference was detected according to seed species richness. Experiments using glass beads of different sizes imbedded in fresh faeces were conducted in the field. Among the 74% of beads retrieved into the soil up to 10 cm depth after one week, averages of 69% were in the 0-2 cm layer. Bead size had no effect on burying depth and horizontal dispersal at short range was negligible. In the most frequently used defecation sites, the seed bank is enriched and dung beetle burying and rolling activity may change the vertical distribution of small seeds dispersed by monkeys or already present in the soil.

Thus howler monkeys modify the regeneration niche of some woody plants species and create a spatial heterogeneity in their dissemination area. Moreover, by locally stimulating dung beetle activity they enhance the turn over of the seed bank.

P11

The aquatic biodiversity research project on the Philippine Island of Palawan (AQUA Palawana)

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The poster aims to introduce the AQUA Palawana Project to the audience. This joint initiative of the Western Philippines University and the International Research Institute of Entomology at the Museum of Natural History Vienna provides instruments for the research into and the protection of the aquatic biodiversity of the island. The region focused belongs to one of the world's biodiversity hotspots and represents a corridor connecting Borneo and the E-Philippines. Strategies of the project are presented. Its results obtained so far, which include taxonomic works in Hydraenidae, Elmidae, Psephenidae, Dytiscidae (Coleoptera), and Parathelphusidae (Decapoda) illustrate the large part of endemic taxa in key habitats.

P12
Are isolated remnant trees on young pastures effective refuges of epiphyte diversity?

K. Friedrich, N. Köster, J. Nieder, W. Barthlott
University of Bonn, Germany

Epiphytes are threatened by the destruction of tropical forests as a result of increasing human land use. Our study provides a comparison of the epiphytic vegetation on primary forest trees and isolated remnant trees in a montane rainforest area in northern Ecuador. Twenty-five forest trees and 27 isolated trees hosted 279 epiphyte species of 25 families and 74 genera. Isolated trees had only 30 % less epiphytic species than trees in the primary forest. However, diversity decreased with increasing isolation of the remnant trees. Therefore it seems that isolated trees are less effective in the conservation of the epiphyte flora of tropical forest areas affected by agriculture than forest fragments.

P13
Participatory land use planning for conservation of biodiversity

K. Gaesing, W. Kenea
University of Dortmund, Germany

Poor households reduce their expenditures and earn their living by using 'free' resources from the forest. In Kakamega Forest in Kenya, this has led to a devastating destruction of biodiversity. Such a situation requires not only solutions on the individual farmer's side, but also collective action within the communities living close to the forest, the formulation and implementation of appropriate policies to protect biodiversity and competent actors with the possibility to embark on concerted action. Participatory land use planning has proved to be a method that can provide a platform for discussion of problems, solutions and different options. It can bring different stakeholders together for planning and implementation and it has the possibility to implement identified solutions, if government, administration and NGO/CBO are properly involved in the process. The poster explains the method of Participatory Land Use Planning, its usefulness with regard to the conservation of biodiversity as well as the link between participatory research and policy formulation.

P14
Ethno-ecology of hurricanes: an urgent invitation to do research

E. I. Garrido-Pérez
University of Goettingen, Germany

In the last three millennia lowland Mayans of Mexico learned to survive in a world without dramatic climate changes. Examples? Small crops harvested before the hurricane season, use of the forest by small-scale selective logging and non-timber products extraction, fishing, and other activities made according to seasonality. But now, due to global climate change, hurricanes are stronger and perhaps more frequent and other weather changes occur. What cultural adaptations will the Mayans develop? How can Ecologist help them? More multidisciplinary studies still need to be done.

P15
Influence of altitude and anthropogenic alteration on amphibians – insights from Mt Manengouba, Cameroon

N. L. Gonwouo, M.-O. Rödel
University of Wuerzburg, Germany

Cameroon has a very diverse amphibian fauna with around 200 known species. Nearly two third of all species are on the IUCN red list and more than 50% of them occur at Mount Manengouba. One of the most important threats is habitat degradation. The aim of this study is to describe the amphibian communities along an altitudinal gradient from 800 m asl to the peak, to identify sensitive areas and give direct conservation recommendations for this area, which is under heavy human pressure.

P16

Biodiversity, foraging behavior, and pollination efficiency of flower visitors at *Aechmea nudicaulis* in secondary forest and restinga, Santa Catarina, S-Brazil

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[1]University of Tuebingen, Germany
[2]Federal University of Santa Catarina, Florianópolis, Brazil

Among bromeliads, ornithophily is a widespread floral syndrome. However, insects can also be observed on their flowers. In this study, flowers of *Aechmea nudicaulis* were observed, recording all flower visitors and their behavior. Also experiments of pollinator efficiency with bagged flowers were made. About 29 taxa of flower visitors were found; more than 36% were insects. Although the ornithophilous syndrome suggests hummingbirds as the main pollinator, the flowers of this bromeliad attract a huge variety of insects and bees may also effectively pollinate them.

P17

Influence of age & stress on the rooting potential of hard-to-root native tree species for reforestation projects in the S-Ecuador

S. Gross
University of Bayreuth, Germany

Vegetative propagation can fill the big demand for treelets of high quality for reforestation projects in the tropics. We encountered difficulties to propagate 6 Ecuadorian tree species by stem cuttings & air-layers from old trees whereas young stock plants that endured stressful pre-treatments showed good rooting. We will correlate our observations with the contents of carbohydrates and phytohormones and will make recommendations for appropriate stock plant production of native tree species.

P18
Altitudinal zonation and diversity patterns of the forests of Mt Kilimanjaro

A. Hemp (Abstract not received)
University of Bayreuth, Germany

P19
Climate change and its impact on the cloud forests of Mt Kilimanjaro

A. Hemp (Abstract not received)
University of Bayreuth, Germany

P20
Diversity and refuge function for indigenous flora and fauna of the Chagga home gardens on Mt Kilimanjaro

C. Hemp (Abstract not received)
University of Bayreuth, Germany

P21
Recovery of litter-dwelling beetle communities during secondary succession in the Atlantic Forest of S-Brazil

P. Hopp
RWTH Aachen, Germany

The development of litter-dwelling beetle assemblages during secondary succession in the Atlantic forest of S-Brazil was investigated using a chronosequence approach. Secondary forests (4-6 yrs, 12-15 yrs, 35-55 yrs) were compared with "old-growth" forests (>100 yrs) regarding abundance, species richness, body size distribution and assemblage structure of carabid, curculionid and tenebrionid beetles. The study aims to evaluate the importance of secondary forests for conservation of the diversity in the region.

P22
Mammal remains from a prehispanic site in NE-Bolivia suggest faunal stasis

R. Hutterer, M. Mannert
Zoological Research Museum Alexander Koenig, Bonn, Germany

We identified and analyzed 1,500 remains of mammals (of a total of 20,000 fragments) from a prehispanic settlement hill called "Loma Mendoza" (departamento Beni, NE-Bolivia), left by an unknown culture about 1,000 years ago. 21 species of mammals were used by the indigenous population as a resource of food, ornament, or tool. Large rodents were most numerous (41.7%), with *Myocastor coypus* as the dominant species. Next in frequency were artiodactyls (23.7%), whereas didelphids (10.1%), xenarthrans (8.6%), carnivores (7.9%), and primates (1.4%) were represented by lower numbers. All species of mammals still occur in the same area today, suggesting a faunal stasis in the Beni Savanna of central Bolivia.

P23
The governance of biodiversity: the case of Kakamega Forest in W-Kenya

J. Kariuki
University of Dortmund, Germany

Reasons for the destruction of Kakamega Forest in W-Kenya are the shortcomings of the policy framework regarding biodiversity and its lack of implementation. The challenge lies in harmonising the institutional network for a better protection of biodiversity, i.e., to strive for a better definition of actors' roles, to give hints as to strengthen the implementation of policies, to avoid duplication of efforts and to make policies and strategies more practical and bring them closer to the concerned people.

P24
Importance of pollinators for our world food crops

B. Vaissière, J. Cane, I. Steffan-Dewenter, S. Cunninhgam,
C. Kremen, T. Tscharntke, Y. Clough, A.-M. Klein
University of Goettingen, Germany

In a world of declining biodiversity, the production of many crops nourishing humanity suffers because of their dependence on effective pollinators. Data from 200 countries were analyzed to show that most crops (87 out of 115) depend upon animal pollination comprising 35% production, although most staple crops are independent comprising 60%. Pollinators are essential for 13 crops directly consumed by humans, while for the majority production increases between 5 to 90%. Local and landscape-wide management is necessary to conserve a diversity of natural pollinators sustaining crop diversity and production.

P25
Population structure of two SE-Asian pioneer tree species: *Macaranga hypoleuca* and *Macaranga beccariana* (Euphorbiaceae)

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[1]University of Kassel, Germany
[2]University of Wuerzburg, Germany

Pioneer trees play a crucial role for the regeneration of the rainforest. Based on nuclear and chloroplast microsatellite markers, we assess the genetic diversity and population structure of the dioecious pioneer species *Macaranga hypoleuca* and *M. beccariana* on Borneo. First results point to moderate to high levels of genetic diversity within populations but relatively low differentiation among populations. We observed a weak "isolation-by-distance." Preliminary chloroplast data indicate a strong regional differentiation between the northern and eastern parts of Borneo.

P26
Continuous high resolution dendrometry as a tool for quantifying vine and tree transpiration

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Variation in stem diameter has been continuously measured by high resolution dendrometry in trees and lianas in stands along an altitudinal gradient from 1920-2125m a.s.l. of a tropical montane forest in Southern Ecuador. Simultaneously, sap flow rates were measured. Daily sap flow rates and daily changes of stem diameter in all measured individuals show highly significant linear correlations (R2 = 0.7-0.8). Therefore, transpiration can be estimated from stem dendrometry data.

P27
Beta diversity of epiphyte communities in a montane moist forest of S-Ecuador

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National University of Piura, Peru

We compared patterns of diversity and floristic composition of ridge and ravine forest in a montane moist forest of S-Ecuador. Species density and species richness were greater in ravine forest than in ridge forest, while evenness was lower. Floristic composition differed significantly between forest types and was closely correlated with light and humidity. Our results suggest that heterogeneity of stand structure and mesoclimate considerably increase local niche availability and epiphyte diversity.

P28
Leaf-litter ant communities in two types of rainforests in Borneo, Sarawak/Malaysia

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Few studies have compared the ant fauna of different tropical forest types. In Gunung Mulu National Park (Sarawak/Malaysia) we compared ant communities of leaf-litter and soil in alluvial and limestone forest with Winkler bags and Barber traps to assess the impact of different soil and vegetation types. Species richness and diversity was low in alluvial forest and much higher in limestone forest. Regularly floods in alluvial forest seem to allow only existence of well adapted species, while limestone forests have a well drained topsoil layer that offers better conditions for ants.

P29
The Sulawesi throughfall displacement experiment – ecosystem and economic response to ENSO droughts in rainforests and agroforests

G. Moser
University of Goettingen, Germany

Most droughts in the SE-Asian rainforest region are related to the El Nino southern Oscillation (ENSO) phenomenon. Knowledge whether and how these ecosystems are adapted to severe droughts is limited. An approach of building throughfall displacement roofs in natural forest and agroforest in Sulawesi, Indonesia, was chosen to simulate and study the drought effects on ecosystem functioning. The ecosystem water and nutrient balance, the activity of soil organisms, plant animal interaction, and the ecophysiological responses of plants will be studied during simulated drought periods.

P30

Diversity of vascular epiphytes in natural and intervened habitats at Yanayacu Biological Station, E-Ecuador

A. Muñoz Barriga
Catholic University, Quito, Ecuador

The results of a study concerning diversity of vascular epiphytes in the Yanayacu Biological Station (2000 m asl) in the eastern foothills of the Ecuadorian Andes are presented. The plots were carried out at sites showing two opposite levels of anthropogenic influence: trees located in the protected forest and isolated remnant trees embedded in nearby pasture. Additionally the impact of local topography (sites were located either in ridge, slope or valley) was studied.

P31

The potential of Near Infra-Red Spectroscopy (NIRS) as a rapid tool to quantify spatial variability of forest soils

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[3]University of Duisburg-Essen, Germany

Information of spatial variability of soils is important for developing site-specific management strategies. Quantification of spatial variability of soils is limited due to the intense sampling and laborious and expensive analyses required. NIRS could be a potential alternative for quantifying spatial variability since it requires minimal sample preparation; it's fast and cost effective. This study showed that NIRS could be used to quantify spatial variability of forest soils due to its qualitative and quantitative capabilities. The results will be presented.

P32
Savanna amphibians along a disturbance gradient – first results from the Pendjari region, Benin

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[2]University of Wuerzburg, Germany

Conservation efforts are often directed towards forests and their diversity. However, other ecosystems such as savannas are often under even more pressure. We investigated anthropogenic disturbance in N-Benin. Amphibians were used as model systems in order to assess whether suitable indicator species can be found. In theory this group should be suitable due to their lifestyles, e.g., using terrestrial and aquatic habitats. In practice, tadpoles of a few genera proved to be useful.

P33
Banana *Xanthomonas* Wilt disease in Uganda: the possible role of stingless bees in the spread of *Xanthomonas campestris* pv. *musacearum* (*Xcm*)

F. N. Namu, D. Wittmann
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Banana *Xanthomonas* Wilt caused by *Xcm* emerged and spread in Uganda in year 2001. *Xcm* is speculated to occur in sap, ooze and nectar of bananas and spread by stingless bees. We tested if stingless bees collected sap, ooze and nectar from bananas. The nectar had 11 % sugar concentration. We found that stingless bees collected only nectar from bananas. The bees can spread *Xcm* up to 1054 m, the maximum flight distance to 11 % nectar sugar.

P34

Banana *Xanthomonas* Wilt in Uganda: How far can stingless bees spread *Xanthomonas campestris musaceaurum* (*Xcm*)

F.N. Namu, D. Wittmann
University of Bonn, Germany

Xanthomanas campestris musacearum (*Xcm*) causing banana *Xanthomonas* wilt in Uganda is rapidly spreading in banana farms. Stingless bees are thought to spread *Xcm* through nectar. Bananas nectar has low sugar concentration, our banana had 11%. Stingless bees mostly benefit from nectar sugar of 45-60%. We determined the maximum foraging distance the bees collected 11, 33, 48, and 54% sugar solutions and the duration of the foraging trip. Result showed that the bees flew up to 1050 m to collect 11% and 1200 m to collect 48%. The bees took 400 s to and from 1200 m.

P35

Tree regeneration in canopy gaps in a montane rainforest in S-Ecuador

L. Nauheimer
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I investigated the tree regeneration in canopy gaps in montane rainforest in S-Ecuador and its differences between trees in two habitats, at the ridge and in the ravine, and also its dependencies to environmental factors. Therefore the growth of more than 2000 juvenile trees has been measured for three years. The plants were specified and the temperature, air humidity, and the canopy-openness got measured. The growth is correlated to the available light and the two habitats show significantly differences in forest structure, regeneration, environmental factors, and composition.

P36

Regeneration requirements of tropical tree species under aspects of heterogeneity and reforestation

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In situ and *ex situ* conservation of indigenous tree species in Kenya is of major concern due to on-going high deforestation rates. Some species such as the mahogany are highly threatened and there is a great need to conserve them. Little information exists on regeneration dynamics of tropical trees. A study was conducted to assess the role of spatial heterogeneity of abiotic factors in regeneration of 5 common and endangered tropical tree species in Kakamega Forest, Kenya. Intra- and inter-competition between the species was also assessed. Results of this study will be presented.

P37

The worldwide distribution of *Eichhornia* - what makes the invasive *Eichhornia crassipes* so aggressive? A molecular approach

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[2]University of Hamburg, Germany

Eichhornia crassipes is among the world's worst invaders. Its native range is the Amazon basin, but nowadays it is introduced to more than 50 countries on five continents. The proliferation of water hyacinth is determined largely by nutrient supply and the absence of natural enemies. In the present study, we analyze the genetic structure and diversity of populations collected in S-America, Asia, and Africa. Molecular analyses were carried out using AFLP from 187 individuals representing 13 populations. Genetic distance trees show several independent introductions worldwide.

P38
Simulating the effects of decreasing fragment size on function and diversity of tree groups in tropical rainforests

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We apply the individual-based simulation model FORMIND to investigate the effect of decreasing fragment size on function and diversity of tree functional groups in tropical rainforests, showing an example from the Brazilian Atlantic rainforest performed within the Brazilian-German MATA ATLANTICA-project. Main aim of this contribution is to estimate minimum fragment sizes for maintaining remnant biodiversity and to investigate the prerequisites for potential regeneration of the highly fragmented and disturbed Atlantic rainforest.

P39
Prey composition and inhabitants of *Nepenthes madagascariensis*

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[2]University of Koblenz-Landau, Germany

Nepenthes madagascariensis is a carnivorous plant endemic to Madagascar which captures its prey in pitcher-like leaves. Contents of 642 pitchers were collected *in situ* in two different sites. They contained approximate 49,000 prey individuals from 21 orders. Herewith prey composition of *N. madagascariensis* could be adequately characterised for the first time.

Furthermore numerous arthropods were observed which use the pitchers as a temporal habitat. Inhabitants from 13 families and four orders could be observed. A crab spider species of the genus *Synaema* (Thomisidae) which lives at the slippery inner surface of the pitchers was observed in detail. If threatened it is able to drop into the digesting liquid for several minutes. This study presents an overview about the complex relationships between *N. madagascariensis* and different types of arthropods.

P40

Understanding the ecological impact of climate: observation, measurement, and modeling

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The influence of spatial and temporal variability of climate is difficult to assess in remote areas of tropical montane forest. To improve this, we have developed a combined approach using conventional measurements, remote sensing and modeling techniques, to obtain the whole picture of climatic variability in the valley of Rio San Francisco in the Andes of S-Ecuador. The new methods will be based on our long experience with station data (8 years), radar and satellite observation of precipitation and clouds (5 years). The modeling approach will make use of nested numerical models like MM5 for regional climate modeling and the SVAT (soil-vegetation-atmosphere-transfer) CLM (community land model). The MM5 will supply atmospheric fields of important climate variables, while the CLM simulates local climate and the interaction of the vegetation cover, soil and atmosphere, by applying the concept of plant functional types and delineating several land use classes. The MM5 will work in three domains: The largest covering all of Ecuador at a resolution of 27 km per pixel and driven by global reanalysis data available from NCEP/NCAR. The South of Ecuador is simulated at a resolution of 9km and the immediate surroundings of the research area (120x120 km) will be scaled down to 3 km resolution. To enable the downscaling to the watershed scale of the CLM, a combination of station and remote sensing data will be utilized with methods of non-linear interpolation and sub-models for certain variables. The final domain will cover the whole watershed of the Rio San Francisco (12x15 km) at a resolution of 30 m, supplying data on precipitation, temperature, radiation, evapotranspiration, soil temperature, and wind. This will improve the capability to understand the observed ecological processes and phenomena in the Reserva Biológica San Francisco considerably and will be a valuable tool for the new DFG-research unit FOR816 for the next three years.

P41

Brazilian-German research on sustainability in fragments of Atlantic rainforest in NE-Brazil: results of the first phase and outline of future studies

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Since 2003, structural modifications of rainforest edges and reproductive biology of tree species have been studied in rainforest patches in the NE-Brazilian state of Pernambuco. The cooperation between the Brazilian (UFRPE-Federal Rural University of Pernambuco) and the German (University of Ulm) crew is embedded in the binational program "Science and technology for the Atlantic rainforest" funded by BMBF and CNPq. Results of the first project phase are presented and an outline of the studies of the second project phase is given.

P42

Species richness of ants visiting bromeliad inflorescences

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We investigated the number of ant species associated with extrafloral-nectary bearing inflorescences of the bromeliad species *Aechmea lindenii* and *A. nudicaulis*. Species accumulation curves were compared according to bromeliad species and habitat type, and performance of three nonparametric species richness estimators was tested. The estimated total number of associated ant species ranged from 10-13 in *A. nudicaulis*, secondary forest, to 48-54 in *A. lindenii*, secondary forest. Our results indicate that the inventory of 39 species in *A. lindenii*, secondary forest, is not far from completion.

P43

Cichlids from the lower Congo River: a potential model system in the study of speciation processes

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P44

Cavendishioid mycorrhiza – a new mycorrhizal type occurring on Neotropical blueberries belonging to the Andean clade of Ericaceae

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Ericaceae are associated with symbiotic root fungi forming several mycorrhizal types. Our investigation in S-Ecuador revealed a further mycorrhizal type, which we termed 'cavendishioid mycorrhiza'. This association occurs only on species belonging to Andean clade Ericaceae (Vaccinioideae), while other ericads from the same area are ericoid mycorrhizal. Our ongoing investigations shall shed more light on the evolution of this special mycorrhiza, investigating the phylogeny and biogeography of the associated fungi.

P45

Mycorrhizae of epiphytic orchids in a tropical mountain rainforest of S-Ecuador harbor diverse Tulanellales and Sebacinales distinct of the known orchid symbionts

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[2]University of Tuebingen, Germany

Investigation of epiphytic orchids in the tropical mountain rainforest of S-Ecuador revealed typical orchid mycorrhizas. Ultrastructure of the associated fungi showed members of the Tulasnellales and Sebacinales, but molecular phylogeny revealed individual members of these two fungal groups as new to science und distinct from so far know terrestrial fungi. Current further studies will reveal vertical and horizontal transfer potential of the mycobionts including terrestrial orchids to evaluate the regeneration potential of the orchids as dependent on the mycobionts.

P46

Influence of spatial distribution of host plants (Euphorbiaceae: *Macaranga*) on the population structure of obligate plant ants (Hymenoptera: *Crematogaster*)

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University of Wuerzburg, Germany

Diversification in *Crematogaster* ants may either be driven by adaptation towards different *Macaranga* hosts or by spatial distribution of their hosts. After anthropogenic disturbance these pioneer trees increase in abundance but usually are patchily distributed in primary forest gaps. Dispersal abilities of ant queens were assessed by population genetic methods to infer importance of spatial distribution of hosts. Relatedness of founding queens collected from seedlings from forest gaps was compared to potential mother colonies to infer origin and distance traveled.

P47

Patterns of environmental factors and diversity of Chironomidae (Diptera) from lakes on the Yucatán peninsula, Guatemala, Belize, Mexico

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The number of studies that focus on the diversity of lake Chironomids and its underlying factors are scarce for the tropical and subtropical lowlands of the new world. This fact contrasts with the importance of this dipteran family in the trophic chain of all inland waters, further its high taxonomical and autecological diversity and its significance as proxies for environmental gradients along spatial and temporal scales. In this ongoing study, 18 lakes of Yucatán were investigated so far, distributed on the SW-NE precipitation/drought gradient on the peninsula and belonging to various ecological types. Chironomids were determined on the basis of larval head capsules extracted from superficial sediments of the lake bottom. An adequate level of taxonomic resolution was attained by the use of metric analysis and a digital image data bank. (1) To date approx. 65 morpho-species belonging to 29 genera were recorded and described. (2) Analysis of the results against data from other studies showed that the chironomid fauna of Yucatán can be understood as a Circum-Carribean element, sharing most genera with the northern coast of Colombia, less with Florida and the Mississipi basin, and least with the close by Central American highlands and Cordillera. (3) The compositon of chironomid communities of the lakes is strongly determined by the variation of lake water salinity in lakes situated close to the coastal line. Other important factors are the trophic state of the lakes due to basin morphometry and anthropogenic alterations of the littoral belt owing to land use. (4) However, the challenge of this study is to assess the importance of the precipitation/drought gradient (and its subordinate small scale effects) as a possible determinant for the occurrence of chironomid taxa against the aforesaid dominant environmental factors.

P48

Reproduction of selected Clusia species on the Nouragues inselberg in French Guiana

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University of Prague, Czech Republic

The pollination, seed dispersal, and seedling survival were studied for two dioecious *Clusia* species that dominate the shrub vegetation of the Nouragues inselberg in French Guiana. *Clusia* spp. (sect. Oedematopus) flowers during the night and is pollinated by cockroaches. Its odor is dominated by acetoin, a compound that rarely appears in flower scents. Other aspects of the pollination process are discussed. *Clusia nemorosa* [G. Mey.] produces resins to attract bees. However, evidence suggests that pollen-collecting bees are by far the most effective pollinators because they frequently visit female flowers by mistake. Primary dispersal of both species is provided by the same bird species. The pattern of seed distribution differs due to different handling of the seeds. This pattern is further changed by ants, the secondary dispersers. There exit differences in germination and seedling survival in different environments on the inselberg. Their effect on the succession process on the inselberg is discussed.

P49

Comparative diversity and community structure in Indonesian forest understory bird assemblages

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There is little information on the comparative structure of rainforest bird communities across biogeographical regions. Using a standardized mist-netting method, we assessed understorey bird communities at four Indonesian locations (W-Papua, Sulawesi, Borneo, and Siberut/off W-Sumatra). The information presented allows developing thorough hypotheses on the mechanisms which structure species-rich tropical vertebrate communities. The method used could be seen as a possibility to monitor tropical forest bird communities on a long term basis.

P50
Impact of overgrazing: behavioral responses of the lizard *Pedioplanis l. lineoocellata*

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We studied the foraging behavior of the lizard *Pedioplanis l. lineoocellata* along a grazing gradient from not overgrazed to shrub encroached to determine the effects of habitat degradation on this species. We found that the lizard did shift its foraging behavior in response to habitat degradation. As a result of lower prey density on degraded habitats *P. lineoocellata* was forced to cover larger areas and to spend more time to search for prey during forays to obtain sufficient amounts of food. Based on these results we can state that overgrazing has a negative impact on *P. lineoocellata*.

P51
Seed consumption by tropical small mammals from Borneo

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Seed dispersal in tropical forests is facilitated by a diverse array of frugivorous animals. We examined seed contents in more than 500 faecal samples of small mammals from Bornean logged and unlogged rainforests. Seeds were found in c. 20% of samples gathered from rats and squirrels (six species) and c. 15% of samples from tree shrews (three species). Beside for fig seeds, seed identification was not possible, indicating a gap in our knowledge of Asian forests. This needs to be filled for investigating further the vital role of small mammals as seed dispersers and forest regenerators.

P52
Role of tent building ant *Phyllidris sp.* a vector of Black Pod Disease of cocoa caused by *Phytophtora palmivora* in central Sulawesi, Indonesia

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This study took place in a cocoa plantation highly dominated by a single tent building ant species of the *Phyllidris genus*, which excludes nearly all other ants. The presence of nests as well as the abundance of these ants was positively correlated to infection with the Black Pod Disease (BPD) caused by *Phytophtora palmivora*. In a baiting experiment sane immature cocoa pods were inoculated a) with dead *Phyllidris* ants and b) with their tent material. In both cases after six days the pods showed the typical lesions. Tent building ants like *Phyllidris* are thus able to serve as vector of BPD in cocoa.

P53
Biodiversity of beetles associated with tank bromeliads in S-Brazil

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Abundance and species richness of beetles associated with tank bromeliads were studied in secondary and primary Atlantic rain forest in S-Brazil. Beetles of 20 families were collected in terrestrial and epiphytic bromeliads. Aquatic Scirtidae, Dytiscidae and Hydrophilidae occurred in high abundance but low richness. Among terrestrial beetles, species of Staphylinidae, Scarabaeidae and Curculionidae were recorded in high numbers. The specificity of the association with bromeliad species and habitat type of dytiscid, hydrophilid and scarabaeid beetles is discussed.

Late Submissions

P54
Biogeography of Odonata in SE Madagascar

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We inventoried Anisoptera and Zygoptera species in SE Madagascar at the beginning of the rainy season. The area consists of a mosaic of different ecosystems along a general gradient of rainfall and vegetation formations ranging from evergreen humid to spiny forest within a few kilometres. Within this region we investigated two littoral forests, three humid forests, one transitional forest and deforested cultural landscapes. The species were collected and observed at different reproduction habitats like streams, ponds, swamps and rice paddies. We took samples at each locality at least for one day with sunshine. Further collecting for several days at the same locality did not result in more Odonata species at most sites. In total we found more than 50 Odonata species in the region. We discovered at least two new species, one in the littoral forests and the other in the low mountain forest. Species assemblages in deforested areas around littoral and mountain forests were similar but differed from degraded areas in the transitional and dry forest. Species turnovers between the three different forest types are high and indicate that the assemblage of Odonata in the forests is typical for the different habitats. In the degraded landscape between littoral forest fragments no forest-dwelling species were found, and especially for the Zygoptera with poor dispersal potential, forest fragmentation leads to isolated populations.

P55

Bridging the past and the future- phytogeographic research in Eastern Arc Mountains, Tanzania

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The Eastern Arc Mountains in Kenya and Tanzania support a high density of endemic species. Origins of this striking biodiversity are subject of much debate. A research initiative bridging palaeoecology, phylogeography, and modelling disciplines will determine what patterns of floristic diversity are at different ecological levels, and what the controlling factors on thisare. Key methodological challenges include heterogeneous sampling and data incompatibility; for example one conclusion so far is how strong levels of endemism are correlated with collecting intensity.

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