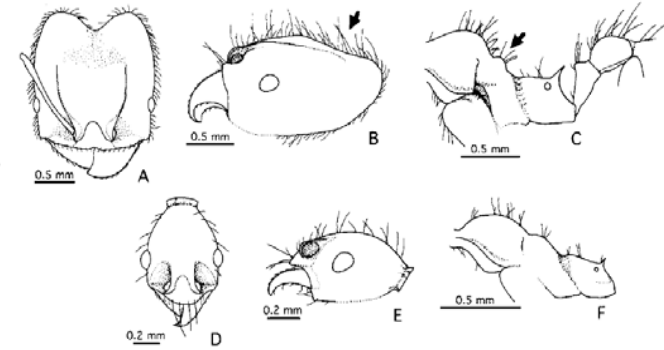


Ants in the 'Heart of Borneo' – a unique possibility to join taxonomy, ecology and conservation

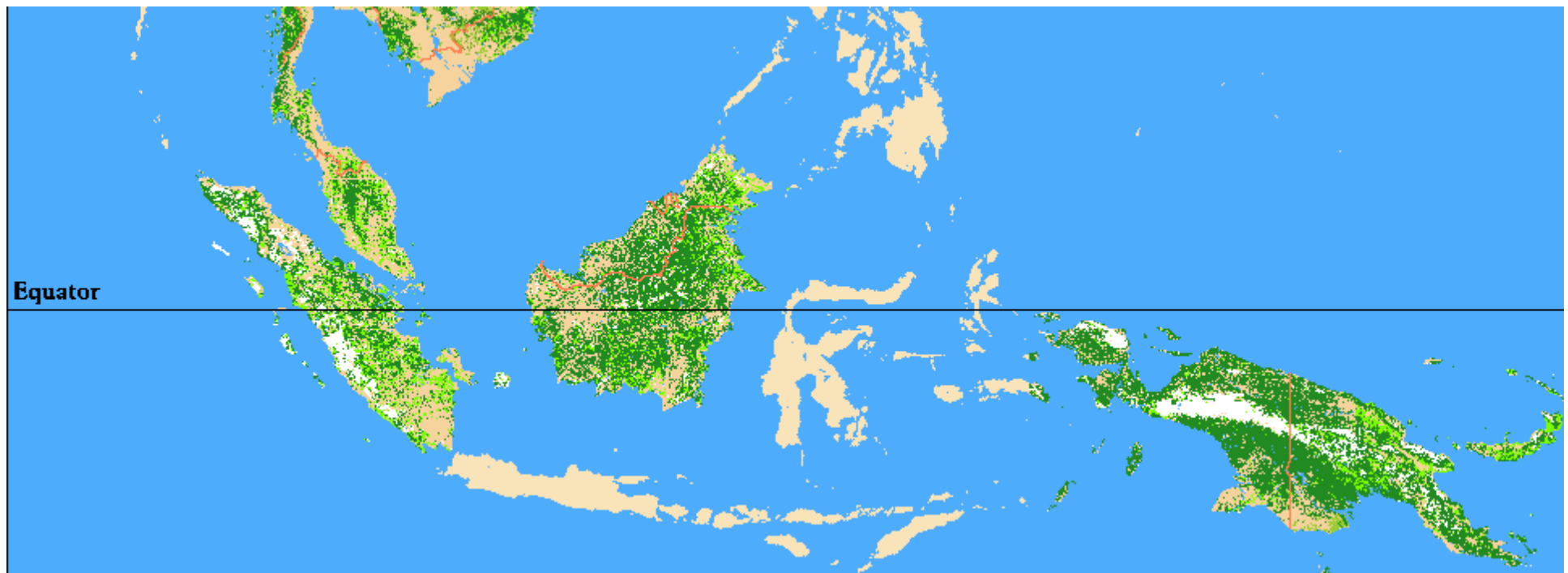
Carsten Brühl, University Landau, Germany





Borneo

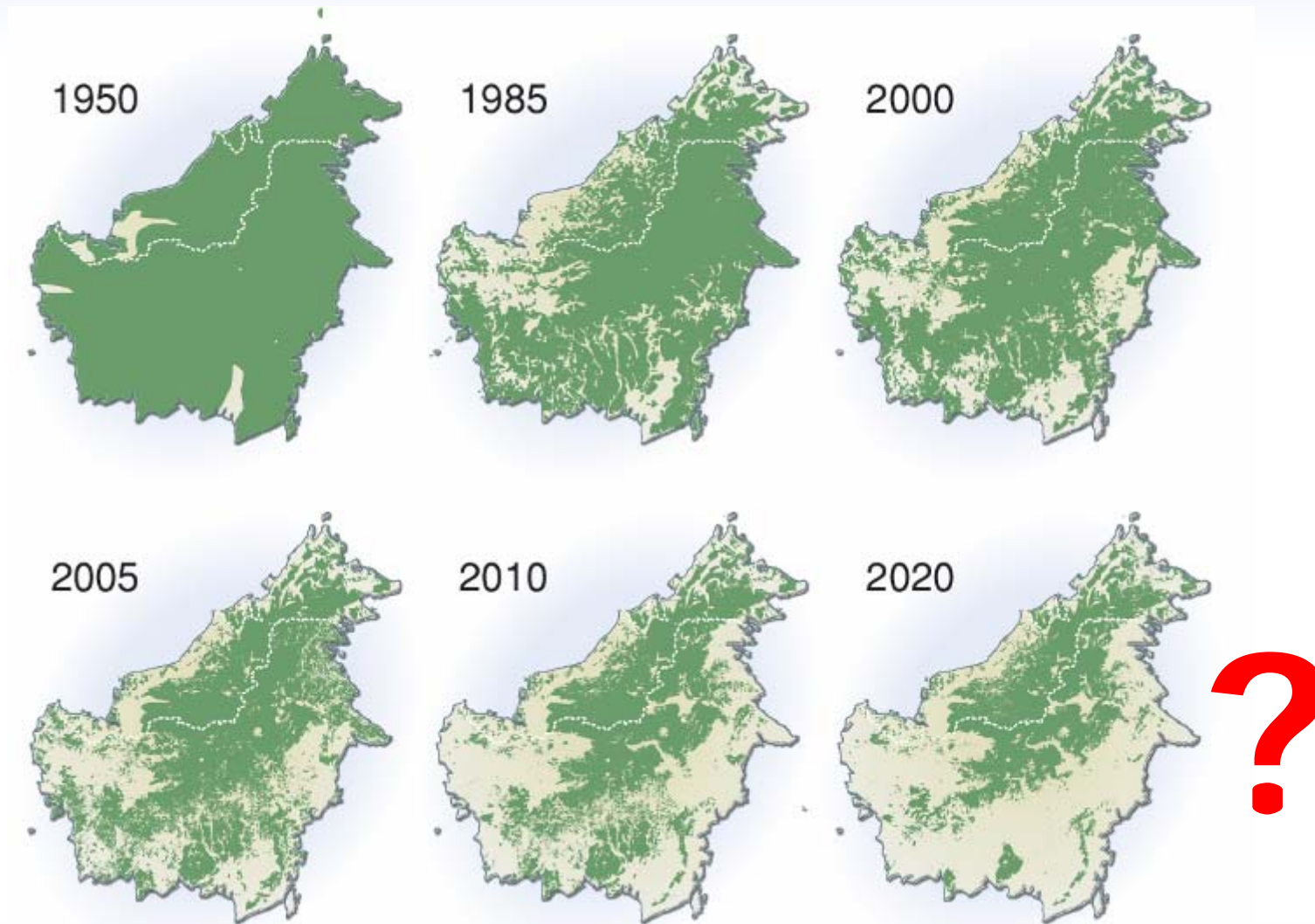
Interior mountain ranges of Central Borneo represent the only remaining large, contiguous and undisturbed tropical rainforest of Southeast Asia



JRC/ESA TREES project 1995



Borneo

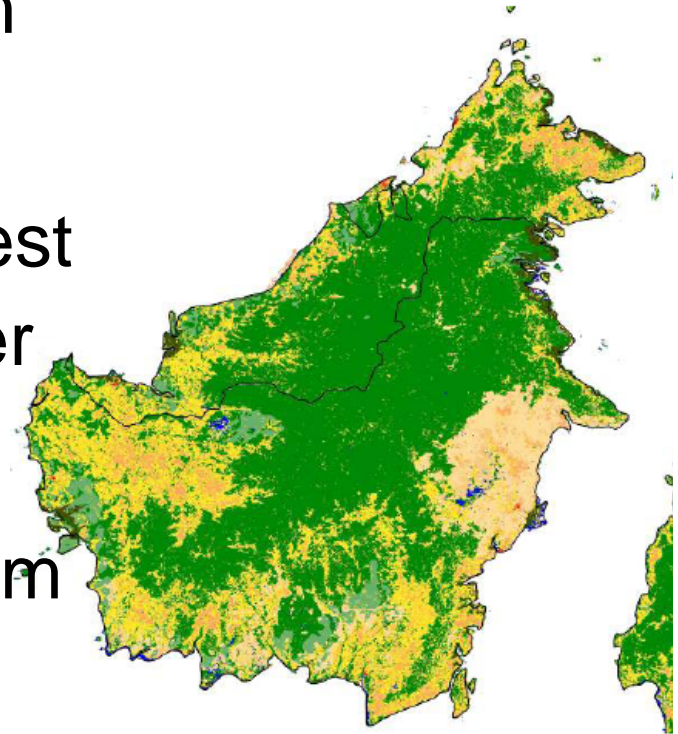


UNEP, 2008



Borneo

- ✖ If the current rate of deforestation continues, Borneo could lose most of its lowland forests in less than ten years(WWF 2005)
- ✖ Today, only half of Borneo's forest cover remains, down from 75 per cent in the mid 1980s
- ✖ Under threat especially by oilpalm expansion





Oil palm (*Elaeis guineensis*) is grown across more than 13.5 million ha (FAO 2007) in a zone naturally occupied by moist tropical forest, the planet's most biologically diverse terrestrial ecosystem.



,It is this generation of ecologists who will determine whether the tropical agroscape is to be populated only by humans and their mutualists, commensals, and parasites, or whether it will also contain some islands of the greater nature - the nature that spawned humans yet has been vanquished by them.

An ocean of oil palm plantations, no matter how sustained the yield and no matter how well-fed the caretakers, is no more human destiny, nor is it of more ecological interest, than is any other assembly line.'

Daniel H. Janzen 1986 The future of tropical ecology. *Ann. Rev. Ecol. Sys.*



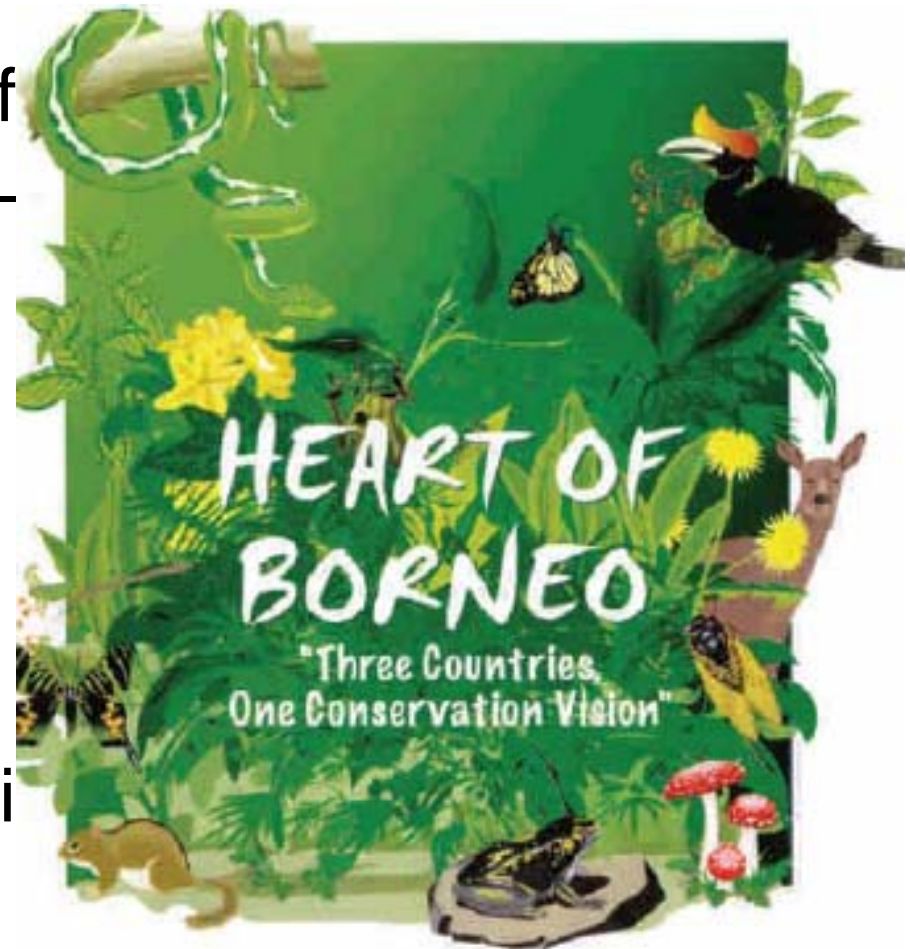
The 'Heart of Borneo'

A conservation initiative for the remaining large block of Southeast Asian rainforest—a total of 220,000 km² - under the title:

'Heart of Borneo'

Initiated by WWF

Indonesia, Malaysia, Brunei





Heart of Borneo

- ✿ Declaration signed 12. February 2007, Bali
- ✿ a trans-boundary conservation project including national parks, production forest and other sustainable land-use.

Done at Bali, Indonesia on the twelfth day of February, two thousand and seven in three original copies.

For the Government of
His Majesty the Sultan
and Yang Di-Pertuan of
Brunei Darussalam

H.E. Pehin Dato Dr.
Awang Haji Ahmad bin
Haji Jumat
Minister of Industry and
Primary Resources,
Brunei Darussalam

For the Government
of the Republic of
Indonesia

H.E. Mr. M. S. Kaban
Minister of Forestry,
Republic of Indonesia

For the Government of
Malaysia

H.E. Dato' Seri Azmi bin
Khalid
Minister of Natural
Resources and Environment,
Malaysia



Heart of Borneo

Within the 'Heart of Borneo' there will be many questions regarding conservation management.

Most important: Where to establish core conservation areas with limited disturbance ?



UNEP 2006



Conservation and insects?

- ✿ Conservation Biology traditionally is oriented towards vertebrates such as birds and large mammals because they are attractive to the public and good distribution data often exist.
- ✿ However, the biodiversity of tropical rainforests is defined by invertebrates - especially insects - and many functional processes in this ecosystem are driven by them.
- ✿ Research project: Insect biodiversity patterns as a contribution of Biology towards the implementation of an effective management of the proposed conservation area



The idea

Include: butterflies & moths, dragonflies and ants.

1. different trophic levels in the food web: herbivorous butterflies & moths, predatory dragonflies and ants
2. differ in dispersal ability and habitat specialization
3. can be sampled quantitatively in large numbers using established and tested techniques
4. and taxonomy of these groups is comparatively well resolved and keys are available for Borneo



Martin Pfeiffer, Antbase.net



Ants - Roles in the ecosystem

Predators

Seed dispersers = ,ecosystem engineers‘

Soil turners





Ants – sampling methods

- ✿ Various protocols for different habitats exist
- ✿ Very accessible and diverse: leaf litter
- ✿ Sample processing with help of para taxonomists





Ants – taxonomy

a database

www.antbase.net

Muzium maya bagi semut (Formicidae) di Malaysia, Mongolia, Germany. Sejumlah 553 spesies semut (94 genera) telah ditunjukkan dalam gambar yang beresolusi tinggi, 16 poster semut di Asia boleh di dapati di perpustakaan kami, dan kami mempunyai banyak lagi maklumat yang menarik tentang semut.

Many taxonomists in ANeT with experience of Borneo species



The aim

- ✿ to provide well-founded conclusions on the biodiversity status of various regions in the prospective conservation zone
- ✿ determination of species richness, proportion of endemic species, rare species communities
- ✿ provided within a few years based on detailed distribution data of many ant species and knowledge of their ecology.



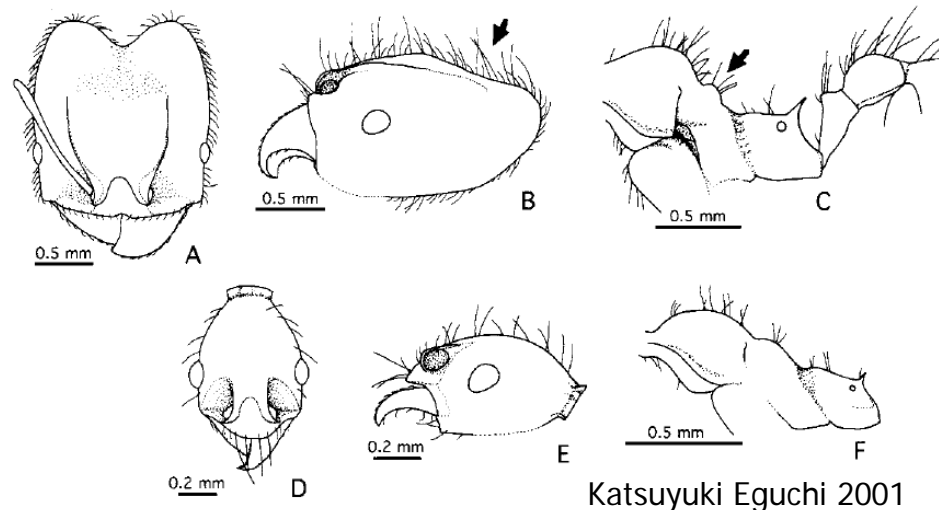
- ✿ unique opportunity for ANeT to use the diversity of the members in an integrative approach
- ✿ ecologists & taxonomists in a conservation context for the last remaining rainforest in Southeast Asia





Ecologists need

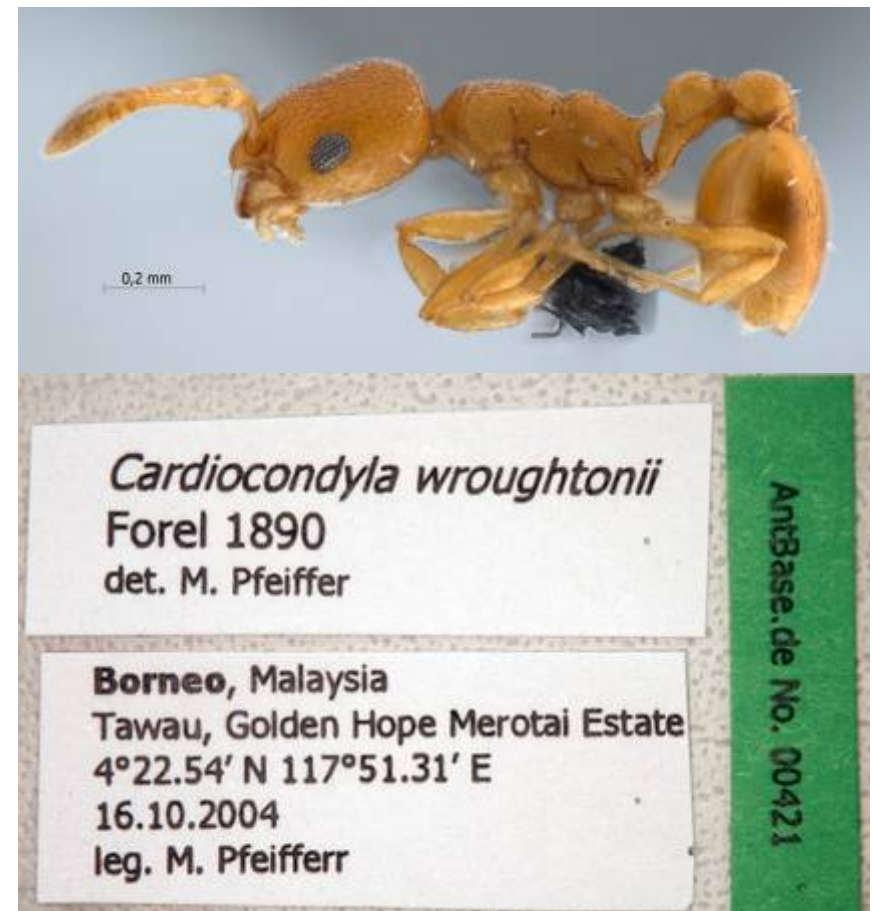
- ✿ Taxonomic keys
- ✿ Species names and taxonomic history
- ✿ Species records and phylogenetic relationships
- ✿ Additional ecological information





Taxonomists need

- ✿ Labelled specimens of a certain quality
- ✿ Voucher specimens
- ✿ Access to collections





Advice for Ecologists

- ✂ Learn to curate material
- ✂ Sort and clean samples
- ✂ Learn the terminology
- ✂ Invest time in studying specimens
- ✂ Visit taxonomists and museums and herbaria
- ✂ Write taxonomists into your grant proposals, offer collaborative authorship
- ✂ Deposit vouchers
- ✂ Take a course & teach someone else

Nicholas J. Gotelli, 2004



Advice for Taxonomists

- ✱ Be patient
- ✱ Write a key
- ✱ Accept rare specimens
- ✱ Be willing to examine some unmounted material
- ✱ Write ecologists into your grant proposals
- ✱ Consolidate nomenclature

Nicholas J. Gotelli, 2004

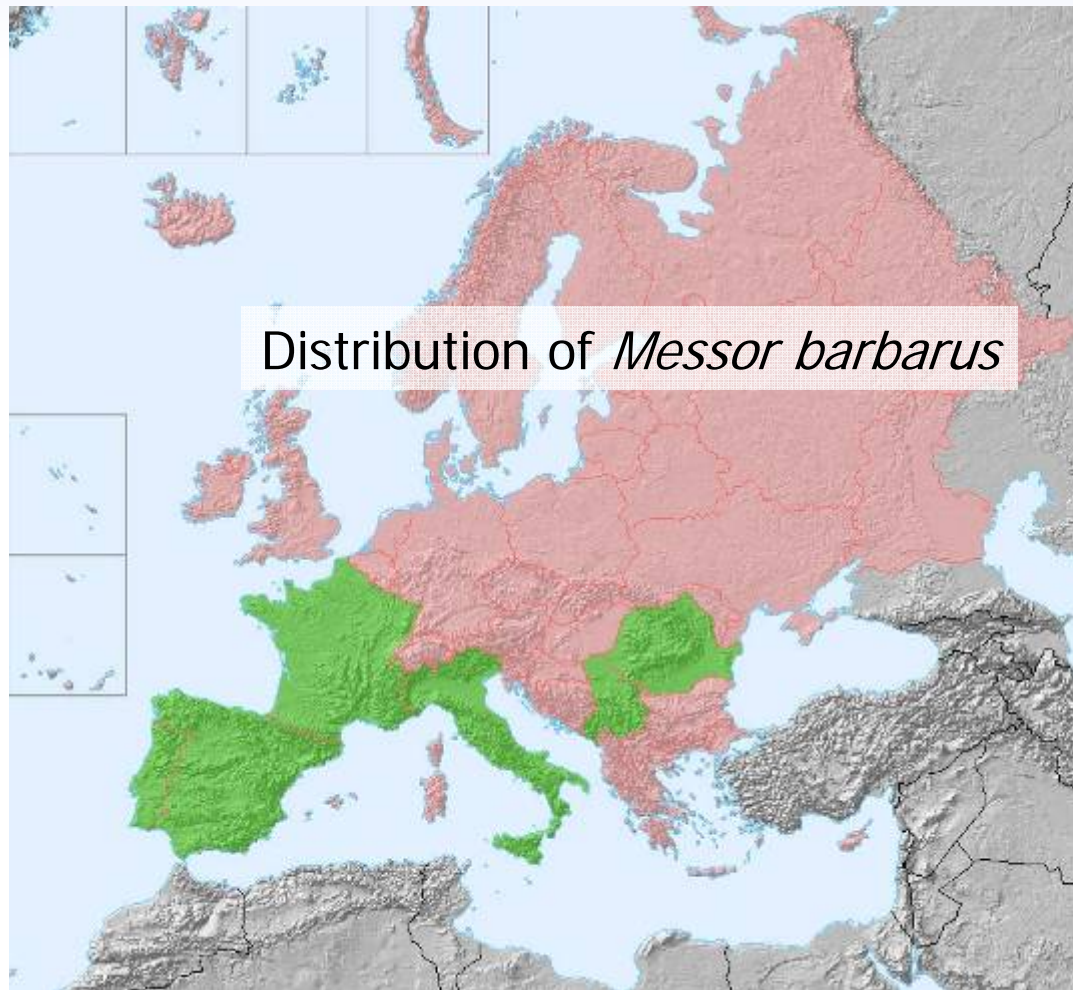


For both ...

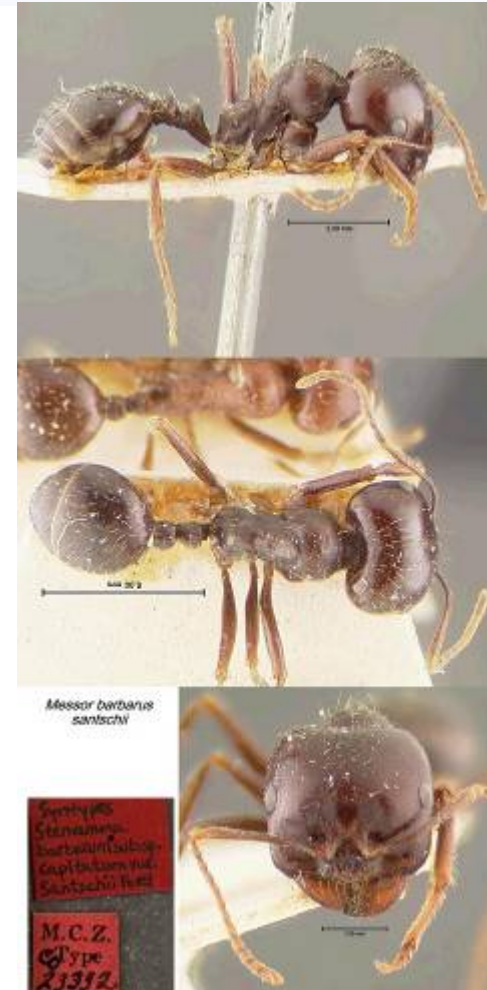
- ✿ Collaborate: joint funding proposals & authorship
- ✿ Increasingly important in organismal biology today
- ✿ Think about including modern methods (e.g. DNA bar coding)



The aim: distribution map



Fauna Europaea <http://www.faunaeur.org/>

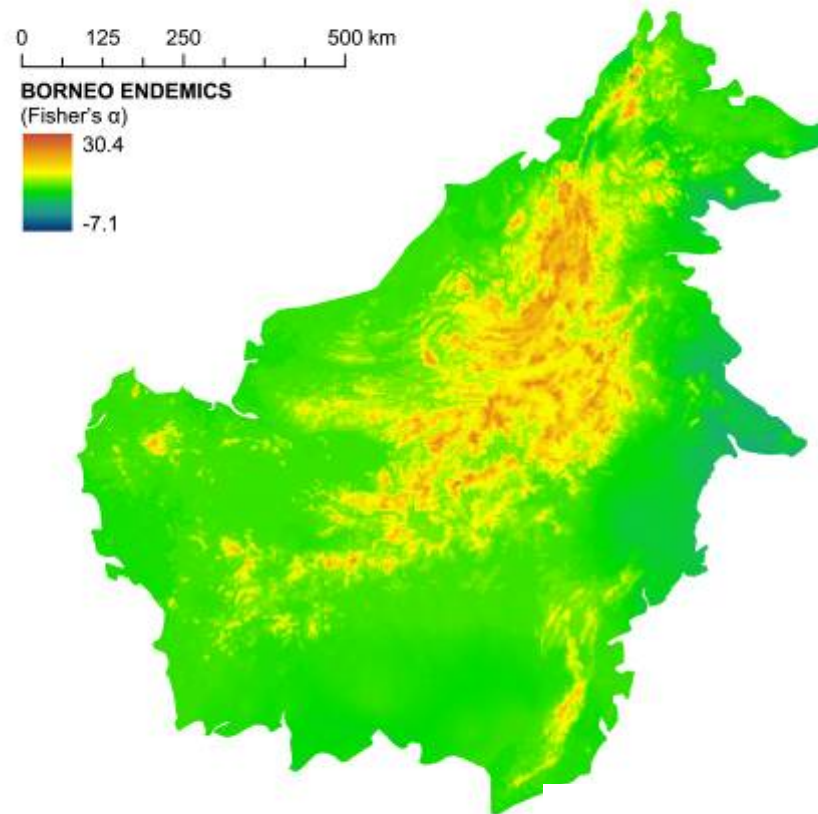
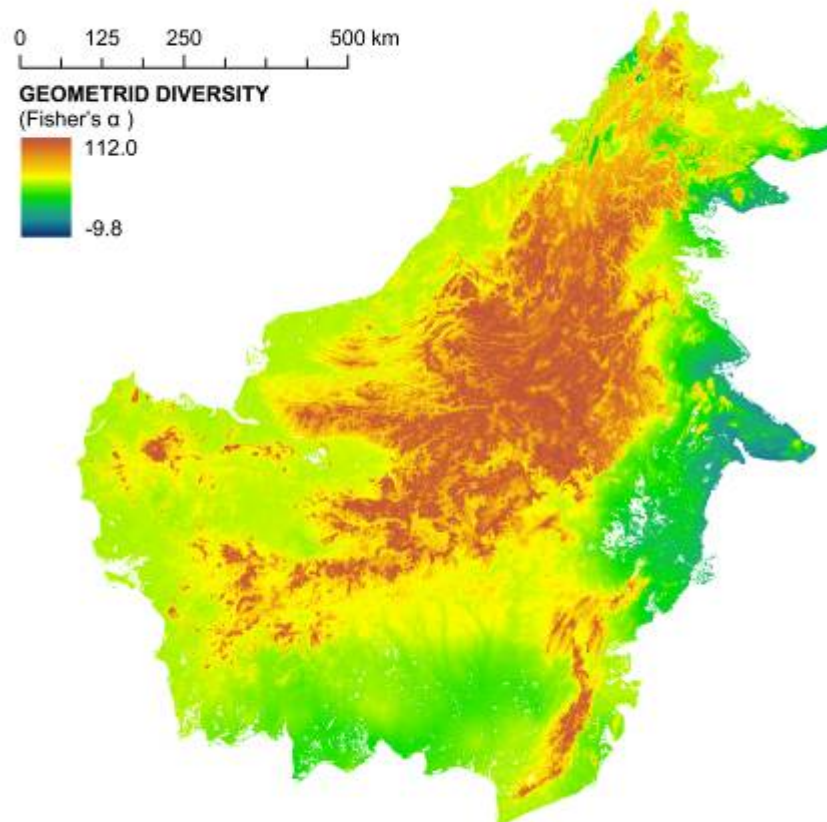




Borneo – moths (Geometridae)



Predicting geometrid moth diversity in the Heart of Borneo by Jan Beck, Wolfgang Schwanghart, Chey Vun Khen and Jeremy D. Holloway. Submitted *Journal of Applied Ecology*.



Data included: >35,000 specimens, 102 sites, over 80 percent of the ca. 1080 geometrid species known from Borneo



Limitations

- ✂ Most records are from the north of Borneo for historic reasons
- ✂ New sampling activities should be focussed on Kalimantan
- ✂ Distribution maps and ecological data are needed for ants – a new database?





How to proceed?

- ✂ Collect information on distribution for some selected well resolved groups
- ✂ Enter collection information into database
- ✂ Plot distributions
- ✂ Use modelling approaches for unknown area
- ✂ Collect in undersampled areas



How to proceed?

- ✿ Get funding for taxonomists and ecologists
- ✿ Lobby the idea at governmental funding agencies, NGOs or other organisations
- ✿ Use the political situation in Borneo for the project

Thank you

