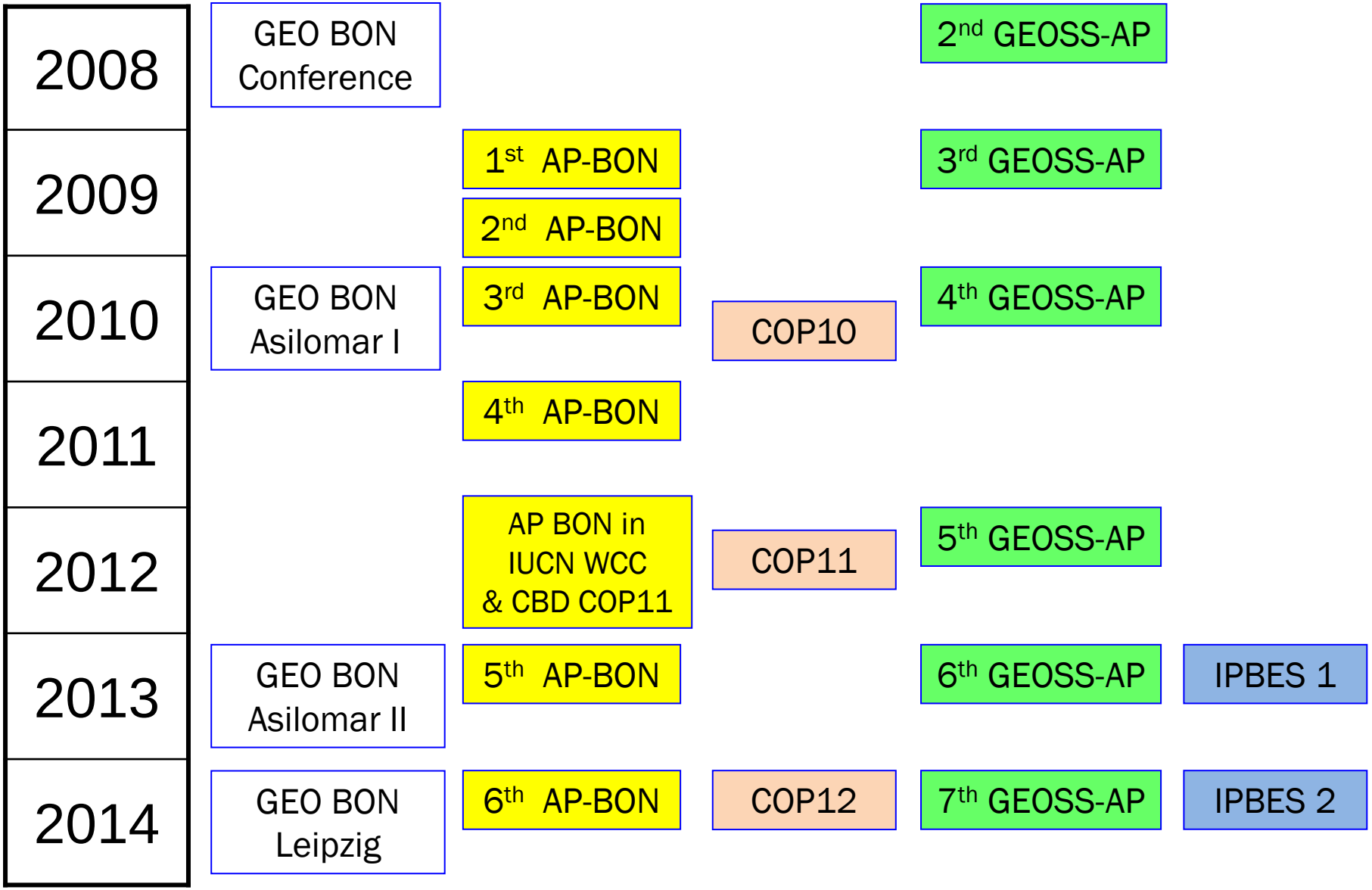
May 4–5, 2015, FUTURE EARTH
A Symposium on Global Biodiversity Monitoring

Plant diversity monitoring in AP BON, Asia-Pacific Biodiversity Observation Network

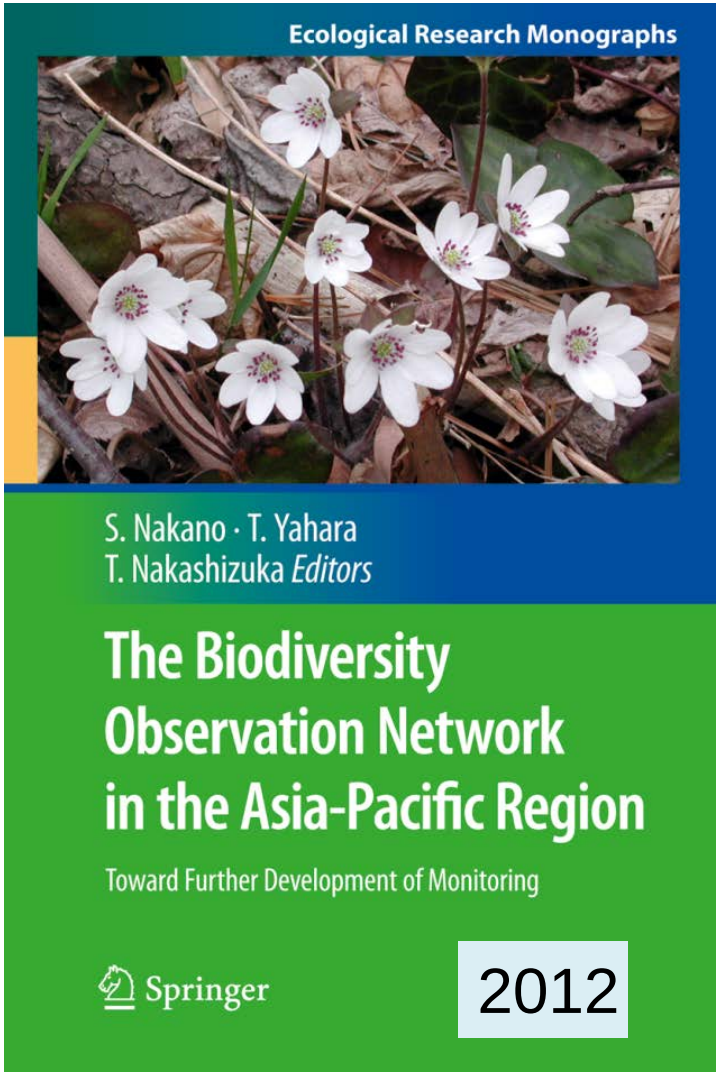
Tetsukazu Yahara

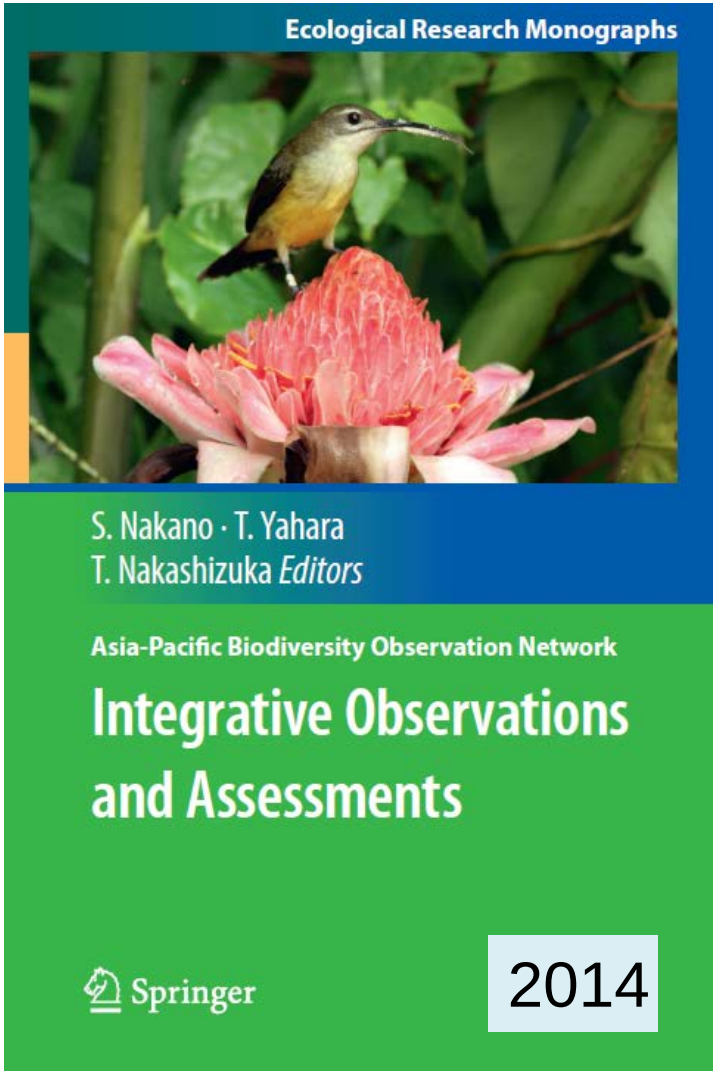
Center for Asian Conservation Ecology &
Institute of Decision Science for a Sustainable Society
Kyushu University, Japan

History of AP-BON and GEOSS-AP symposium



Publications of AP-BON Book



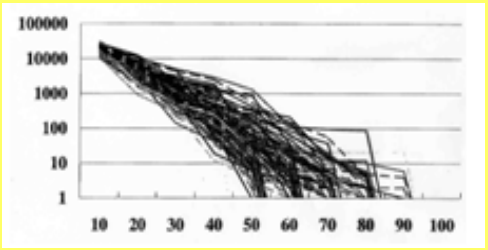


Integrative observations and assessments of Asian biodiversity (sponsored by MoEJ; 2011-2015)

- Developing models & tools to assess biodiversity & ecosystem services in AP
- Developing models and tools to identify hot spots and EBSA in AP
- Research plan and outputs co-designed with MoE (user)

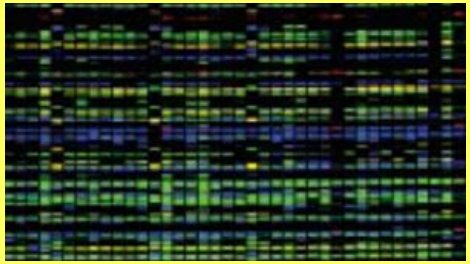
Theme 1

Modeling and mapping bio-diversity changes



Theme 2

Gene and species diversity changes

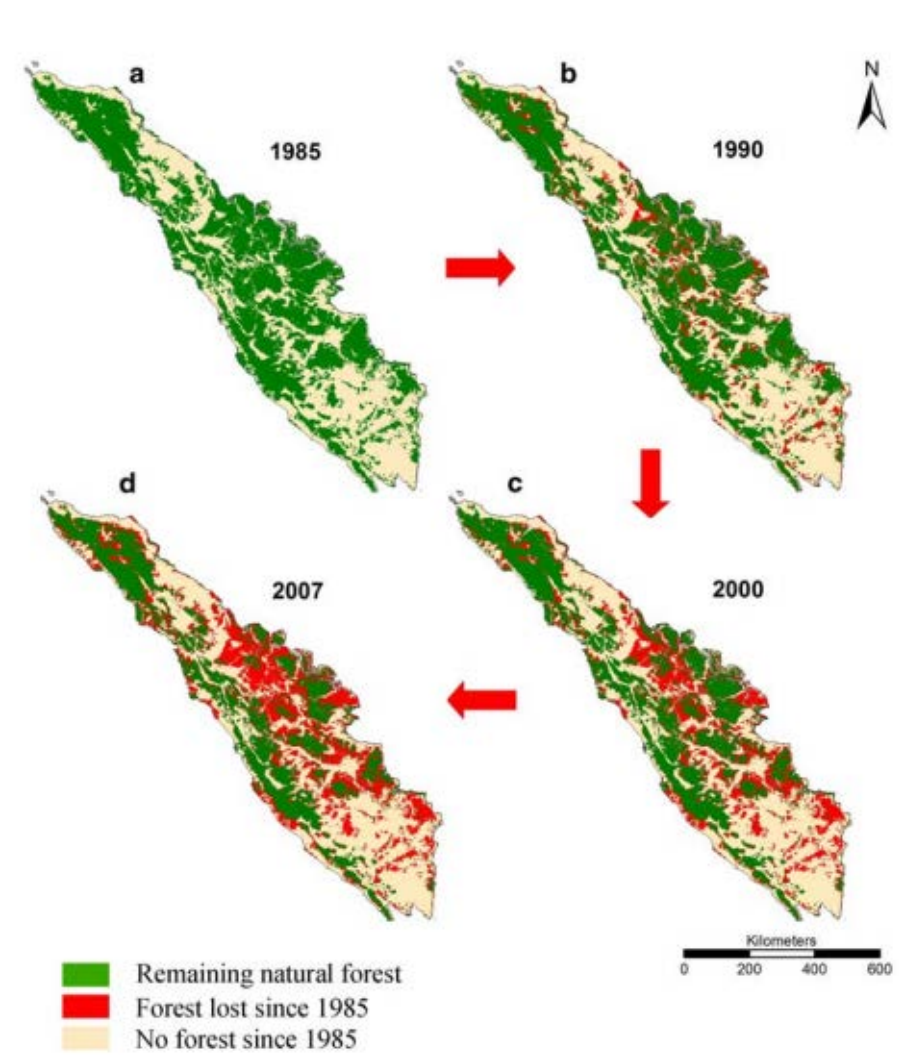


Theme 3-5

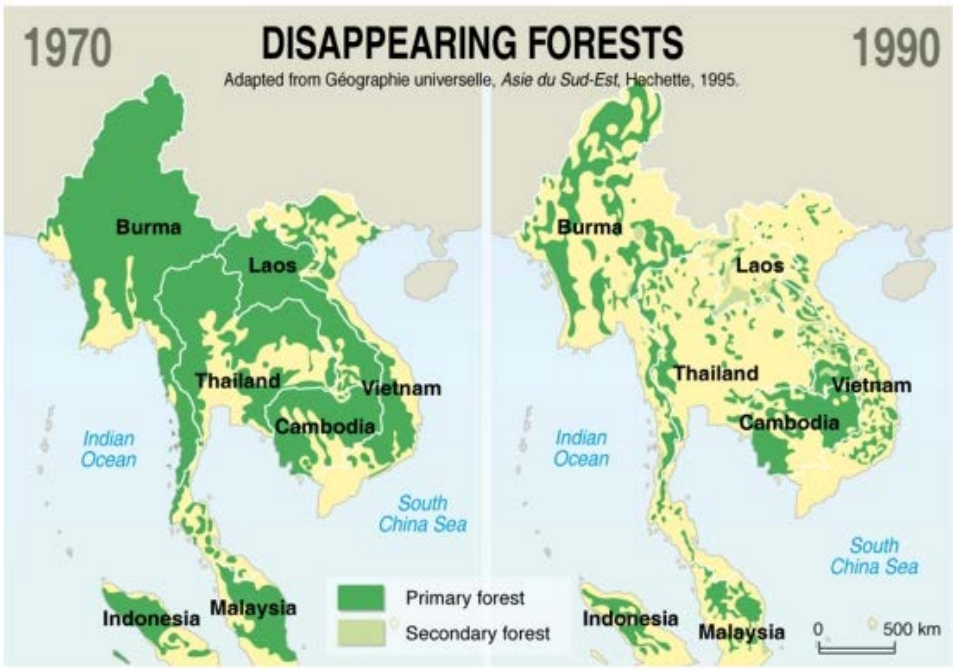
Forest, freshwater and marine ecosystems

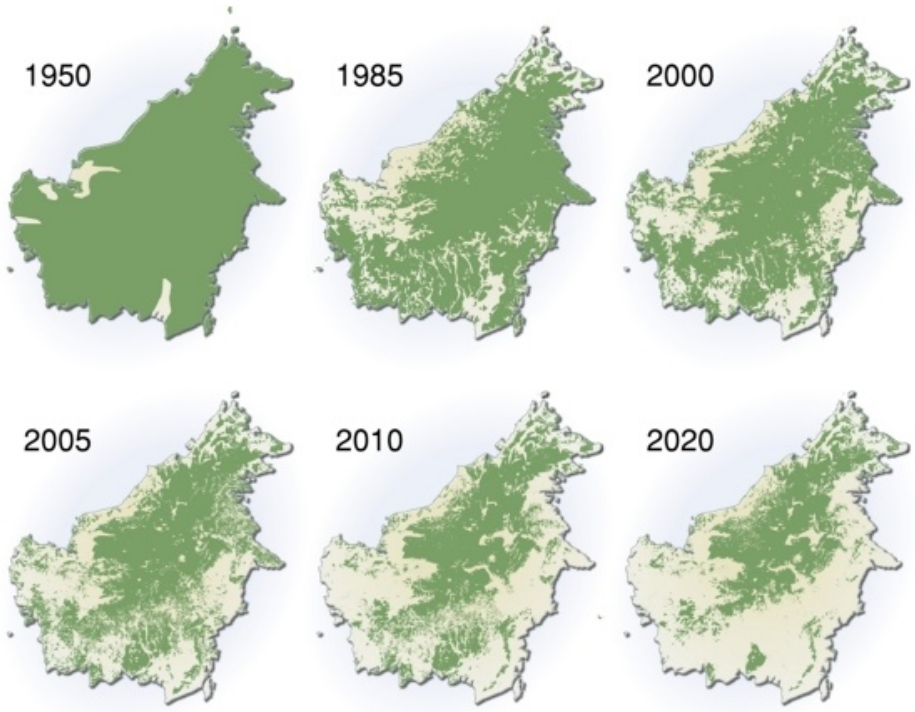
Contribution to IPBES, GEO BON, CBD, REDD+, & National Strategy

How rapidly are plant species being lost in tropical Asia?



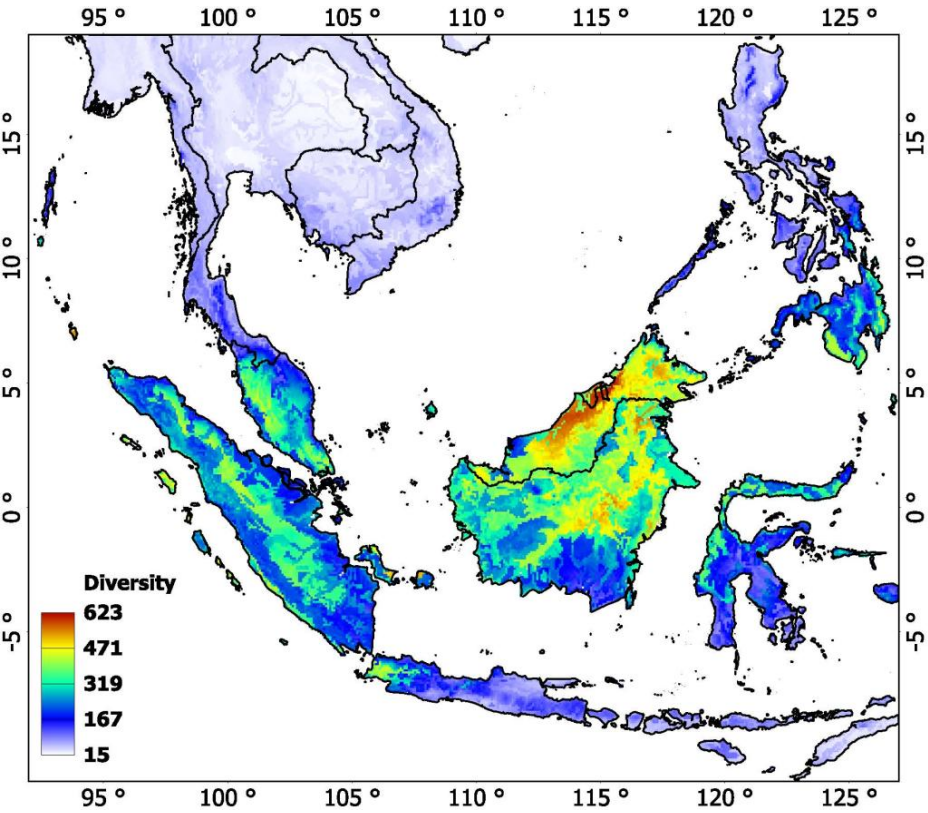
Laumonier et al. (2010)

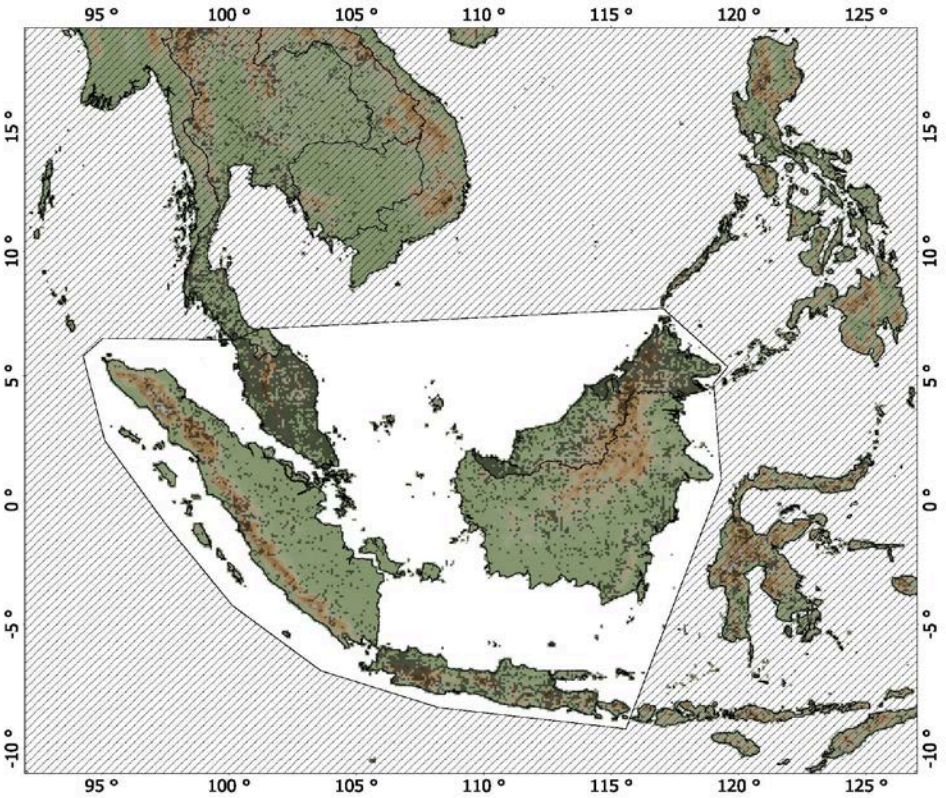




Assessments with herbarium records

Raes, Saw, van Welzen & Yahara (2013) estimated species richness of 7 tree families with herbarium records and species distribution models.

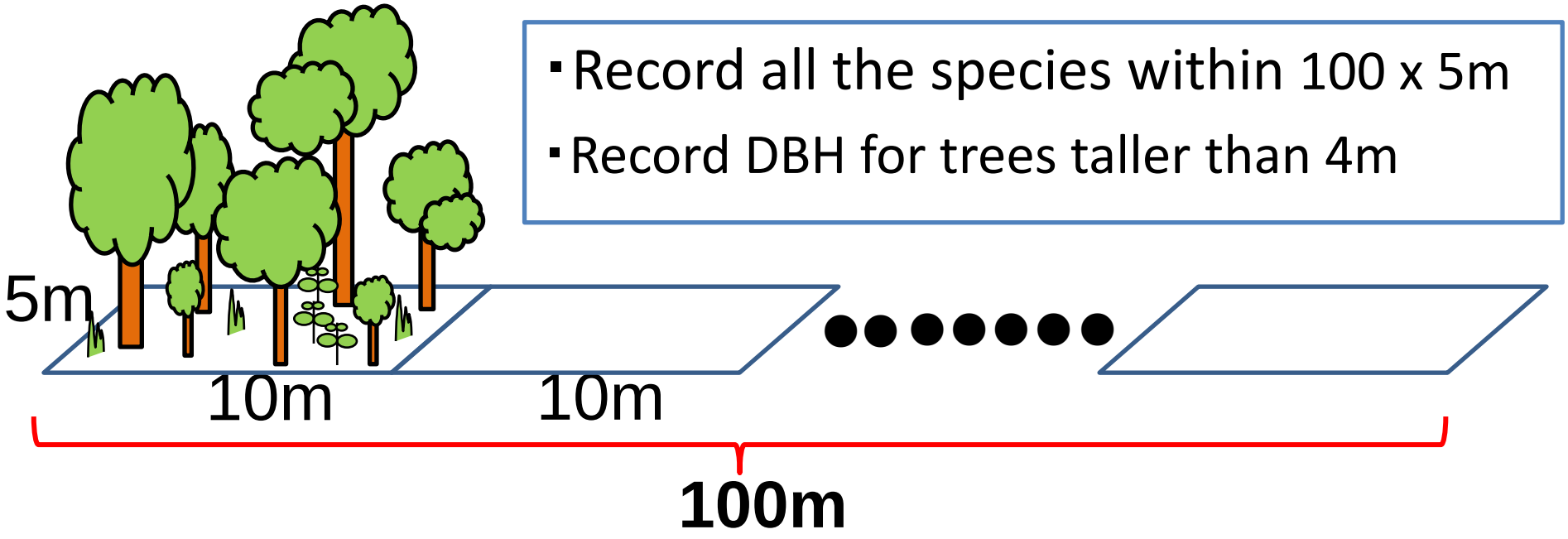




Tree species diversity estimated in Sarawak is the highest in SE Asia.

However, specimen density distribution is highly biased.

Standardized belt transect survey



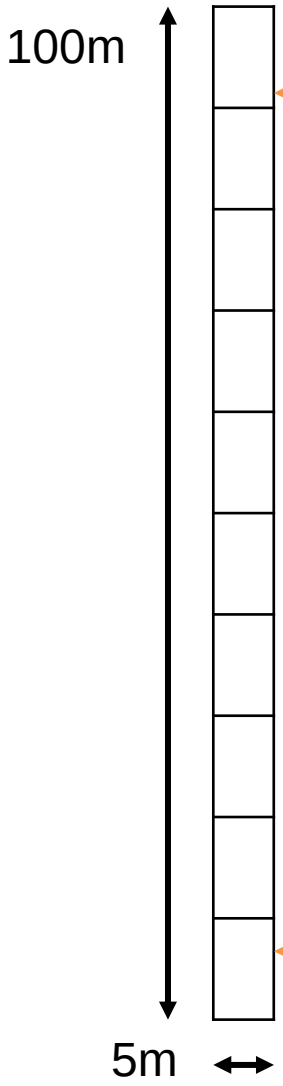
- Record all the species within 100 x 5m
- Record DBH for trees taller than 4m

Collecting specimens and taking pictures

Identification using herbarium specimens

Recording all species in 100m x 5m

An example of transect record: data from Mandor Nature Reserve, W Kalimantan



No	Specimen	Date	Subplot		Family	Name
1	1	14-Sep		1	Dipterocarpaceae	Shorea stenoptera
2	2	14-Sep	out		Rubiaceae	Mussaenda
3	3	14-Sep		1	Thymeleaceae	Goniostylis
4	4	14-Sep		1	Connaracaea	Ellipanthus
5	5	14-Sep		1	Sapindaceae	Nephelium
328	328	16-Sep		10	Fabaceae	
329	329	16-Sep		10	Celastraceae	Lophopetalum エダミドリ
287	0	16-Sep		10	Burseraceae	Santiria 287
330	330	16-Sep		10	Dichapetalaceae	Dichapetalum?
5	0	16-Sep		10	Sapindaceae	Nephelium 小葉4枚
36	0	16-Sep		10	Gnetaceae	Gnetum 1
331	331	16-Sep		10		
332	332	16-Sep		10	Burseraceae	Dacriodes
333	333	16-Sep		10	Sapindaceae	Nephelium
334	334	16-Sep		10	Thymeleaceae	Goniostylis

Scientific name: Dipterocarpaceae ***Shorea stenoptera*** Burck
No. 1
#

1st record

Scientific name: Rubiaceae ***Lasianthus*** aff. ***angustifolius***
No. 32
#

Picture guide as an output of Plant Diversity Assessment

Scientific name: Fabaceae ***Bauhinia menispermacea*** Gagnep.
No. 112
Flora Malesiana describes this species with "**petals yellow** with a dark red centre, narrowly obovate", but flower color may vary between Kuchin and Mandor.

Scientific name: Thymelaeaceae ***Gonystylus***
No. 334
#

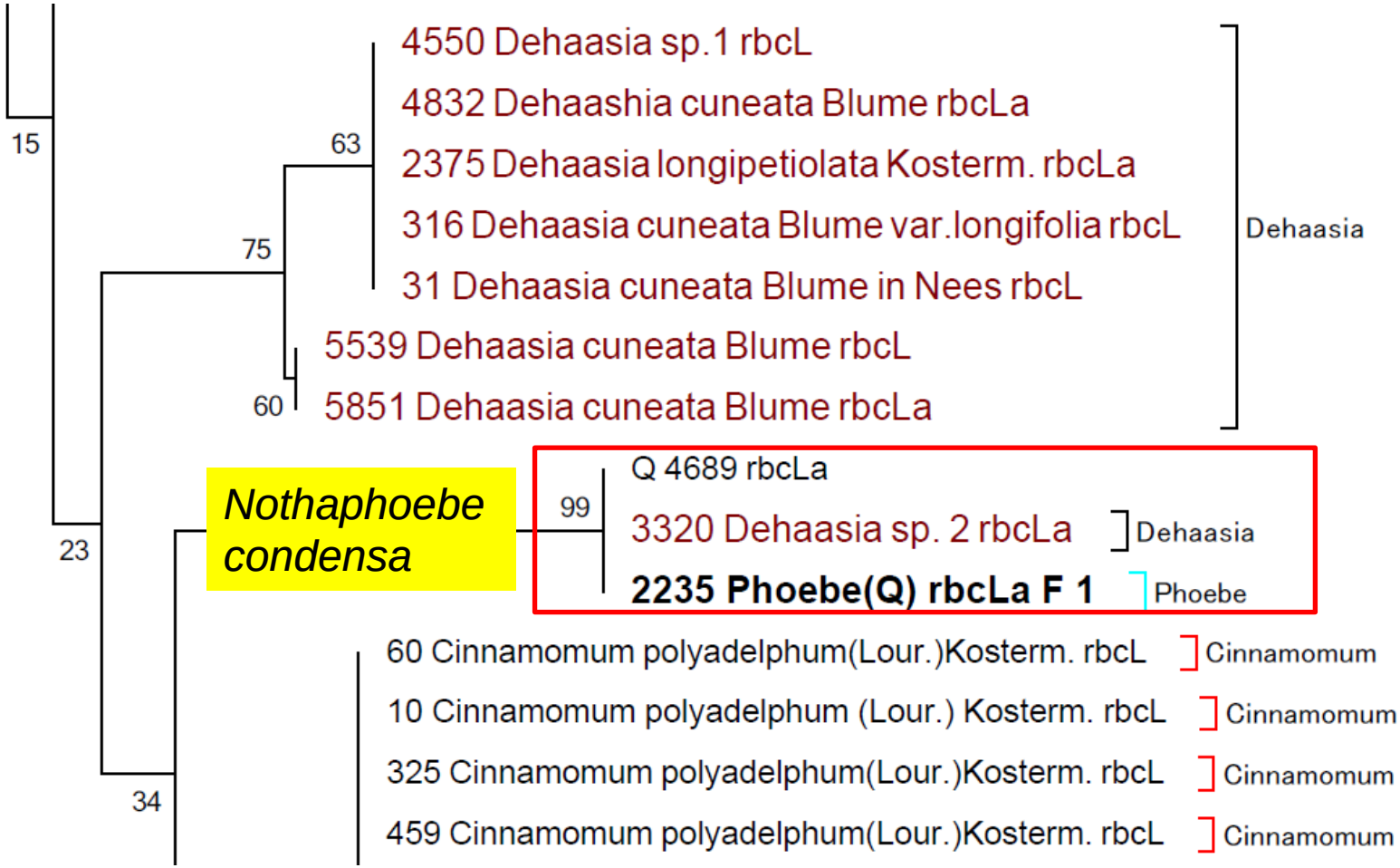
Last record

Mandor

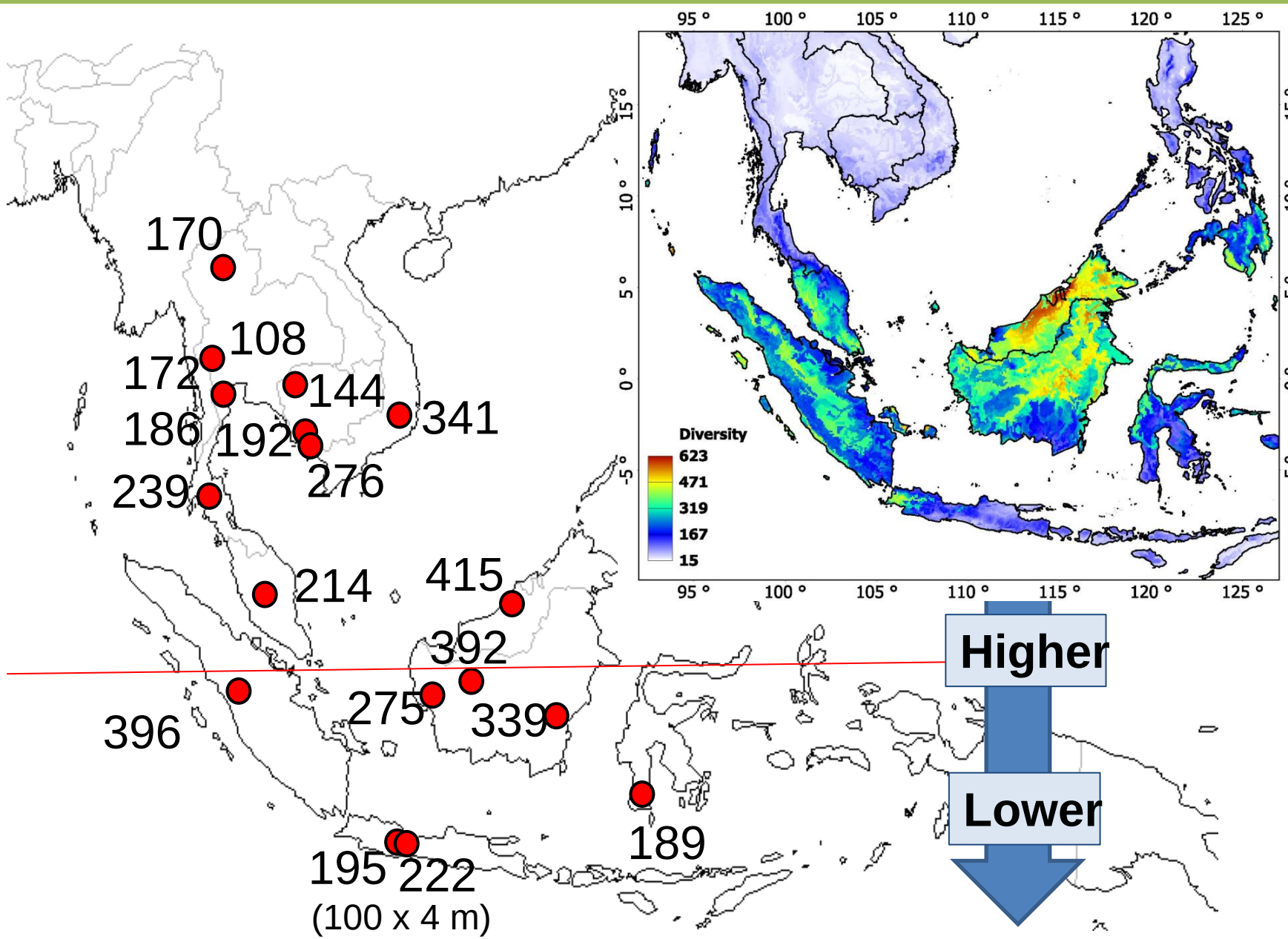
Identification of sterile plants with DNA sequence

Identification of sterile plants with DNA sequence

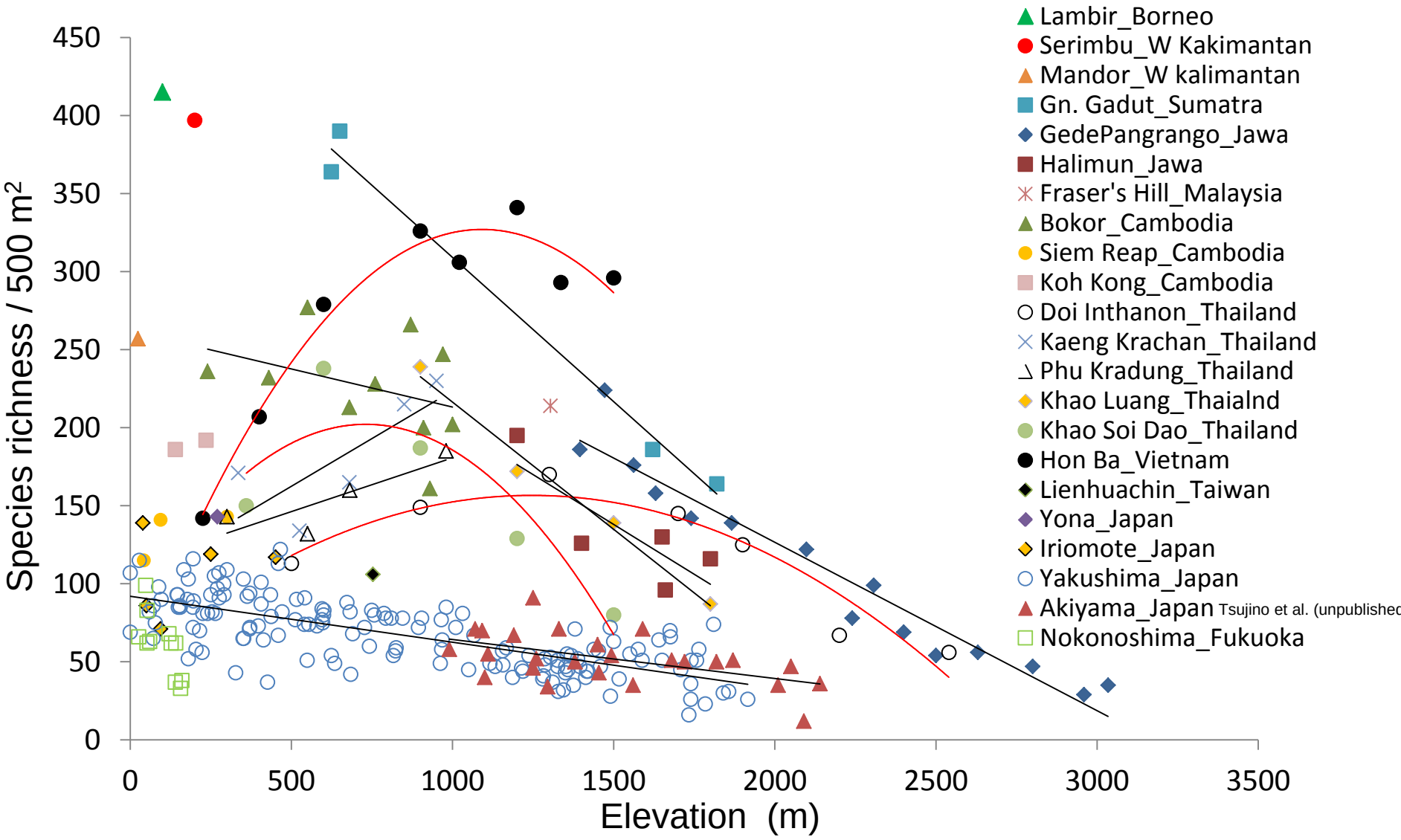
A phylogenetic tree of Lauraceae including unknown plants



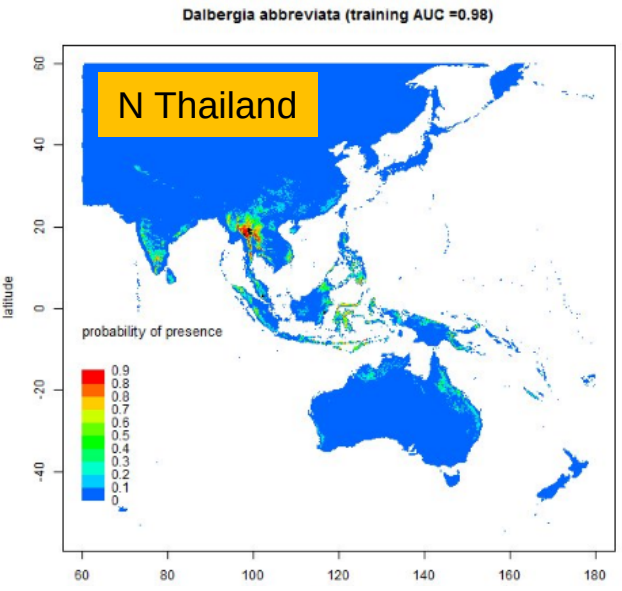
Vascular Plant Species Richness / Transect (500 m^2)

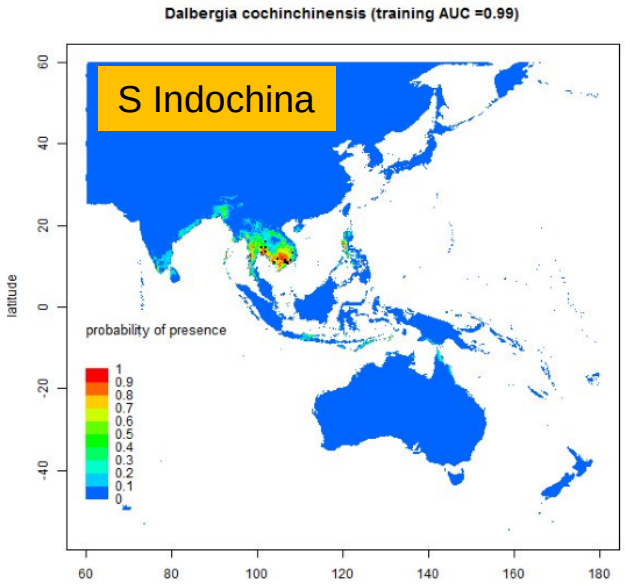


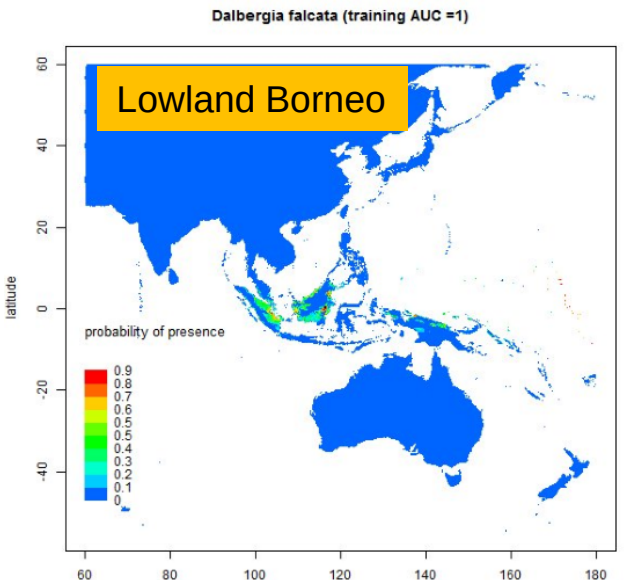
Plant Species Richness/500m² vs Altitude

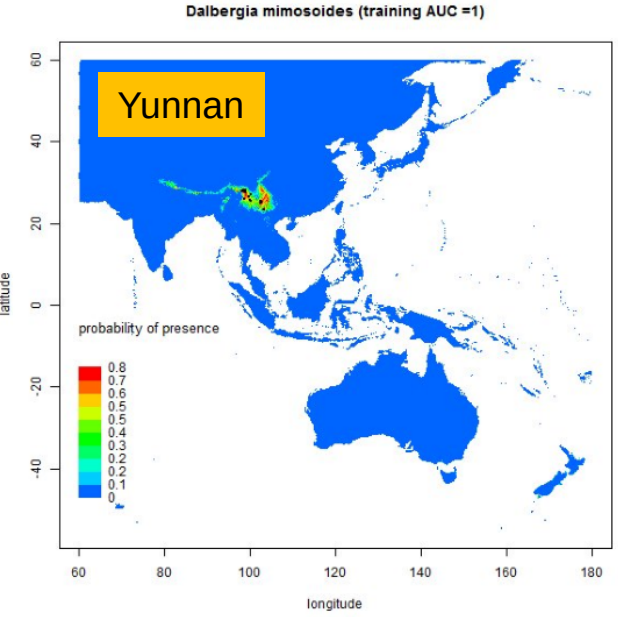


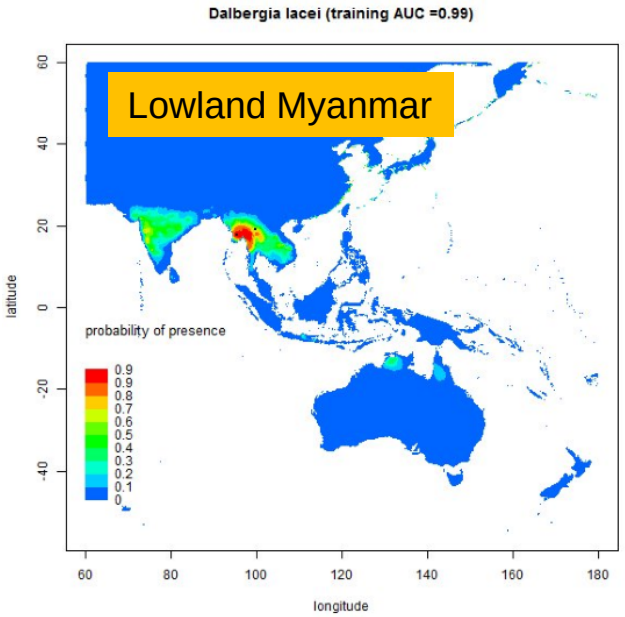
Distribution of rare species : Dalbergia

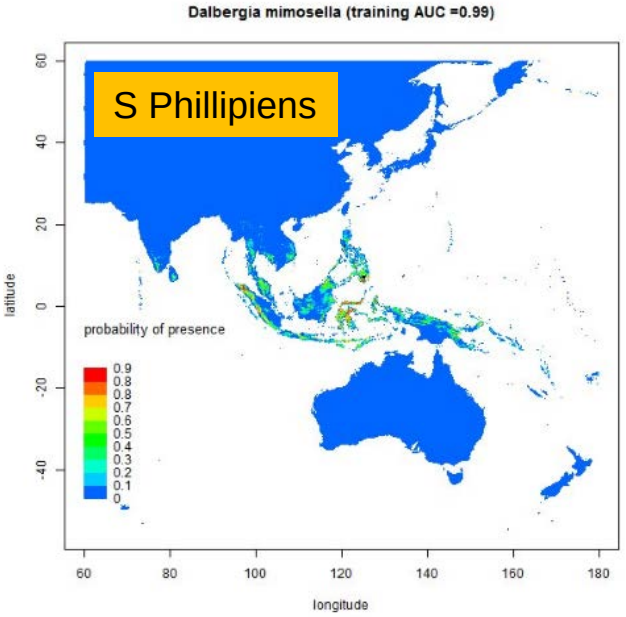








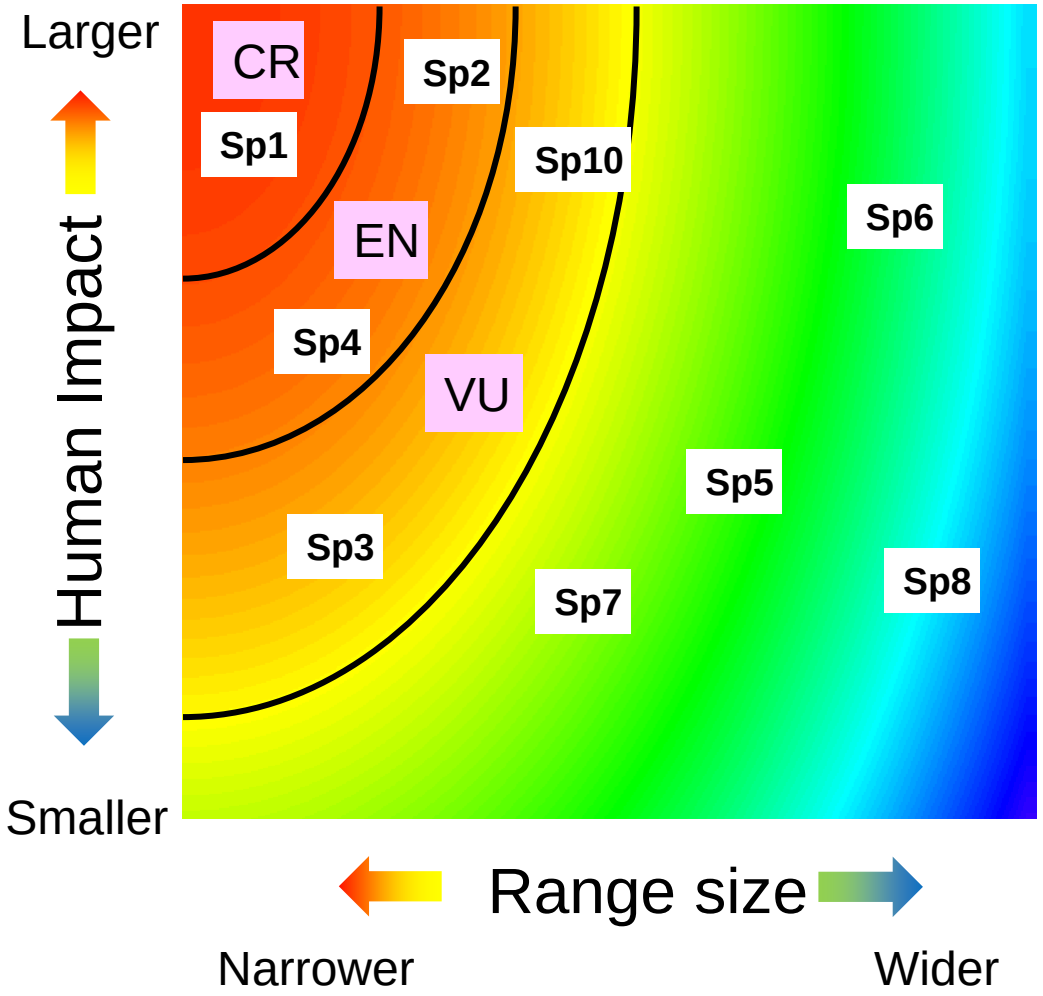




Extinction Risk Assessment

Fumiko Ishihama

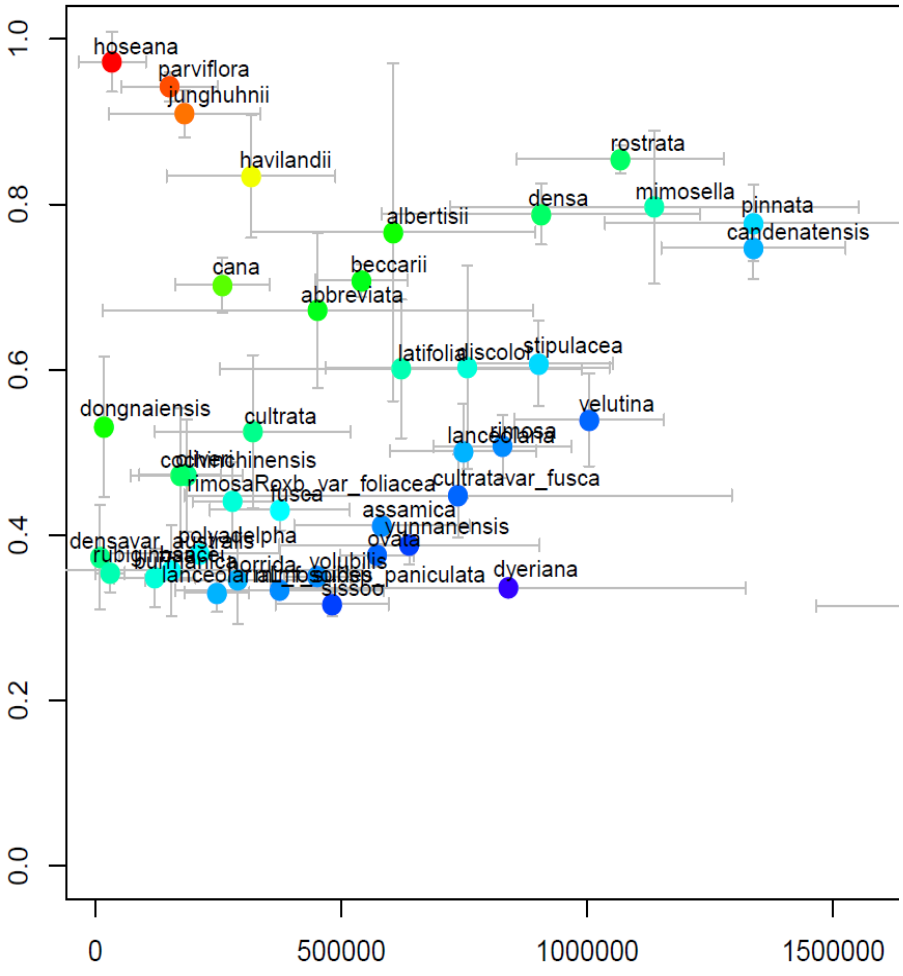
Extinction risk is considered to be higher in species having narrower ranges under higher human impact



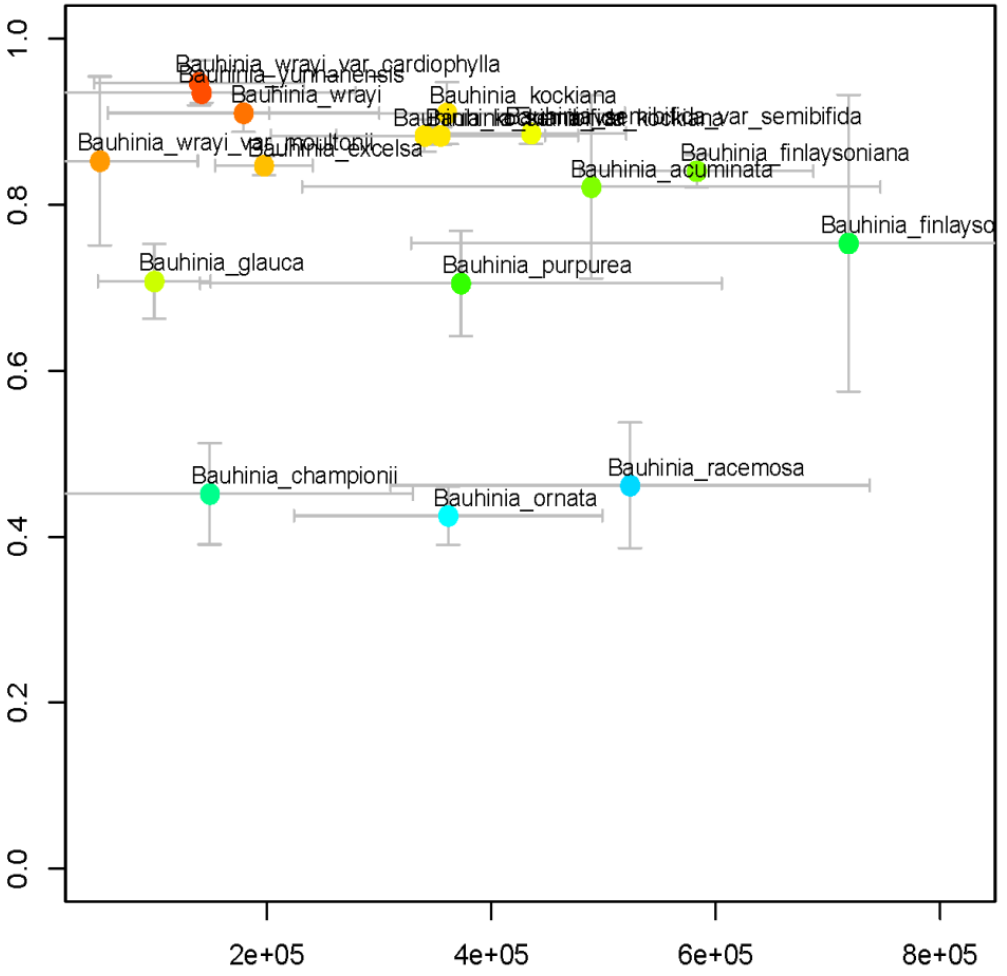
Extinction Risk Assessment

Fumiko Ishihama

Dalbergia



Bauhinia



Many more new species: a case of Lauraceae




	Cambodia Bokor		Vietnam Hon Ba		Malaysia Fraser's Hill		Indonesia Gn. Gadut (Sumatra)		Total	
Genus	Known	Unknown	Known	Unknown	Known*	Unknown	Known	Unknown	Known	Unknown
Actinodaphne	1	0	1	6	5	0	3	0	10	6
Alseodaphne	0	0	1	0	0	0	0	0	1	0
Beilschmiedia	4	0	4	5	1	0	2	3	11	8
Cinnamomum	5 (2)	0	2	6	2	1	2	4	6	11
Cryptocarya	3	1	2	1	1	0	4	2	10	4
Dehaasia	2	1	0	0	0	0	1	0	3	1
Endiandra	0	0	1	0	1	0	2	1	4	1
Lindera	1 (1)	0	0	0	2	0	1	0	3	0
Litsea	6	0	7	3	6	0	8	5	27	8
Machilus	1	2	0	5	0	0	0	0	1	7
Neolitsea	3	2	2	2	2	3	1	2	8	9
Nothaphoebe	0	0	0	0	0	0	0	0	0	0
Phoebe	2	0	1	0	1	0	0	0	4	0
Total	28	6	21	28	21	4	24	17	94	55
	0.82	0.18	0.43	0.57	0.84	0.16	0.59	0.41	0.63	0.37

*Including known but undescribed spp.

(Yahara unpublished)

Most work on biodiversity change is on ecosystems and species diversity, and **intra-specific genetic diversity typically is neglected**

We lack observations across many species, but possible to **value-add to existing monitoring of change in species' range extent**

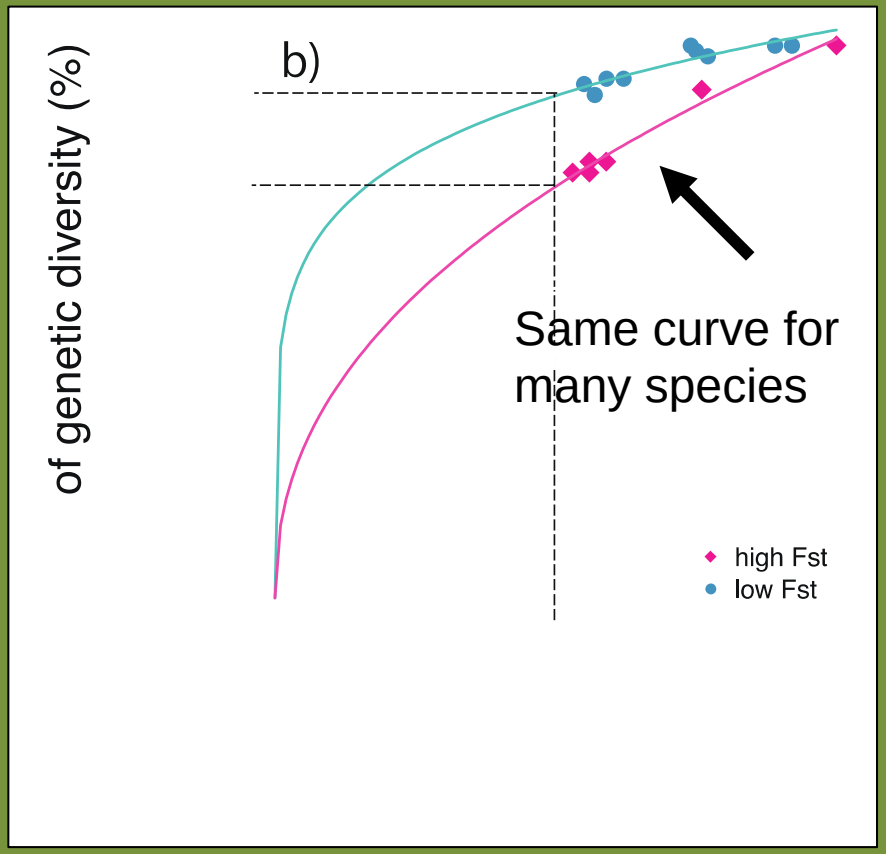
bioGENESIS
a core project of DIVERSITAS

Dan Faith

Analysis of AFLP genetic data for 27 plant species, over many populations covering the range of each species;
data from Alsos et al.(2012)

If we know about the dispersal properties of the species we can assign parameters of power curve. Over many species, use loss of range extent to estimate loss of within species genetic diversity

See Mimura et al in revision



Summary

- Achievements of AP-BON
  - A coordinated network has been established.
  - Two volumes of AP BON Books have been published.
  - Projects sponsored by MOEJ are going on.
- Plant diversity observation as an example
  - Specimen-based approach + Standardized transect survey
  - Extinction risks can be assessed with distribution areas and land use changes
  - Many threatened species and many undescribed species (37% in Lauraceae)
- Genetic diversity
  - Even for non-threatened species, genetic diversity loss is associated with range loss.