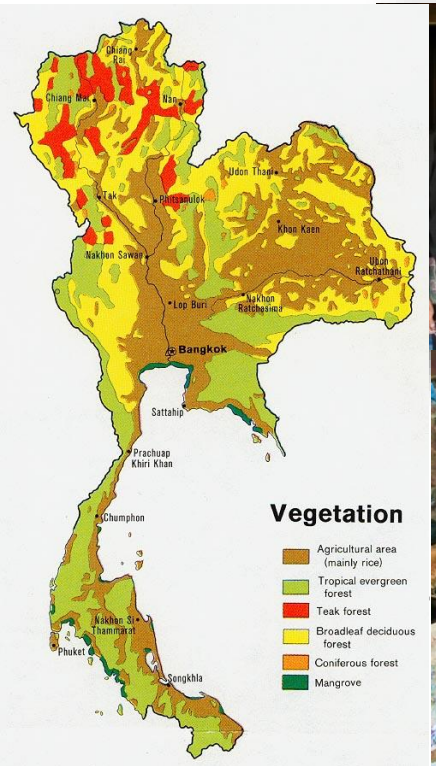
INTERNATIONAL CONFERENCE ON BIODIVERSITY IBD 2025
Queen Sirikit National Convention Center (QSNCC), Bangkok, Thailand
5–7 November 2025

Ethnobotany in Thailand

Henrik Balslev, Department of Biology, Aarhus University, Denmark



To the memory of
Queen Sirikit (1932-2025) of Thailand

Her Majesty the Queen visiting members of the Phu Ethnic Group at Phon Village, Kham Muang District, Kalasin Province. The village had previously been very poor as it is remotely situated. Their traditional silk cloth called "Phrae – Wa" has been popularized both in Thailand and abroad through Her Majesty the Queens initiative

- Encouraging women to weave traditional colorful silk cloth
- Queen Sirikit Botanical Garden in Chiang Mai was supported by the Danish Government
- It is an important center for botanical research and ethnobotany

King Chulalongkorn - Rama V (1853-1910)

- Chulalongkorn visited Denmark 1897 and 1907, fostering close ties between our two countries
- Invited Danish naval officers to train Thai marine

Princess Maha Chakri Sirindhorn

- Danish Grand Cross of the Order of the Dannebrog
- Prolific supporter of science and culture
- Long standing support for the ***Flora of Thailand***
- Supported the 2022 FoT meeting in Singapore
- Opened and spoke at the FoT meeting in Denmark in 2024

ETHNOBOTANY AS A SCIENCE

Definition of Ethnobotany

Ethnobotany (*ethnology* = study of culture and *botany* = study of plants) is the scientific study of the relationships that exist between people and plants

Origin:

The term *Ethnobotany* used first time by Harschberger in 1896 and defined it as "the use of plants by aboriginal peoples"

("The purpose of Ethnobotany", Botanical Gazette 21: 146–154)

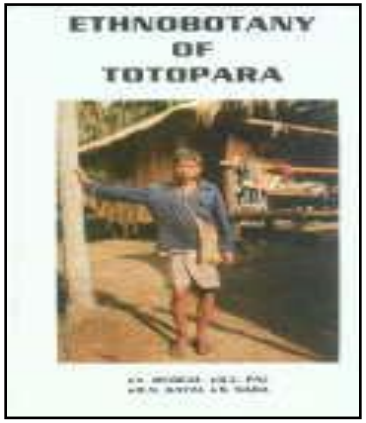
Subsequent broadening of the concept:

How are plants used ?
How are plants managed?
How are plants perceived?
Ethnobotany continues to focus on *traditional peoples* (Cotton, 1996)

History of Ethnobotany

•Before 1895:

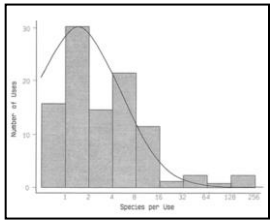
Focus on application and economic potential of plants used by native peoples ("Aboriginal botany") – the colonial era



•1895-1980:

Increasing focus on anthropological and ecological aspects of ethnobotany

Mostly descriptive studies



•1980—:

Broadening of the concept to "all plant studies that describe local people's interaction with the natural environment"

Increasing emphasis on quantification and use of ecological theory, testing of hypothesis, *etc.*

$$UV_s = \frac{\Sigma_i UV_{is}}{n_s}$$

Increasing emphasis on comparative studies between different ethnic groups

Quantitative Etnobotany

26 Ethnobotanical Indices

$$UV_S = \sum_i^n Value_{UseCategory(i)}$$

$$UV_{is} = (\sum U_{is})/(n_{is})$$

$$RUV_i = \sum (UV_{is}/UV_s)/n_i$$

$$CSI = \sum_{i=1} (i*e*c)*CF$$

$$UV_s = (\sum UV_{is})/(n_i)$$

$$CV_e = Uc_e * Ic_e * \sum IUc_e$$

$$PV_e = Up_e * Ip_e * DUp_e$$

$$IV_s = n_{is}/n$$

$$CV_{species\ 1} = P_{cs}/S_c$$

$$EV_e = Oe_e * Pe_e$$

$$PPV = \sum RU_{(plantpart)} / \sum RU$$

$$IUV = \sum SU_{(plantpart)} / RU_{(plantpart)}$$

$$SU$$

$$= \sum Uses$$

$$= \sum Uses_{\ Species\ (i)}$$

$$EICS = \sum_{i=1}^{n} (p/u*i*e*c)$$

$$RU_{\ PlantPart}$$

$$ROP = FL * RPL$$

$$RU = \sum_i^n Species_i$$

$$OUV = PPV * IUV$$

$$ICS = \sum_{i=1}^{\cdot\cdot} (q*i*e)$$

$$FL = I_p/I_u * 100\%$$

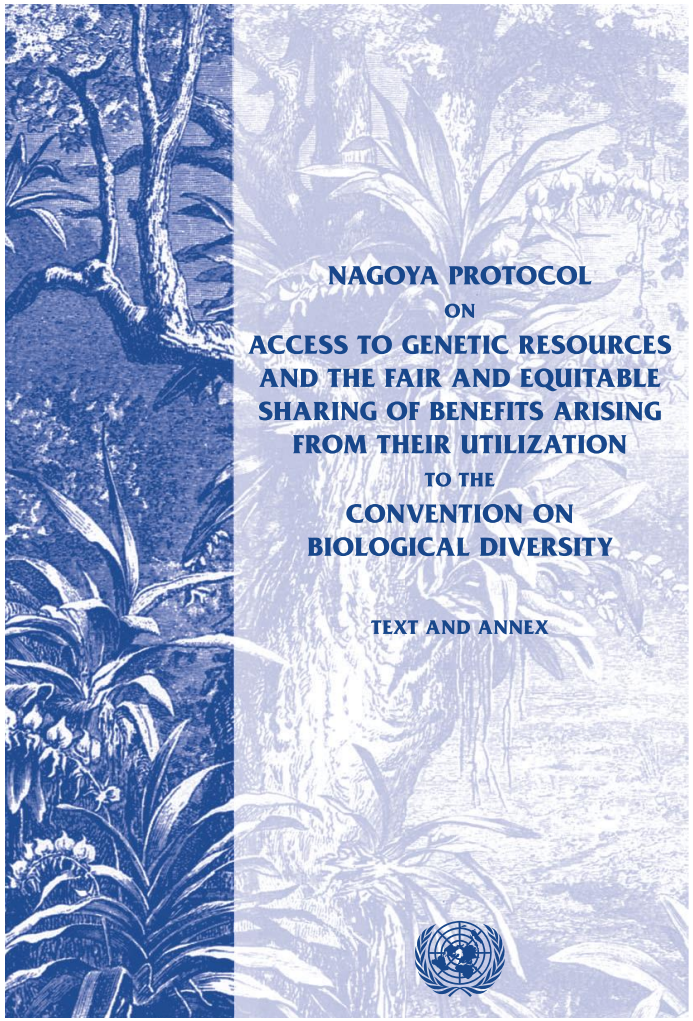
$$FUV = \sum UVs/(n_s)$$

$$V_e = CV_e + PV_e + EV_e$$

$$IS_s = (\sum IS_{is})/(n_i)$$

$$RIR_{Taxon} = \frac{1}{2}(\sum \frac{T_m}{n_m} + \sum \frac{T_f}{n_f})$$

The Nagoya protocol



- Supplementary agreement to CBD
- Adopted by the COP at its 10th meeting October 2010 in Nagoya, Japan
- Provides a transparent legal framework for the effective implementation of one of the three objectives of the CBD:

" the fair and equitable sharing of benefits arising out of the utilization of genetic resources"

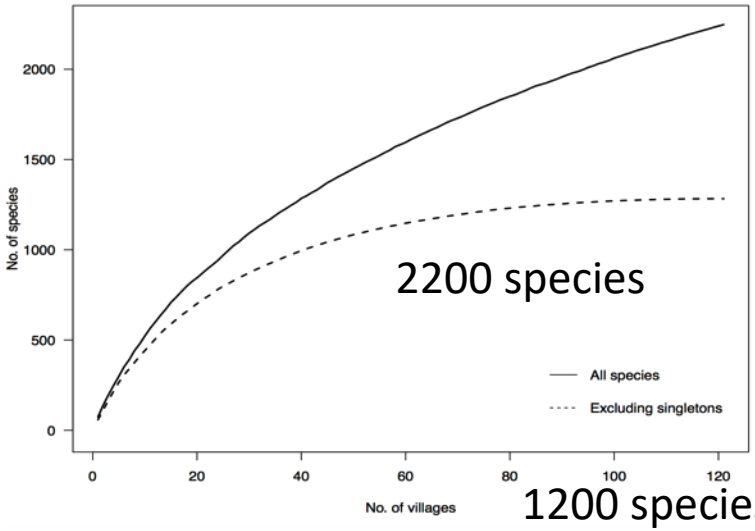
thereby contributing to the conservation and sustainable use of biodiversity

Ethnobotany

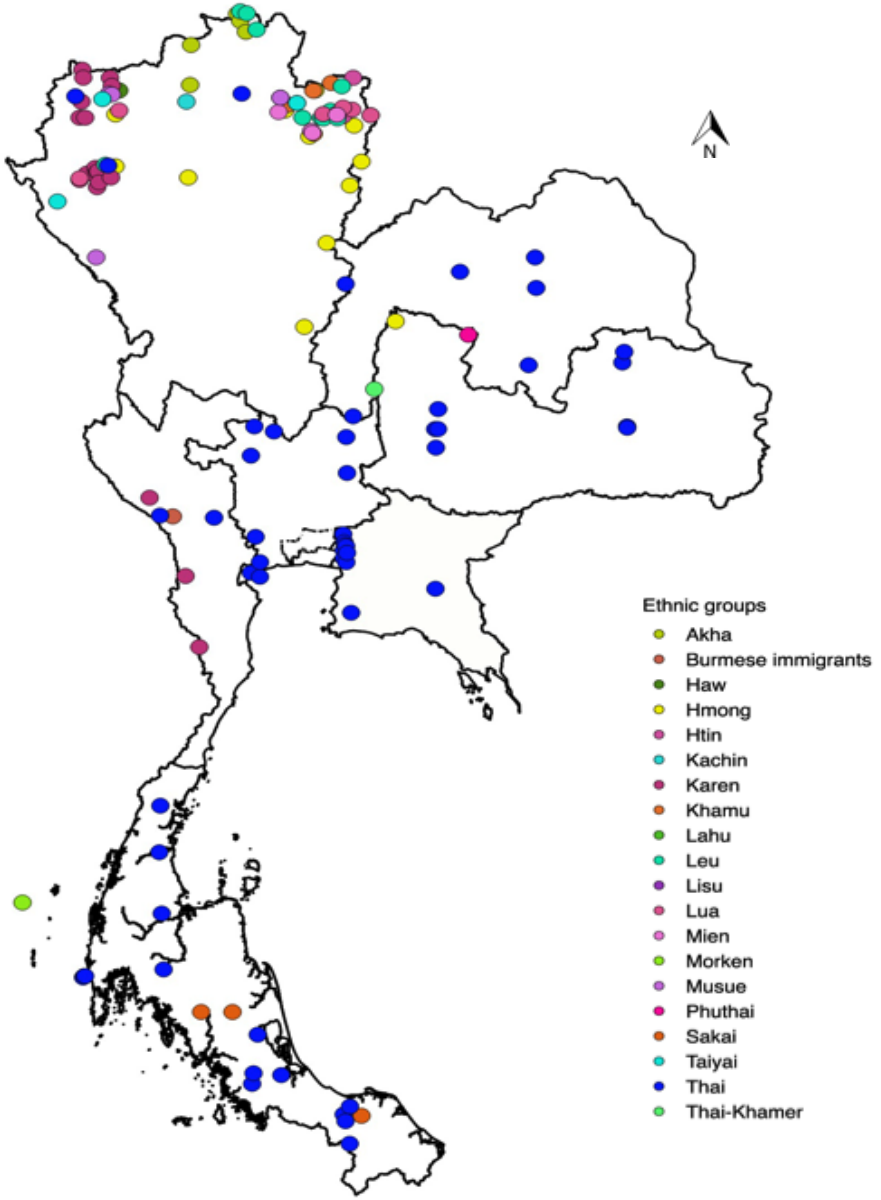
- provides local knowledge for development
- by its very nature it is participatory
- prevents knowledge erosion
- rescues knowledge from acculturation
- helps countries to fulfill the Nagoya protocol

Ethnobotany in Thailand

Analysis of the Thai ethnomedicinal flora
Based on 64 scientific papers and reports
Data from 121 villages and 21 ethnic groups



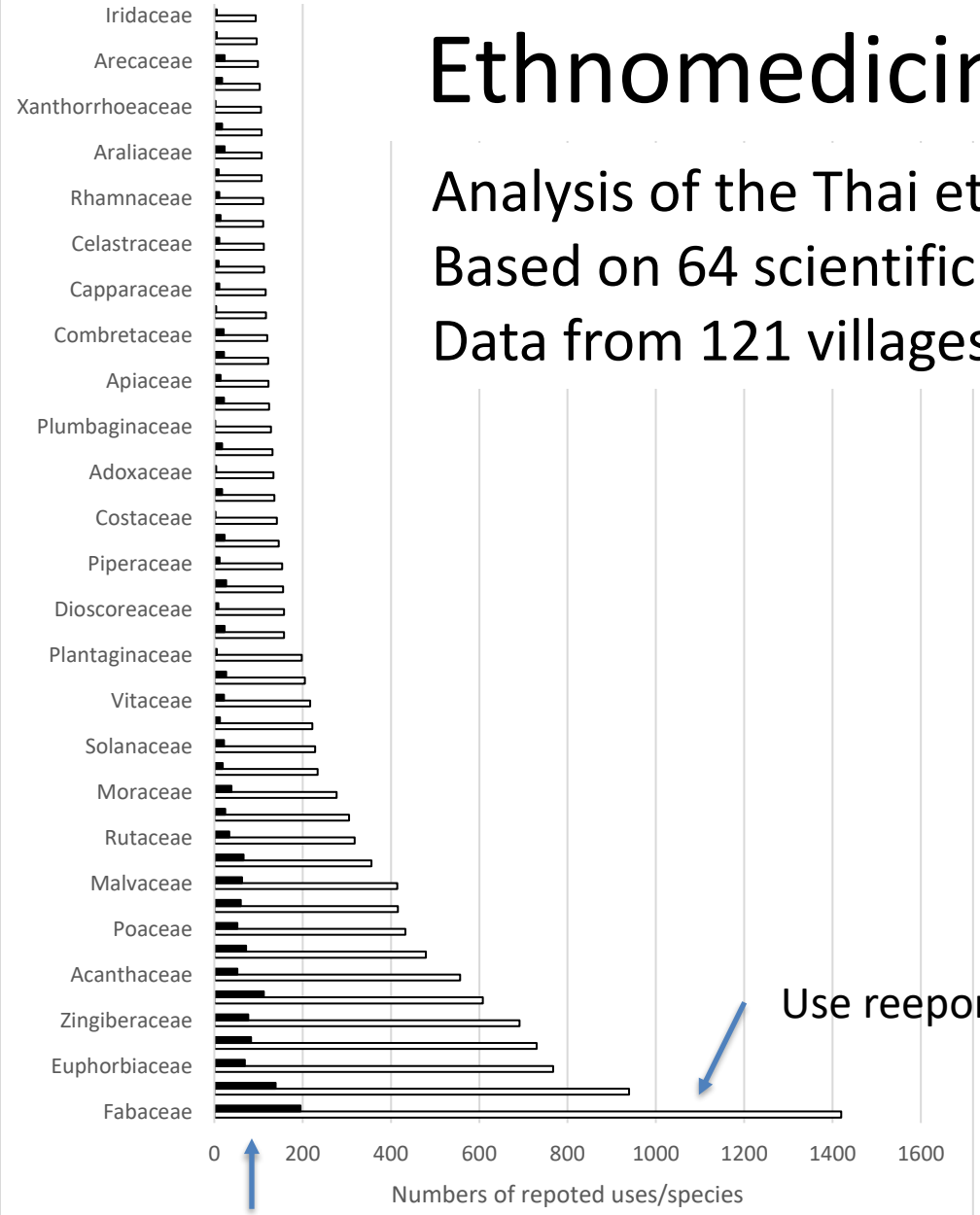
Accumulation curves for medicinal plant species in Thailand plotted against increasing number of studied villages.



Phumthum, M. et al. & H. Balslev. 2018. Ethnomedicinal plant diversity in Thailand. *Journal of Ethnopharmacology.* 214:90-98.

Ethnomedicine of Thailand

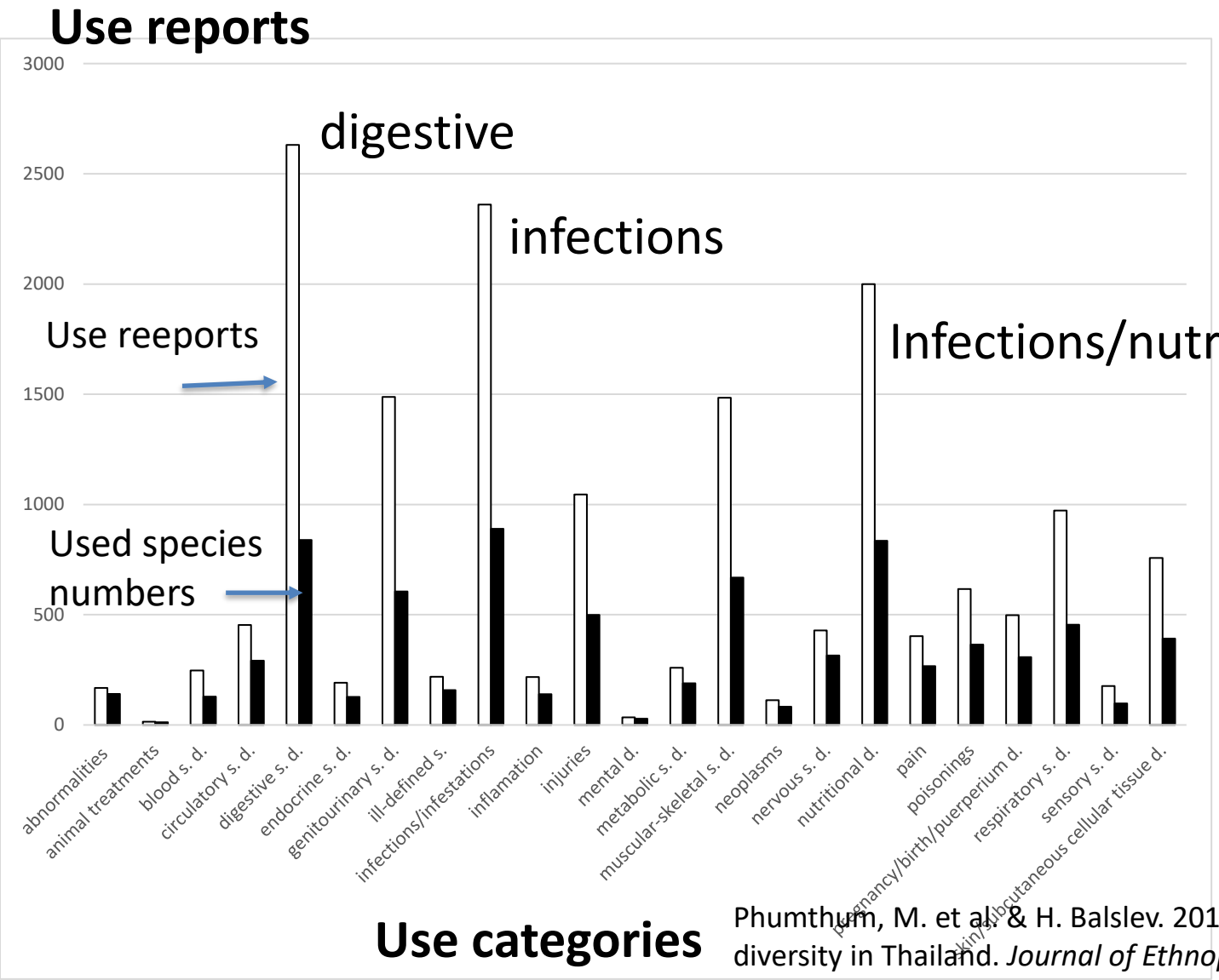
Analysis of the Thai ethnomedicinal flora
Based on 64 scientific papers and reports
Data from 121 villages and 21 ethnic groups



Fifty plant families in Thailand with the highest number of medicinal **use reports** (white bars) and **species with medicinal uses** (black bars)

Phumthum, M. et al. & H. Balslev. 2018. Ethnomedicinal plant diversity in Thailand. *Journal of Ethnopharmacology.* 214:90-98.

Ethnomedicine of Thailand



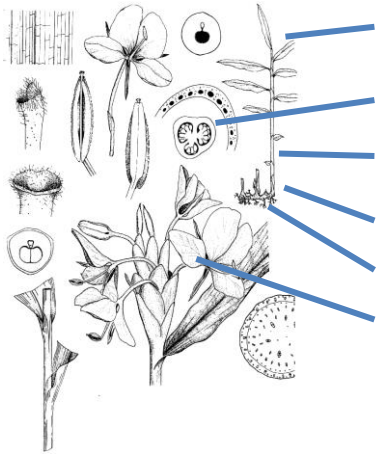
Numbers of use reports (white bars) and medicinal plant species (black bars) in 23 use categories.

Phumthum, M. et al. & H. Balslev. 2018. Ethnomedicinal plant diversity in Thailand. *Journal of Ethnopharmacology.* 214:90-98.

Thai ginger ethnobotany

Zingiberaceae plant part used in ethnomedicine

ZINGIBERACEAE
691 USE REPORTS/PLANT-PARTS FOR MEDICINE



Leaf (22 UR)

Fruits/seeds (19 UR)

Entire plant (19 UR)

Rhizome (558 UR)

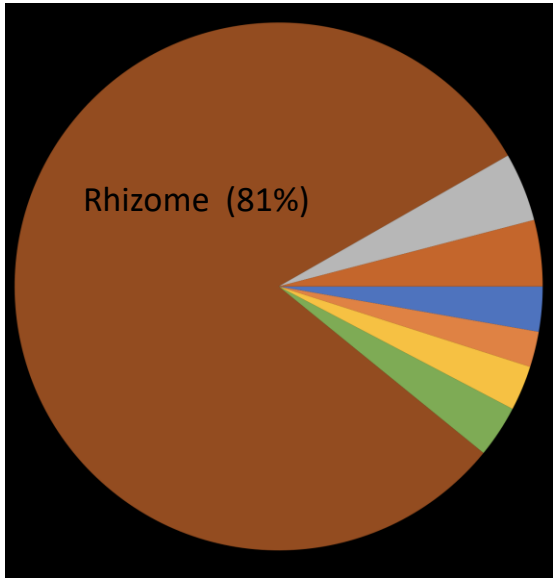
Root (29 UR)

Flower/inflorescence (15 UR)

Unspecified part (29 UR)

Methee Phumthum w. parents

ZINGIBERACEAE
RELATIVE IMPORTANCE OF USE REPORTS/PLANT-PARTS FOR MEDICINE



Unspecified part (4%)

Root (4%)

Entire plant (3%)

Flower/inflorescence (2%)

Fruits/seeds (3%)

Leaf (3%)

Thai ginger ethnobotany

Preparation of Zingiberaceae for medicinal use

ZINGIBERACEAE
277 USE REPORTS/PREPARATION FOR MEDICINE

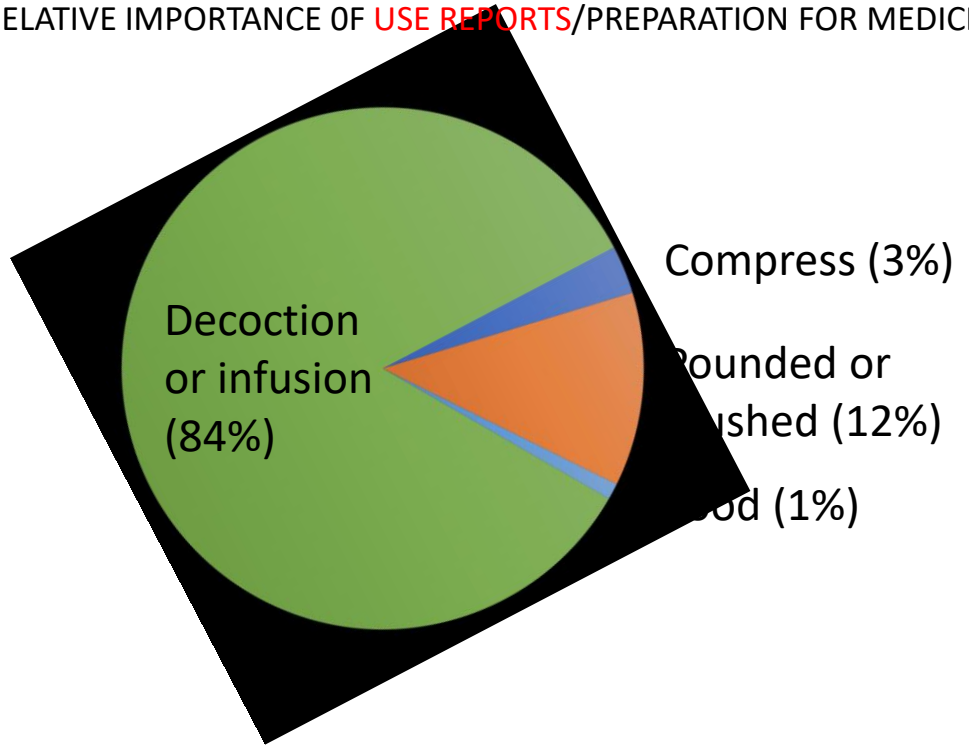
Decoction or infusions
(229 USE REPORTS)

Pounded or crushed
(37 USE REPORTS)

Compress
(9 USE REPORTS)

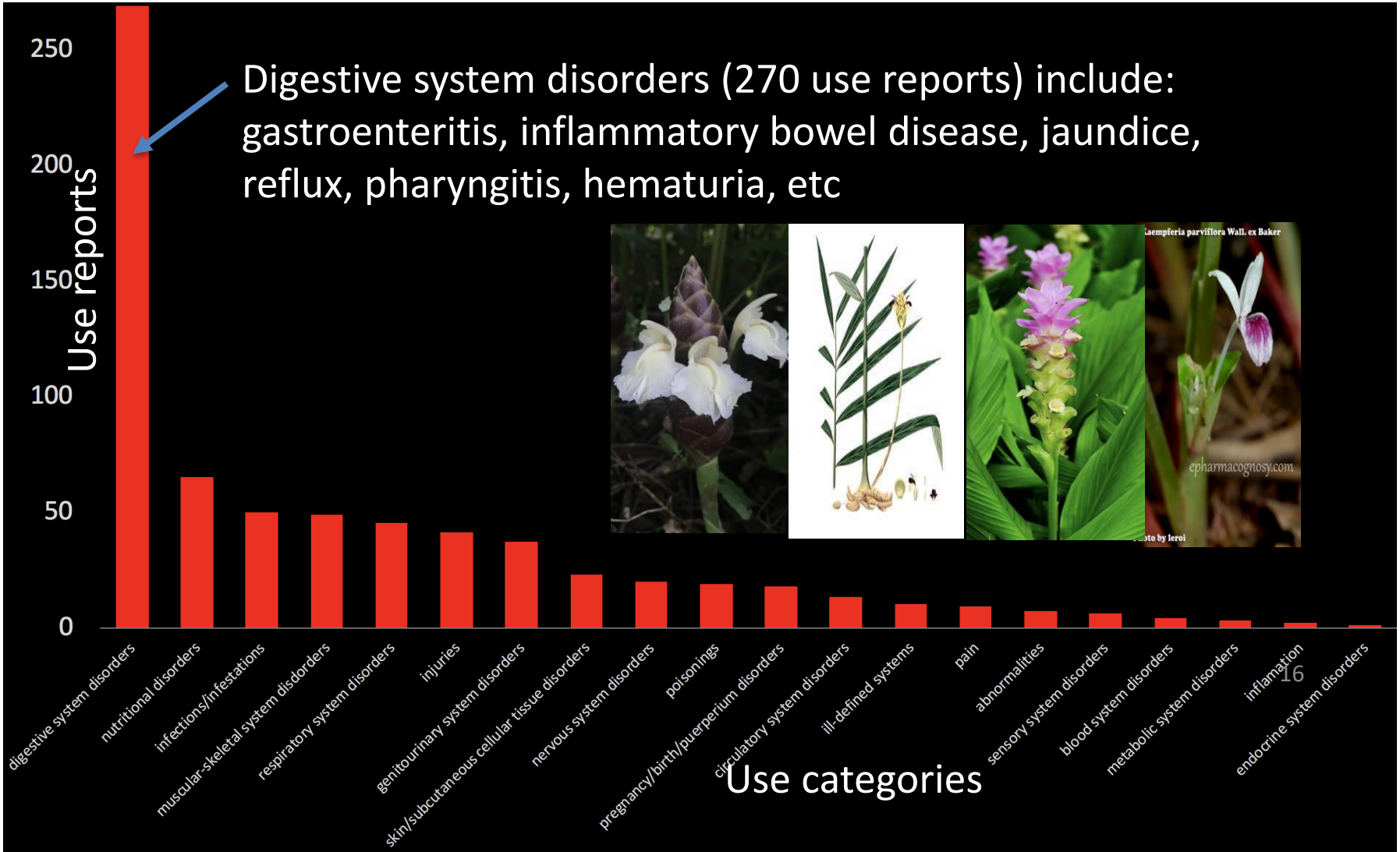
Food
(2 USE REPORTS)

ZINGIBERACEAE
RELATIVE IMPORTANCE 0F USE REPORTS/PREPARATION FOR MEDICINE



Thai ginger ethnobotany

Zingiberaceae were used to treat ailments in all 20 medicinal use categories
Almost 40% of use reports treat digestive system disorders



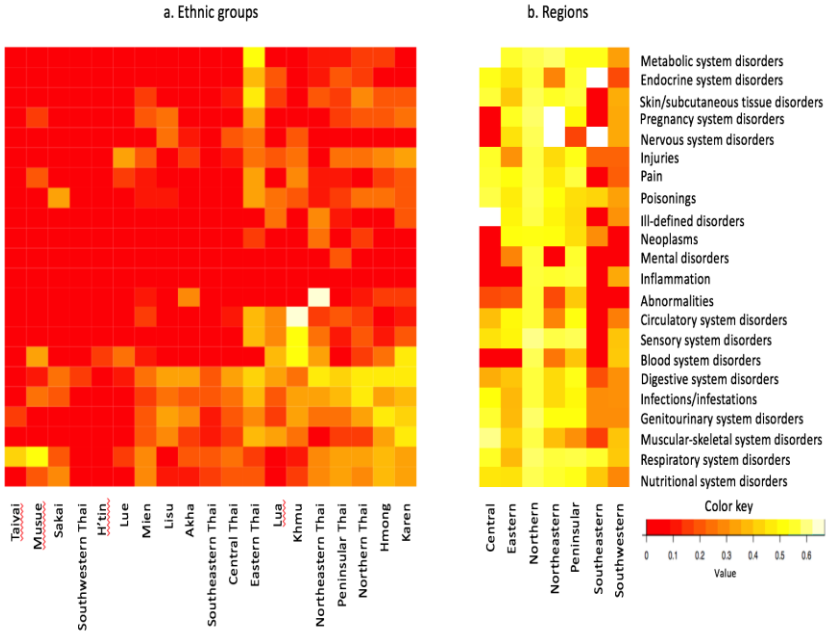
Thai ginger ethnobotany

Informant Consensus Factor ICF = $\frac{Nur-Nt}{Nur-1}$

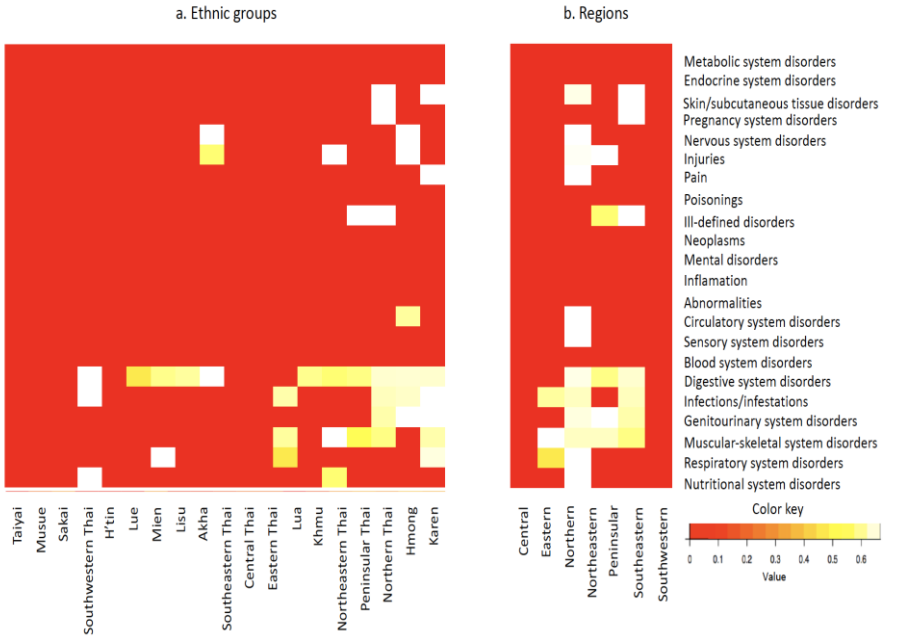
Nur is the number of use reports in a use category

Nt is the number of species used as medicine in a particular use category

All medicinal plants in Thailand



Medicinal Zingiberaceae in Thailand



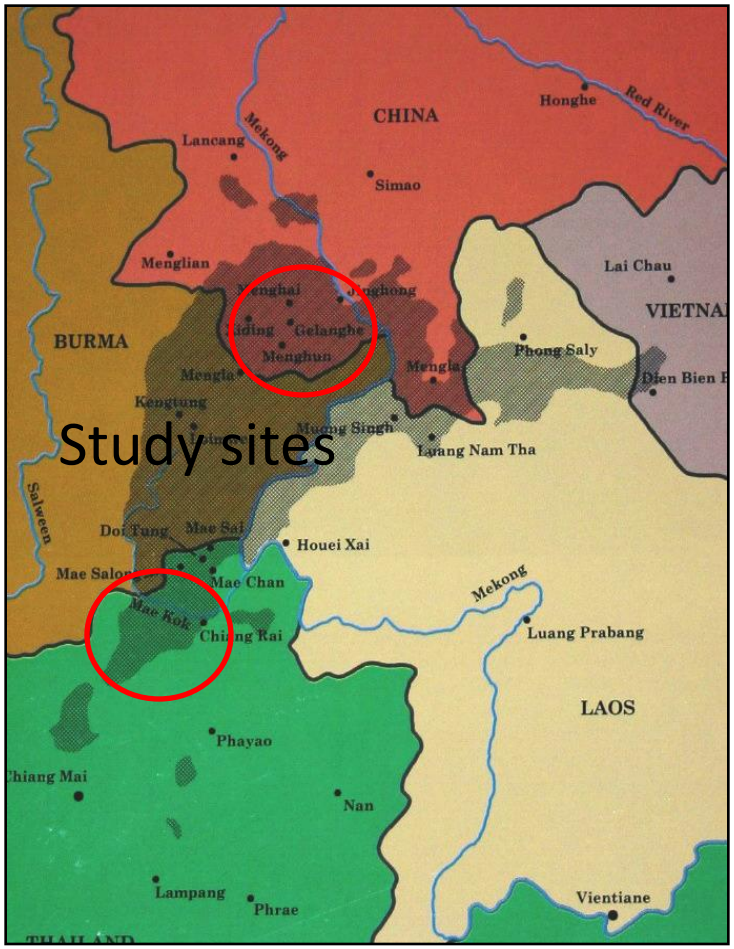
Cook, F. 1995. Economic Botany Data Collection Standard prepared for the International Working Group on Taxonomic Databases for Plant Sciences (TDWG). Royal Botanic Gardens, Kew

Logan, M.H. 1986. Informant consensus: A new approach for identifying potentially effective medicinal plants. Plants in indigenous medicine and diet: Biobehavioral approaches, 91

Comparative ethnomedicine

Are ethnomedicinal uses culturally or ecologically bound ?

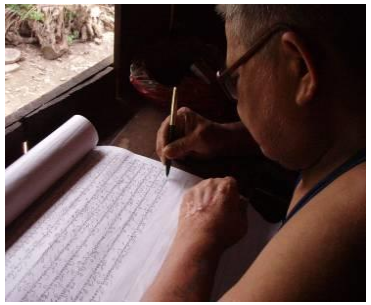
Angkhana Inta
(PhD, ethnobotanist, CMU)



Akha 1.1 mio people

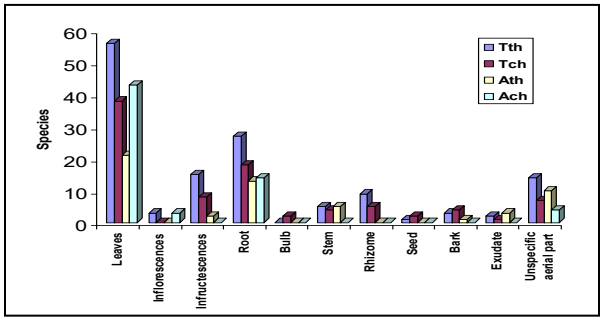
Tai Lue 1 mio people

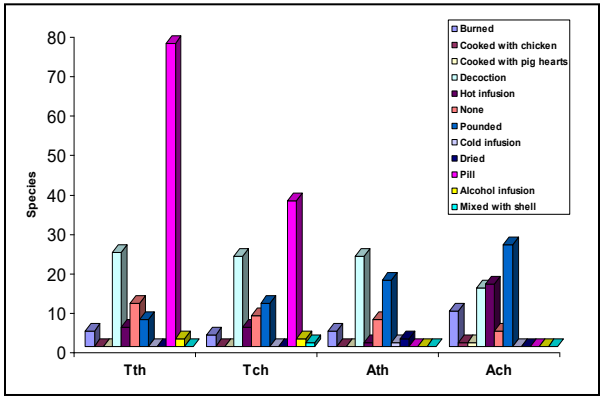
Migrated from China to Thailand 1800 and 1925

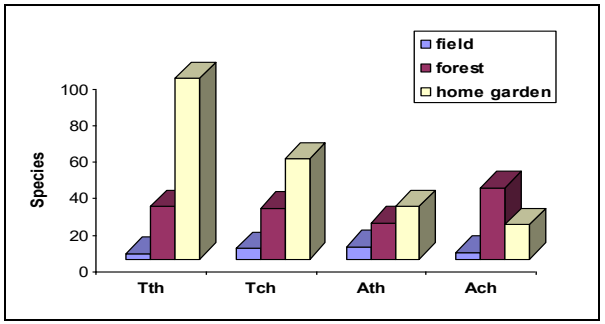


Comparative ethnomedicine

Are ethnomedicinal uses culturally or ecologically bound ?



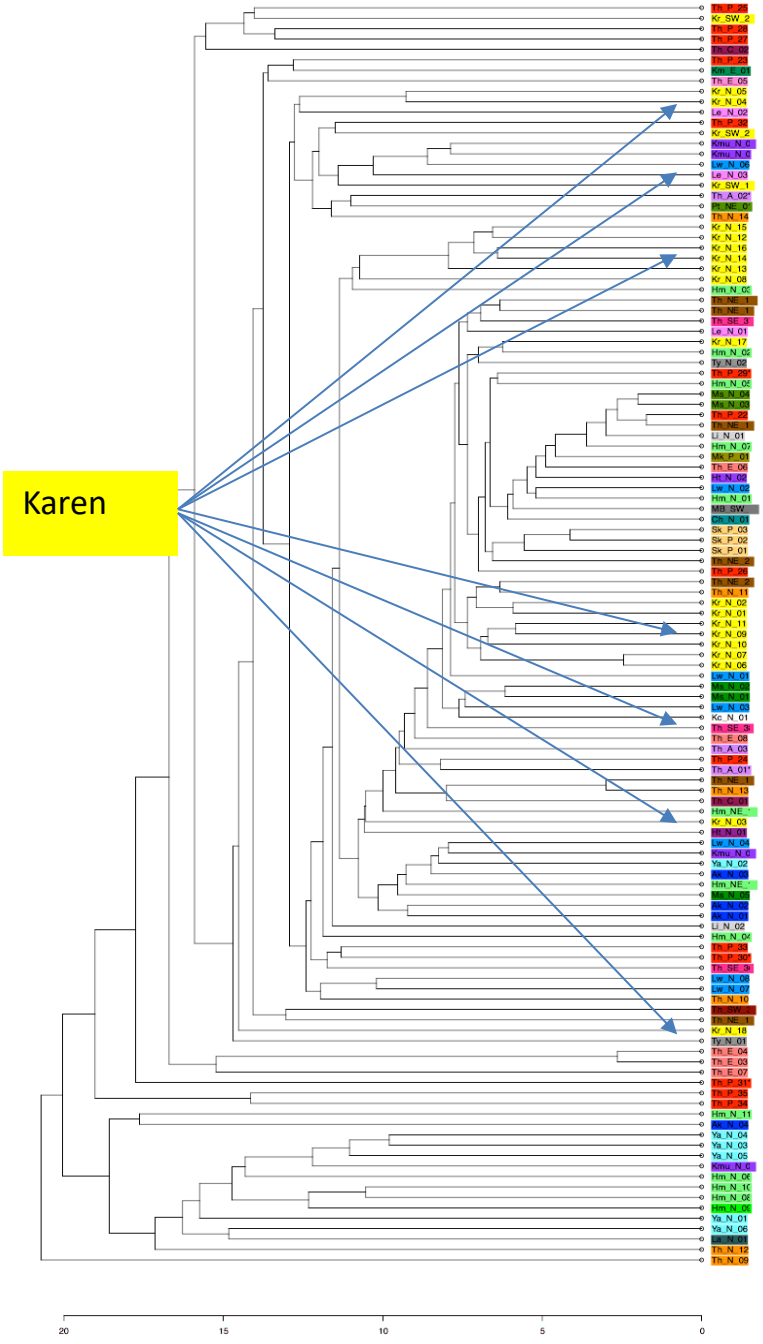




1. The patterns and systems of use are culturally determined and inherited from generation to generation

but

2. The specific plant species used are ecologically determined, *i.e.,* the ecological determinism is superimposed on top of the cultural systems that determine plant use.



SIMILARITIES BETWEEN USED SPECIES/VILLAGE

Cluster analysis of medicinal plants used in the 121 villages inhabited by 19 ethnic minority. groups and rural Thai communities in 7 regions

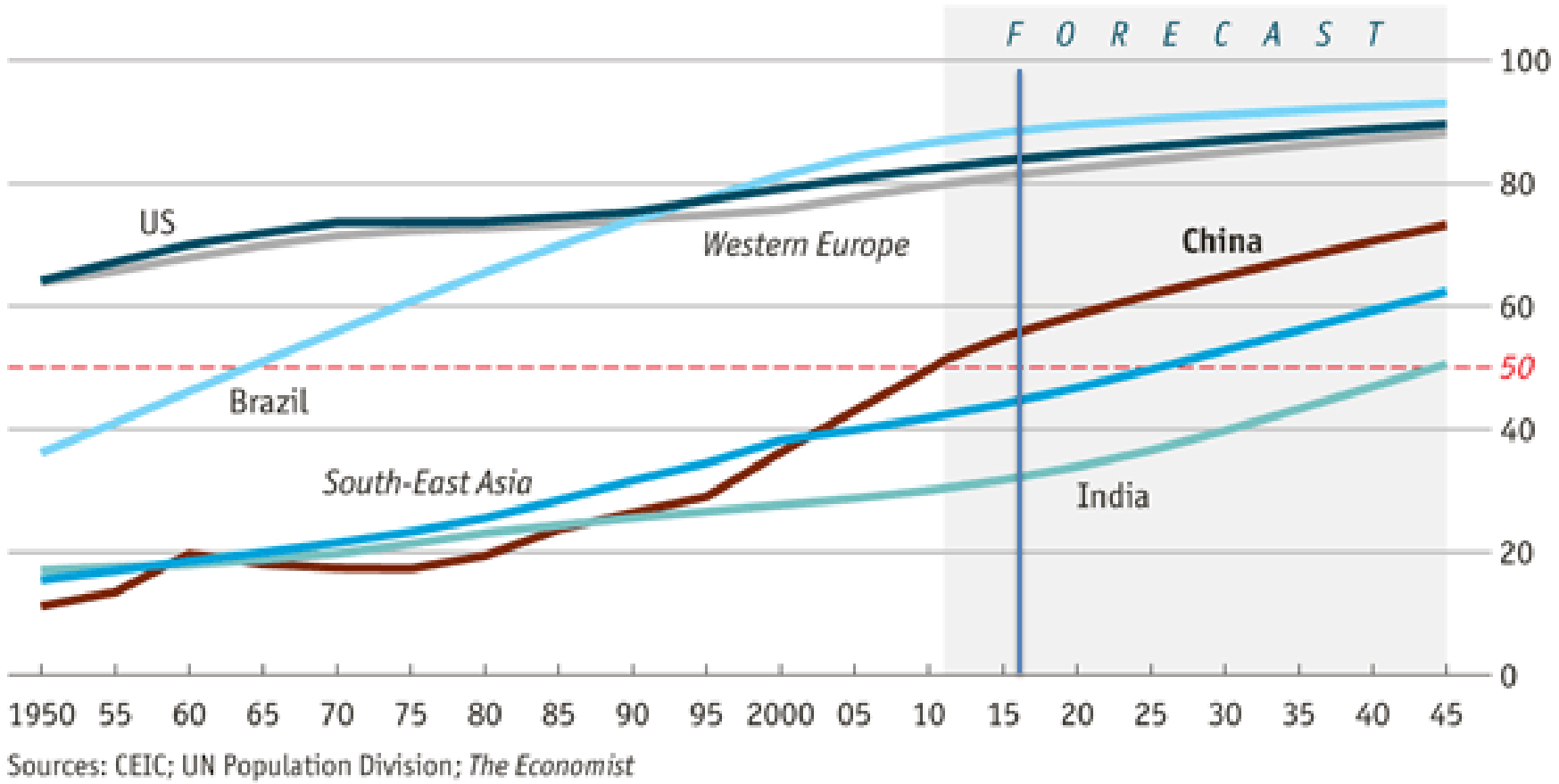
The many Karen villages were NOT clustered in the diagram

Same for the other ethnic minority groups and also for the rural Thai communities

So patterns of which species are used do not have strong cultural/ethnic boundaries

Phumthum, M. et al. & H. Balslev. 2018. Ethnomedicinal plant diversity in Thailand. *Journal of Ethnopharmacology.* 214:90-98.

Ethnobotany and urbanization



Ethnobotany and urbanization

- Lack of contact with natural environment
- Loss of traditional knowledge
- KNOWLEDGE EROSION

In a time when modern societies are said to be information-based

And in a time when modern societies are building technical capacity to handle exponentially growing amounts of information

Etnobotany and erosion of traditional knowledge

General assumption in ethnobotanical studies :

all plants mentioned as useful

= those are actually being used

- loss of actual uses of plants

  = **loss of traditional plant use knowledge**

- Gap between people's knowledge and their actual use of plants

  = **First sign of knowledge erosion**

Reyes-García *et al.,* 2005

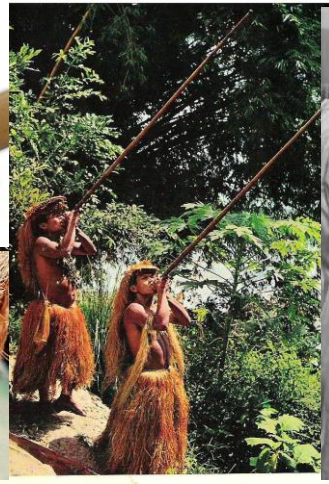
Etnobotany of medicinal plants

Traditional medicine and drug discovery

Strychnos toxifera in the Amazon

- **Curare** – South American arrow poison – preparation described by Humboldt 1799-1804 from the Orinoco area
- Collins Brody (1811-12) showed that curare does not kill the animal if it is kept ventilated — it was a muscle relaxant that paralyzed breathing
- In 1942 curare became a muscle relaxant in surgery (*Strychnos toxifera)*



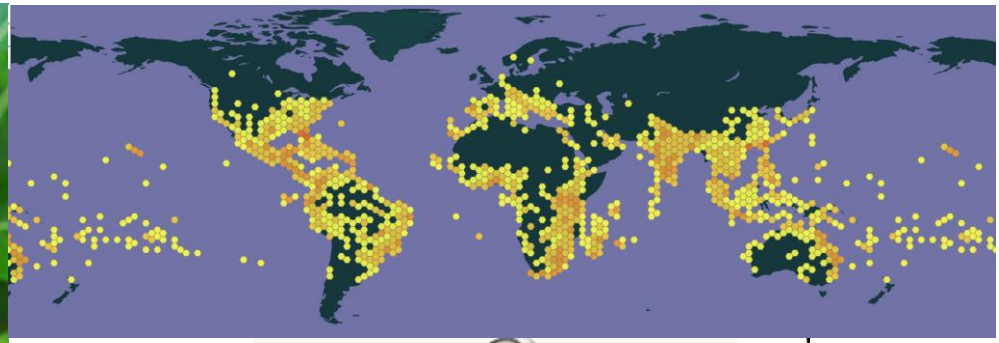
Traditional medicine and drug discovery

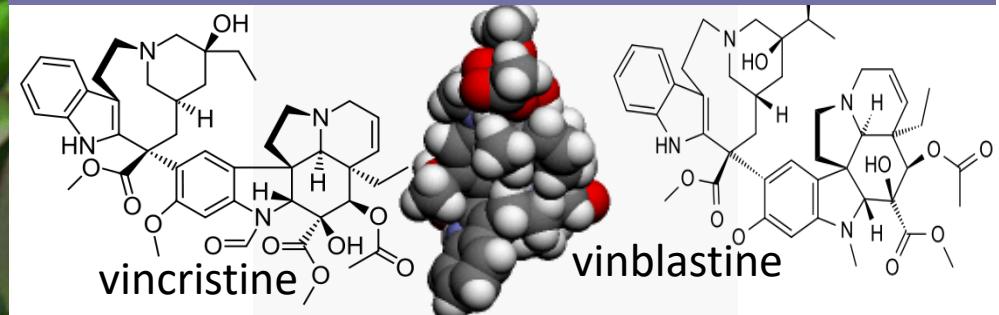
Cataranthus roseus – Madagascar periwinkle

• Ethnobotanists had described traditional uses of it to treat many diseases, incl. diabetes, malaria, Hodgkin's lymphoma and leukemia
Contains vinblastine, used to treat lymphoma and leukemia

• 1950s chemists isolated vinblastine and vincristine

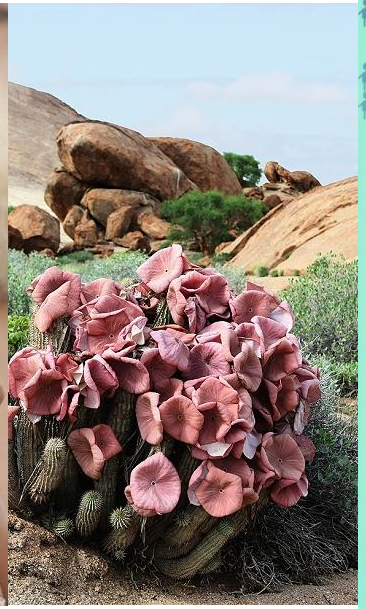
• very effective in treatment of leuchemia and other cancer forms

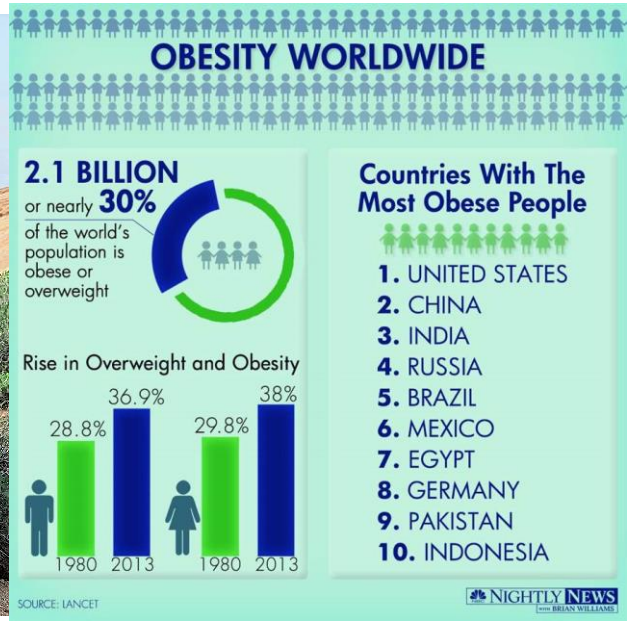




Traditional medicine and drug discovery

Hoodia gordonii (Apocynaceae)





- Ethnobotanist described how the San people used *Hoodia gordonii* to supress appetite in the harsh desert environment 1932
- South Africa's CSIR patentet its use without recognizing the San as discoverers 1997
- CSIR sold the patent to British Unilever, who developed the drug for 20 mio GBP
- The San won a courtcase to be compensated with 8% of the profits 2003
- Unilever dropped the product for commercial and security reasons 2009

Verrmaak et al. (2011) Hoodia gordonii:An Up-to-Date Review of a Commercially Important Anti-Obesity Plant. Planta Med 77, 1149–1160

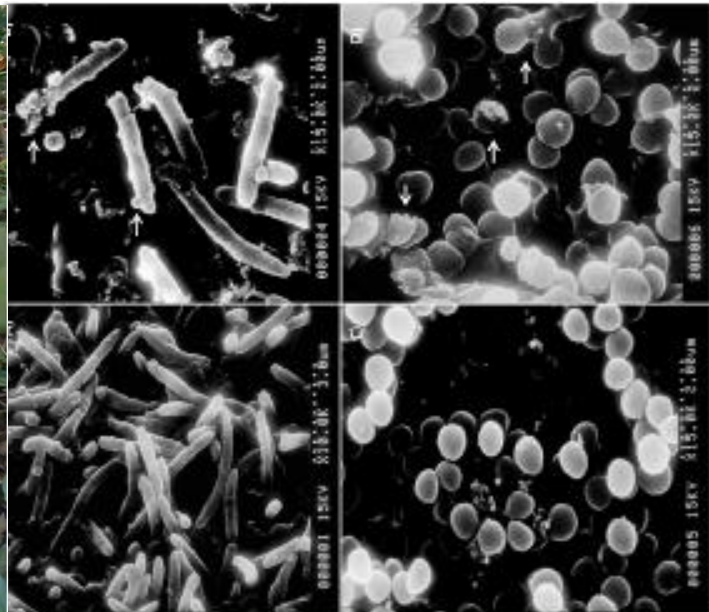
Traditional medicine and drug discovery

- Tiwtawat Napiroon, when he was a PhD students, Kasetsart University, came across ethnobotanical information that *Lasianthus* species were used in traditional medicine to treat “noises in the ear”
- Napiroon has now proved that leaf extracts have anti-bacterial effects

ANTIBACTERIAL PROPERTY TESTING OF TWO SPECIES OF TROPICAL PLANT *LASIANTHUS* (RUBIACEAE)

Tiwtawat Napiroon[1], Henrik Balslev[2], Sutee Duangjai[3], Duangchai Sookchaloem[3], Kongkanda Chayamarit[4], Wichai Santimaleeworagun[5] and Srunya Vajrodaya[1]

South East Asian Journal of Tropical Medicine and Public Health vol. 48, jan 2017



CONCLUSION

ETHNOBOTANY — why ?

- Qualitative and quantitative methods both remain valuable in ethnobotany
- Qualitative methods may generate a deeper cultural understanding but do not lend themselves to comparisons
- Quantitative methods lend themselves to stronger and more generalized conclusions
- Provides important leads to commercial/industrial drug discovery
- Preserves local knowledge for maintaining local pharmacopeias
- Documents ecosystem services
- Answers intrinsic questions about our world

THANK YOU FOR YOUR ATTENTION

https://seafancarrental.com/best-sunrise-and-sunset-spots-in-thailand/