



การเขียนบทความ เพื่อตีพิมพ์เผยแพร่ผลงานทางวิชาการ



การเผยแพร่ผลงานทางวิชาการ

- บทความวิจัยหรือบทความทางวิชาการฉบับเต็มที่มีการตีพิมพ์ในรายงานสืบเนื่องจากการประชุมวิชาการ (Proceeding)
- บทความวิจัยหรือบทความทางวิชาการที่ตีพิมพ์ในวารสารวิชาการระดับชาติ (Journal)
- บทความวิจัยหรือบทความทางวิชาการที่ตีพิมพ์ในวารสารวิชาการระดับนานาชาติ (International Journal)



แปลงวิจัยนิเวศวิทยาป่าไม้ถาวรระยะยาว 15 เฮกแตร์ ดอยอินทนนท์

15-ha Doi Inthanon Long Term Forest Ecological Research Plot

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วัตถุประสงค์ของการวางแผนศึกษานิเวศวิทยาป่าไม้ขนาดใหญ่

- เพื่อจัดเตรียมข้อมูลประชากรที่มีขนาดใหญ่ของการเกิดขึ้นร่วมกันของชนิดพันธุ์
- เพื่อจัดเตรียมข้อมูลที่ถูกต้องแม่นยำต่อกำลังผลิตของไม้ทางด้านเศรษฐศาสตร์ / การกักเก็บคาร์บอน / การอนุรักษ์หรือสงวนพันธุ์พืช
- ข้อมูลการศึกษาวิจัยระยะยาวสามารถศึกษาและติดตามการเปลี่ยนแปลงภูมิอากาศ / การรบกวนโดยมนุษย์ และการประเมินการสูญเสียพันธุ์ของชนิดพันธุ์ไม้ป่าเขตร้อน
- เพื่อได้ข้อมูลพื้นฐานรายชนิดเพื่อช่วยในการขยายพันธุ์สำหรับการฟื้นฟูป่าและการปลูกสร้างสวนป่า
- เพื่อเป็นข้อมูลสำหรับการบริหารจัดการพื้นที่อนุรักษ์



การบริการของแปลงถาวรขนาดใหญ่ต่องานวิจัยพื้นฐาน

แปลงถาวรขนาดใหญ่

ปฏิสัมพันธ์ระหว่างพืชและสัตว์

ปฏิสัมพันธ์ระหว่างดินและพืช

งานวิจัยทางสังคมพืช/สัตว์

งานวิจัยด้านนิเวศวิทยา

งานวิจัยด้านสรีรวิทยา

งานวิจัยด้านพันธุศาสตร์

งานวิจัยด้านชีวลักษณะ



The **Center for Tropical Forest Science (CTFS)** is a global network of forest research plots and scientists dedicated to the study of tropical and temperate forest function and diversity. **The multi-institutional network comprises more than thirty forest research plots across the Americas, Africa, Asia, and Europe, with a strong focus on tropical regions.** CTFS monitors the growth and survival of approximately 3.5 million trees and 7,500 species.

CTFS conducts long-term, large-scale research on forests around the world to:

- Increase scientific understanding of forest ecosystems
- Guide sustainable forest management and natural-resource policy
- Monitor the impacts of climate change
- Build capacity in forest science

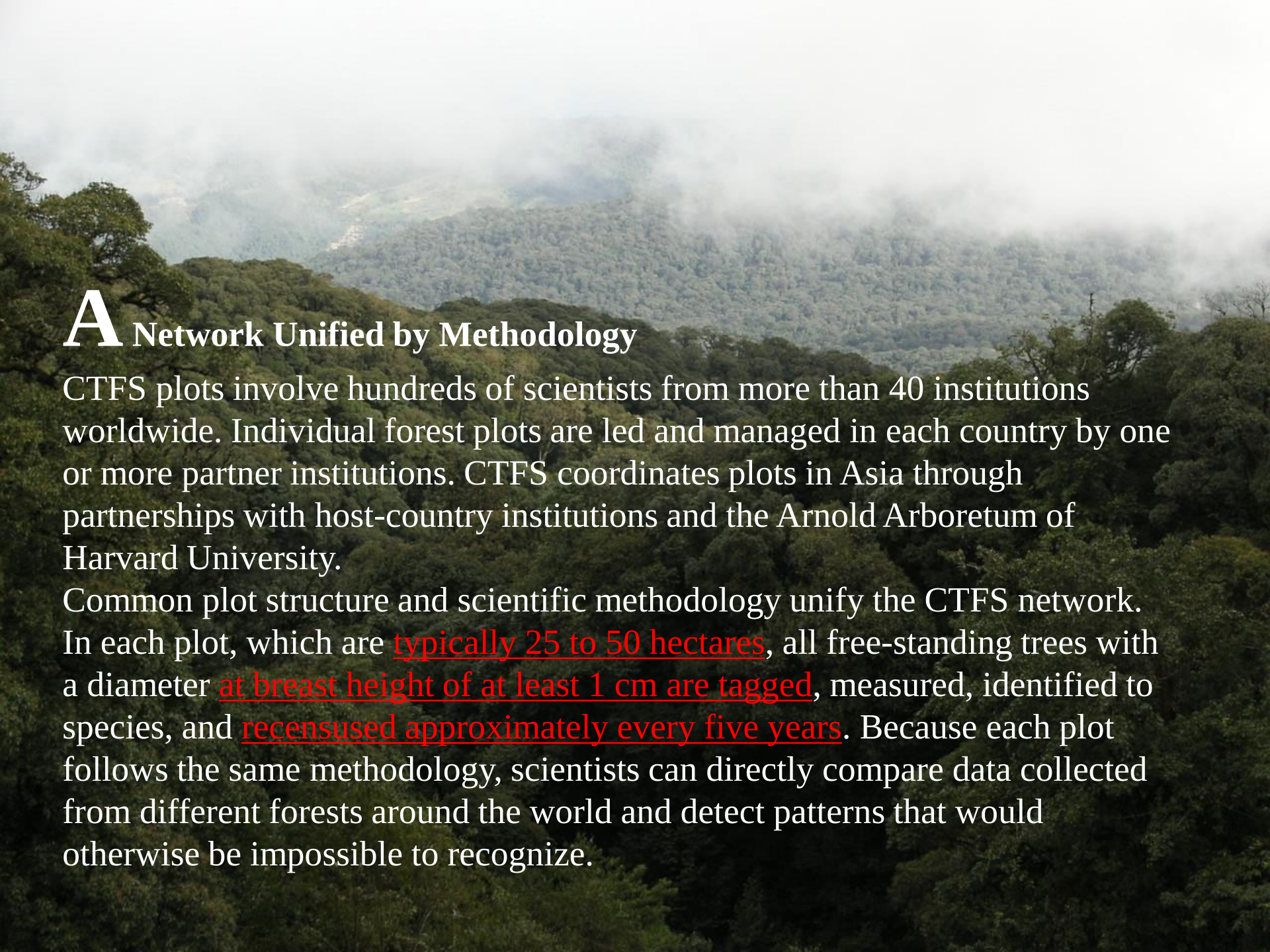
Source: <http://www.ctfs.si.edu/>

Center for Tropical Forest Science (CTFS)

a global network for forest research and training



The ARNOLD
ARBORETUM
of HARVARD UNIVERSITY

A misty forest landscape with a large tree in the foreground and a mountain in the background. The text is overlaid on the left side of the image.

A Network Unified by Methodology

CTFS plots involve hundreds of scientists from more than 40 institutions worldwide. Individual forest plots are led and managed in each country by one or more partner institutions. CTFS coordinates plots in Asia through partnerships with host-country institutions and the Arnold Arboretum of Harvard University.

Common plot structure and scientific methodology unify the CTFS network. In each plot, which are typically 25 to 50 hectares, all free-standing trees with a diameter at breast height of at least 1 cm are tagged, measured, identified to species, and recensused approximately every five years. Because each plot follows the same methodology, scientists can directly compare data collected from different forests around the world and detect patterns that would otherwise be impossible to recognize.

•Africa •Korup, Cameroon •Ituri, Dem. Rep. of Congo •Rabi, Gabon	•Asia •Changbaishan, China •Dinghushan, China •Gutianshan, China •Xishuangbanna, China •Mudumalai, India •Danum Valley, Malaysia •Lambir, Malaysia •Pasoh, Malaysia •Palanan, Philippines •Bukit Timah, Singapore •Sinharaja, Sri Lanka •Fushan, Taiwan •Lienhuachih, Taiwan •Nanjenshan, Taiwan •Doi Inthanon, Thailand •Huai Kha Khaeng, Thailand •Khao Chong, Thailand •Mo Singto, Thailand	•Europe •Wytham Woods, UK	•Latin America •Ilha do Cardoso, Brazil •Manaus, Brazil •Amacayacu, Colombia •La Planada, Colombia •Yasuni, Ecuador •Barro Colorado Island, Panama •Cocoli, Panama •Sherman, Panama •Luquillo, Puerto Rico	•North America •Haliburton Forest, Canada •CRC: Smithsonian Conservation & Research Center, USA •SERC: Smithsonian Environmental Research Center, USA •Wabikon Lake Forest, USA •Wind River, USA •Yosemite National Park, USA
•Oceania •Wanang, Papua New Guinea •Laupahoehoe, USA •Palamanui, USA				

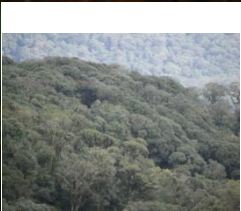
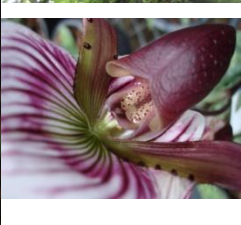


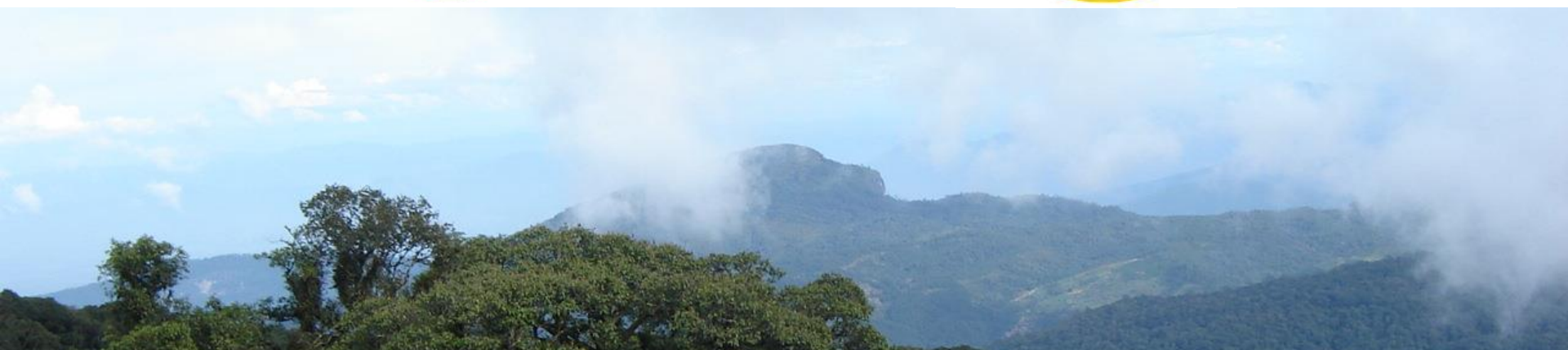
Doi Inthanon Forest Dynamic Plot

(Since 1996)

Maejo University, Thailand
Kasetsart University, Thailand
Royal Forest Department, Thailand
Osaka City University, Japan
Kyoto University, Japan
Utsunomiya University, Japan
Chiba Natural History Museum, and Institute, Japan

Doi Inthanon Forest Dynamic Plot
(since 1996)





สูงสุดแดนสยาม THE HIGHEST SPOT IN THAILAND

สูงจากระดับน้ำทะเลปานกลาง 2,565.3341 เมตร
2,565.3341 Meters Above Mean Sea Level

อุทยานแห่งชาติดอยอินทนนท์ กองอุทยานแห่งชาติ กรมป่าไม้
Doi Inthanon National Park, National Parks Division, Royal Forest Department

สยามีสท์ ไทย
THAIFARM BANK



Dec, 2000

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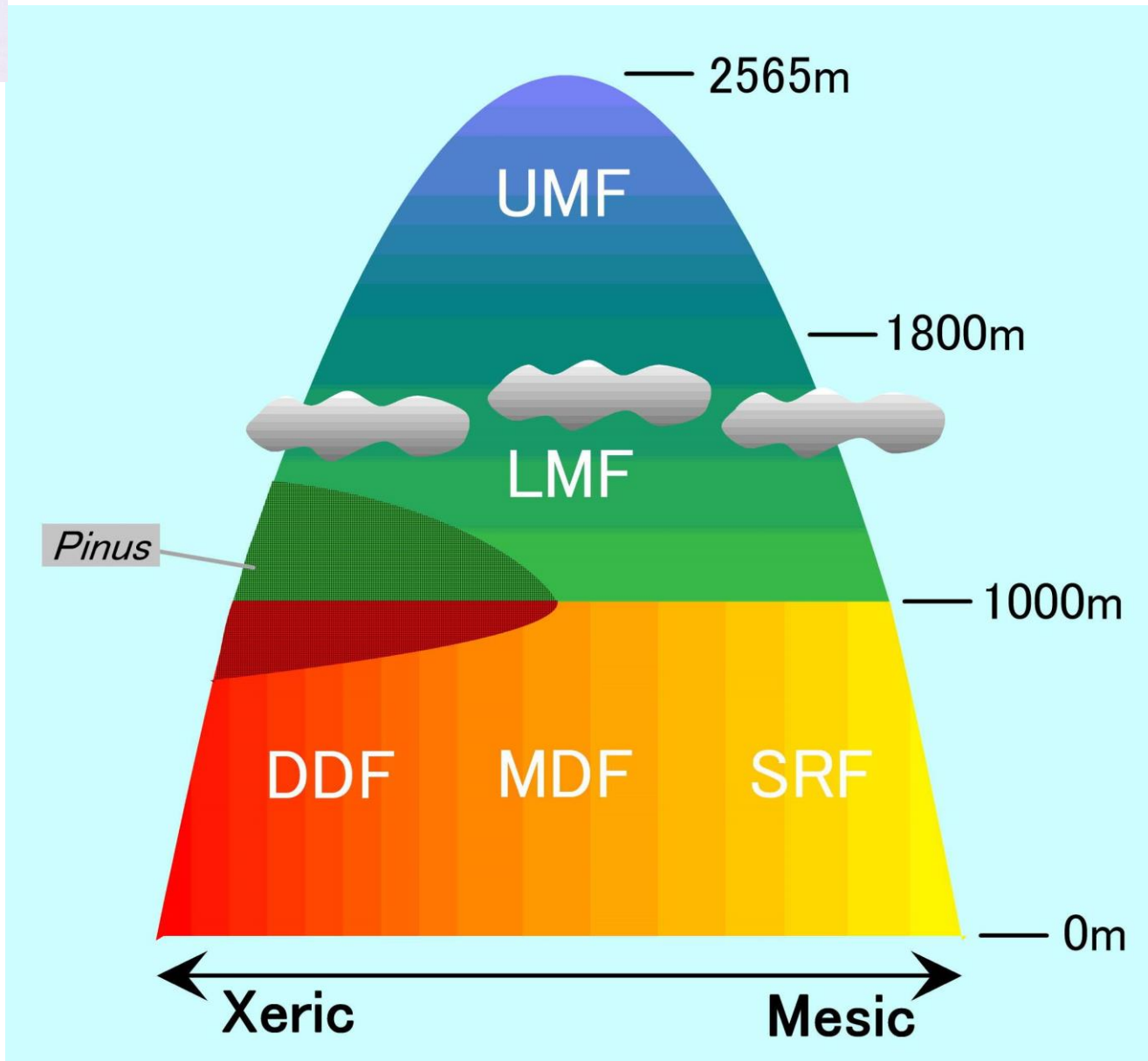
Assist. Prof. Dr. Kanittha
Satienperakul
Maejo Univ.

Geographical Location of Doi Inthanon



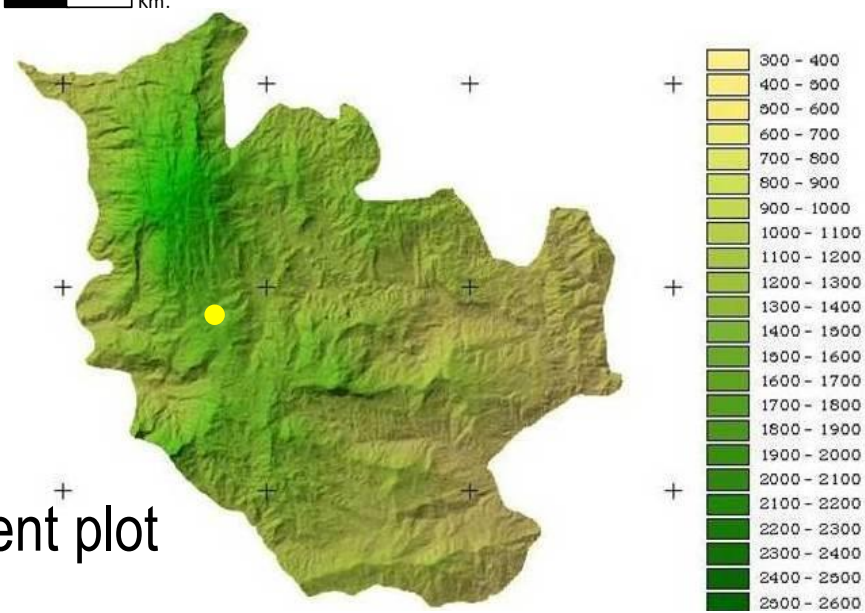
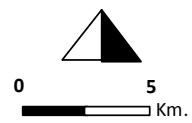
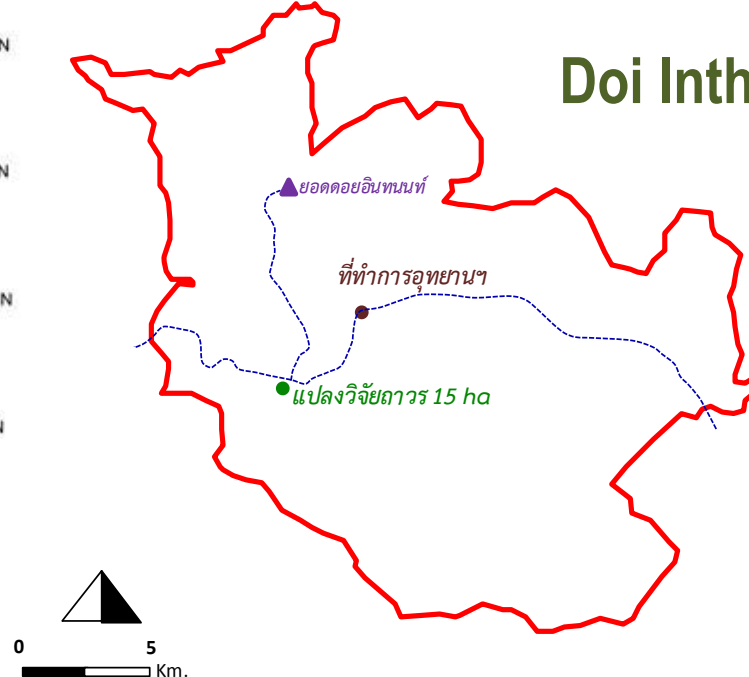


Vegetation Zonation of Doi Inthanon





Doi Inthanon National Park



A 15 ha permanent plot



300 m.

An aerial photograph of a dense forest. A rectangular plot is outlined in blue. To the left of the plot, a vertical double-headed arrow indicates a height of 300 m. Below the plot, a horizontal double-headed arrow indicates a width of 500 m. In the top right corner of the plot, a blue rounded rectangle contains the text '15 hectar' and '93.75 rais'. The forest is lush green, and the background shows more forested hills.

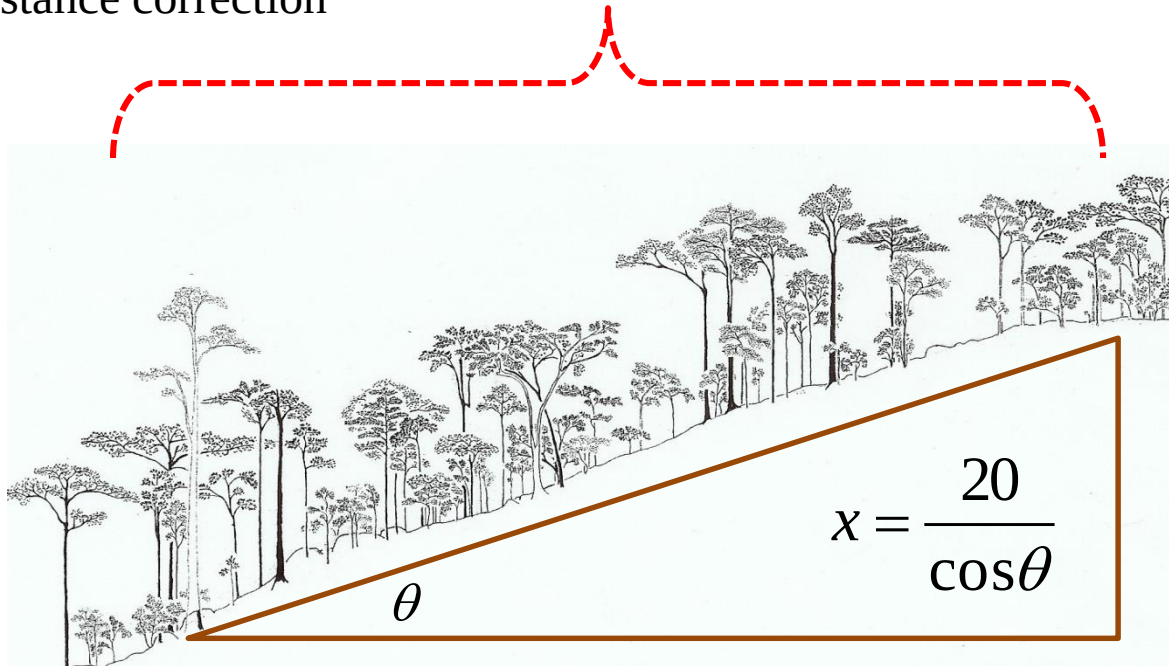
15 hectar
93.75 rais

500 m.

History of plot demarcation

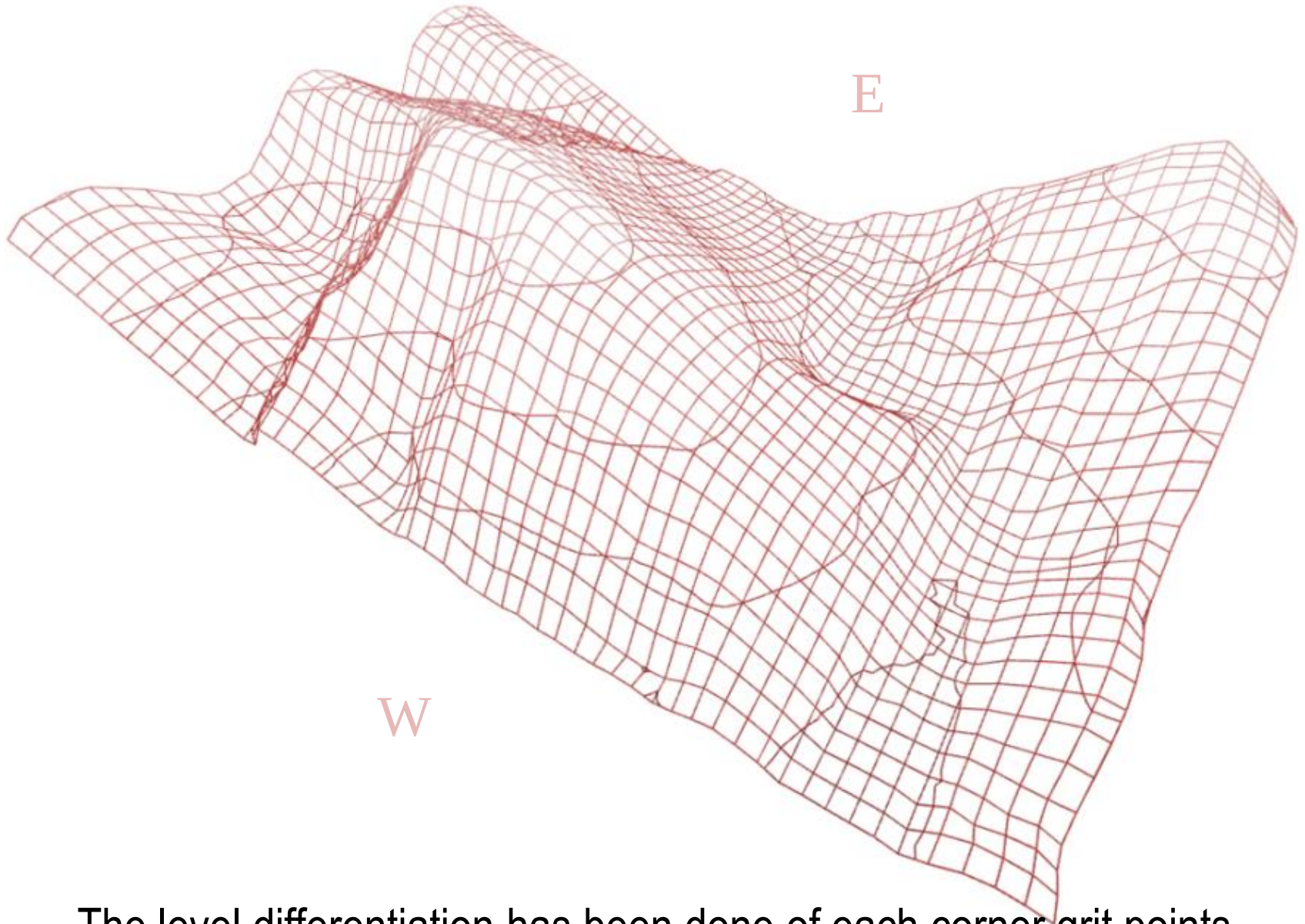
Quadrates of 20×20 m size was constructed in the horizontal distance using traverse compasses (LS-25, Ushikata, Tokyo) and measuring tape. All 20×20 m corners were allocated with PVC pipes.

Distance correction $\times$ (*Horizontal distance*)



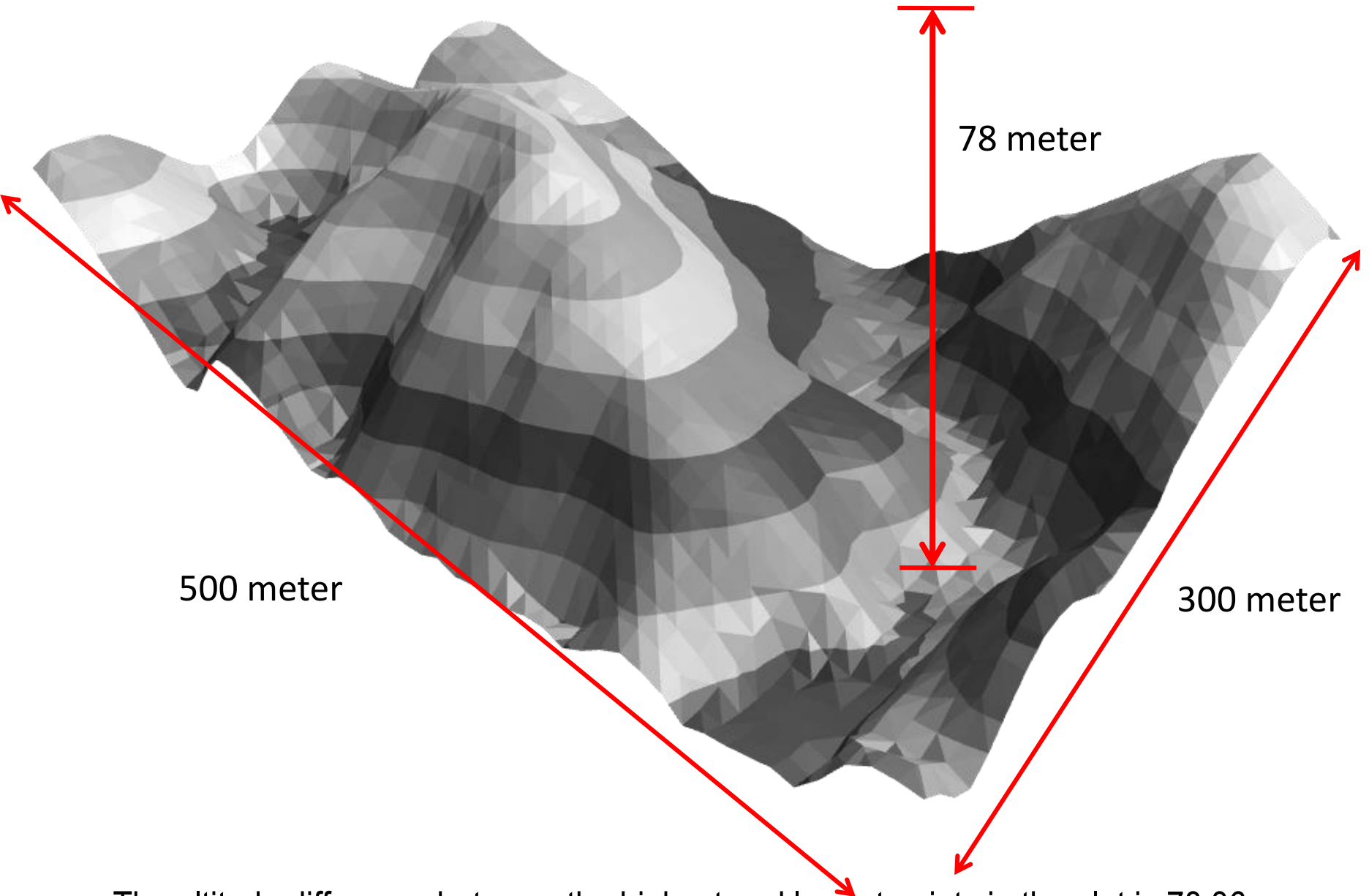
Tree census have been done and followed the methods standardized by the Center for Tropical Research Forest Science in the Smithsonian Tropical Research Institute (see Condit, 1998).

Plot demarcation



The level differentiation has been done of each corner grit points.

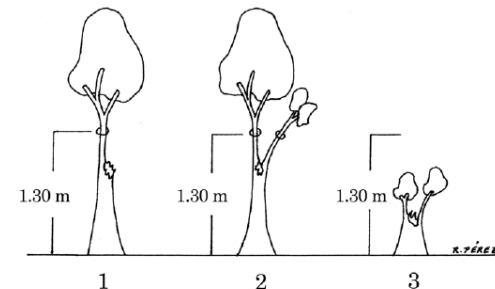
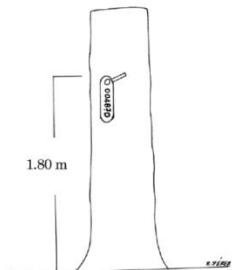
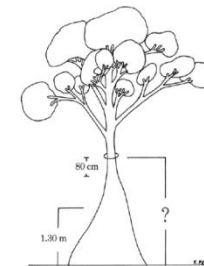
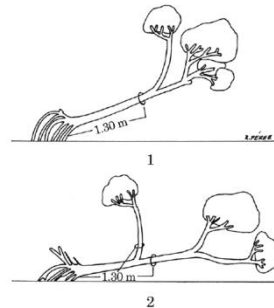
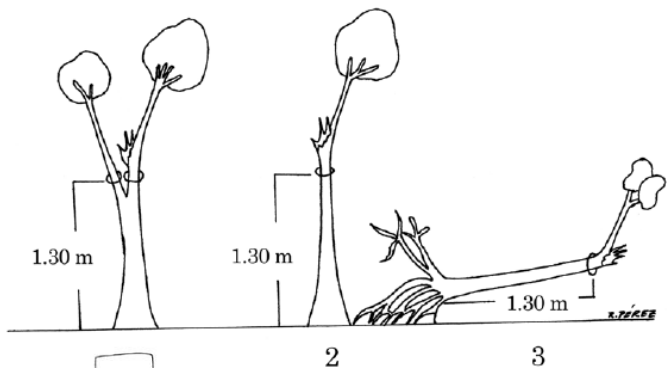
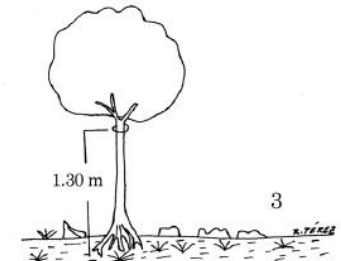
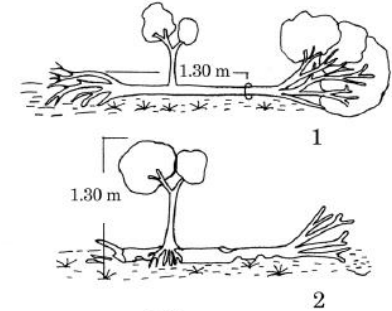
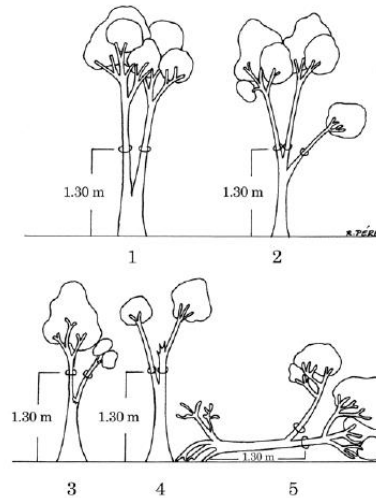
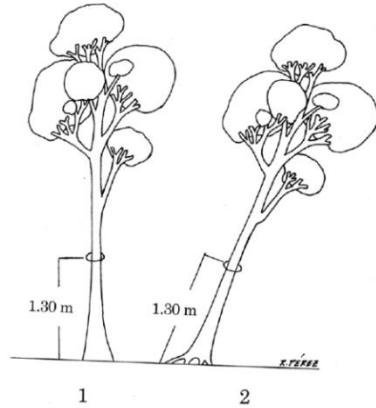
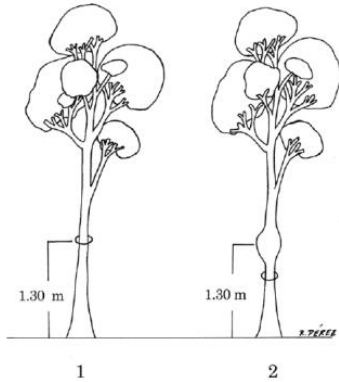
Plot demarcation

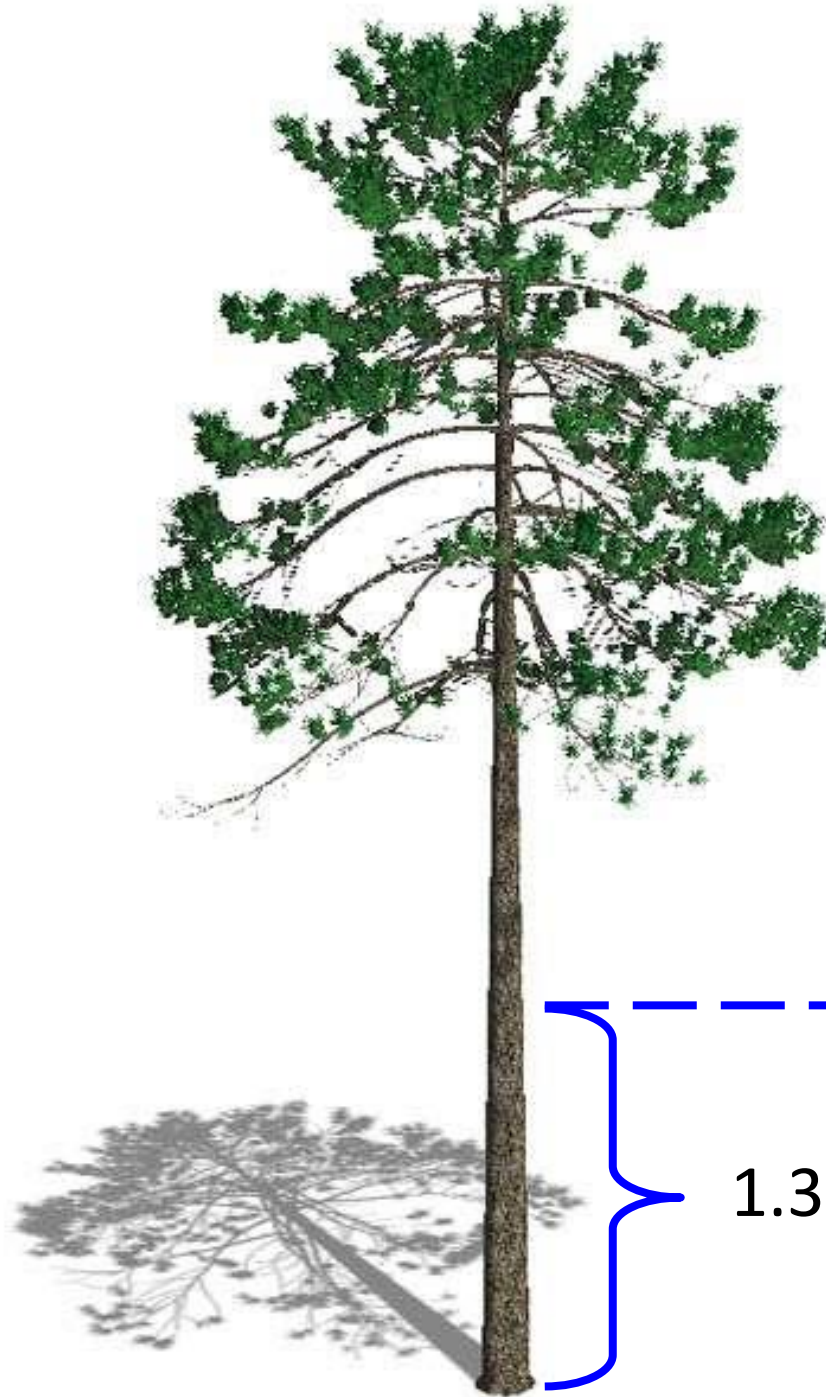


The altitude difference between the highest and lowest points in the plot is 78.36 m.



Measuring Trees

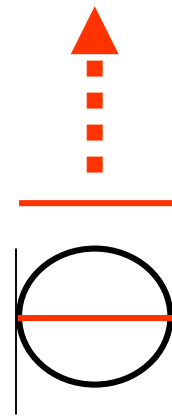




1.30 m.

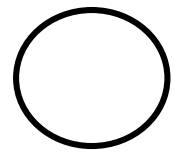
Diameter at Breast Height

DBH

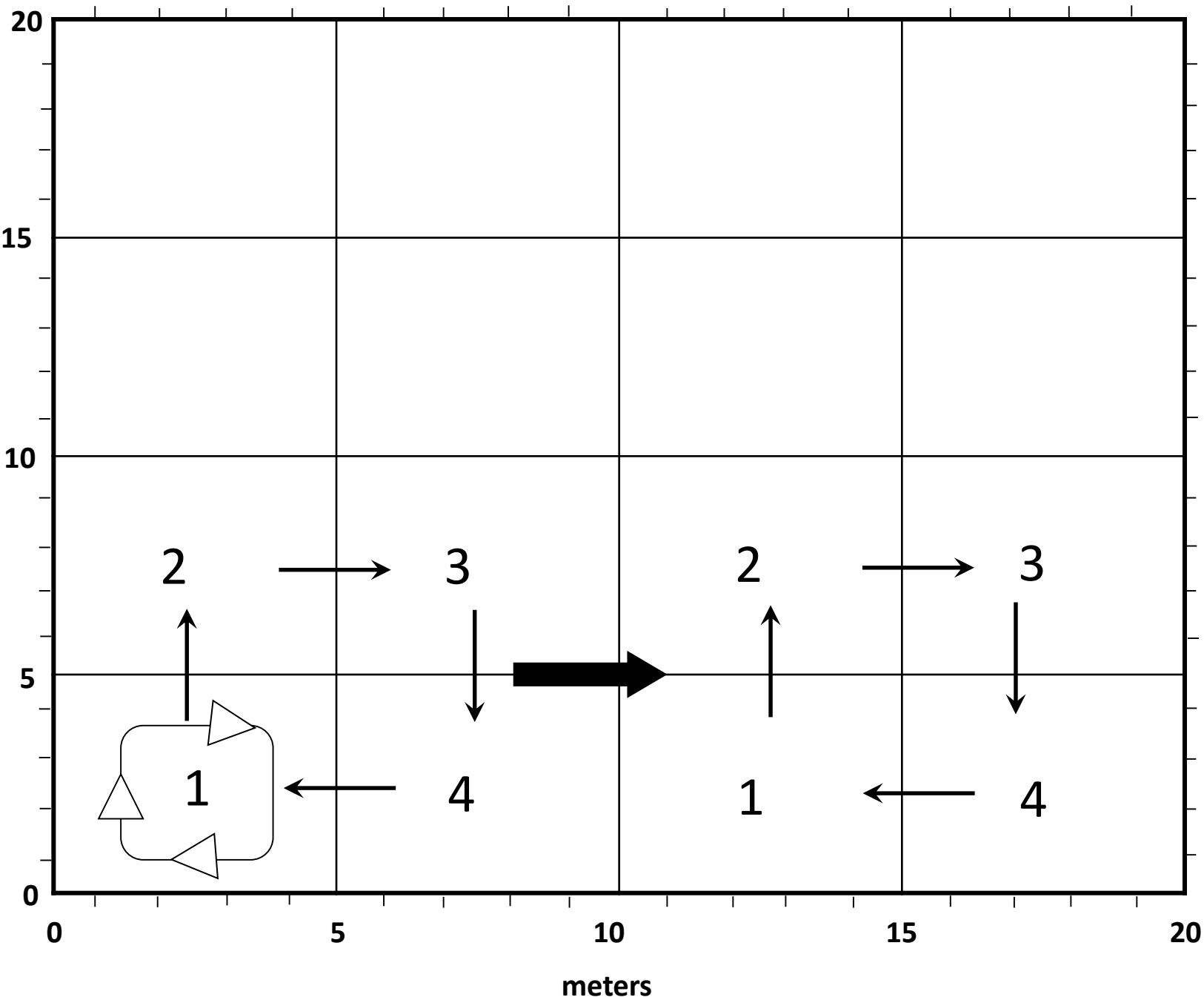


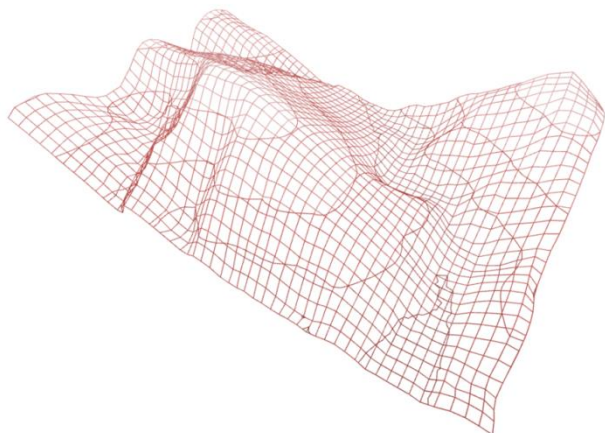
Girth at Breast Height

GBH



meters





การสำมะโนประชากรพรรณพืช (Tree census)

แปลงขนาด 300 x 500 ตารางเมตร ทำการแบ่ง
แปลงย่อยขนาด 10 x 10 ตารางเมตร จำนวน
1,500 แปลงย่อย

ภายในแปลงขนาด 10 x 10 ตารางเมตร ทำการ
แบ่งแปลงย่อยขนาด 5 x 5 ตารางเมตร เพื่อเก็บ
ข้อมูลไม้ยืนต้น ที่มีขนาดความโตที่ระดับความสูง
เพียงอกตั้งแต่ 1.0 เซนติเมตร

ติดหมายเลขประจำต้น (ขนาด dbh เล็กกว่า 20
cm แขนงหมายเลขด้วยลวดทองแดง และ ขนาด
dbh ใหญ่กว่า 20 cm จะติดหมายเลขด้วยตะปู
อะลูมิเนียม) แต่ละต้นจะทำการบันทึกตำแหน่งที่ตั้ง
เก็บตัวอย่างใบเพื่อนำมาเทียบและจำแนกชนิด และ
ทำการทาสีที่บริเวณวัดบนลำต้นเพื่อหมายตำแหน่ง
วัดซ้ำในรอบต่อ ๆ ไป



















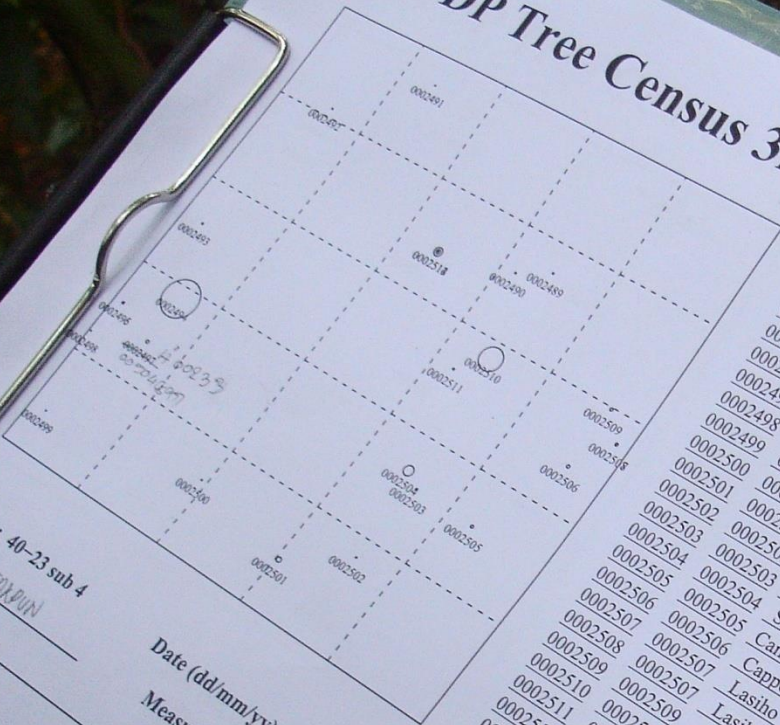




Wood density measurement



DIFDP Tree Census 3rd



Quad.No.: 40-23 sub 4
Recorder: J. J. J.

Field ID: Recorder JANUN

Date (dd/mm/yy) 19/09/09
Measure _____
Date _____

Measure _____ Date 19/02/09

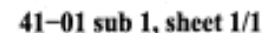
Date / /

Tree No.	Fork	Sp. Code	GBH(2nd)	GBH(3rd)
0002489	0002489	Sympma	4.7	4.9
0002490	0002490	Sympma	4.7	4.8
0002491	0002491	Antiso	3.3	3.89
0002492	0002492	Calopo	3.95	4.4
0002493	0002493	Cameol	5.7	6.05
0002494	0002494	Chiora	122.5	122.9
0002495	0002495	Cinnbe	8	-
0002496	0002496	Cinnbe	3.75	3.8
0002497	0002497	Mallkh	10.3	10.3
0002498	0002498	Calopo	3.9	4.1
0002499	0002499	Syzyan	3.35	3.8
0002500	0002500	Beigl	3.8	4.1
0002501	0002501	Pitch	14.4	16.2
0002502	0002502	Calopo	4.3	4.5
0002503	0002503	Syzyan	7	8.8
0002504	0002504	Cameol	29.6	10.2
0002505	0002505	Cappcf	0	0
0002506	0002506	Lasiho	0	8.3
0002507	0002507	Lasiho	6.7	0
0002508	0002508	Ardiru	69.9	5.8
0002509	0002509	Cameol	26.2	14.4
0002510	0002510	Mallkh	14	5
0002511	0002511	Mallkh	3.1	3.1
0002512	0002512	Mallkh	3.1	3.1
0002513	0002513	Mallkh	3.1	3.1
0002514	0002514	Mallkh	3.1	3.1
H00630	H00630	Drypin	3.1	3.1
H00233	H00233	Drypin	3.1	3.1

DIFDP Tree Census 3rd Phase, 40-23 sub 4		
H(2nd)	GBH(3rd)	Comment
4.7	4.9	
7	41.5	
	3.69	
4		

sub 1

40-23 sub





Voucher specimens of plants

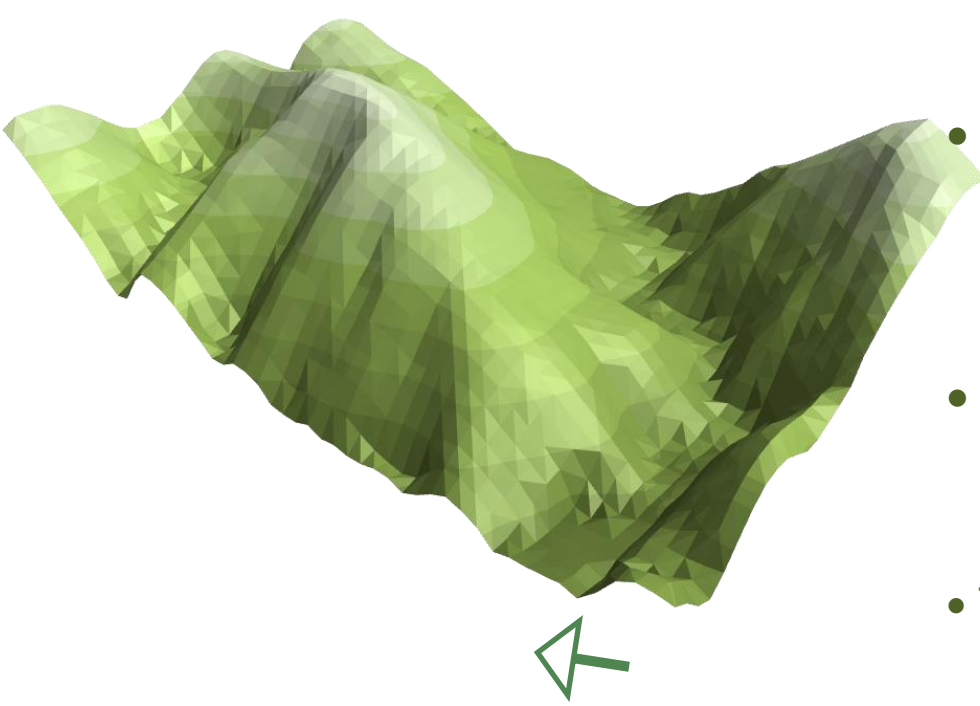
Plant specimens were collected branchlet or leaf specimens from every tree and then the specimens were identified by reference to specimens from herbaria at the Forest Herbarium, National Park, Wildlife and Plant Conservation Department, Bangkok; Queen Sirikit Botanical Garden, Chiang Mai; Chiang Mai University, Chiang Mai; and in Japan (Kyoto university, Kyoto; The university of Tokyo, Tokyo).

The voucher specimens were stored in the Herbarium of the Natural History Museum and Institute, Chiba in Japan, and duplicate specimens were sent to the Forest Herbarium, National Park, Wildlife and Plant Conservation Department of Thailand and Chiang Mai University (Hara *et al* 2002).

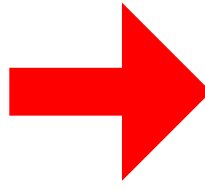
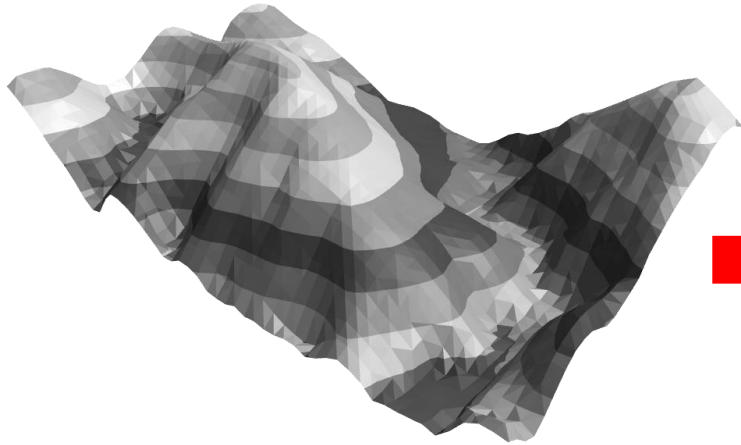




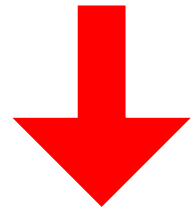
Establishment of the Permanent Plot



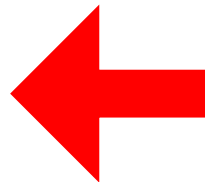
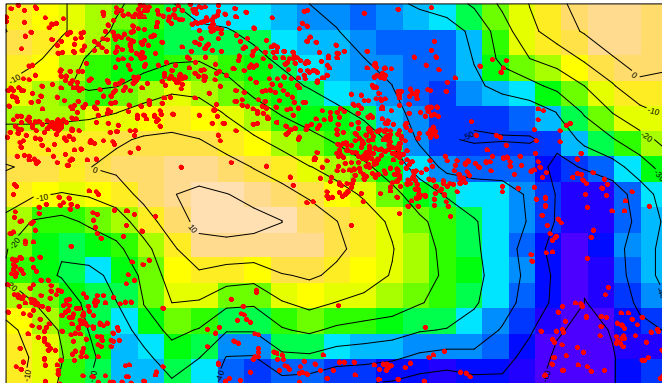
- Plot demarcation
 - Altitude: ca. 1,700 m.a.s.l.
 - December, 1996–March, 1997
 - 300 x 500 m (15ha Area): 10 x 10 m grid
- First Tree Census
 - March, 1997– March, 2000
 - Lives standing trees (d.b.h. $\geq$ 1.0 cm)
 - D.b.h., position, species name were record
 - 167 spp., 78646 trees
- Second Tree Census
 - January, 2003 – March, 2003
 - 167 spp., 96631 trees (10258 trees were dead and 17985 trees were recruited)
- Third Tree Census
 - January, 2009 – May, 2009



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Date		Time		Page Input		Formula		Data		Review		View		File		Home		Insert		Layout		References		Send To		Tools		Window		Help	
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Litsea beusekomii Kostermans





Excel data entry

From-SynthesizedData - Microsoft Excel

Home Insert Page Layout Formulas Data Review View

Cut Copy Paste Format Painter Clipboard

MS Sans Serif 10 A A B I U Font

Wrap Text Merge & Center Alignment

General Number Styles

Conditional Formatting Format as Table Cell Styles

Insert Delete Format Cells

AutoSum Fill Clear Sort & Find & Filter Select Editing

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
	Quadrat	X	Y	Sub	StemID	NewID	Fork	Stemdata_Comment	Censusdata0_Date	DBH0	Censusdata0_Comment	Censusdata1_Date	DBH1	Censusda1D	Code
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2	01-02	1	2	4	250161		250161		4/3/1997	1.12809		28/3/2003	1.09759		
4	01-02	1	2	4	250162		250162		4/3/1997	1.701168		28/3/2003		dead	
5	01-02	1	2	4	250163		250163		4/3/1997	1.701168		28/3/2003	2.629472		
6	01-02	1	2	4	250164		250164		4/3/1997	9.427326		28/3/2003	11.33628		
7	01-03	1	3	1	250437		250437		20/3/1997	2.819148		28/3/2003	2.929871		
8	01-03	1	3	1	250438		250438		20/3/1997	2.156295		28/3/2003	2.56629		
9	01-03	1	3	1	250439		250439		20/3/1997	1.904808		28/3/2003	2.093352		
10	01-03	1	3	1	250440		250439		20/3/1997	1.967604		28/3/2003	2.093352		
11	01-03	1	3	1	250441		250441		20/3/1997	1.936199		28/3/2003		dead	
12	01-03	1	3	1	250442		250441		20/3/1997	1.158663		28/3/2003	1.266154		
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SynthesizedData

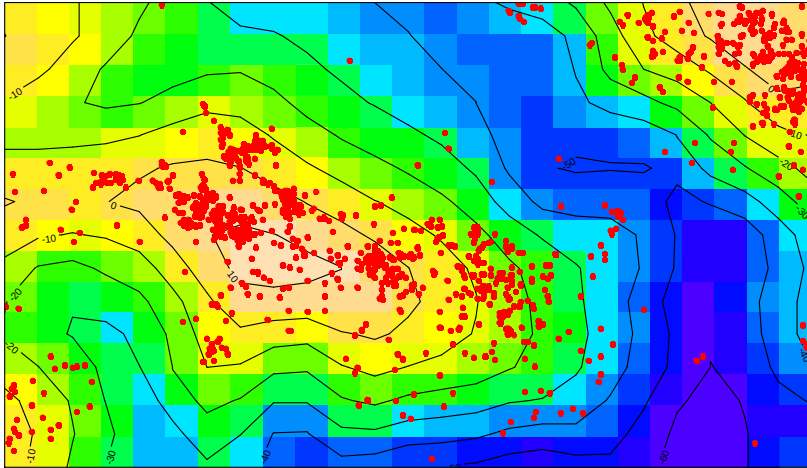
Ready

100%

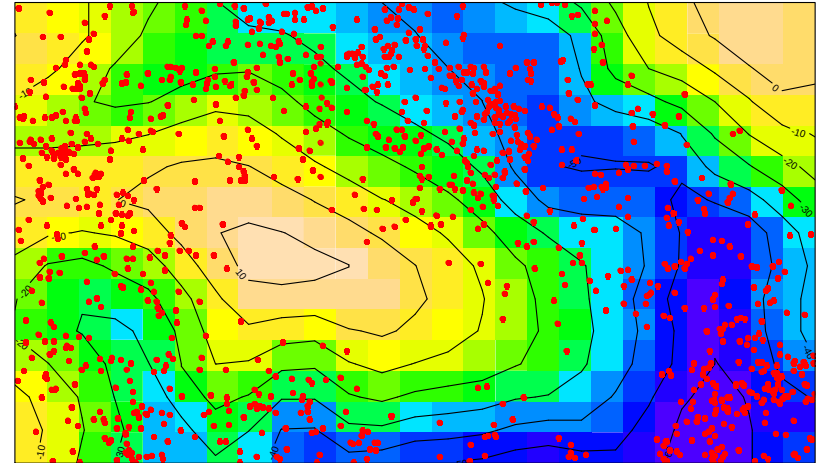
EN 16:58



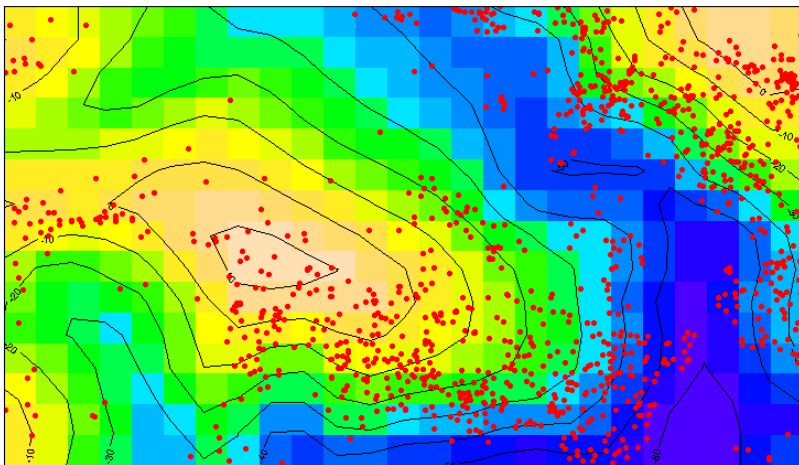
Lindera metcalfiana Allen



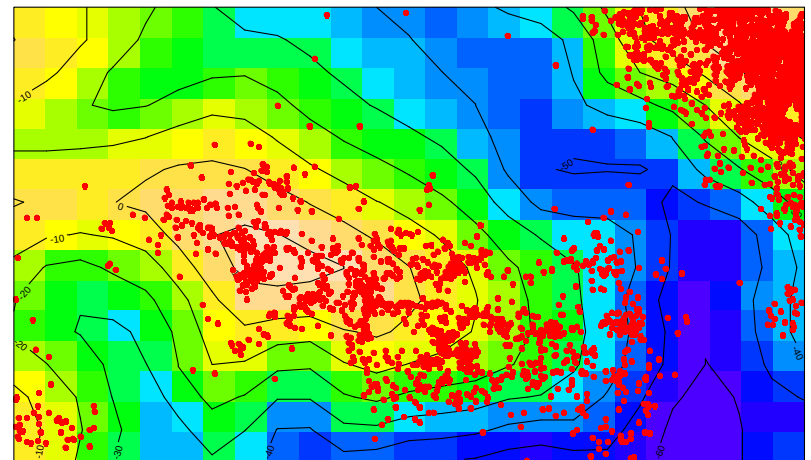
Litsea yunnanensis Yen C. Yang & P. H. Huang



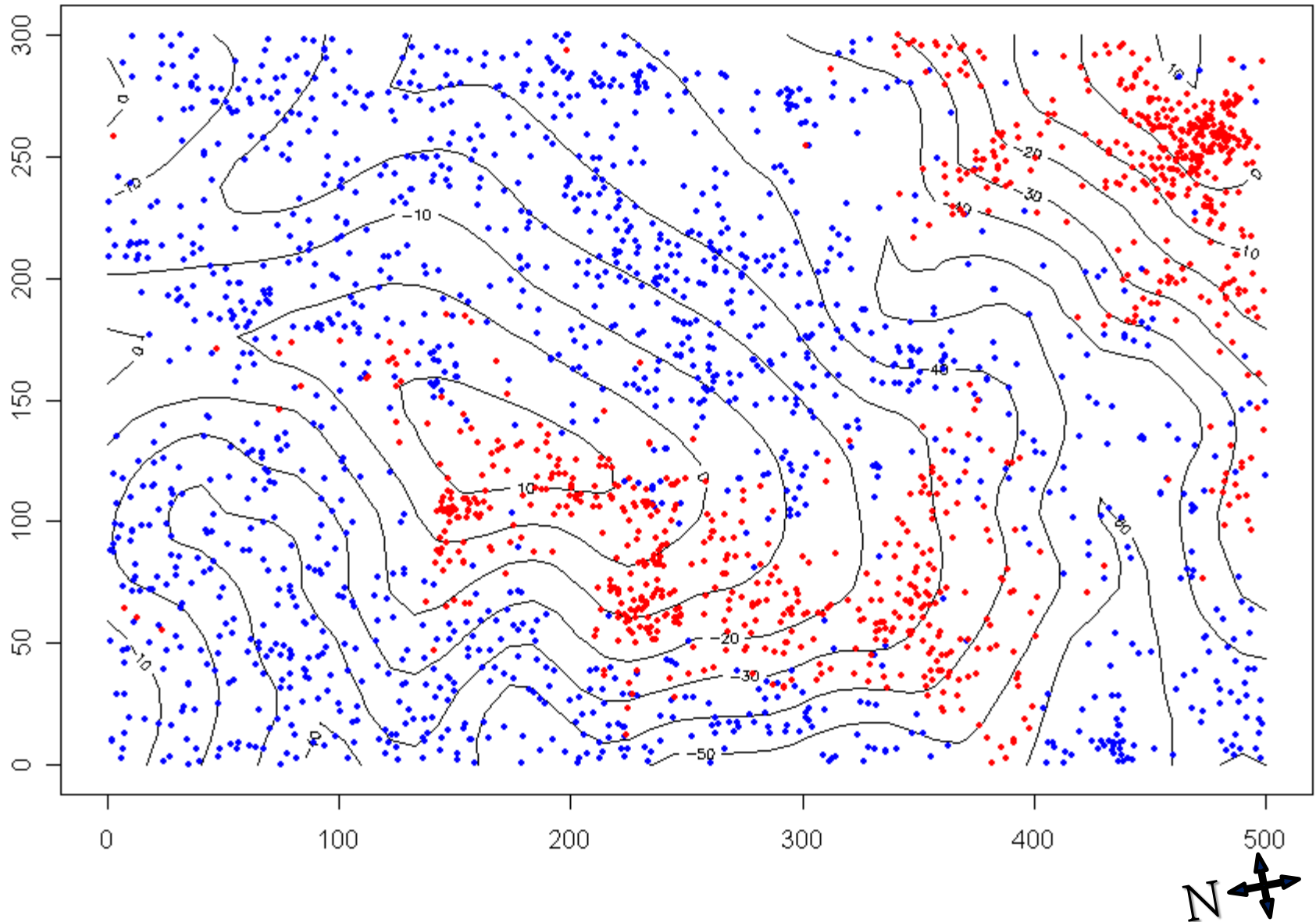
Quercus eumorpha Kurz (Syn. = *Q. lenticellata* Barnett)



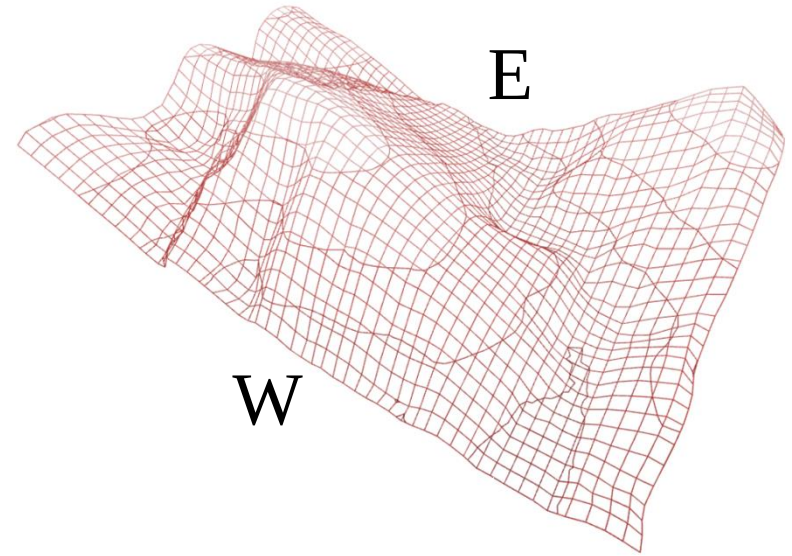
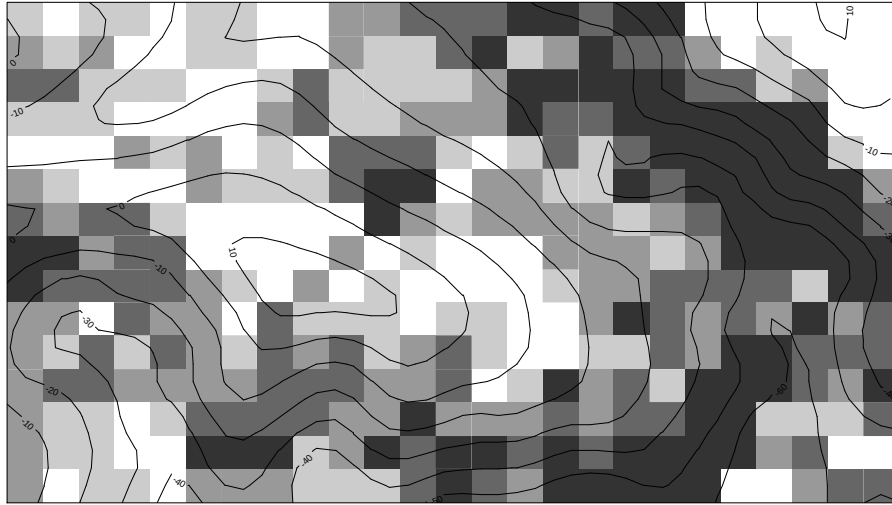
Castanopsis calathiformis Kurz



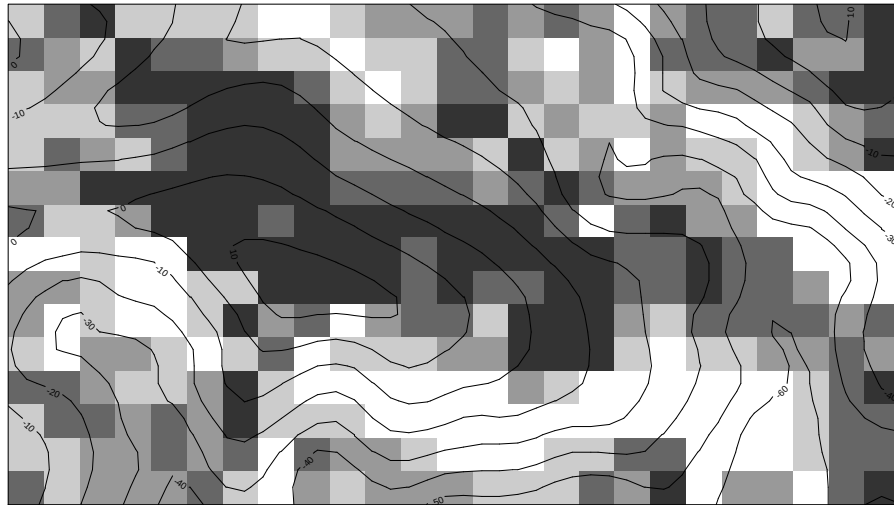
The distribution of low specific gravity woods (4 species, $n=1,845$, $wsg < 0.40$ g.cm^{-3} , blue spots) and high specific gravity woods (2 species, $n=1,046$, $wsg > 0.70$ g.cm^{-3} , red spots)



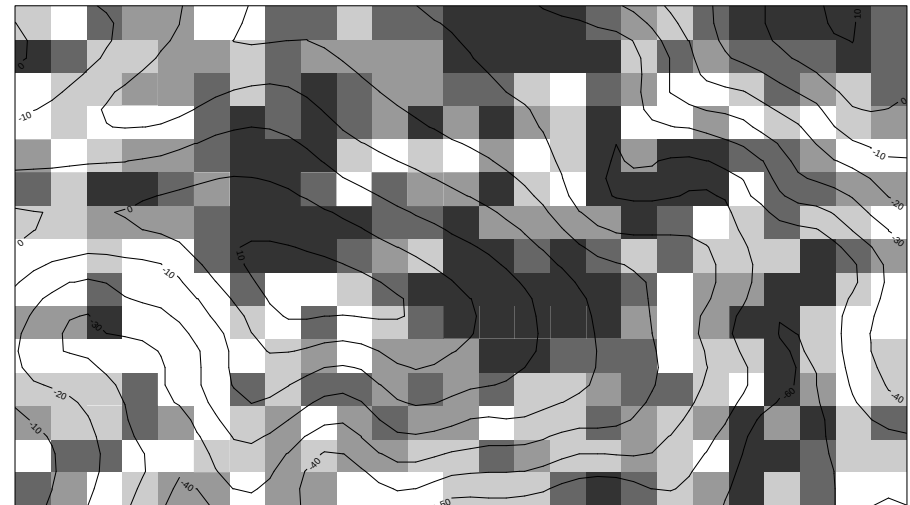
Mean wood density



Mean relative growth rate of saplings



Mean mortality rate of saplings



100m.

Darker shading indicates higher values.



Total above ground biomass of species (dbh $\geq$ 1 cm)

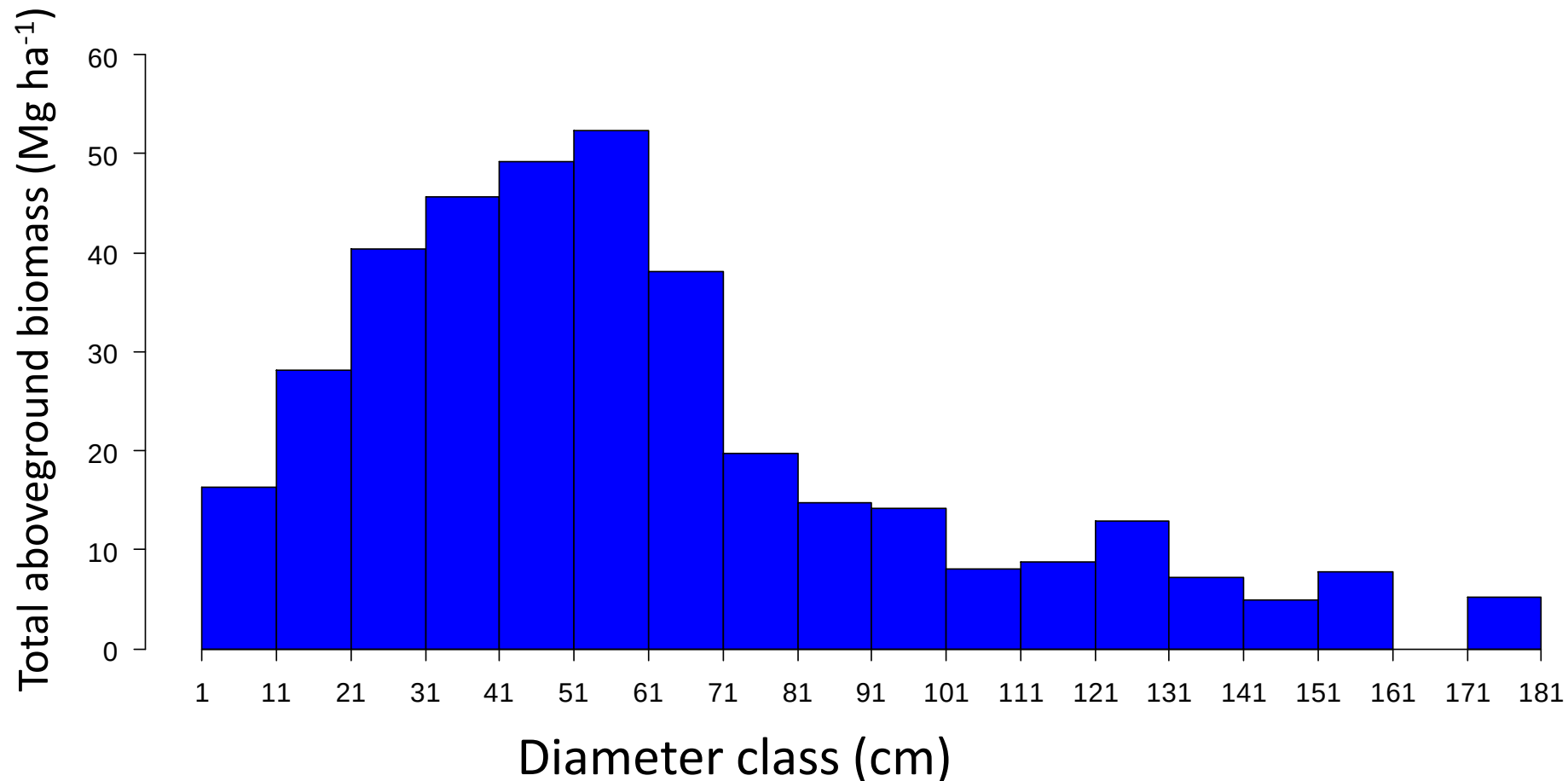
Rank	Species	Mg/ha	%
1	<i>Mastixia euonymoides</i> Prain	61.29	16.40
2	<i>Quercus eumorpha</i> Kurz (Syn. = <i>Q. lenticellata</i> Barnett)	38.96	10.42
3	<i>Calophyllum polyanthum</i> Wall.	24.85	6.65
4	<i>Quercus brevicalyx</i> A. Camus	21.90	5.86
5	<i>Manglietia garretii</i> Craib	21.18	5.67
6	<i>Cryptocarya densiflora</i> Blume	10.73	2.87
7	<i>Nyssa javanica</i> Wangerin	10.37	2.78
8	<i>Drypetes</i> sp.	10.27	2.75
9	<i>Chionanthus ramiflorus</i> Roxb.	7.58	2.03
10	<i>Syzygium angkae</i> (Craib) P. Chantaranothai & J. Parnell ssp. <i>angkae</i>	7.55	2.02
11	<i>Syzygium tetragonum</i> Wall.	7.29	1.95
12	<i>Lithocarpus vestitus</i> (Hickel & A. Camus) A. Camus	7.18	1.92
13	<i>Acer laurinum</i> Hassk.	6.69	1.79
14	<i>Castanopsis purpurea</i> Barnett	5.47	1.46
15	<i>Castanopsis calathiformis</i> Kurz	5.06	1.35
.	.	.	.
.	.	.	.
	Other	127.37	34.08
	Total	373.72	100

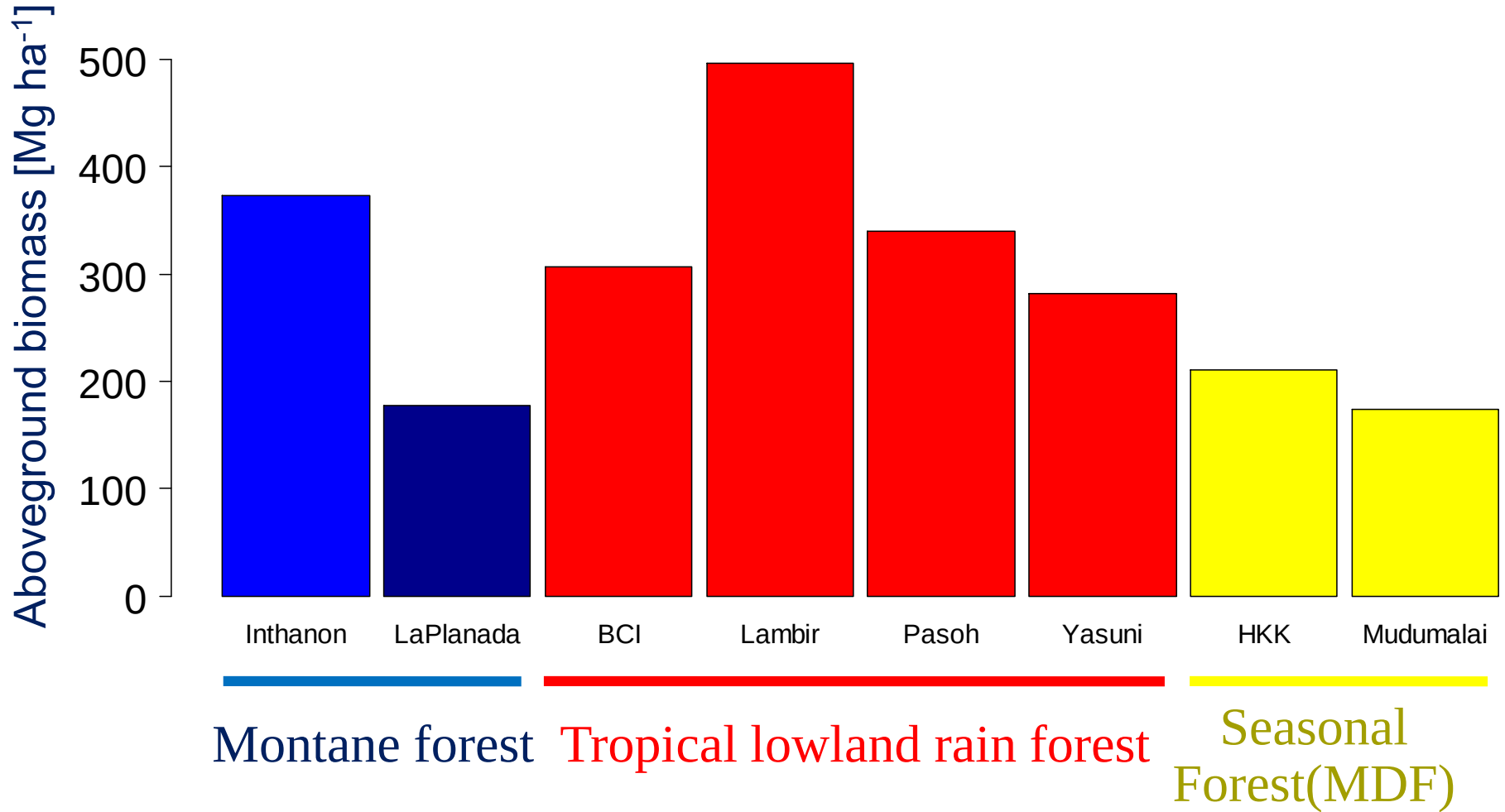
Total above ground biomass (dbh $\geq$ 1 cm)

Rank	Genus	Mg/ha	%
1	Mastixia	61.29	16.40
2	Quercus	60.86	16.29
3	Calophyllum	24.85	6.65
4	Manglietia	21.18	5.67
5	Lithocarpus	15.54	4.16
6	Drypetes	15.10	4.04
7	Syzygium	14.83	3.97
8	Cryptocarya	14.56	3.90
9	Litsea	12.83	3.43
10	Castanopsis	12.73	3.41
11	Nyssa	10.37	2.78
12	Chionanthus	7.58	2.03
13	Acer	6.69	1.79
14	Persea	5.55	1.48
15	Cinnamomum	5.16	1.38
.	.	.	.
.	.	.	.
.	.	.	.
	Other	190.0	50.8
	Total	373.72	100

Rank	Family	Mg/ha	%
1	Fagaceae	89.13	23.85
2	Cornaceae	61.29	16.40
3	Lauraceae	47.76	12.78
4	Guttiferae	24.85	6.65
5	Euphorbiaceae	23.05	6.17
6	Magnoliaceae	21.21	5.68
7	Myrtaceae	14.83	3.97
8	Nyssaceae	10.37	2.78
9	Rubiaceae	7.69	2.06
10	Oleaceae	7.58	2.03
11	Aceraceae	6.69	1.79
12	Uniden	5.05	1.35
13	Elaeocarpaceae	4.79	1.28
14	Myristicaceae	4.48	1.20
15	Meliaceae	3.95	1.06
.	.	.	.
.	.	.	.
.	.	.	.
	Other	127.65	34.16
	Total	373.72	100

Frequency distribution of aboveground biomass estimated in each of diameter classes.





Aboveground biomass of tropical forests

Source (except for Doi Inthanon): Chave *et al.* (2008)



การวางแผนแบบ Netting Plot เพื่อศึกษา Seed Production



Seed dispersal and germination



Seed dispersal and germination



Inventory and monitoring of plants living in the canopy layer of a tropical montane rain forest





Rhododendron veitchianum by N. Ando



Agapetes lobbii by M. Kanzaki



Ione rimannii by N. Ando



Dendrobium infundibulum by M. Kanzaki



Eria siamensis Photo by N. Ando

Dendrobium chrysanthum by
M. Kanzaki

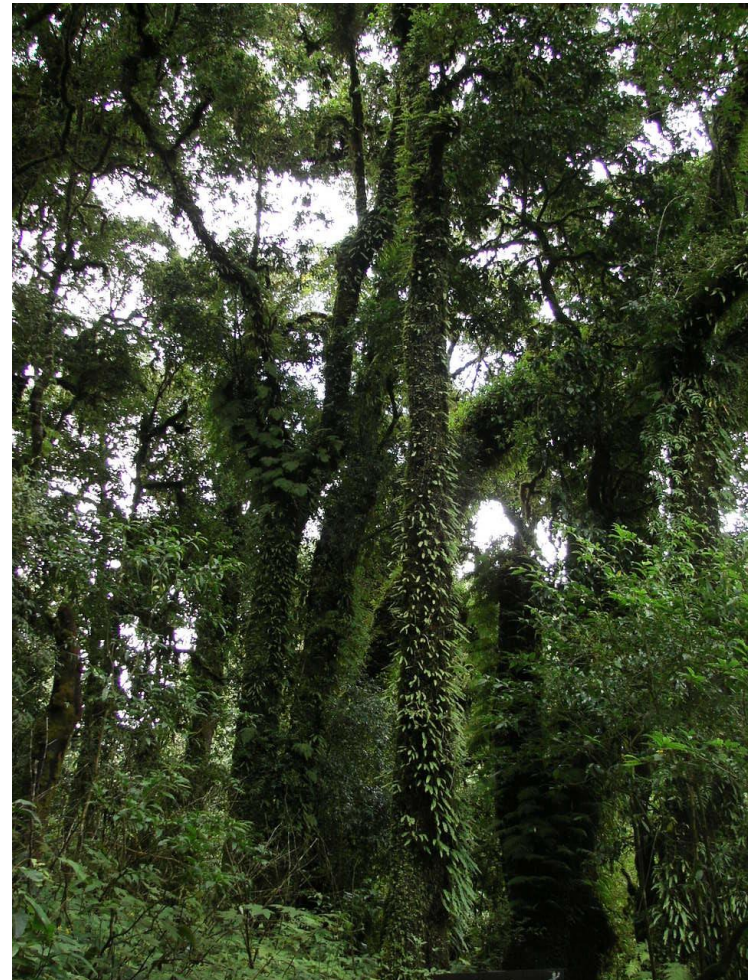




Rhaphidophora sp. by N. Ando

Current Research Phase

Diversity and Dynamics of Epiphyte, Hemiepiphyte, and Parasite in Tropical Forests of Doi Inthanon National Park (2008-2012)



Moving in the crown using lanyard rope

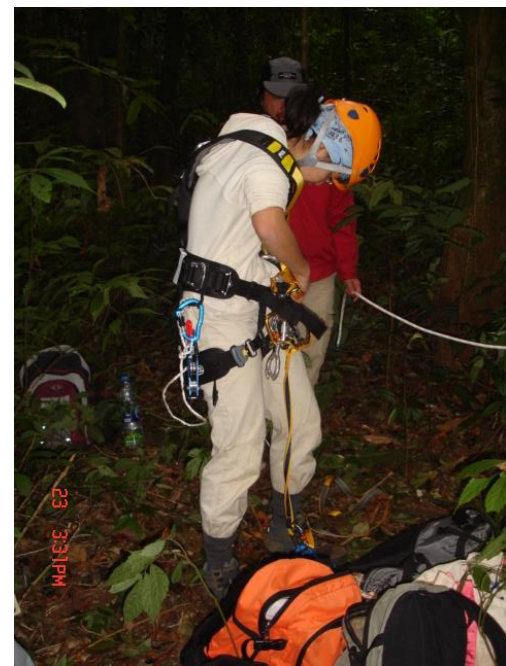


Un-destructive measurement data of a tropical lower montain forest at Doi Inthanon National Park





Diversity and Dynamics of Epiphyte, Hemiepiphyte, and Parasite in Tropical Forests of Doi Inthanon National Park (2008-2012)



Phase I (2008-2012)
Phase II (2013-2017)



“Ecology and Utilization of Forest Vegetation in North Thailand”

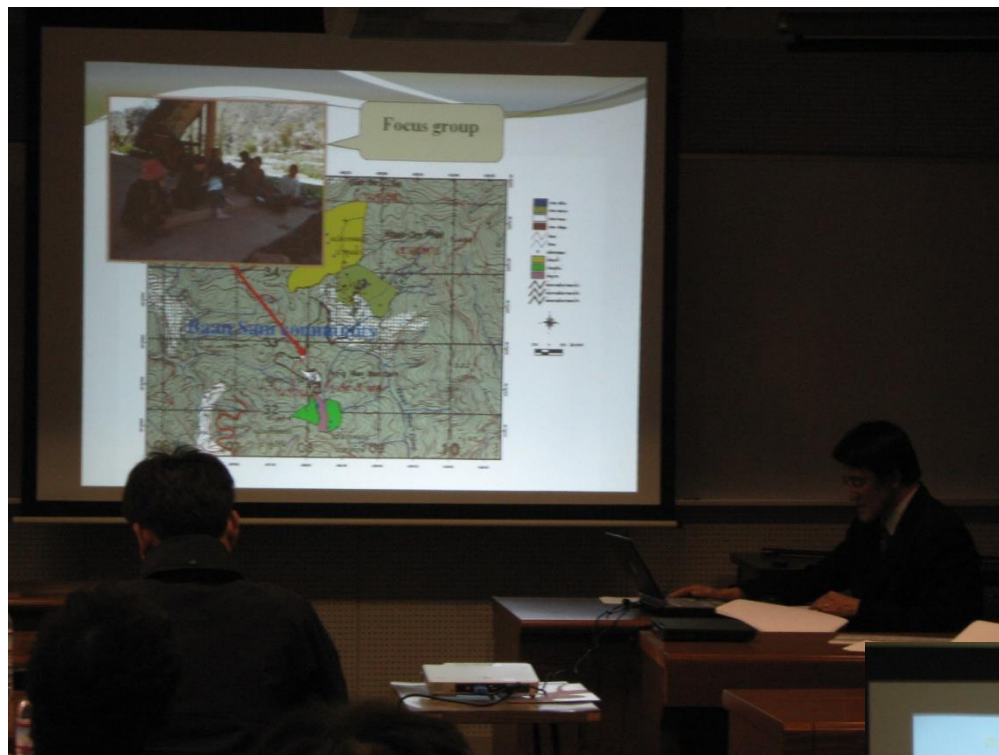
Joint Reporting Seminar

23 August 2007

At International Education and Training Center (IETC)

Chiang Mai University

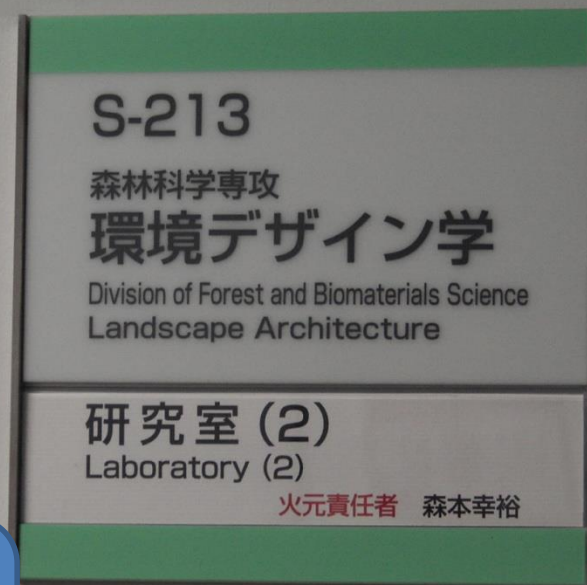




Kyoto University
Japan

Osaka City University
Professor Dr. Akira Itoh





Chance and
Corporate



The Floristic Composition of Tropical Montane Forest in Doi Inthanon National Park, Northern Thailand, with Special Reference to Its Phytogeographical Relation with Montane Forests in Tropical Asia

Masatoshi Hara¹⁾, Mamoru Kanzaki²⁾, Takashi Mizuno³⁾, Hideyuki Noguchi³⁾,
Kriangsak Sri-Ngernyuang⁴⁾, Sakhan Teejuntuk⁵⁾, Chettha Sungpalee⁶⁾,
Tatsuhiro Ohkubo⁷⁾, Takuo Yamakura³⁾, Pongsak Sahunalu⁵⁾,
Pricha Dhanmanonda⁵⁾ and Sarayudh Bunyavejchewin⁷⁾

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Ecological Research (2003) 18, 1–14

Habitat differentiation of Lauraceae species in a tropical lower montane forest in northern Thailand

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Habitat divergence in sympatric Fagaceae tree species of a tropical montane forest in northern Thailand

Hideyuki Noguchi^{*,1}, Akira Itoh^{*}, Takashi Mizuno^{*}, Kriangsak Sri-ngernyuang[‡],
Sakhan Teejuntuk[§], Witchaphart Sungpalee[§], Masatoshi Hara[#], Tatsuhiro
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(Accepted 22 June 2007)



Published/Graduated Secondary forest succession after the cessation of swidden agriculture in a tropical montane forest in Northern Thailand

Maki Fukushima^{a,1,*}, Mamoru Kanzaki^a, Masatoshi Hara^b, Tatsuhiro Ohkubo^c,
Witchaphart Sungpalee^d, Sakhan Teejuntuk^e, Chettha Sungpalee^f,
Pongsak Sahunalu^g, Pricha Dhanmanonda^g and Satoshi Nanami^h

- 17 International papers

- 7 Master Degree Students

- 4 Ph.D Students

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Intra- and interspecific variation in wood density and fine-scale spatial distribution of stand-level wood density in a northern Thai tropical montane forest

Witchaphart Sungpalee^{*,1}, Akira Itoh^{*}, Mamoru Kanzaki[†], Kriangsak Sri-ngernyuang[‡],
Hideyuki Noguchi^{*}, Takashi Mizuno^{*}, Sakhan Teejuntuk[§], Masatoshi Hara[#], Kwanchai Chai-udom^{**},
Tatsuhiro Ohkubo^{††}, Pongsak Sahunalu[§], Pricha Dhanmanonda[§], Satoshi Nanami^{*},
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J For Res (2003) 8:311–316
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ORIGINAL ARTICLE

Kriangsak Sri-ngernyuang · Kwanchai Chai-Udom
Mamoru Kanzaki · Tatsuhiro Ohkubo · Takuo Yamakura

Survival and germination of an experimental seed bank population of two species of Lauraceae in a tropical montane forest in Thailand



ปัจจัยสู่ความสำเร็จของงาน



Selecting a Site การเลือกพื้นที่วิจัย

-Biogeography ชีวกายภาพ

(to cover the major tropical forest regions)

-Local site conditions สภาพพื้นที่

(representative of variation, i.e. climatic, soil, and disturbance)

-Host-Country Partner Institutions พันธมิตร

(local scientific participation)

-Science and Management Objective ความสำเร็จของ
วัตถุประสงค์

-Logistics and Feasibility ความเป็นไปได้และการเข้าถึง

(accessibility, labor force, local office)



Personnel ทีมงาน

- *Scientific Managers* หัวหน้าโครงการ
- *Field Coordinators* หัวหน้างานภาคสนาม
- *Field Assistants* ผู้ช่วยงานภาคสนาม
- *Database Coordinator and Clerical Assistants*
ผู้จัดการข้อมูล / เสมียนธุรการ



Maejo University Chiang Mai

ขอบคุณครับ



อุทยานแห่งชาติ
ดอยอินทนนท์
Doi Inthanon National Park