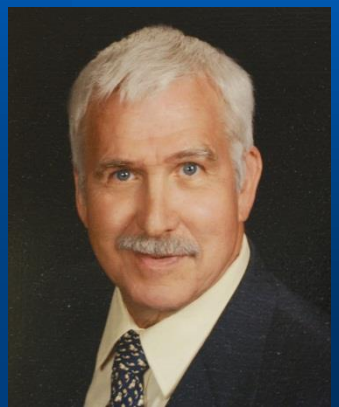
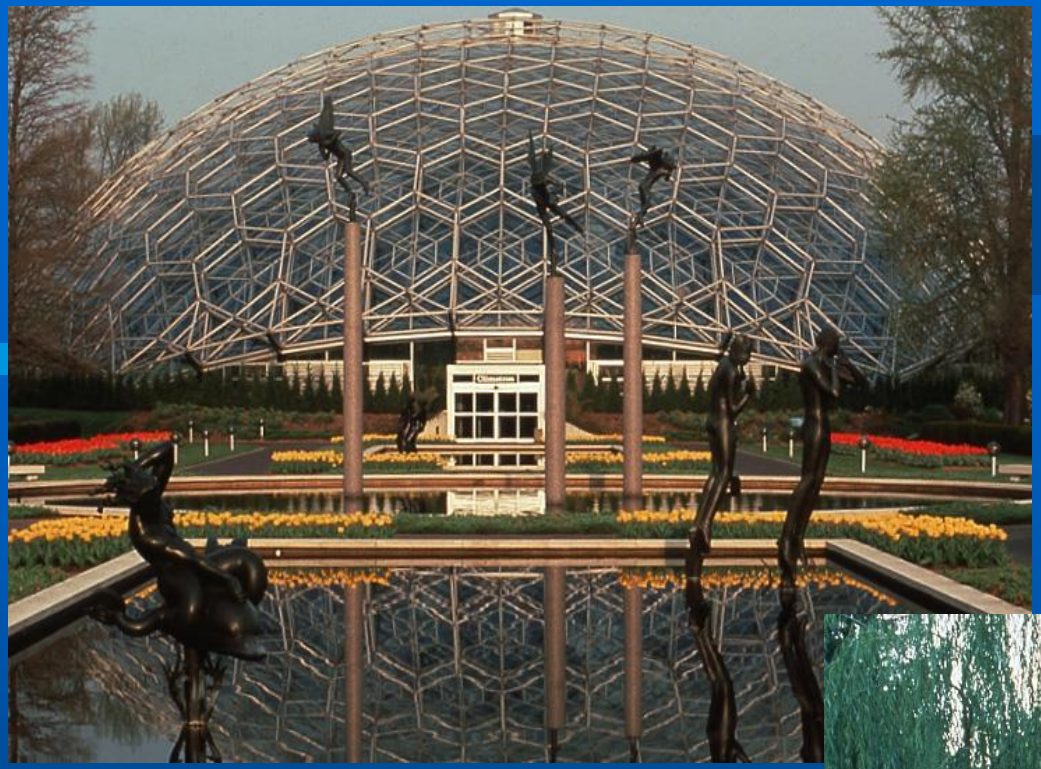
Research Program
Missouri Botanical Garden

The role of the Missouri Botanical Garden in the Process of Discovery

Tom Croat

P. A. Schulze Curator of Botany





Missouri Botanical Garden Mission

To discover and share knowledge about plants and their environment, in order to preserve and enrich life.

Our Founder
Henry Shaw

Early garden plans and layout of existing Gardens

Shaw Nature Reserve

- Formerly Shaw Arboretum
- Purchased 1300 acres in 1925
- 1000 more acres added since

Missouri Botanical Garden Programmatic Areas

- **Horticulture**
  - 79 acres of outdoor gardens and greenhouse displays
  - 900,000 visitors annually
  - Opened to the public in 1859
- **Education**
  - K through 12
  - Adult Education Classes
  - Curriculum Development
  - Teacher Training

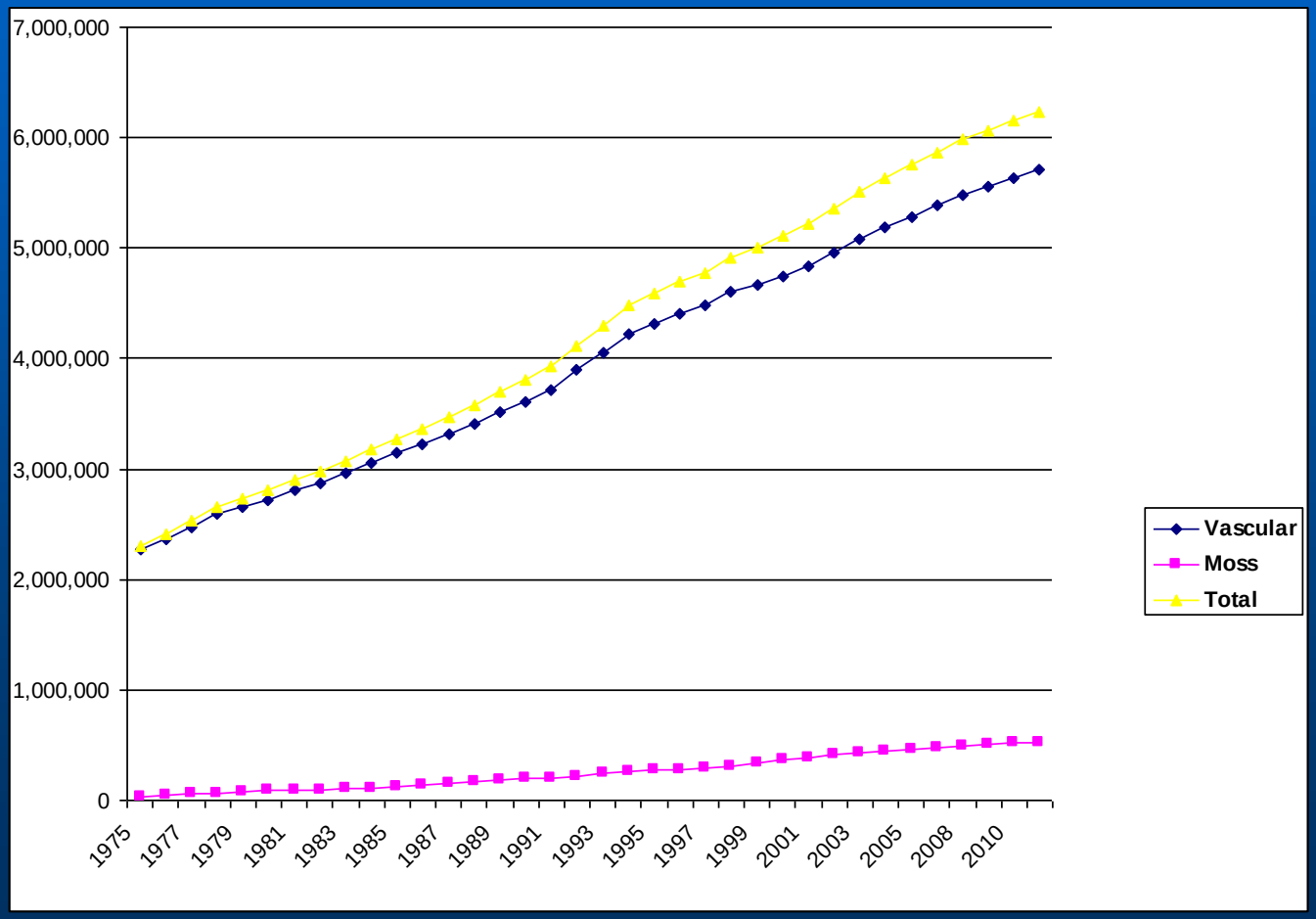
Missouri Botanical Garden Programmatic Areas

- **Research**
  - Herbarium
    - 6.23 million plant specimens
      (5.7 million vascular plants & 525,000 bryophytes)
  - Botanical Library
    - 200,000 volumes & extensive archives
  - Databases
    - 1,256,000 scientific names
    - 4,005,000 specimens
    - 170,000 images of plants (living & specimens)
  - Staff of 120, including 45 Ph.D. scientists
  - Graduate Program

Herbarium Collection Growth

- **6,231,759 specimens** (31 December 2010)
  - 5,706,547 vascular plants
  - 525,212 bryophytes
- **3.9 million mounted specimens added from 1975 to 2010**
- **112,000 (average) mounted specimens added each year since 1975**

Herbarium Growth, 1975-2010



Herbarium Activities, 2006-2010

	Specimens/Transactions
Loans sent	21,615 (268 trans.)
Loans received	16,180 (196 trans.)
Loans returned to MO	24,490 (447 trans.)
Loans returned by MO	21,337 (369 trans.)
Exchanges received	21,408
Exchanges sent	21,542
Gifts received	10,229
Gifts sent	13,879
Research Visitors	297 (189 US, 108 foreign)

(Average # specimens per year)

New Species Described between 1960 and 2011

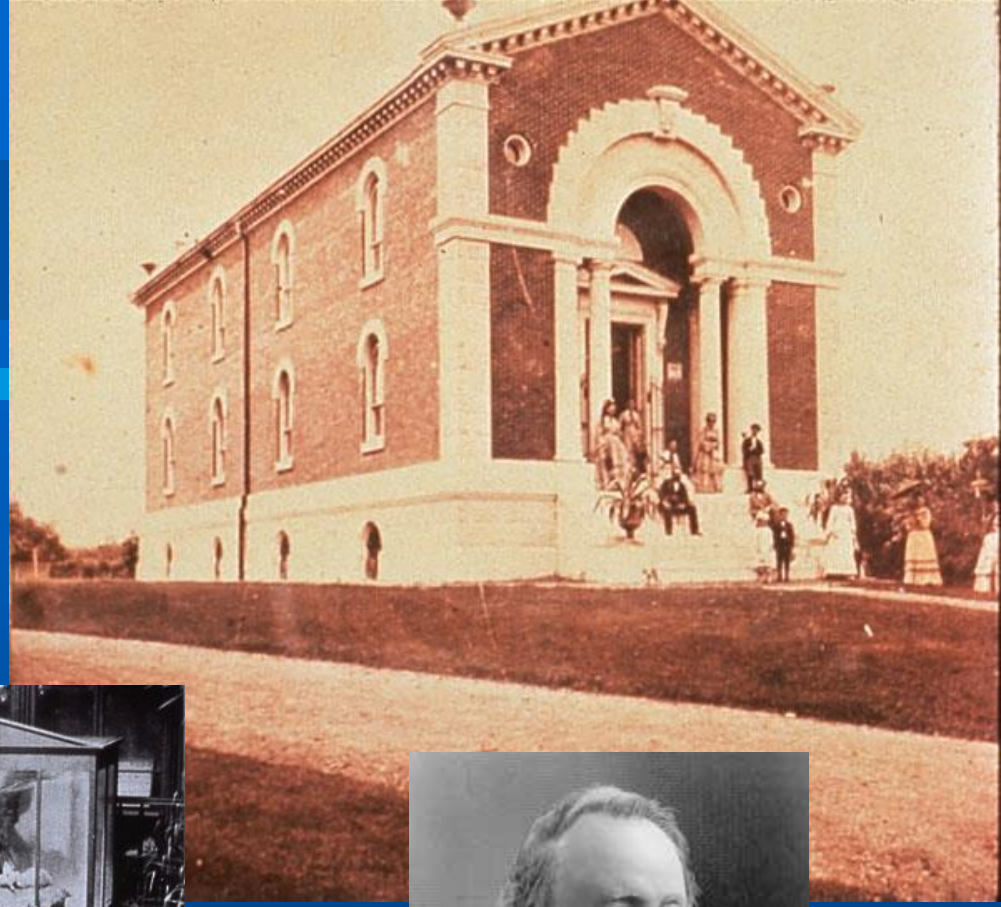
- **6734 New species described**
- **5207 New combinations**
  - **Averaging 129 over 50 years by MO staff scientists**
  - **176 in decade of 1960's**
  - **1993 (411 species)**
  - **2004 (701 species)**
  - **2005 (367 species)**
  - **2006 (580 species)**
  - **2007 (395 species)**

Constructed 1859-1860

The Museum Building, the first herbarium and library

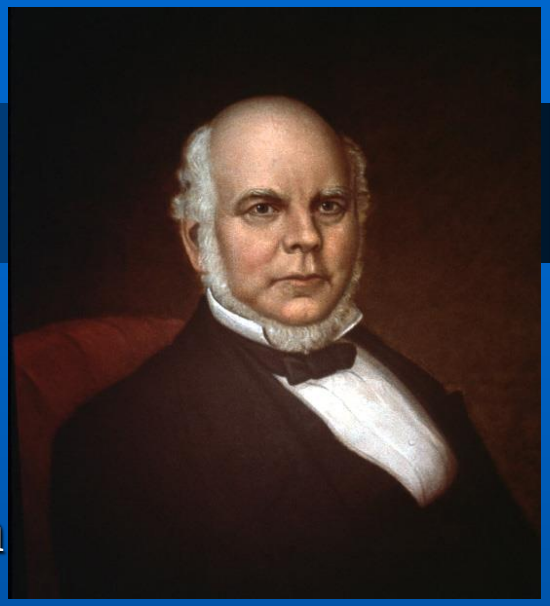
The Herbarium

Museum Building



Henry Shaw

Cucurbita foetidissima Kunth



George Engelmann

John Fremont

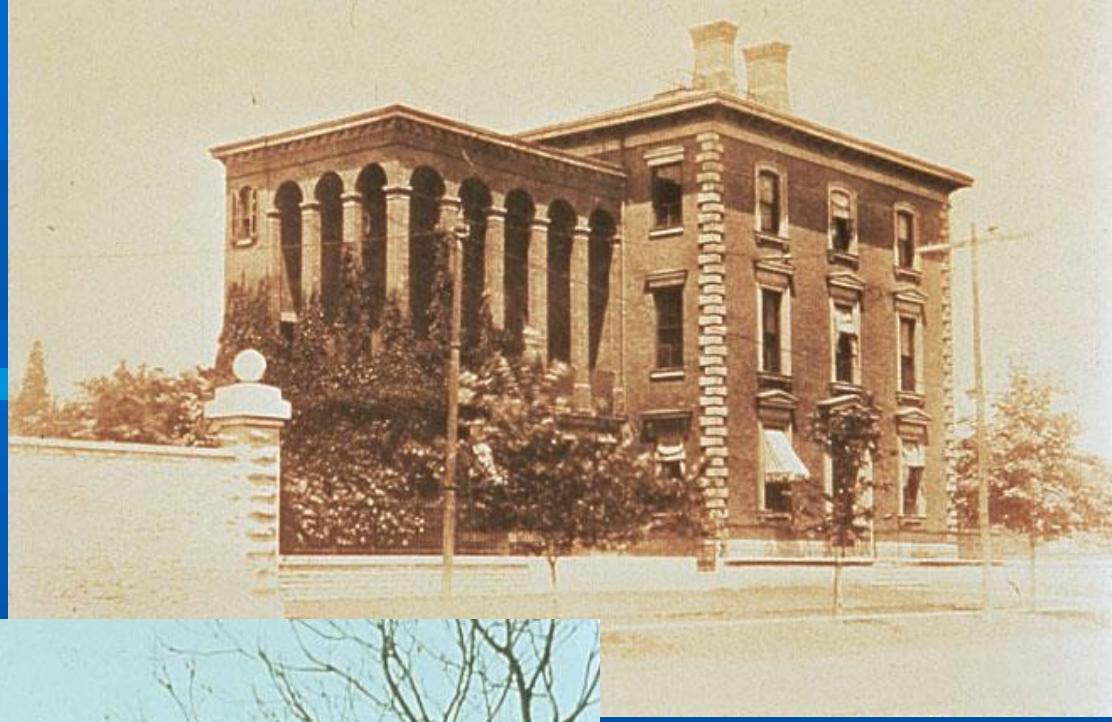
William Trelease

Directors of the Missouri Botanical Garden

- **Henry Shaw (1859-1889) 30 yrs**
- **William Trelease (1889-1912) 23 yrs**
- **George Moore (1912-1953) 41 yrs**
- **Edgar Anderson (1954-1956) 2 yrs**
- **Frits Went (1958-1963) 5 yrs**
- **David Gates (1965-1971) 6 yrs**
- **Peter Raven (1971-2010) 39 yrs**
- **Peter Wyse Jackson (2010-Present)**

Town House

Moved to Garden
1891-1892



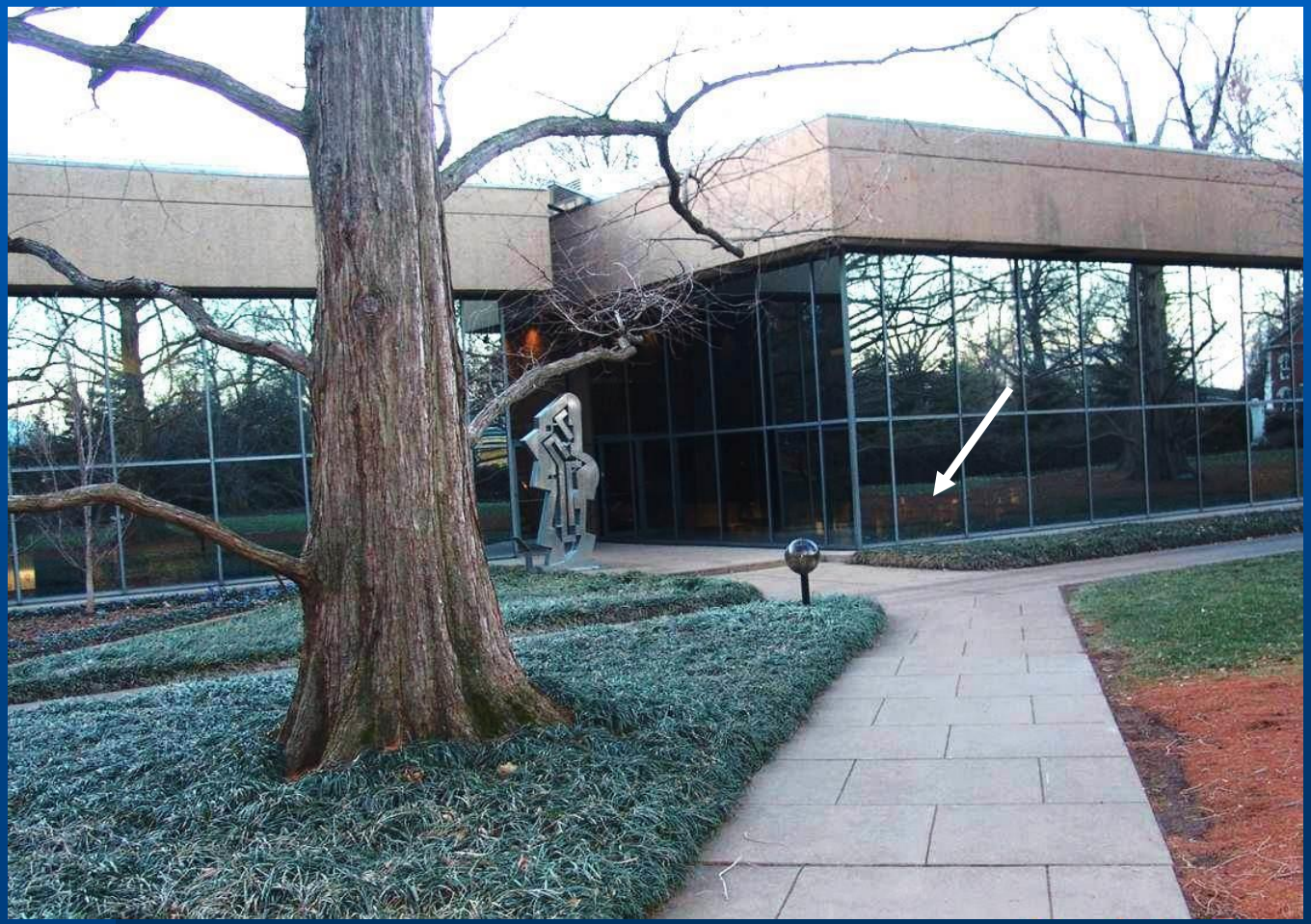
Herbarium and Library moved to Garden in 1926

Herbarium Addition to Town House, 1902

Administration Building - 1909

Work at the Missouri Botanical Garden beginning August, 1967

Current Office in Lehmann Building 007



The Herbarium

Lehmann Building

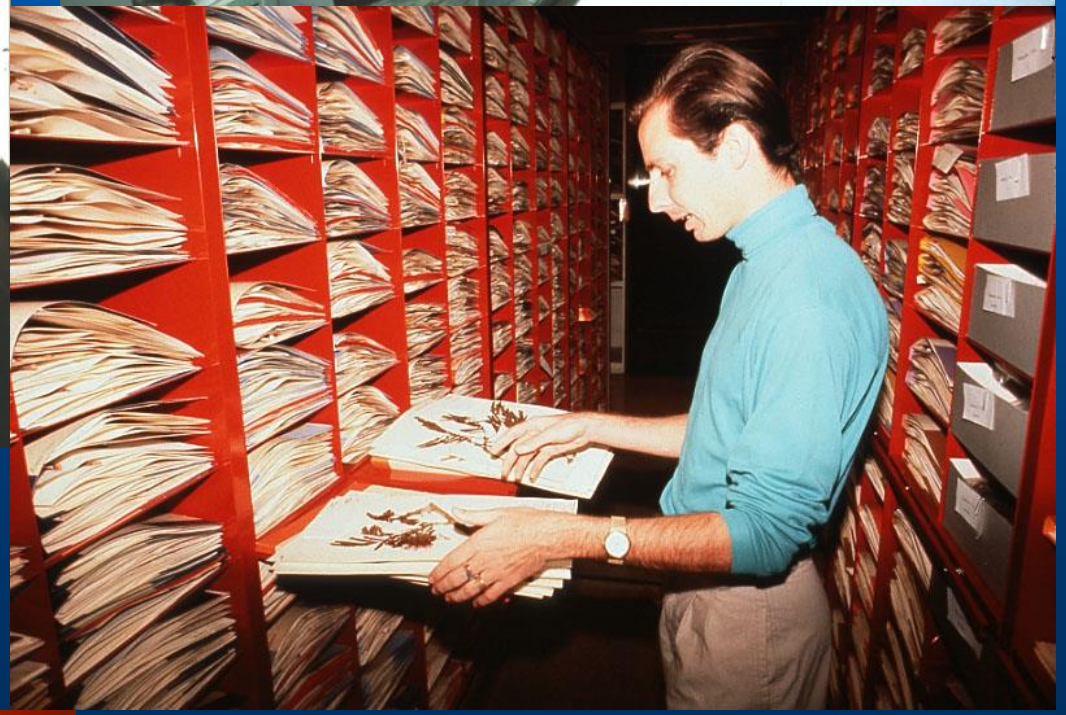
Constructed in 1972


Lehmann Building
Herbarium compactors

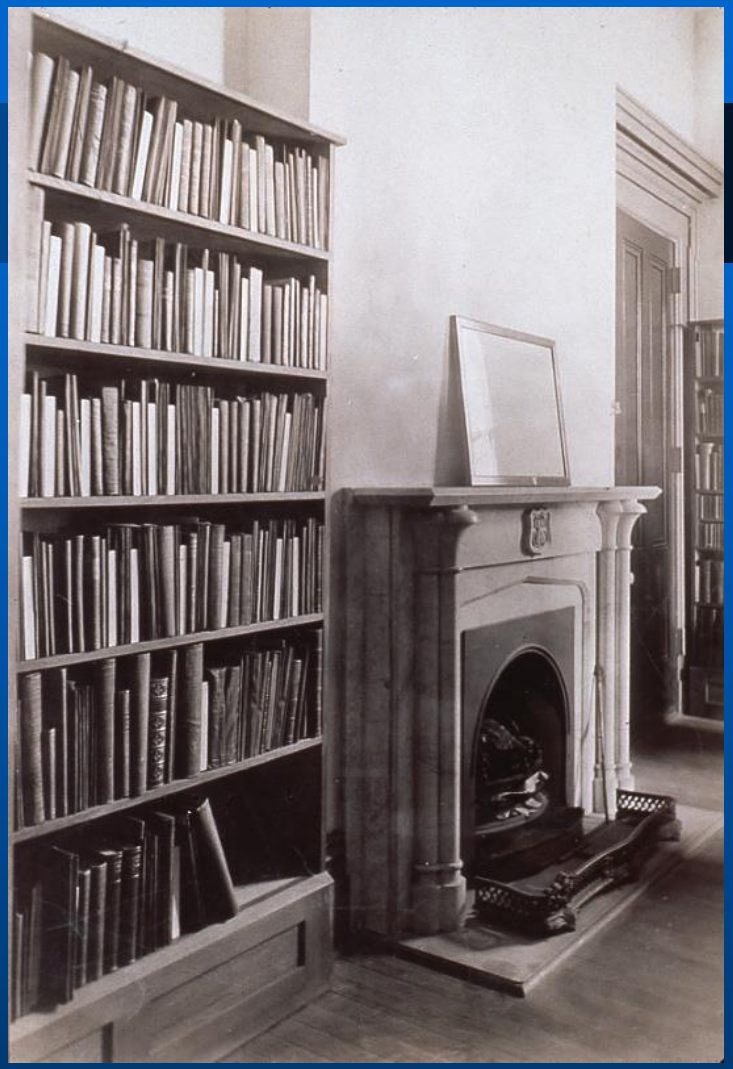
The Herbarium

Monsanto Center

Formally opened in 1998

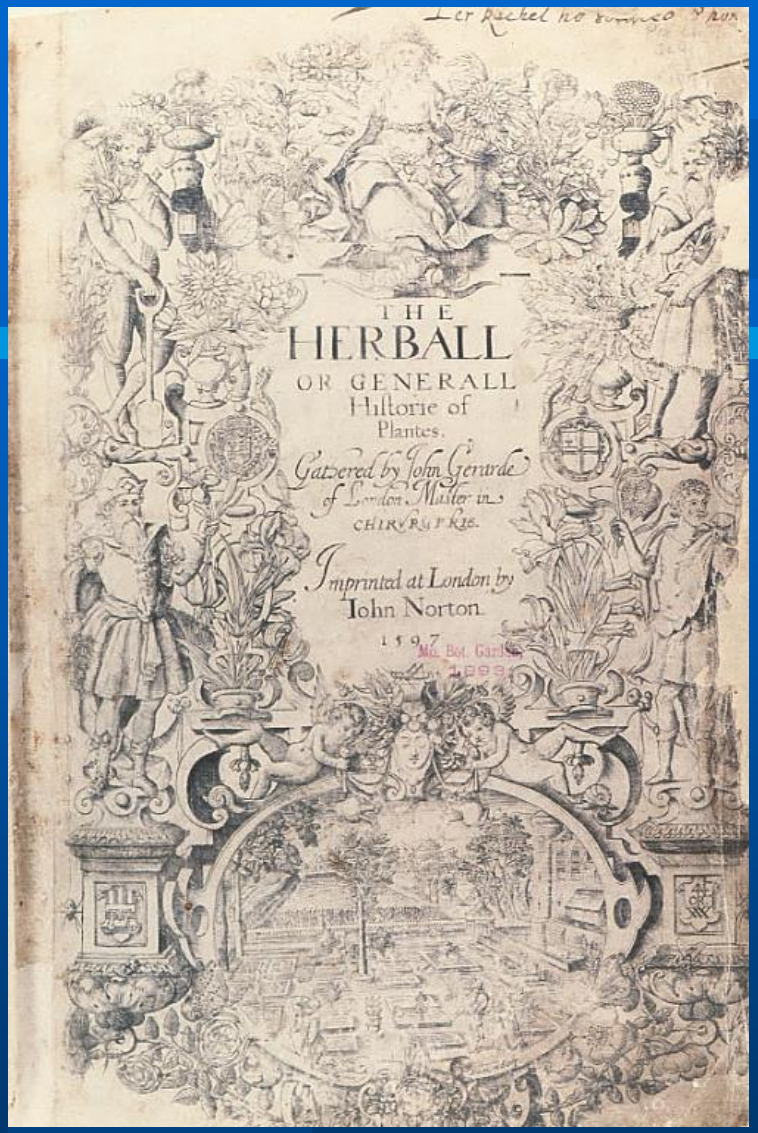


The Library



Herbarius

Peter Shöffer, 1484




HISTORIE OF PLANTS. 717

5 *Vitis dura cina.*
Stalked, or hard grapes.

The place.

A fit foile for Vines, saith *Florentinus*, is every blacke earth, which is not very close nor clammie, hauing some moisture: notwithstanding *Columella* saith, that great regarde is to be had, what kinde or sort of Vine you woulde nourish, according to the nature of the countrie and soile.

A wise husbandman will commit to a fat and fruitfull soile a leane Vine, and of his owne nature not too fruitfull: to a leane grounde a fruitfull Vine: to a close and compact earth, a spreading Vine, and that is full of matter to make branches of: to a loose and fruitfull soile, a Vine of fewe branches. The same *Columella* saith, that the Vine delighteth not in dung, of what kinde soeuer it be; but fresh moulde mixed with some shauings of horn is the best to be disposed about the rootes, to cause fertilitie.

The time.

Columella saith, that the Vines must be pruned before the yoong branches bud foorth. *Palladius* writeth in Februarie: if they be pruned later, they lose their nourishment with weeping.

The names.

The Vine is called in Greeke ἄμπελος ἡμερὰς, as much to say in Latin, as *Vitis vinifera*, or the Vine which beareth wine, and ἄμπελος ὀινόφορος, that is, *Vitis manu facta, siue cultiua*, tame or manured Vines and it is called ἱκτὶς ἄγριος, that it may differ from both the Bryonies, the white and the blacke, and from *Tamus*, or our Ladies seale, which be likewise named ἄμπελοι. It is called *Vitis*, bicause *inuitatur ad vnas putandas*. It is cherished to the intent to bring foorth full clusters, as *Varro* saith.

Plinie maketh *Vua Zibeba, Alexandrina vitis*, or Vine of Alexandria, in his 14. booke third chapter, describing the same by those very woords that *Theophrastus* doth. *Dioscorides* setteth it downe to be *altera species Vitis syluestris*, or a second kinde of wilde Vine, but we had rather retaine it among the tame Vines. We may name it in English smal Raisin Vine. The fruits are hereof called in shops by the name of *Passularum de Corintho*: in English Currans, or smal

Syluestris Vitis, or wilde Vine, is called in Greeke ἄμπελος ἀγρία, and in Lat

Eclogs.

Syluestris raris spargit Labrusca racemis.

The wilde Vine with her branches few and clusters thinne
Adornes our countrey Bowre, a seemely thing I winne.

To this wilde Vine do belong those, which *Plinie* in his 16. booke 27. cha
led *Trifera*, or that bring three sundrie fruites in one yeere, as *Insana*, an
cause in those some clusters are ripe and full growen, some in swelling, and

The fruit of the Vine is called in Greeke βότρυς and σταφυλὴ: in Latine *Ra*
a bunch or cluster of Grapes.

The cluster of Grapes that hath beene withered or dried in the sunne,
in Latine *Vua passa*: in shops *Passula*: in English Raisins of the sunne.

The berrie or grape it selfe is called in Latine *Acinus*, and also *Granum*,
king of the berrie.

The seede or stones contained within the berries, are called in Latine
Nucles: in shops *Ariculi*, as though they should say *Ariculi*, bicause they a

Zz 4

The Herball, or Generall Historie of Plantes, John Gerarde, 1597

A

VOYAGE

To the Islands

Madera, Barbados, Nieves, S. Christophers

AND

JAMAICA,

WITH THE

Natural History

OF THE

Herbs and *Trees, Four-footed Beasts, Fishes, Birds, Insects, Reptiles,* &c.

Of the last of those ISLANDS;

To which is prefix'd An

INTRODUCTION,

Wherein is an Account of the

Inhabitants, Air, Waters, Diseases, Trade, &c

of that Place, with some Relations concerning the Neighbouring Continent, and Islands of *America*.

ILLUSTRATED WITH

The FIGURES of the Things describ'd,

which have not been heretofore engraved;

In large Copper-Plates as big as the Life.

By *HANS SLOANE*, M.D.

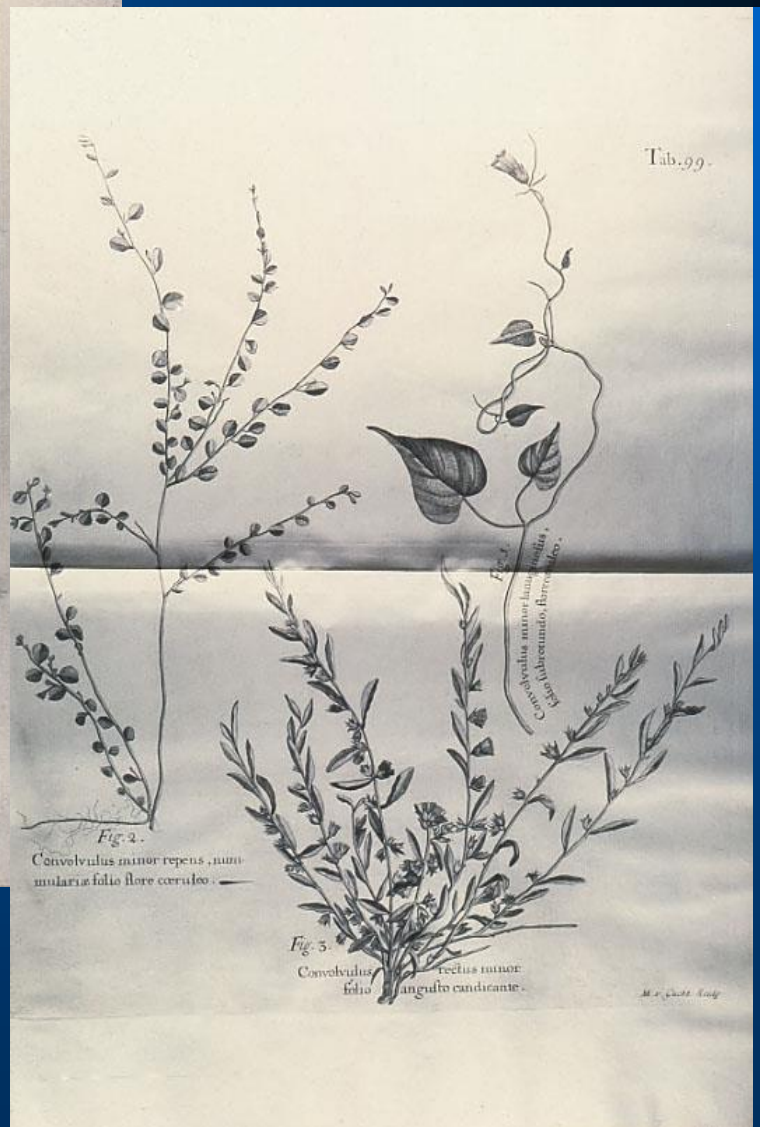
Fellow of the *College* of *Physicians* and Secretary of the *Royal-Society*.

In Two Volumes. Vol. I.

Many shall run to and fro, and Knowledge shall be increased. Dan. xii. 4.

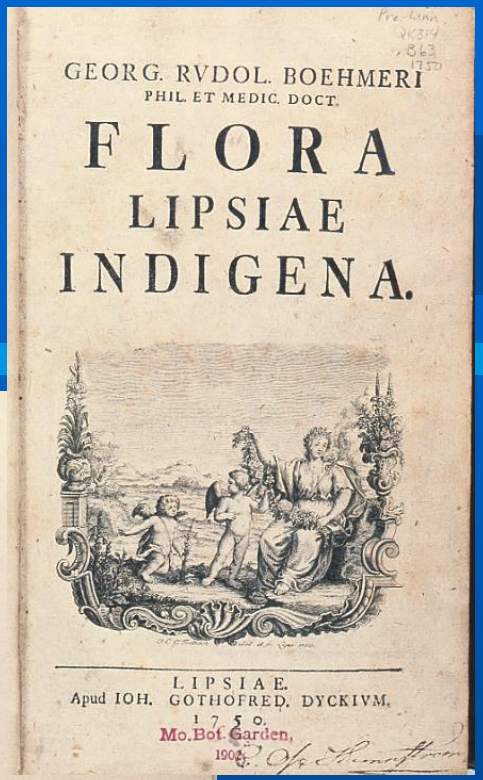
LONDON:

Printed by *B. M.* for the Author, 1707.



"*Natural History of Jamaica*"
Hans Sloane, 1707

***Rubus idaeus* L.**



***Senna angustisiliqua* (Lam.) H.S. Irwin & Barneby**

Published in 1750

Species Plantarum
Carl Linné, 1753

CAROLI LINNÆI

S:æ R:giæ M:tis Sveciæ Archiatri; Medic. & Botan. Profess. Upsal; Equitis aur. de Stella Polari; nec non Acad. Imper. Monspel. Berol. Tolos. Upsal. Stockh. Soc & Paris. Coresp.

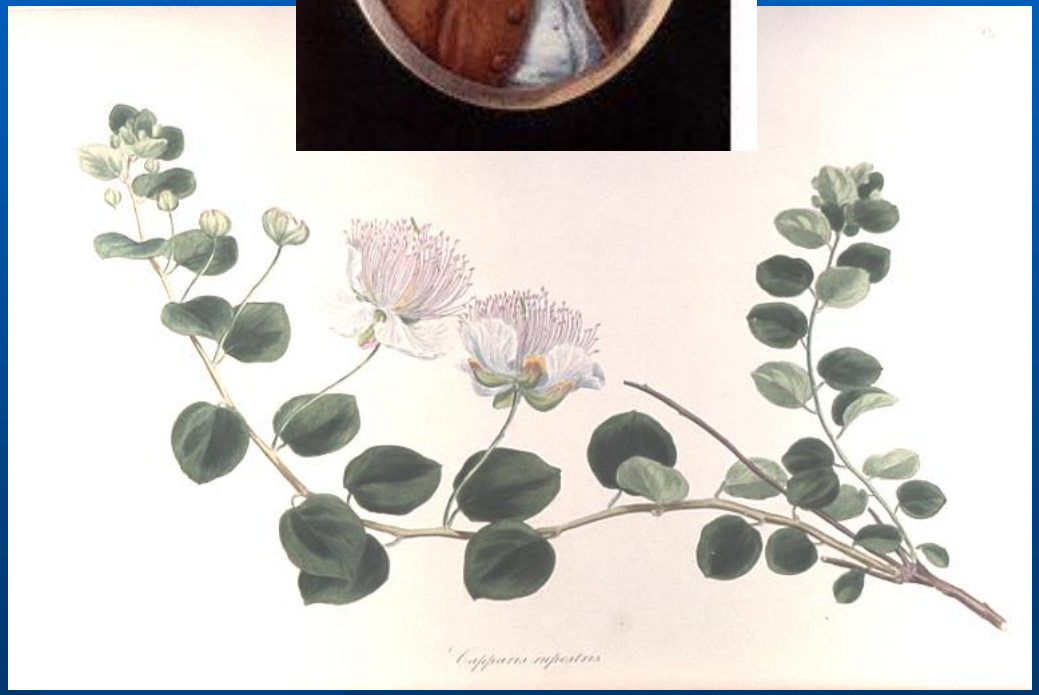
SPECIES PLANTARUM,

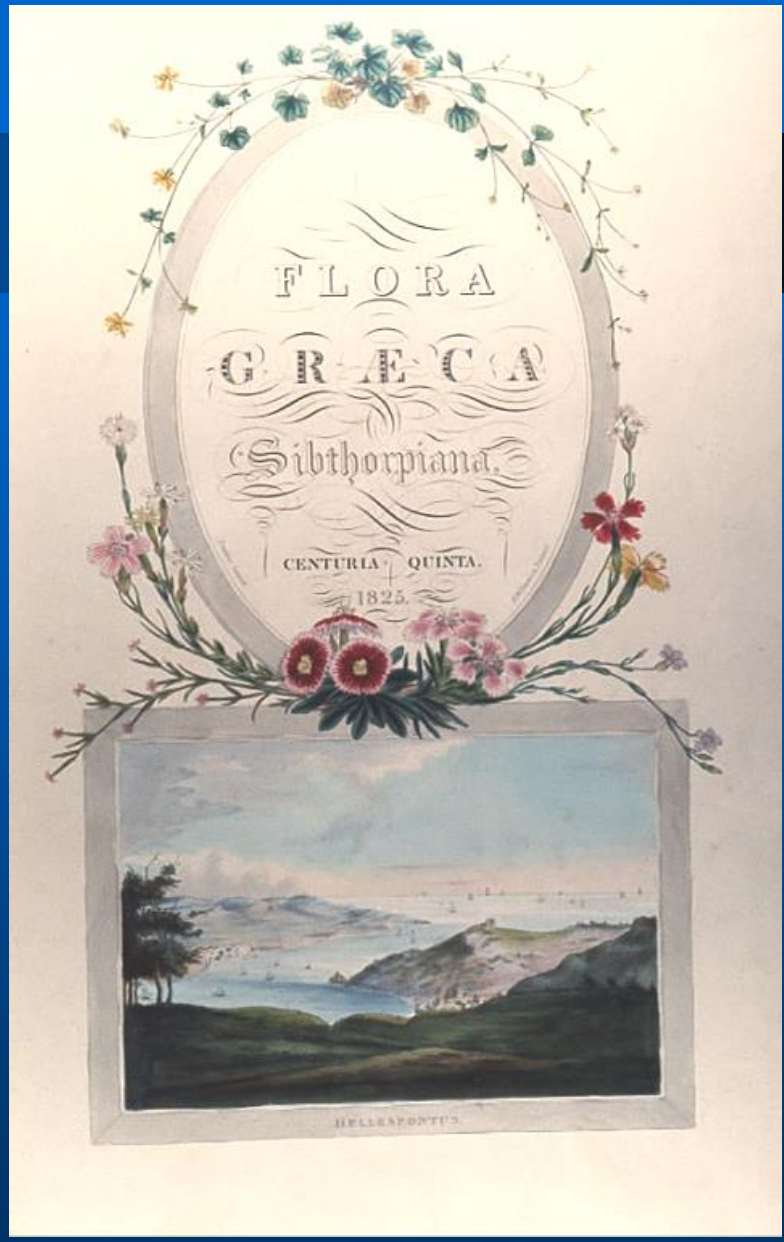
EXHIBENTES
PLANTAS RITE COGNITAS,
AD
GENERA RELATAS,
CUM
Differentiis Specificis,
Nominibus Trivialibus,
Synonymis Selectis,
Locis Natalibus,
Secundum
SYSTEMA SEXUALE
DIGESTAS.

Tomus I.

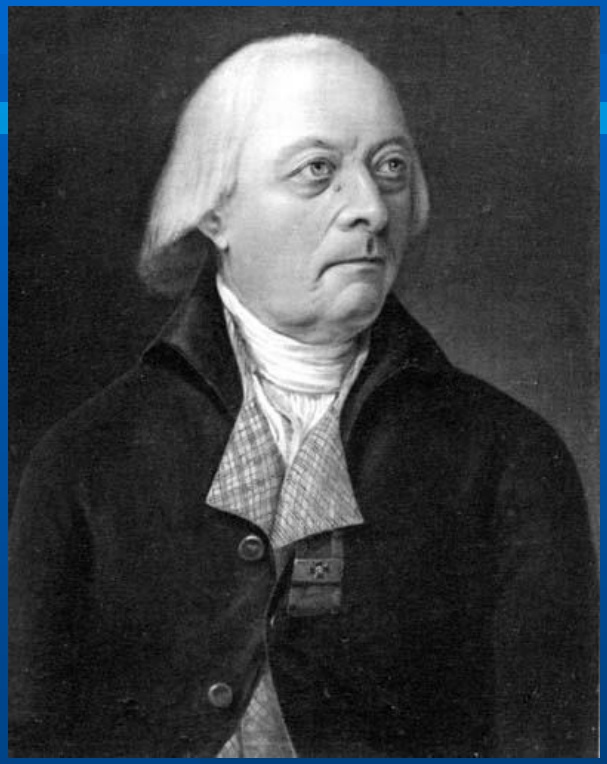
Cum Privilegio S. R. M:tis Sueciæ & S. R. M:tis Poloniæ ac Electoris Saxon.

HOLMIÆ,
Impensis LAURENTII SALVII.
1753.





Flora Graeca
John Sibthorp, 1806



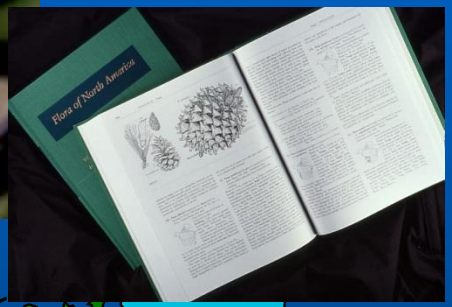
Fragmenta botanica
Nikolaus Joseph Jacquin, 1809

Special Collections

- **Liquid preserved (spirit) samples**
  - **4,500 accessions**
- **DNA Bank**

  (Samples in silica gel)
  - **11,000 samples**

Research Projects: North America



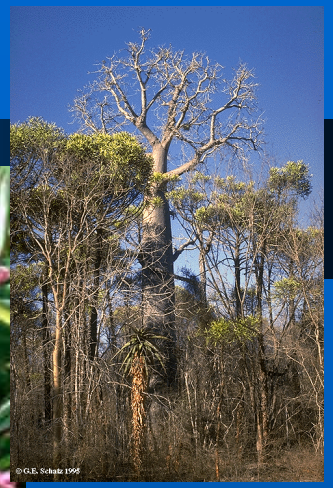
- **Flora of North America**
  - **21,000 taxa**
  - **30 volumes and internet site**
  - **850 contributors**
- **Flora of Missouri**
- **Plant Identification Service**

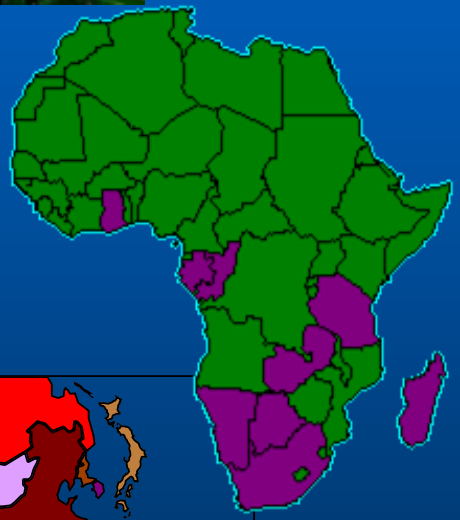
Research Projects: Neotropics

- Flora Mesoamericana
  - 17,000 taxa, 7 volumes, 300 contributors
- Flora of the Venezuelan Guyana
  - 9,500 taxa, 9 volumes, 200 contributors from more than 20 countries
- Floras of Nicaragua, Costa Rica, Panama
- Checklists of Ecuador, Peru, Bolivia
- Inventories
- Training

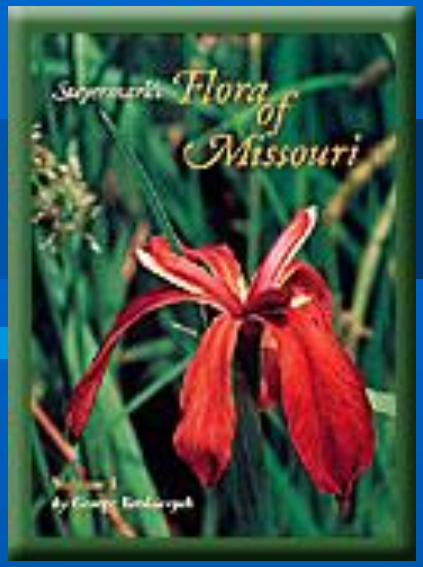
Research Projects: Africa and Asia

- Floras and Checklists
  - Madagascar
  - Southern Africa
- Flora of China
  - 30,000 taxa, 50 volumes, 600 contributors
- Vietnam
- Ethnobotany
- Bioprospecting
- Inventories
- Conservation

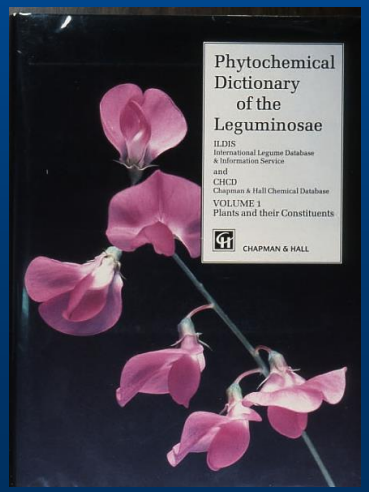




Products

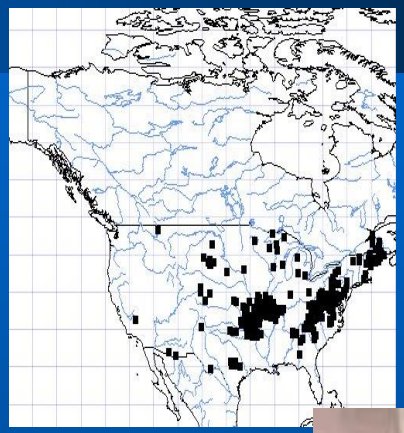


- **Publications**
  - **Books**
  - **Journals**
    - ***Annals of the Missouri Botanical Garden***
    - ***Novon***
    - ***Monographs in Systematic Botany from the Missouri Botanical Garden***
  - **Web site**
    - **http://www.mobot.org**



Products

- TROPICOS Database
  - Nomenclature
  - Specimens
  - Bibliography
- On-line Images
  - Botanical literature
  - Living plants
  - Specimens
- GIS Applications
  - Mapping
  - Predictive modeling



Tropicos Database

- Nomenclature
- Bibliography
- Synonymy
- Specimens
- Distribution
- Type Specimen
- Chromosomes

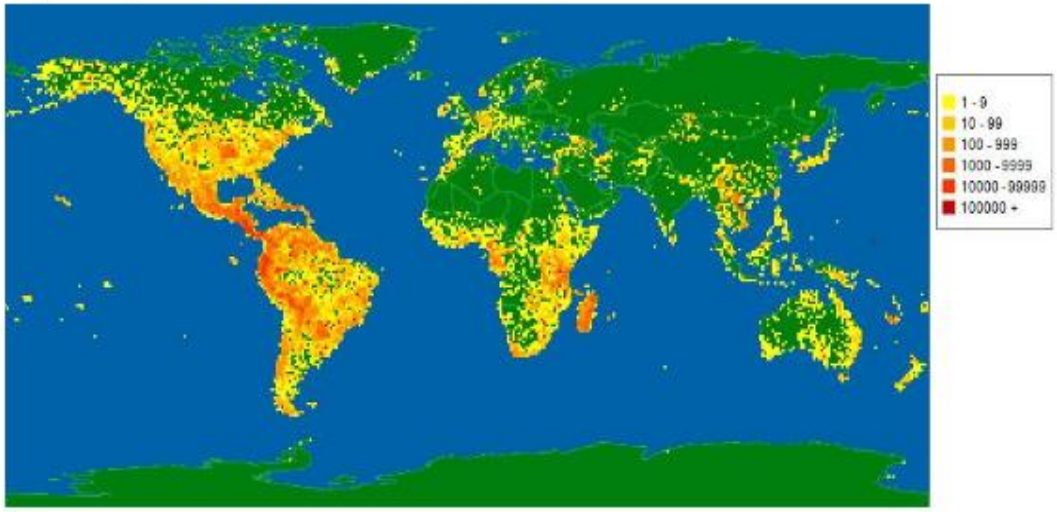
Tropicos® was originally created for internal research but has since been made available to the world's scientific community. All of the nomenclatural, bibliographic, and specimen data accumulated in MBG's electronic databases during the past 25 years are publicly available here. This system has over 1.2 million scientific names and 4.0 million specimen records.

Quick Name Search: Tabebuia billbergii [Search] [Search Exact]

Common Name:

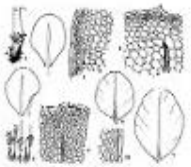
News | Links | Stats | Heat Map | Country Map

This map shows the density of Tropicos specimen records that have coordinates. Click the image to see a larger version and to explore specimens at particular degree square.



Click an image for detailed information:












Tabebuia billbergii subsp. *ampla* A.H. Gentry

Group: Dicot **Rank:** subspecies **Herbarium Placement:** Monsanto, 3rd, C, 258

Authors:
Gentry, Alwyn Howard

Published In: Phytologia 35(3): 187. 1977. (Phytologia) BHL

Type-Protologue
Locality: Ecuador: Guayas Prov. 1 km E of turnoff to Julio Moreno on Guayaquil-Salinas toll road, 30 Oct 1974
Collector and Number: Gentry 12243
Distribution: Ecuador, Peru
Institution(s): HT: MO; IT: QCA, S

Type Specimens
- HT: Alwyn H. Gentry - 12243. (MO)

Higher Taxa: Taxonomy Browser
Concept: System details
- class: Equisetopsida C. Agardh
- subclass: Magnoliidae Novák ex Takht.
- superorder: Asteranae Takht.
- order: Lamiales Bromhead
- family: Bignoniaceae Juss.
- genus: *Tabebuia* Gomes ex DC.
- species: *Tabebuia billbergii* (Bureau & K. Schum.) Standl.

Combinations for this basionym:
Handroanthus billbergii subsp. *ampla* (A.H. Gentry) S. O. Grose

Projects: Ecuador , Peru

Keywords: CEC, PERU
Images:

Gentry - 12243 - Ecuador

Gentry - 12243 - Ecuador

Tabebuia billbergii subsp. *ampla* A.H. Gentry

Region All Country All

Maps Google Maps ESRI Google Earth (KML) SimpleMappr

Country Occurrence Map Elevation Chart Phenology Charts

EXPORT Format Tab Delimited CSV Export...

Encoding Type ANSI UTF-8 UTF-16

Include specimens whose determinations have a qualifier

Include cultivated specimens

Include specimens for basionym and other combinations

Include specimens on map with approximate coordinates

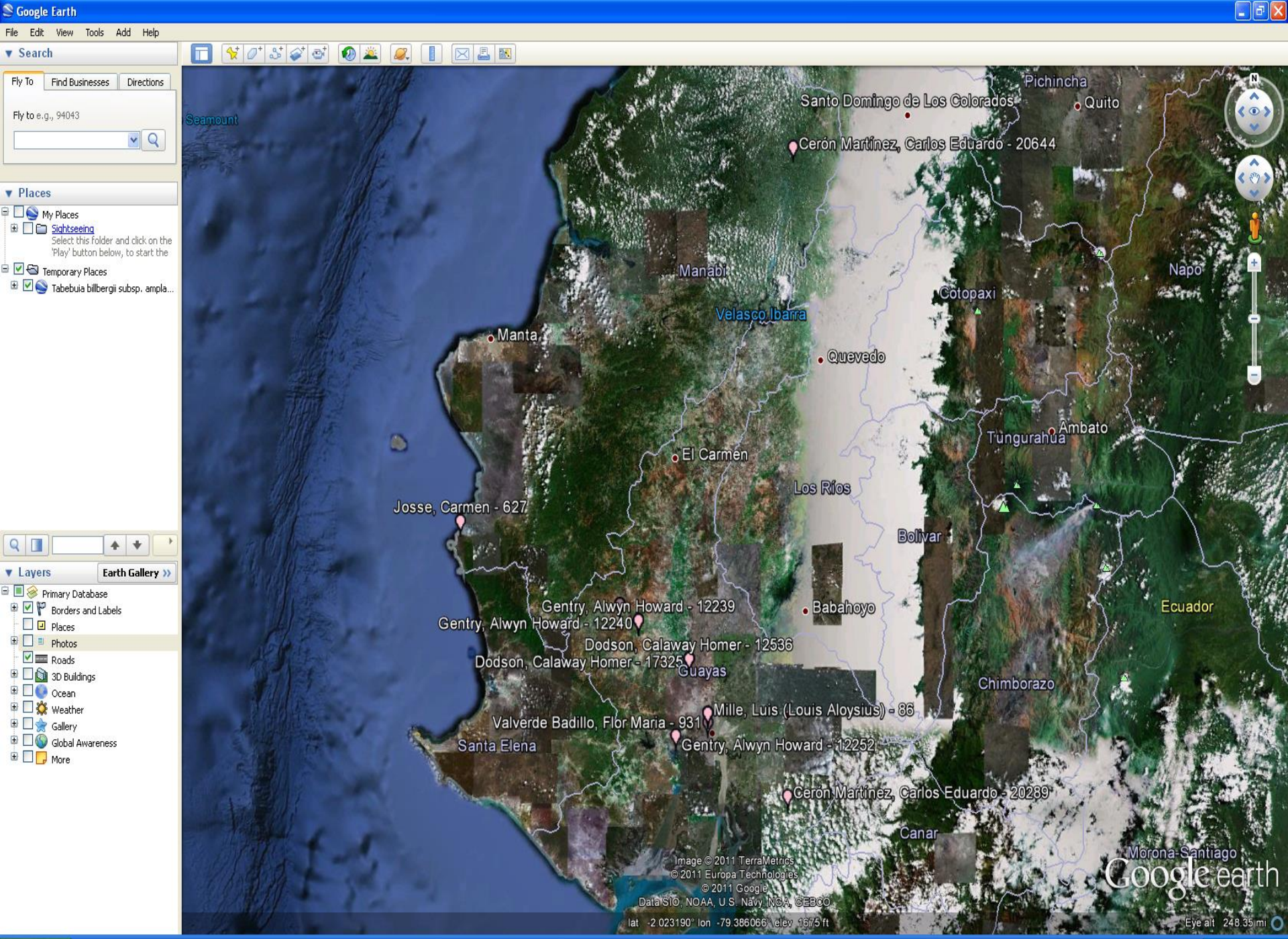
Specimen coordinates in square brackets [ ] have been approximated based on political units.

Records 1 - 30 of 30 Page 1 of 1

Country	Upper	Lower	Elevation	Latitude	Longitude	Date	Qual.	Collectors	Coll No	Institutions
Ecuador	El Oro		33 m			23/11/1978		Linda K. Albert de Escobar	836	MO
Ecuador	El Oro					15 May 1979		Linda K. Albert de Escobar	1249	QCA
Ecuador	El Oro					0/4/1979		Linda K. Albert de Escobar	1247	QCA
Ecuador	Guayas		0 m			10/12/1934		Ynés Mexía	6758	C, F, K, US
Ecuador	Guayas					20/1/1962		Amy J. Gilmartin	537	US
Ecuador	Guayas					15/10/1962		Amy J. Gilmartin	810	US
Ecuador	Guayas					0/10/1955		Erik Asplund	18194	S
Ecuador	Guayas		20 - 200 m	02°00'00"S	079°58'00"W	16 Feb 1982		Calaway H. Dodson & Alwyn H. Gentry	12536	MO
Ecuador	Guayas					12/9/1955		Erik Asplund	17607	B, G, K, NY, S
Ecuador	Guayas					27/12/1953		Folke Fagerlind	s.n.	S
Ecuador	Guayas		0 m	01°50'00"S	080°14'00"W	29 October 1974		Alwyn H. Gentry	12236	MO
						29 October				

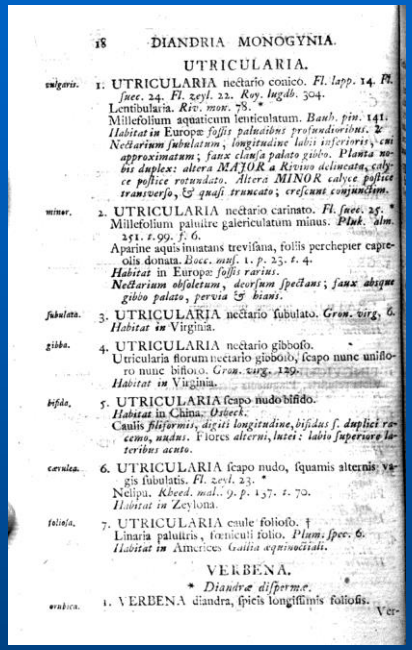
On-line Plant Images

- ***Tabebuia billbergii* subsp. *ampla* A. H. Gentry**
- **A. Gentry 12234, Ecuador**


Google Earth
File Edit View Tools Add Help
Search
Fly To
Find Businesses
Directions
Fly to e.g., 94043
Places
My Places
Sightseeing
Select this folder and click on the 'Play' button below, to start the
Temporary Places
Tabebuia billbergii subsp. ampla...
Layers
Earth Gallery
Primary Database
Borders and Labels
Places
Photos
Roads
3D Buildings
Ocean
Weather
Gallery
Global Awareness
More
Seamount
Pichincha
Santo Domingo de Los Colorados
Quito
Cerón Martínez, Carlos Eduardo - 20644
Manabi
Napo
Cotopaxi
Velasco Ibarra
Manta
Quevedo
Tungurahua
Ambato
El Carmen
Los Ríos
Josse, Carmen - 627
Bolivar
Gentry, Alwyn Howard - 12239
Gentry, Alwyn Howard - 12240
Babahoyo
Ecuador
Dodson, Calaway Homer - 12536
Dodson, Calaway Homer - 17325
Guayas
Chimborazo
Mille, Luis (Louis Aloysius) - 86
Valverde Badillo, Flor Maria - 931
Santa Elena
Gentry, Alwyn Howard - 12252
Cerón Martínez, Carlos Eduardo - 20289
Canar
Morona-Santiago
Image © 2011 TerraMetrics
© 2011 Europa Technologies
© 2011 Google
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
lat -2.023190° lon -79.386066° elev 1675 ft
Google earth
Eye alt 248.35 mi
start
Inbox - Microsoft Out...
Tropicos Editing System
Missouri Botanical Gar...
Research Program (lo...
Tropicos | Name - Ta...
Google Earth
9:47 AM

Botanicus: On-line Images from Literature

- 1,085 titles (books/journals)
- 4,837 volumes
  - Dating from 1480
- 2,088,544 pages
- 231,205 links to original descriptions (protologues)



18 DIANDRIA MONOGYNIA.

UTRICULARIA.

vulgaris. 1. UTRICULARIA nectario conico. *Fl. lapp.* 14. *Fl. fuec.* 24. *Fl. zeyl.* 22. *Roy. lugdb.* 304.
Lentibularia. *Riv. mon.* 78.
Millefolium aquaticum lenticulatum. *Bauh. pin.* 141.
Habitat in Europæ *fossis palustribus profundioribus.* ♃
Nectarium subulatum, longitudine labii inferioris, cui approximatum; fauce clausa palato gibbo. Planta nobis duplex: altera MAJOR a Rivino delineata, calyce postice rotundato. Altera MINOR calyce postice transverso, & quasi truncato; crescunt conjunctim.

minor. 2. UTRICULARIA nectario carinato. *Fl. fuec.* 25.
Millefolium palustre galericulatum minus. *Pluk. alm.* 251. *t.* 99. *f.* 6.
Aparine aquis innatans trevisana, foliis perchepier capreolis donata. *Boce. mus.* 1. *p.* 23. *t.* 4.
Habitat in Europæ *fossis rarius.*
Nectarium obsoletum, deorsum spectans; fauce obliqua gibbo palato, pervia & hians.

fubulata. 3. UTRICULARIA nectario fubulato. *Gron. virg.* 6.
Habitat in Virginia.

gibba. 4. UTRICULARIA nectario gibboso.
Utricularia florum nectario gibboso, scapo nunc uniflo-ro nunc bifloro. *Gron. virg.* 129.
Habitat in Virginia.

bifida. 5. UTRICULARIA scapo nudo bifido.
Habitat in China. *Osbeck.*
Caulis *filiformis, digiti longitudine, bifidus s. duplici racemo, nudus.* Flores *alterni, lutei: labio superiore laciniis acuto.*

cærulea. 6. UTRICULARIA scapo nudo, squamis alternis vaginantibus. *Fl. zeyl.* 23.
Nelipa. *Rheed. mal.* 9. *p.* 137. *t.* 70.
Habitat in Zeylona.

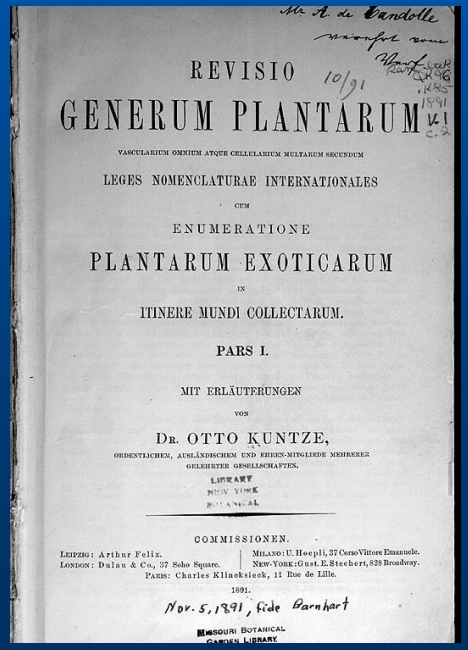
foliosa. 7. UTRICULARIA caule folioso. †
Linaria palustris, fasciculi folio. *Plum. spec.* 6.
Habitat in Americes *Gallia æquinoctiali.*

VERBENA.

* *Diandræ diſperme.*

urnica. 1. VERBENA diandra, spicis longissimis foliosis. Ver-

Linnaeus' *Species Plantarum*, 1753

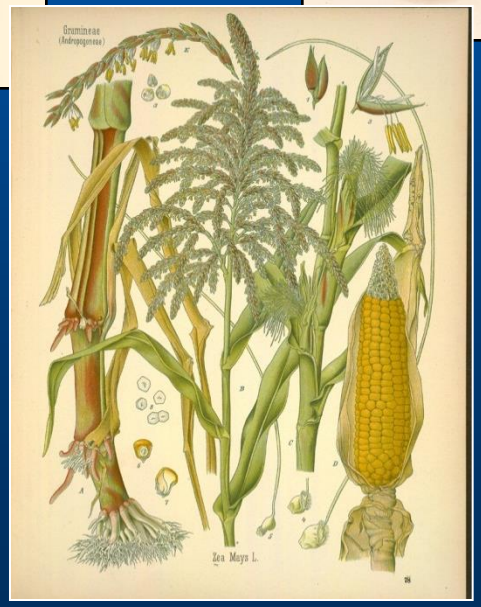


REVISIO
GENERUM PLANTARUM
VASCULARIUM OMNIUM ATQUE CELLULARIUM MULTARUM SECUNDUM
LEGES NOMENCLATURAE INTERNATIONALES
CUM
ENUMERATIONE
PLANTARUM EXOTICARUM
IN
ITINERE MUNDI COLLECTARUM.
PARS I.
MIT ERLÄUTERUNGEN
VON
DR. OTTO KUNTZE,
ORDENTLICHEM, AUSLÄNDISCHEM UND EHREN-MITGLIEDE MEHRERER GELEHRTER GESELLSCHAFTEN.
COMMISSIONEN.
LEIPZIG: Arthur Felix.
LONDON: Dulau & Co., 37 Soho Square.
PARIS: Charles Klincksieck, 11 Rue de Lille.
MILANO: U. Hoepli, 37 Corso Vittore Emanuele.
NEW-YORK: Gust. E. Stechert, 828 Broadway.
1891.
Nov. 5, 1891, fide Barnhart

Kuntze's *Revisio Generum Plantarum*, 1891

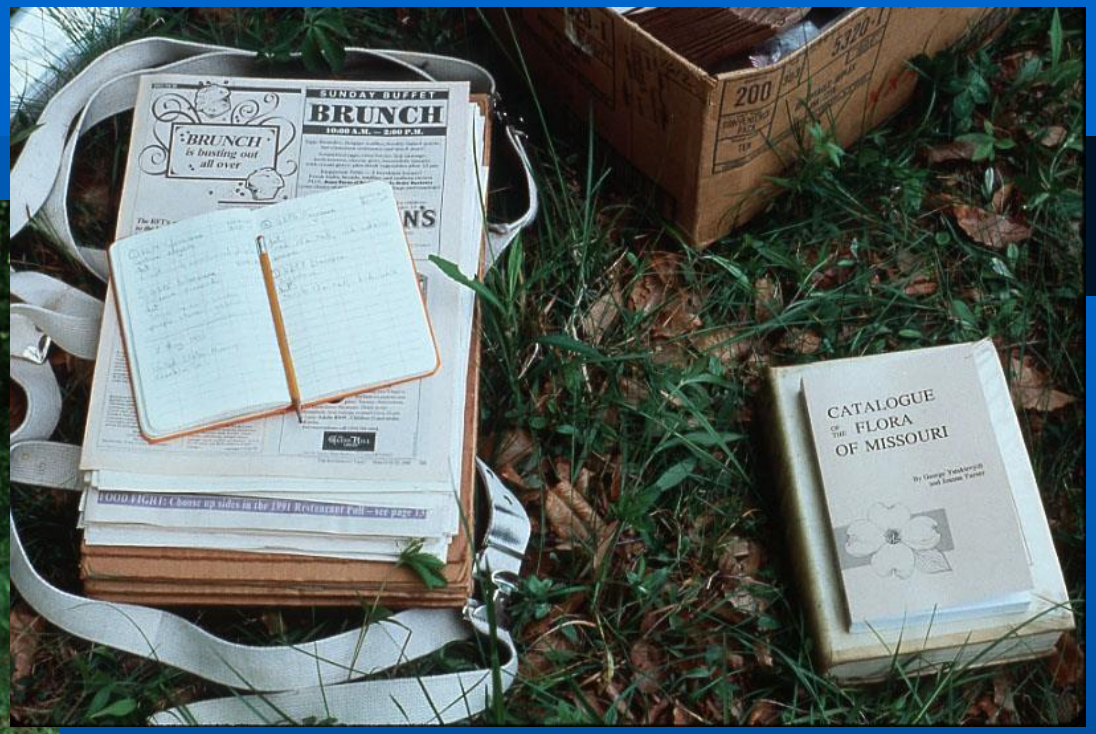
On-line Images from Literature

- **Additional information:**
  - **Author biographies**
  - **Bibliographic descriptions**
  - **Links to other on-line botanical data**



World Wide Web Access

- Missouri Botanical Garden
  - http://www.missouribotanicalgarden.org
- TROPICOS
  - http://www.tropicos.org
- Botanicus
  - http://www.botanicus.org

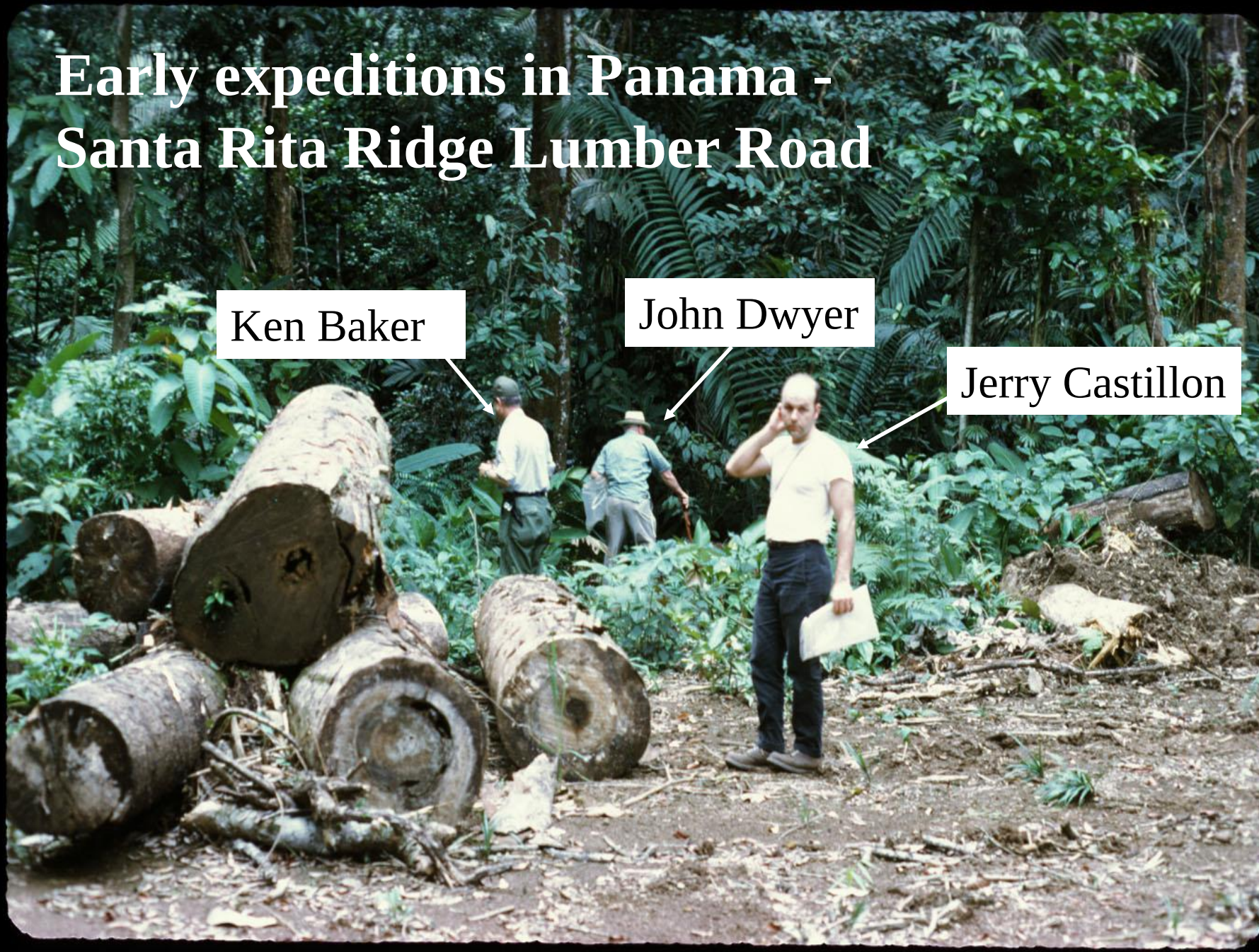


Where herbarium specimens come from. The importance of field work.

Anthurium centimillesimum Croat

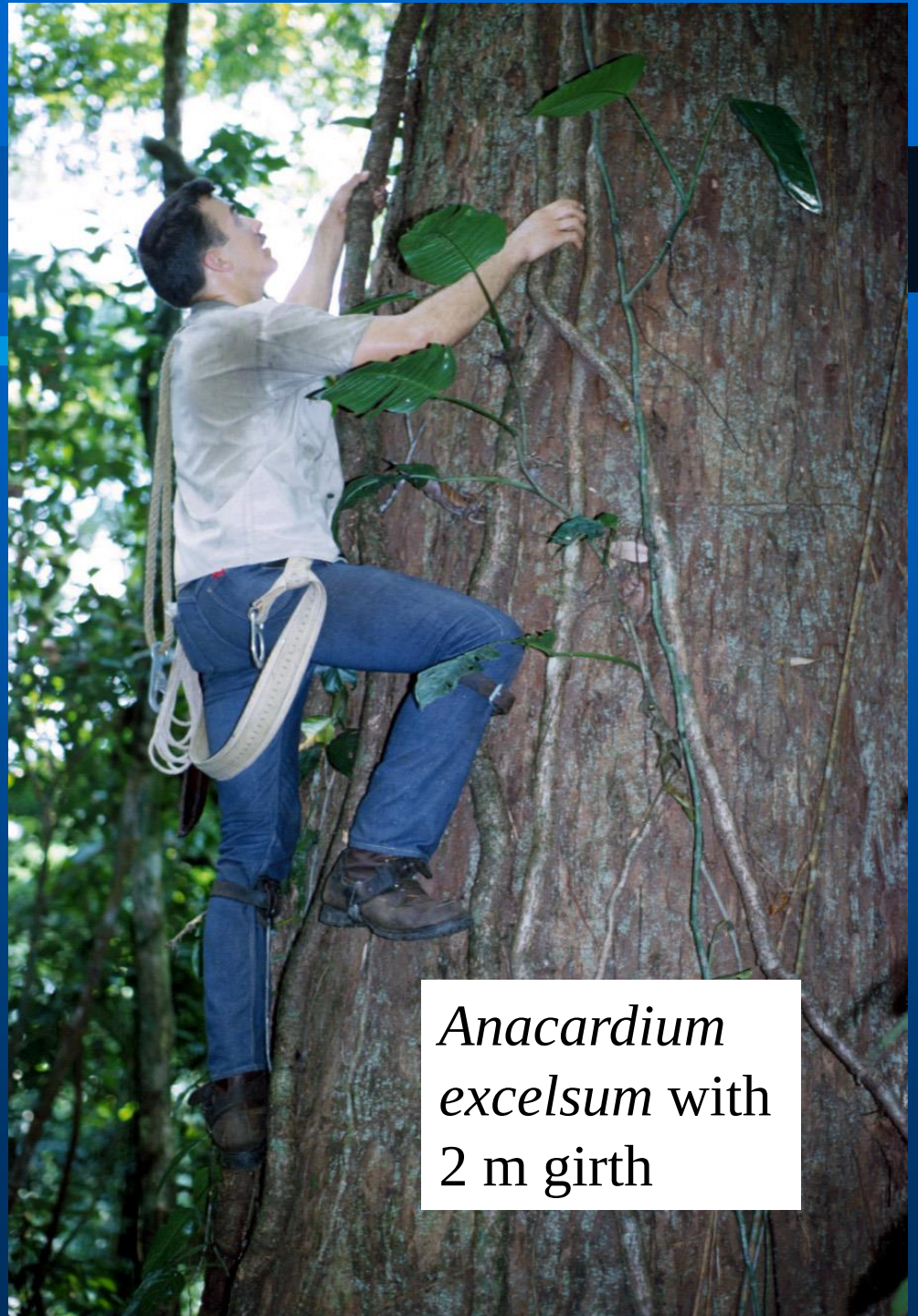
Tom Croat's
100,000th collection

Early expeditions in Panama - Santa Rita Ridge Lumber Road



Methods of Collecting

Climbing trees with climbing spikes enables one to go nearly anywhere to get to epiphytes.

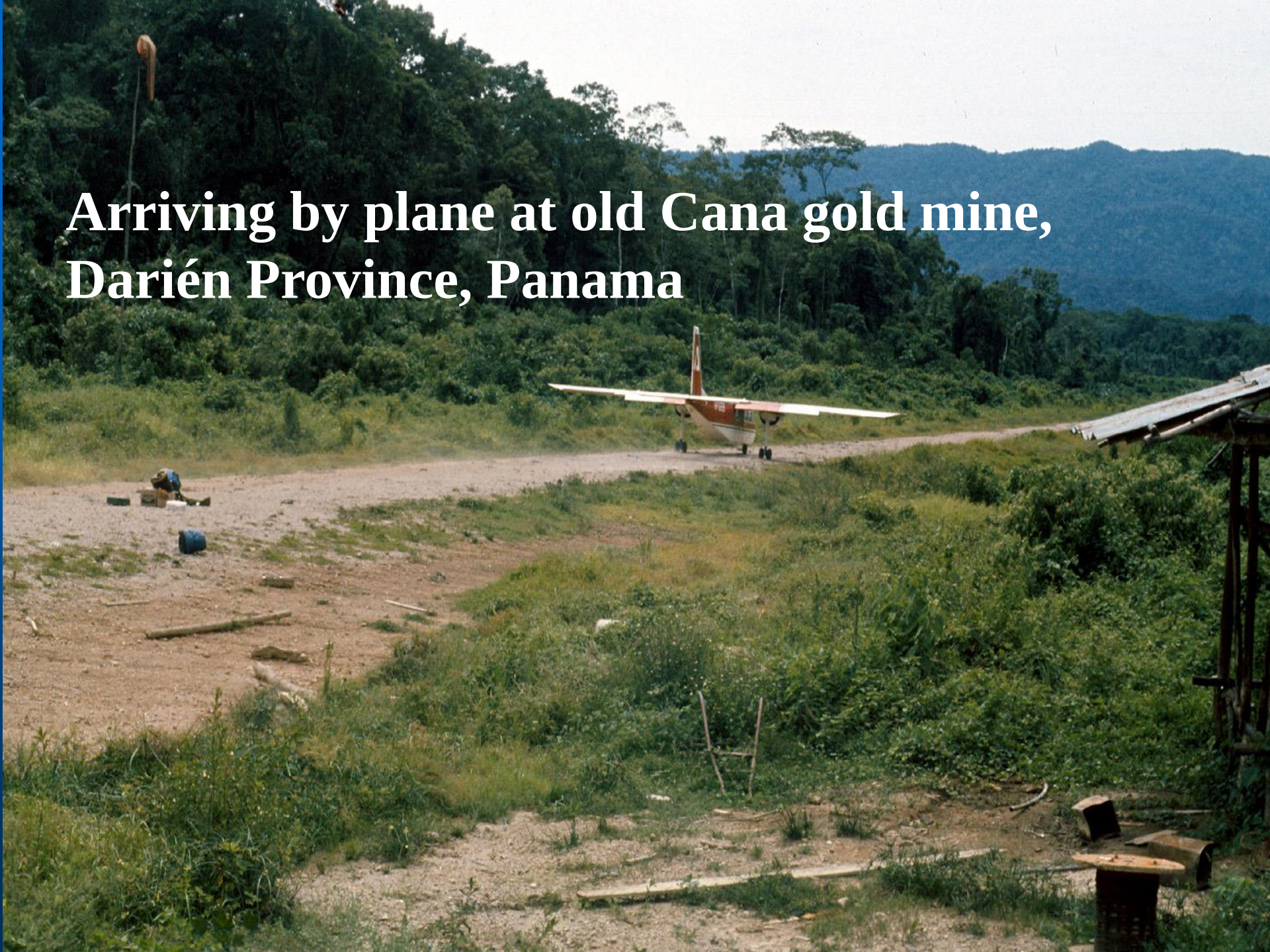


Anacardium excelsum with 2 m girth

Climbing trees provides an opportunity to take photos of epiphytes in natural conditions

Collecting by boat in the new, rapidly filling Bayano Lake

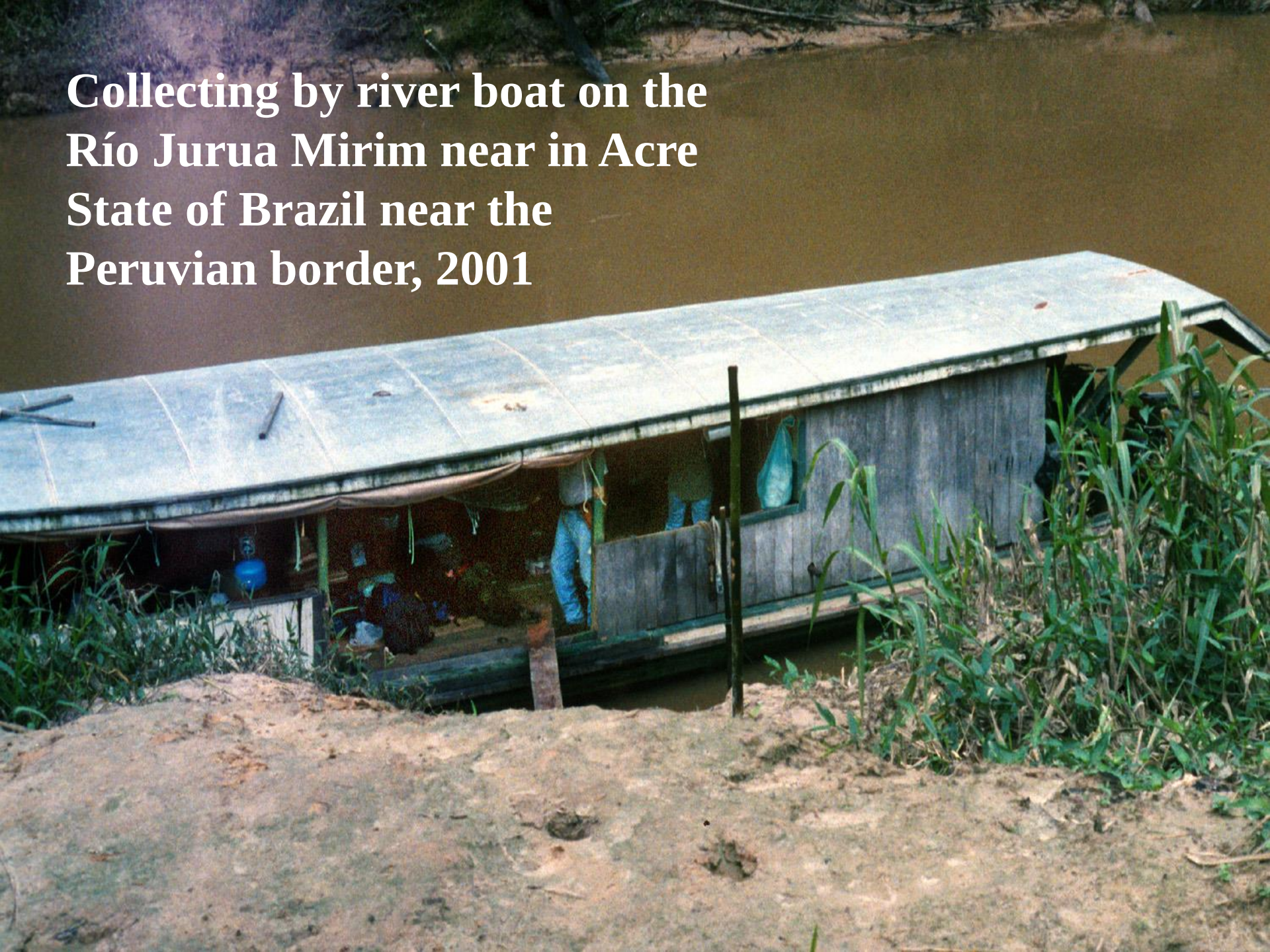
Collecting at gold mine on the Upper Río Turquesa in Panama



Arriving by plane at old Cana gold mine, Darién Province, Panama


Using mules to get to Cerro Pirre in Darién Province, Panama
Narciso Bristan

Collecting by river boat on the Río Amazonas in Peru with Amazon Tropical Drug Company, 1972

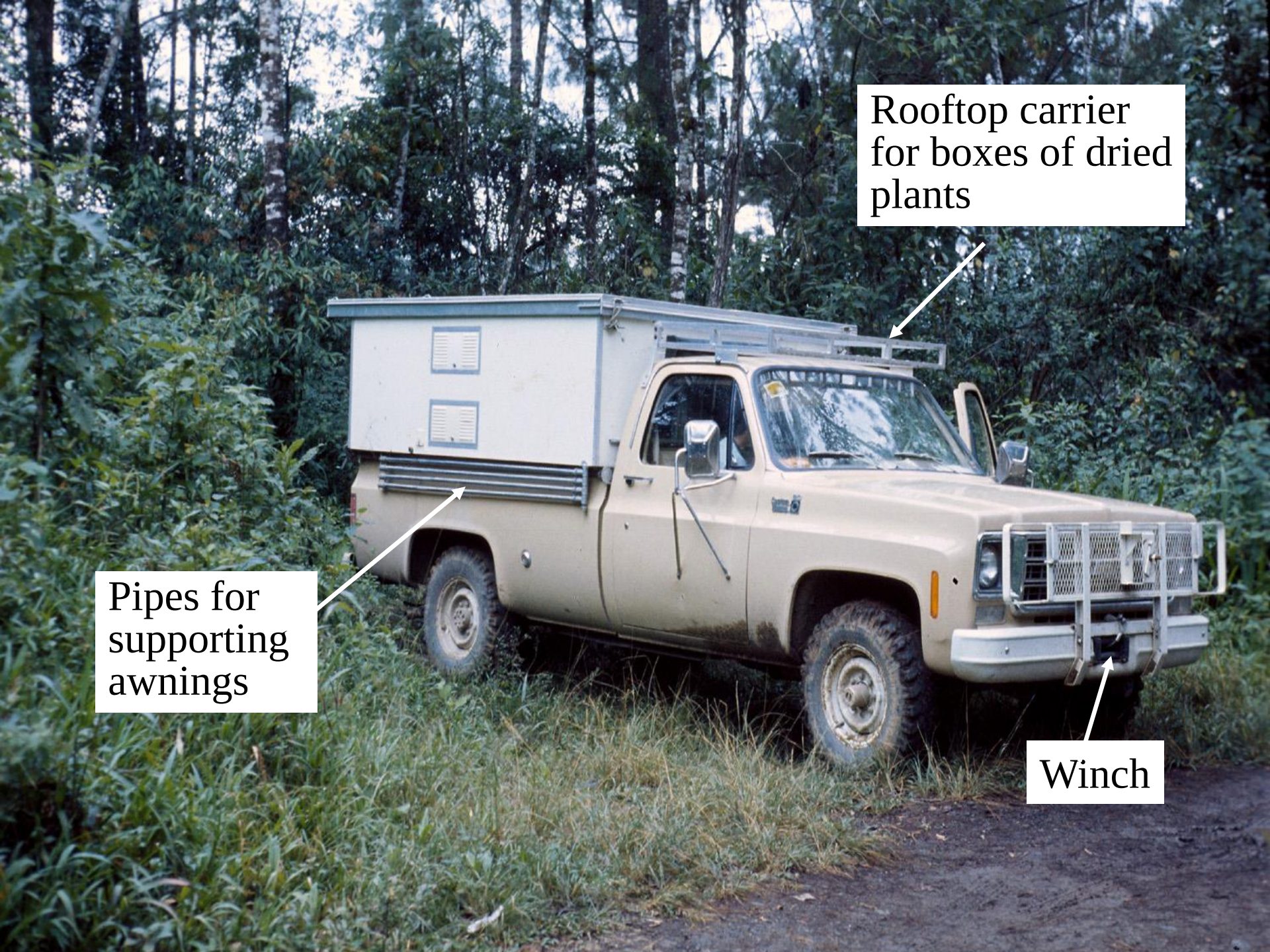


Collecting by river boat on the Río Jurua Mirim near in Acre State of Brazil near the Peruvian border, 2001

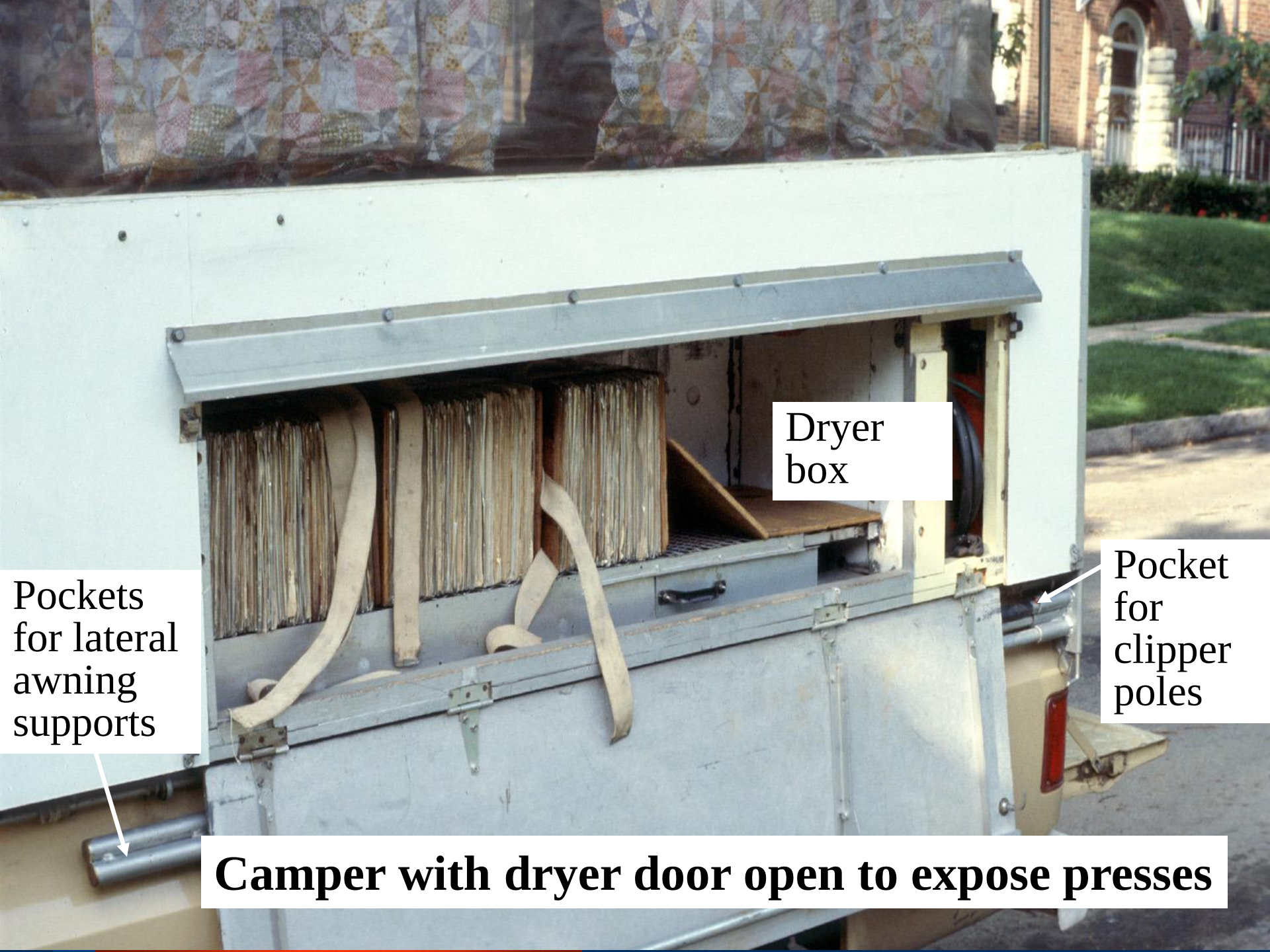

Pressing plants on Rio
Jurua Miry, Acre, Brazil


Collecting in Madagascar in
a long-bed Landrover, 1974
2429 TF

Improvised wooden dryer in back of Land Rover


Rooftop carrier for boxes of dried plants
Pipes for supporting awnings
Winch

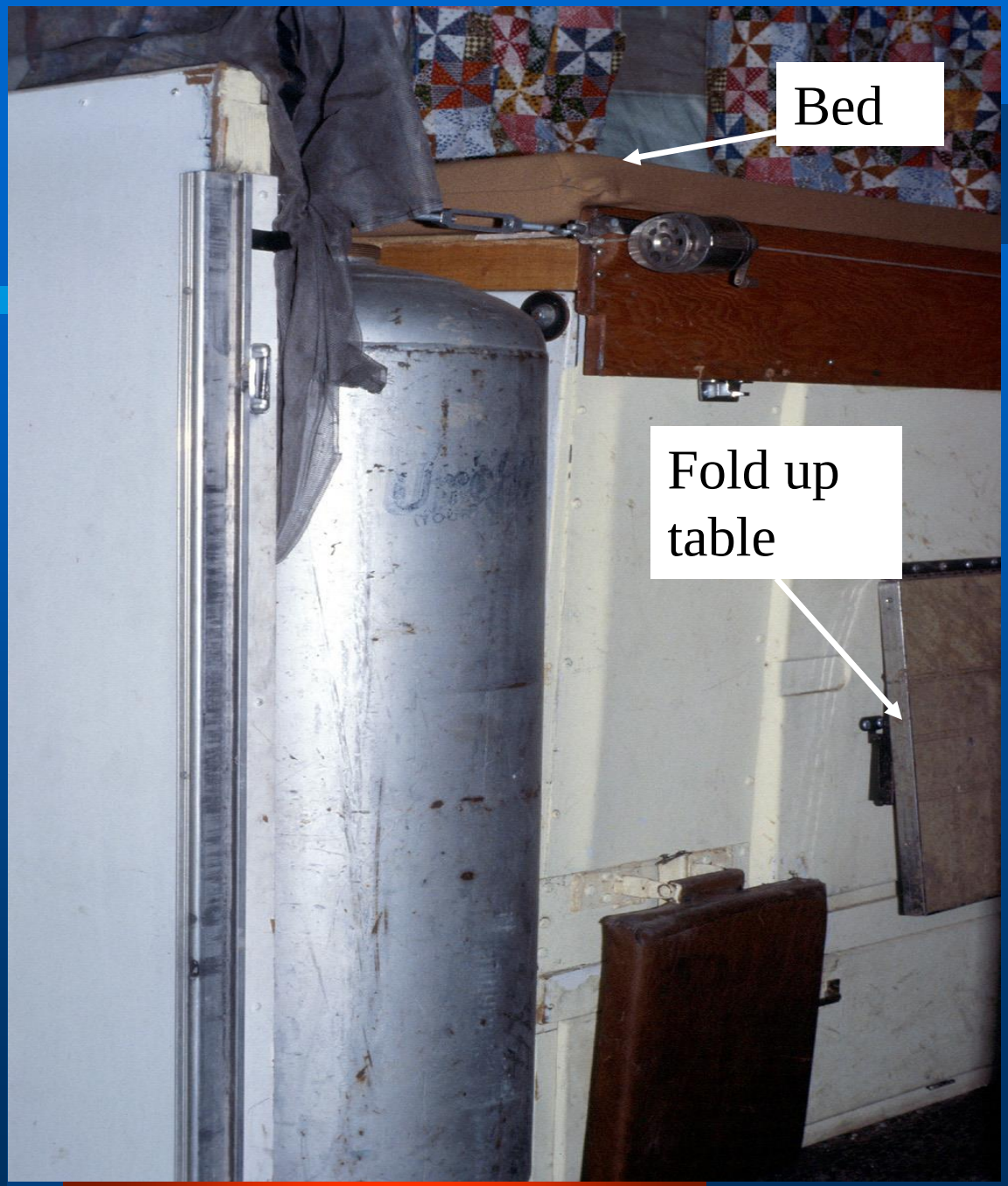
Framework of camper showing back of refrigerator and drawer slides



Camper with dryer door open to expose presses

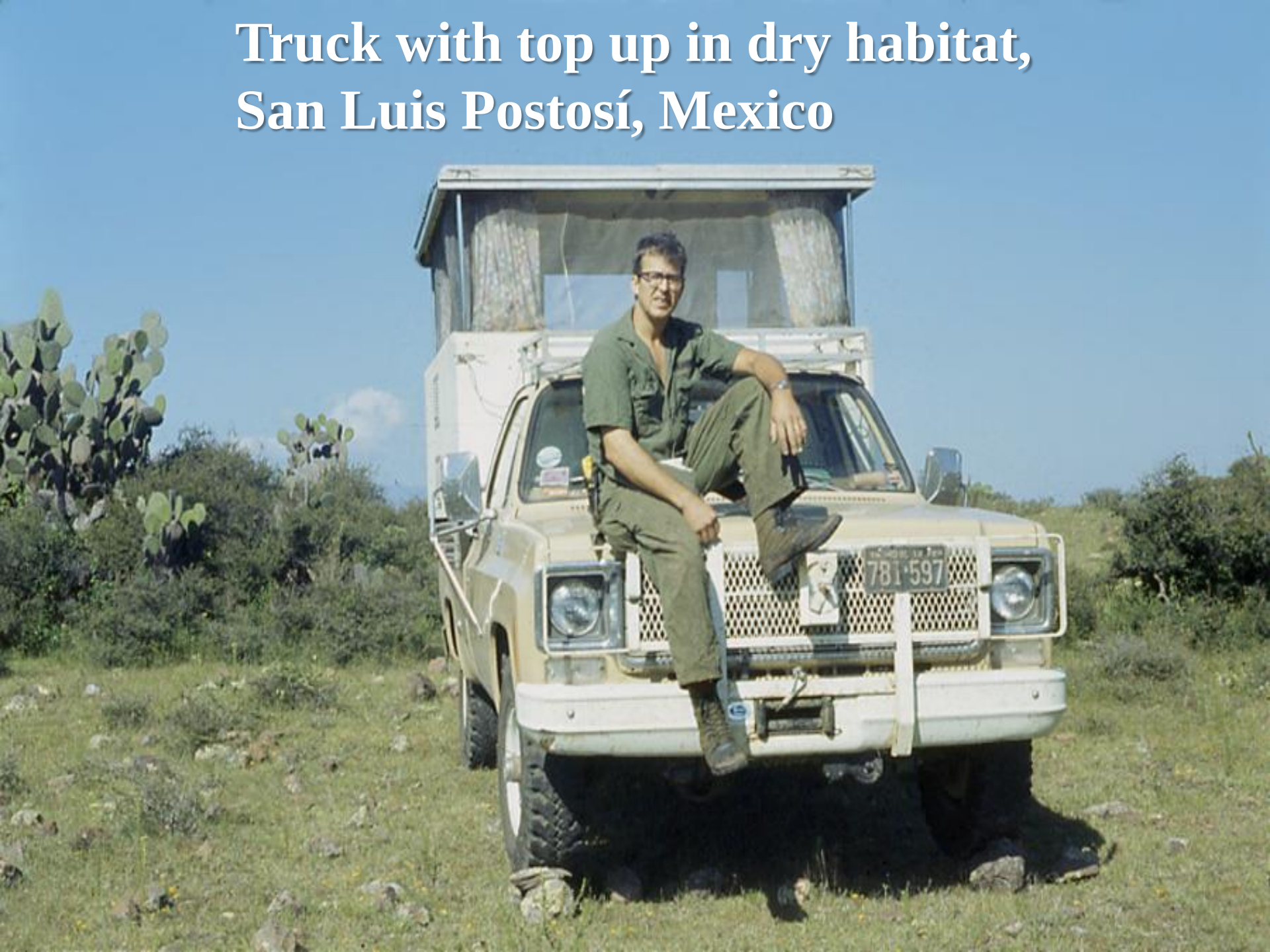

Sink, stove and roof elevator
4043
Extruding strut for raising roof
Gas Stove


Automatic CO_2 fire extinguisher
Dryer Heat Control Thermostat



End of plant dryer and 100 # propane cylinder

Truck with top up in dry habitat, San Luis Postosí, Mexico



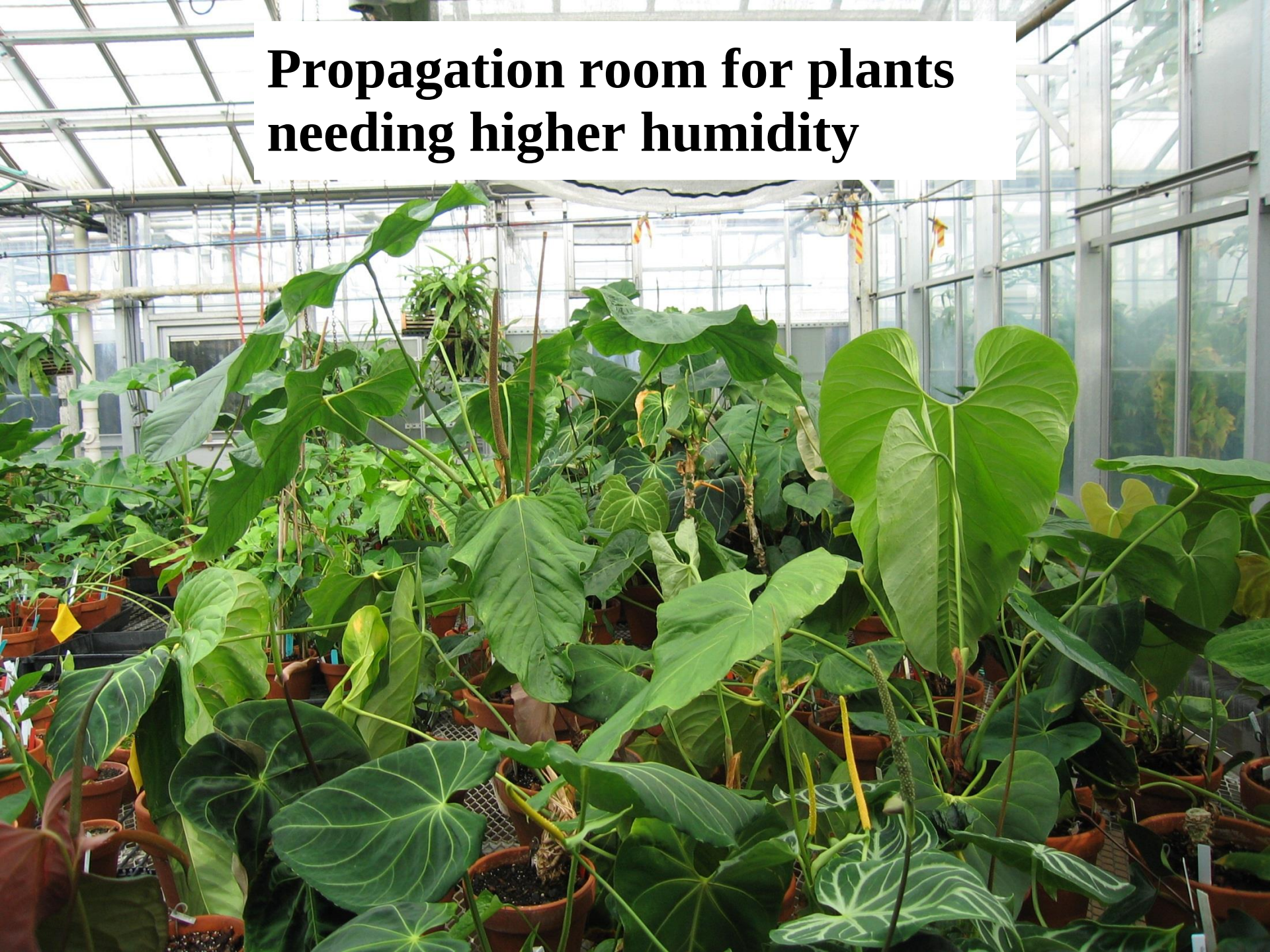
Truck with awnings when rain is expected

Campsite in Serrania de Juarez, Oaxaca, Mexico


Aroid Collections
More than 6000
living collections

Cuttings are started in sphagnum moss

Living collections useful in breeding studies


Propagation room for plants needing higher humidity

Detailed descriptions can be made from living material

Computerized record system in Greenhouse Office traces location and status of all collections

Role of the Missouri Botanical Garden in the Process of Discovery

- **Newly Described Species**
- **The Importance of Field Work**
- **The Importance of Exploring New Areas when they first become accessible.**

Aroid Research Program

- **Program consists of Tom Croat, Carla Kostelac, Emily Colletti and 16 Volunteer Research Assistants**
- **Division of Activities**
  - **Operating Lucid Key to Anthurium and Philodendron**
  - **Decisions on possible novelties**
  - **Describing Plants**

CATE *Araceae*

Identifying Aroids online using CATE Araceae (Lucid Key)

- **Anna Haigh, Ben Clark**
- **Royal Botanic Gardens, Kew**
- **Tom Croat, MBG**

The Process of Identification

- **Steve Aylward**
- **Susan McQueen**

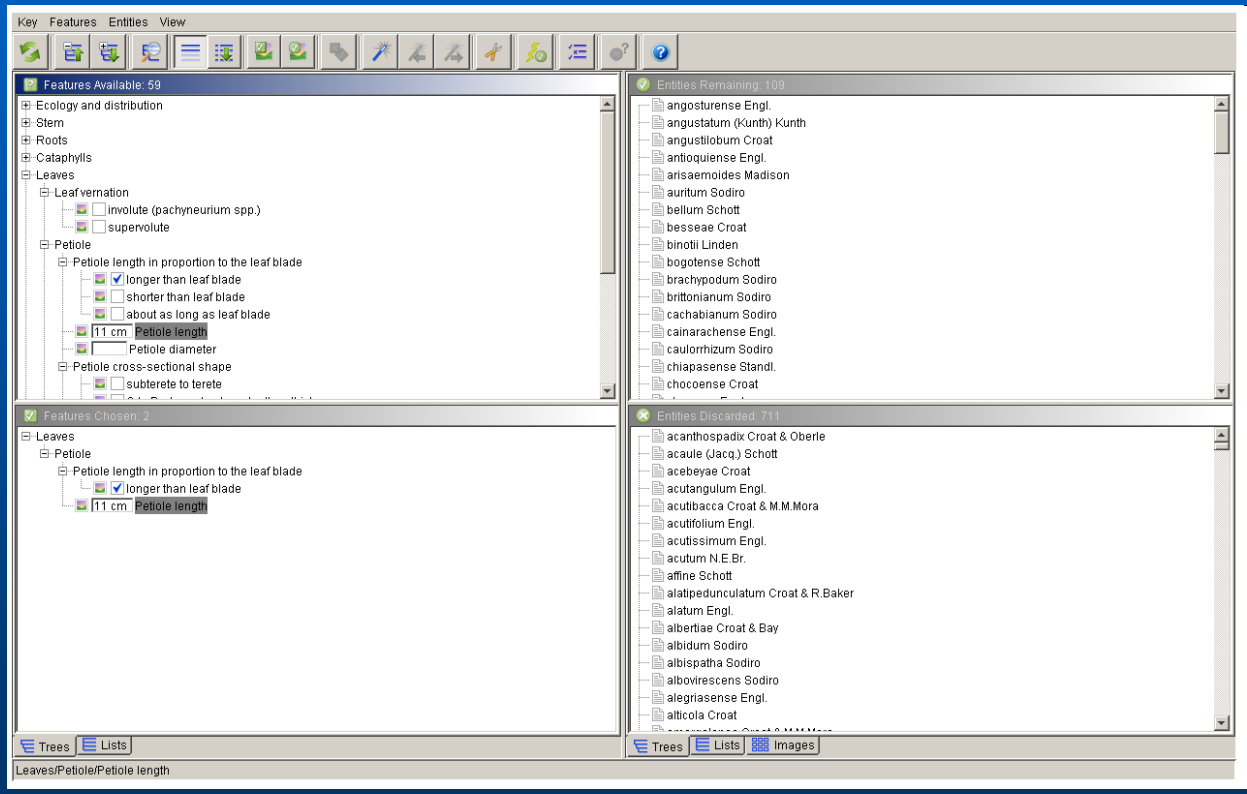
  Operation of Lucid Multicotymous Key to Anthurium and Philodendron

Character States in the Anthurium Key

- **Ecology**
- **Stem**
- **Roots**
- **Cataphylls**
- **Leaves**
- **Inflorescences**
- **Infructescence**

Step 3

- Once the application has loaded, you can use the key.
- Click on the blue question mark if you are not sure how to use it.
- Clicking on species names will take you to the species page.



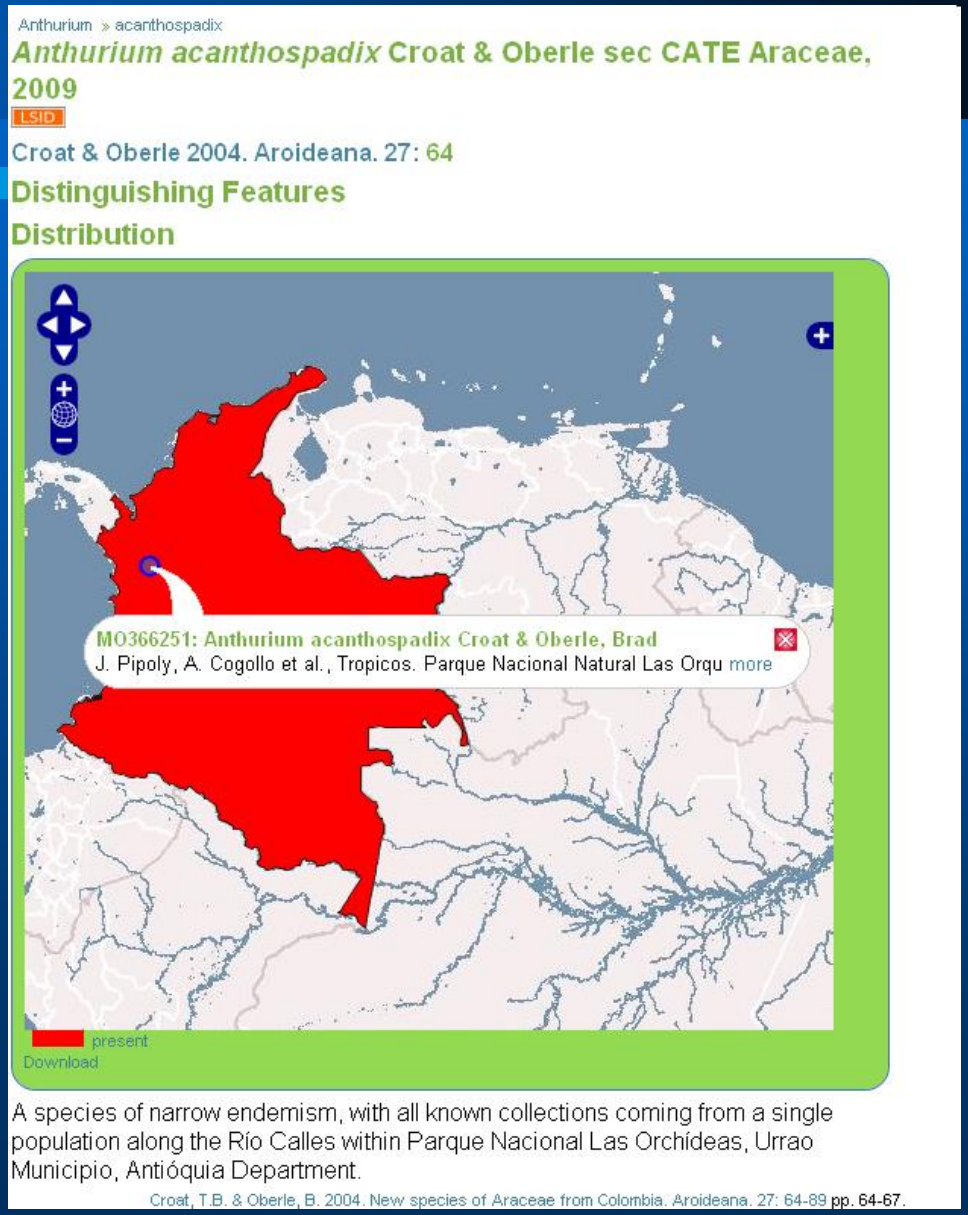
Species Pages (1)

Species Pages contain:

- The species name, authority and protologue reference
- Images

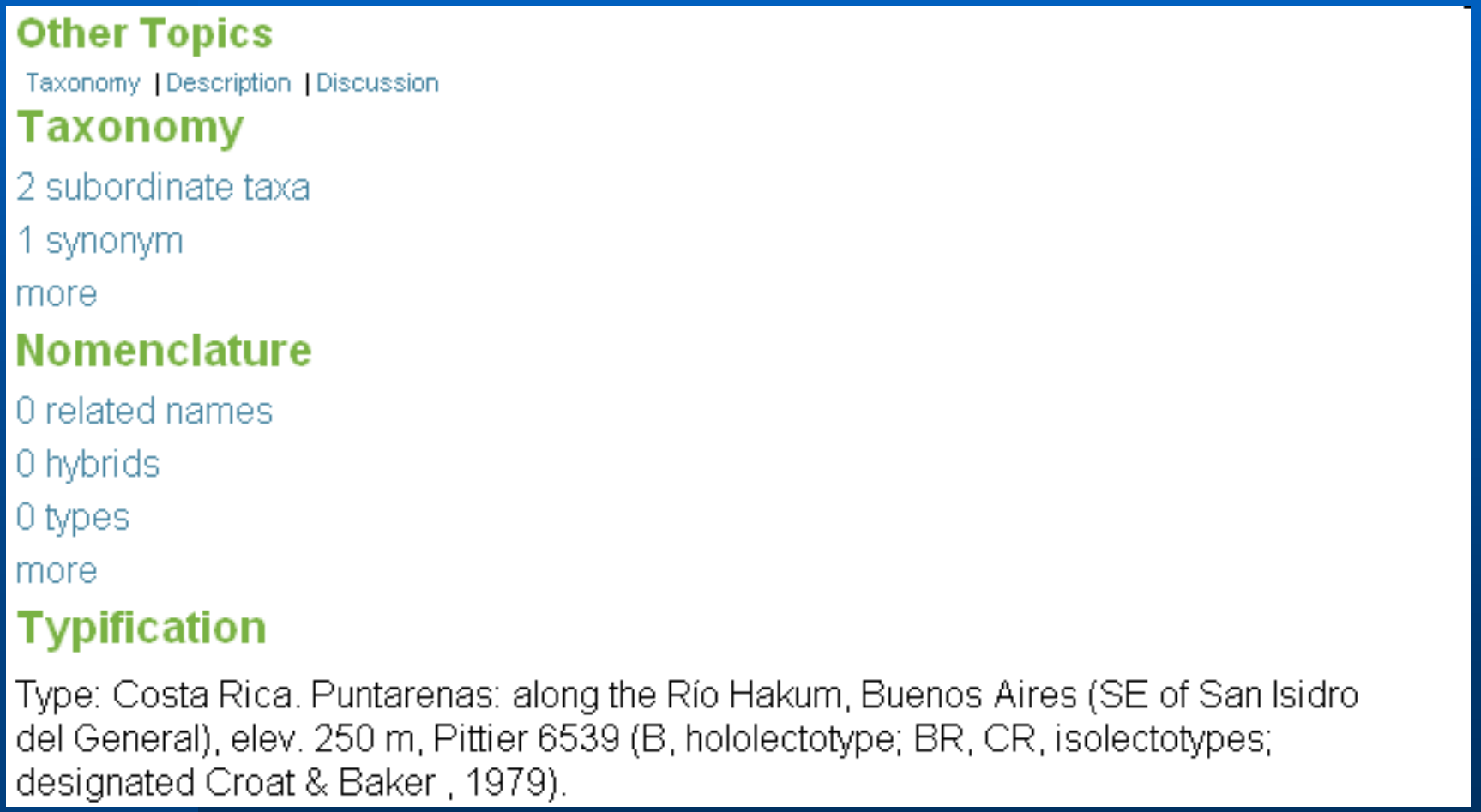
Species Pages (2)

- Maps, with specimen locations where available, plus distributional information.



Species Pages (3)

- Other Information

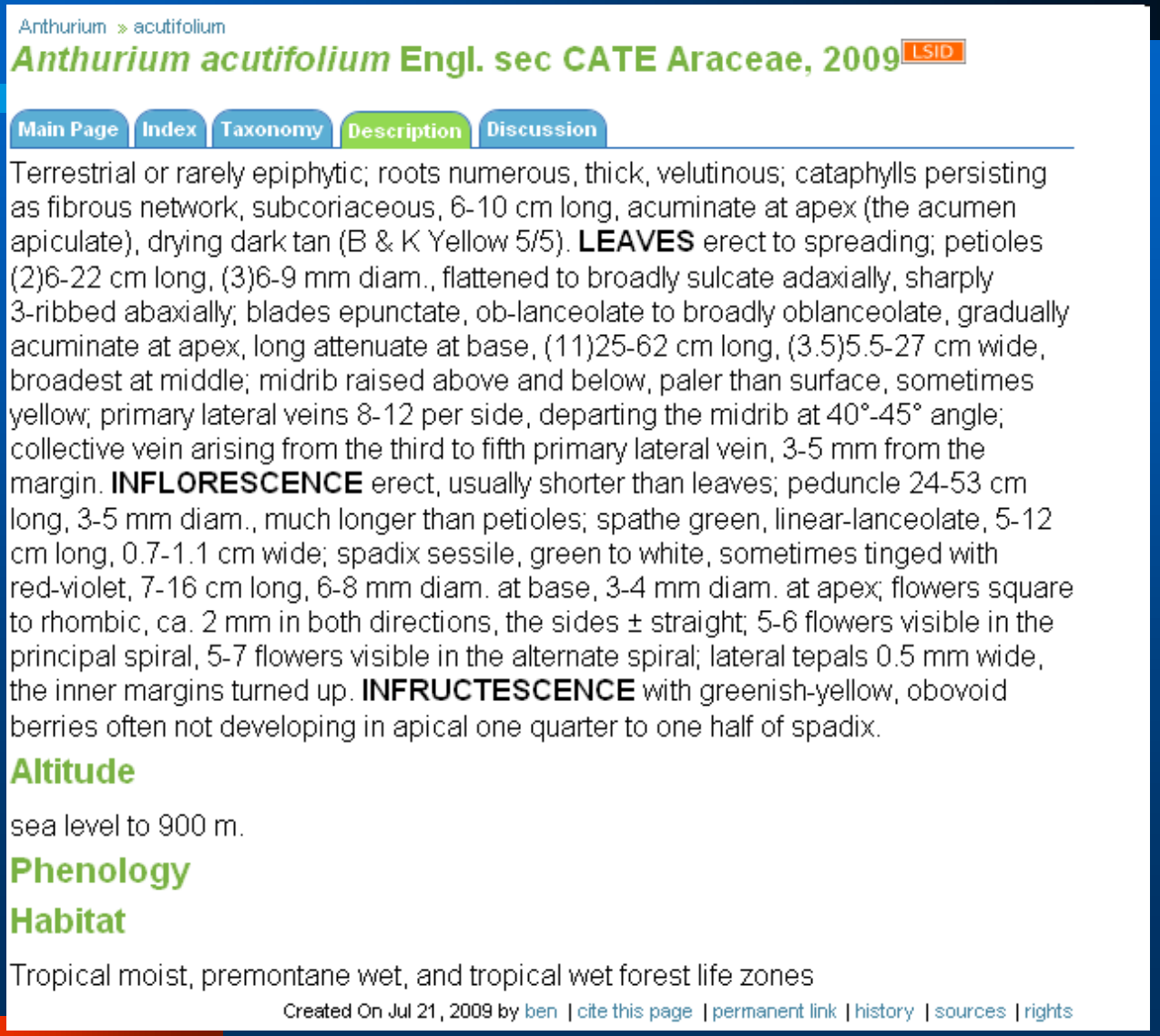


Species Pages (4)

- Selecting a link takes you to more information

Species well covered

- *A. dolichostachyum*
- *A. effusilobum*
- *A. ionanthum*



Anthurium » acutifolium

***Anthurium acutifolium* Engl. sec CATE Araceae, 2009** LSID

Main Page | Index | Taxonomy | Description | Discussion

Terrestrial or rarely epiphytic; roots numerous, thick, velutinous; cataphylls persisting as fibrous network, subcoriaceous, 6-10 cm long, acuminate at apex (the acumen apiculate), drying dark tan (B & K Yellow 5/5). **LEAVES** erect to spreading; petioles (2)6-22 cm long, (3)6-9 mm diam., flattened to broadly sulcate adaxially, sharply 3-ribbed abaxially; blades epunctate, ob-lanceolate to broadly oblanceolate, gradually acuminate at apex, long attenuate at base, (11)25-62 cm long, (3.5)5.5-27 cm wide, broadest at middle; midrib raised above and below, paler than surface, sometimes yellow; primary lateral veins 8-12 per side, departing the midrib at 40°-45° angle; collective vein arising from the third to fifth primary lateral vein, 3-5 mm from the margin. **INFLORESCENCE** erect, usually shorter than leaves; peduncle 24-53 cm long, 3-5 mm diam., much longer than petioles; spathe green, linear-lanceolate, 5-12 cm long, 0.7-1.1 cm wide; spadix sessile, green to white, sometimes tinged with red-violet, 7-16 cm long, 6-8 mm diam. at base, 3-4 mm diam. at apex; flowers square to rhombic, ca. 2 mm in both directions, the sides ± straight; 5-6 flowers visible in the principal spiral, 5-7 flowers visible in the alternate spiral; lateral tepals 0.5 mm wide, the inner margins turned up. **INFRUCTESCENCE** with greenish-yellow, obovoid berries often not developing in apical one quarter to one half of spadix.

Altitude

sea level to 900 m.

Phenology

Habitat

Tropical moist, premontane wet, and tropical wet forest life zones

Created On Jul 21, 2009 by ben | cite this page | permanent link | history | sources | rights

Ecology

- **Growth habit:** Epiphytic, hemiepiphytic, epipetric, terrestrial

  Possibly a weak character

- **Geographic distribution:**

  Excellent choice within limits

- **Elevation:**

  Generally a good choice, especially if a range is given.

- **Genus Section:**

  Necessary choice for best results

Stems

- **Stem:** Stem habit**: Appressed-climbing, scandent, rhizomatous, shortly erect**

  Typically not a good first choice owing to variability in some species

- **Internodes:** Size proportions: **Longer than broad, as broad as or broader than long**

  Often an excellent choice, especially when contrasting vines with short-stemmed epiphytes or hemiepiphytes

- **Internode size: length, width**

  Same as above

Leaves

- **Leaves:** Leaf vernation: **involute or supervolute**
- Petiole: Petiole length in proportion to leaf blade: **shorter than, longer than, about as long as.**
- Petiole length and diam.
- Petiole cross-sectional shape**: subterete to terete, C to D-shaped or broader than thick; C to D-shaped or thicker than broad, obtusely V-shaped to triangular; quadrangular, markedly ribbed.**

Leaves, cont.

- Petiole adaxial (upper) surface: **sulcate, flattened, with medial rib, convex, 3-ribbed, multi-ribbed.**
- Petiole abaxial surface: **rounded, angular, 1-ribbed,**
- Petiole margins: **no margins, acutely raised, winged, obtusely raised.**
- Geniculum: **length**

Blade Shape

Blades: Shape: **linear to lanceolate, obovate to oblanceolate, oblong, elliptic, ovate, triangular to trullate, subcordate, cordate to ovate-cordate or triangular-cordate, subhastate to hastate, sagittate to triangular-sagittate, trifid, trisect, palmatifidid to pedatifid, palmatisect to pedatisect.**

Blade size, glossiness and texture

- Blade overall length:
- Blade overall width:
- Blade length to width ratio:
- Blade coloration: **concolorous, moderately bicolorous, markedly bicolorous.**
- Blade glossiness on upper surface: **matte or matte-subvelvety; semiglossy to glossy, velvety**

Blade size, glossiness and texture, cont.

- Blade glossiness on lower surface: **matte, semiglossy to glossy.**
- Blade texture above: **smooth or bullate to rugose.**
- Blade color when dried on upper surface: **Yellowish, greenish to olive-green, grayish, brownish, dark brown to blackish, reddish brown.**
- Blade color when dried on lower: **Yellowish, greenish to olive-green, grayish, brownish, dark brown to blackish, reddish brown.**
- Blade glandular or dark punctations: **Absent, present only on lower surface, present on both surfaces.**

Blade lobes and venation

- Posterior or lateral lobes: **absent or present**
- Anterior medial lobe length:
- Midrib: shape above: **bluntly acute or narrowly rounded, narrow to sharply acute, broadly convex or round-raised, flat, sunken.**
- Midrib shape below: **bluntly acute or narrowly rounded, narrow to sharply acute, broadly convex or round-raised, flat, guadrangular (square to rectangular), multiribbed.**
- Primary lateral veins: **clearly visible, inconspicuous or too numerous to count**
- Departing angle of primary lateral veins:

Blade lobes and venation, cont.

- Primary lateral veins appearance above: **sunken, raised, flat or obscure, etched, quilted.**
- Primary lateral veins appearance below: **flat or obscure, raised, narrow to sharply acute, bluntly acute, broadly convex to narrowly rounded, pleated-raised, sunken.**
- Collective veins: Origen: **Absent, arising from one of the lowermost basal veins, arising from one of the uppermost basal veins, forming the only basal vein.**
- Collective veins distance from margins:

Inflorescences

- **Inflorescences:** Length in proportion to leaves: **shorter than leaves, longer than leaves, about as long as leaves.**
- **Peduncle length:**
- **Spathe length:**
- **Spathe width:**
- **Spathe shape: linear to lanceolate, obovate to oblanceolate, ovate, elliptic, oblong, subcircular.**
- **Spathe 3-dimentional shape: fully expanded, boat-shaped (more or Less enclosing spadix).**

Inflorescences (cont.)

- **Spathe disposition at anthesis: erect, spreading, reflexed, twisted, coiled, cucullate.**
- **Spathe color: green to greenish, violet-purple to magenta, white to cream, yellowish to yellow to orange; pinkish, reddish to red; brownish.**
- **Spadix Length.**
- **Spadix diam.**
- **Spadix color: green, white to cream, yellow to yellowish, orange to orangish, magenta to purplish to maroon, brown, reddish to red, pinkish, bluish.**
- **Stipe: present or absent**

Infructescense

- **Infructescense:** Spathe persistence: **persisting more or loss intact and living, persisting dried and withered, deciduous infructescence.**
- Berries color: **white to cream, greenish white to olive-green, brown, yellow to orange, reddish to red or pinkish, purplish.**
- Seed number: **1-2 per locule, 3 or more per locule.**

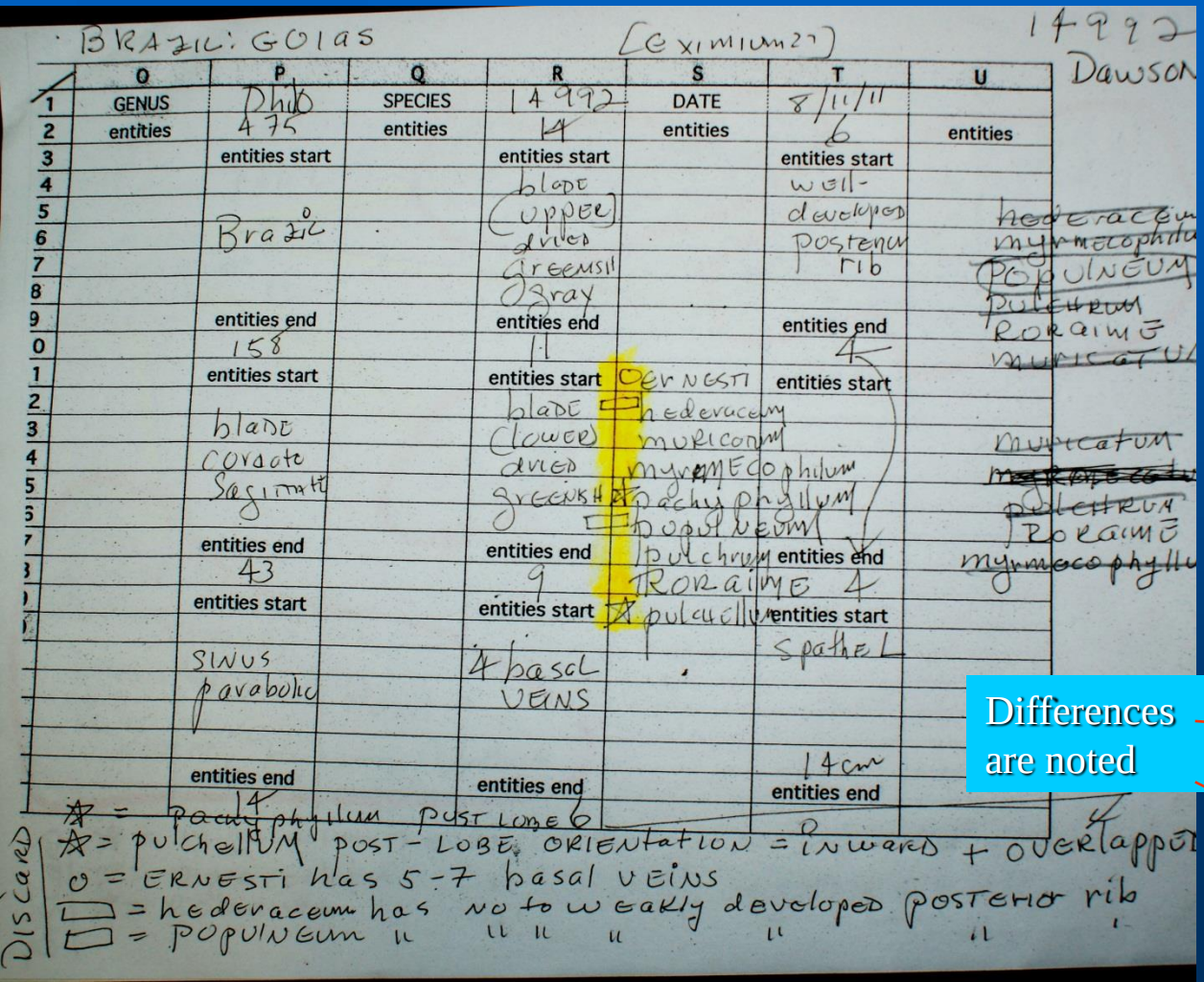
Operating a Volunteer Research Program

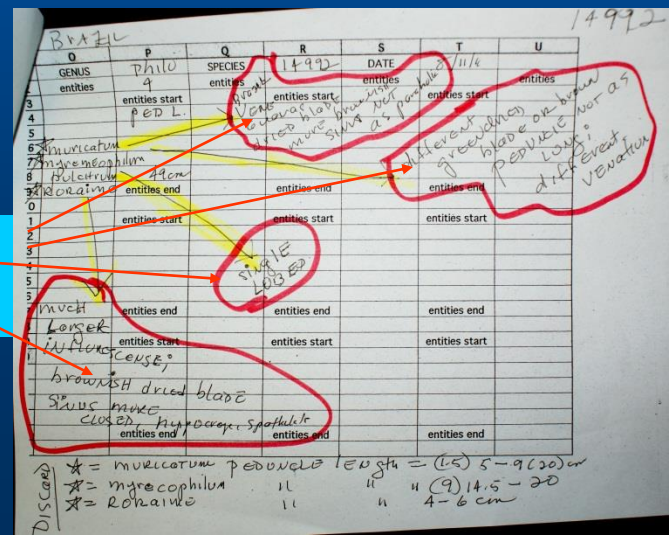
- **Using Lucid to sort out new species**
  - **Two volunteers working 30 hours per week**
    - **Steve Aylward**
    - **Susan McQueen**
  - **Preparing diagnosis and assigning name**
    - **Tom Croat**
  - **Preparing descriptions**
    - **Jim Gribb**
    - **Jere Deal**
    - **Ann Grace**
    - **Bob Hormell**
    - **Polly Kinslowe**
    - **Nick Russell**

Keying out unknown specimens in LUCID

The penultimate choices are listed and compared with files

Differences are noted





Deciding if a species is new to science

- **Tom Croat**
- **Tools Used**
  - **Existing descriptions**
  - **Type specimens and photos of types**
  - **Experience of more than 40 years**

Cluttered Home Office where Decisions are Made

Comparing specimen with existing species

Deciding if a plant is new and preparing diagnosis

Recording New Species Names

- **Al Rossell enters new name in Tropicos**
- **Susan Fenwick records name and sectional name in Araceae Project webpage**
- **Barbara Altenbernd photocopies and make new file**

Designation of Describer

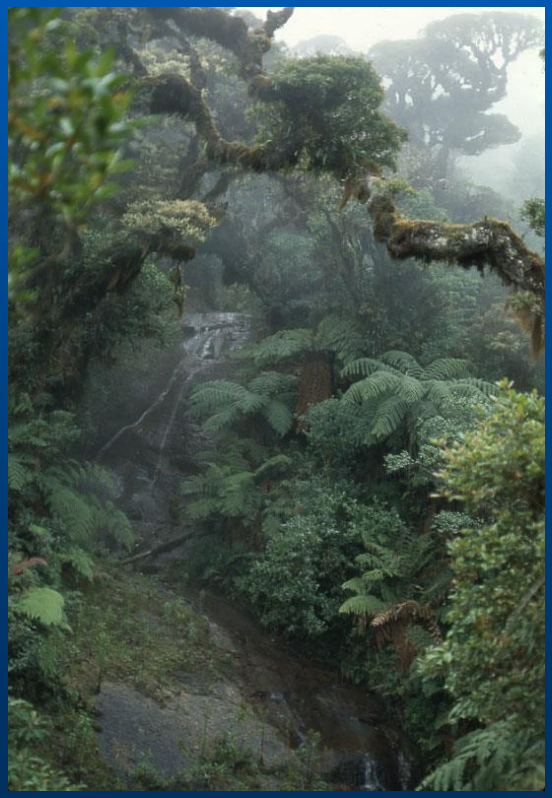
- **Jim Grib- Sect. Belolonchium, Porphyrochitonium of Central America**
- **Bob Hormell-Sect. Cardiolonchium**
- **Nick Russel- Calomystrium of C. Am.**
- **Jere Deal- Calomystrium of S. Amer.**
- **Ann Grace- Digitinervium & Xialophyllium**
- **Polly Kinslow-Philodendron s. rupicola**

Accomplishments of Aroid Research Group

- Over 103,000 herbarium collections
- Most species rich living collection
- Largest collection of Araceae in world
- Over 1000 New species described
- 1434 Species of Anthurium in Lucid
  - 890 Species or 62% of total are Croat authored species

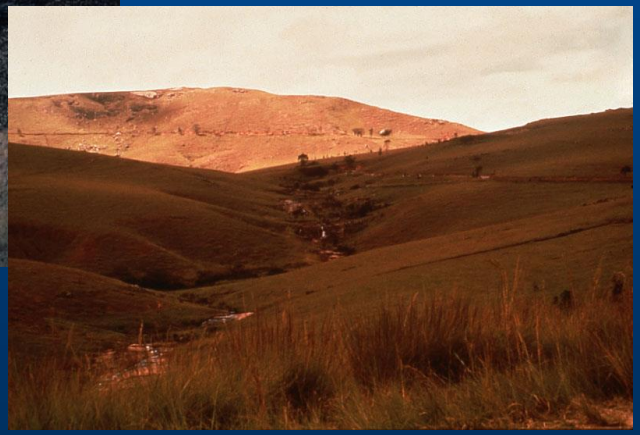
Why is specimen information important?

- To learn about and understand the natural world
- To develop tools to communicate that knowledge



Why is collection information important?

- To preserve basic knowledge of disappearing biological diversity
- To provide a scientific basis for management decisions

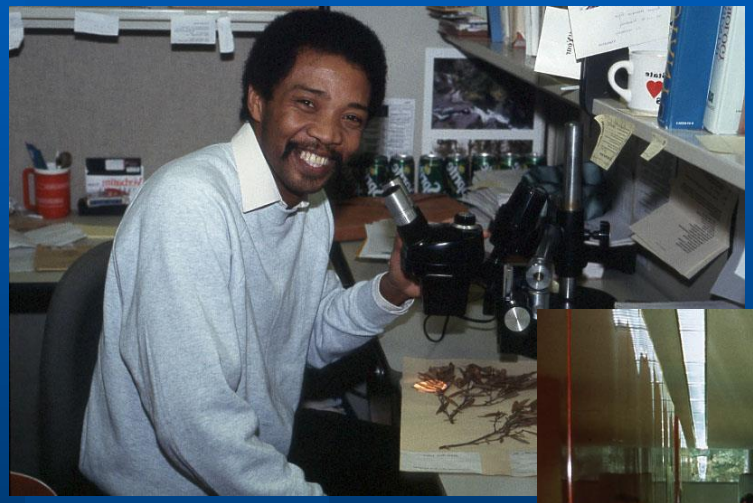


Why is collection information important?

- To record man's use of the natural world

Why is collection information important?

- To provide direction for new research



What is our role and responsibility?

- We are stewards of a vast array of information that can be used to answer fundamental questions about biodiversity, taxonomy, evolution and mankind's understanding and use of the botanical world.
- We have an obligation to provide this information in ways that will be most useful to those who need it to ensure the preservation of the world's plant diversity.

Thank you