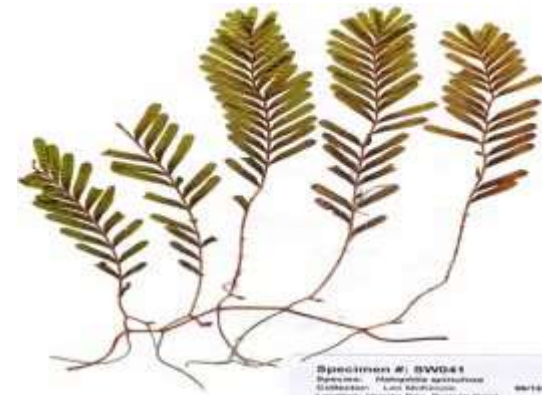


# Herbarium : Technique and Role



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**Specimen #: SW041**  
Species: *Halophila spinulosa*  
Collector: Len McKenzie 06/12/1998  
Location: Hervey Bay, Burum Point  
Latitude: 25° 8.27' S Longitude: 152° 39.23' E  
Depth: 9.2m Sediment: Sand % cover: 90  
Other spp:  
Flowers: 0 Fruit: 0  
Comments:



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# Herbarium: An Introduction

- ▶ Herbarium represent the collection plants from specific areas.
  - ▶ Herbaria hold the original material that all species are based on and identified by (the type specimen);
  - ▶ They are a depository of material for genetic and comparative analyses, including studies that utilize DNA.
  - ▶ They are used as databases for study of Biodiversity and are invaluable biological resources for taxonomic and biogeographic studies.
  - ▶ Gives a picture of the species richness, variations and the ecosystem types, agricultural and horticultural aspects.
  - ▶ Represent the microhabitat, priority centers for biodiversity and genetic resources.
  - ▶ Preserve an historical record of change in vegetation over time. Use of such data is helpful in tracking climate change.
- 

**A herbarium is a collection of plant specimens pressed, dried and arranged according to an accepted system of classification.**

**Or**

**Documentation of earth's diversity through dried reference specimens in collections, known as herbaria.**

**Herbaria, a priceless storehouses of information**



## History:

The beginning of the herbarium as a collection of dried specimens affixed to paper for a lasting record is attributed to Luca Ghini (1490-1556). According to Arber ((1938) Ghini seems to have been the sole initiation of the art of herbarium making.

## The Specimen:

Vascular plant affixed to a 11 ½ inch x 16 ½ inch sheet. Wood specimens, fossils, pollen and spores, liquid preserve materials, photographs, drawing should be considered as specimens and therefore as art of herbarium.



- ❖ Total 2639 herbaria in the world in 147 countries
- ❖ Total 27 million authentic specimens (Holmgren et al. 1990).
- ❖ India- Total 59 recognized Herbaria
- ❖ Indian herbaria- 3.5 million specimens of plants.

# MATERIALS REQUIRED FOR DEVELOPING A HERBARIUM

- ▶ Herbarium building
- ▶ Herbarium Storage Cabinet or Pigeonhole Almirah
- ▶ Racks For Storing Duplicates etc
- ▶ Mounting Boards
- ▶ Genus Folder
- ▶ Species Folder
- ▶ Palm folder
- ▶ Herbarium Boxes
- ▶ Cardboard and Millboard
- ▶ Determinavit Slips
- ▶ Hanging Lables
- ▶ Webbing Straps
- ▶ Double Flimsies



# Herbarium Storage Cabinet

## Steel Almirah

- ▶ The doors of these cupboards should close tightly. The inside size of one pigeon-hole is almost universally accepted as more or less 45 cm deep, 31 cm wide and 15 cm high. The cases can have 2–5 pigeon-holes in a horizontal row and 6–13 in a vertical row



# MOUNTING BOARDS

- ▶ Mounting boards should be made of acid free 100% rag paper and strong enough not to bend easily
- ▶ Their size is almost same in all recognized herbaria; it is 28 x 42 cm (+ - 1 cm)



# SPECIES FOLDER



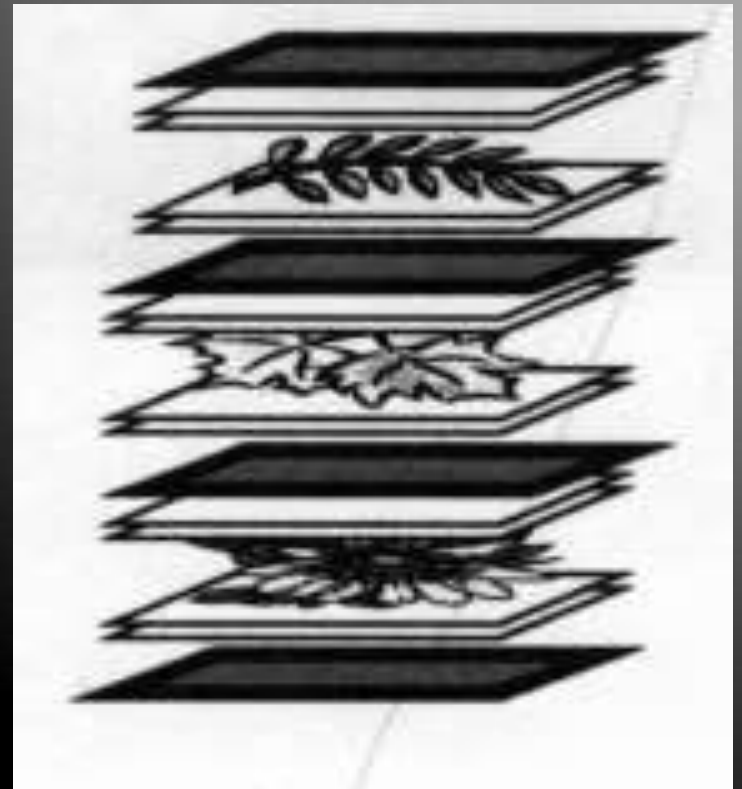
- ▶ A species folder has specimens of one species
- ▶ The paper for species folder is also acid free strong rag paper, but lighter than the genus folder
- ▶ The size of the species folder is 42 X 58 cm (unfolded) or 42 X 29 (folded)
- ▶ The maximum thickness of a species cover full with specimens is about 5 cm
- ▶ At the right hand bottom of the folder the generic and specific name along with author's name is written .

# Pressing

The pressing process begins by putting the plant in a single half-sheet of newspaper folded crosswise in the following sequence

cardboard, blotter, fold of newspaper with plant, blotter, cardboard, blotter, fold of newspaper with plant

specimens of only one species should be placed in each fold of newspaper–



# DRYING

- ▶ In countries with high atmospheric humidity, drying occurs slowly some form of artificial heat is needed to speed up the drying
- ▶ some large herbaria (RBG, Kew) have a permanent drying cabinets or ovens operated by electricity.



# POISONING

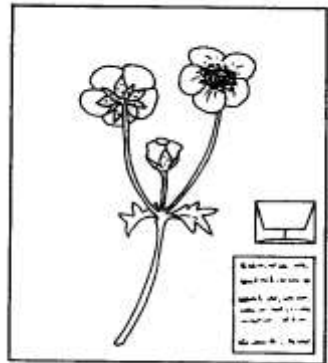
- ▶ Making herbarium specimens unpalatable insect pests specimens may be poisoned by dipping or painting them with an alcoholic solution of mercuric chloride.
- ▶ In place of mercuric chloride, lauryl pentachlorophenate (a 3.75% solution of LPCP in pure white kerosene free from high boiling paraffins) can be used. This solution is used at the British Museum Herbarium where specimens are dipped in the solution in a galvanized iron tank.
- ▶ This technique has also been used on mounted specimens with success.

# MOUNTING OF SPECIMENS



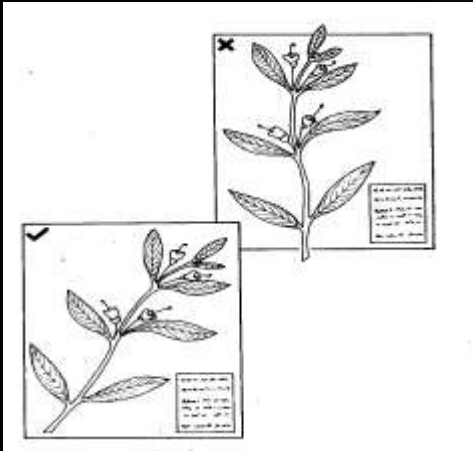
Display both sides of leaves—if necessary, detach and turn one leaf or place in capsule

If only one large leaf, cut off part and turn or place in capsule



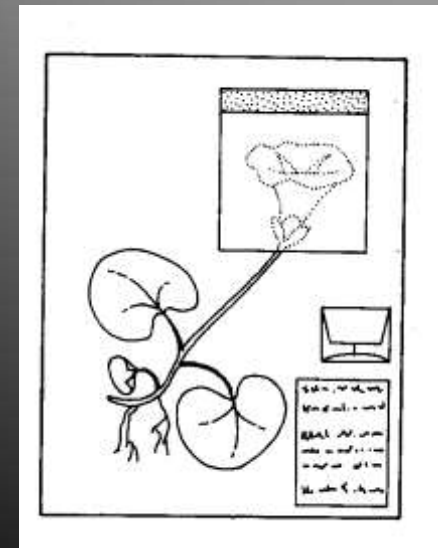
Display both aspects of the flower where possible

# MOUNTING OF SPECIMENS



Large specimens are best arranged diagonally. This provides both more length and width than positioning longitudinally; it can also prevent parts of specimens lying behind the label

Delicate flower must be protected by placing a 'window' or of translucent paper over it. This window is then secured by its outer edge only, allowing it to be folded back for close examination of the flower and its point of attachment to the specimen, information which is lost if the flower is detached





# STITCHING OF SPECIMENS

After gluing the specimens on sheet it stitches. Stitches should be small and independent and thread should not be carried from one stitch to another on the lower side of the mounting sheet. On each side of the stem/ twig a hole is made and a thread is inserted. A knot is put at the back and thread is cut after each knot. Each knot of the threads on the back of sheets should be covered with linen or paper tape. It save the knot from loosening and also from the thread catching on parts of specimens kept underneath. For round fruits many loops of thread are necessary.

# LABELING OF SPECIMENS

- ▶ Labels should be printed on acid-free paper with permanent ink
- ▶ Generally size of the label is 8 X 12 cm
- ▶ To write your labels it is advisable to use permanent and water resistant ink (black or blue)

## RAW MATERIALS HERBARIUM & MUSEUM, DELHI (RHMD)

National Institute of Science Communication And Information Resources, Dr. K.S. Krishnan Marg, New Delhi-110012

No.....Date...  
Genus & Species .....  
Family.....  
Locality.....  
Altitude.....Longitude.....Latitude.....  
Habitat.....  
Distribution.....  
Description Notes.....  
.....  
.....  
.....  
Vernacular /local name.....  
Local Uses.....  
Collector.....  
DET. BY.....

## LARGEST HERBARIA IN THE WORLD

Name	Location	Date Established	Number of Specimens (approximate)
Museum National d'Histoire Naturelle	<a href="#">Paris, France</a>	1635	8,877,300
Royal Botanic Gardens	Kew, <a href="#">England</a>	1841	6,000,000
New York Botanical Garden	<a href="#">New York</a> , New York, U.S.A.	1891	6,000,000
Komarov Botanical Institute	St. Petersburg, <a href="#">Russia</a>	1823	5,770,000
Swedish Museum of Natural History	<a href="#">Stockholm, Sweden</a>	1739	5,600,000
The Natural History Museum	London, England	1753	5,300,000
Conservatoire et Jardin Botaniques	Geneva, <a href="#">Switzerland</a>	1824	5,200,000
<a href="#">Harvard University</a>	Cambridge, Massachusetts, U.S.A.	1864	5,000,000
Smithsonian Institution	Washington, D.C., U.S.A.	1848	4,858,000
Institut de Botanique	Montpellier, France	1845	4,368,000

source: Data from P. N. Holmgren, Index Herbariorum, 8th ed. (New York: New York Botanical Garden, 1990), Index.

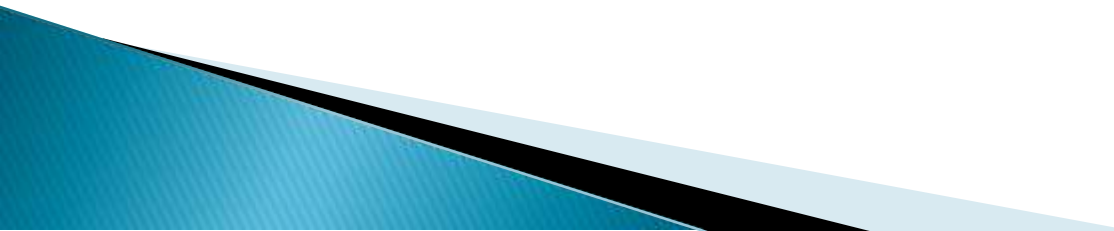


**An Internal View of Kew's Herbarium**

## SOME MAJOR HERBARIA IN INDIA

PLACE	NO. OF SHEETS
CENTRAL NATIONAL HERBARIUM, KOLKATA	25,00,000
FOREST RESEARCH INSTITUTE HERBARIUM, DEHRADUN	3,00,000
BSI SOUTHERN CIRCLE, COIMBATORE	2,00,000
BSI EASTERN CIRCLE, SHILONG	1,00,000
BSI WESTERN CIRCLE, PUNE	1,25,000
BSI NORTHERN CIRCLE, DEHRADUN	60,000
BSI SIKKIM HIMALAYAN REGION, GANGTOK	50,000
BSI CENTRAL CIRCLE, ALAHABAD	40,000
NBRI HERBARIUM, LUCKNOW	1,00,000

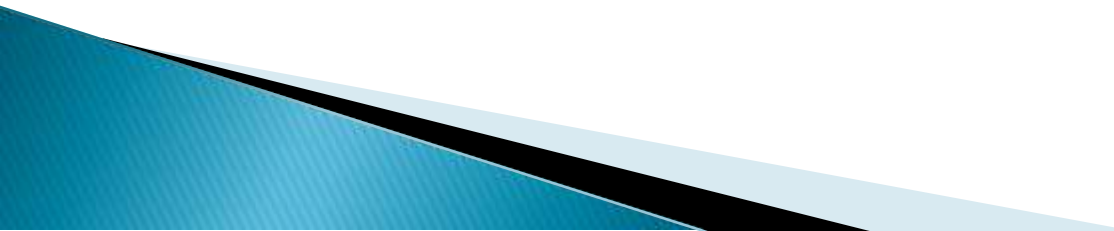
# Roles of Herbarium

- ❖ **Ecology and Phytogeography**
  - ❖ **Impact of climate change**
  - ❖ **Anthropogenic Changes**
  - ❖ **Horticulture**
  - ❖ **Agronomy and Forestry**
  - ❖ **Material for DNA analysis & DNA Bar Coding**
  - ❖ **Chemical analysis, Pharmaceutical Research**
- 

# Roles of Herbarium contd....

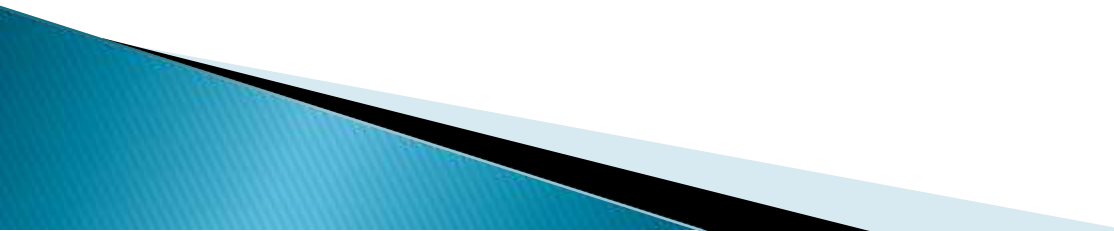
- ◆ **Biodiversity assessments & Conservation Priorities**
  - ◆ **Propagation of Endangered species**
  - ◆ **Pollen for Systematic, Pollination studies**
  - ◆ **Health care & forensic sciences**
  - ◆ **Invasive Species**
  - ◆ **Solving Issues of Origin**
  - ◆ **Hybrids**
  - ◆ **Gene flow from GM Crops**
  - ◆ **Phylogenetic evaluations of Microorganisms**
  - ◆ **Symbionts and Plant diseases**
- 

# Roles of Herbarium contd....

- Identification of Plant species of potential economic value
  - Medicinal properties
  - Antioxidant Properties
  - Antibacterial activity
  - Common names and local uses of plants
  - Preserves local plant use information
- 



# CONCLUSIONS.....

- ▶ **Herbarium specimens invaluable**
  - ▶ **Used for research, training, education**
  - ▶ **Essential for management of plant resources**
  - ▶ **Have been used beyond the purposes for which they were collected**
  - ▶ **Many areas of their utility yet to be discovered**
- 

ISO-TYPE



Thanks !

Save Nature  
Save Girl Child

*Eucalyptus verrucata*