

The Shirpur Education Society's  
**H. R. Patel Institute of Pharmaceutical Education and Research, Shirpur**

**Certificate Course on Herbarium Techniques**

**Total Duration: 30 Hours**

**Syllabus**

<b>Sr. No.</b>	<b>Content</b>	<b>Hours</b>
1	<b>Introduction to certificate course:</b> Introduction, significance, outcomes	1 Hour
2	<b>Conservation and preservation of plant biodiversity:</b> Introduction, importance and techniques	3 Hours
3	<b>Herbarium Preparation:</b> Introduction, importance, general methodology	4 Hours
4	<b>Collection of the plant specimen:</b> Scientific technique, tools required for collection and preservation of plant material	4 Hours
5	<b>Pressing and drying of the plant specimen:</b> Pressing and drying technique	2 Hours
6	<b>Protection techniques:</b> Poisoning of specimens, chemicals used	2 Hours
7	<b>Mounting and labelling of specimen:</b> Mounting of specimen on herbarium sheet, labelling of herbarium sheet, importance of labelling, classification system	4 Hours
8	<b>Storage of herbarium sheets:</b> herbarium keeping and treatments	1 Hour
9	<b>Demonstration of herbarium preparation</b>	2 Hours
10	<b>Practical training</b>	6 Hours
11	<b>Performance evaluation test</b>	1 Hour



  
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**Certificate Course on Herbarium Techniques**

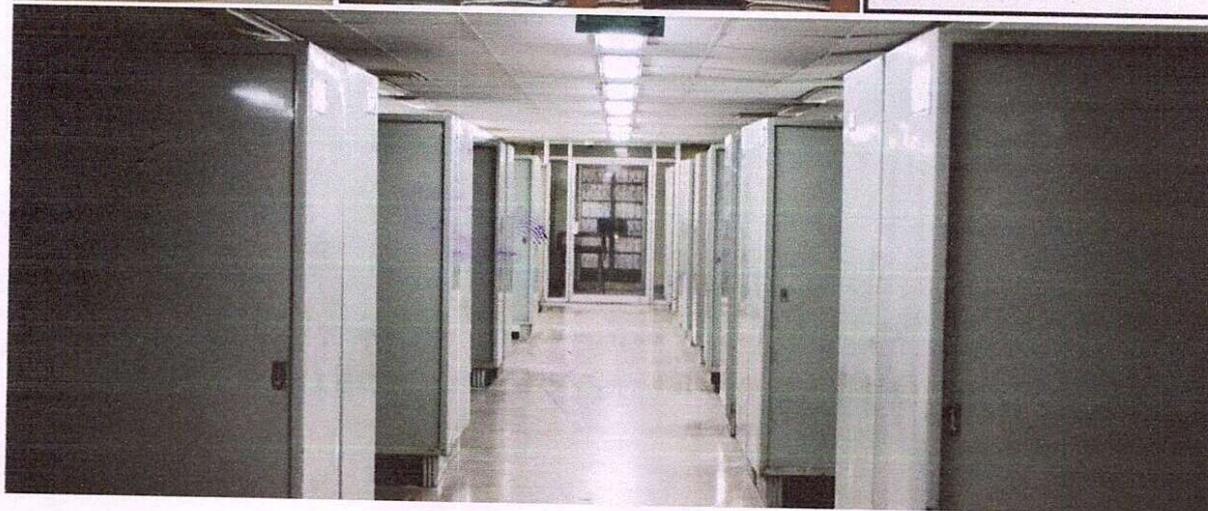
**Day wise Schedule**

Day	Content
1	Introduction of certificate course
2	Introduction to conservation and preservation of plant biodiversity
3	Importance of conservation and preservation of plant biodiversity
4	Techniques of conservation and preservation of plant biodiversity
5	Introduction to Herbarium, general methodology
6	Importance of herbarium preparation
7	General methodology used in herbarium preparation
8	General methodology used in herbarium preparation
9	Scientific techniques of plant specimen collection
10	Scientific techniques of plant specimen collection
11	Tools required for plant collection
12	Techniques and importance of preservation of plant material
13	Pressing of the plant specimen
14	Drying of the plant specimen
15	Protection techniques and importance
16	Chemicals used in protection
17	Mounting of specimen on herbarium sheet
18	Labelling of herbarium sheet
19	Importance of labelling of herbarium sheet
20	Classification systems used for labelling
21	Herbarium keeping and herbarium treatments
22	Demonstration of herbarium preparation
23	Demonstration of herbarium preparation
24	Practical training
25	Practical training
26	Practical training
27	Practical training
28	Practical training
29	Practical training
30	Performance evaluation test



  
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# TRAINING COURSE ON HERBARIUM TECHNIQUES AND METHODOLOGY



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## 1. INTRODUCTION TO HERBARIUM

A herbarium (plural herbaria) is a storehouse of dried plant specimens collected from far and wide, mounted on appropriate sheets, arranged according to some known system of classification and kept in pigeonholes of steel or wooden cup-boards and are generally associated with botanic gardens and educational or research organizations. The word 'Herbarium' was derived from *Herbar* means plant specimens and *arium* means an artificial place.

Tournefort (1700) used the term *Herbarium* as an equivalent to *Hortus siccus* and Linnaeus also used this term. It was mainly through Linnaean's influence the word *Herbarium* superseded the former term *Hortus siccus*, in Latin literally meaning dry garden.

Lawrence (1951) defines it, as "the arrangement of specimens in the sequence of an accepted classification and the specimens are available for reference or other scientific studies. "Herbarium" used in its original sense referred not to a collection of plants, but to a book about medicinal plants. According to Fosberg and Sachet (1965), a modern herbarium is "a great filing system for information about plants, both primarily in the form of actual specimens and secondary in the form of published information, pictures and recorded notes".

## HISTORY OF HERBARIUM

- Luca Ghini (1556) is the sole initiator of the art of herbarium making, who started collecting, drying and pasting them over paper.
- Gherardas Cibo, student of Ghini began collecting plants and preserving them from 1582 and continued till his death.
- In those days, the herbarium sheets were bound into volumes and just like books these herbaria volumes were also arranged vertically as in Libraries.
- However, in 18<sup>th</sup> Century, Linnaeus started a new method in which he mounted his specimens on single sheets and started storing them flat horizontally, which is followed by almost all the museums and herbaria in the world.

## OBJECTIVES OF HERBARIUM

- To provide facilities for determination of any material including new taxa.
- To enable preparation of new monographs and floras.
- To preserve specimens of historic importance.
- To assemble data for working out ranges and ecological distribution.



- To bring together in a relatively permanent form of specimens for comparative morphological or phylogenetic studies and
- To provide material for specific research as in plant anatomy, palynology and ethnobotany and also for molecular research.

### HERBARIUM SHEET

The general size of the mounting board or herbarium sheet is 42 x 28 cm. The label with the size of 12 x 8 cm is generally pasted on the bottom right hand corner of the mounting board. The specimen is pasted as far as possible in the middle, field number at middle of left margin and accession number and/or barcode at right top of the herbarium sheet.

### ROLE OF HERBARIUM IN TEACHING AND RESEARCH

*Teaching:* The herbarium serves as an aid in teaching botany to degree and post-graduate students. It is difficult for any student to identify local plants without the help of a proper herbarium. Many specimens, which the teacher would like to show to his students, may not be available fresh at the time of giving the course. In such situations, available specimens in the herbarium serve the purpose.

*Research:* Herbarium, which was considered to be the concern and tool of an “orthodox taxonomist” is totally unanimously believed to be an essential requirement for biosystematic research. For biosystematic studies (including population studies) the worker needs material of his taxon from far and wide. As it is not conveniently possible always to visit different areas of occurrence of the taxon, one has to largely fall back on resources of the herbaria.

For ethnobotanical researches, the herbaria have proved to be very valuable source of information. Many native uses of plants recorded on the herbarium sheets have never gone into published literature and therefore have never been subjected to scientific scrutiny. Herbaria also provide a meeting place for discussions and exchange of ideas among scientists from far and wide.

### TYPES OF HERBARIA

Herbarium ranges from small personal collections, mostly of a few hundred specimens to large collections of colleges, universities, private foundations and government agencies.

There are different types of herbaria and they are being used for various activities and generally the following types of herbaria are categorised.

- ❖ International herbaria (e.g. Royal Botanic Gardens, Kew)
- ❖ National herbaria (e.g. Central National Herbarium, Howrah)



- ❖ Regional herbaria (e.g. Andaman and Nicobar Regional Centre, BSI, PortBlair)
- ❖ University herbaria (e.g. Calcutta University Herbarium, Kolkata)
- ❖ Medicinal plant herbaria (e.g. Central Institute of Medicinal and Aromatic Plants, Lucknow)
- ❖ Economically important plant herbaria (e.g. Industrial section Indian Museum, Kolkata)
- ❖ Local herbaria (e.g. Malabar Botanical Herbarium, Calicut)
- ❖ Agricultural herbaria (e.g. Tamil Nadu Agricultural University Herbarium, Coimbatore)

The contents or holdings in a herbarium vary according to the interest of the organization or institution. The labels and notes on the sheets also slightly vary accordingly a) the herbaria of organizations like Botanical Survey of India contain all collections from any explored area. b) The herbaria of the institution interested in drugs and medicines include plant specimens of known medicinal value or plants that are reported or supposed to have medicinal properties. c) The Herbaria of the universities and colleges generally contain specimens only for teaching and research. d) Weeds of cultivated fields form the contents of the herbaria of Agricultural colleges and universities.

#### ACRONYM

An acronym (from Greek *acro-* in the sense of *extreme* or *tip* and *onyma* or *name*) in a strict sense is an abbreviation of several words in such a way that the abbreviation itself forms a pronounceable word. But for herbarium, the acronym is an abbreviated form to denote a particular herbarium and it is assigned by the Index Herbariorum (IH), in which each institution is assigned a permanent unique identifier in the form of a one to eight letter code, a practice that dates from the founding of IH in 1935. For example, Central National Herbarium, (Calcutta) Howrah – **CAL**, Madras Herbarium, Coimbatore – **MH**, Royal Botanic Gardens, Kew – **K**, Natural History Museum, London – **BM**.

#### FUNCTIONS OF HERBARIUM

Herbarium is a conservatory of material and data. The specimens in the herbarium carry valuable data on their labels. Large herbaria have collections from far and wide, and thus, provide at one place, basic material for study of flora and vegetation of different places or regions. The material in the herbarium remains a permanent record of flora of these regions and in certain cases, where catastrophes or other factors have totally destroyed the vegetation



the collections in the herbarium provide evidence of what once existed there. Thus herbaria serve as invaluable conservatory of flora of different parts of this earth. Properly collected plants bear labels with abundant data on habit, habitat, local names, native uses of the plant, abundance or frequency of the species, associated plants etc. Such notes on labels once incorporated on sheets in the herbaria continue to provide data for botanical, ethnobotanical and phytogeographical studies for all times to come. Thus herbaria also serve the valuable function of data banks on plants.

An active herbarium continues to receive fresh material either through the collections of its own staff or through gifts, exchanges, etc. The collections and the data on collection are never static or closed resource; they continue to increase and expand in contents and value. Therefore, the herbarium basically a conservatory of material and data is a "living organism" which continues to grow.

#### IMPORTANT HERBARIA OF THE WORLD

There are approximately 3,000 herbaria in the world today, as per the data published by the *Index Herbariorum*. Collectively the world's herbaria contain an estimated 350,000,000 specimens that document the earth's vegetation for the past 400 years. A list of the largest herbaria of the world with approximate number of specimens in each is given below.

LOCATION	ACRONYM(S)	NO. OF SPECIMENS
Museum National d'Historie Naturelle, Paris	P	8,000,000
Newyork Botanical Garden, New York, USA	NY	7,800,000
V.L. Komarov Botanical Institute Leningrade, Russia	LE	7,200,000
Royal Botanical Gardens, Kew	K	7,000,000
The National Herbarium Nederland (NHN), The Netherlands	L, U, WAG	7,000,000
Missouri Botanical Garden, St. Louis, USA	MO	6,600,000
Conservatorie et Jardin Botaniques de la Ville de Geneve, Geneva, Switzerland	G	6,000,000
Harvard University Herbaria, Cambridge, USA	A, AMES, ECON, FH, GH	6,000,000
Natural History Museum, London	BM	5,200,000



## MAJOR HERBARIA IN INDIA

1. The Central National Herbarium (CAL) located at Howrah, established in 1795 and comprises about 2,000,000 (2 million) specimens. This is the first herbarium in the country and one of the most important Asian Herbaria.
2. Forest Research Institute, Dehra Dun contains 350,000 specimens (DD)
3. The National Botanic Gardens, Lucknow contains 260,000 specimens (LWG)
4. Blatter Herbarium, St. Xavier's college, Fort Bombay contains 200,000 specimens. (BLAT)
5. Botanical Survey of India has herbaria attached to their regional centres and units in different parts of India.

No.	CENTRES/ UNITS	LOCATION	DATE OF INITIATION	ACRONYM	NO. OF SPECIMENS
1.	Central National Herbarium	Howrah	1795	CAL	2,000,000
2.	Industrial Section Indian Museum	Kolkata	1887	BSIS	20,000
3.	Southern circle	Coimbatore	1955	MH	2,80,000
4.	Western circle	Pune	1955	BSI	1,75,000
5.	Eastern circle	Shillong	1956	ASSAM	2,60,000
6.	Northern circle	Dehra Dun	1956	BSD	1,10,000
7.	Central circle	Allahabad	1962	BSA	65,000
8.	Andaman and Nicobar circle	Port Blair	1972	PBL	25,000
9.	Arid zone circle	Jodhpur	1972	BSJO	25,000
10.	Arunachal Pradesh circle	Itanagar	1977	ARUN	15,000
11.	Sikkim Himalayan circle	Gangtok	1979	BSHC	35,000
12.	Deccan circle	Hyderabad	2005	BSID	10,000

  
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## 2. COLLECTION

### FIELD EQUIPMENTS

Following items are very essential during plant collection trips:

Altimeter,	Identity cards,	Ropes,
Axe,	Ink,	Rubber,
Binoculars,	Kerosene,	Scale,
Camera,	Khurpi,	Seal and Rubber Stamp,
Candles,	Knife,	Service stamps,
Clothes,	Letter-heads,	Shoulder bags,
Contingency vouchers,	Matchbox,	Soap,
Cutter,	Medicines,	Specimen tubes,
Drying / Blotting sheets,	Old newspapers,	Stove,
Field book,	Pencils,	Straps,
Field shoes,	Petromax,	Tents,
First Aid Box,	Pocket lens,	Torch with batteries,
Global Positioning System (GPS),	Polythene bags,	Tree Pruner,
Ice axe,	Presses,	Utensils,
	Raincoat,	Vasculum

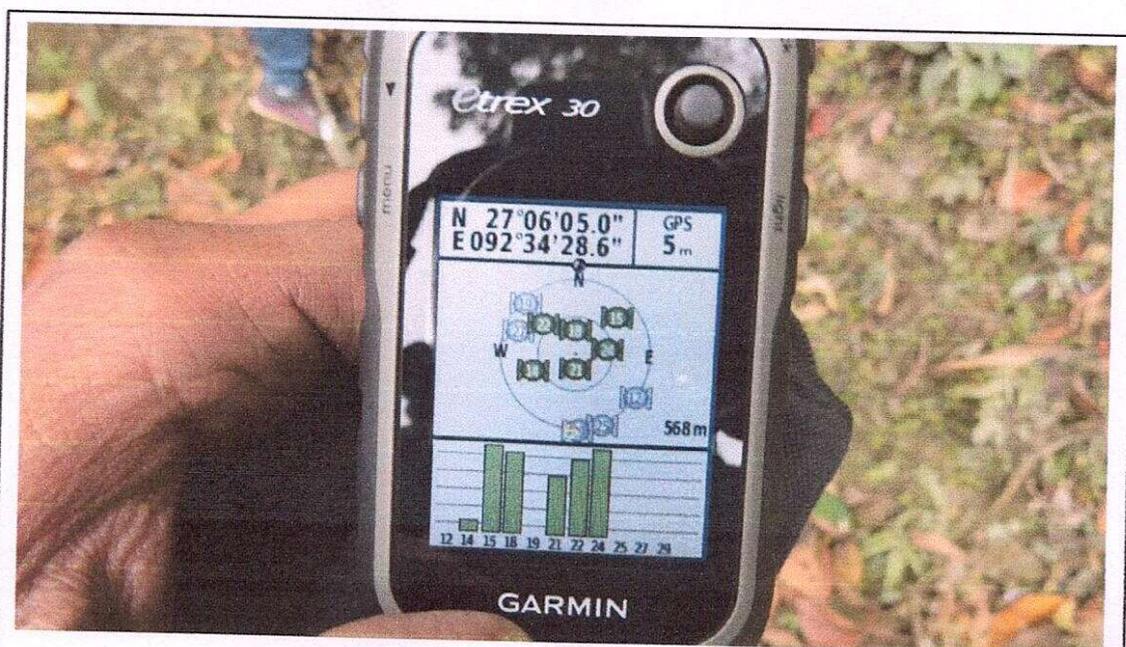
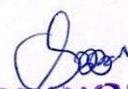


Fig. 1: Global Positioning System (GPS) instrument

  
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## KINDS OF FIELD WORK

Depending upon the purpose of plant collections fieldwork can be broadly classified into three types. 1. *Collection trip*: It is of short duration usually of only one day to nearby place. 2. *Exploration*: It is done for preparing detailed floristic accounts and for study of economic plants of some region and. 3. *Expedition*: It is undertaken to remote and difficult areas and are usually of several months duration.

## COLLECTION

There are three ways of collecting the plant specimens in the field.

1. If the trip is for one day, one can carry the plant press and newspapers or blotters. The specimens are pressed then and there in the field.
2. The second method is to keep the collected specimens in metal can called *Vasculum*. Wet newspapers must be placed inside the *Vasculum* to keep the specimens cool. The plants kept in the *Vasculum* must be transferred to newspaper that day itself or the *Vasculum* along with the plants may be kept in a cool place overnight.
3. Now-a-days polythene bags are available and they are of varying sizes. The collected plants are placed inside and the mouth is tied tightly. This is easy to carry and there will be no serious loss of the plant material kept inside. The plants can be pressed after reaching the headquarters.

## WHAT TO COLLECT?

What plants shall be collected depends on the purpose of study. If the object of study is the preparation of flora of a region, collection should be exhaustive and samples of all plants of that area should be collected. Collections should contain at least flowers or fruits or preferably both.

In case of grasses and other herbs the whole plant including the underground part should be collected. The size of the herbarium sheet on which the specimens will finally be mounted is approximately 28 x 42 cm and this limits the size of the collected plants or twigs.

Due to various considerations, at least four specimens of each plant are collected; this is done particularly to facilitate distribution and exchange. Of the four specimens, two will be mounted and kept in the herbarium and the rest will be kept as duplicates.

The numbers given to collections are very important record. All the four specimens of the same plant are given the same field number. The number must be attached to the specimen in the field itself and this number will always go with the specimens even if there is a possibility



of change of name at a later date. Collection number refers to even the most valuable specimens like type specimens. A type is an element on which the description associated with the original publication of a name was based.

A very important part of the plant collection work is the recording of field notes. Detailed notes should be entered in the field note-book at the time of collection in the field itself. Generally, the following details should be recorded in the field notebook.

a) Date b) Vernacular name c) Locality d) Habitat e) Description f) Collector's name, etc.

This is the most important part of the plant collection trip and one must remember that the specimen we are going to collect in the field will be used by some persons on a later date. So the following points are to be borne in mind.

1. Do not collect scraps of plants.
2. If the specimen is herbaceous whole plant including the underground parts must be collected or if it is woody, a twig that can easily fit into the herbarium sheet can be collected. It must be 35-40 cm long.
3. Very rare specimens like orchids, insectivorous plants and endangered specimens must be collected sparingly.
4. Collection should be made of the material in all stages of development. If necessary, 2 or 3 trips to the same spot must be made to collect different stages of the specimen.
5. Sometimes bulbous specimens must be collected for planting in the experimental garden.
6. All the areas of the locality must be visited and then only the collection will be complete.

Collection of certain groups like succulents, aquatic plants, aroids large bamboos, and very tall trees require special methods and precautions. Succulent plants like Cacti, *Euphorbia* and members of Crassulaceae present unusual difficulties in making herbarium specimens. Their thick succulent tissues take very long time to dry and so they require special attention. Hence, either the tissues should be killed by dipping in boiling water or excess of tissues removed by hollowing out the thick organs. Treating with alcohol or strong Formalin can also kill the tissue.

While recording the characters of succulents, especially the spiny succulents, details of shape, size and the arrangement of spines and joints should be noted.

Some plants like *Lemna* and *Wolfia* are microscopic and cannot be processed for the herbarium in the usual way. These plants should be collected in mass with the collection number, notes etc., sun dried and put in a packet and the whole packet pasted on the



mounting board. These can also be preserved in any of the liquid preservatives used for embryological or anatomical studies. The common liquid preservative is:

Ethyl alcohol 95%	50 cc
Glacial acetic acid	5 cc
Formaldehyde 40%	5 cc
Water	40 cc

The collection number and place, date etc. should be written on a slip in lead pencil or Indian ink and put inside the jar or pasted on it.

Ferns should be collected with their basal portion, because the shape of rhizome and hairs and scales on rhizome are important taxonomic characters. Fronds without sori are of little value. Slender aquatic plants, after collection is placed in a tray containing water and is spread out. Then a wire press or sieve plate with which paper or muslin cloth is inserted below the specimen and taken out; the paper or cloth is lifted slowly with both hands and placed between the dryers. Some aquatic lithophytes like the members of Podostemaceae cannot be detached from the rocky substratum and a portion of the rock needs to be broken apart for collecting them. The rock with the plant has to be either dried or preserved in liquid medium.

#### FIELD NOTE BOOK (FIELD DIARY)

While preparing herbarium specimens close attention should be given to recording all necessary data concerned with the plants, which may not be present or detected after drying

The following points to be noted during plant collection in field notebook:

1. Colouration of foliage and floral parts.
2. Corolla venation.
3. Anther colouration before and after dehiscence.
4. Viscidity of parts.
5. Pollinating agencies.
6. Texture of foliage and perianth parts.
7. Colour and nature of fleshy matured fruit.
8. Habitat.
9. Exact location; use proximate object near the site.
10. Waxed pattern of shoot and root system.
11. Insecticides and repellents.
12. Branching pattern of shoot and root system.
13. Type of soil, moisture content, slope and light conditions.





### 3. PROCESSING OF SPECIMENS

The processing of specimens includes a. Poisoning, b. Pressing, c. Drying, d. Mounting, e. Stitching, f. Labelling, g. Identification / Determination of plants, h. Incorporation and i. Arrangement. These are discussed in detail below.

#### a. Poisoning

The specimens are poisoned either immediately in the camp or after reaching the headquarters. If possible, such as in the case of one-day trips, it is advisable to poison the plants immediately after collection; poisoning kills the plant and thereby the formation of abscission layer is prevented. The poisoning is generally done by dipping the whole plant in a saturated solution of mercuric chloride in ethyl alcohol. The solution is poured in a tray and the specimen is dipped in it with the help of forceps. **Dipping fingers in the solution should**



Fig. 3: Poisoning chemicals

**be avoided and rubber gloves should be used while poisoning.** All parts of the plant are dipped in the solution and left there for 15-20 seconds, depending up on the thickness of the plants. Mercuric chloride is a deadly poisonous chemical and its effect on human beings is cumulative. Lauryl pentachlorophenate (LPCP) is used in some herbaria as substitute for mercuric chloride and it is reported to be very effective and comparatively safer in handling.

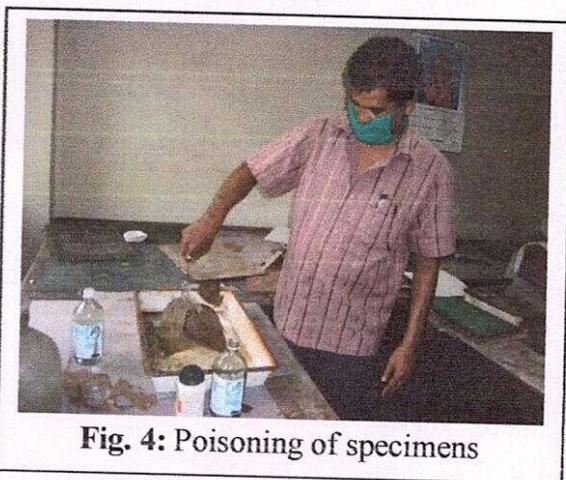


Fig. 4: Poisoning of specimens

Recently another method has often been adopted for collecting and poisoning plants during explorations and expeditions involving longer durations. This is called as Formalin method. This method is highly suitable for tropical countries. The collections are spread out in ordinary old newspapers and bundled up. Each bundle is then placed in a large polythene bag. 70% ethyl alcohol with 5 cc of

10% Formalin mixtures is poured over the bundles, so that the bundles just get soaked thoroughly without however having excess of Formalin in the bags. The bags are then tied airtight. No further change of folders is necessary till reaching the headquarters.

reaching the headquarters, the specimens are spread out for pressing and drying as usual. This method is advantageous in many ways.

1. It saves the labour and time in daily changing and pressing and drying of blotters during the tour.
2. As it saves from carrying large amounts of blotters and presses, reduces the luggage. The old newspapers can be purchased as and when required in any place.
3. Since the tissues of the plants are killed instantaneously by the Formalin fumes, the formation of abscission layer is prevented, thereby preventing detachment of leaves, flowers, fruits and other plant parts.

### b. Pressing

Pressing as far as possible must be carried out in the field itself. It is the process of placing specimens between the absorbents under heavy pressure. Herbaceous specimens should be washed to remove mud from roots. All plant parts such as leaves and flowers etc. are spread out neatly. This needs considerable patience. Some leaves are placed facing up and others facing down to show the characters on both surfaces. This is especially important in case of ferns with sori on the ad axial side. In case of gamopetalous flowers, if possible, one flower should be split open longitudinally and pressed with corolla spread out to show Androecium and Gynoecium. If the specimens are longer than the size of mounting sheet, they can be folded like "V" or "N" or "M" or "W". After gluing and stitching the parts easily stay in position. If there are too many leaves or branches, a few are removed so that there is a little over lapping as possible and all parts are easily visible.

While pressing the specimens should be placed in such a way that there is almost uniform thickness of the bundle in the middle and on sides. This will provide uniform pressure in the press. The main object of pressing is to flatten and dry the specimen. This is done by keeping the straps light and by changing the blotters every day for 6-10 days depending on weather. The plants gradually lose their moisture and finally become completely dry. The used and moist blotters are dried and used again.

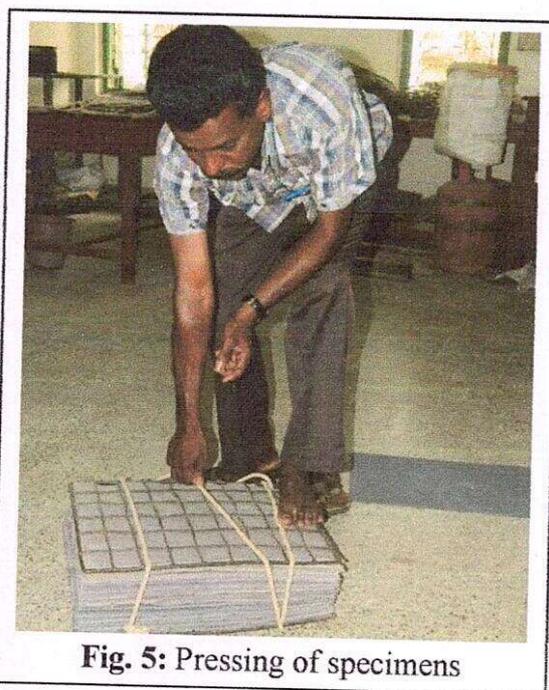


Fig. 5: Pressing of specimens

Pressing succulents and aquatic plants is not so easy. Succulent plants may be dipped in boiling water and pressed. But this will completely alter the shape of the specimen and details may be modified. The best method is to split the succulent part and remove the fleshy inner contents. Salt may be added to cut surfaces for quick drying. For pressing aquatic plants take a big tray and pour water in it. Place a glass plate or tin sheet inside the water i.e. at the bottom of the tray and put a white paper over the plate. The size of the paper must be slightly bigger than the size of the specimen. Now transfer the aquatic plants to the tray and carefully spread the leaves, branches, etc. The lay of the specimen cannot be altered afterwards. Then carefully lift the glass plate with the paper. The specimen now will sit on the white sheet. Aquatic plants have mucilage with them and so there is no need to apply gum or paste for pasting. The plant will automatically get pasted to the white paper. Place the paper with the plant over newspaper and usually thin cloth piece is spread over the plant. Then place another newspaper over it. This is the way of pressing and pasting algae or aquatic plants. While pressing always place one specimen in each sheet. Don't always place the specimen in the center. This will make the pile uneven. In the bundle of the papers, corrugated boards must be put at regular intervals. This will enhance aeration and hasten drying. This is called *Ventilator*. The sequence of placing plants in a press is ventilator, drier, specimen in specimen paper, drier and ventilator. The press level must be even and so packing may be given wherever necessary. Then apply ropes or straps to tighten the press. Put weight over the board. The drying must be gradual.



Fig. 6A. The wrong method of pressing plants

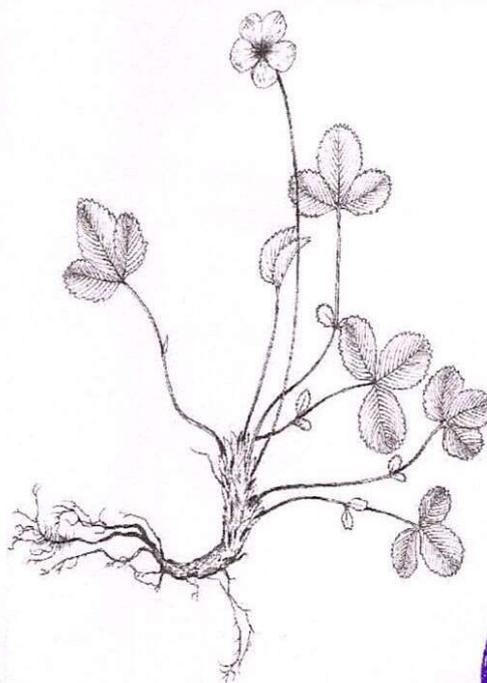


Fig. 6B. The right method of pressing plants



### c. Drying

Plants should be placed in the press and be tightened. The faster the drying, greater will be the quality of the dried specimen (Fig.4). The fungal and bacterial attack will be very less or nil. If the drying is quicker, the plant parts will not lose much of their colour. Some students will immerse the plant in Copper Sulphate solution before pressing. This will make the plant appear green even after drying. Plants must be sweated in the field press for 12-24 hrs. Then open the field press and transfer the material to fresh blotters. In the course of 48 hours, the plants must be changed at least 3 times. This will hasten the drying and prevent the withering of plant parts. The wet & used blotters must be sun dried and must be made use for future drying. The sheets must be completely dry and free from mould. If sheets are found to infect, they must be discarded immediately. For one week, there must be daily changes of the sheets. The plants must be carefully transferred.

In temperate places or during rainy season, artificial drying is essential. If artificial heat is used there must be maximum airflow. Double-faced corrugated boards or aluminium ventilators are the best. The specimen should not be dried in an oven. A collapsible drying frame is used in field and camp stove or Hurricane lamp placed below it (Fig.4). In the laboratory "dry box" can be employed. The lower chamber will be having electric heater. The upper chamber will be used for placing the field press with specimens. This is extremely successful and saves labour and time. The quality of dried specimens will be great. There is a very quick method of drying. The plant is placed in between the driers and they are placed over a cloth bundle. Then apply a hot electric iron over the paper. This will hasten the drying. But this is not a proper method because the plant specimens turn brittle and break.

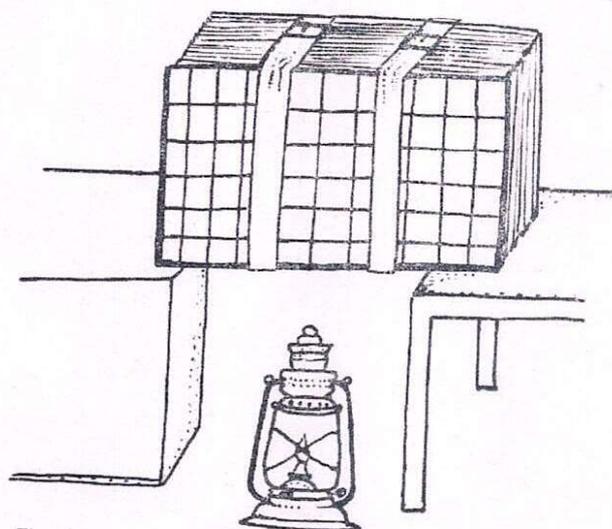


Fig. 7. Drying specimens or blotters on heat of Kerosene lamp

### Disadvantages of heating & non-heating processes

No.	WITHOUT HEAT	ARTIFICIAL HEAT
1.	3 or 4 weeks are needed for complete drying.	The glaucescence or waxy bloom of the specimen will be lost.
2.	Blotters must be changed and so large quantity of newspaper is needed.	Very quickly plant becomes brittle.
3.	The wet blotters must be dried for recycling	The natural colour of the plant is lost.
4.	The labour and time expenditure is high.	The corrugated sheets used for the ventilation leave ridge markings on the plant parts.
5.	Fungal and insect attack will be there. Insect larvae present inside the flower may continue eating the floral parts.	-

#### d. Mounting

After the specimen is pressed, dried and poisoned, it is affixed along with a label on a mounting sheet. The mounting sheets are made from heavy long-lasting white card sheet in uniform size of 28 x 42 cm. The aim of mounting is that the specimens should be neatly and uniformly spread and fixed on the sheet and all parts of the plant should be easily visible for study.

The common technique now in use in our country is pasting specimens to sheet with glue. The common animal glue used for bookbinding are available in market as flakes or pieces is employed. The glue paste is prepared by adding flakes of glue to boiling water, gradually and in small quantities till it makes a thin syrupy paste. To give this glue some insect repellent properly, small quantity of Mercuric Chloride, Thymol crystals or Copper Sulphate (Blue vitriol) is added. The glue or paste is coated on a glass plate or tin plate. The specimen is placed over the paste and tapped gently with forceps. Then with the help of forceps carefully transfer the plant to the mounting sheet in the proper place. Now a day's fevicol also used instead of animal glue flakes.

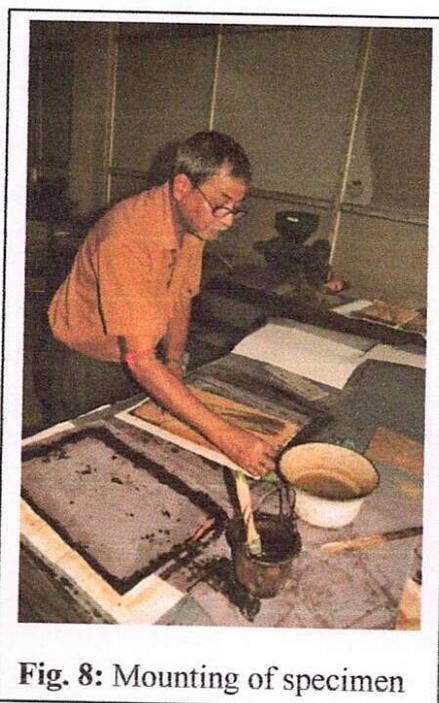


Fig. 8: Mounting of specimen

The mounting sheets with specimens glued on them are kept in press for one day for proper sticking and drying.

### e. Stitching

The stitching 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.

*Strapping:* In this process, the specimen is not glued to the sheet, but only loosely strapped to the sheet by means of ordinary thread stitches or by some other device such as gummed cloth or paper tapes or by liquid plastic method. There are quick drying liquid plastics available in market. This is an expensive procedure.

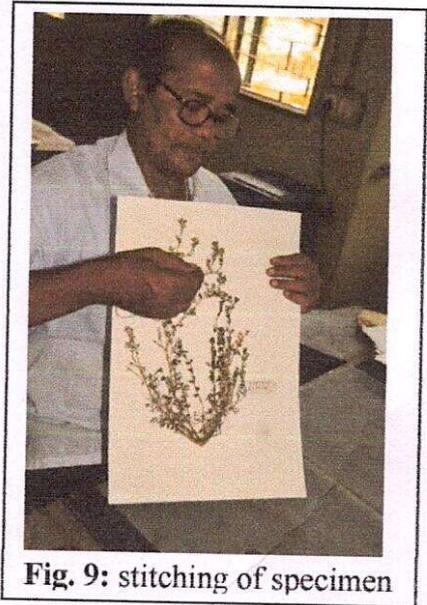


Fig. 9: stitching of specimen

### f. Labelling

After the mounting of specimens on the herbarium sheets, the pasting of herbarium labels is done on the sheets. The size and design of herbarium labels slightly vary according to need. Size is about 8 x 12 cm. In general, the label should contain the following data. 1. Name of the family, 2. Name of the genus and species, 3. Locality of collection, 4. Date of collection, 5. Habitat, 6. Collector's name and field number and 7. Vernacular name and local uses.

Herbarium label is fixed on the bottom right hand corner about 1 cm away from edges of the mounting sheet. It should be fixed with paste or glue.

After gluing the specimens and pasting the labels, the data on the labels should be entered clearly with some permanent ink or preferably typed before pasting. Labels are records expected to last for long and should not fade out. A specimen without any label, even if it is neatly and properly mounted, is of little value.

10	<b>CENTRAL NATIONAL HERBARIUM (CAL)</b> Botanical Survey of India INDIAN BOTANIC GARDEN, HOWRAH
	FLORA OF <u>DARJEELING DIST. (WB.)</u>
	COLL. NO. <u>32598</u> Date <u>27/03/04</u>
	Family <u>ORCHIDACEAE</u>
	Name <u>Coelogyne pempahishayana</u> <u>Chowdhery</u>
	Local name <u>x</u>
	Locality <u>Kalimpong sub. div. Halumba</u> <u>estate</u> <u>Nr. 3900 ft.</u>
	Notes <u>high forest on tree trunks, in asso-</u> <u>ciation with Dendrobium, Coelogyne &amp;</u> <u>and mosses. Flowers white fragrant.</u> <u>Nat. Common</u>
	Collector <u>H.J. Chowdhery</u>
	Identified by <u>H.J. Chowdhery</u>
0	cm

Fig. 10: Model of Label used by Botanical Survey of India

### g. Identification / determination of plants

Usually, identification is considered to be the process through which a specimen whose name is not known is recognized by its characters, to be similar to some known plant and accordingly given a name. But it is now felt that since no two individuals plants are exactly identical, this process should not be called identification but determination. That is why, the annotation slips are called and marked "Determinavit" slips. However, the word identification is now so universally employed that it clearly signifies the entire process.

For the purpose of identification, the scientific method is to first study the characters of the plant, check them with the flora of the region, work through the family, genus and species keys and compare with full description and illustration. Thereafter it is to be carefully compared with earlier identified plants of the species or variety, as the case may be.

### h. Incorporation

When the specimens are ready (mounted, labeled and identified), they are stamped with a distinctive mark of the herbarium or institution. The stamping is usually done on the top right hand corner of the sheet. This stamp carries the name of the institution, a serial number called the herbarium accession number and sometimes the date of accession. The sheets are listed in the accession register and now the sheets are ready for filing in the herbarium.

The mounted, identified and accessioned herbarium sheets are sorted out family, genus and species wise.

All the sheets of the same species are filed in lighter covers called the "species cover or folders"; and all the species (with species covers or folders) belonging to one genus are placed in one more folder of heavy paper called the genus cover.

### i. Arrangement of specimens

The specimens are usually arranged in the herbarium according to some recognized system of classification. In many Indian herbaria the order and numbering of families and genera is according to Bentham & Hooker's *Genera Plantarum*. In few European herbaria the families are arranged according to the recent classification, APG III (Angiosperm Phylogeny Group).

The herbarium sheets are to be arranged in wooden or steel Almirahs with pigeonhole

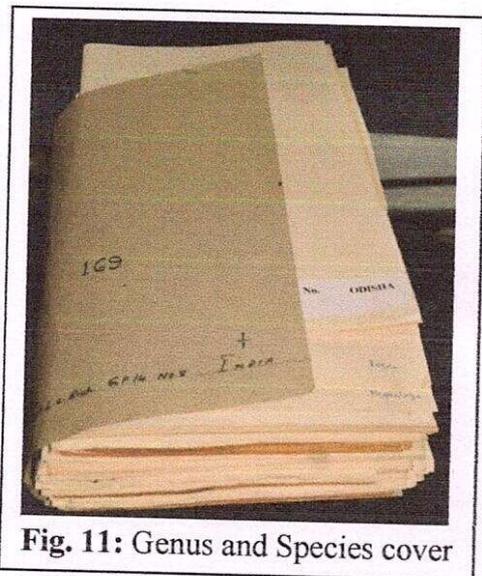


Fig. 11: Genus and Species cover

compartments. The pigeonhole, where bundles of a new family start, is marked by a fixed label or by hinged cardboard separator. The name of the family is printed or written on this in bold letters.

The size of the species cover is usually 32 x 48 cm and that of Genus cover is 40 x 60 cm. Materials are added to the herbarium through one or more of the following means: -

- a) Through actual collection by the herbarium staff.
- b) By procuring collections of others through purchase, gift or exchange.
- c) Sometimes it is agreed that material received for routine identification or expert opinion of specialists in the herbarium will be retained for incorporation.

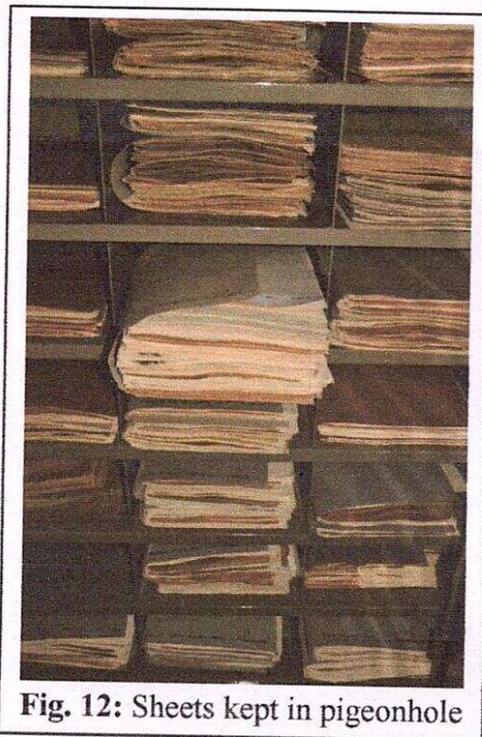


Fig. 12: Sheets kept in pigeonhole

In the herbarium the most important collection is the type collection. The type specimens such as holotype and isotypes are usually kept separately in safe custody. This is to avoid unnecessary handling.

#### j. Lending

The specimens received on loan (for study or identification) are the property of other institutions or individuals and need great care. Soon after receipt, they should be counted and checked with the accompanying list. All the specimens received for study must be returned duly annotated by the botanist who examined them and within the period agreed upon.

#### 4. MAINTENANCE

Collector takes lot of trouble in preparing good herbarium sheets. In some cases herbarium sheets alone act as representative of the plant, because all the plants may be missing in that locality. This is the case with the copy specimens recorded by Fyson. So to protect the sheets from fungal and insect pests is an important step. Insects like tobacco or herbarium beetle (*Lasioderma sericorne*) or drugstore beetle (*Stegolium paniceum*) and silver fish are common enemies. They complete their life cycle with the dried specimens. The life cycle period is 70 to 90 days. Unattended herbarium get lose because of these insects. The insecticide kills the insects either by contact or by being eaten. Contact insecticides used in herbaria are Cyanide gas, Paradichloro benzene (PDB), Carbon dioxide or DDT. Digestive poisons are the salts of Mercury and Arsenic. Mercuric chloride is the insecticide.



Care must be taken when new herbarium specimens and collection is brought in. One must check up whether the specimens have been poisoned properly. If a non-poisoned, infected specimen enters the herbarium it may become the source of further infection. The incoming specimens are kept in deep freezer for overnight and taken in. This is possible only with very big herbaria, where incoming specimens are of large quantity and manual poisoning is not possible.

1. FUMIGATION: This is done for killing pests in mounted as well as unmounted duplicate specimens. This process involves any one of the volatile poisonous liquids like methyl bromide, carbon disulphide or carbon tetrachloride. These are placed in small saucers or petridishes in each herbarium case and the case kept closed for about a week. Methyl bromide is used in herbarium of New York Botanical Garden. Sometimes Paradichlorobenzene is placed in all or many of the pigeonholes.
2. HEATING is another method of insect killing. Some herbaria use electric heater instead of fumigation. This requires special insulated herbarium cases with an electric heating element at the bottom. The specimens are placed inside the chamber at 44°C and left there for few hours.
3. CHEMICAL TREATMENT is another method of insect control. There are two ways of poison action. One is permanently poisoning the specimen and the second is making the material unpalatable. The method of application is either dipping the material in the insecticide before pasting or spraying the chemical after pasting. Mercuric Chloride ( $Hg Cl_2$ ) and ethyl alcohol is the best mixture, but it is deadly poisonous and should be handled carefully. Further if it is handled by barren hands, the hand may get blackened. Moreover metal forceps and trays should not be used. They get corroded.
4. HANDLING OF SPECIMENS: Sheets with specimens are intended to use by students, scholars and scientists. These specimens must be preserved as long as possible and this depends upon the handling of these sheets. Some of these points are to be borne in mind.
  - Keep the sheets always flat.
  - Don't shuffle or leaf through a folder like a book or pack of cards.
  - Plant materials are brittle and they can break and get damaged, if handling is improper.
  - Store the sheets in shelves and don't crowd the shelf.



- Use the folders namely species folders and genus folders carefully and keep the specimens inside when they are not in use.
- Don't put books or heavy articles over the herbarium sheets.
- If the parts of the specimens get detached, store them in small envelope and attach it to the sheet.
- During transport don't tie the bundle of sheets tightly. This may damage the specimen.
- Some students and scholars may try to examine the specimens or dissect the floral parts. They should not be allowed to touch the main material. The reserve materials kept in the small envelope may be used.
- For examination and dissection, dried material must be kept in boiling water and then softening agents must be added. The composition is
  - 1.6 m (75%) aqueous "Aerosol OT"
  - 73.4 ml distilled water.
  - 25 ml methyl alcohol.
- The materials must be placed in a watch glass and the solution is added to it, which makes dissect the specimens easier.
- The herbarium sheet must be placed below long armed dissection microscope during examination. Do not bend the sheet.
- Never write any comments or notes on the sheet. Don't make any corrections without the permission of the in charge.
- Place the sheets back in the shelf only after getting permission from the in charge.
- Dummy folders: As a result of change in nomenclature / taxonomic revision or removal of sheets for repairing or for sending on loan, a dummy folder with necessary notes will make it easy. When anybody tries to trace the sheet, the whereabouts of the sheet can be made out from the notes.

For example in *Ionidium* write see *Hybanthus*.

Generally, the *Hybanthus* genus is known by its old name *Ionidium*. If anyone search for the specimens of *Ionidium* will not be able to locate because of nomenclatural change. So if the note in a sheet "see *Hybanthus*" in the dummy folder, leads the researcher to *Hybanthus*.



– V. SAMPATH KUMAR  
Scientist 'D'  
Central National Herbarium  
Botanical Survey of India, Howrah – 711 103



**President :**  
Shri Amrishbhai R. Patel  
M.L.A.

**Principal :**  
Dr. S. B. Bari  
M.Pharm. Ph.D., D.I.M.F.J.C.

## Report of Certificate Course on Herbarium Techniques

**Duration of Course:** 30 days (15 March 2023 to 13 April 2023) 30 Hours

**Name of the coordinator:** Dr. R. E. Mutha

**Name of resource persons:** Dr. R. E. Mutha, Mr. C. J. Bhavsar, Mr. V. S. Bagul

**Scope of the course:** To introduce and emphasize the importance of conservation and preservation of plant biodiversity. With this, make the students skilled to prepare and preserve the herbarium of the plant specimen.

**No of participants:** 114

### Summary of the event:

Certificate Course on Herbarium Techniques was conducted from 15 March 2023 to 13 April 2023 on the syllabus as per need of current scenario and environmental situation. A total of 66 students of the S. Y. B. Pharm had attended the course and gained the knowledge and required skill relevant to herbarium and herbarium preparation. Along with this, students gained awareness and importance of conservation and preservation of plant biodiversity. At the end of the course, an assessment test was conducted to know the status of knowledge gained by the students. Finally, certificates of the course were distributed to the students.

  
**Dr. R. E. Mutha**  
Coordinator



  
**Dr. S. B. Bari**  
**PRINCIPAL**  
H.R. Patel Institute of Pharmaceutical  
Education & Research  
Shirpur Dist. Dhule (M.S) 425 405

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**Notice**

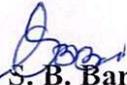
25/02/2023

All the students of S. Y. B. Pharm are hereby informed that institute has framed and going to start a Certificate Course on Herbarium Techniques for 30 days duration from 15 March 2023 to 13 April 2023. So, interested students should enroll their names toward the coordinator of the course before 6 March 2023.

Time: 9.45 to 10.45 am

  
**Dr. R. E. Mutha**  
Coordinator



  
**Dr. S. B. Bari**  
**PRINCIPAL**  
H.R. Patel Institute of Pharmaceutical  
Education & Research  
Shirpur Dist. Dhule (M.S) 425 405











Shirpur Education Society's  
**H. R. Patel Institute of Pharmaceutical Education & Research, Shirpur**

**FEEDBACK FORM**

We expect assessment of this event (**Certificate Course on Herbarium Techniques**) from you and request that you to share your ideas and suggestions. This feedback will help us in planning future events. Thank you.

Duration: 15 March 2023 to 13 April 2023 (30 days)

Please comment on aspects of Training Program using the following rating.

[Tick in appropriate Box]

Sr. No.	Particulars	Excellent	Good	Average	Poor
1.	Relevance of Topic	✓			
2.	Session contents	✓			
3.	Whether this course meets your expectations?	✓			
4.	Venue and facilities	✓			
5.	Was the course being beneficial for future scope?	✓			
6.	Do you feel competent and confident at the end of the course?		✓		
7.	Overall rating of certificate course	✓			

Please express your opinion about the program:

This..... will..... helpful..... for..... me..... to.....<sup>learn</sup>..... different..... herbarium plants..... The..... content..... was..... very good..... & knowledgable.

Any other comment:

Name: Nayan Rajendra Chaudhari

Organization: HRPAPER, Shirpur

Email and Mobile No: nxc3093@gmail.com 9834591349

*Raudhari*

Sign of trainee



*Rajendra*  
**PRINCIPAL**  
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Shirpur Dist. Dhule (M.S) 425 405

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2.	Session contents	✓			
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4.	Venue and facilities	✓			
5.	Was the course being beneficial for future scope?		✓		
6.	Do you feel competent and confident at the end of the course?	✓			
7.	Overall rating of certificate course	✓			

**Please express your opinion about the program:**

This types of programme are really useful to increase our knowledge & interest towards nature.

**Any other comment:**

Name: Jayesh Vitthal Mistari

Organization: H.R. Patel Institute of Pharmaceutical Education & Research, Shirpur

Email and Mobile No: jayesh.mistari2@gmail.com, & 9421534019

*Jayesh Mistari*  
Sign of trainee



*Govt*  
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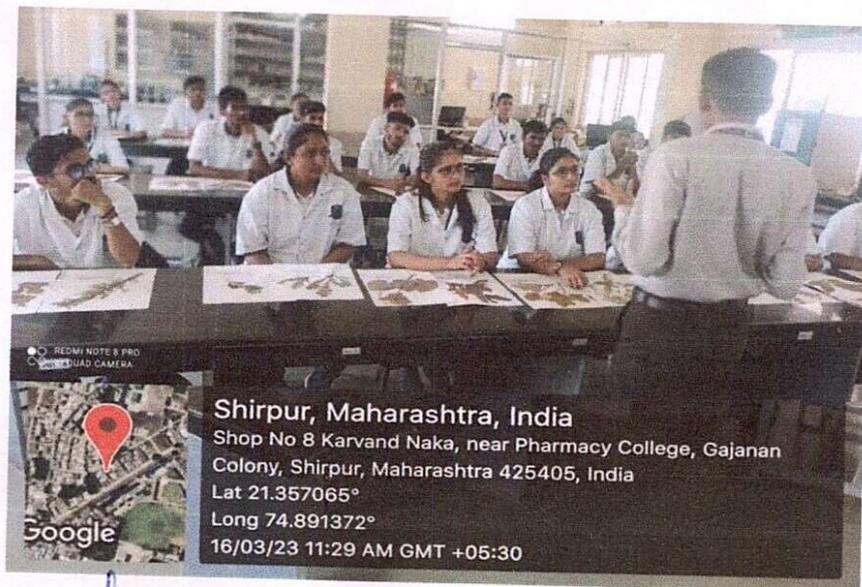
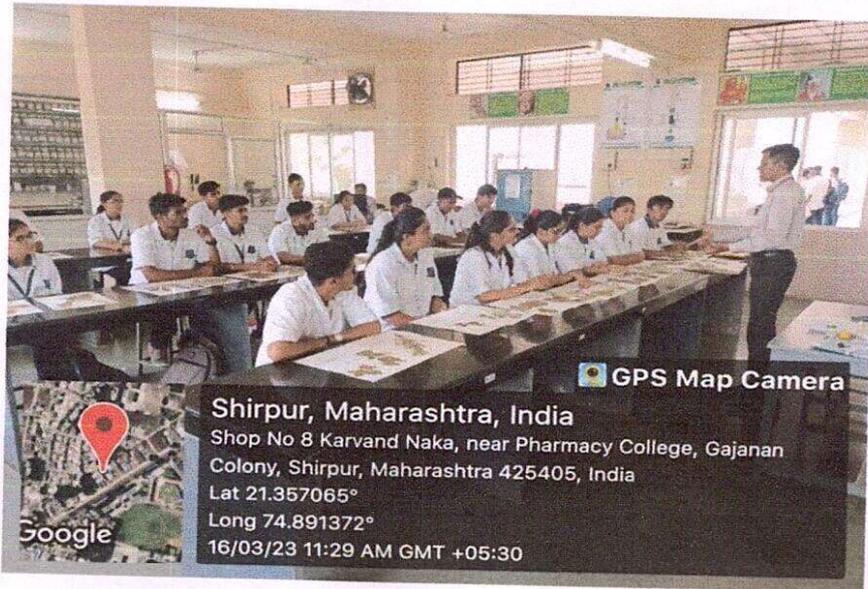
## H. R. Patel Institute of Pharmaceutical Education and Research, Shirpur

Academic year 2022-2023 (15 March 2023 to 13 April 2023),

Class: S. Y. B. Pharm, Time: 9.45 to 10.45 am (1 Hour)

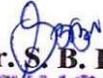
Name of The Course: Certificate Course on Herbarium Techniques

Duration of Course: 30 days



  
Dr. R. E. Mutha  
Coordinator



  
Dr. S. B. Bari  
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# H. R. Patel Institute of Pharmaceutical Education and Research, Shirpur (M.S)

## CERTIFICATE

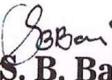
OF APPRECIATION

This certificate is presented to

Mr/Ms. Bari Tejaswi Dipak for her/his active participation in 30 days "Certificate Training Course on Herbarium Techniques" Academic year 2022-2023 (15 March 2023 to 13 April 2023), organized by Department of Pharmacognosy, H. R. Patel Institute of Pharmaceutical Education and Research Shirpur Dist. Dhule.

  
Dr. R. E. Mutha  
Coordinator



  
Dr. S. B. Bari  
Principal



Shirpur Education Society's

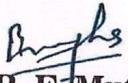
**H. R. Patel Institute of Pharmaceutical  
Education and Research, Shirpur (M.S)**

# CERTIFICATE

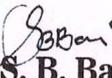
OF APPRECIATION

This certificate is presented to

Mr/Ms. Girase Vaibhav Govindsing for her/his active participation in 30 days "Certificate Training Course on Herbarium Techniques" Academic year 2022-2023 (15 March 2023 to 13 April 2023), organized by Department of Pharmacognosy, H. R. Patel Institute of Pharmaceutical Education and Research Shirpur Dist. Dhule.

  
Dr. R. E. Mutha  
Coordinator



  
Dr. S. B. Bari  
Principal



**President :**  
Shri Amrishbhai R. Patel  
M.L.A.

**Principal :**  
Dr. S. B. Bari  
M.Pharm. Ph.D., D.I.M.F.J.C.

## Report of Certificate Course on Herbarium Techniques

**Duration of Course:** 30 days (24 May 2022 to 22 June 2022) 30 Hours

**Name of the coordinator:** Dr. R. E. Mutha

**Name of resource persons:** Dr. R. E. Mutha, Mr. C. J. Bhavsar, Mr. V. S. Bagul

**Scope of the course:** To introduce and emphasize the importance of conservation and preservation of plant biodiversity. With this, make the students skilled to prepare and preserve the herbarium of the plant specimen.

**No of participants:** 113

### Summary of the event:

Certificate Course on Herbarium Techniques was conducted from 24 May 2022 to 22 June 2022 on the syllabus as per need of current scenario and environmental situation. A total of 66 students of the S. Y. B. Pharm had attended the course and gained the knowledge and required skill relevant to herbarium and herbarium preparation. Along with this, students gained awareness and importance of conservation and preservation of plant biodiversity. At the end of the course, an assessment test was conducted to know the status of knowledge gained by the students. Finally, certificates of the course were distributed to the students.

  
**Dr. R. E. Mutha**  
Coordinator



  
**Dr. S. B. Bari**  
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**H. R. Patel Institute of Pharmaceutical Education and Research, Shirpur**

**Notice**

11/05/2022

All the students of S. Y. B. Pharm are hereby informed that institute has framed and going to start a Certificate Course on Herbarium Techniques for 30 days duration from 24 May 2022 to 22 June 2022. So, interested students should enroll their names toward the coordinator of the course before 17 May 2022.

Time: 9.45 to 10.45 am



Dr. R. E. Mutha  
Coordinator



Dr. S. B. Bari  
**PRINCIPAL**  
H.R Patel Institute of Pharmaceutical  
Education & Research  
Shirpur Dist.Dhule(M.S) 425 405











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**FEEDBACK FORM**

We expect assessment of this event (**Certificate Course on Herbarium Techniques**) from you and request that you to share your ideas and suggestions. This feedback will help us in planning future events. Thank you.

Conducted during 24 May 2022 to 22 June 2022 (30 days)

Please comment on aspects of Training Program using the following rating.

[Tick in appropriate Box]

Sr. No.	Particulars	Excellent	Good	Average	Poor
1.	Relevance of Topic	✓			
2.	Session contents	✓			
3.	Whether this course meets your expectations?		✓		
4.	Venue and facilities	✓			
5.	Was the course being beneficial for future scope?	✓			
6.	Do you feel competent and confident at the end of the course?		✓		
7.	Overall rating of certificate course	✓			

Please express your opinion about the program:

..It is an excellent course, knowledge about conservation of plants..

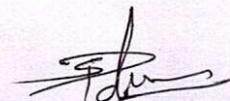
Any other comment:

—

Name: Pradip Sakharchand Chavan

Organization: H. R. P.I.P.E.R. Shirpur.

Email and Mobile No: 88 8788185584



Sign of trainee



  
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Shirpur Dist. Dhule (M.S.) 425 405

Shirpur Education Society's  
**H. R. Patel Institute of Pharmaceutical Education & Research, Shirpur**

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2.	Session contents	✓			
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4.	Venue and facilities		✓		
5.	Was the course being beneficial for future scope?	✓			
6.	Do you feel competent and confident at the end of the course?		✓		
7.	Overall rating of certificate course	✓			

Please express your opinion about the program:

..... Add on course girls additional knowledge  
..... about conservation of plant: .....

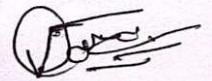
Any other comment:

.....  
.....

Name: Vaishnavi Jagdish Bairagi .....

Organization: H.R.P.I.P.E.R. Shirpur .....

Email and Mobile No: 902 9322092122 .....



Sign of trainee



  
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Shirpur Dist. Dhule (M.S) 425 405

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**H. R. Patel Institute of Pharmaceutical Education and Research, Shirpur**

Academic year 2021-2022 (24 May 2022 to 22 June 2022),

**Class:** S. Y. B. Pharm, **Time:** 9.45 to 10.45 am (1 Hour)

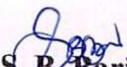
**Name of The Course:** Certificate Course on Herbarium Techniques

**Duration of Course:** 30 days



  
**Dr. R. E. Mutha**  
Coordinator



  
**Dr. S. B. Bari**  
**PRINCIPAL**  
H.R Patel Institute of Pharmaceutical  
Education & Research  
Shirpur Dist.Dhule(M.S) 425 405



Shirpur Education Society's

**H. R. Patel Institute of Pharmaceutical  
Education and Research, Shirpur (M.S)**

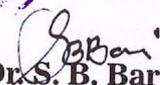
## **CERTIFICATE OF APPRECIATION**

This certificate is presented to

Mr/Ms. Mayuri Dhanlal Jaiswal for her/his active participation  
in 30 days **"Certificate Training Course on Herbarium Techniques"** Academic year  
2021-2022 (24 May 2022 to 22 June 2022), organized by Department of Pharmacognosy,  
H. R. Patel Institute of Pharmaceutical Education and Research Shirpur Dist.  
Dhule.



  
**Dr. R. E. Mutha**  
Coordinator

  
**Dr. S. B. Bari**  
Principal



Shrirpur Education Society's

**H. R. Patel Institute of Pharmaceutical  
Education and Research, Shirpur (M.S)**

## **CERTIFICATE OF APPRECIATION**

This certificate is presented to

Mr/Ms. Pradip S. Chavan for her/his active participation  
in 30 days **"Certificate Training Course on Herbarium Techniques"** Academic year  
2021-2022 (24 May 2022 to 22 June 2022), organized by Department of Pharmacognosy,  
H. R. Patel Institute of Pharmaceutical Education and Research Shirpur Dist.  
Dhule.



  
**Dr. R. E. Mutha**  
Coordinator

  
**Dr. S. B. Bari**  
Principal

The Shirpur Education Society's  
**H. R. Patel Institute of Pharmaceutical Education and Research, Shirpur**

**Report of Certificate Course on Herbarium Techniques**

**Duration of Course:** 30 days (1 March 2019 to 30 March 2019) 30 Hours

**Name of the coordinator:** Mr. R. E. Mutha

**Name of resource persons:** Mr. R. E. Mutha, Mr. C. J. Bhavsar

**Scope of the course:** To introduce and emphasize the importance of conservation and preservation of plant biodiversity. With this, make the students skilled to prepare the herbarium of the plant specimen.

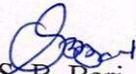
**No of participants:** 66

**Summary of the event:**

Certificate Course on Herbarium Techniques was conducted from 1 March 2019 to 30 March 2019 on the syllabus as per need of current scenario and environmental situation. A total of 66 students of the S. Y. B. Pharm had attended the course and gained the knowledge and required skill relevant to herbarium and herbarium preparation. Along with this, students got awareness and importance of conservation and preservation of plant biodiversity. At the end of the course, an assessment test was conducted to know the status of knowledge gained by the students. Finally, certificates of the course were distributed to the students.

  
Mr. R. E. Mutha  
Corodinator



  
Dr. S. B. Bari  
**PRINCIPAL**  
H. R. Patel Institute of Pharmaceutical  
Education & Research  
Shirpur Dist. Dhule (M.S) 425 405

The Shirpur Education Society's

**H. R. Patel Institute of Pharmaceutical Education and Research, Shirpur**

**Notice**

16/02/2019

All the students of S. Y. B. Pharm are hereby informed that institute has framed and going to start a **Certificate Course on Herbarium Techniques** for 30 days duration from 1 March 2019 to 30 March 2019. So, interested students should enroll their names toward the coordinator of the course before 21 February 2019.

Time: 9.45 to 10.45 am

  
**Mr. R. E. Mutha**  
Coordinator



  
**Dr. S. B. Bari**  
**PRINCIPAL**  
H.R Patel Institute of Pharmaceutical  
Education & Research  
Shirpur Dist.Dhule(M.S) 425 405







Shirpur Education Society's  
**H. R. Patel Institute of Pharmaceutical Education & Research, Shirpur**

Schedule: Day & Date: 1 March 2019 to 30 March 2019

**FEEDBACK FORM**

We expect assessment of this event (**Certificate Course on Herbarium Techniques**) from you and request that you to share your ideas and suggestions. This feedback will help us in planning future events. Thank you.

Please comment on aspects of Training Program using the following rating.

[Tick in appropriate Box].

Sr. No.	Particulars	Excellent	Good	Average	Poor
1.	Relevance of Topic	✓			
2.	Session contents	✓			
3.	Whether this course meets your expectations?		✓		
4.	Venue and facilities	✓			
5.	Was the course being beneficial for future scope?	✓			
6.	Do you feel competent and confident at the end of the course?	✓			
7.	Overall rating of certificate course	✓			

**Please express your opinion about the program:**

..Excellent..certificate..course.....

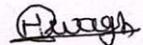
**Any other comment:**

..Nil.....

**Name:** ..Harshad..Satisb..wagh.....

**Organization:** ..HRPIPER, Shirpur.....

**Email and Mobile No:** .....



Sign of trainee



  
**PRINCIPAL**  
H.R. Patel Institute of Pharmaceutical  
Education & Research  
Shirpur Dist. Dhule (M.S) 425 405

Shirpur Education Society's  
**H. R. Patel Institute of Pharmaceutical Education & Research, Shirpur**

Schedule: Day & Date: 1 March 2019 to 30 March 2019

**FEEDBACK FORM**

We expect assessment of this event (**Certificate Course on Herbarium Techniques**) from you and request that you to share your ideas and suggestions. This feedback will help us in planning future events. Thank you.

Please comment on aspects of Training Program using the following rating.

[Tick in appropriate Box].

Sr. No.	Particulars	Excellent	Good	Average	Poor
1.	Relevance of Topic	✓			
2.	Session contents	✓			
3.	Whether this course meets your expectations?		✓		
4.	Venue and facilities		✓		
5.	Was the course being beneficial for future scope?	✓			
6.	Do you feel competent and confident at the end of the course?	✓			
7.	Overall rating of certificate course	✓			

Please express your opinion about the program:

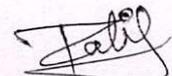
Addition in knowledge & More explanation  
of Herbarium Techniques

Any other comment:

Name: Patil Akash Pratap.

Organization: H.R.P.I.P.E.R., Shirpur

Email and Mobile No: .....

  
Sign of trainee



  
**PRINCIPAL**  
H.R. Patel Institute of Pharmaceutical  
Education & Research  
Shirpur Dist. Dhule (M.S) 425 405

The Shirpur Education Society's

**H. R. Patel Institute of Pharmaceutical Education and Research,  
Shirpur**

Academic year 2018-2019 (1 March 2019 to 30 March 2019), **Class:** S. Y.  
B. Pharm, **Time:** 9.45 to 10.45 am (1 Hour)

**Name of The Course:** Certificate Course on Herbarium Techniques  
**Duration of Course:** 30 days



  
**Mr. R. E. Mutha**  
Coordinator



  
**Dr. S. B. Bari**  
**PRINCIPAL**  
H.R Patel Institute of Pharmaceutical  
Education & Research  
Shirpur Dist. Dhule (M.S) 425 405

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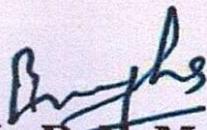
# CERTIFICATE OF APPRECIATION

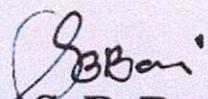
This certificate is presented to

Mr/Ms. Jain Gunjan Avinash for

her/his active participation in 30 days "Certificate Training  
Course on Herbarium Techniques" in Academic year  
2018-2019 (1 March 2019 to 30 March 2019) organized by  
Department of Pharmacognosy, H. R. Patel Institute of Pharma-  
ceutical Education and Research Shirpur Dist.  
Dhule.



  
Mr. R. B. Mutha  
Coordinator

  
Dr. S. B. Bari  
Principal

Shirpur Education Society's  
**H. R. Patel Institute of Pharmaceutical  
Education and Research, Shirpur (M.S)**



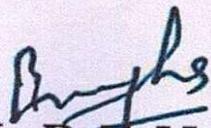
# CERTIFICATE OF APPRECIATION

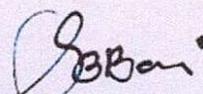
This certificate is presented to

Mr/Ms. Wani Sakshi Pravin for

her/his active participation in 30 days "Certificate Training  
Course on Herbarium Techniques" in Academic year  
2018-2019 (1 March 2019 to 30 March 2019) organized by  
Department of Pharmacognosy, H. R. Patel Institute of Pharma-  
ceutical Education and Research Shirpur Dist.  
Dhule.



  
Mr. R. B. Mutha  
Coordinator

  
Dr. S. B. Bari  
Principal