Flowering Plant Identification and Aesthetic Characteristics

B.Sc. BBZ

Semester 3

Taxonomic Resources and Nomenclature: Part 1

Unit 1: Taxonomic Resources & Nomenclature
इकाई 1– वर्गीकीय संसाधन और नामकरण

1.1.	**Taxonomy**	**वर्गिकी**
1.1.1.	Definition	परिभाषा
1.1.2.	Aims of Taxonomy	वर्गिकी के उद्देश्य
1.1.3.	Components of Taxonomy	वर्गिकी के घटक
1.2.	**Taxonomic Resources**	**वर्गिकीय संसाधन**
1.2.1.	Introduction	परिचय
1.2.2.	Herbarium	हर्बेरियम (वनस्पति संग्रहालय)
1.2.3.	Botanical Gardens	वानस्पतिक उद्यान
1.2.4.	Museum	संग्रहालय
1.2.5.	Zoological Parks	प्राणी उद्यान
1.2.6.	Keys	कुंजी
1.2.7.	Flora	फ्लोरा / वनस्पतिजात
1.2.8.	Manuals and Catalogues	नियम पुस्तिका एवं सूचीपत्र
1.2.9.	Monograph	मोनोग्राफ
1.2.10.	Importance of Taxonomical Aids	वर्गिकीय सामग्री का महत्त्व
1.3.	**International Code of Nomenclature (ICN)/ International Code of Botanical Nomenclature (ICBN)**	**नामकरण अंतर्राष्ट्रीय संहिता (ICN)/ अंतर्राष्ट्रीय वानस्पतिक नामकरण संहिता (ICBN)**

1.1. TAXONOMY

1.1.1. Definition

The term **Taxonomy** has been derived from Greek words *taxis* (meaning **arrangement**) and *nomos* (meaning **rules or laws**). This term was coined by **A. P. de Candolle** (in 1813) in his famous work **Theorie elementaire de la botanique** (Elementary Theory of Botany). Thus, taxonomy is the study of the arrangement of plants and animals on the basis of some laws.

Taxonomy is defined as "the science of identifying, naming, and classifying plants, animal or other organisms".

Simpson (1961) defined taxonomy as "the theoretical study of classification including its bases, principles, procedures, and rules".

Ernst Mayer defined taxonomy as "the theory and practice of classifying organisms".

Kristofferson (1995) defined taxonomy as "the practice of recognising, naming, and ordering taxa into a system of words consistent with any kind of relationships among taxa that the investigator has discovered in nature".

Augustin Pyramus de Candolle

Taxonomy (Gr.)= taxis + nomous

arrangement   law or rule

Given by A.P. de Candolle (1813)

Book- Theorie Elementaire de la Botanique (Theory of Elementary Botany)

• Definition-

It is a branch of botany which deals with the study of identification, nomenclature and classification of plants.

Father of Taxonomy- Carolous Linnaeus

Indian father of Taxonomy- H. Santapau

❖The term 'taxon' was first introduced by **Adolf Meyer (1926)**, a German biologist, for the animal groups

Taxon(singular)

Taxa(plural)

Taxon = Group of organism occupying a fix unit in a classification is called as **taxon.**

The term taxon refers to a taxonomic group like variety, species, genus or any other higher group.

a named group of organisms, like a phylum, genus, or species

Domain
Kingdom
Phylum
Class
Order
Family
Genus
Species

taxon

1.1.2. Aims of Taxonomy

1) To provide a suitable identification and communication method.
2) To provide classification based on natural affinities of plants.
3) To provide an inventory of plant taxa by means of flora.
4) To detect evolution at work, discovering its process of interpreting into results.
5) To provide an integrating role in the training of biology students on the relationships between many biological fields and data gathering science.

1.1.3. Components of Taxonomy

Identification

Nomenclature

Classification

1.1.3.1. Identification

Identifying an unidentified specimen with an already known taxon and giving a correct rank and place in an existing taxonomy is known as **identification** or **determination**. In reality, it requires giving an unknown specimen a name. This can be accomplished by visiting a herbarium and comparing uncertain specimens to herbarium specimens that have been properly recognised. Alternatively, the specimen might be submitted to a field specialist who can assist with identification.

Identification can also be accomplished through the use of identification keys offered in various forms of literature, such as floras, monographs, and manuals.

1.1.3.2. Nomenclature

After identification of a taxon, it should be given a scientific name. Thus, the process of determining a correct name for a taxon is known as **nomenclature**. It is a clear and widely accepted system of rules that the botanists use for naming newly discovered plants.

The International Code of Botanical Nomenclature (ICBN) regulates plant nomenclature through its rules and recommendations. The Botanical Code, which is revised in every 6 years or so, aids in selecting a single accurate name for a taxon with a certain circumscription, location, and rank from among the many scientific names available. A list of preserved names is supplied in the code to avoid difficult name changes for particular species. The International Code of Nomenclature for Cultivated Plants (ICNCP) is a slightly modified version of the Botanical Code that governs cultivated plants.

1.1.3.3. Classification

Division of organisms into categories based on their similarities is termed **classification**. The creatures are grouped into increasingly inclusive groups until all of them are grouped into a single most inclusive category. Assigning proper location and rank to a new taxon, breaking a taxon into smaller units, combining two or more taxa into one, shifting its position from one group to another, and changing its rank are all part of the classification process. Taxonomic entities are classified in a variety of ways:

1) **Artificial Classification:** This type of classification is based on some easily observable features, like habit, colour, form, etc., often irrespective of their affinity.

2) **Natural Classification:** This type of classification is based on overall similarity, mostly on gross morphology.

3) **Phenetic Classification:** This type of classification uses data from all accessible sources, including morphology, anatomy, embryology, phytochemistry, ultrastructure, and all other disciplines of research, to determine overall similarity in terms of a phonetic link. **Sneath** and **Sokal** (1973) are prominent proponents of this categorisation.

4) **Phylogenetic Classification:** This type of classification is not mutually exclusive, but often overlaps in practice, and is based on common evolutionary descent.

Taxonomic Tools or Aids :-

- Taxonomic aids are the tools for the taxonomic study.

- Some techniques, procedures and stored information that are useful in identification and classification of organisms are called taxonomical aids.

- They are required in almost all branches of biological studies for their proper identification and for finding their relationship with others.

- Some of the taxonomical aids are keys, flora, revisions, monograph, catalogues, herbarium, botanical gardens etc.

1.2. TAXONOMIC RESOURCES

1.2.1. Introduction

Taxonomic resources or **aids** are specimens, materials, and other sources of information that can assist in the identification and classification of an unknown organism. Classification of organisms into distinct groups necessitates extensive field and laboratory research. This is an important procedure since taxonomic classification aids in the identification of numerous creatures required in various domains, such as agriculture, industry, bio resources, and so on. The major source for examining the relative level of a collection of species, their taxonomic hierarchy, and taxonomic rank is taxonomical aids. Following are some of the taxonomical aids:

1) Herbarium
2) Botanical gardens
3) Museum
4) Zoological parks
5) Keys
6) Flora
7) Manuals and catalogues
8) Monograph

👉 **What is Herberium**
👉 **Importance of Herberium**
👉 **Herberium Techniques**
👉 **Steps involves in Herberium Techniques**

Ada Hayden Herbarium (ISC)
Iowa State University

Gossypium herbaceum L.

Distribution: Africa, Asia
Genome designation: A2-97A1
Tube #: 121
Block #: 147
Collector: J. F. Wendel/ T. D. Couch
Collection site: Bessey Hall Greenhouse
                 Iowa State University

Collection number: 515
Date: January, 1988

A herbarium is a collection of pressed and dried plant specimens, mounted on sheets bearing a label, arranged according to a sequence and available for reference or study.
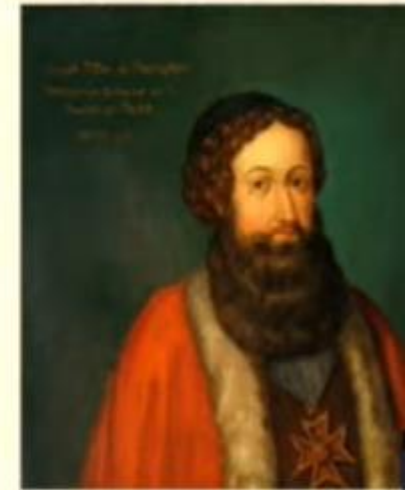
2 . Herberium Techniques

- A **pressed and dried plant sample that is permanently glued or strapped to a sheet of paper** along with a documentation label.

- **Luca Ghini,** Italian Botanist, (1490 – 1556) - Hortus siccus.

- Latin: *hortus* ("garden") + *siccus* ("dry")

- **Joseph Pitton de Tournefort** (1656 – 1708) a French botanist - Herbarium
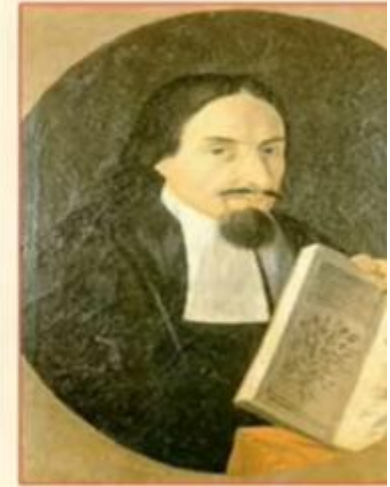
Luca Ghini

Tournefort

1.2.2.1. Types of Herbarium Sheet

There are several varieties of herbarium sheets. The list is as follows:

1) **Holotype:** It is based on the herbarium sheet's original description of the plant.

2) **Lectotype:** In the case of holotype, the second herbarium sheet is missing. It is made from the actual plant.

3) **Neotype:** If the holotype plant is lost, several herbarium sheets are created from another plant of the same species.

4) **Syntype:** When the original plant and holotype plant are both lost, the syntype is a collection of herbarium sheets made from multiple plants of the same species.

5) **Isotype:** It is a second herbarium sheet made from the original plant in the presence of holotype.

6) **Paratype:** It is the supplementary herbarium sheet used in the original description of plant. It is made from a different plant of the same species with some differences.
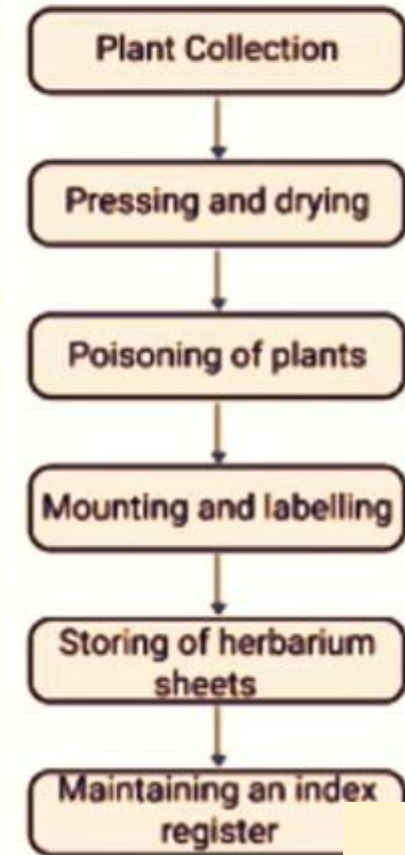
3 . Importance of Herberium

- Resource material for systematic research.

- Reference for comparing doubtful and newly collected fresh specimens.

- New monographs and floras.

- Floristic diversity.

- Environmental assessment,

4 . Steps involves in Herberium Techniques

1) Field visits and collection of specimens,

2) Drying,

3) Mounting on herbarium sheet,

4) Preservation,

5) Labelling

6) Storage

7) Maintenance

Plant Collection

↓

Pressing and drying

↓

Poisoning of plants

↓

Mounting and labelling

↓

Storing of herbarium sheets

↓

Maintaining an index register

A . Field visit and Specimen Collection

- Collect complete specimen - root system, Leaves, flowers and fruits

- Transfer specimen in a vasculum.

- Tag with a field number and

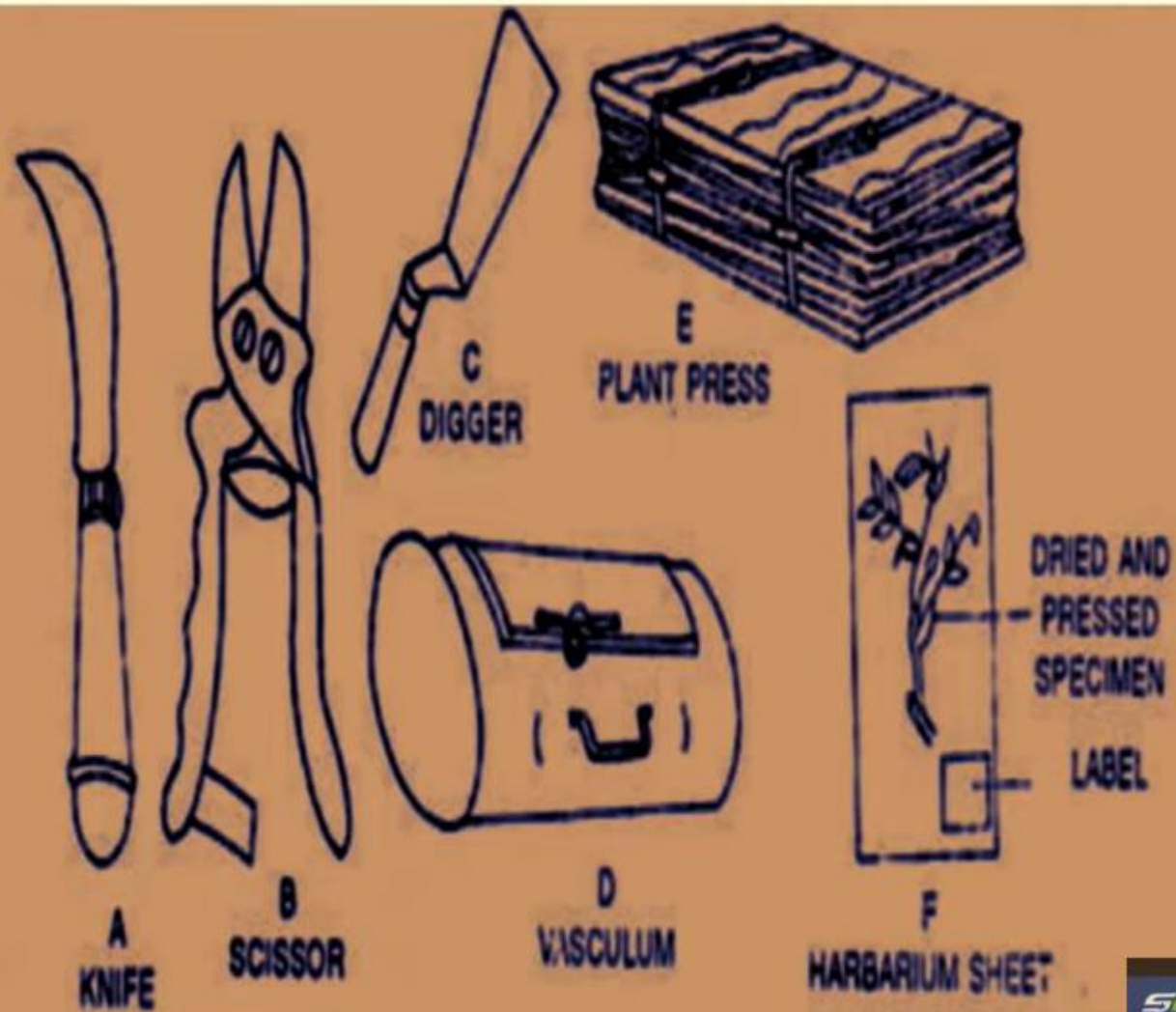- Record basic information in a field notebook.

Tools Required

B . Pressing and Drying

- Spread out between the folds of old newspapers or blotting sheets.

- Avoid overlapping of parts.

- The larger specimen may' **folded in 'N' or' W' shapes**.

- Place blotting sheets in the plant press for drying.

- After 24 to 48 hrs. the press is opened

- Repeat the process for a week using fresh blotters.

C. Mounting

- Mount dried specimens on herbarium sheets (size 41 x 29 cm).

- Mount with help of glue, adhesive or cello-tape.

- The bulky plant parts are dried without pressing.

- Collect succulent in 4% formalin or FAA.

D. Preservation

- Spray fungicides - 2% solution of mercuric chloride.

E . Labelling

- A label is pasted or printed on the lower righthand corner.

BOTANICAL SURVEY OF INDIA

Flora of .... State..
Serial .... Date...
Name...
Family...
Local Name..
Habit...Height...............Fl.............. Fr.............
Locality... Alt.................................
Soil..
Vegetation type...
Associated plants..
Distribution... Abundance...........................
Uses..
Significant notes...
....
....
....
Photograph... Collector..............................

Identified by..

F . Storage

- Place dried labelled specimens in **specimen covers**, which are kept together in genus covers.

- **Genus covers** are incorporated into the herbarium cupboards.

- Arrange according to accepted system of classification(In India Bentham and Hooker's system)

G . Maintenance

- **Fumigation**: methyl bromide, carbon disulphide or carbon tetrachloride.

- **Heating:** Electric heater for insect killing.

- **Chemical treatment:** Dipping /Spraying with.
(Mercuric Chloride (Hg Cl2) and ethyl alcohol mixture)

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.

Virtual Herbaria

https://ivh.bsi.gov.in/index.html

1.2.2.3. Functions of Herbarium

1) Herbarium is a vital conservatory of plant material of flora collected from different regions. Thus, they provide at one place, basic material for study of flora and vegetation of different places or regions.

2) Herbarium specimens bear vital data on their labels, including information on habitat, local names, flower colour, or other plant features, native uses of the plant, abundance or frequency of species, associated plants, etc.

   This data provides valuable material for morphological description and range of variation of a similar plant collected from a different region, range of distribution and variation in its uses in different places. Thus, a herbaria provide data for botanical, ethno-botanical and phytogeographical studies.

3) Herbarium serves as an aid in teaching botany in institutions with a herbarium to show the students a plant specimen that may not be available fresh at the time of giving the course. It also helps the students to identify local plants they have collected.

4) Preserved herbarium specimens are used in most types of taxonomic research. It is an essential requirement for biosystematics research for correct identification and nomenclature of plants being studied.

5) Herbarium specimens are used as a source of material for anatomical, palynological and chemo-taxonomical studies.

6) Herbarium provides information on actual places of occurrence, time of flowering and fruiting, related species, and other data for research in embryology, cytology and ecology.

7) Herbarium sheets have records of many native uses of plants, thus herbarium is an essential source of information for ethno-botanical researches.

1.2.2.4. Types of Herbaria

Herbaria are of the following types based on the purpose, region, contents, and plant groups present:

1) **Herbaria of Medicinal Plants:** These include specimens of plants having important medicinal properties. **For example**, ACECR; Central herbarium of medicinal plants, halejerd region, Karaj, Alborz province.

2) **Herbaria of Weeds:** These include weeds of cultivated fields and waste places.

3) **Regional Herbaria:** These include specimens of plants of a particular region. **For example**, Herbaria of the Central Circle, Allahabad.

Table 1.1: Some Important Herbaria of the World
(सारणी 1.1– विश्व के कुछ महत्वपूर्ण हर्बेरिया)

S.No. (क्रम संख्या)	Herbarium (हर्बेरियम)	Place/Country (स्थान / देश)	Year of Founding (स्थापना का वर्ष)	Number of Sheets (Approx.) (शीट्स की संख्या (लगभग))
1)	Royal Botanic Garden, Kew V. L. Komarov (रॉयल बोटैनिकल गार्डन, क्यू वी. एल. कोमारोव)	London, U.K. (लंदन, U.K.)	1853	6,500,000
2)	Botanical Institute (वानस्पतिक संस्थान)	Leningard, (लेनिनगार्ड, U.S.S.R.)	1823	5,000,000
3)	Museum National d'Historic Naturelle Laboratoric de Phanerogamme., (संग्रहालय राष्ट्रीय डी' हिस्टोरिक नेचुरले लेबोरेटोरिक डी फेनेरोगैम.)	Paris, France (पेरिस, फ्रांस)	1635	5,000,000
4)	Conservatorie et (कंजर्वेटरी एट)	Geneva, Switzerland (जिनेवा, स्विट्जरलैंड)	1817	4,000,000
5)	Jardin Botaniques New York Botanic Garden (जार्डिन बोटैनिक्स न्यूयॉर्क बॉटेनिक गार्डन)	New York, U.S.A. (न्यूयॉर्क, U.S.A.)	1891	3,000,000
6)	U.S. National Museum (यू.एस. राष्ट्रीय संग्रहालय)	Washington U.S.A. (वाशिंगटन U.S.A.)	1868	3,000,000
7)	Vienna Botanischer Gaertn. (वियना बोटानिशर गर्टन।)	Vienna, U.S.A. (वियना, U.S.A.)	1748	2,500,000
8)	National History Museum(राष्ट्रीय इतिहास संग्रहालय)	Chicago, Austria (शिकागो, ऑस्ट्रिया)	1893	2,350,000
9)	Royal Botanic Garden(रॉयल बॉटेनिक गार्डन)	Edinburgh, U.K. (एडिनबर्ग, U.K.)	1761	2,500,000
10)	Missouri Botanic Garden (मिसौरी वनस्पति उद्यान)	St Louis, U.S.A.) (सेंट लुइस, U.S.A.)	1859	1,700,000
11)	National Herbarium (राष्ट्रीय हर्बेरियम)	Melbourne, Australia (मेलबोर्न, ऑस्ट्रेलिया)	1857	1,500,000
12)	Zurich Botanischer Gaertn (ज्यूरिख बोटानिशर गर्टन)	Zurich, Germany (ज्यूरिख, जर्मनी)	1834	1,500,000
13)	Gray Herbarium (ग्रे हर्बेरियम)	Cambridge, U.S.A. (कैम्ब्रिज, U.S.A.)	1807	1,485,000
14)	Harvard University, Philadelphia Academy of Sciences, Philadelphia (हावर्ड यूनिवर्सिटी, फिलाडेल्फिया एकेडमी ऑफ साइंसेज, फिलाडेल्फिया)	U.S.A.	1812	1,000,000
15)	Arnold Arboretum (अर्नोल्ड अर्बोरेटम)	Boston, U.S.A. (बोस्टन, U.S.A.)	1872	700,000
16)	Department of Agriculture (कृषि विभाग)	Peradeniya, Ceylon (पेराडेनिया, सीलोन)	1817	85,000

17)	Gardon college (गार्डन कॉलेज)	Rawalpindi, Pakistan (रावलपिंडी, पाकिस्तान)	1893	60,000
18)	Herbarium of the Rangoon University, Rangoon (रंगून विश्वविद्यालय का हर्बेरियम, रंगून)	Burma (बर्मा)	1947	15,000
19)	Central National Herbarium (केंद्रीय राष्ट्रीय हर्बेरियम)	Calcutta (कलकत्ता)	1793	2,500,000
20)	Forest Research Institute Herbarium (वन अनुसंधान संस्थान हर्बेरियम)	Dehradun (देहरादून)	1874	3,00,000
21)	Botanical Survey of India, Southern Circle (भारतीय वानस्पतिक सर्वेक्षण, दक्षिणी सर्कल)	Coimbatore (कोयंबटूर)	1874	2,00,000
22)	Blatter Herbarium St. Xavier's College (ब्लैटर हर्बेरियम सेंट जेवियर्स सर्कल)	Bombay (बॉम्बे)	1906-7	100,000
23)	Botanical Survey of India, Eastern circle (भारतीय वानस्पतिक सर्वेक्षण, पूर्वी सर्कल)	Shillong (शिलांग)	1956	100,000
24)	Botanical Survey of India, Western Circle (भारतीय वानस्पतिक सर्वेक्षण, पश्चिमी सर्कल)	Poona (पूना)	1956	135,000
25)	Botanical Survey of India, Northern Circle (भारतीय वानस्पतिक सर्वेक्षण, उत्तरी सर्किल)	Dehradun (देहरादून)	1956	60,000
26)	Botanical Survey of India, Industrial Section (भारतीय वानस्पतिक सर्वेक्षण, औद्योगिक अनुभाग)	Calcutta (कलकत्ता)	1887	50,000
27)	Botanical Survey of India, Central Circle (भारतीय वानस्पतिक सर्वेक्षण, केंद्रीय सर्कल)	Allahabad (इलाहाबाद)	1955	40,000
28)	National Botanic Garden Herbarium (राष्ट्रीय वनस्पति उद्यान हर्बेरियम)	Lucknow (लखनऊ)	1948	100,000

Table 1.2: Some Important Herbaria of India
(सारणी 1.2– भारत के कुछ महत्वपूर्ण हर्बेरिया)

S.No. (क्रम संख्या)	Name of Herbarium (हर्बेरियम का नाम)	Place (स्थान)	Year of Founding (स्थापना का वर्ष)	Abbreviation (संक्षिप्त रूप)	Total Number of Sheets (Approx.) (शीट्स की कुल संख्या (लगभग))
1)	Central National Herbarium (केंद्रीय राष्ट्रीय हर्बेरियम)	Shibpur, Howrah (शिबपुर, हावड़ा)	1973	CAL	25,00,000
2)	Botanical Survey of India, Southern Circle (भारतीय वानस्पतिक सर्वेक्षण, दक्षिणी सर्कल)	Coimbatore (कोयंबटूर)	1874	MH	2,00,000
3)	Botanical Survey of India, Eastern Circle (भारतीय वानस्पतिक सर्वेक्षण, पूर्वी वृत्त)	Shillong (शिलांग)	1956	ASSAM	1,00,000
4)	Botanical Survey of India, Western Circle (भारतीय वानस्पतिक सर्वेक्षण, पश्चिमी सर्कल)	Poona (पूना)	1956	BSI	1,25,000
5)	Botanical Survey of India, Northern Circle (भारतीय वानस्पतिक सर्वेक्षण, उत्तरी सर्कल)	Dehradun (देहरादून)	1956	BSD	60,000
6)	Botanical Survey of India, Industrial section (भारतीय वानस्पतिक सर्वेक्षण, औद्योगिक अनुभाग)	Kolkata (कोलकाता)	1887	BSIS	50,000
7)	Botanical Survey of India, Central Circle (भारतीय वानस्पतिक सर्वेक्षण, केंद्रीय सर्कल)	Allahabad (इलाहाबाद)	1955	BSA	40,000
8)	National Botanic Garden, Herbarium (राष्ट्रीय वनस्पति उद्यान, हर्बेरियम)	Lucknow (लखनऊ)	1948	NGB	1,00,000
9)	Forest Research Institute Herbarium (वन अनुसंधान संस्थान हर्बेरियम)	Dehradun (देहरादून)	1816	DD	3,00,000

BOTANICAL GARDEN

1.2.3. Botanical Gardens

Botanical garden is an educational institution for scientific workers and general public to enlighten interest in plant life. It should include a herbarium, library, photographic studies, lecture pavilion, and recreational facilities.

Botanical gardens have morphological gardens to show seed dispersal in plants, genetics or breeding gardens to show the laws of heredity, and a taxonomic garden to show plant families. They should also have a fruticetum, arboteum, a section of economic plants, green houses, and nurseries for propagating and cultivating exotic, end genetic and delicate plants.

Botanical gardens are valuable for botanists, as well as for home gardeners, nurserymen, horticulturists, landscape gardeners, foresters, and national and international tourists.

Functions of Botanical Gardens

1) Botanical gardens serve as outdoor laboratories.

2) They initiate studies on tropical and temperate ecosystems and their biota, before they are lost to science and preserve such systems.

3) They are the centres of gene pools or germ plasma banks of wild relatives of economically important plants.

4) They establish nature centres and youth museums to focus on destruction of tropical and temperate ecosystem, and environmental degradation.

5) They maintain less attractive and abandoned ornamental plants.

6) They train city arborists in plantation of trees in urban areas.

7) They collaborate with universities and other institutions to conduct research in environmental biology, etc.

8) They organise educational programmes to create environmental awareness among children, students and train teachers in environmental education.

9) They are the centres of conservation for endangered and rare species.

10) They provide living plant material for research.

11) They serve as pollution indicator centres by growing pollution-susceptible plants.

12) They introduced and distributed most of the economic plants to other parts of the world.

13) They provide a suitable environment for relaxation and relieve the body and mind of the stress and strain.

14) They also arrange flower shows, put on displays seasonal plants, flower and plants of unusual interest.

15) They conserve the flora and fauna in natural habitats.

Kolkata, West Bengal

Auroville Botanical Gardens, Tamil Nadu

Brindavan Garden, Mysore, Karnataka

Chambal Garden, Kota, Rajasthan

Chashme Shahi Garden, Srinagar

Company Garden, Allahabad

Hanging Garden, Mumbai, Maharashtra

Jallianwala Bagh, Amritsar, Punjab

Jawahar Lal Nehru Botanical Garden, Gangtok, Sikkim

1.2.4. Museum

The term museum originates from the Greek word *mouseion*, which was believed to be the **temple of Muses** (the goddess of arts and sciences) in ancient times. Museum is a place where the general public can view artistic and educational materials on display; such resources that are on display for study are referred to as collections, which include scientific specimens, artistic creations, exhibits, and data on technology development.

Types of Museums
1) General museums
2) Applied science museums
3) Natural science museums
4) Museums of art and history

Functions of Museums

1) **Acquisition of Materials:** An acquisition is a new object that a museum adds to its collection. The most useful method for museums to obtain objects is through field collections. The scientific and technical staff do field visits to collect samples and data on specific topics that fall under the purview of the museum.

2) **Recording of Materials:** Skilled staff carefully records each collection. The data, source, mode of acquisition, and any other information available are recorded into the record register as soon as the objects are received.

3) **Preservation of Materials:** The main goal of a museum is to protect chosen things that are donated. Museum curators are aware that no specimen will ever be preserved indefinitely. The goal of museums is to extend the life of artefacts. In a museum, preservation is done in two steps:
   i) Specimens need to be placed in an environment that prevents degradation.
   ii) Specimens should be safeguarded.

4) **Research:** Extraction of as much knowledge as possible from artefacts is a vital application of museums. To publicise the research study on collections, several museums published academic journals, range of papers, and books.

5) **Material Exhibitions:** Some museum employees arrange new acquisitions for displays. Specimens chosen for exhibition are displayed in a variety of ways. The aim of exhibitions determines the appeal and strategies to use.

6) **Education:** Several colleges provide courses in certain subject areas that take advantage of collections of museums. So museums aid in the dissemination of knowledge.

Examples of Museums

1) American Museum of Natural History, New York (U.S.A).
2) Swedish Museum of Natural History, Stockhlom (Sweden).
3) National Museum of Natural History, New Delhi (India).
4) Indian Museum, Kolkata (India).

American Museum of Natural History, New York

Swedish Museum of Natural History, Sweden

National Museum of Natural History, New Delhi

1.2.5.   Zoological Parks

Zoological park (or zoo, zoological garden, animal park) is a facility where animals are retained in enclosures, taken care of, displayed to the public, and can also be bred for conservational purposes. London Zoological Gardens was the first to be termed as zoo, and was opened for scientific studies in 1828 and to the public in 1847.

The first zoo was established in Chennai in 1885, marking the start of the regular zoo movement in India.

National Zoological Garden, Johannesberg Africa

Functions of Zoological Parks

1) Zoological parks have many varieties of animals.

2) Animals in zoological parks are protected, receive lovely weather, breathe clean air, and have plenty of room to run around.

3) Zoological parks have evolved into preserves for endangered wildlife and a repository for information on animal behaviour, breeding patterns, etc.

4) They assure food, medical care and treatment to the retained animals.

5) They protect the animals from poaching and also make them feel safe from their natural enemies.

6) They protect the endangered species and prevent them from becoming extinct.

7) They are excellent resources for educating people about the country's rich fauna.

8) They help in making the public aware of the environmental problems.

9) They also serve as an important income source for many local communities all around the world.

10) They highly encourage the global cooperation.

London Zoo, UK

Examples of Zoological Parks

1) National Zoological Garden of Africa, South Africa
2) London Zoo, UK
3) National Zoological Park, New Delhi
4) Alipore Zoological Garden, Kolkata.

National Zoological Park, New Delhi

THANK YOU