



# Conserve O Gram

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## Preparing And Storing Herbarium Specimens

### *Introduction*

A herbarium consists of preserved plant specimens, each with a label bearing documentary information. Herbaria are repositories for vascular plants, bryophytes, lichens, algae, and fungi. Specimens are used as references for comparison and identification with unknown samples, documenting species distribution, identifying times of fruiting and flowering, and documenting variation in species among others.

See related NPS *Conserve-O-Grams* (COGs) 2/16, 2/17, 2/19, 3/6, 3/7, 3/8, and the NPS *Museum Handbook*, Part I, Chapter 3, Biological Infestations; Appendix Q: Curatorial Care of Natural History Collections; Appendix T. Curatorial Care of Biological Collections; and Part II, Museum Records, Appendix H: Natural History.

The method of preparation and storage depends on the type of plant being sampled. Most specimens are mounted on normal herbarium sheets. They usually include both reproductive and vegetative organs, features critical to identification. Plant parts that can't be easily pressed, such as large flowers, bulbs, fruits, cones, bark, or large-diameter woody stems, can be dried in boxes or paper bags. Lichens and bryophytes, which include mosses, liverworts, and hornworts, are usually dried in packets, paper bags, or boxes, because pressing is either inconvenient or irreversibly distorts

material for adequate identification. Lichens are usually collected attached to their substrate (e.g., rocks, stems, soil crusts) and are not amenable to pressing.

Herbarium specimens are documented in accordance with procedures outlined in *Museum Handbook*, Part II, Appendix H, Natural History.

### *Mounting Herbarium Specimens*

Dried, pressed vascular plants should:

- be mounted on an archival-quality paper sheet measuring 11 x 17 inches
- be accompanied by a label
- have a acid free fragment envelope
- have sufficient space to allow placement of a label (Fig. 1)

Mount specimens using commercially available acid free adhesives. Several types of adhesives have been used, but polyvinyl acetate (PVA) adhesives are preferred, because they:

- are water soluble and can be thinned by adding water
- form a strong bond between plant materials and paper when dried



Figure 1. Herbarium sheet with label.

Commercially-available, liquid PVA adhesive mixtures include Elmer's Glue and Missouri Botanical Garden type adhesive. Although methyl cellulose adhesives are used in libraries and other museum collections, they have not proven durable or sufficiently strong for herbarium specimens.

Strips of adhesive linen tape provide additional support for woody stems or relatively large, bulky materials such as fruits. Objects that cannot be satisfactorily mounted on sheets, including flowers, fruits, cones, and bark, are best stored in acid-free boxes (Fig. 2). Bryophytes and lichens are best stored in acid free packets.



Figure 2. Archival box with plant specimens that cannot be mounted on herbarium sheets.

## Specimen Storage

Mounted herbarium specimens are stored in standard herbarium cabinets in accordance with *Museum Handbook*, Part I, Appendix Q, Curatorial Care of Natural History Collections and Appendix T, Curatorial Care of Biological Collections.

Ensure that plants are thoroughly dry and free of pests before placing in cabinets. Do not place plants in ovens to dry, or dry them at temperatures greater than 50° C (120° F). This will cause damage to the internal structure of leaves and flowers. Never use a microwave oven to dry or treat herbarium specimens for pests.

Place specimens in a freezer for 7-10 days before filing to ensure that any potential pests (e.g., insects, insect eggs, fungal spores) are killed (COG 3/6).

Vascular plant specimens of the same species can be placed collectively within a single, labeled "genus" folder, for which different sizes are available, depending on the number of sheets to be enclosed. Archival boxes holding fruits and cones, and packets of mosses and lichens are stored in trays that fit a standard herbarium shelf.

## Herbarium Organization

Organization of the herbarium (Fig. 3) varies depending on the size and scope of the collection, including:

- arranging labeled genus folders or packets in alphabetical order by genus and species, which in turn are arranged by plant families in alphabetical order

- organizing families either alphabetically or in a phylogenetic sequence

The circumscriptions (and their names) of some families and genera have changed significantly in recent decades. If a phylogenetic sequence is used, refer to the most current literature, or use an arrangement that best coincides with the regional manual being used for identification. Refer to *Museum Handbook*, Part II, Appendix H, Natural History.



Figure 3. Herbarium cabinet with folders holding herbarium sheets organized alphabetically by family.

### *Handling Specimens*

To minimize damage when handling or moving specimens from storage for study:

- Keep specimens mounted on sheets flat so that they do not bend during examination.
- Place specimen folders on stiff card board or in a box when moving them from cabinet to workspaces
- Limit stacked folders so that the weight of

the top specimens does not damage the lower specimens.

- Examine most prepared specimens on the flat surface of a work table or bench, and preferably under a microscope and task light attached to an adjustable arm (boom stand).
- Remove specimen sheets from each folder one at a time. Don't flip through them.
- Keep mounted specimens in folders specimen-side up, never turning them over so the specimens are face down or turning the specimen sheets in a folder like the pages of a book.
- Remove each specimen from the folder "specimen-side up," arrange them in a pile or individually if space permits.
- Replacing specimen sheets in the same order as they were removed from the folder or from the shelf.

Before refiling, review specimens for potential maintenance, (i.e., loose specimens, pests, broken fragments, and incorrect labels). Make necessary repairs, and decontaminate specimens that may have been exposed to pests, especially if the specimen has been out on loan.

### *Pest Management*

Common herbarium pests include:

- silverfish
- book lice (psocids)
- cigarette or tobacco beetles (*Lasioderma*), depending on geographic location

- dermestids
- drugstore beetles (*Stegobium paniceum*.)

Reduce pest infestations with regular cleaning of floors, cabinets and work spaces in accordance with the NPS *Museum Handbook*, Part I, Museum Collections, Chapter 5, Biological Infestations; Chapter 13, Museum Housekeeping. Inspect herbarium cabinets regularly to ensure that gaskets between doors and frame provide an effective seal (COG 4/3).

**Note:** The use of moth balls (naphthalene or paradichlorobenzene) in herbaria to repel insects has been discontinued because of their toxicity (COGs 2/16, 2/17). For more information on NPS Integrated Pest Management, visit <http://www1.nrintra.nps.gov/BRMD/ipm>

If pests are discovered on specimens or within folders, immediately place on a rigid handling board, wrap them in plastic and place in a freezer at -20° C for at least 7-10 days (COG 3/6).

### References

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Canadian Museum of Nature.

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[http://nature.ca/prodserv/herbrules\\_e.cfm](http://nature.ca/prodserv/herbrules_e.cfm)

### *Herbarium and Archival Supplies*

Herbarium Supply Company

2317 Birdie Drive

Bozeman, MT 59715-8420

[www.herbariumsupply.com](http://www.herbariumsupply.com)

Gaylord Brothers

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