

Care of Herbaria (including paper)



S. Brown, J. Atkinson, M. de No Honrubia 2015

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1. Introduction to Herbarium Collections

Herbarium collections consist of preserved specimens of vascular plants, bryophytes, lichens, algae and fungi; each with a label bearing contextual information. These collections are used for scientific study, reference purposes, comparison and identification as well as for display, teaching and outreach.

2. Collection Issues

2.1 New Acquisitions – Quarantine

Before placing the specimens in their permanent location it is important to make sure that they are not infested with pests. If this is not possible specimens should be kept them inside polyethylene bags until they can be checked (National Park Service, 2009).

If you suspect that specimens are infested keep them separate from your collection to avoid the spread of infestation (Bridson, 1992, p.10). The treatment of pest infested specimens is discussed below.

2.2 Pests

Many of the common museum pests pose a risk to herbaria; for further information see Pinniger (2015).

2.3 Labelling

Documentation is as important as the specimen itself. Without labelling the research value of the specimen is lost. All Herbaria labels should contain the following information:

- Scientific name
- Collector's name
- Collecting location
- Collection date
- Field catalogue number
- Accession number
- Treatment information



3.1 Storage

Effective storage designs improve access, minimize unnecessary handling, and support specimens properly; it protects specimens from pests, light, fluctuating temperature and relative humidity, and environmental pollutants.

The storage system of choice depends on the type of plant material. Plant parts that cannot be pressed easily, such as large flowers, bulbs, fruit, cones, bark, may be dried and stored in acid free boxes. Many plants are mounted on herbarium sheets. Specimens should be mounted on acid free (pH neutral) sheets of 100 alpha cellulose or cotton rag paper (see supplier list below). These sheets can then be stored in acid free folders. Take care to label all of the folders with the specimen information to avoid any unnecessary disturbance of the specimen itself. Store folders placed flat on a shelf or in acid free boxes. Boxes create a neutral, dust free environment for the collection but extra care must be taken when lifting specimens out of boxes as this has the potential to cause tearing (Bridson, 1992, p.11). Ideally boxes should open from the front so specimens can be slid out.

Common sense should be used so as not to over pack boxes as this may crush and cause physical damage to the specimens lower in the box. It is not advisable to store the specimens too high. It would be more difficult to access them and there would be a risk of dropping them (Bridson, 1992, p.9). Moving or transporting specimens should be undertaken horizontally with both hands, keeping the specimens upwards, even if they are in envelopes (National Park Service, 2009).

3.2 Display

Specimens should be displayed mounted in glass cases to protect them from physical damage, dust and atmospheric pollution. Movement and vibrations can damage the specimens so the mounts must be secured horizontally or ideally slightly inclined on solid, flat supports. The sheets must not be inclined more than 45 degrees. Mounts can be secured with polyester strips in the corners. For further guidance please consult a conservator.

3.3 Environment

'Bad' environments can be harmful to both the specimen and to the mounts and accompanying documentation. The relative humidity (RH) of an environment is particularly important. RH should fluctuate no more than 10% during any 24 hour period. It is advisable to install environmental monitoring equipment in both storage and display areas. It is not within the remit of this document to detail RH controls within stores but simple controls using domestic humidifiers and dehumidifiers can greatly improve environments where it is not feasible to run air conditioning units for extensive periods of time.

Dust can also be harmful to the collection as it introduces acidic particles which can facilitate the breakdown of both the specimens and the paper. Maintaining a dust free environment with good housekeeping mitigates the decay of your collection.

Table 2. Ideal RH and Temperature Ranges	
RH	40 and 60% RH (Bridson, 1992, p.10).
Temp	The recommended temperature for herbaria specimens and paper is between 20° and 23° C.

4. Conservation

4.1 Pest Management

No museum is completely impenetrable to pests. The key to pest management is to prevent their presence as much as possible:

- Maintain a clean environment: dust and dirt encourage pests to your museum.
- Quarantine new acquisitions.
- Create barriers between collections and the environment through storage boxes and display cases.
- Implement an Integrated Pest Management (IPM) plan; see

www.museumpests.net for details or guidance on IPM.

4.4 Pest Infestation

Large scale infestations will require the advice of a conservator and possibly an outside contractor. Individual specimens can be treated as follows:

- Seal affected specimens in polyethylene bags.
- Freeze for 7-10 days at -18° (Bridson, 1992, p.15).
- Remove from the freezer and allow 24 hours for the specimen to return to room temperature before unsealing the specimen from the polyethylene wrap.

CAUTION: Older literature on the treatment of pest infested specimens discuss the use of insecticides and microwaving specimens, both of which can pose a significant risk to your collection and to human health (RBGS, 1995) and should be avoided.

4.2 Handling

Preferably, the collection should be handled as little as possible. When handling specimens always do so by holding the mounting paper, taking care not to touch the specimen itself as these can be extremely fragile. Ensure that the paper is handled with clean hands; gloves (such as nitrile gloves) can be worn but these may reduce dexterity.

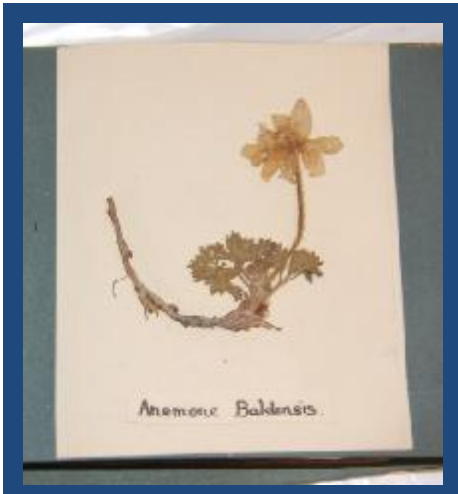
4.3 Light

Light damage is irreversible, and can harm both specimens and their accompanying documentation. Light can cause the breakdown and fading of collections; the collection should be kept in the dark whenever possible.

When exposure to light is inevitable, for example while on display, the amount of light exposure should be limited. This can be achieved by keeping specimens away from daylight, using low UV output lamps in display cases and by rotating displayed collections regularly.

4.5 Mounting

If a new mounting is required please consult a conservator. Basic repairs to mounting can be undertaken in-house using archival standard material. Recommended archival material includes the use of:



4. Re-store without putting strain on the new join (NatSCA, 2013).

This method works like butterfly strips on human skin injuries, holding the edges together and preventing more damage. If there is a major tear or loss contact your local conservator, as specialist skills and equipment will be needed.

4.6 Mould

In an extensive mould outbreak, contact a conservator. Contaminated specimens should be sealed in polyethylene to prevent the spread of spores.

6. Additional Information

This information sheet was compiled by [Cardiff University Conservation](#) students as part of the Federation of Museums and Art Galleries in Wales project 'Linking Natural Science Collections in Wales', funded by [Esmee Fairbairn Collections Fund](#) and supported by the [Welsh Government's Museums Libraries Archives Division](#) and [Amgueddfa Cymru - National Museum Wales](#). You can find information about the project on the website of the [Federation of Museums and Art Galleries in Wales](#).

This leaflet provides a brief introduction to the subject. If you require detailed advice on the care of museum collections please consult your regional conservator or the Institute of Conservation's [Conservation Register](#).



7. Suppliers

www.conservation-by-design.co.uk
www.preservationequipment.com
www.conservation-resources.co.uk

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Smithsonian Science, 2013. <http://smithsonianscience.org/2009/09/nabian-specimens-come-to-the-herbarium-of-the-national-museum-of-natural-history/>

Pest Identification and Guidance: www.collectionlink.org

Pinniger, D. 2015 *Integrated Pest Management in Cultural Heritage*. Archetype Publications London, 142 pages.

- 100% alpha cellulose or cotton rag paper which is acid free and pH neutral
- Adhesive linen tape
- Grade A methyl cellulose or acrylic to adhere labels to herbarium sheets

Note: The use of polyvinyl acetate emulsion adhesives is discouraged as their acidity increases with age (Down et al. 1996).

4.7 Cleaning

Cleaning herbaria and paper should always be done dry, as any liquid may cause irreparable damage to the specimen (Finney, 2006). Specimens should also only be worked on individually, which makes it easier to ensure that the vital information on attached boards, labels and notes will not be lost (Bedford 1999).

Cleaning and repairing small tears can be done in-house, but any major work should be done by a conservator. Below are a few short guides to assist you with a few basic treatments.

Removing Dust & Dirt:

1. Use a soft, dry, clean brush or a smoke sponge.
2. Rub the sponge or gently brush the areas you think are dirty.
3. Remove any excess by brushing it away from the specimen (CCI 2002).

Repairing Tears or Broken Specimen:

1. Cut very thin strips of pre-gummed archival standard tape or Japanese tissue paper.
2. Align the two sections that you wish to join.
3. Lay the strips perpendicular to join on the reverse of the object, use Wheatstarch paste with the Japanese tissue paper.