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Mounting Herbarium Specimens

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List of variations with their advantages and disadvantages

The production of faultless herbarium records, i.e. those that can be used scientifically without restrictions and are durable from a conservation point of view, is one of the cornerstones of the activities in a herbarium.[1]

Only the possibility of conserving plants and storing them for later investigations created the prerequisite for comprehensive research into plant diversity on our planet. [2]

With the herbarium record, the morphological and anatomical characteristics of a conserved individual can be easily examined and observed even after centuries.[2]

Each herbarized and labelled plant is evidence that a particular species has occurred in a particular place at a particular time. A herbarium is therefore a database of plant diversity in space and time.[2]

This large database of herbarium specimens is of great scientific value for a wide variety of questions on plant diversity.[2]

Advantages of well mounted specimens

Good specimens have been in use for many hundreds of years. The oldest specimens in use in the Kärntner Landesherbar (however with special precautions) date back to 1752![1]

Problems with poorly mounted specimens

The problem of bad specimens is not new. Professional herbariums are often confronted with specimens that are prepared by plant collectors to the best of their knowledge and belief. However, they rarely meet the requirements placed on them (i.e. the protection of plants from damage and the facilitation of studying the plants from all sides). Since rarities are one of the preferred collection objects, unusable specimens are particularly painful. If data must be researched and/or specimens restored, this enormously labor-intensive process is not feasible for many herbaria due to the lack of personnel.[1]

Definition of "Mounting"

The pressed and dried plant is attached to a solid sheet of paper.

Mounting is the process of affixing a dried pressed plant and its label to a sheet of heavy paper. This provides physical support that allows the specimen to be handled and stored with a minimum of damage.[3]

Methods and Variants of mounting specimens

- **Strip method**: The dry plants are glued to a sheet of paper with narrow, rubberized paper strips.
- **Glue method**: The dry plants are glued directly to the paper sheet with glue.
- **ETH method**: The dry plants are glued onto a narrow strip of paper, which is then glued into a paper envelope.
- **Pin method**: The dry plants are attached to the paper sheet with narrow strips of paper and pins.
- **Sewing**: The dry plants are sewn onto a firm sheet of paper.

Once the optimum arrangement of the specimen has been determined, it is attached to the sheet using a combination of glue and strips of gummed linen cloth tape. **Gummed linen mounting strips** are then applied to reinforce portions of the plant that might be torn loose as the specimen is used.[4]

There are two main ways of mounting specimens: *strapping* (the 'straps' may be either thread, linen tape, archival self-adhesive tape (various widths available) or plastic glue) and *overall gluing*. There are arguments for and against both methods.[5]

Strip Method

- When sticking the strips on, it is important to ensure that they do not cover up any features that are important for their intended use. So, you stick in the middle of the internode, but briefly under terminal flowers. Large leaves must be fixed at the tip. The paper strips should never be glued over flowers.[6]
- Strapping of the specimen to the sheet is strongly recommended. Strips of adhesive linen tape provide additional support for woody stems or relatively large, bulky materials such as fruits.[5]
- Small straps of rubberized linen tape are placed across the specimen at intervals and stuck to the sheet at either end. Thin straps should be used on finer parts of the specimen and thicker straps where extra strength is needed, e.g. thick stems.[5]
- During assembly, the plants are fixed to the sheet with rubberized paper strips. Larger plant parts such as branches can also be sewn onto the herbarium sheet with thread. These methods have the advantage that the plants can be moved and thus better observed; in addition, they can easily be removed from the sheet again for later analyses.[7]

Not suitable are:

- Sellotape / Scotch tape turns yellow, attacks the paper and the plant and quickly falls off again.[6]

Glue Method

- For this we use wood glue "Geistlich Konstruvit" after many years of experience in the Botanical Museum Berlin-Dahlem. This glue is milky white in liquid state but becomes colorless transparent after drying. It can also be used for thin plant material and has very good adhesive properties. We have not been able to observe plant damage caused by the allegedly very rigid connection of the plants with the herbarium sheet.[8]
- Glue is used sparingly to attach the larger portions of the plant, such as stems, large leaves, and fruits.[4]

- Adhesive is applied to the reverse side of the specimen so that virtually all the specimen is firmly attached to the sheet.[5]
- In some cases, delicate leaves and petals will absorb the water in the adhesive and curl up. It is best if these are avoided and only the stems glued, especially if decontamination by deep freezing is to be anticipated. The specimens can be protected by 'windows' or by placing inside a transparent sleeve.[5]
- Material prepared by overall gluing must be left under pressure while the glue dries. This is done by covering each mounted sheet first with waxed paper and then with a sheet of drying paper. The procedure is repeated until a pile of protected specimens is built up; it is then weighted down with sandbags and left overnight. The specimens can then be 'finished'. Rigid or bulky stems which might tend to lift free should be stitched firmly to the sheet. Adhesive should be applied to parts which are still free by sliding under leaves etc. with a flat knife blade. If transparent windows are necessary, they should be attached at this stage. Re-glued specimens should again be left under pressure while the glue dries.[5]
- Should an adhesive be needed to attach a specimen, use Grade A methyl cellulose with a molecular weight of 4000.[9]

ETH Method

The dried and pressed plant is glued on a 7x25 cm paper strip. This strip is glued inside an envelope to the right of the fold on its left edge so that it can be turned over to view the underside of the plant.

Pin Method

The dried and pressed plant is stapled onto a firm sheet of paper with narrow strips of paper and small pins.

	Strip Method	Glue Method	ETH Method	Pin Method
Amount of work	The labor involved in any of the strapping methods can be greater than in gluing. (is very dependent on the shape of the material. Can also be relatively fast)	If gluing is used, bulky specimens may require some reinforcement by strapping, usually with thread.	Relatively low	More elaborate than strip method
Risk of injury	minimal	minimal	minimal	present
Material consumption	Little paper	Little paper	More paper	Minimum an Papier, aber zusätzlich Stecknadeln
Remounting	Easy to reverse (should remounting be necessary).	Can only be removed if reversible (water soluble) glue was used.	Not so easy, plant must be removed with water	Relatively easy

Detaching and inspecting parts	Will allow easy removal of portions for detailed study.	As full a range of organs as possible must be placed in a paper capsule before mounting.	may have to be detached from the paper strip	easy
Damage caused by extreme temperatures	Decontamination by deep freezing (see Egenberg & Moe 1991) or heating should not cause damage by differential contraction or expansion between the differentially hygroscopic specimens, paper and glue.	Damage by differential contraction and expansion is possible, especially to delicate flowers. These, however, are normally left free and 'windowed' (see below). Handmade and mouldmade paper will cause less damage.	Damage should not occur. Tensions are balanced	Damage should not occur. Tensions are balanced
Damage due to movements	Specimens are susceptible to damage as this form of attachment still allows a certain degree of movement when the sheets are handled, or sent through the post.	Specimens are firmly attached to the sheet, thus reducing damage.	Damage possible because mounted plants are moved	Damage possible because mounted plants are moved
Loss of fragments	Fragments can easily be removed illicitly.	Helps to guard against the illicit removal of fragments.	Fragments can easily get lost	Fragments can easily get lost

Summary:

Strip Method	++++++	++++++	++++++	++++++	++++++	+-+-+-+-+	----------	----------
Glue Method	++++++	++++++	++++++	++++++	+-+-+-+-+	+-+-+-+-+	----------	----------
ETH Method	++++++	++++++	++++++	+-+-+-+-+	----------	----------	----------	----------
Pin Method	++++++	++++++	+-+-+-+-+	+-+-+-+-+	----------	----------	----------	----------

Bottom line

The decision as to whether to mount by strapping or by overall gluing can be difficult. Strapping is perhaps appropriate for small herbaria with restricted access to visitors, while overall gluing can give better long-term protection to specimens in large, busy herbaria with free access to visitors and frequent requests for loans. [7]

The strip method is a tried and tested and most durable method. With finely branched, soft, long plants, the effort of mounting can be greater than with compact, stiff, short plants. It is the best method for documents that are to be included in the proper herbarium and are to serve research for decades to centuries.

The glue method is particularly suitable for large, flat plants. In the case of finely branched plants, there is a danger that glue will swell out next to the plant, stick to other surfaces and there will be too little adhering surface to effectively fix the plant. For herbaria, which are mainly used for visual instruction, the more robust type of fixation is well suited.

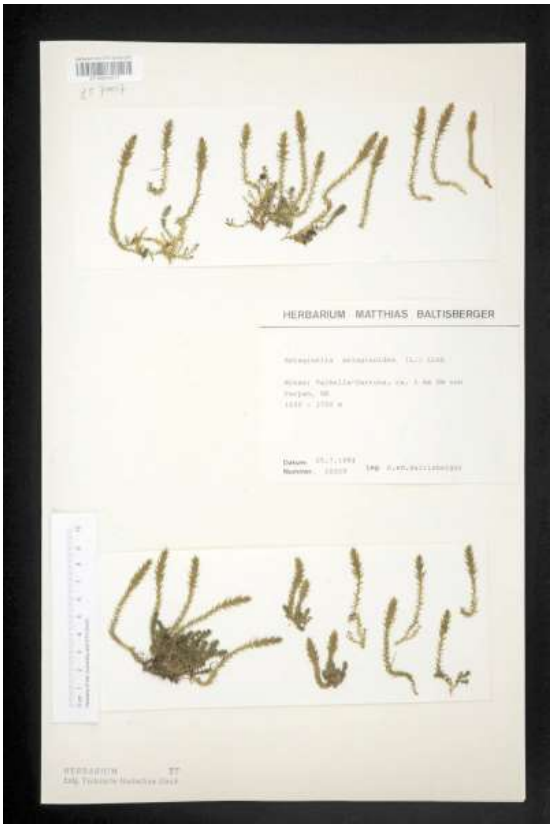
The ETH method is a time-saving method for less ramified plants. The cover is well protected against mechanical damage by the cover. With this type of herbarium cover, however, a lot of dead material, i.e. paper, is hoarded, which takes up a lot of space and adds weight. It holds the danger that the document sticks.

With the pin method, the plant to be examined can be easily detached, but the (re-)assembly is much more complex than the other methods and the danger of plants buckling is great. There is also a risk of injury and the resulting risk of infection from the (rusty) needles. In many cases, the sum of the needles is also a significant factor.

Pictures

Strip method

Glue method



ETH-method

Pin method

References

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