

Plant Materials

Found in such items as baskets, hats, containers, and mats

Identification and General Information

Plant materials include a wide and varied group of plant parts from many species. General categories of plant materials include grasses, rushes, barks, woods, gourds, stems, roots, seeds, and leaves. These materials can be used to construct baskets, netting, cordage, and even fabrics. Common production methods include felting, knitting, knotting, coiling, plaiting, and weaving, to name a few. Identification of plant materials is often done microscopically. Some individuals may have developed a more intimate knowledge of surrounding terrains, plants, and techniques, which allows them to identify plant species through visual examination. These versatile materials, as well as their processing and construction techniques, vary greatly from region to region.

Basic Care and Storage

Pay extra care and attention to items made from plant materials because of their inherent fragility. The decomposition of items made from plant materials is often initiated by the fragility of the materials themselves, the construction techniques, normal use, inadequate storage, and mishandling. They are particularly susceptible to the three leading types of deterioration.

Physical Deterioration: Swelling and shrinkage due to an excessively humid or dry environment, and fragility due to excessive light exposure; also includes tears, breaks, misshapen structures, abrasion, and soiling.

Chemical Deterioration: Reaction between the item and other materials causing a chemical *change* that leads to such problems as embrittlement.

Biological Deterioration: Mold, bacteria, fungi, soiling, or infestation of insects or rodents.

Deterioration, whether it is physical, chemical, mechanical, or biological, will likely result in very fragile items that are prone to embrittlement, distortion, and areas of loss. Items constructed of plant materials, including three-dimensional items, such as baskets and hats, and two-dimensional or flat items, such as mats, should not be flexed, scraped, or abraded.

Plant materials are susceptible to damage from both humid and dry environments. A basket constructed of woven reeds, leaves, grasses, or bundles of pine needles that becomes saturated with moisture from high humidity may become too heavy to support itself. Swelling due to humidity can cause stress on many traditional construction techniques. Items made of birch bark can swell or warp. This swelling leads to breaks within woven or tied fiber bundles, allowing the bundles to splay out of position. Warping or fractures can also occur on a microscopic level within the plant materials. The risk is also greater for older, more fragile items stored within humid environments.

Color changes and stains are another concern in highly humid environments. Tide lines can occur. These form when the combination of soils and acidic by-products within fibers migrates through the plant materials, depositing in a dark wavy line, or tide line, on the surface. High humidity can cause water-based dyes or surface paints to run or bleed into surrounding areas.

While not as common, low humidity and high temperatures can also be detrimental to plant materials. Loss of moisture can further embrittle them, again resulting in distortion, delamination, and fractures.

Plant materials are especially vulnerable to light damage. Light affects components inside the fibers and accelerates embrittlement, weakening of fibers, and fading. It is important to monitor light exposure in both storage and display areas. As with textiles, a good rule of thumb is to exhibit plant material items for no more than four months in even the most controlled lighting. Displays of plant materials should never use direct or bright light.

Special Pest Concerns

Fungi, which include mold and mildew, will grow on plant materials in excessively humid environments and cause discoloration, embrittlement, and structural damage. Baskets with food deposits are particularly susceptible to fungi, insects, and rodents. If your plant material items suffer from water or humidity damage, or if mold is visible on the surface of items, isolate them and contact a conservator for advice.

Insect infestations are a special concern for plant materials. The items themselves, as well as the remains of foodstuffs and previous contents stored within them, can attract pests. Insects will feed on plant materials or use them as areas in which to lay egg cases. Rodents will use plant materials as areas for nesting. Routine inspection, regular cleaning, and an active program of integrated pest management are the best means of prevention. If any infestation is noted, isolate the item and contact a conservator immediately. Avoid the use of over-the-counter pesticides as they can stain the item and may be toxic to the user.

Routine Handling

Wash your hands prior to handling and wear gloves when handling items made of plant materials. When transporting items made of plant materials, use a board or box for support to limit the stresses of handling. Three-dimensional items, such as baskets, can be especially fragile

and will need extra support inside and out to prevent breakage. When moving baskets that are conical in shape, support the outer walls with supportive coils or rings made of extruded polyethylene tubing or backer rod, or of cloth tubing. Supports can be coiled around the exterior or interior of a basket, conforming to its shape, supporting either a fragile and heavy top edge or delicate footing. For information on how to manufacture these supports, see the sections on exterior and interior supports, below.

Display Issues

Assess the structural condition of your item before displaying it. Ask yourself if it will withstand the stress of being displayed without an exterior or interior support. For example, is a basket strong enough to be used for display without collapsing? If not, you may want to choose another item.

The form of the piece will determine the way it is displayed. For three-dimensional items, a flat board or platform, preferably within a display case, works well. A hanging piece that is both flat and flexible can be displayed by draping it over a fabric-covered rod for short periods, such as three to four months. A fabric-covered slanted mount board is best for fragile flat items that cannot be draped over a rod or cannot sustain their own weight, like a bag with a handle. A cost-effective option is to fabricate storage mounts that can double as display mounts.

In general,

- support items, preventing undue stress to fragile fibers;
- protect items from excessive humidity or dryness; and
- protect items from excessive light exposure.

Mounts and Supports

Flat Storage

Secure flat plant material items on support boards with twill tape ties, or line a board with a piece of washed cotton muslin, securing this in place with small tabs of 3M #415 double-sided tape.

The texture of the fabric will prevent slippage of the item when opening and closing drawers or moving items from one location to another.

If you are going to store items in drawers or boxes, line the surface on which they will sit with a sling of muslin, nonwoven polyester, or Tyvek fabric larger than the item. By gently grasping the fabric excess on the side, you can lift an item out of a box or drawer with minimal handling. This sling method will allow you to safely remove two- and three-dimensional items from deep drawers or boxes. Do not use a sling for exceedingly fragile items. Instead, choose a flat board, and create two handles with twill tape secured through slots in the board. You should be able to lift the board by the twill tape handles without touching the item. As always, protect an item stored on an open shelf from dust and dirt by covering it with unbuffered tissue or cotton muslin.

Exterior Flexible Supports

Rings and coils are often wrapped around the exterior of baskets to support the walls from the outside. The rings can be constructed of polyethylene tubing available from conservation catalogs, which comes in 3/4-inch or 1 1/4-inch diameter rolls. Once cut to the appropriate size, these tubes can be hot-glued together, creating stable doughnut supports.

If you do not have access to polyethylene tubing, you can create support rings out of rolled lengths of thermal-bonded polyester batting wrapped in washed cotton knit fabric or Tyvek fabric. Once the fabric length is positioned, pin and then secure it with hand stitching.

Take care not to make your stitches so large that they may snag on the item.

Interior Flexible Supports

When a basket is collapsing, internal polyethylene rings may be too stiff and unwieldy to insert. In this instance, it may help to insert softer, more supple tubing made of thermal-bonded polyester batting covered in washed cotton knit fabric. Another option is to fill the space with soft crumpled, unbuffered, acid-free tissue.

When storing a flat woven item in a box, such as a large mat that requires folding, pad out the folds with rolls of crumpled acid-free tissue to prevent knife-edge creases from developing. Protect against abrasion between layers by lining with flat sheets of acid-free tissue. If you are storing items on open shelves, cover them with a piece of acid-free tissue or washed de-sized muslin fabric to prevent dust and dirt from settling on the items.

Hats may need a support to rest upon. You can often build structural shapes with corrugated acid-free board, and then pad them with thermal-bonded polyester felt or batting, and cover them with muslin or cotton knit fabric. These forms should easily fit the item and not cause undue stress to it. Make a base for these forms with a board so that they are stable and will not tilt over.

Cleaning and Minor Repairs

Storing items in protective boxes or a cabinet and displaying them in cases are a good defense against dust and dirt accumulation. The less dust accumulation you have, the less handling and abrasion your items will receive during cleaning.

Since plant materials are so susceptible to damage from water, only dry surface cleaning is recommended. Vacuuming with the aid of a soft brush can help remove loose dust and dirt

with minimal risk to plant materials. However, thoroughly examine your item for broken and unstable areas prior to any surface cleaning. Brushing the surface gently with a soft bristled brush will help loosen dirt, which can then be picked up with a vacuum micro-attachment. Take care to have the vacuum on a low suction setting. Remember to vacuum the surface in a methodical row-by-row manner. This will facilitate the overall cleaning of the item so that no one area is brighter than another.

Do not remove unknown substances found in storage containers without thoroughly examining them. Foodstuffs, herbs, or other materials found on items may provide significant clues about an item's previous use. If the surface of an item will not be abraded, distorted, or affected by soil and loose particulates found within it, you may want to leave the item as is for later testing and documentation. A curator or other appropriate person may be able to help you decide whether to maintain or discard such information. However, if you must clean a basket to prevent further damage, you may want to keep a sample of the material and take photographs and notes to document the area.

Items made from plant materials often have areas of loss due to use, fragility of materials, or handling and storage procedures. No one method of repair answers the needs of all plant materials. Adhesives, patches, and solvents can cause irreversible changes to the item and may be inappropriate for museum objects. For this reason, it usually is recommended that you choose repair methods that will not alter the item permanently.

When making the decision to mend an item, ask yourself the following questions:

- Will the mend help the item hold together structurally?
- Will the mend fill in an area of loss to create a whole looking item?
- Will the mend be stronger than the surrounding area and cause more breaks or

damage in the future?

- Will the mend be visible to the viewer?

Remember that the overall goal of mending is to prevent further deterioration and to stabilize the item. Small areas of loss that do not affect the structural integrity of the item may be better left alone. Certain types of mending, for example, the joining or binding of plant materials, can be a reversible treatment. However, such detailed mending must be executed with extreme care. In general, mends are designed to help hold an item together. Unfortunately, mending practices can split and tear plant fibers. Filling in areas of loss with new or secondary materials can be a complex and difficult procedure. In many cases, it is recommended that a conservator be consulted.

A simple mending technique, however, can stabilize rims and footings within woven, plaited, or bundled plant materials and prevent further deterioration. A mend should not be stronger than the surrounding area. Too much strength often causes fragile plant materials to form new breaks at the joins, promoting damage rather than preventing it.

Wrapping and tying original materials with single strands of cotton embroidery floss and splints of thin Japanese paper or Tyvek can mend or bind broken areas together. Be sure to wash the floss first because of potential dye bleeding. This type of repair is commonly used on baskets that are woven or sewn together with bundles of plant materials, like pine needles or grasses. Use cotton embroidery floss that is an appropriate color. The thread can be wrapped around broken reeds or bundles, attaching them to one another, and preventing further breakage. If the bundles are exceedingly fragile, try wrapping a splint of thin Japanese paper or Tyvek around the area first before securing it with the cotton embroidery floss. You can tone the paper to match the surrounding area with a thin wash of acrylic or artist color paint.

When choosing a needle, test it in an inconspicuous area to make sure it will not make a hole in the plant materials. A size 24 tapestry needle with a duller point and large eye for thread is a common choice. Insert the needle between fibers and stalks rather than through them. Take care not to pull the thread too tight; this will cause a break in the plant materials and lead to more damage. It is important to document all repairs made. Diagrams, photos, notes, and a small sample of materials used should be kept in a file about the item.