



Guide to Herbarium Specimens for Seeds of Success

Basic Voucher Specimen Preparation Techniques

Below is a description of a few issues plant collectors should be aware of when collecting specimens for the Seeds of Success program. For the majority of vascular plants species no special consideration is made when pressing specimens in the field except to attempt to display the specimen in such a way that all taxonomic features of the specimen can be examined easily. There are a few exceptions to be aware of and they include: ferns, large bulky fruits, grasses, seeds, large leaves and thick woody specimens.

The standard herbarium specimen: The standard U.S. herbarium sheet is 11 $\frac{3}{4}$ inches wide by 16 $\frac{1}{2}$ inches long. If your specimen is larger please consider dividing, bending or folding the specimen so it will fit on a sheet. If a specimen requires more than one sheet, it is acceptable as long as the label data indicates there are multiples to be mounted on separate sheets (e.g. Sheet 1 of 2, Sheet 2 of 2). Please be aware that these separated pieces still belong to a singular collection.

Ferns: If only a few leaves are collected it is important that one or a few of the leaves are reflexed so that when mounted upon a sheet a researcher will be able to examine both the top (adaxial) and bottom (abaxial) surface of the leaf. This is most important because key taxonomic characteristics (spore producing structures) are typically located on the abaxial surface. If the leaf is not reflexed before pressing than an attempt should be made to collect multiple leaves so upon mounting both surfaces can be observed.

Large Bulky Fruits (e.g. pine cones, cacti, etc.): The point of fruit attachment is the most fragile part of a herbarium specimen and almost always breaks away from the specimen- either during preparation, shipping, mounting or examination. Indicate on the main specimen label the presence of detached bulky ancillary fruits. Place the ancillary fruit in a separate paper/plastic bag and include a duplicate label in the bag. As for cacti specimens, the entire specimen should be completely dried and placed in a paper bag (with a label) to both contain any separated pieces and to protect the processing technician from the spines and/or glochids.

Grasses and Grass-like Specimens (e.g. reeds and rushes): It is important to remember the dimensions of a herbarium sheet and prepare accordingly. Grasses are often collected in overly large clumps/tufts. The specimen may be split into multiple but similar size specimens to fit on a sheet (see example about multiple sheet specimens). Always remove soil and mud from the roots.

Seeds: The primary objective of the Seeds of Success program is to maintain a seed bank for the conservation and development of native plant materials for restoration and rehabilitation of U. S. lands. As such, it is preferable that some seeds stay with the voucher collection. After pressing and drying, a specimen may begin to shed seed. If this occurs the seed may become separated from the specimen during shipment and processing. Once separated, unless witnessed directly by the processing technician, this seed will not be placed back with the specimen because it cannot be assumed that this is the specimen to whom the seed belongs. To prevent this, place the loose seed in a paper or plastic envelope labeled with the collection information (collector name and number) so that it can be included with the mounted collection.

Large Leaves: Some of the same concerns regarding ferns and grass collections apply here. Researchers are interested in both surfaces of the leaf. Keep in mind the size of standard herbarium sheet and plan accordingly when collecting such plants.

Thick Woody Specimens (e.g. shrubs and trees): It is best practice to use pruning shears for cutting clean edges on thick woody plants. Prune specimen to fit a herbarium sheet. When collecting bulky, dry, brittle 3D specimens such as *Artemisia tridentata* (Big Sagebrush), try to press these specimens as flat as possible. Do not send branches that have not been thoroughly pressed. Avoid collecting gigantic and heavy branches unless it is absolutely necessary for identification; select a piece that is best suited for a standard herbarium sheet.

Example of a mounted grass specimen can be seen at: <http://collections.nmnh.si.edu/search/botany/?ti=3>

Search by Field (menu tab)

Taxonomic Name: *Achnatherum wallowaensis*

Select Search

Click the image to enlarge

Please browse the digital images of the Smithsonian Institution's botany type collection so that you may become more familiar with the various techniques used for mounting botanical specimens.

Labeling Voucher Specimens

The specimen label is the most significant part of the specimen. Without a label or with poor/inaccurate label information a specimen is rendered useless as a scientific or historical artifact. A future researcher should be able to use a specimen label to connect the specimen to the place and time of its collection along with the collector and possible determiner of the plant species.

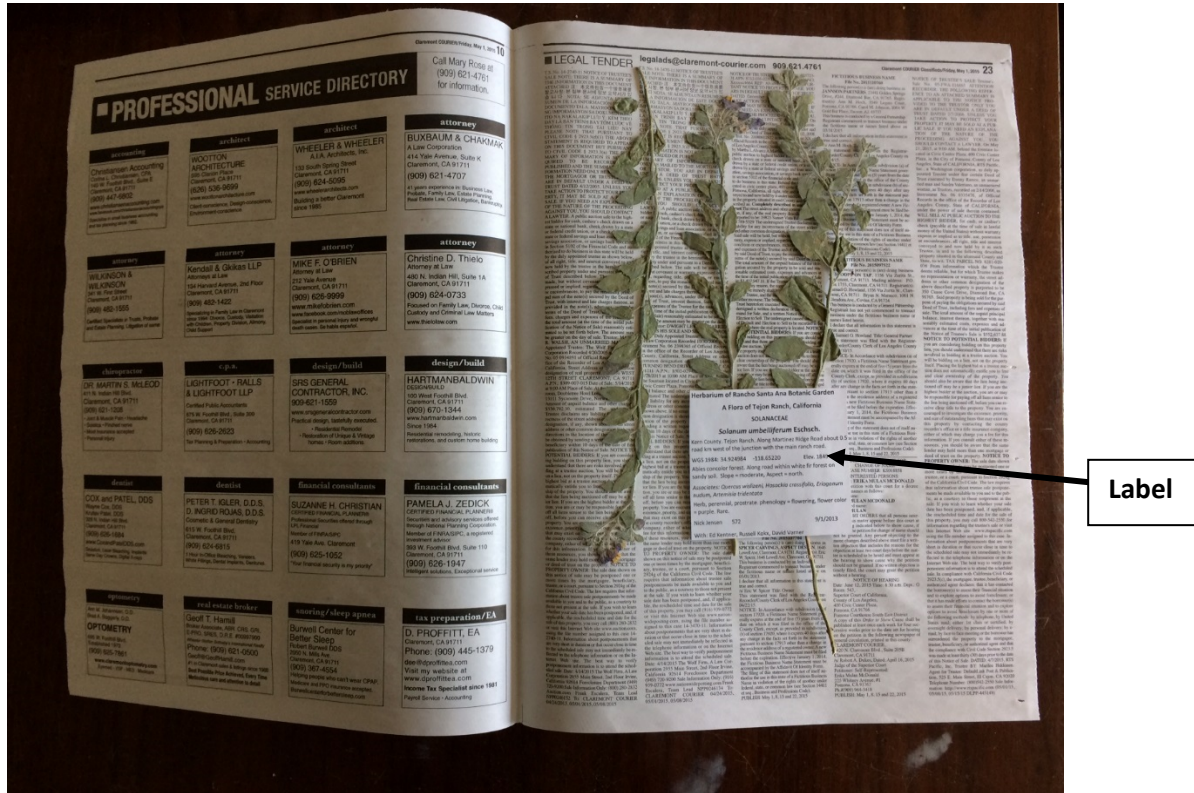
A typical label is approximately a 4 x 4 inch square (an ideal size) and printed on acid free paper. The label should contain taxonomic determination (family, genus, species, infraspecific species, etc.), collection location (as specific as possible; country, state, county, city/town, nearby roads, etc. As well as coordinates and elevation), the date of collection, the name of the collector and associated collector(s), and the collection number. Examples of excellent SOS voucher specimen herbarium labels are included at the end of this document and are also available as a separate Word document ***herbarium label template*** on the SOS website.

Shipping Bundled Voucher Specimens (with labels!)

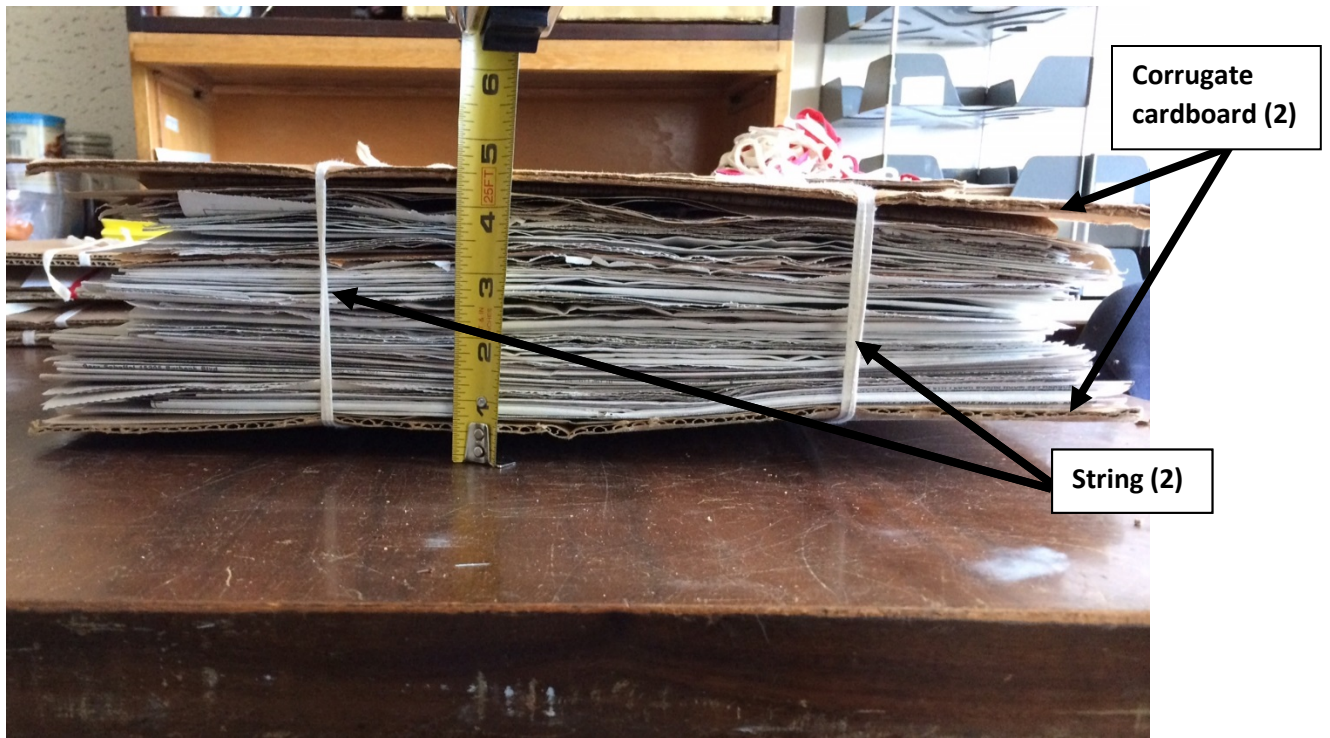
Please keep in mind that specimens will be shipped via multiple modes of transportation and processing centers through the U.S. Postal Service. Specimens should be securely bundled and packaged. To properly prepare specimens for shipping, place the specimen and label in newsprint (see photo below) and stack into a bundle. Sandwich the bundle of specimens between two pieces of cardboard. Tie the bundle with two strings. Wrap the bundle like a present with newsprint or craft paper (this prevents loose pieces from ending up in the bottom of the box). As for selecting a box, when reusing boxes try to find ones that will hold the bundle(s) as snugly as possible (less movement = less damage). The best box size for shipping specimens is 18"x 12"x 13".

Finally, remember to put a notice of transmittal inside the packaging that indicates who (institution) is sending the specimens and the number of specimens in the shipment. The document should also clearly state the intention of the sending institution. If from a Bureau of Land Management office or affiliate the transaction is considered a 'transfer' of federal material. If the collecting institution is a private entity (botanic garden or university) the transaction is considered a 'gift' to the Smithsonian. We also welcome scanned and emailed PDF documents. Please remember to sign and date the transmittal notice. The transmittal notice template is available on the SOS website.

The following is a step-by-step guide to shipping your voucher specimens



- Include a label with each specimen in standard size newsprint/paper (16.5" x 11")
 - Do not **staple** labels to newsprint
 - Do not **tape** labels to newsprint
 - Do not **paperclip** labels to newsprint
 - Just match label to specimen, toss label in, close newsprint and repeat
- **Do not** include herbarium mounting paper with your specimens
- Include enough plant material for a standard herbarium sheet (16.5" x 11")
 - Collect specimens with as much information possible about the plant. Including;
 - Flowers (if present)
 - Fruits (if present)
 - Shoots
 - Roots (annuals, grasses, etc).



- There are **over 65** specimens in this bundle.
 - Depending upon on how bulky specimens are, you might fit less in a bundle
- Bundle measures about 4.5 inches tall.
- Use two corrugate cardboard. One under the specimens and one on top.
- Use two string to secure the bundle. Tie bows (or a half hitch).



- Specimens in bundle should fit in a standard box (18"x 12"x any height)
- For this particular box, 3 bundles could fit, stacked on top of each other. This box measures 18"x 12"x 13".



- Ship bundled voucher specimens to :

Smithsonian Institution, NMNH
Department of Botany, MRC 166
P.O. Box 37012
Washington, D.C. 20013-7012

For **FedEx** shipments, use this address:

Smithsonian Institution
NMNH Department of Botany, MRC 166
10th and Constitution Ave., NW
Washington, D.C. 20560

Contact: Erika Gardner
202.633.0936
gardnere@si.edu

- Please be sure to include a notice of transmittal with your herbarium vouchers
 - Template available on the SOS website (www.blm.gov/sos).