

TECHNICAL NOTE

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COLLECTING AND PROCESSING BOTANICAL VOUCHER SPECIMENS

Derek Tilley, PMC Manager, Aberdeen, Idaho
Terron Pickett, PMC Agronomist, Aberdeen, Idaho



This Technical Note provides instructions on how to make botanical voucher specimens. Materials and construction of plant presses is discussed as well as techniques and instructions for collection and pressing of various plant forms for optimum long-term preservation. We also describe proper documentation and record keeping of field data.

There are several reasons why a person might want to create a botanical voucher specimen. You might want to press a specimen for later identification. Making a pressed specimen gives you the ability to take the plant back to your office and run it through a key at a later date, or you can send the specimen to another lab or herbarium for identification. You might also want to keep a record of a plant for legal purposes. For example, you might be involved in a wetland determination, and you might want to keep specimens so that you can back up your determination in the future. This can be especially important if the site conditions become altered.

Presses



There are a few different types and constructions of plant presses, each with particular advantages and disadvantages associated with them. There are several good presses available commercially from biological supply shops or forestry catalogs, and these cost anywhere from about \$50 to \$150, depending on the quality of the materials. Homemade presses, however, can be cheaper and stronger than most commercially bought presses.

Most commercial plant presses are made of wood slats riveted together. Open frame presses are relatively light, but they aren't terribly strong. The wood frames can bend or break if the plant samples are too thick. The durability of the press is also dependent on the type of wood used for construction. Presses made of hardwood like oak will be much stronger than a press made of pine or fir.

For a stronger press, it is relatively simple to construct your own using a solid piece of plywood instead of a riveted lattice. Best results typically come from medium grade plywood; OSB is not recommended as it will flake and splinter. Thicknesses of $\frac{1}{2}$ inch or more seem to work best, while thicknesses of $\frac{7}{16}$ or less tend to bend and warp as you put tension on the straps.

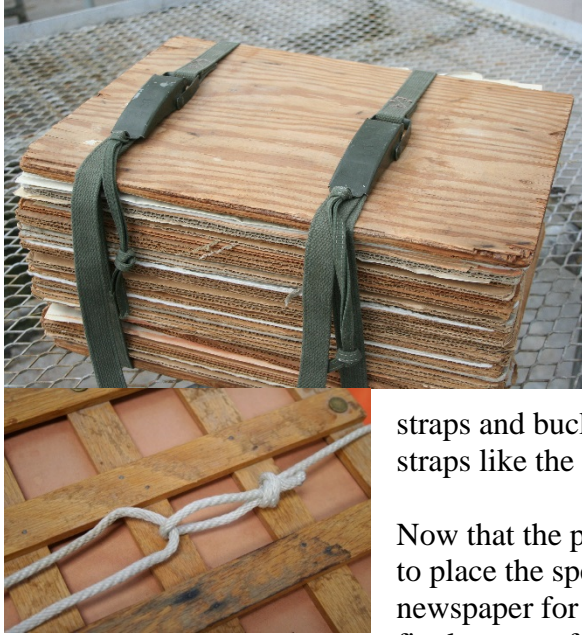
Herbarium vouchers typically measure 11.5 x 16 inches, so a standard press is about 12 x 16 inches. You can get pieces of plywood custom measured and cut at the hardware store, or you can buy a full sheet of plywood and make multiple presses out of it.

Corrugated sheets of cardboard, or plant press ventilator sheets, can be purchased online, but again, it is just as easy, and much cheaper to cut your own. Most furniture shops or appliance stores will let you pick through old boxes and take what you want. One important thing to remember is that the channels running through the corrugates all need to run in the same direction, along the short axis. This allows for maximum airflow and



quickest drying of the specimen. Keep this in mind when laying out and cutting sheets.

Occasionally botanists use felt sheets between the cardboard corrugates. These allow the harder plant parts like roots and stems to be squished flat without wrecking the corrugated cardboard. They can also help absorb moisture that can come with wetland or aquatic plants or with succulent species. They aren't entirely necessary though, and many people don't use them.



The final major component of the press is the straps. Most presses come with two nylon or canvas straps with some sort of buckle on the end. Sections of rope with widths of $\frac{1}{4}$ to $\frac{1}{2}$ inch also works. Just tie a loop in one end and run the loose end through the loop. Then you can get some good leverage as you pull on the loose end. A shoelace knot will hold the press together.

For serious plant collecting with 30 or more sheets in a press, you should use heavier duty straps and buckles. Army surplus stores often have excellent straps like the USGI canvas strap tie down shown.

Now that the press is put together, you'll need some paper sheets to place the specimens in. Most botanists use some form of newspaper for this. Most weekly want ads are 11.5 x 17 inches and fit almost perfectly in a press, and they are put together simply, so it doesn't take an inordinate amount of unfolding to get to a sheet.

In the Field

You'll want to have a few tools on hand if you're likely to be making plant collections. Claw hammers and rock hammers are popular and easy to get. Shovels also may come in handy for digging out stubborn roots or when looking for deep bulbs like those of death camas. For woody species a good pair of shears is very handy.

When making collections in the field, always try to get everything from the plant you might need to make a proper identification. Often times in the key you might be required to get measurements from mature flowers and ripe fruit at the same time, so you'll want to collect both. You also want to get as much of the plant as you can. For herbaceous species like grasses and forbs you'll want to dig up the root system as part of your collection; look for rhizomes, stolons, bulbs or tubers. For woody trees and shrubs you might want to strip some bark and include it. Thickened roots and rhizomes, or fleshy plants like cacti can be cut in half before pressing.



It's best to get more than enough material for your specimen to fill a mounted sheet fully. You may need to dissect many flowers to make your way through the key. You might also need material for making DNA or protein samples later on.

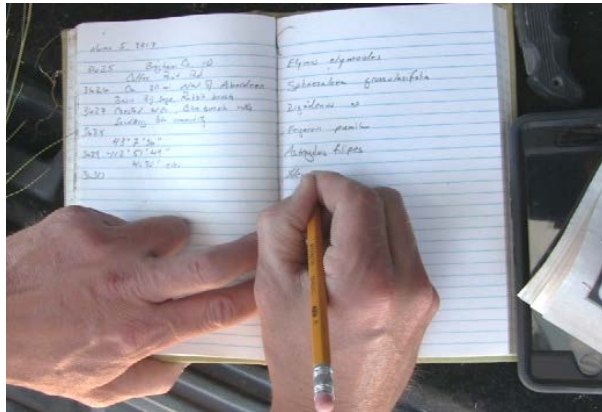
Keep the plants intact if possible. Plants can be bent or folded to fit the page.



Records

For occasional plant collecting it is fine to take notes directly on the newsprint, but it is a good idea to keep a field journal that can always be referred to for information at a later date.

The idea is to be able to go back and find the same site at a later date. In plant materials, we often record a stand location while plants are in bloom so we can return and collect seed a few weeks later. Record the date, state and county along with any information of cross roads, mile markers, and GPS coordinates if possible. You'll also want ecological site data like plant community, soil type and slope aspect.



You might also take notes about the plant itself if you think it might be important for identification; traits like tree height, overall outline or even smell. And make sure to add the collection number to the newsprint sheet with the specimen.

Drying

The best way to preserve the color of a plant specimen is to dry it. University herbaria dry their plants in large drying cabinets set between 95 and 115° F with plenty of airflow. The airflow and low humidity are critical to preserving the color. Excessively high temperatures however can cause the plants to blacken and become brittle. In the Great Basin, summer temperatures and low humidity allows us to dry plants by just setting the press outside in a warm spot. Running a fan aimed at the openings in the cardboard will help remove moisture. You may need to tighten the straps occasionally as the plants shrink and the press loosens.

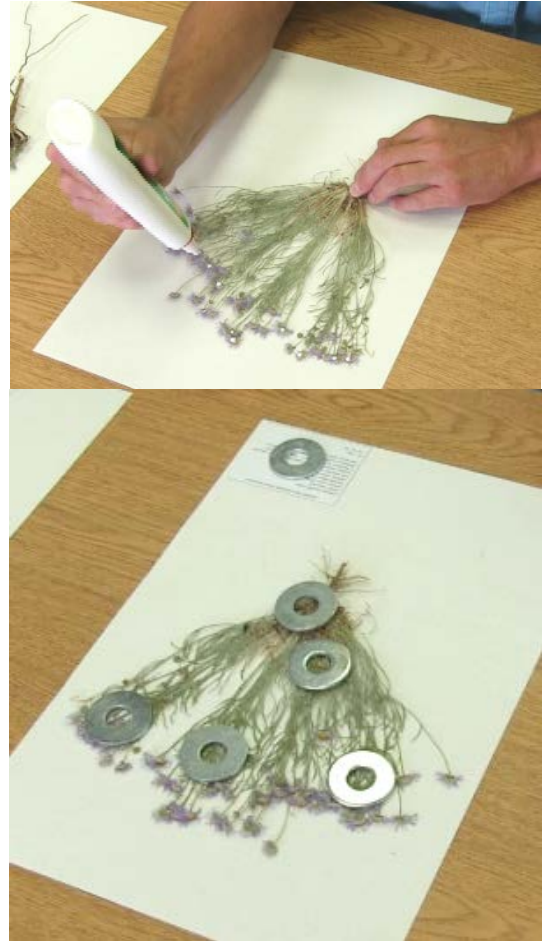
To tell if the plants are done drying, place your hand flat against the specimen. If you can detect any differences in temperature between the plant and the paper or cardboard, it still contains moisture, and isn't ready. This will take several days to a couple weeks.

Mounting

If you're going to mount your collections, we recommend using high quality herbarium sheets; however any durable, semi-rigid paper can be used. Regular white glue works great for mounting plants to paper. Add glue to as many leaves or other plant parts as possible and hold the plant to the sheet using weights. Heavy steel washers or lead tire weights work well for this. Try not to glue the weight to the page!

Add an herbarium label, usually in the bottom right corner of the sheet, that includes the collection information and the name of the collector.

When properly done, pressed voucher specimens can hold their form and color for decades and can be a useful tool for training, plant identification and records.



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