How to learn to identify plants

- Get a good picture book of the plants in your area, preferably one that sorts the pictures by color and flower shape. When you have identified your plant, read all about it.
- Watch out for wild flower hikes, possibly sponsored by your state's Native Plant Society, the Audubon Society, or local naturalists club or ...
- If there is a Forest Service, Park Service, or Bureau of Land Management office in your vicinity, ask the folks there about groups, opportunities, and books.
- Ask for advice at your nearest herbarium; these are often located in colleges, universities, or natural history museums.
- Check your local library for books about plants.
- Take a college course in plant taxonomy or systematics.
- See what you can find on the Web.
- PRACTICE! Study plants; then study more plants.

Intermountain Herbarium
Department of Biology
Utah State University
Logan, Utah 84322-5305

Phone: 435-797-1584; Fax: 435-797-1575
Email: herbarium@biology.usu.edu

Making Herbarium Specimens

What

Why

How

The Intermountain Herbarium
Department of Biology
Utah State University

What are Herbarium Specimens?

Herbarium specimens are carefully documented, well-preserved plant specimens. They consist of well-laid out, dried plant material that is attached, together with a label, to a sheet of paper. The label states where the plant was collected, what kind of habitat it grew in, who collected it, and when.

The quality of herbarium specimens is determined by both the specimen and the label. Specimen without labels may be pretty, but they are not herbarium specimens. Label without specimens are almost useless; they could be used to locate replacement specimens.

Bryophytes

Bryophytes are dried and placed in paper envelopes.

The label is glued to the front of the envelope.

Some material requires special preservation. Cones are placed, with their label, in plastic bags. Bryophytes are dried and stored in paper packets. Fungi are stored, after being completely dried, in plastic bags and boxes. Fleshy fruits may be stored, with their label, in alcohol or other preservatives. But for most plants, and most purposes, the combination of pressing, drying, and gluing to paper works just fine.

Although simple the technique is effective: specimens made over 500 years ago are still being studied.

Why make them?

Making a good herbarium specimens does take time, so why should you do it? The answer varies, depending on your purpose, but ALL herbarium specimens are a long-term source of verifiable data.

Once deposited in an accessible herbarium, specimens can be part of many research studies, including studies that may not have been dreamed of when they were first collected. But there should always be a reason for making a herbarium specimen, particularly those that require killing a plant. So what are good reasons?

Learn about plants. Nothing beats making your own plant collection as a way to learn about the plant diversity. The process of identification requires close examination.

While identifying a plant, make sure to look at things like nectaries and hairs that may not be mentioned in keys but have a lot to do with a species' success. Making your own collection will also quickly give you an appreciation of the importance of good field notes..

Macrofungi

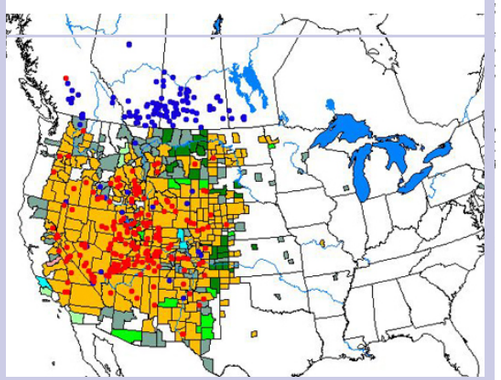
Macrofungi are dried completely, and then stored in plastic bags with the label.

And there are more reasons .....

Documenting Species Diversity.

Herbarium specimens are a permanent record of which species grow, or once grew, at a particular location, in a particular habitat, at a given time. Taxonomists, ecologists, and landscape architects rely on herbarium specimens to determine which species have been found in a particular area. Floras may provide a brief description of the habitats in which a species grows; to find out whether it has been found at a specific location, it is usually necessary to go and check the specimens themselves

Achnatherum hymenoides
Distribution based on herbarium specimens



Taxonomic Research. Taxonomists examine specimens from multiple herbaria to determine the range of variation that exists within a species. Such examination may lead, for example, to the recognition of a new species, a decision that two species should be combined, or recognition that plants growing at higher elevations tend to differ from those at lower elevations. Without herbarium specimens, often made for other purposes, such studies are not possible.

Documenting Research.

Voucher specimens are herbarium specimens that document a research study. They enable others to determine later what kind of plants you were calling by a particular name.

Voucher specimens also give your study substance, repeatability, and longevity. If the taxonomic treatment (classification) of any of the species you have worked with is changed, subsequent researchers can go to your voucher specimens and determine what your plants are called under the new system. If there are no voucher specimens, your paper has lost some, possibly all, of its value.

Papers that are supported by voucher specimens should include a statement stating where the specimens are located. If only some of the taxa in the study are documented by voucher specimens, then the statement should detail which these are. The minimum information should include species name, collector's name and number, and institution where lodged.

If space is a problem, as it is in some journals, a list could be deposited with the editors and the libraries of the authors' institutions and a note made to that effect in the paper.

Studies of a general nature may not benefit from voucher specimens, and not all species mentioned in a paper will require vouchers. Reviewers and users of the publications will judge for themselves the relative merit of the work and its repeatability. Part of that evaluation will depend on the extent to which it is documented by voucher specimens.

Type specimens are a particular kind of voucher specimen. They anchor the meaning of a species, subspecies, or varietal name. People publishing such names are required by the *International Code of Botanical Nomenclature* to deposit a voucher specimen for the name in a herbarium, and state which herbarium, when they publish the name..

Making Good Herbarium Specimens

1. **Collect equipment: Field notebook, pencils, digger, knife, plastic bags, stationery tags, hand lens, map, backpack, water, altimeter, GPS unit.**
2. **At site: Make field notes for the area as a whole. Record date (with year), who is with you, where you are (state, county, verbal description, latitude and longitude (or UTM coordinates), elevation. Describe habitat: slope, direction of slope, soil, cover, associated species (scientific names preferred; a few dominant species is more useful than a list of all species), moisture regime).**
3. **Select plant; make sure that, for every plant you kill, there are at least 20 more in the immediate vicinity. For woody plants, this is not a great concern because collecting an adequate sample does not kill the plant.**
4. **In field notebook: give plant a collection number, leave line for its name, Add notes about the distribution of this particular species in the area - ecology, abundance. Add notes on flower color, plant height, tree or shrub (if woody).**
5. **Obtain plant material. Woody plants - flowers and leaves; make sure your field notes indicate whether shrub or tree and height. Herbaceous plants - flowers, leaves, and enough of base to indicate whether it is woody at base and whether it is rhizomatous or not. Collect enough material that you can save some for keying and still make a good herbarium specimen.**
6. **Write collection number IN PENCIL on stationery tag(s) and attach to specimen, plus samples. Place main sample in plastic bag and/or press (see 7). It is best to press plants immediately, but a plant press is a bulky, awkward object. Place other samples in appropriate container; write number on outside of container.**
7. **Back to the plant press: Lay each plant out, with its stationery tag, inside a folded sheet of newspaper (or other thin paper). Make sure that neither the paper nor the plant material extend beyond the edges of the press.**
8. **Put plant press in/on dryer (in dry climates the top of a car works well). Put bags with identification samples in refrigerator. Key them out soon.**
9. **Making labels: Use a computer program, if available. They will make your label look very smart and have features that speed up the label making process.**

For more information on collecting and label making, see http://herbarium.usu.edu/K-12/Collecting/ or visit your closest herbarium at a university, college, or government office.

For an example of a good flowering plant herbarium specimen, see the cover panel.