GEORGESON BOTANICAL GARDEN

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# MAKING A BOTANICAL PLANT COLLECTION

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The vascular plant flora is not well known over large areas of Alaska. Each new collection gives us more information about the species of plants present, their various forms, and their overall distribution. This information is of primary interest to plant taxonomists and is essential background for plant geographers and ecologists. It has also become increasingly obvious that an inventory of plant diversity is a foundation for efforts to conserve natural resources, and plant specimens are the physical documentation of this diversity.

Plant collections, suitably preserved and mounted, provide a permanent physical record of our natural history heritage. The herbarium, in which such collections are housed and curated, is essentially a plant specimens library. Specimens are integral to research, and are necessary to university courses in plant taxonomy. They provide the raw material for examination and discussion through which students learn the principles and procedures of plant systematics. The UAF Herbarium is located in the basement of the Museum.

The following remarks and guidelines are intended to aid the student, amateur botanist, and professional from fields other than taxonomy to prepare plant collections. Certain minimum standards must be observed so that the specimens can be identified and also be of lasting scientific value.

## When and Where To Collect

To obtain a representative collection of plants from your area, gather specimens from as many different habitats as possible. Collect from tundra, bogs, forests, and fields. Roadsides and other disturbed areas often provide interesting discoveries. Submerged, floating, and emergent vegetation of rivers and ponds should not be overlooked, although the task of collecting presents some interesting logistic problems. Since not all plants bloom at the same time, by collecting at regular intervals throughout the growing season, you will obtain a good sample of the flora from each of the major habitats you are able to visit repeatedly.

## How To Collect

Obtain permission and permits as required by law before collecting. Collect with discretion, and avoid placing any population of plants at risk of extinction. If there is any doubt, do not collect it. Avoid collecting rare plants (see *Candidate Threatened and Endangered Plants of Alaska* by Murray and Lipkin, available at the University of Alaska Museum).

Look for plants with well-developed flowers and or fruits. The taxonomy of vascular plants is based on complete and mature specimens, therefore accurate identifications are more likely with good material at hand. Unless you want to show some unusual form of variation, take plants that are representative of the

population you are sampling. While the plants are fresh and tissues are still flexible, gently tap the root mass against your foot or the ground to remove as much soil as you can. Whenever possible, entire plants should be collected; that rule is, of course, limited to those plants small enough to be placed within a single sheet of folded newspaper. Although we emphasize that flowers and fruits are generally essential, do not fail to get the basal leaves and roots as well. Usually a sturdy trowel will suffice to dig up plants. An army surplus trenching tool or an old ice-axe is excellent too. Remember to replace your divots.

A pocket knife is adequate for collecting portions of trees, shrubs, and large herbs, but pruning shears make the job much easier. Shrubs and trees can be collected by taking the tips of branches or sections of stems with mature leaves (and flowers or fruits, whenever possible). Be sure to note the total height of the plant. Very large herbaceous plants, such as tall umbellifers, are often a problem. Cut away and discard most of the stem, but retain at least a representative leaf with petiole and short section of attached stem, the flowers, and the stem base with a portion of the root. Collect enough material to fill a folded sheet of newspaper.

A plant press is unwieldy, to say the least, and it is best left in the vehicle, at home, or at camp. Protect the specimens in large, plastic freezer bags. If you plan to carry the fresh specimens with you all day commercial ziplock bags make good containers, since you can blow air into them before zipping shut; the air will act as a cushion and offer some protection against damage while in a backpack. Plastic Tupperware-like boxes are the high-tech solution.

## The Notebook

The scientific value of specimens depends on the specimen and on the data you take when making the collection. It is important to adopt a system to insure that the data for each specimen are recorded faithfully and consistently. If you are collecting just a few plants, you may write all the field notes on the newspaper in which the plant is pressed. Preferably, every collector should keep a pocket-size field notebook to record each collection. Don't trust your memory!

If this is your first collection, simply start with Number 1 and proceed consecutively so that each collection has a unique number. Assign a new number to each collection from a single locality on any one day. If the same species is collected on the same day, but at a different locality, assign it a different number. If the same species is collected again at the same location as before, but on a different day, give it a different number also. Do not mix different species of plants on a sheet.

Essential data include where (general and specific locality, habitat, elevation), when (day, month, year), and by whom collected (your name). Additional information may include exposure (N, S, E, W), slope angle (flat, gentle, steep) soil texture (gravel, sand, loam) and moisture (wet, moist, dry), flower color (some blossoms fade with drying, some colors intensify), odor, relative abundance (abundant, common, infrequent, rare), and conspicuous use by animals. A page of your field notebook may look like this:

**Kodiak Island**

21 Jul 1994

Monaska Bay - sea cliffs behind beach - elev. 1-10 m.s.m.

245. *Campanula* sp.
common in s-facing rock crevices, flowers blue

246. *Draba hyperborea*
rare in dry rock crevices

247. unknown shrub
1.5 m. tall, growing in seepage at base of cliff in wet, rocky soil

When pressing the specimens, the collection number is placed on the sheet of newspaper containing the specimens, which relates those specimens back to the data in your notebook. Ideally, this field notebook becomes part of the permanently curated collection.

## How to Dry the Specimens

Place the fresh specimens in a sheet of folded newspaper. When folded, the size of the paper should conform to the size of the plant press, blotters, and cardboard ventilators. The dried specimens will be mounted on a sheet of herbarium paper a bit smaller than the folded newspaper, thus each paper of specimens equals a minimum of one finished herbarium sheet.

A little extra time taken while pressing plants will make a critical difference in the quality of the herbarium specimens. Lay out the plant(s) in a "natural pose." Bend or fold the stems into V or N shapes as necessary to fit the plants within the folded sheet of newspaper. Be certain that both leaf surfaces are exposed and that flowers or fruits are clearly visible and are not covered by stems or leaves. When placing several small plants in a sheet of newspaper, arrange them so they do not overlap. In essence, attempt to display all diagnostic features so they will show after the plant has been dried and firmly glued to a herbarium sheet. Cut open thick, moist stems, rootstock, dense cushions, etc., so the specimens will be flatter and dry more quickly. A deep longitudinal cut will allow you to expose the inner portions of both halves of thick roots and stems with the uncut portion serving as a hinge. Plants such as water lily, skunk cabbage, moss campion, and broomrape require special handling.

Place each sheet of specimens between two botanical blotters and these in turn between two cardboard ventilators. Repeat this arrangement until all the specimens have been processed. Tie the press tightly with straps or rope. Place the press in the sun where it will be exposed to breezes or over a source of gentle heat.

Dry the plants as quickly as possible. Dried correctly, the specimens retain much of their original color. The best practice is to check your press every day to determine progress and remove dry plants. Be alert for signs of mold or darkening plant tissues; the appearance of either means the plants are drying too slowly and a heat source is needed. Be careful, however, with artificial heat. Do not cook or scorch the plants, or they will become discolored and brittle.

Increase the rate of drying by exchanging wet blotters for dry ones (the first change after 24 hours), using extra cardboard, and putting the thicker and more succulent specimens toward the outside of the press. Even these efforts are challenged by the lush herbaceous vegetation in wetter regions of Alaska, unless you have a source of warm, dry air–a heated indoor space.

If you have only a few specimens, they can be kept in the press until you are ready to process them. You will probably need the press space for more plants, so remove the dry plants, leaving them in their newspapers. When you have accumulated a stack three or four inches thick, wrap the specimens in newspaper and tie them snugly between cardboard. The bundles of dry specimens should be placed in sturdy boxes, ready for identification.