

## Guide to Plant Collecting for Botanists at the University of Vermont

Cyrus Guernsey Pringle, the founder of the Pringle Herbarium, was described by Asa Gray as the Prince of Plant Collectors. Pringle's collections provide excellent examples of the scientific and aesthetic qualities that the finest botanical specimens should have. You can learn a great deal about plant collecting from careful inspection of the plants collected by Pringle in the University Herbarium. Patient preparation of the plants and careful attention to field data are both necessary for the production of artistic, scientifically useful botanical specimens.

Your first task in collecting is to assemble a plant press. Simple endframes can be made from pieces of plywood or mortarboard cut to 12" x 18". Corrugated cardboard "ventilators", cut to 12" x 18" from corrugated cardboard boxes, make up the bulk of the press. Your plants are pressed between these ventilators in ordinary newspaper. (You will find that a wide format newspaper such as the Vermont Cynic is more useful for this purpose than a narrow format newspaper such as the Burlington Free Press.) Collectors often add absorbent blotters between the newspaper and the ventilators. Build the press up to the size that suits you, and bind it with clothesline, adjustable straps, or backpacking stretchers.

In the field, collect directly into a quantity of newspaper carried between two boards. Attach a tag with your collection number to each piece of each collection (more on numbers below). Be sure to turn over at least one leaf so that both leaf surfaces show on the final specimen. Identification often involves characters from both sides of the leaves. Be especially careful in putting flowers into the press, since they will provide you with the best clues to identification. One way to ensure good drying of flowers is to enclose them in the folds of a piece of tissue paper or toilet paper. The moisture is drawn from the flower quickly by the highly absorbent tissue, and the flower does not stick to the tissue paper, as it often does to newspaper. If you are unable to collect a desired plant with flowers, make sure that it at least has some fruits. A plant with neither flowers nor fruits is worthless and cannot be included in a botanical collection. Many families (Brassicaceae, Fabaceae, etc.) require both flowers and fruits for identification to species. Roots must be included in all collection of herbaceous plants.

On returning to home base, transfer each specimen to its own piece of newspaper between two pieces of cardboard. Build up a stack of specimens in newspaper between cardboards, then bind them tightly between your endboards with your straps. Great pressure or weight is needed: specimens must be flat. Have someone show you the best way to tie up a plant press, which is with a slip knot tied through a bowline. The difference between mediocre and outstanding botanical specimens is usually the work put into the plants once they are in the press. Change the blotters and/or the newspaper regularly to dry the plants as quickly as possible.

Slow drying usually means browner plants with greater damage from mold. Once the plants have become limp in the press (generally in 4-5 hours), rearrange them to suit your taste so that they will form an attractive herbarium sheet (112 x 162" including space at the lower right for a label). Tighten the press frequently (1-2 times daily) to keep pressure on the drying plants.

Particular kinds of vascular plants offer special problems to the collector. When the whole of a plant is too large to include on a standard-sized herbarium sheet, you may divide the entire plant into pieces the size of herbarium sheets, resulting in a single collection of several sheets. You may also preserve only a portion of the plant, such as the summit of the stem or a single branch, and include a description of the whole plant (including the missing pieces), in your field data. Cut your plants into neat pieces using a sharp blade or clippers. Sections of stems between nodes and portions of large leaves can also be eliminated without danger of rendering the plant unidentifiable.

Succulent plants such as cacti have always been a problem for the collector. One way to deal with these juicy plants is to "skin them alive". You can split a large petiole like that of celery in half, then remove the watery tissue in the interior, and finally press the remaining tough outer portion. Large roots and stems may also be split and cut down to solve the drying problem. Include only a small portion of the bark of extremely large stems.

Aquatic plants present a special problem, since they cannot be handled successfully with ordinary techniques. Plan an herbarium sheet in a shallow tray full of water. Float your plant in the tray and arrange it on the herbarium sheet as you gradually drain the water. Once you are satisfied with the layout of your plant, dry the plant on its herbarium sheet right in the regular plant press. A piece of wax paper will prevent the plant from sticking to blotters and newspapers.

Rapid drying of plants improves the quality of herbarium specimens, primarily by reducing the amount of time which fungi have to act on the plants. Ideal temperatures are 115E-120E F. A number of ways have been devised by which botanists may accelerate drying. Drying cabinets with special electric or steam heaters are available at most herbaria. There is a cabinet drier in the systematics laboratory at UVM. Those collecting in limited quantities can expect very good results from changing newspaper and blotters regularly.

The data to be included with collections of vascular plants should be recorded in a field notebook. Botanists ordinarily use a new notebook for each major collecting trip so that all records are not vulnerable to loss at any one time. Among the easiest field labels to use are the standard stringed "jewelry" tags available in stationery stores like McAuliffe's.

All botanical collectors have personal number systems. The first plant that you collect will be your number one (for example, A. C. Smith's first collection was A. C. Smith No. 1). Thereafter, you keep a chronological record of your collection numbers. Many botanical collectors have reached No. 10,000, and at least two have reached 100,000 in this century. The collection number is used by systematic botanists to identify individual collections of plants, so it is a very important number. If you mistakenly include two kinds of plants under one of your collection numbers, assign one of them the number followed by the letter "a".

Field data includes geographical, ecological, and morphological information. Geographical data should include state or province, county or department, town or region, topographic features such as rivers and mountains, and latitude and longitude. Ecological data

can include substrate, slope, rock type, moisture, sun, degree of disturbance, altitude and associated plants. Morphological data should include anything that is not easily visible in the dried specimen: height of plant, habit of plant, diameter of trunk at breast height, odor and color of flower, odor and color of leaves, taste, color and kind of fruit, presence of milky or colored juice, and texture of plant parts. Most botanists stipulate that the locality should be easily relocated from the field data. Remember to tag each piece of each collection with its number.

The label for your herbarium specimen should be roughly 2 3/4 x 4 1/4" (8 per sheet of paper). The name of the plant goes at the top. Include geographic, ecological, and morphological data in 3 short paragraphs below. Put your name and collection number at the bottom left. Put the date collected at the bottom right. If you have more than one sheet for a collection, only the first label needs the full treatment. Only plant name, collector, and collection number are needed on the rest. Each label should indicate the total number of sheets in the collection, for instance "sheet 1 of 3," "sheet 2 of 3," and "sheet 3 of 3." A sample label is photocopied below for reference.

<b>EISEMAN HERBARIUM</b>	
<b><i>Calystegia spithamea</i> (L.) Pursh</b>	
VERMONT. Colchester Co. Winooski: just north of the Winooski River at west end of Winooski Gorge.	
Dry soil under power lines, east of the I-89 overpass and south of Rt. 15 and the railroad (east tip of the Winooski Nature Trail Property.	
Charles S. Eiseman 16	June 9, 2005