

## COLLECTION, PREPARATION, AND PRESERVATION OF HERBARIUM SPECIMENS

- 1 Although various methods have been devised for preserving specimens of vascular plants, none surpasses the easy, inexpensive, efficient method of **pressing and drying**.
- 2 In the field, specimens are carefully selected as representative of the population. Normally they are in flower and/or fruit. Underground parts of herbaceous plants are often diagnostic and should be dug up (using a strong trowel, **brick hammer**, screwdriver, etc.) where feasible.
- 3 In the field, a record is made (preferably in a bound notebook) of the collection number, date, location (country, state, county, legal description or longitude/latitude, verbal description, elevation, etc.), and habitat for each collection with notes where possible on associated species and on plant features (e.g., petal color, glaucescence, etc.) often lost in drying or otherwise not evident after pressing (e.g., habit, height, dbh., etc.)
- 4 The plant is pressed as soon as possible for best results. If a field press is not used, the material is placed in a tagged plastic bag. Pressing can be delayed, often overnight, if the bags are kept cold (ice chest with ice; refrigerator).
- 5 Preparation of a specimen for pressing includes removal of soil from roots and a judicious pruning of superfluous leaves, etc., without destroying parts necessary for identification. Plants that are longer than a single folded sheet of newspaper (ca. 12 in. × 15 or 16 in.) are bent accordion-style (V-, N-, or W-shaped, etc.). Some leaves are turned over so both surfaces are displayed on the dried specimen. Extra flowers and/or fruits are included where possible. The collection number corresponding to the number in the collecting notebook is written on the sheet.
- 6 After the plant(s) is positioned in the folded newspaper, it is placed between cardboard (12 × 18 in.; with corrugations running short dimension) which serve as ventilators. The resulting pile of newspapers and cardboard is placed between press frames (a 12 × 18 in. lattice of ash or hickory slats, riveted or screwed together or **sheets of exterior grade, 1/4 or 3/8 in. plywood**) and tightly bound with two, 6-12 ft. long straps (webbing with buckles or sash cord **with a loop in one end**). To facilitate drying, the press is placed on an artificial heat source (e.g., **plant dryer**) or in the sun with corrugations parallel with the wind).
- 7 If heat is not used, the pressing papers with enclosed plants may first be placed between two felt blotters or driers and then between cardboard. The blotters must be exchanged for warm, dry ones every day until specimen is dry. The moist blotters are placed in the sun or against heating radiators to dry. This method is inefficient but sometimes unavoidable. A portable field dryer frame with heat source (**electrical cord with 4 or 5 sockets and 150 watt light bulbs**, or other heat source) works well on field trips.
- 8 The dried specimens are stored in the numbered newspapers until identified and mounted.
- 9 When the specimens are identified, neatly typed labels are prepared with the data (item 3) in the following order: scientific name with authority (e.g., *Buchloë dactyloides* (Nutt.) Engelm. or *Quercus rubra* L.), location, habitat, associated species, notes on plant features, date of collection, and the collector's name with collection number. The label, usually 25-100 percent rag paper, may be 4 × 2.5 in. or larger. Duplicate labels may be prepared on a high-quality photocopier.
- 10 If the specimen is to be mounted, it should be attached to a sheet of 100 percent rag herbarium paper (11.5 × 16.5 in.). Mounting paper may be obtained from a biological supply house (as with the corrugates, blotters, and other supplies; **see addresses below**). The label is neatly glued to the lower right-hand corner of the sheet. The specimen may be attached with linen straps, thread, or glue (such as Elmers), or a combination of these methods. If glue is used, it is spread in a thin layer over a sheet of glass or **plexiglass** (14 × 20 in. or larger) with a paint brush. The specimen, face up, is placed firmly, but without smearing, on the glue, lifted with forceps, and carefully dropped in the desired position on the mounting paper. A piece of wax paper (12 × 18 in.) is then placed over it. The sheets with wax paper are stacked in a pile and a moderate weight is placed on top. When the glue is dry, the twigs and other bulky parts of the specimen are taped or sewn to the sheet for additional reinforcement or additional **drops of glue** are added.
- 11 The mounted plant may now be placed with other specimens in standard genus covers in insect- and dust-proof herbarium cabinets housed in a dry place. The sheets should be protected from insect attack by including a small container of paradichlorobenzene (PCB) in the case or by occasional fumigation (with chemicals by specially trained individuals or by **placing the plants in a deep-freeze for several days**). The climate throughout much of the Rockies is sufficiently dry that fumigation is not necessary.

**FOR ADDITIONAL INFORMATION ON FIELD AND HERBARIUM TECHNIQUES SEE:**

- Forman, L. and D. Bridson. 1991. *The Herbarium Handbook*. Royal Botanical Gardens, Kew.
- Judd, W.S., and other authors. 2008. *Plant Systematics: A Phylogenetic Approach*. Sinauer Associates, Inc.
- Metsger, D.A. & S.C. Byers (eds.). 1999. *Managing the Modern Herbarium*. Society for the Preservation of Natural History Collections. Elton-Wolf Publ., Vancouver, B.C., Canada.
- Simpson, M.G. 2010. *Plant Systematics*. Elsevier Academic Press. Sunderland, Massachusetts.
- Woodland, D.W. 2000. *Contemporary Plant Systematics*, 3<sup>rd</sup> Edition. Andrews Univ. Press, Berrien Springs, Michigan.

**SOURCES OF COLLECTING AND HERBARIUM SUPPLIES**

Carolina Biological Supply Company, [www.crolina.com](http://www.crolina.com)

Herbarium Supply Company, P.O. Box 10966, Bozeman, MT 59715, 800-348-2338, 406 994-006

St. Louis Paper and Box Company, 3843 Garfield Ave., St. Louis, MO 63156, 800-779-7901

**FOR ASSISTANCE WITH PLANT IDENTIFICATION (IN EXCHANGE FOR DUPLICATES):**

B. E. (Ernie) Nelson, Curator [bnelsonn@uwyo.edu](mailto:bnelsonn@uwyo.edu)

OR

Ronald L. Hartman, Curator Emeratus [rhartman@uwyo.edu](mailto:rhartman@uwyo.edu)

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**FLORAS USEFUL FOR PLANT IDENTIFICATION IN WYOMING**

- Ackerfield, J. 2015. *Flora of Colorado*. Sida, Bot. Misc., No. 41. Botanical Research Institute of Texas, Fort Worth. x + 818 pp.
- Albee, B.J., L.M. Shultz, and S. Goodrich. 1988. *Atlas of the Vascular Plants of Utah*. Utah Museum of Natural History, Occ. Publ. 7. xx + 670 pp.
- Arnow, L., B. Albee, and A. Wyckoff. 1980. *Flora of the Central Wasatch Front, Utah*. Univ. of Utah Printing Serv., Salt Lake City. xiv + 663 pp.
- Barkley, T.M., ed. 1977. *Atlas of the Flora of the Great Plains*. Iowa State Univ. Press, Ames. xii + 600 pp.
- Barneby, R.C., A. Cronquist, A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. 1989. *Intermountain Flora: Vascular Plants of the Intermountain West, U.S.A., Vol. 3B: New York Botanical Garden, Bronx*. 279 pp.
- Cronquist, A., A.H. Holmgren, N.H. Holmgren, and J.L. Reveal. 1972. *Intermountain Flora: Vascular Plants of the Intermountain West, U.S.A., Vol. 1: Hafner Publ. Co., New York*. 270 pp.
- Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. 1977. *Intermountain Flora: Vascular Plants of the Intermountain West, U.S.A., Vol. 6: Columbia University Press, New York*. 584 pp.
- Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. 1984 & 1994. *Intermountain Flora: Vascular Plants of the Intermountain West, U.S.A., Vols. 4, 5: New York Botanical Garden, Bronx*. 573 & 496 pp.

- Cronquist, A., N.H. Holmgren, and P.K. Holmgren. 1997. Intermountain Flora: Vascular Plants of the Intermountain West, U.S.A., Vol. 3A: New York Botanical Garden, Bronx. 446 pp.
- Dorn, R.D. 1917. Flora of the Black Hills. <http://www.wynps.org/wp-content/uploads/Flora-of-the-Black-Hills.pdf>. ii + 78 pp.
- \*Dorn, R.D. 1984. Vascular Plants of Montana. Mountain West Publ., Cheyenne, WY 82003. iv + 276 pp.
- \*Dorn, R.D. 2001. Vascular Plants of Wyoming. Ed. 3, Mountain West Publ., Cheyenne, WY 82003. iv + 412 pp.
- Evert, E.F. Vascular Plants of the Greater Yellowstone Area: Annotated Catalog and Atlas. Publ. privately. Park Ridge, IL 60068. viii + 751 pp.
- Flora of North America Editorial Committee. 1993+. Flora of North America. Vols. 1-9, 12, 19-28, Oxford Univ. Press, NY. (30 volumes upon completion).
- Great Plains Flora Association. 1986. Flora of the Great Plains. Univ. Press of Kansas, Lawrence. vii + 1,392 pp.
- Hitchcock, C.L. and A. Cronquist. 1973. Flora of the Pacific Northwest. Univ. of Washington Press, Seattle. xix + 730 pp. Revision in press (2018).
- Hitchcock, C.L., A. Cronquist, M. Ownbey, and J. W. Thompson. 1955-1969. Vascular Plants of the Pacific Northwest. 5 volumes, Univ. of Washington Press, Seattle. As: Vol. 17 of the Univ. of Washington Publ. in Biology.
- Holmgren, N.H., and P.K. Holmgren 2017. Intermountain Flora: Vascular Plants of the Intermountain West, U.S.A., Vol. 7: New York Botanical Garden, Bronx. 303 pp.
- Holmgren, N.H., P.K. Holmgren, and A. Cronquist. 2005. Intermountain Flora: Vascular Plants of the Intermountain West, U.S.A., Vol. 2B: New York Botanical Garden, Bronx. 488 pp.
- Holmgren, N.H., P.K. Holmgren, J.L. Reveal, and Collaborators. 2012. Intermountain Flora: Vascular Plants of the Intermountain West, U.S.A., Vol. 2A: New York Botanical Garden, Bronx. 731 pp.
- Kaul, R.B., D. Sutherland, and S. Rolfsmeier. 2006. The Flora of Nebraska. School of Natural Resources, Univ. of Nebraska, Lincoln. vi + 967 pp.
- Lesica, P. 2012. Manual of Montana Vascular Plants. BRIT Press, Botanical Research Institute of Texas, Fort Worth. 771 pp.
- Nelson, B.E. 1984. Vascular Plants of the Medicine Bow Range. Rev. ed., Jelm Mountain Press, Laramie. 357 pp.
- Scott, R.W. 1995. The Alpine Flora of the Rocky Mountains: The Middle Rockies. Vol. 1. Univ. of Utah Press, Salt Lake City. ix + 901 pp.
- Van Bruggen, T. 1985. The Vascular Plants of South Dakota. Ed. 2, Iowa State Univ. Press, Ames. xxv + 476 pp.
- Weber, W.A. and R.C. Whittmann. 2012. Colorado Flora: Western Slope. Ed. 4, Univ. Press of Colorado, Boulder. xxxvii + 532 pp.
- Weber, W.A. and R.C. Whittmann. 2012. Colorado Flora: Eastern Slope. Ed. 4, Univ. Press of Colorado, Boulder. li + 549 pp.
- Welsh, S.L., N.D. Atwood, L.C. Higgins, and S. Goodrich, eds. 2008. A Utah Flora. Ed. 4, Brigham Young Univ., Provo, UT. xxvi + 1,019 pp.

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\*Dorn books available from the Rocky Mountain Herbarium

**FIELD LABEL**

\*Collector \_\_\_\_\_ \*No. \_\_\_\_\_  
\*Date collected \_\_\_\_\_  
Family (or acronym) \_\_\_\_\_  
Scientific name \_\_\_\_\_  
\*Locality, \*State: \_\_\_\_\_ \*County: \_\_\_\_\_  
\*Verbal: \_\_\_\_\_  
\*Township \_\_\_\_\_ \*Range \_\_\_\_\_ \*Section \_\_\_\_\_  
Or \*Latitude \_\_\_\_\_ \*Longitude \_\_\_\_\_  
Elevation: \_\_\_\_\_  
\*Habitat \_\_\_\_\_  
\*Occurrence: Common \_\_\_\_\_, Occasional \_\_\_\_\_, Rare \_\_\_\_\_  
Height (if portion of plant collected) \_\_\_\_\_  
Flower color \_\_\_\_\_  
Remarks: \_\_\_\_\_

\* **Essential data**, the remainder, can be obtained from maps, identifying plant, etc.

**SAMPLE LABEL**

Caryophyllaceae Wyoming, U.S.A

Cerastium fontanum Baumg.  
subsp. triviale (Link) Jalas

Crook Co. T54N R62W S7  
Black Hills: Geis Springs and vicinity, ca. 5 air mi E of  
Alva.  
Ponds and pond margins and adjacent oak woodlands and  
prairies; shaded slope.

13 Jul 1983 Elev. 4700 ft.

Ronald L. Hartman 16040

ROCKY MOUNTAIN HERBARIUM (RM)  
University of Wyoming, Laramie