What to Do with an Unknown Specimen: Preparation & Storage of Vouchers

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What to Do with an Unknown Specimen: Preparation & Storage of Vouchers

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Properly prepared voucher specimens are fundamentally essential in documenting occurrences & distributions of plant species.

- Specimen provides permanent, verifiable, tangible evidence
- Specimen label provides geographical, ecological & other kinds of data
What should I do with a voucher specimen?

• Voucher specimens should be deposited in an officially recognized public herbarium.
  • Where they will provide a permanent record
  • Where they will be available to other researchers
• Most state universities have an herbarium.
The herbarium

VSC – Valdosta State University Herbarium
What is an herbarium?

- Collection of dried plant specimens
- Permanent repository of specimens and data
- Each herbarium specimen provides a permanent record (*voucher*) of the occurrence of a species at a particular geographical station.
  - *Specimens without geographical data are of limited use!*
How long will herbarium specimens last?

- If properly cared for herbarium specimens will last indefinitely.
  - Dry
  - Free of pests (insects, fungi)
- Oldest herbarium >425 years old
  - Kassel, Germany
  - Founded 1569

Specimen collected >175 years ago by Wm. Baldwin, St. Marys, GA.
How do I prepare a voucher specimen from start to finish?

- Locate plants in field
- Prepare specimen for press
- Record geographical, ecological & other data in field notebook
- Press specimen
- Dry specimen
- Identify specimen
- Prepare specimen label
- Mount specimen
- Apply accession no. to herbarium sheet
- Sort specimens
- File specimen in herbarium
Specimen data

- Geographical data
  - Country
  - State
  - County
  - Locality (e.g., distance and direction from nearest town or other landmark, hwy intersection, etc.)

- Ecological data
  - Habitat (e.g., roadside, pasture, coastal prairie, bayswamp, etc.)
    - Size and extent of population

- Misc. data
  - Flower color
  - Habit (e.g., 3 m shrub, 40 ft tree, vine, etc.)

- Collector name(s) & number

- Collection date
Pressing the specimen

- Enfold fresh specimen in single newspaper page.
  - Tear entire section (e.g., sports section, arts section) of newspaper into individual pages, by tearing in two lengthwise along vertical center crease.
- Write collection number along margin of folded newspaper page.
- Place newspaper with specimen between blotters in plant press.
• Two press straps or ropes
• Two plywood boards (½ X 12 X 18 in)
• Blotters (12 X 18 in) – *absorb moisture from specimen*
• Pasteboard ventilators (12 X 18 in, channels parallel to 12 in edge) – *allow air flow through press*
Constructing the plant press

- Board
- Ventilator
  - Blotter
  - Blotter
- Ventilator
  - Blotter
  - Blotter
  - Blotter
- Ventilator
  - Blotter
  - Blotter
- Repeat sets as needed
  - Blotter
  - Ventilator
- Board

Specimen in newspaper
Specimen in newspaper
Specimen in newspaper
Plant press
Press set
ventilator
Press sets fanned to show intercalated specimen
blotters
The plant press
Pressing the specimen
Small herbs (<1 m tall)

- Generally entire plant preserved on herbarium sheet
- Special considerations
  - Include several plants if possible
  - Include as much of plant base as practicable, e.g., representative portion of root system, rhizome, corm, etc.
  - Rinse soil from roots.
  - Taller plants – Break & fold stems – don’t bend.
Larger herbs (>1 m tall)

- Stem may be broken (not bent!) and folded one or more times to fit sheet.
- If not practical to preserve entire plant, then cut into pieces and include representative portions.
  - Base of plant – rinse soil from roots
  - Portion of mid-stem with leaves
  - Upper stem with leaves, flowers & fruits
  - If entire plant not preserved, then estimate height & record in field notebook.
Trees, shrubs & vines

• Only representative portions of plant preserved.
• Include enough stem to show pattern of leaf arrangement.
• Position leaves to show both upper and lower surfaces.
• Include flowers and/or fruits.
• Break & fold stems – don’t bend.
• Estimate plant height & record in field notebook.
Closing the press
Drying specimens
Specimen identification

- Routine determinations – various floristic manuals
- Newly introduced, non-indigenous plants – exotic floras & primary literature (journal articles & monographs)
- Reference specimens in herbarium are indispensable!
Specimen identification
General considerations

Well preserved specimens with intact flowers & fruits are essential for positive identification, especially of poorly known species, newly introduced non-indigenous species, or other species not represented in the herbarium.

Report in 2000 of Queensland sedge (*Cyperus hyalinus*) new to W Hemisphere based on these materials.
Specimen identification
Some special considerations
Graminoids

- Grasses, sedges, rushes, etc.
- Mature fruits essential for positive identification
- Characteristics of plant base useful in identification
Scientific name
*Fabaceae*
*Sesbania drummondii* (Rydb.) Cory

Geographical data
- **Country**: U.S.A.
- **State**: Georgia
- **County**: Glynn County
- **Locality**: Hofwyl-Broadfield Plantation State Historic Site; 0.35 mile S jct. hwys. US 17 and GA 99 at Broadfield; 15-20 plants observed, 4-5 m high with gray-green foliage, locally common in open area between Hwy. US 17 and flatwoods along east side of hwy.

Misc. data
- **Date of collection**: 17 Oct 1999
- **Collector name(s) & number**: Richard Carter 14427 with S. Corbett & G. Bennett det. R. Carter

Collecting information

Valdosta State University Herbarium (VSC)
Mounting herbarium specimens

• Specimens mounted on archival quality, buffered, neutral pH, herbarium paper (11½ X 16 ½ in)
• Specimen labels printed on archival quality, buffered, neutral pH paper
• Fragments preserved in archival quality paper packets
• Archival quality glue or linen tape used to affix specimens, labels & fragment packets
Variety of methods used to affix dried plant specimens to herbarium paper

• “Spot welding” with glue & weighting (metal rods, heavy washers, etc.) until dry
• Glass plate or plastic tray coated with thin layer of glue using paintbrush; specimen placed on layer of glue, carefully lifted with forceps, and placed on herbarium sheet; pressure applied until glue dries
• Strapping techniques
  • Specimens attached with strips of adhesive linen tape
  • Viscous strands of Archer’s adhesive extruded from plastic applicator bottle dry to form plastic straps
Spot welding

Dots of glue applied to underside of specimen & weights added
Strapping technique

Strips of archival quality adhesive linen tape used to affix specimen
Mounted specimens given accession number, sorted, & filed systematically

- Serial accession number stamped on each herbarium sheet
- Specimens sorted by family, genus, species
- Specimens filed in herbarium cabinets sequentially in archival quality genus folders
Preparing specimens for mailing

- Cut several pieces of pasteboard or cardboard corresponding to dimensions of folded newspaper.
- Place folded newspaper with specimen between pasteboards & reinforce with additional pasteboards as needed.
- Secure parcel with tape & post.
Preparing fresh specimens for mailing

- Carefully flatten specimen within folded section of newspaper.
  - Use entire newspaper section (e.g., sports section) consisting of multiple pages folded together, with final folded dimensions being ca. 11 X 13 ½ in.
- Press flat under books or other heavy objects for several days.
- Refer to “Preparing Specimens for Mailing” for further instructions.
To be avoided....

- Do not tape or staple specimens to paper.
- Do not leave specimens in zip-lock or other plastic bags at room temperature for prolonged periods.
- Do not mail fresh specimens in zip-lock or other plastic bags.
Refrigeration of specimens

• Specimens may be kept in refrigerator tied up or zipped inside plastic bags for several days, if it is not possible to prepare them immediately.

• Precautions should be taken to prevent freezing of specimens.
Specimens should be stored in a dry, pest-free environment

- Store in tight herbarium cases
- Ideal temperature <21°C
- Ideal relative humidity 30-40%
- Isolate unprocessed specimens from herbarium collection
- To eliminate pests, freeze incoming specimens before transferring to herbarium collection
- Use repellent in cases – naphthalene “moth balls”
Pest control through freezing

- Safe & effective, if properly done
- Rapid freezing essential to prevent acclimation of insect pests
- Specimens tied into packet no more than 150 mm (ca. 6 in) thick
- Packet placed loosely in plastic bag to reduce condensation
- Domestic freezer: -18°C, at least 48 hrs
  - Refreezing after rapidly bringing packet to 15-20°C recommended for control of resistant dermestids
- Ultracold (-80°C) freezer best if available
Caveat collector!
The plant that was sent with elation arrived much to my consternation. What was pressed under foot is now moldy as soot and received only great lamentation.

Richard Carter, 2003
<table>
<thead>
<tr>
<th>Date</th>
<th>Species</th>
<th>Location</th>
<th>Notes</th>
</tr>
</thead>
</table>
| 8 August 1965 | with G. Jule | San Diego County | \[...\]
| 9 August 1965 | with G. Jule | San Diego County | \[...\]

**Notes:**
- San Diego County
- San Diego Botanic Garden
- Specimen prepared by G. Jule
- Specimen collected by T. Jule

**Images:**
- Photograph of a grass specimen
- Photograph of a book
- Photograph of a plant specimen

**Additional Information:**
- Specimen number: 10233
- Specimen date: 12 August 1965
- Prepared by: G. Jule
- Collected by: T. Jule
Selected References