

The Horticulturalist's Guide to Specimen Collecting

This protocol illustrates every step of plant collecting tailored for DBG Horticulture staff. It outlines what you need to do before leaving, what to do when you're in the field, and what to do when you get back from the collecting trip. If you're planning to do a lot of collecting in a particular season, please let the Collections Assistant, Margo Yousse, know so we can find room to accommodate your specimens.

All protocols and instructional videos are available on the [Interactive Guide to Asset Management](#). Questions can be directed to Collections Assistant (margo.yousse@botanicgardens.org).

Before Leaving:

- Permits & Access
 - ***Required:** Obtain a Permit for the collection area or a [Land Access Agreement for private land*](#)
 - Scan and copy permission paperwork. Send an both electronic and hard copy to the Scientific Data Manager (richard.levy@botanicgardens.org)
 - Bring original copy (when applicable) with you every time you are in the field
- Means to record data
 - Print out sheets from our [custom field book](#) so that you're prompted to collect all the necessary data fields when collecting

Reference Sheets

SITE/LOCATION
NAMING A SITE
<ul style="list-style-type: none">• Use a clear and consistent schema.• If surveying a greater area, use this as the general site name and then use a numbering or otherwise more specific system for naming sub-sites.• It is best to agree on a naming schema with team at start of work.• Use the same schema each time the site is visited and in all forms of documentation.• Use existing site names per previous department work.
Examples May Ranch MR01 MR02 MR03 MR04 MR05
Arapaho National Forest ANF Summit Lake ANF Mt Goliath ANF Lincoln Lake
DESCRIBING A LOCATION
<ul style="list-style-type: none">• Be succinct• Use nearby named places, landmarks, political or physical, or road intersections• Use distances and cardinal directions if in relation to landmark
Examples 1 km north of Dawson Butte Great Western Reservoir Open Space, south of reservoir 100 m south of intersection of CO RD 17 and Hwy 24 North east of Eads. 2.5 km north of Eads airport.

Data Sheets

Collector	Date	
Assoc. Collectors		
Habitat type & description		
Site/Location name		
Lat/Lon	elev.	
#	Within viewshed <input type="checkbox"/> Abundant >500 <input type="checkbox"/> Common 101-500 <input type="checkbox"/> Frequent 11-100 <input type="checkbox"/> Occasional 6-10 <input type="checkbox"/> Rare 1-5	
ID	<input type="checkbox"/> Tissue Sample	
DYNAMIC PROPERTIES ASSOC. TAXA MICROHABITAT	CPC PopSize Est <input type="checkbox"/> >500 <input type="checkbox"/> 101-500 <input type="checkbox"/> 31-100 <input type="checkbox"/> 11-30 <input type="checkbox"/> 1-10	
	CPC % Reproductive	
	# Plants Seeds Collected From	
	<input type="checkbox"/> Scouting	
SLOPE	ASPECT	SOIL
#	Within viewshed <input type="checkbox"/> Abundant >500 <input type="checkbox"/> Common 101-500 <input type="checkbox"/> Frequent 11-100 <input type="checkbox"/> Occasional 6-10 <input type="checkbox"/> Rare 1-5	
ID	<input type="checkbox"/> Tissue Sample	
DYNAMIC PROPERTIES ASSOC. TAXA MICROHABITAT	CPC PopSize Est <input type="checkbox"/> >500 <input type="checkbox"/> 101-500 <input type="checkbox"/> 31-100 <input type="checkbox"/> 11-30 <input type="checkbox"/> 1-10	
	CPC % Reproductive	
	# Plants Seeds Collected From	
	<input type="checkbox"/> Scouting	
SLOPE	ASPECT	SOIL

Metadata Dictionary

Field Work Metadata Dictionary
Vouchers Taken
Collector/Associated Collectors Same as Darwin Core term recordedBy. A list of names of people, groups, or organizations responsible for recording the original Occurrence. The primary collector or observer, especially one who applies a personal identifier (recordNumber), should be listed as collector.
Date Same as Darwin Core term eventDate. The date-time or interval during which an event occurred. For occurrences, this is the date-time when the event was recorded. recommended best practice is using the format YYYY-MM-DD.
Site/Location Name The assigned name or locality description of the site where the study is taking place.
Latitude Same as Darwin Core term decimalLatitude. The geographic latitude (in decimal degrees, using the spatial reference system given in geodeticDatum) of the geographic center of a Location. Positive values are north of the Equator, negative values are south of it. Values lie between -90 and 90, inclusive.
Longitude Same as Darwin Core term decimalLongitude. The geographic longitude (in decimal degrees, using the spatial reference system given in geodeticDatum) of the geographic center of a Location. Positive values are east of the Greenwich Meridian, negative values are west of it. Values lie between -180 and 180, inclusive.
Elevation Same as Darwin Core term minimumElevationInMeters. The lower limit of the range of elevation (altitude, usually above sea level), in meters. If elevation is recorded in feet, please denote "ft" or "feet".

- Equipment
 - Check out the [Field Trip Checklist](#) to make sure you have what you need. All collecting equipment is found in the Prep Room (room 121; Appendix 1) off the FNC loading dock.



- Specialized collecting equipment must be pre-arranged through the Research Coordinator (Karen, karen.rojasmeza@botanicgardens.org) including items such as:
 - GPS units
 - tablets
 - beacons
 - quadrats
 - densimeters
 - soil moisture probes
 - cameras

In the field:

- First, agree on a naming schema for the site where you're collecting – be clear and consistent and use existing site names. When describing the site, be succinct and use distances/ cardinal directions.
- Make notes about the site in the field book. Include the fields:
 - latitude & longitude
 - elevation
 - slope
 - aspect
 - substrate moisture level (feel/ball test described in [metadata dictionary](#) of the field book)
 - terrain
 - land use/disturbance
 - soil type



- Before collecting your specimen, assign it your collector number (start at 1 and move up sequentially) – this number will correspond to the number you write on your specimen’s newsprint. Assign the specimen a field identification which could just be as broad as family level or even a brief description of the plant (ex. yellow aster, grass with hairy ligule, etc). Do not change your collection number later. If you accidentally use the same collection number for two different collections, you can add A and B after the number to distinguish between the two collections.
- Take photos of the environment, the plant in the ground, and the crew you’re working with (make sure the camera GPS is turned on) note the photo numbers and describe photo’s contents in a field photography notebook. You can [upload this photo to iNaturalist later](#).



- Make a list of the associated taxa, note any microhabitats, and record the plant’s abundance. Include descriptions of the plant’s dynamic properties such as:
 - phenology
 - height
 - diagnostic traits that degrade over time (smell, petal color, etc.)
 - habit
- After filling out information in the field book and taking the appropriate photos, dig the specimen out of the substrate while trying to maintain the root structure.
 - Use a single piece of newsprint for each specimen and label it with your initials and the collection number on the bottom creased side.
 - Use a field press to determine appropriate amount of material. Your specimen needs to fit on mounting sheet which is the size of the field press.
 - If the specimen is oversized, fold it as many times as needed so it fits into the press and tear off small a piece of newsprint, make a slit in it, and place the slit over any folded plant parts to keep them in place.
 - Dissect bulky root balls and cut off outwardly projecting branches.



- Take off a quarter-sized piece of tissue sample and place it in a coin envelope labelled with date, collector, and collector number. Place tissue envelopes into a bag of silica.
 - If collecting several individuals for the same collection, use jewelry tag to denote which individual was sampled.



Back at the Gardens

- Refer to the [Return from Field Checklist](#) for a quick guide of steps to take.
- Transfer the contents of your field press into a permanent press.
 - Set the plant up how you want it to look forever – open flowers, expose grass ligules, dissect large fruits.
 - Consider leaving room for a specimen label in the bottom right corner.
 - Make sure all newsprint is labeled with collector initials and number.
 - If plant is sticky or has juicy fruits, line the inside of the newsprint with wax paper, so the plant doesn't stick to the newsprint.
 - The press should have two pieces of cardboard on either end, and the specimen newsprint should be sandwiched between two pieces of blotter paper with a piece of cardboard in between specimens.



- Double check that you took a tissue sample of each specimen.
- Use two orange, Nylon straps to secure the press.
 - Face the nylon straps in opposite directions and double back the loose end of the strap through the pre-tied loops
 - Stand on top of the press to get it as flat as possible. Tie a forward knot in both the straps



- Fill out a Drier Tracking Sheet (magnetized to drier door) and place it in the slats of your permanent press.
- Place the press on its side in the drier to maximize airflow.



- Write your name and the date on the dry erase board on the front of the drier. Email the Collections Assistant (margo.yousse@botanicgardens.org) that you've placed a press in the drier.
- Transfer coin envelopes of tissue sample into bulk silica boxes on Prep Room shelves.
 - If you're not assigned your own silica bin add envelopes to the Incoming 2022 sample bin.
 - Please do your best to keep your envelopes in order.



- Transcribe specimen data into the appropriate [spreadsheet template](#).
 - Our Scientific Data Manager is very happy to answer any questions or provide clarifications and tips with the spreadsheet.
 - Contact the Scientific Data Manager (richard.levy@botanicgardens.org) when you're finished transcribing field notes and identifying your specimens so the data can be uploaded, and labels can be made.
- Coordinate with the scientific data manager (Rick) to get your photos uploaded and named properly.
- If further specimen identification help is needed, please contact the collections assistant (margo.yousse@botanicgardens.org) to work out a time where you can come use the herbarium resources and get experts to confirm the IDs of your specimens

Appendix 1: Prep Room Layout



A. Field Presses

B. Tissue Sample Envelopes

C. Jewelry Tags

D. Permanent Presses

E. Nylon Straps for Permanent Presses

F. Digging/Cutting Tools

G. Wax Paper Bags/Paper Bags



H. Cardboard

I. Blotter Paper

J. Tissue Sample Repository

K. Newsprint

L. Bins for Extra Dry Silica and a Wet Silica Repository



M. Drier Tracker Sheets

N. Cactus Drying Bucket

- Slice your cacti pad in half or barrel cactus into thirds and place in the bucket (knives and tongs can be found on the back herbarium bookcases). Cover the specimen in ethanol which is found upstairs in the Ecology Lab's flammable cabinet. Leave bin with cactus and ethanol in flammable cabinet for 24hrs, then press [according to these additional guidelines](#).