



Department of **Biodiversity,
Conservation and Attractions**
Western Australian Herbarium

Western Australian Herbarium Research Collection User Guide

The Western Australian Herbarium (PERTH) is a part of the Department of Biodiversity, Conservation and Attractions. It is responsible for the description and documentation of the botanical (plant, algal, and fungal) biodiversity of Western Australia.

The Western Australian Herbarium is located at the Keiran McNamara Conservation Science Centre (17 Dick Perry Drive, Kensington, WA 6151).

The Western Australian Herbarium consists of two collections:

Reference Collection, publicly accessible during normal working hours Monday – Friday, 8.00 am to 5.00 pm, except Public Holidays, and during a twice yearly scheduled intensive cleaning (March, September).

The Reference Herbarium is a primary resource for both the community and industry consultants for identifying specimens. While the Reference Herbarium is not complete, and will at times be insufficient to finalise an identification, it is generally sufficient for most user's needs.

Research Collection, restricted access, Monday – Friday, 8.30 am to 4.30 pm, except Public Holidays, during a twice yearly scheduled intensive cleaning (March, September), and a December-January closure. The Research Collection should be accessed only when the resources of the Reference Herbarium have been exhausted.

The Research Collection is a valuable and irreplaceable resource which underpins flora conservation, biodiversity surveys, and taxonomic and other scientific and cultural research. Scientific botanical specimens are managed to protect their value indefinitely. Many specimens are fragile, and the Herbarium must balance the needs of users with the long term safety of its specimens. This is best served by ensuring that unnecessary and inappropriate handling is avoided wherever possible.

Herbarium rules and housekeeping

Access.

Unsupervised access to the Research Collection is available to visitors who need to intensively study the collection or regularly cannot satisfy their identification requirements using the Reference Collection or the Herbarium's Identification Service. Unsupervised use of the Research Collection is a privilege and requires prior approval from the Curator or the Collections Manager. Use of the Herbarium Collections outside regular hours requires permission from the Curator or Collections Manager, and is dependent on staff availability.

The Western Australian Herbarium acknowledges the Traditional Owners of the land and waters from where our collections have come, and pays respect to their Elders past, present and emerging.

Visitors who require single or infrequent access to the Research Collection may request access when needed; an escorted visit will be arranged in these cases. Please make an appointment at least 24hrs in advance at herbarium@dbca.wa.gov.au.

Visiting national and international scientists are requested to contact the Curator or Collection Manager in advance of travel to ensure availability of space in the Research Collection.

Induction training explains specimen handling procedures, quarantine, security, and evacuation protocols, and is offered to visitors who need frequent or extended access to the Research Collection at the beginning of the year, and end of each month (see <https://waherbariuminduction.eventbrite.com.au> for upcoming dates).

Access for regular users is granted for one calendar year and may be terminated if the terms and conditions of use are breached. Access is provided upon signing the Herbarium Register at Reception each day on entry and exit. A security card will be issued daily and must not leave the facility. Security swipe cards are not transferable. Please report the loss of a security card immediately to reception.

The Collections Manager will allocate temporary bench space and equipment for visitors.

Herbarium specimens are vulnerable to damage from a range of insect pests. Visitor's specimens required for study in the herbarium are to be frozen for a minimum period of 7 days by the herbarium, or placed in a snap lock bag. Refer to the *Integrated Pest Management Plan* for further details.

The Type Room and Loan Storage Rooms can be accessed only with the permission of the Curator or Collections Manager. These rooms have gas fire suppression; ensure you move quickly out of these areas in times of emergency.

Ancillary collections available at PERTH include nomenclatural type, historical (<1829), spirit, microscope slide, and carpological specimens. The carpological specimens are housed at the end of each family. Please contact the Collections Manager if you require access to other ancillary collections.

Digital data is available from FloraBase (<https://florabase.dpaw.wa.gov.au/>) and the Australasian Virtual Herbarium (https://avh.ala.org.au/occurrences/search?q=collection_uid%3Aco75). Please email herbarium@dbca.wa.gov.au if you should need assistance with a specific query.

Comfort.

Neither food nor beverages (including water bottles) are permitted in the Research Collection Vaults or Vestibules. A café is available on the Ground Floor, pleasant outdoor seating surrounds the building, and a tea area is available on the First Floor.

Smoking is not permitted in the building or within 5 metres of any part of the building.

As part of our Integrated Pest Management protocols, the Herbarium Vaults are maintained at around 16°C and 45-50% relative humidity, with some areas experiencing high levels of air movement. Vestibules are maintained at around 20°C. These temperatures may be uncomfortable for some people. Please bring something warm to wear.

Please wear enclosed shoes for safety.

If you are working in the collections, we will provide access to seating and ergonomic mats for your comfort and to avoid fatigue. Anti fatigue mats, provided on request, are only to be used when standing. Chairs/stools are not to be placed on the mats as this reduces the free movement of the chair and may cause injury.

Extra lighting is provided in all work locations should it be needed.

While we are not a library, please consider other patrons of the Herbarium at all times:

- Speak in quiet tones
- Switch mobile phones to silent
- Take phone calls outside
- Wear appropriate clothing and maintain appropriate personal hygiene. Clean field clothing is acceptable.
- Don't monopolise resources at the expense of others
- If the behaviour of other patrons seems inappropriate, please inform staff.

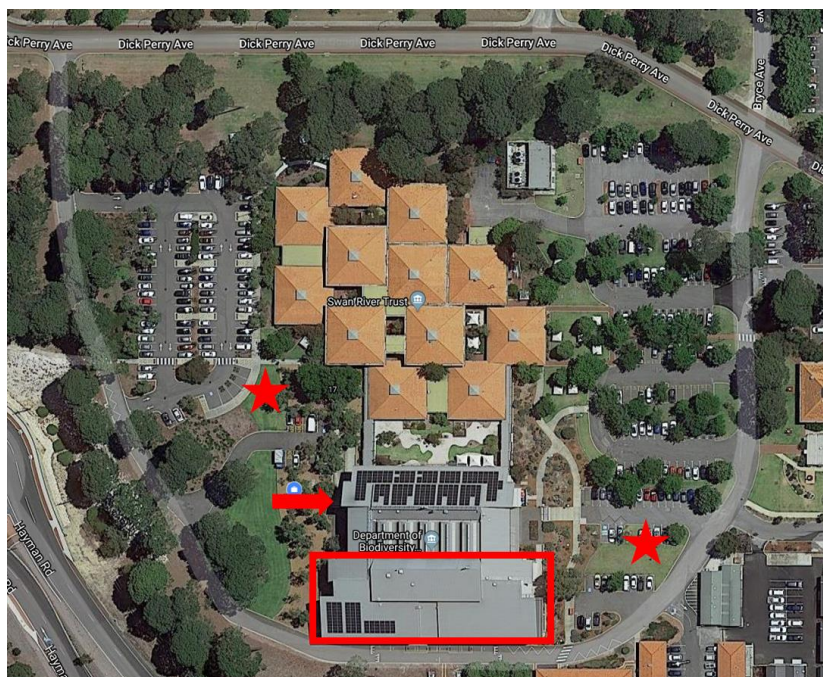
Safety considerations.

Corridors should always be kept clear. Please do not leave trolleys, ladders, kick stools or stacks of boxes where people can trip or where access pathways can be blocked.

Freezer access is not permitted, please request assistance.

Please familiarise yourself with Appendix 1: Hazardous Herbarium Specimens.

Familiarise yourself with the emergency exits and evacuation routes. In an emergency follow the directions given by fire wardens, moving as quickly as possible to the nearest exit and assemble in the demarcated Evacuation Assembly Areas.



Department of Biodiversity, Conservation and Attractions. The red rectangle is the Western Australian Herbarium, arrow indicates reception, stars indicate Evacuation Assembly Areas.

Any unusual noxious smells, smoke, spillages of chemicals, etc., must be reported immediately to any available staff member.

In case of emergency, do not use the lift/elevator. Do not stop or go back to collect belongings. Do not re-enter building until told to do so by a staff member. Do not leave the vicinity unless directed.

Do not open fire exits unless there is an emergency.

Should you be required to use the lift/elevator during normal operation, and an emergency should arise, please follow this procedure:

- Press and hold the telephone button for 5 seconds: the alarm will be activated.
- A connection to Schindler will be made; wait for an operator and provide your details.
- Wait patiently; available Herbarium staff will try to communicate with you.
- Should the lights go out, a push-on safety light is installed to the left of the doors of the eastern elevator (with no windows).

Should you need medical assistance please immediately inform an Herbarium staff member.



On each of the three levels of the Herbarium is a First Aid Station marked with large green signs. An Emergency Eye Wash station is located on the Ground Floor in the Preparation Laboratory.

First Aid supplies are housed in a mounted metal box on the wall. A defibrillator and oxygen are located on Ground Level by Reception.

Emergency First Aid Contact

Position	Phone Number
Ambulance, Fire, Police	000
Health and Safety Officer	9219 9778
Collections Manager	9219 9130

Integrated Pest Management Information.

Please ensure your shoes, clothing, and belongings are free of plant material and soil.

Entry and exit to the Vaults is through the Vestibules only (except in emergency situations). Please do not leave doors to the Vestibule or Vaults open.

Please do not move specimens between floors or between Vaults. No specimens are to be left outside of boxes overnight.

Please do not bring into the Collections areas the following items:

- Unsealed food and beverage items,
- Any tobacco products,
- Corrugated cardboard and other paper products, and
- Fresh or dried plant material (e.g., plant cuttings, potted plants, fresh flowers, seeds, dried herbs, tea).

Please report any beetle, booklice, silverfish, or other insects found in the building immediately to a member of the Collections Team and the Collections Manager.

Use of specimen driers and other facilities located in the Preparation Laboratory require prior arrangement with the Collections Manager.

Specimen and box handling information

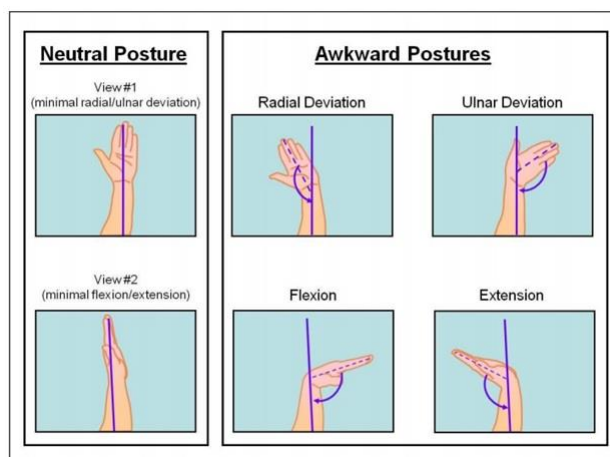
The Research Collection is housed in four separate Vaults on the First and Second Levels. Cryptogams are housed in Vault 1; fungi, lichens, algae, and bryophytes are arranged alphabetically by genus. Ferns are in the process of being arranged to PPGI, and are in Vault 1. The systematic sequence for vascular specimens in both the Research Collection and Reference Herbarium follows the ordinal phylogeny of the Angiosperm Phylogeny Group (APGIV 2016). Genera within families-species-infraspecific taxa are arranged alphabetically. In both Reference and Research Collections, indexes of families and genera are available, providing the Vault number and row number for the START of the taxonomic group (and start of the columns for each family).

Specimens in the Research Collection are kept in sealed plastic boxes to reduce the possibility of insect and water damage.

Please note the following safety considerations in **handling PERTH boxes**.

- Full boxes may be heavy and weigh as much as 7 kg.
- Remove the box from the racks and place on flat surface before opening the lid. Take care and avoid using thumbs to open the lids.

- Prior to moving a box, ensure the front lid is in the locked position.
- Use a locking safety ladder to remove a box from the specimen racks if the box is above shoulder height. Maintain three points of contact at all times (two feet and hip or hand) and work in pairs to pass down boxes. Please advise an Herbarium staff member if you are unable to easily access specimen boxes, and particularly if you find the boxes too heavy to manage.
- Use proper lifting technique (squat or semi-lunge) for boxes below mid-thigh.
- The box is to remain horizontal at all times.
- Carry the box holding the sides and bottom, with the lid facing your body. Avoid extended gripping using thumbs.
- Carry one box at a time or move multiple boxes using a trolley (available in Vestibule).
- Place the box back in the same position as removed (checking the address on the label).
- Check the lid is in the locked position.
- Be gentle when opening, closing, handling and moving boxes; abrupt, heavy and rough movement can damage specimens.
- For repetitive hand and wrist actions ensure a neutral posture to avoid injury.



Please take care when **handling specimens**:

DO

- Wash your hands before and after handling specimens.
- Maintain sheets within their flimsy, folder and box, specimen side always up.
- Place specimens with care, rather than sliding them between or across other specimens.
- Ensure the specimens are aligned neatly.
- Hold specimens horizontal and slowly and carefully place all the way into the box before closing the lid.
- Always use a red support (plastic tray) when carrying specimens removed from boxes.
- Enclose the tray tag within the box upon closing the lid.
- Ensure the lid locks shut.

DO NOT

- Remove specimens from the Vestibule.
- Bend, twist or flex specimens.
- Turn specimens over like the pages of a book.
- Place heavy objects on, or lean on, specimens.

- Drop or knock piles of specimens.
- Overfill a box. A box is considered full when the top folder within a box is gently resting on the top inside of the box (this may not be obvious from the front of the box). If any resistance is met when placing a folder into a box then the box is overfull, incorporate into another box or alert Collections staff.

When in doubt, folders and specimens should be left on the side table in the Vault or in the Vestibule and the Collections Team be alerted. Remember: Misfiling is worse than not filing.

Permission must be sought from the Curator or the Collections Manager before:

- *Removing specimens from the Vestibule.*
- *Removing any part of a specimen for morphological or anatomical study.* All dissected portions of specimens are to be placed in 'cellophane' packets, folded and placed under a stem. Place these specimens aside for the Collections Team to further curate.
- *Removing fragments of specimens for destructive sampling.* Destructive Sampling MUST be approved prior to removal of any part of the specimen. Refer to the *PERTH Destructive Sampling Policy* for further details.

Please notify the Collections Team if you notice irregularities, damaged or insect attacked specimens, or consider a specimen to be type material.

Annotation slips can be generated, upon request, by members of the Collections Team.

DO

- Write interpretations of the primary data or redeterminations on slips, when necessary.
- Write legibly with permanent ink (provided - preferred) or pencil.
- Ask the Collections Team to generate personalized slips, as needed.
- Place slips sticking out from under a label or stem to avoid loss.
- Set aside annotated or damaged specimens for the Collections Team to curate.

DO NOT

- Alter, correct or remove information on labels or slips.
- Glue down slips.

Please include the plant's name with author, your name and the date of determination. For nomenclatural type specimens please include the current name as well as the basionym, the publication details, and the category of type specimen.

Specimens required for loan can be set aside and the Collections Manager notified. Loan requests are between institutions, not individuals, and an official loan request is required from an Index Herbariorum-registered institution before specimen loans can be processed.

Specimens may be photographed with permission; no flash photography. High-resolution images of herbarium specimens are available on request; if required please contact the Collections Manager.

The order of folders within a species must be maintained. At PERTH the specimens are housed in the Research Collection in the following order within a species:

- Subspecific taxa are housed alphabetically within a species.

- Specimens from WA are enclosed in a thick white folder.
- Specimens from other states within Australia are enclosed in a coloured folder (each state is represented by a different colour; order within this category is unimportant).
- Specimens from outside Australia including Australian territories are enclosed in a black folder.
- Specimens that have an affinity to the taxon (e.g., preceded by ?, aff., cf.) are placed in a folder at the end of the taxon.

Contacts

Curator: John Huisman, John.Huisman@dbca.wa.gov.au, 9219 9137

Collections Manager: Shelley James, herbarium@dbca.wa.gov.au, 9219 9130

Appendix 1: Hazardous Herbarium Specimens

Do not work with specimens if you have a known allergy to a plant group (e.g., grasses).

Talk with your supervisor to assist with working out a work program to avoid the plant group.

Avoid scratching your skin or rubbing your eyes whilst working with the specimens.

Always wash hands before and after handling the specimens.

Optional Personal Protective Equipment (PPE) includes: laboratory coat, gloves, dust mask. Please contact the Collections Manager if PPE is required.

Prior to commencing work in the Collection:

- Be aware you may be working with hazardous specimens in the Herbarium.
- Take care in handling specimens and avoid contact with plant material at all times.
- Forceps are available for use with herbarium specimens.

Chemical Treatment

Prior to integrated pest management procedures, specimens were treated with various chemicals to prevent insect attack. The concentration within the collections of these chemicals is low.

Mercuric chloride - Any older specimens (pre-1974) may have been treated with mercuric chloride. Mercury vapour can accumulate in tightly closed boxes. Mercury could accumulate in the blood stream leading to heavy metal poisoning. The concentration of mercury vapour in this well ventilated herbaria is extremely low, and all backing sheets have largely been removed.

LaurylPentaChlorPhenate (LPCP) – organochlorine compound used as a pesticide from 1930's to 1974.

Methyl bromide – an ozone depleting substance used as a fumigant for quarantine purposes.

Naphthalene - both the solid and the vapour states are toxic. Naphthalene is sold as flakes or a solid block (white crystals). Suspected of causing cancer. While the Western Australian Herbarium never actively used naphthalene for pest management, specimens from collectors and other institutions may have been exposed to this chemical.

DichloroDiphenylTrichloroethane (DDT) – used as DDT dust, toxic on contact and suspected of causing cancer. All older Australian agricultural specimens (pre-1987) should be regarded as potentially contaminated.

To reduce your exposure to harmful chemicals, there are recommended routine practices to follow whilst working in the Herbarium:

- Thoroughly wash hands before and after handling specimens.
- Open box in well ventilated area, remove specimens and allow approximately 5 minutes for gaseous vapours to disperse. If easy to do so, move to another location for a short time.

- If concerned about chemicals used on specimens or on the paper, wear disposable gloves (lab coat optional).

Awareness of hazardous plant groups

Hazards may be common to a plant family or genus, or unique to a plant part.

At all times, handle only the backing sheet and with care to avoid injury to yourself and the specimen.

Some of the more prominent hazardous plant families are listed below – please note that this list is by no means exhaustive, and prior assessment should be taken before undertaking work in any part of the herbarium.

Plant group	Hazard	Safety controls – PPE is optional
CYCADACEAE	Neurotoxins; gastrointestinal irritation.	Handle with gloves.
FERNS FUNGI/mould on specimens)	Potential for inhaled spores.	Dust mask.
URTICACEAE (esp. <i>Dendrocnide</i> , <i>Laportea</i> , <i>Urtica</i>)	All parts have stinging hairs which causes irritant dermatitis and respiratory irritation. Pain can last for hours or months.	If necessary to handle the plant material, wear gloves and dust mask. Boxes containing specimens may be annotated “handle with caution”. See below for first aid.
CUNONIACEAE FABACEAE MALVACEAE MORACEAE	Irritating hairs which can cause contact dermatitis.	Handle with caution – no need for gloves if care taken.
CACTACEAE	Spines may penetrate skin.	Use tools not hands. If necessary to handle the plant material then wear heavy duty gloves.
ASTERACEAE CHENOPODIACEAE FABACEAE PROTEACEAE ROSACEAE SOLANACEAE VERBENACEAE	Species with thorns/spines or prickles which may penetrate or puncture skin.	Handle with caution – no need for gloves if care taken.
ANACARDIACEAE ASTERACEAE CANNABACEAE EUPHORBIACEAE MORACEAE RANUNCULACEAE	Potential for skin irritation.	Known hazard with fresh sap, unlikely to encounter a hazard when dry. Disposable gloves are available if required.
PROTEACEAE (<i>Grevillea</i>)	Pollen can cause skin irritation (contact dermatitis).	If sensitive wear disposable gloves to protect from pollen.
GRASSES	Respiratory allergy due to pollen, contact allergy.	If sensitive wear appropriate PPE.

First Aid

For Urticaceae and stinging hairs:

- Do not scratch or rub the affected area, as this can cause the hairs to break off and make them very difficult to remove.
- Remove visible hairs with tweezers.
- Alert an herbarium staff member and they will provide wax strips. Apply adhesive tape or warmed wax hair removal strips to area and quickly rip off to remove the finer hairs.

Alert herbarium staff if you suffer from allergies. You may wish to discuss where your medication is kept in case of emergency.

If you suffer from asthma or other respiratory illness, ensure you have your medication with you before working in the Collection.

If you notice your eyes are itchy, wash eyes thoroughly with water without rubbing your eyes. An eye wash station is located on the Ground floor in the Preparation Laboratory.

All other first aid injuries, render your own first aid. If more serious, or you are in doubt, ask for a first aid officer or the Health and Safety Officer. In emergency, dial 000 for emergency services.