What's a herbarium?

A herbarium is like a warehouse of information about plant biodiversity. Plant samples are taken from the field by people with special collecting permits, then dried or otherwise preserved. They are then carefully stored in archival conditions to ensure their longevity. These specimens, including information about them, are kept to learn more about the plants and their habitat.

To see an example of a herbarium specimen visit www.chah.gov.au/avh/help/specimen/index.html

Dried herbarium specimens are expertly mounted on archival paper so that they can be preserved for hundreds of years.

The information label has all the original information about when and where the plant was collected – this information is databased.

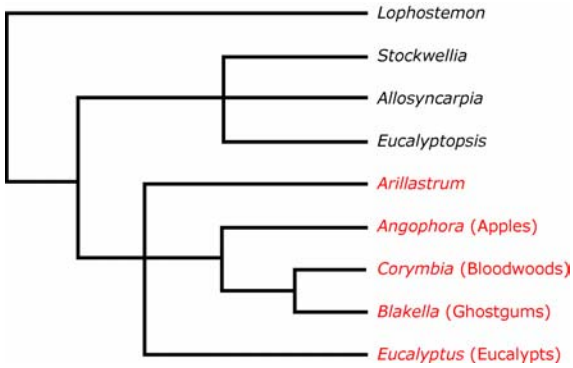
Some plants, like orchids, are stored in alcohol to help maintain their unique shape.

Sheets with mounted herbarium specimens are catalogued in 'compactus' units under very specific archival conditions.

What are herbaria used for?

The collections housed in herbaria are primarily used for scientific research. Research that might commonly take place in a herbarium includes:

- Mapping current and past ecological and geographic distribution of plants to help with landcare and bioprospecting;
- Evolutionary history of plants;
- Existing and changing nature of plant communities and their habitats;
- Invasion biology and weed ecology;
- Molecular phylogenetics; and
- Classification and naming of plants.



Herbarium specimens and information about them help to correctly identify plants, such as the spotted gum – Corymbia maculata *(right), and its relationships with other plants (above).*

Many specimens in herbaria are unique. The Australian National Herbarium holds specimens that date back to Captain Cook's expedition in 1770. These specimens are particularly valuable not just because of their cultural significance but because they are a snapshot of Australia's botanical history that can never be recaptured.

Owing to the precious nature of herbarium specimens they are not usually available for the public to view or handle and most herbaria have restricted access to minimise damage to their collections.

Plant specimens are mounted by trained volunteers (above), then entered into databases (right), like Australia's Virtual Herbarium that contains millions of records of plant specimens.

The Australian National Herbarium

The Australian National Herbarium (ANH) contains over 1.4 million herbarium specimens, including 120,000 located at Atherton, and is the largest herbarium in Australia. It is jointly supported by CSIRO Plant Industry and the Australian Government Department of the Environment and Heritage as part of the Centre for Plant Biodiversity Research.

Working as part of the ANH in Canberra are around forty researchers, PhD students and technical and support staff. This is supplemented by a number of honours students, summer students and botanical interns throughout the year. At any time up to five visiting scientists also work at the ANH in Canberra. A group of about fifty volunteers also assist with specimen processing, especially mounting.

The Australian National Herbarium in Canberra was extended in 1994 to accommodate more specimens, expand the library and map resource rooms as well as molecular laboratories essential for developments in modern herbaria research.

Research at the ANH focuses on Australian native plants and plants of Papua New Guinea, Indonesia and New Zealand. Staff at the ANH employ a range of techniques in molecular biology, environmental modelling and community ecology and have specific expertise in eucalypts, orchids, melaleucas, daisies, mosses, hopbushes and lilly pillys.

The ANH is recognised as the national herbarium for Australia and maintains its collections under high quality standards and is recognised for its international reputation and standing.

To share scientific knowledge and resources, the ANH participates in a loan program whereby herbarium specimens are loaned to other scientific institutions where scientists can research them. Although not open to the public the ANH offers guided tours to special interest groups.

For more information on the ANH visit www.cpbr.gov.au/cpbr/herbarium.

Modern herbaria research relies on new specialist techniques such as molecular biology as well as classical methods. The ANH is supported by extensive laboratory facilities and expertise to analyse the molecular nature of Australia's plants.

The Atherton Herbarium

The Atherton Herbarium is part of the Australian National Herbarium (ANH) housing 120,000 of the total 1.4 million specimens of the ANH. These specimens are predominantly tropical plants of Australia with some from Papua New Guinea.

Since the establishment of the Atherton Herbarium in 1971 researchers there have been responsible for discovering many new species and identifying a number of rare species in Queensland's rain forests. The Atherton Herbarium has successfully documented the rain forest flora of northern Queensland which was poorly known prior to its establishment.

As part of the Australian National Herbarium, the Atherton Herbarium, Queensland (above) houses 120,000 herbarium specimens.

Visitors and student groups may be given a behind the scenes glimpse of the facility during guided tours (left).

Specimens held at the Atherton Herbarium also provided the information necessary to develop the interactive identification key *Australian Tropical Rain Forest Plants – trees, shrubs and vines*.

Two retired botanists expert on rain forest flora are adding to the interactive rain forest identification key *Australian Tropical Rain Forest Plants: trees, shrubs and vines* by including orchids, herbs, ferns, grasses, pandans, parasites and palms. They are available for discussion at Atherton Herbarium by appointment. One person works at the Atherton Herbarium to ensure specimens are maintained correctly and specimen loans are arranged.

Local scientists use the Atherton Herbarium as the basis for field work and local community groups use its resources for reference purposes. The Atherton Herbarium is not open to the public, but occasionally supports visiting scientists and takes guided tours.

Collecting plant specimens and undertaking field work in Queensland's rainforest is an ongoing and important component of research into Australia's tropical flora.

Delivering information

The ANH is committed to making information about plants readily available in user friendly formats to other researchers, the public and special interest groups. A particular focus for the ANH is ensuring information from the Atherton Herbarium is available to scientists and others interested in plants of the rain forests of Queensland.

Three resources currently available are Australia's Virtual Herbarium, the interactive identification key titled *Australian Tropical Rain Forest Plants: trees, shrubs and vines*, and the Atherton Herbarium Reference Collection. These resources will be built on and are available in Atherton.

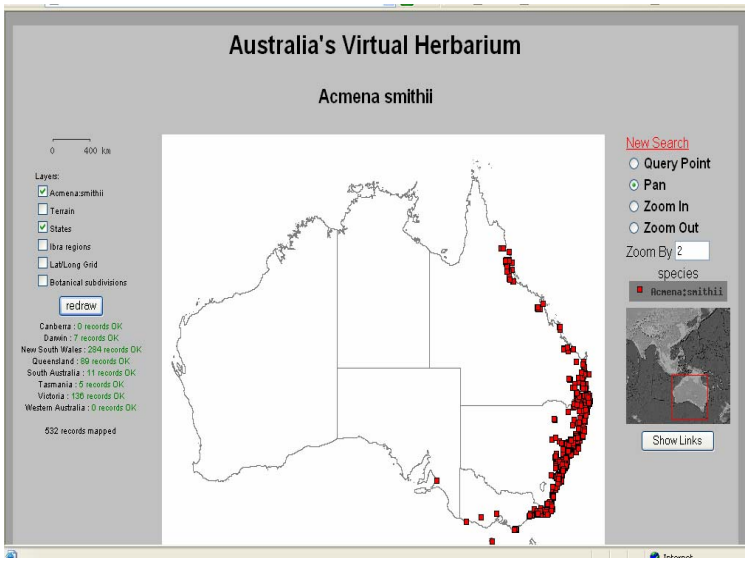
Australia's Virtual Herbarium

Australia's Virtual Herbarium (AVH) is a collaboration between all major herbaria in Australia to make available over the internet information on Australian native plants.

All information about a herbarium specimen is included in the AVH including what plant it is, date it was collected, who collected it, where it was collected, neighbouring plants and habitat.

Information associated with six million herbarium specimens across Australia will be recorded as part of the AVH. Users will be able to find the geographic distribution, view images, read about and identify Australian native plants through the AVH.

All the specimens held in the Atherton Herbarium have been databased and their transfer to the AVH will be complete by December 2004.



Australia's Virtual Herbarium is particularly useful for mapping the distribution of plant species such as the Australian rain forest plant Acmena smithii *(lilly pilly) shown here.*

A computer terminal is available at the Atherton Herbarium for access to the AVH by other researchers, the public and special interest groups. Demonstrations of the AVH in Atherton can be arranged by contacting the Atherton Herbarium Assistant.

For more information on the AVH visit www.chah.gov.au/avh

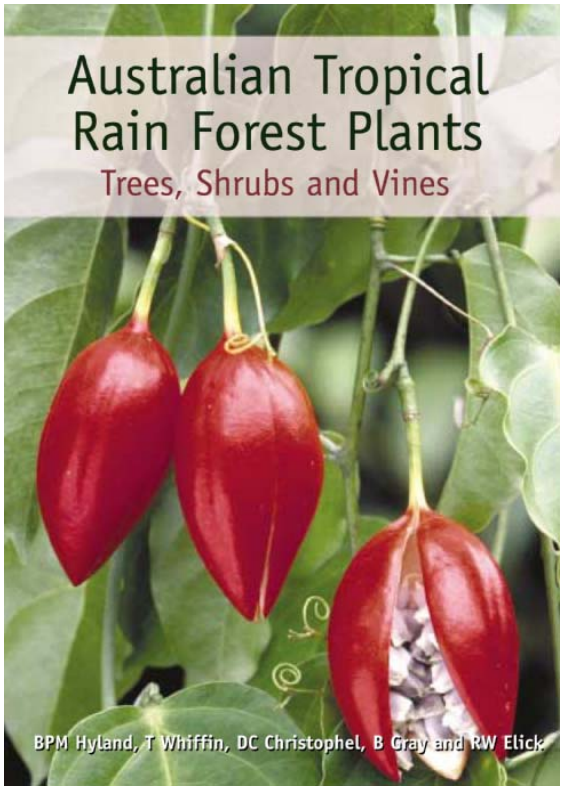
Australian Tropical Rain Forest Plants: trees, shrubs and vines

Available on CD *Australian Tropical Rain Forest Plants: trees, shrubs and vines* is an interactive identification and information system for 2,154 species of trees, shrubs and vines of northern Australian rain forests. It includes species in northern Australia, from Broome in Western Australia to Townsville in Queensland and is based on the collection of Australia's tropical flora held in the Atherton Herbarium.

The CD is easy to use and provides a simple means of naming a rain forest plant using whatever information is available, such as leaves, flowers, plant shape etc. By selecting characters from the plant and responding to a series of choices, the user is able to achieve identification via a process of elimination. A total of 154 characters, covering the morphology – habit, bark, leaves, flowers, fruits, buds and seedlings – and some geographic and ecological information ensure reliability of the key is high. Interpretation of the character information is assisted with help notes and images featuring colour or line drawings.

A comprehensive information system for each species includes common name, scientific name, geographic and ecological information, distinguishing features and natural history notes. The descriptions are combined with high quality colour images for most species, leaf X-ray images and a map showing natural distribution.

Work is underway to expand the key further to include orchids, ferns, herbs, grasses, pandans, parasites and palms of Queensland's rain forests.



A copy of *Australian Tropical Rain Forest Plants: trees, shrubs and vines* is available for other researchers, the public and special interest groups to use at the Atherton Herbarium. To arrange an appointment to use it please contact the Atherton Herbarium Assistant.

To order a copy visit
www.publish.csiro.au/pid/3400.htm

Australian Tropical Rain Forest Plants: trees, shrubs and vines *is an excellent tool for people wanting to identify or learn about plants of Australia's tropical rain forests.*

Atherton Herbarium Reference Collection

Some herbaria have reference collections that are available to other researchers, the public and special interest groups to use. Reference collections contain samples of specimens that represent species preserved in the main collection and usually of a particular geographic region.

The Atherton Herbarium has established a reference collection that represents about 95 per cent of all the species in the main collection of the Atherton Herbarium including most rainforest species of northern Queensland. By December 2005 it will represent 100 per cent of species.

The Atherton Herbarium Reference Collection includes specimens that represent plant species from the Atherton Herbarium and provides access to maps and computers to assist with plant identification.

The Atherton Herbarium Reference Collection is available to use to assist in the identification of northern Queensland's rain forest plants and for research purposes.

Specimens contained within the Atherton Herbarium Reference Collection are specially mounted and covered in plastic so they can be safely handled by anyone without damaging the specimens.

As appropriate, specimens will be added and renewed to ensure the most representative and accurate selection of specimens remains available at all times.

Also available with the Atherton Herbarium Reference Collection are maps of northern Queensland and a computer terminal where visitors may access both Australia's Virtual Herbarium and the CD *Australian Tropical Rain Forest Plants: trees, shrubs and vines*. These facilities will supplement the actual specimens to provide a complete resource of botanical information about plants of northern Queensland.

The Atherton Herbarium Reference Collection is currently available to members of the public and research scientists. Members of the public and scientists are welcome to use the Atherton Reference Collection by making an appointment with the Atherton Herbarium Assistant.

Useful contacts

CSIRO Enquiries
1300 363 400

CSIRO Enquiries is your one stop shop for general enquiries about CSIRO and general science enquiries. It can also help you find a publication, learn about a science topic and act as a general access point to CSIRO if you don't know who to call specifically.

Atherton Herbarium Assistant
07 4091 8804

The Atherton Herbarium Assistant is based at the Atherton Herbarium. Please call the Atherton Herbarium Assistant to make an appointment to visit the Atherton Reference Collection or for assistance with general enquiries about plants of northern Queensland.

Dr Judy West
Director of the Centre for Plant Biodiversity Research (CPBR)
02 6246 5113

The Director of the CPBR manages the Australian National Herbarium that is responsible for specimens currently housed in Atherton and Canberra.

Please contact the Director if you wish to know when botanists from the Centre for Plant Biodiversity Research will be visiting Atherton.