Lesson 2.3.1: Collecting and caring for plant specimens

Key Activities / Resources

Preparation and materials:

- Through the NICA project *What Local Native Plant is That?,* seek expert advice on common plant species in a nearby bushland (identified in Lesson 1.1.2). Pass onto the experts any maps and information that the class has collated through Lesson 1.1.2.
- Tenure of the land is of particular importance. Remember it is illegal to collect specimens in National Parks and State Forests without permits. Although the latter may be obtained from the Environmental Protection Agency[40], it is recommended that schools avoid collecting in these areas. If the bushland is located within private land, permission must also be sought, from the land owner. If unsure, contact NICA.
- The experts will then survey the area, make notes on the particular ecosystems, vegetation types, key features and the most common 20 plant species (including trees, shrubs, herbs, vines, grasses, weeds if present). They will tie temporary tags to the plants. The tags will have the names of the plants and the experts who identified them, and marked as "weed" if it is a known environmental weed.
- The expert will report back to the teachers and suggest a trail through the bushland (considering accessibility, safety and minimizing levels of disturbance) where students will locate the tags and make field observations. Upon request and if available, the experts may accompany the teachers or the class to the field.
- Teachers will organize prior consent from parents for field trip to the bushland.
- Review all relevant field safety precautions and procedures.

Materials to take include:

- first-aid kit
- personal field gear (hat, water bottle, long-sleeved shirt, long trousers, rain coat, sun screen and insect repellent, rucksack)
- marked up maps from Lesson 1.1.2
- hard-back folders with at least 20 recording sheets for individual specimens (Resource sheet 2.3.1).
- a day press that is light enough to carry around, containing a few cardboard corrugates, a few dozen sheets of newspaper and some sheets of foam (for bulky items), held together by webbing straps. Refer to Resource sheet 2.3.2. Note the preferred size of the specimens and herbarium sheets, although for this project, smaller specimens and sheets that fit into the NICA Herbarium Plus folder may also be used. For small specimens and short field trips, cardboard corrugates and newspaper (or even a scrap book) secured by clips would suffice if wooden pressers are unavailable.
- collecting bags: plastic bags (zip locked or with rubber bands or ties to close them) and small brown paper bags for fruits and seeds
- pencils and field note books (optional for individual students)
- tie-on tags (with room for the scientific name and specimen number e.g. 001 which corresponds to that on the recording sheet)
- 1 or 2 pairs of secateurs
- hand lens and / or magnifying glass

[40] www.epa.qld.gov.au/ecoaccess/plants_and_animals (accessed Jan 09)

- gloves for handling prickly or sappy material
- a trowel or digging out herbaceous plants with underground structures
- digital cameras
- a GPS – Global Positioning System (if available)
- binoculars (if available)
- a soil testing kit (optional)

In the field:

- The teacher will lead the students along the trail proposed by the expert. This reduces disturbance.
- Students will take turn and work in pairs (or threes if GPS is available), to ensure that all students will have a chance to collect and record field information.
- Students will locate the plants with tags.
- Teachers will guide each pair of students in field observations and writing down field notes and GPS readings (if available) in the recording sheets for each specimen (Resource sheet 2.3.1).
- Be sure to take photographs of the whole plants (where possible) as well as distinctive plant parts on site and record the number of photos taken for each plant. To avoid confusion, take the first photo of each plant with the name tag on.
- All students are encouraged to record their own observations in their field note books and take photographs (if they have cameras) of the plants and the sites.
- Students will collect specimens and put them in the day press or plastic bags. Refer to Resource sheet 2.3.2 and preferably also the original Queensland Herbarium manual for details on selecting and handling the specimens.
- Don't forget to include in each specimen a tie-on tag with the specimen number (e.g. 001 unique in the herbarium collection of your school) and scientific name.
- Remove the tags from the plants when you are sure that you will be able to identify them in your next visit (or if this is your last visit to the site).

Back in class / lab:

- Share any interesting field observations and discuss what the students have learnt.
- If you were unable to press the specimens in the field, do them as soon as possible once you are back at school.
- Follow the instructions for drying and caring for specimens in Resource sheet 2.3.2 and preferably also in the original manual. If you do not have a presser and webbing straps, simply put a couple of large, heavy books on top of the specimens sandwiched in newspaper and cardboard corrugates.
- Set up a roster so student pairs take turn to check the specimens and change the paper for the next few weeks until all specimens are completely dry.
- Download all the photographs taken on the field trip, rename them by species names and organize them in a folder or a series of folders so that they can be retrieved easily.
- Prepare, preferably printed, permanent labels for all the specimens, extracting information from the recording sheet. Minimum information should include:
  - specimen number
  - scientific name
  - identified by
  - date of collection
  - collector
  - locality
  - habit (or growth form)

- When all the specimens are completely dry, fix them onto hard paper with glue and attach the permanent labels. When the glue is dry, put them into plastic sleeves and file in the Herbarium Plus folder. See a similar example at: www.noosariver.com.au/whatplant/your-herbarium/what-is-it/
- You may like to print out a few photos of the specimens in the field and file them into the folder also, along with the original recording sheets.
- Keep the folder in a cool, dry place.

Related or Extension Activities

Numerous related or extension activities may be sparked from the initial exercise of collecting and preserving the plant specimens. Below are just a few suggestions:

- Students each choose their favourite species (among the collected ones) and find out any / everything they can about them. Present these in the form of posters, paintings, written essays, stories, songs or poems. Interestingly, Music Australia[41] lists 32 pieces of music written about Wattles, the *Acacia*.
- As a class, take the fun challenge of choosing one species to be your Class or even School Flora Emblem. The challenge is initiated by the Australian National Botanic Gardens. Check out their education kit at www.anbg.gov.au/education/floral-emblem-ed/index.html#brainstorm
- Middle to upper high school students may want to review the specimens and group them according to families (e.g. Mimosacea, Myrtaceae, Moraceae, Fabaceae) or genera (e.g. *Acacia, Eucalyptus*). Students form small groups and research on the common characteristics of the families. Present these in the form of posters, songs or poems.

Resources

Queensland Herbarium's *Collecting and Preserving Plant Specimens Manual* (2007) provides a detailed, photographic guide to the procedures of plant collection and preservation, including reasons for collecting and notes on particular plant families, weeds and difficult groups. www.epa.qld.gov.au/publications/p01811aa.pdf/Collecting_and_preserving_plant_specimens_a_manual_version_3.pdf (accessed Jan 09)

An Introduction to Collecting Plants by Centre for Plant Biodiversity Research gives detailed guidelines on the collection and preservation of specimens as well as the kind of information to include in the field note book or recording sheets for the specimens. www.anbg.gov.au/cpbr/herbarium/collecting/collecting.html (accessed Dec 08)

Australian national Botanic Gardens' website www.anbg.gov.au/flora/index.html

Noosa's Native Plants website: www.noosasnativeplants.com.au

41

www.musicaustralia.org/apps/MA?function=searchResults&term1=Wattles%20(Plants)%20Songs%20and%20music.%20&scope=scope&parameter1=phrase&location1=Anywhere

Resource Sheet 2.3.1: Sample Recording Sheet for Individual Specimen

Specimen number (unique in your herbarium): _____

Species scientific name: _____

Family: _____ Identified by: _____

Collection date: _____ Collected by: _____

Locality: _____

Latitude: _____ Longitude: _____ Altitude: _____

Site map / description:

Rock / soil type (if known): _____

Vegetation (e.g. dry / wet health; tidal / freshwater wetland; wallum woodland; dry / wet Eucalypt forest, rainforest): _____

_____

Plant description (habit): tree / mallee / shrub / herb / fern / vine / parasite / tussock

Drawing & notes (indicate height & width, smell, sap, colours, bark, associated fauna):

Local abundance: dominant / abundant / frequent / occasional / rare

Form completed by: _____ Class: _____

Resource Sheet 2.3.2

Excerpt from *Collecting and Preserving Plant Specimens Manual*[42], Queensland Herbarium

Selecting the plant material

Select vigorous, typical specimens. Avoid insect-damaged plants. Collect at least two sets of specimens (duplicates) and number each set. Keep one set for your reference, and send the duplicate set to the Herbarium for identification or as a voucher if required. The Queensland Herbarium does not return specimens.

A good specimen includes underground parts, stems, leaves, flowers and fruits. Basal parts of grasses, sedges, ferns and bulbous plants are essential for identification.

The plant material should be fertile i.e. in flower or fruit (both if possible), as these characteristics are often vital for identification. Some time should be spent looking at a number of individuals, and choosing the one with a number of flowers or more mature fruits.

Choose individuals that show the variation in leaf, flower and fruit size. It may be important to show morphological variation, involving the collection of individuals of different sizes.

Collection of sterile material is acceptable for

- bamboos
- rainforest plants. Flowers and fruits are often very difficult to obtain in the rainforest but sterile material can usually be identified.
- some aquatic plants, for example Lemnaceae
- juvenile plants of a known species
- perennial weeds, as a record of naturalisation.

Size of the specimen

A specimen should ideally be 25-40 cm long and up to 26 cm wide, allowing it to fit on a standard herbarium mounting sheet which measures 42 x 27 cm. Conveniently this is also the approximate size of newspapers.

Plant parts that are too large for a single sheet may be cut into sections pressed on a series of sheets, for example a palm or cycad frond.

Long and narrow specimens such as grasses and sedges can be folded once, twice or even three times at the time of pressing. In this way a plant of up to 1.6 metres high may be pressed onto a single sheet.

For very small plants, a number of individuals may be placed on each sheet.

---

42 www.epa.qld.gov.au/publications/p01811aa.pdf/Collecting_and_preserving_plant_specimens_a_manual_version_3.pdf (accessed Jan 09)

Resource Sheet 2.3.2 (p. 2)

Features of the Plant

When collecting from trees or large shrubs, distinctive or notable features should be recorded, for example branching habit, details of the bark and height and width of the plant.

You may need to collect more than one specimen to show the range of variation that is present, for example mature and immature parts, juvenile and adult leaves, coppice shoots.

If the plant is dioecious, with male and female flowers on different plants, collect from each plant and label the specimens A & B.

Handling plants during collection

For best results, specimens should be pressed within a few minutes of being removed from the plant. Many species wilt and fade soon after collection.

If specimens cannot be pressed at the point of collection, for example if it is raining or on steep terrain, they may be stored in large plastic bags. The bags should be kept moist, and the specimens not jammed in too tightly. Make sure that each bag is correctly labeled, using one bag per collection site. However, **storing specimens in plastic bags is not recommended** because it is easy for specimens to become damaged or mixed.

Drying specimens

It is essential to dry the specimens fairly quickly, to prevent to onset of fungal attack. Fungus affected specimens are of limited value to a Herbarium.

If your field trip involves car travel, specimens placed in presses on the roof rack will dry within a few days if the humidity is low.

In a very warm and humid place, the damp papers and corrugates should be replaced daily. In drier inland areas, every 2 or 3 days will suffice. After changing the papers and corrugates, the specimens should be again tightly packed in the press, otherwise they will not remain flat.

At the first paper change, adjust any undesirable features of the specimen, for example folded leaves, leaves all showing the same face, flowers obscured by leaves. Such adjustments will not be possible once the specimen has fully dried. Look for any evidence of insect attack, especially caterpillars in flowers, and remove any insects found. Insects can also hatch after collection and quickly destroy flowers.