COLLECTION AND PRESERVATION OF GREEN PLANTS

Siew N. Chong

TRUST PUBLICATION

ISBN 0 7309 1060 1

AA114

COLLECTION AND PRESERVATION OF GREEN PLANTS

By: Siew N. Chong B. Sc. Hons.,
Ph. D., Dip. Ed., Department
of Applied Science, TAFE
External Studies College,
Prospect Place, Perth, W.A. 6000.

Trust Publication

First published 1986

Reprinted with corrections 1987

ISBN 0 7309 1060 1

Published by
TECHNICAL PUBLICATIONS TRUST
PROSPECT PLACE PERTH WA 6000

Contents

CHAPTER 3 TECHNIQUES IN THE COLLECTION AND PRESERVATION OF SEAWEEDS

Chapter 1

LAWS GOVERNING THE CONSERVATION AND COLLECTION OF NATIVE FLORA

(Adapted with permission from the Department of Conservation and Land Management from the pamphlet "Protecting our Flora - a Brief Guide to the Legislation").

1.1 Native Flora of Western Australia

Western Australia's native flora is *unique* for its beauty and variety. A large number of species are found only in W A. Western Australia's flora is a natural asset of world-wide importance.

Despite the efforts of many botanists in the past 150 years, there is still much that needs to be discovered about our flora. We do not know the precise number of species present in the State. The figure is thought to be about 9 000 with between 1 000 and 3 000 species yet to be scientifically described. The scientific value of our flora is enhanced by the large number of endemic* plants.

The *commercial value* of our native flora is seen in its contribution to the State's economy. It is a world-renowned tourist attraction. Also, it forms a significant wildflower trade.

The *ecological value* of native plant communities is seen in its important role in the environment. For example, they stabilise soil and provide shelter as well as food for animals.

1.2 Flora Conservation

Uncontrolled picking of wildflowers would lead to the loss of some species.

Indiscriminate tampering with wildlife habitats also places our native flora at risk. Our plants have adapted over the ages to live in an astonishing range of natural conditions. For example, some are adapted to life on poor soil. The nutrient levels in the soil can be upset by careless disposal of cigarette butts, fruit peelings and other litter. Vehicle tracks in fragile areas such as coastal dunes and granite rocks may cause loss of plant communities and severe soil erosion. Bush fires cause extensive damage to the ecology of communities.

Nature reserves are areas of natural vegetation set aside and managed as such by the Department of Conservation and Land Management. Some restrictions are imposed on activities in nature reserves to protect the plants, animals and their habitats. Observation of these management regulations helps towards the conservation of wildlife.

---

*Endemic: naturally confined to a restricted region; not found anywhere else.

Although they are an important tool in wild-life conservation, nature reserves alone cannot guarantee the survival of our flora. We have a responsibility to ensure that ALL our wildlife habitat is treated as a nature reserve.

1.3 Flora Protected by Law

The native flora is protected by Law.

The *Laws* governing flora conservation are contained in *The Wildlife Conservation Act 1950-1980*.

These Laws are administered by the *Department of Conservation and Land Management (CALM)*. For full details of the flora Laws, consult the Department.

In general, the Laws prohibit the taking of native flora except under certain specified circumstances.

'Flora' is legally defined as any plant (including any wildflower, palm, shrub, tree, fern, creeper or vine) which is either *native to Western Australia or declared to be flora under the Act*. The classes of flora presently declared as protected are: *Pteridophytes* (ferns and fern allies), *Gymnosperms* (cone-bearing plants) and *Angiosperms* (flowering plants). These classes include all plants except the lower forms of plant life such as mosses, algae, etc.

In legal terms, *"to take"* includes "to gather, pluck, cut, pull up, destroy, dig up, remove or injure the flora or permit the same to be done by any means".

1.4 Permits for Flora Collection

The Department of Conservation and Land Management issues two types of permits for the collection of wildflowers.

(a) *Permits for scientific and other non-commercial purposes*

These are issued for the taking of flora for scientific study, propagation or other non-commercial purposes. The specimens collected cannot be sold.

(b) *Permits for commercial purposes*

These are issued for the wildflower trade. *Florists* and others who trade in native flora are not required to hold a licence unless they are also involved in taking native flora for sale. However, it is an offence to sell flora which has not been legally taken, so it is essential that traders ensure that their stocks are obtained only from authorised sources.

Anyone trading in native flora must keep a written record of the type and quantity of native flora they purchase showing the date of the purchase and the name and address of the supplier. These records must be retained for twelve months and shown to a Wildlife Officer on demand.

Applications for such permits should be directed to:
The Executive Director, Department of Conservation and Land Management, PO Box 104, Como, W.A. 6152

1.5 Conditions and Restrictions

A permit does not provide the freedom to collect anywhere. There are restrictions. These restrictions are stated in the permits issued. Currently, a permit is limited by the following conditions:

CONDITIONS

1. The licence must be carried by the licence holder and produced on demand.

2. The licence does not authorise the taking of *Santalum spicatum* (Sandalwood) or any species declared as *rare flora*.

3. No specimen shall be taken in such a manner so as to destroy or jeopardise the survival of the plant.

4. No protection flora shall be taken from within 50 metres of the centre line of any highway, road or street open to or used by the public.

5. Before entering any State forest or timber reserve to carry out approved picking, contact must be made with the District or Regional Office of CALM nearest to where picking is intended to be carried out, for the purpose of determining the area where specified protection flora may be taken and time that may be spent in any area of State forest or timber reserve.

6. The licence holder shall not take protected flora from Crown land reserves (e.g. nature reserves, national parks, water catchment reserves, State forest and timber reserves and such other similar reserves) without carrying the written permission of the authority in whose control the land is vested pursuant to the Land Act. Such written permission shall state the period for which consent is valid and the particular area concerned.

7. The licence holder shall not take whole plants or roots of plants.

1.6 What Can't You Collect With A Permit?

"Rare flora" may not be collected even with a permit. Rare flora are plants considered to be in danger of extinction, rare or otherwise in need of special protection.

The Minister for Conservation and Land Management has declared the species listed in Table Appendix 1 to be rare flora.

The species listed may not be taken without the specific written approval of the Minister. This prohibition applies equally on Crown and private land; to licensed and unlicensed persons and to the owners or occupiers of land on which rare flora is found. However, the prohibition does not extend to cultivated or domesticated specimens of the rare flora species - the legislation covers only wild populations.

Table Appendix 1

RARE FLORA SPECIES

(This list is correct at the time of printing in 1987, but is subject to change as a result of continuing research on the status of flora populations.)

Acacia anomala	Chittering Grass Wattle
Acacia aphylla	Leafless Rock Wattle
Acacia argutifolia	East Barrens Wattle
Acacia depressa	Echidna Wattle
Acacia guinettii	Guinet's Wattle
Acacia simulans	Barrens Kindred Wattle
Adenanthos cunninghamii	Albany Woollybush
Adenanthos detmoldii	Yellow Jugflower
Adenanthos dobagii	Fitzgerald Woollybush
Adenanthos ellipticus	Oval-leaf Adenanthos
Adenanthos eyrei	Toolinna Adenanthos
Adenanthos ileticos	Club-leaf Adenanthos
Adenanthos pungens	Spiky Adenanthos
Adenanthos velutinus	Velvet Woollybush
Aponogeton hexatepalus	Stalked Water-Ribbons
Asplenium obtusatum	Shore Spleenwort
Baeckea arbuscula	Albany Baeckea
Banksia brownii	Feather-leaf Banksia
Banksia chamaephyton	Fishbone Banksia
Banksia cuneata	Quairading Banksia
Banksia goodii	Good's Banksia
Banksia meisneri var. *ascendens*	Meisner's Scott River Banksia
Banksia sphaerocarpa var. *dolichostyla*	Ironcap Banksia
Banksia tricuspis	Pine Banksia
Boronia tenuis	Blue Boronia
Caladenia bryceana	Dwarf Spider Orchid
Calandenia gemmata forma *lutea*	Yellow China Orchid
Caladenia lavandulacea	Lavender Spider Orchid
Caladenia triangularis	Shy Spider Orchid
Casuarina fibrosa	Woolly Sheoak
Conostylis misera	Grass Conostylis
Conostylis pauciflora	Dawesville Conostylis
Coopernookia georgei	Mauve Coopernookia

(Continued ...)

Darwinia acerosa	Fine-leaved Darwinia
Darwinia carnea	Mogumber Bell
Darwinia collina	Yellow Mountain Bell
Darwinia macrostegia	Mondurup Bell
Darwinia masonii	Mason's Darwinia
Darwinia meeboldii	Cranbrook Bell
Darwinia oxylepis	Gillham's Bell
Darwinia squarrosa	Fringed Mountain Bell
Darwinia wittwerorum	Wittwer's Mountain Bell
Daviesia euphorbioides	Wongan Cactus
Diuris purdiei	Purdie's Donkey Orchid
Donaea hackettiana	Perth Hop Bush
Drosera occidentalis	Minute Pygmy Sundew
Drummondita ericoides	Moresby Range Drummondita
Drummondita hassellii var. *longifolia*	Peak Charles Drummondita
Eremophila denticulata	Fitzgerald Eremophila
Eremophila inflata	Swollen-flowered Eremophila
Eremophila merrallii	Bruce Rock Eremophila
Eremophila microtheca	Heath-like Eremophila
Eremophila resinosa	Resinous Eremophila
Eremophila serpens	Snake Eremophila
Eremophila virens	Campion Eremophila
Eremophila viscida	Varnish Bush
Eucalyptus aquilina	Mt Le Grand Mallee
Eucalyptus bennettiae	Bennett's Mallee
Eucalyptus brachyphylla	Binyarinrinna Mallee
Eucalyptus burdettiana	Burdett Gum
Eucalyptus caesia	Caesia
Eucalyptus calcicola	Hamelin Bay Mallee
Eucalyptus carnabyi	Carnaby's Mallee
Eucalyptus coronata	Crowned Mallee
Eucalyptus desmondensis	Desmond Mallee
Eucalyptus exilis	Boyagin Mallee
Eucalyptus insularis	Twin Peak Island Mallee
Eucalyptus johnsoniana	Johnson's Mallee
Eucalyptus kruseana	Bookleaf Mallee
Eucalyptus pendens	Badgingarra Mallee
Eucalyptus rhodantha	Rose Mallee
Eucalyptus steedmanii	Steedman's Gum
Franklandia triaristata	Plumed Lanoline Bush

(Continued...)

Gastrolobium appressum	Scale Leaf Poison
Gastrolobium glaucum	Wongan Poison
Grevillea baxteri	Cape Arid Grevillea
Grevillea cirsiifolia	Varied-leaf Grevillea
Grevillea drummondii	Drummond's Grevillea
Grevillea dryandroides	Phalanx Grevillea
Grevillea inconspicua	Cue Grevillea
Grevillea infundibularis	Fan-leaf Grevillea
Grevillea involucrata	Lake Varley Grevillea
Grevillea prostrata	Pallarup Grevillea
Grevillea ripicola	Collie Grevillea
Grevillea saccata	Pouched Grevillea
Hakea aculeata	Column Hakea
Hakea megalosperma	Lesueur Grevillea
Halosarcia bulbosa	Large-articled Samphire
Halosarcia entrichoma	Eyelash Samphire
Hibbertia bracteosa	Porongurups Hibbertia
Hibbertia miniata	Orange Hibbertia
Hydrocotyle lemnoides	Aquatic Pennywort
Kennedia beckxiana	Cape Arid Kennedia
Kennedia glabrata	Northcliffe Kennedia
Kennedia macrophylla	Augusta Kennedia
Lambertia echinata	Prickly Honeysuckle
Lambertia orbifolia	Round-leaf Honeysuckle
Lambertia rariflora	Green Honeysuckle
Lasiopetalum bracteatum	Helena Velvet Bush
Lechenaultia pulvinaris	Cushion Lechenaultia
Lechenaultia superba	Barrens Lechenaultia
Leucopogon obtectus	Hidden Beard-heath
Myoporum salsoloides	Jerramungup Myoporum
Pityrodia augustensis	Mt Augustus Foxglove
Pomaderris bilocularis	Tutanning Pomaderris
Pomaderris grandis	Large Pomaderris
Prasophyllum lanceolatum	Brown Leek Orchid
Prasophyllum triangulare	Dark Leek Orchid
Ptychosema pusillum	Dwarf Pea
Pultenaea skinneri	Skinner's Pea
Rhizanthella gardeneri	Underground Orchid
Ricinocarpus trichophorus	Barrens Wedding Bush
Roycea pycnophylloides	Saltmat

(Continued...)

Sowerbaea multicaulis	Many-stemmed Lily
Spirogardnera rubescens	Spiral Bush
Stachystemon axillaris	Leafy Stachystemon
Stawellia dimorphantha	Arrowsmith Stilt-lily
Stylidium coroniforme	Wongan Triggerplant
Stylidium expeditionis	Tutanning Triggerplant
Stylidium galioides	Yellow Mountain
Synaphea pinnata	Helena Synaphea
Tegicornia uniflora	Mat Samphire
Thelymitra fuscolutea var. *stellata*	Star Orchid
Thelymitra macmillanii	Salmon Sun Orchid
Thelymitra psammophila	Sandplain Sun Orchid
Urocarpus niveus	Bindoon Starbush
Urocarpus phebalioides	Gairdner Range Starbus
Verticordia helichrysantha	Barrens Feather Flower
Verticordia staminosa	Verticordia Wongan Feather Flower
Villarsia calthifolia	Mountain Villarsia
Wurmbea humilis	Wongan Dwarf Nancy
Wurmbea tubulosa	Long-flowered Nancy

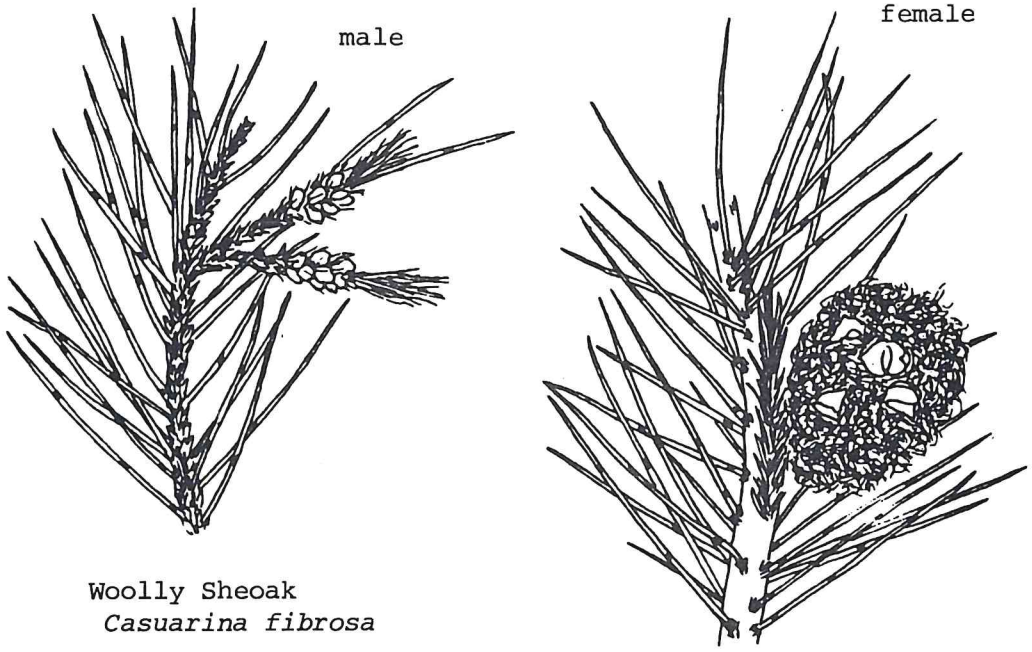


Fig. 1.1
Two examples of rare flora species

(Reproduced with permission from "Protecting our flora - a brief guide to the legislation" by the Department of Fisheries and Wildlife, W.A.)

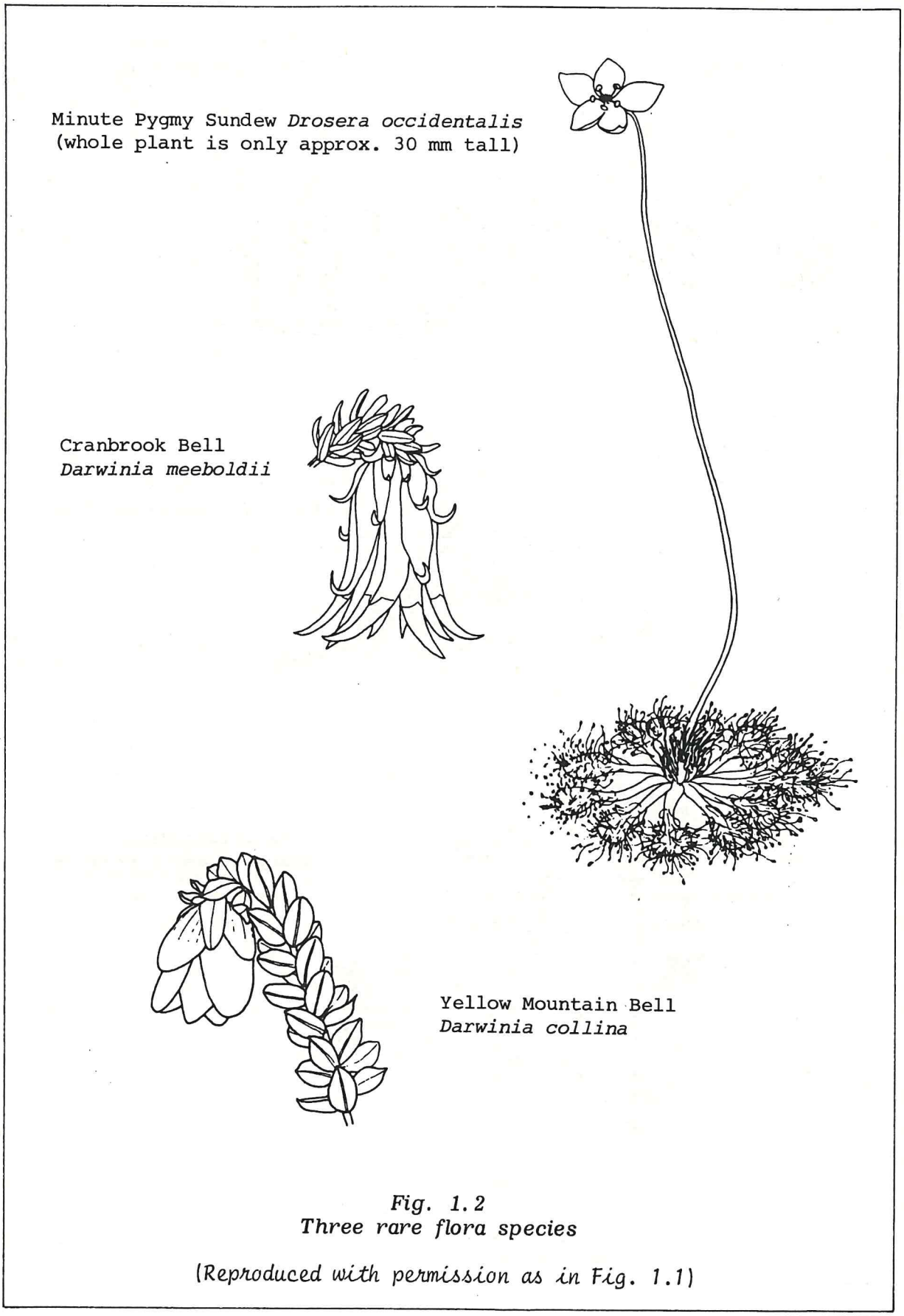


Fig. 1.2
Three rare flora species

(Reproduced with permission as in Fig. 1.1)

Pouched Grevillea
(Grevillea saccata)

Cape Arid Kennedia
(Kennedia beckxiana)

Helena Velvet Bush
(Lasiopetalum bracteatum)

Fig. 1.3
Three rare flora species

(Reproduced with permission as in Fig. 1.1)

1.7 Where Can You Collect Without a Permit?

Without a permit, collection of native plants (except rare species) can be made only on:

(a) Private properties with the written consent of the owner/s.

(b) Your own private properties.

(Note: Private landowners who wish to sell flora taken from their properties must hold a *Commercial Producer's Permit* or a Nurseryman's permit.)

Keep in Mind Basic Conservation Principles when Collecting

1.8 Publications of Related Interest Available on Request From the Department of Conservation and Land Management, W.A..

I. REPORTS

No. 42	1981	A Guide to the Gazetted Rare Flora of Western Australia. B. Rye & S. Hopper.
No. 49	1982	Geographically Restricted Plants of Southern Western Australia B.L. Rye.
No. 54	1982	A Guide to the Gazetted Rare Flora of Western Australia: Supplement I S. Patrick & S. Hopper.

II. PAMPHLETS ON RARE WESTERN PLANTS

1. Caesia *(Eucalyptus caesia)*.
2. Green Honeysuckle *(Lambertia rariflora)*.
3. Fitzgerald Eremophila *(Eremophila denticulata)*.
4. Good's Banksia *(Banksia goodii)*.
5. Lesueur Hakea *(Hakea megalosperma)*.
6. Mogumber Bell *(Darwinia carnea)*.
7. Augusta Kennedia *(Kennedia macrophylla)*.
8. Underground Orchid *(Rhizanthella gardneri)*.

III. BROCHURES

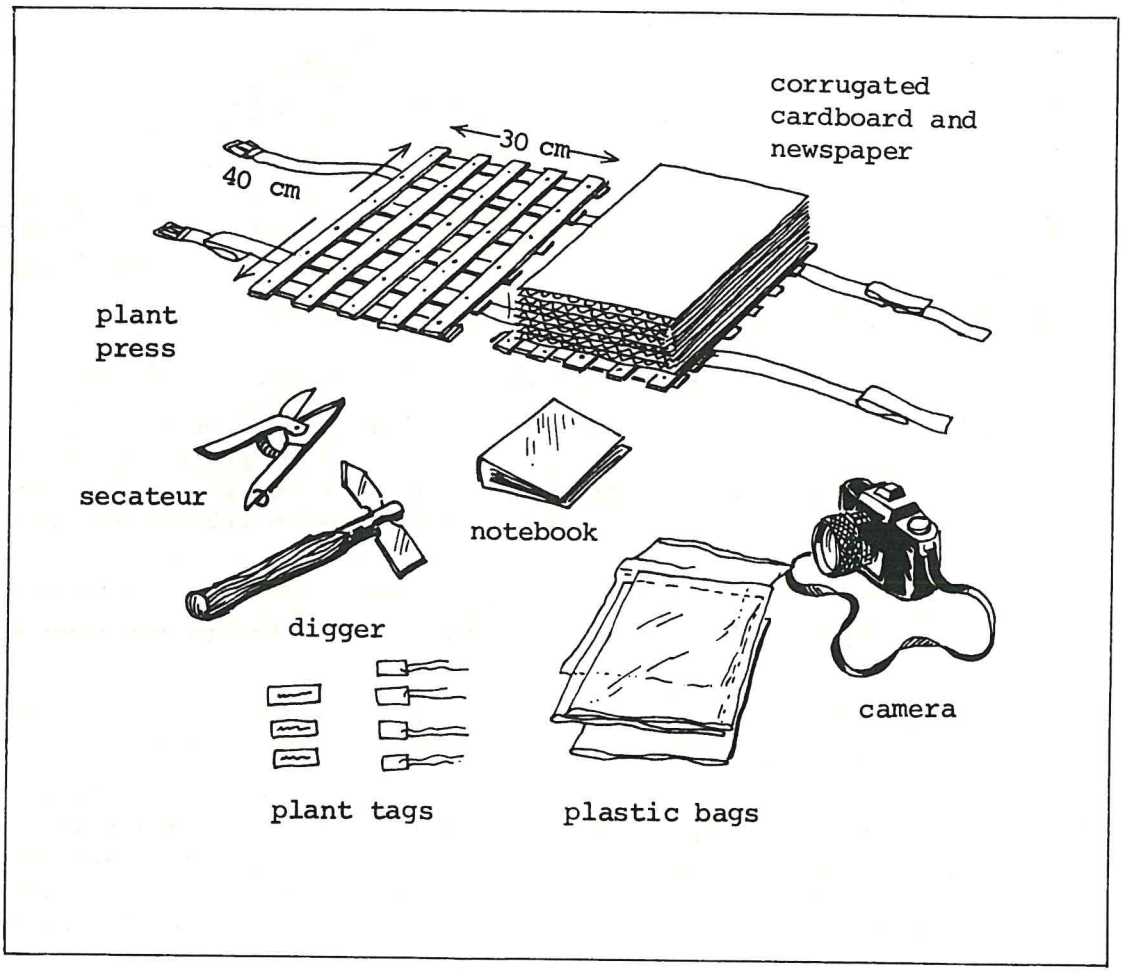
1. Protecting our flora.
2. Western Australian wildlife is protected.

Chapter 2

TECHNIQUES IN THE COLLECTION AND PRESERVATION OF TERRESTRIAL GREEN PLANTS

(Most of the diagrams in this Chapter are adapted with permission from the publication on "Short Guide to Preparing an Herbarium Specimen", by the W.A. Herbarium Department of Agriculture)

2.1 Assemble the Equipment

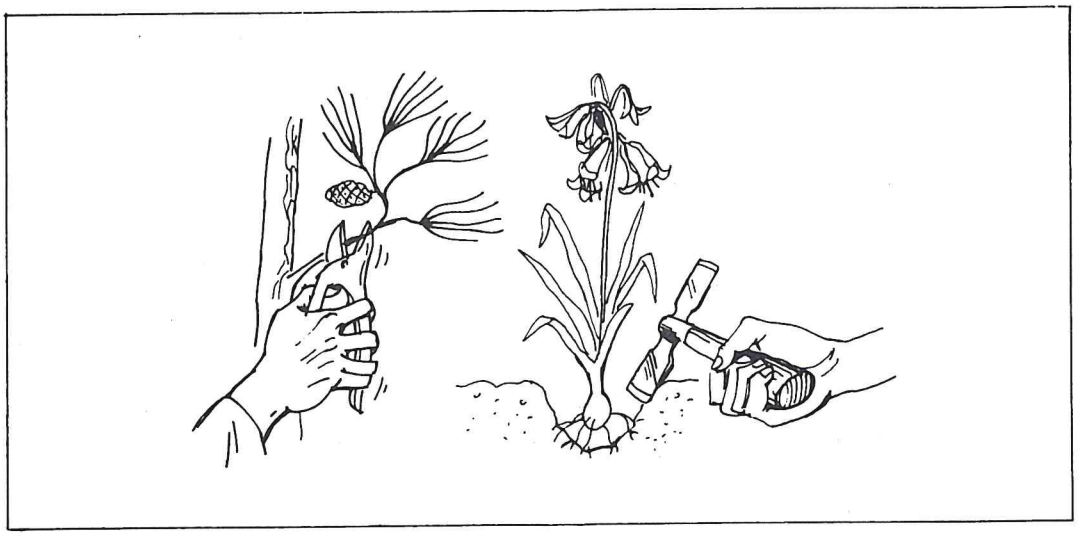


(a) *Gather tools and supplies:* cutting tools, digging tool, notebook, plastic bags to hold unpressed specimens, plant tags, and a camera to record difficult-to-describe plant parts.

(b) *Assemble plant press and accessories:*

A plant press is a means of flattening and drying specimens. It is made up basically of two frames made from masonite, plywood or a lattice of wood strips. A suggested size is 30 x 40 cm. A rope or straps are used to tie the press when loaded. The accessories needed are newspaper, smooth-sided corrugated cardboard and herbarium paper.

2.2 Select Specimens Carefully



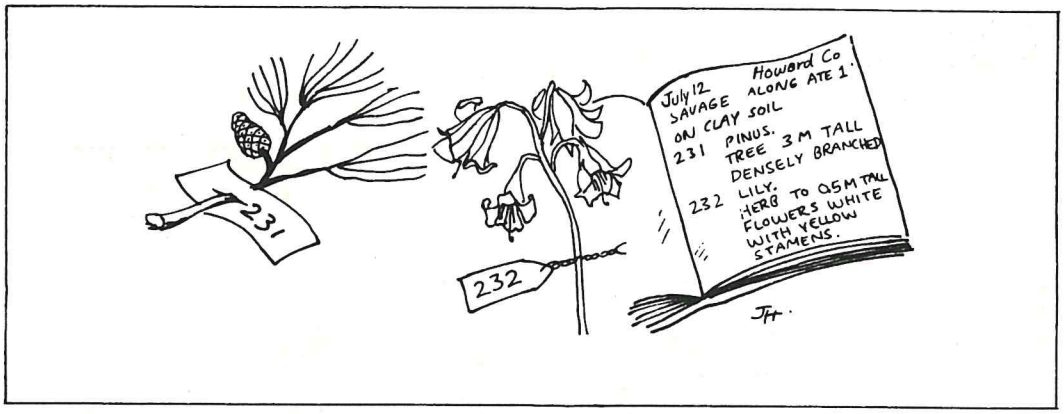
(a) *Specimen must be representative of the plant.*

- Collect entire plants if they are small and not protected.
- Herbs with *underground storage organs* should be dug up complete with these parts. In the case of protected species in which it is desirable to leave the basal parts to shoot again in the following year, make notes on the characteristics of these parts.
- Specimens should include *flowers* and *fruits,* as well as a piece of stem bearing typical healthy leaves. Fruits may have to be collected at a later date.
- *Fern* specimens should include fertile (spore-bearing) fronds and sterile fronds, as well as part of the rhizome.
- *Grass* clumps may be broken up into small tufts of leaves and flowering stalks, and 2 or 3 of these tufts should make a satisfactory specimen. All dirt adhering to the roots should be carefully knocked or washed away. Grasses are best collected after the flowers have opened, but before the fruits are ready to drop.
- *Eucalyptus* specimens should include flower-buds as well as fruits and, where available, juvenile leaves from suckers near the base of the trunk. Notes should describe the type of bark and whether or not rough bark extends over the trunks, main branches, or fine twigs.

(b) *Do not fragmentate specimen* into separate leaves, flowers and fruit. Leave all *structures* intact on stem to show how the parts are arranged on the plant.

(c) *The size of the specimen* is governed by the size of the herbarium sheets on to which they are ultimately to be placed. In large herbaria, the herbarium sheets are usually about 35 cm x 28 cm, so that samples up to about 30 cm long make suitable specimens.

2.3 Record Field Observations on the Spot



Notes should give details that are not readily obtained from the specimens. Observations should be noted down at the time of collection and should include:

Collector's number
Collector's name
Date
Locality
Habitat (associated vegetation, soil type)
Shape and size of plant
Colour and scent of flowers
Bark of tree

2.4 Tag Individual Specimens

Collector's numbers are a useful way of recording and referring to each plant, especially when many specimens are collected on the same field trip.

Small cardboard tags ("price tags") which may be numbered and tied to the specimens are available from many stationery shops.

Any additional associated material would also be numbered. The collection number may be written directly into wood samples with a felt-tipped marking pen.

Numbers for material preserved in liquid fixative may be written in pencil and placed in the container: an additional label on the lid or exterior of the container is advantageous. If specimens are treated with alcohol before drying, or afterwards as a means of applying insecticidal compounds, numbers written with ball-point pens may become illegible; pencil is not affected by such treatment.

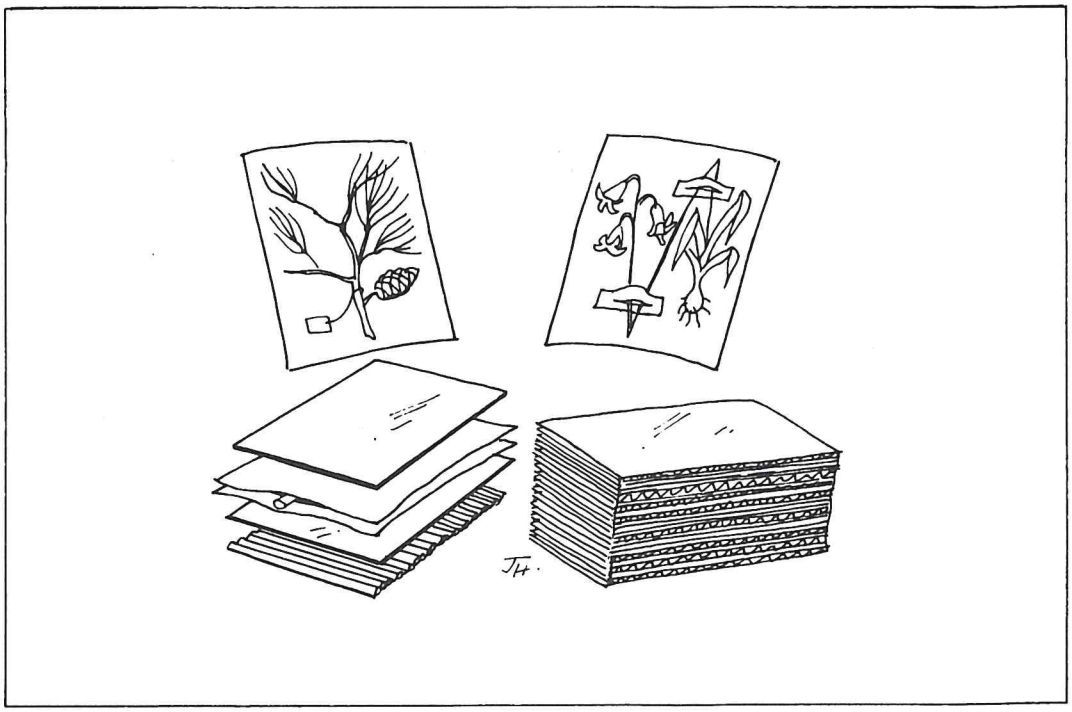
2.5 Transport in Moist Polythene Bags

A large polythene bag is a convenient container for specimens. Sprinkle some water inside and seal the bag off with a rubber band to keep specimens moist. Most plants may be kept fresh for several days when placed in a cool place (refrigerate for prolonged periods).

Flowers, however, generally wilt rapidly. So press specimens with minimal delay.

Presses are taken on botanical excursions and plants often pressed immediately on collection.

2.6 Prepare Specimens for Pressing



Trim shoots of excessively twiggy shrubs. Take care to maintain a true representation of the plant.

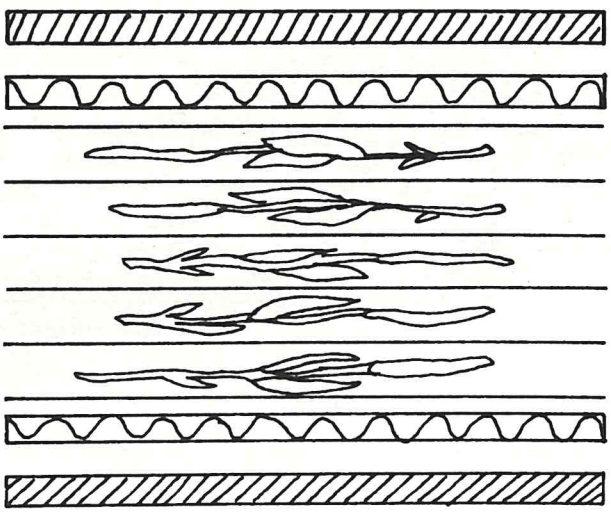
Display specimens on newspaper so that when pressed the structures do not overlap.

Display carefully, as their form at this stage will largely determine their ultimate appearance.

Where a specimen is longer than the herbarium sheet, it should be bent once or twice when collected so as to form a V, N or M (according to its length) and pressed in this position.

Arrange to show upper and lower surfaces of leaves and fronds.

2.7 Arrange Specimens in the Press



Order of arrangement in a plant press

Cover the displayed specimen with another newspaper.

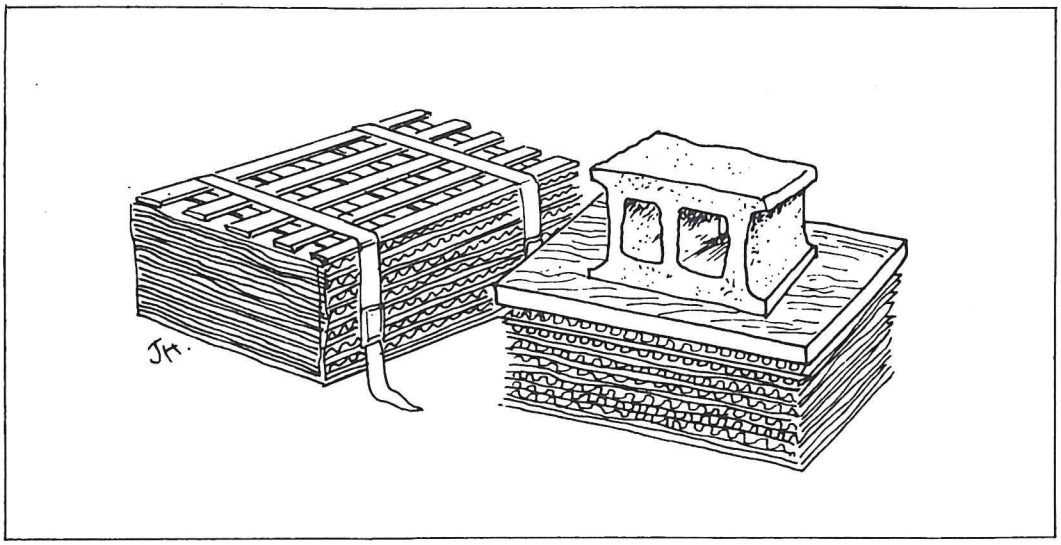
Place another specimen on the top, arrange and press flat. The amount of paper used each time depends on the nature of the specimen. Do not place specimens within folds of newspaper; otherwise, they may be overlooked during subsequent changes of paper.

Where a *specimen is of uneven thickness - for example,* where there is an underground bulb - place several thicknesses of folded newspaper over delicate parts. This ensures uniform pressure on all plant parts and prevents shrivelling as they dry.

Place *corrugated cardboard* or heavy pads of newspaper at intervals to facilitate drying.

Succulent specimens must be killed before pressing (by boiling in water for a few minutes or 85% alchol/FAA* for a few hours. Refer unit 2.13.)

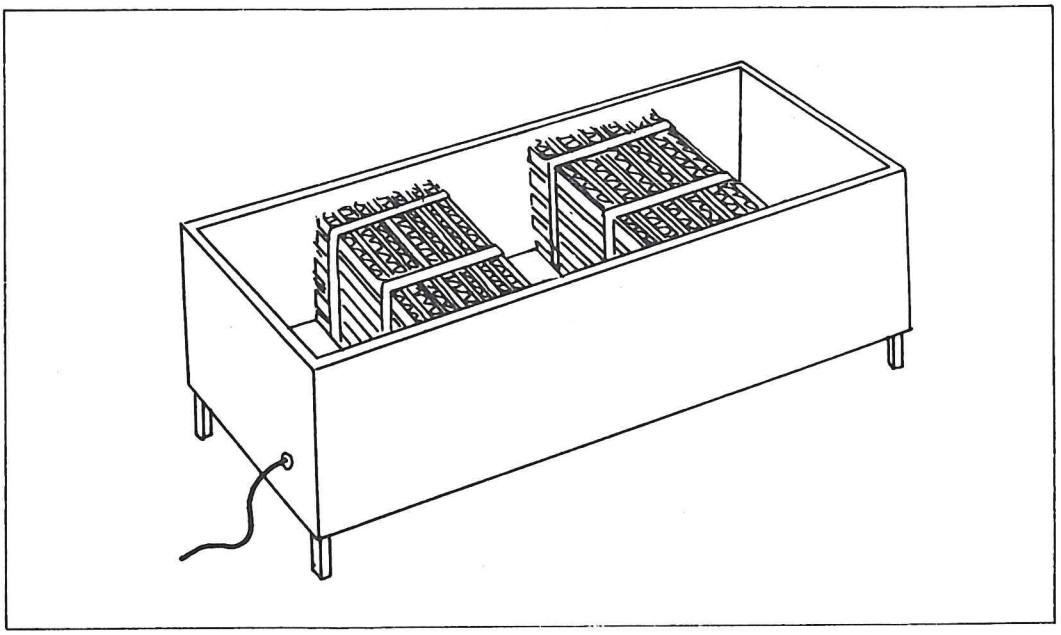
2.8 Press Specimens



Strap the plant press or tie rope to *apply maximum equal pressure,* or place heavy weight on the pile beneath board.

Specimens dried in the absence of adequate pressure show crinkly leaves.

2.9 Dry Specimens

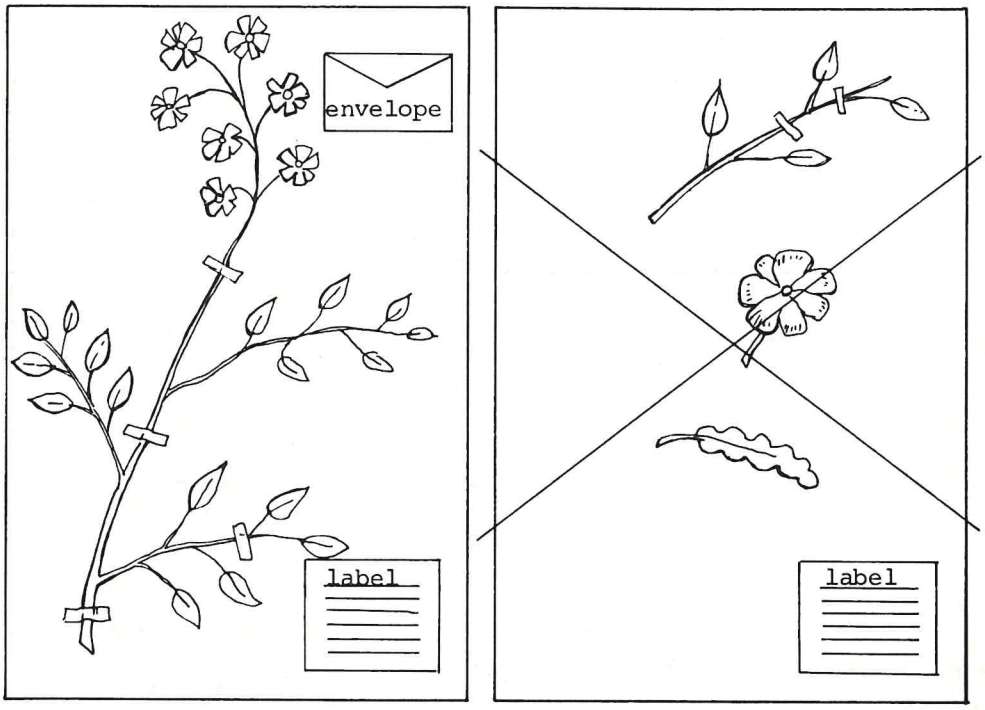


Dry rapidly to preserve a good colour. A few species regularly turn black on drying; however, in general, a brownish or blackish colour means the specimen was dried too slowly.

Place press in a warm, dry place with a good air flow. Most herbaria use drying cabinets with forced circulation of warm air to shorten drying time and to avoid the need to change papers. When in the field, drying can be aided by placing the presses securely on to a roof rack of the vehicle during dry daytime conditions.

Change the newspaper every day for a few days. The number of changes required will vary with the original succulence of the plants and with the weather conditions. No exact guide can be given. Most plants should dry in less than a fortnight and the last one or two changes need only be given at intervals of three or four days. Be particularly conscientious about changing newspaper every day for the first three days. *Tie the rope less tightly each time* to allow freer ventilation. When dry to the touch, test for incompletely dried specimens (incompletely dried specimens will feel cooler and ends will droop when lifted from the fold).

2.10 Mount Specimens

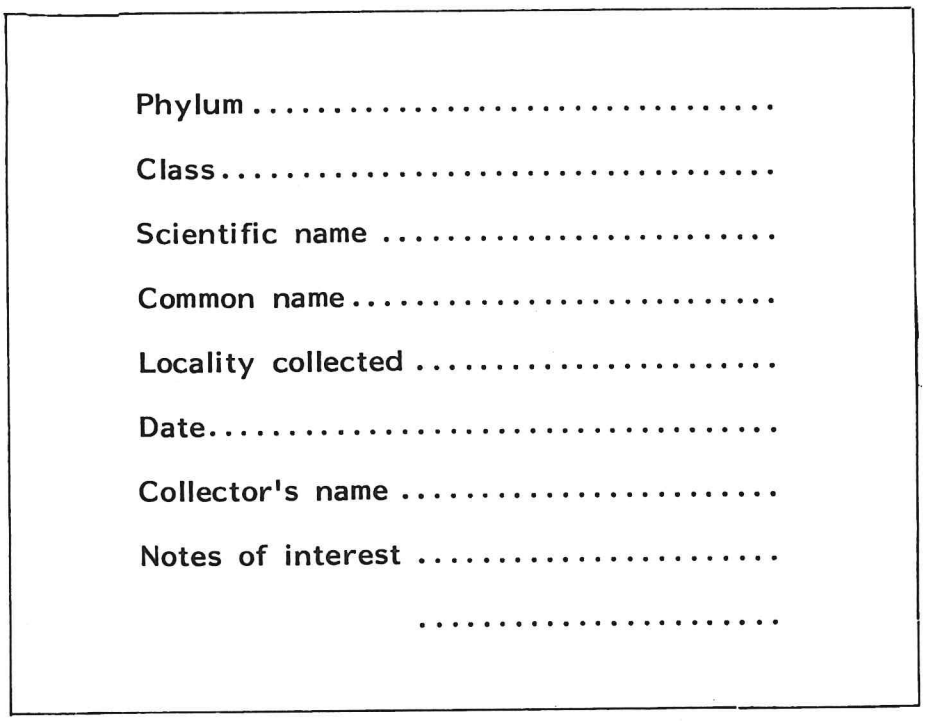


When dry, the specimens may be mounted on sheets of stiff paper of about 20 cm x 33 cm using strips of gummed paper. Hold the specimen down across the stem or any other axis. Do not stick across leaves and flower.

Loose flowers, small fruit and seeds may be placed in separate envelopes and attached to the herbarium sheet on the upper right hand corner.

Do not cut a specimen into fragments (b) above, as these do not show the arrangement of leaves and flowers on the plant.

2.11 Label Herbarium Specimens

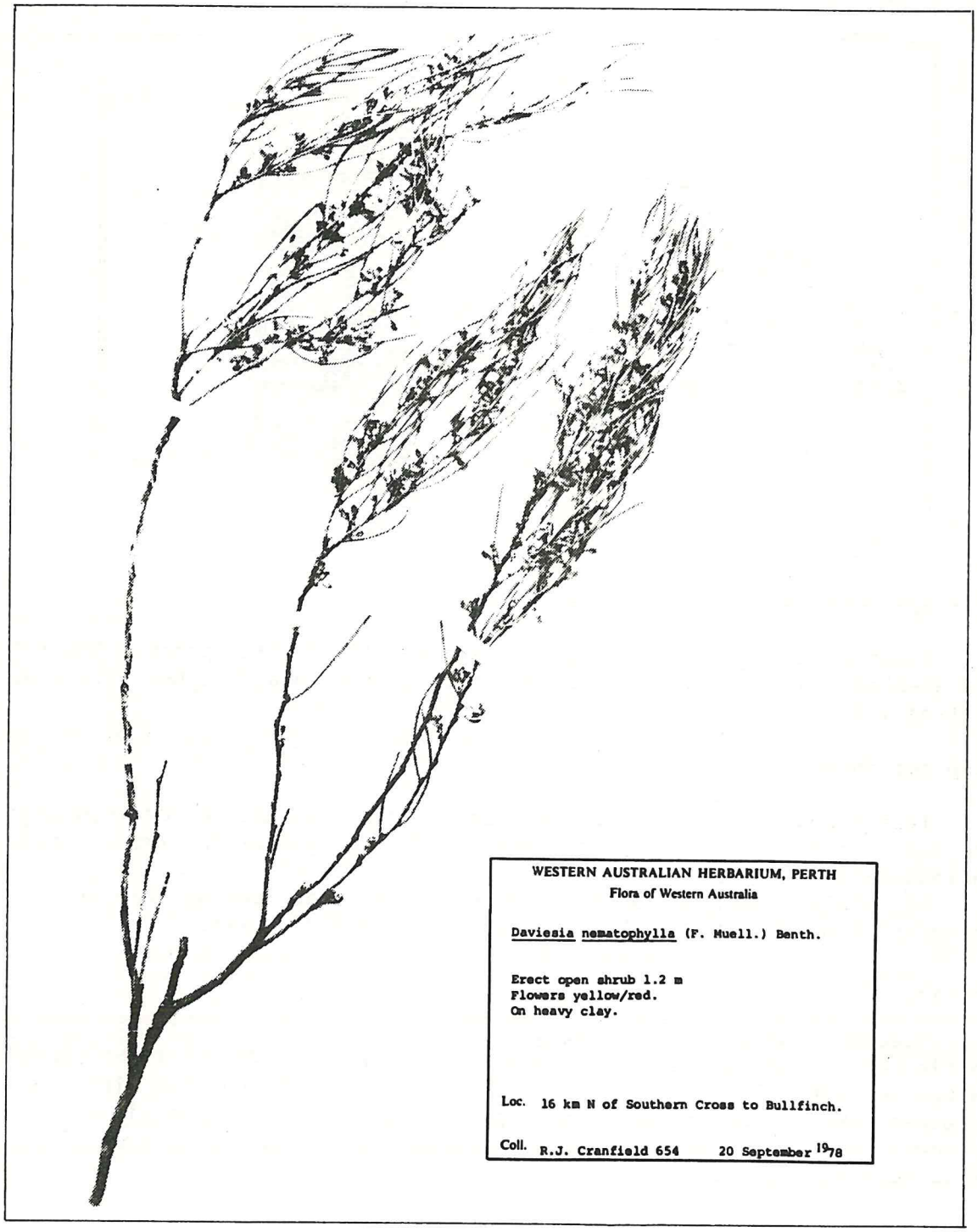


Label the herbarium specimen with a permanent label stuck to the *bottom right hand* corner of the herbarium sheet.

The above is an example of a herbarium specimen label.

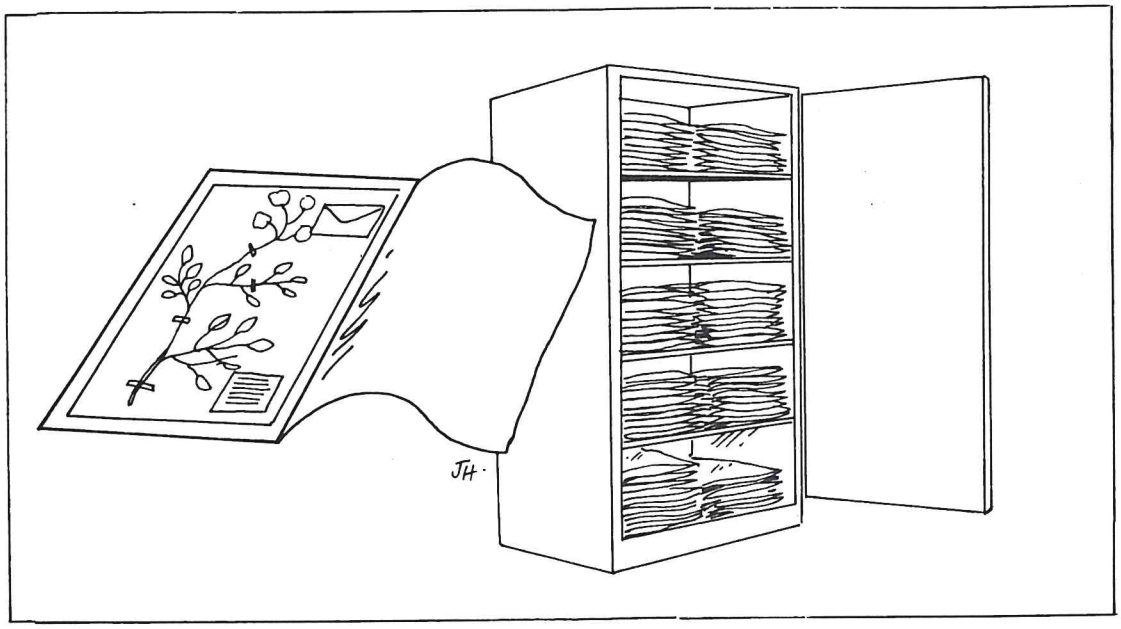
The result is a herbarium specimen. An example of a professionally prepared specimen from the Western Australian Herbarium, Department of Agriculture, South Perth is shown on the next page.

The mounted labelled dry specimen is called a HERBARIUM SPECIMEN



A herbarium specimen is a pressed, dried plant mounted on stiff paper and accompanied by information on scientific name, common name, locality of collection, date of collection, collector and notes of interest.

2.12 Store Specimens



File systematically

Place each herbarium specimen within a fold of white paper. The folds are stacked systematically. They are best stored in a flat box with a well fitting lid.

Keep out insects

Insect control can be made by placing naphthalene flakes or mothballs in the box. In herbaria and larger laboratories, herbarium specimens are stored in insect-resistant cupboards.

Dry plant specimens can be kept indefinitely as long as they are protected from insect attack and stored in a cool dry place.

Fumigation

Specimens which inadvertently become heavily infested with insects can be cleared by fumigating with carbon tetrachloride in an air-tight container. Carbon tetrachloride is highly poisonous and should be handled with the greatest care. A household spray type insecticide may be useful in the case of small collections but (to avoid staining) should not be sprayed directly on to mounted sheets.

2.13 Preservation Techniques for Special Cases

Some species or conditions require special treatment.

(a) *Plants that drop their leaves*

Some plants (e.g. many species of *Ficus*, "Fig", and *Amyema*, "Mistletoe") drop their leaves entirely upon drying or remain alive for an excessively long period in the press.

This is overcome by killing the plant before pressing, either by freezing the specimen for a few hours or dipping it in boiling water for a few minutes.

(b) *Very bulky specimens* (e.g. *Banksia* spikes, thistle heads) may be split lengthwise before pressing.

(c) *Very fleshy or delicate specimens* may be best preserved in liquid fixative rather than by drying. Suitable fixatives include:

i. 70% ethyl alcohol (or 70% methylated spirit) with 30% water.

ii. formalin-acetic-alcohol or FAA

for non-woody soft specimens, fix in -

50% FAA

Conc. formalin .... 5 ml
Glacial acetic acid ..... 5 ml
50% ethyl alcohol ..... 90 ml

for woody and tougher specimens fix in -

70% FAA

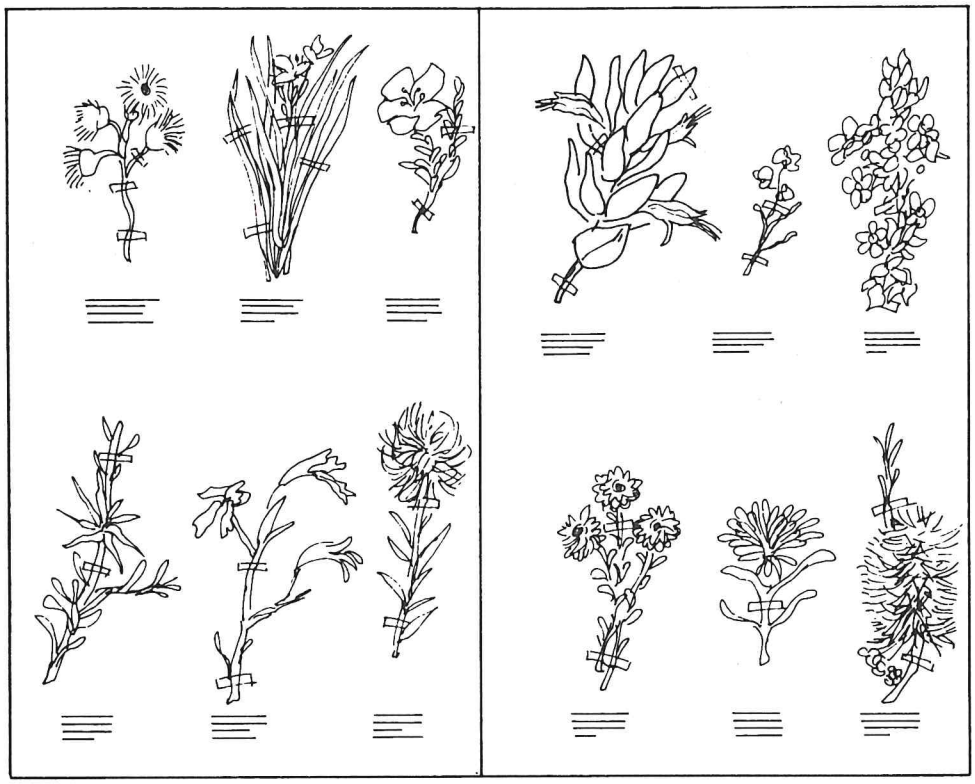
Conc. formalin ..... 5 ml
Glacial acetic acid ..... 5 ml
70% ethyl alcohol ..... 90 ml

iii. 4% commercial formalin in water or salt water.

In some cases, one or other of these fixatives is more appropriate for a particular class of material; for example, 70% ethyl alcohol is very suitable for preserving orchid flowers. Wet preserved flowers of orchids are particularly important as critical details of the shape of floral structures are lost on pressing such flower.

Material still growing (e.g. growing tips, young inflorescences) are better preserved in one of the formalin mixtures.

2.14 Preparation of Field Herbarium



A field herbarium (see above) is a sheet or folder with a number of dried, pressed and identified plants from a given area. It is used in the field as an aid to identifying plants in the area.

(a) *Assemble materials needed*

- hard-paper sheets or folder convenient to carry in the field
- a thumb dispenser of cellotape
- cutting and digging tools
- a plant press
- a field note-book and pencil.

(b) *Collect plants and stick small specimens* on to the sheet. Select parts that are distinctive of the plant. These do not need to be as large or as complete as in the normal herbarium specimen. Leave space under each specimen for identification and notes. Since this is only for temporary use, cellotape may be used for sticking down specimens.

(c) *Press the mounted sheet*

Place newspaper in between individual sheets. Drying procedure is as for herbarium specimen preparation. The sheet may be *placed in a loose-leaf folder* for reference in the field. Additions can be made. The compact nature of the field herbarium makes it very useful for field study. It is a useful way of getting to know the plants in a locality.

Chapter 3

TECHNIQUES IN THE COLLECTION AND PRESERVATION OF SEAWEEDS

(Diagrams in this chapter are reproduced with permission from Gould League Bulletin No. 2 "Seaweeds of our Coast" by G.G. Smith, Botany Department, University of W.A.)

3.1 Collecting Specimens

(a) *Collecting equipment*

Polythene bags
Notebook and pencil
Labels
Chisel and hammer for removing encrusting algae.

(b) Go at low tide to rocky seashore.

(c) Select specimens truly representative of plants. Include reproductive structures wherever available. Avoid damaged or whitish specimens.

(d) Make notes on the spot.

(e) Transport specimens drip-wet in polythene bags.

(f) If *temporary storage* is necessary, immerse specimens in 6% formalin-seawater for half an hour. Store in drip-wet condition.

3.2 Treatment with Preservatives

Sort specimens into three lots.

i. Coralline algae.

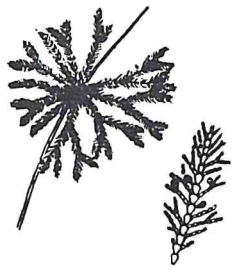
ii. Succulent and tougher seaweeds.

iii. Delicate and finer seaweeds.

(a) *Coralline algae*

Lithothamnion sp

(Red Algae completely encrusted with calcium deposit)

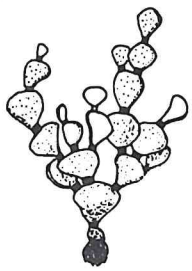


Corallina cuvieri

(Red Algae partially encrusted)

Amphiroa anceps

(Red Algae partially encrusted)



Halimeda cuneata

(Green Algae encrusted on lobes only)

Fig. 3.1
Examples of Coralline Algae common on W.A. Seashores

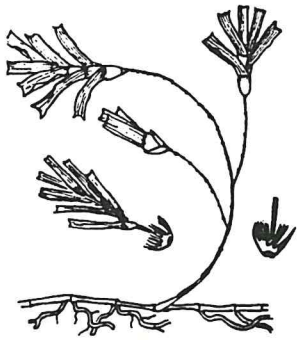
i. Wet preservation in 70% alcohol

ii. Dry preservation: Drying procedure as described for tougher seaweeds. When dry, place in envelopes of appropriate sizes. Mount envelopes on herbarium sheets in such a way that specimens can readily be taken out for examination.

(b) *Tougher seaweeds*

Posidonia australis

(Fibre Ball Weed, a seagrass)



Cymodocea antarctica

(Sea Nymph, a seagrass)

Ecklonia radiata

(Ecklon's Kelp Brown Algae)

Sargassum sp

(Brown Algae)

Scytothalia dorycarpa

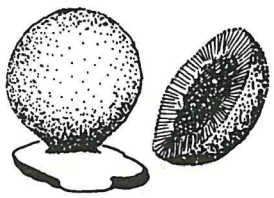
(Brown Algae)

Scaberia agardhii

(Brown Algae)

Eucheuma speciosum

(Jelly Weed, Red Algae)



Codium mamillosum

(Green Algae)

Codium duthiae

(Green Algae)

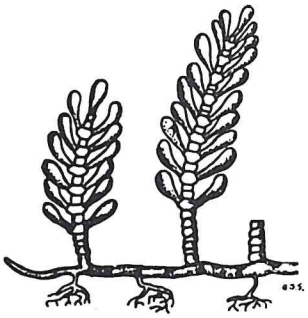
Fig. 3.2
Examples of tougher seaweeds common in W.A.

i. Immerse tougher seaweeds in 10% formalin-seawater.

ii. Leave at least one hour or overnight.

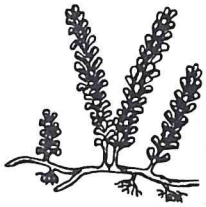
iii. Rinse in running water for 10 minutes.

(c) *Delicate seaweeds*



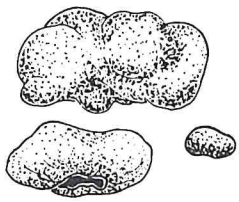
Caulerpa cactoides

(Green Algae)



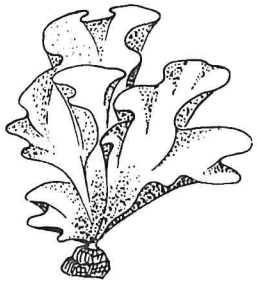
Caulpera racemosa
forma cylindracea

(Green Algae)



Colpomenia sinuosa

(Oyster Thief,
Brown Algae)



Ulva lactuca

(Sea Lettuce,
Green Algae)

Plocamium nidificum

(Red Algae)

Fig. 3.3
Examples of delicate seaweeds common in W.A.

i. Immerse finer seaweeds in 5% formalin-seawater

ii. Leave at least 1 hour or overnight.

iii. Rinse in running tap water for 10 minutes

3.3 Herbarium Sheet Preparation

(a) *Tougher seaweeds*

i. Pat specimens on absorbent paper to remove excess water.

ii. Spread on herbarium sheet. Display to prevent overlap.

iii. Interleave with newspapers.

iv. Place in plant press. Tighten press.

v. Renew newspaper *every day* till dry.

vi. Stick seaweed with thin strips of white gummed paper.

vii. Label:

Scientific name .....

Common name .....

Family .....

Locality .....

Date .....

Collector .....

Notes of Interest .....

.....

(b) *Delicate Seaweeds*

i. Float specimens in tap water in wide container.

ii. Place mounting sheet below a specimen.

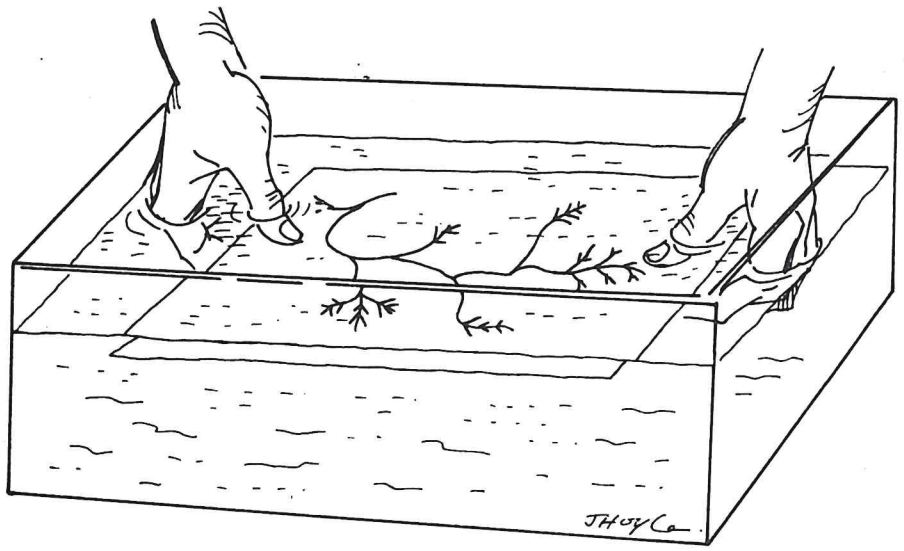


Fig. 3.4
Floating a delicate aquatic plant on to paper

iii. Raise sheet slowly from one end to spread specimen out in as nearly a normal position as possible.

iv. Drain off excess water.

v. Further adjust to display specimen with blunt forceps and water pipette.

vi. Blot off excess water.

vii. Interleave with blotting paper and newspaper. Press specimens as described above.

3.4 Storage of Specimens

Store in flat box.

Add naphthalene flakes to repel insects.

Keep away from light for best colour retention.

3.5 Wet Preservation of Macroscopic Algae

For most study and display purposes, seaweeds are best preserved dry. Wet preservation is sometimes required for microscopic study. Suitable preservatives are:

(a) *Marine Algae*

Concentrated formalin	6 ml
Seawater	84 ml
Glycerine	10 ml
Borax	5 g

(b) *Seagrasses*

70% alcohol with 5% glycerine.