SURVEY OF RARE AND POORLY KNOWN EUCALYPTS OF WESTERN AUSTRALIA

FIELD GUIDE NO. 4

GOLDFIELDS REGION

BY

ANNA NAPIER, ANNE TAYLOR AND STEPHEN HOPPER

SURVEY OF RARE AND POORLY KNOWN EUCALYPTS OF WESTERN AUSTRALIA

FIELD GUIDE NO. 4
GOLDFIELDS REGION

BY

ANNA NAPIER, ANNE TAYLOR AND STEPHEN HOPPER

WESTERN AUSTRALIAN WILDLIFE RESEARCH CENTRE,
P.O. BOX 51, WANNEROO, W.A. 6065

LINE DRAWINGS
BY
SUSAN PATRICK

WESTERN AUSTRALIAN DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

1988

GOLDFIELDS REGION

SPECIES CODES

BRA	Eucalyptus brachyphylla
BRO	E. brockwayi
COG	E. corrugata
DEM	E. 'demissa'
FLA	E. 'flavida'
FOM	E. formanii
GRFS	E. aff. griffithsii
JUT	E. jutsonii
KRU	E. kruseana
*MEO	E. melanoxylon
NIG	E. 'nigrifunda'
OCCS	E. occidentalis ssp. stenantha
ORB	E. orbifolia
PLA	E. 'pla' aff. diversifolia
PIM	E. pimpiniana
RAM	E. rameliana
*RIG	E. rigidula
SPA	E. sparsa
WEB	E. websteriana
WOO	E. woodwardii

*Species considered in previously published works to be rare or threatened but appear to be common on the basis of recent survey. Please record them if observed.

CONTENTS

INTRODUCTION

This interim field guide has been produced to assist contributors to the "Survey of Rare and Poorly Known Eucalypts of W.A." to identify the species of interest. As the list of such species is large, it has been subdivided into different State regions. This booklet covers the Goldfields Region, as defined by the Western Australian Department of Conservation and Land Management (see Fig. 1). Other booklets cover other C.A.L.M. regions.

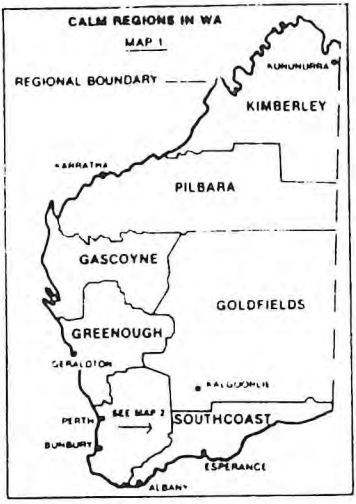
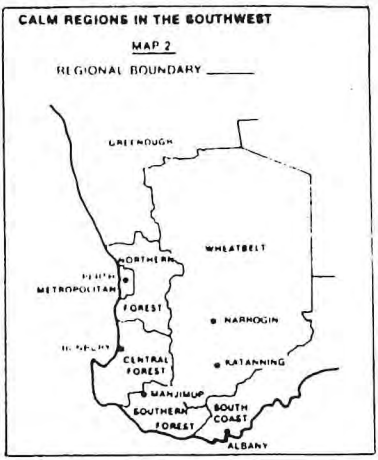


Figure 1



Eucalypts have been the subject of recent name changes and taxonomic research. This field guide is the most up-to-date reference available for rare and poorly known eucalypts of the Region, including new species and subspecies whose names have not yet been published. For information on such taxa, we have relied heavily on the unpublished "Field Guide to Eucalypts Vol. 2" by M.I.H. Brooker and D. Kleinig. We are indebted to the authors for allowing access to their manuscript. We have also drawn heavily on the unpublished research results of Ian Brooker, Lawrie Johnson, Ken Hill, Don Blaxell and Stephen Hopper to whom we are grateful for assistance. Because of the active phase of research occurring on eucalypts, this field guide is very much an

interim report. Undoubtedly, new taxa warranting inclusion in the study will be discovered during the course of the survey.

Common eucalypts of the Region can best be identified using Chippendale's "Eucalypts of the Western Australian Goldfields (and the Adjacent Wheatbelt)" and Blackall and Grieve's "How to Know Western Australian Wildflowers, Part IIIA".

Funding for this field guide and the Rare and Poorly Known Eucalypt Survey has been provided by the Australian National Parks and Wildlife Service and the Western Australian Department of Conservation and Land Management. We are grateful to the Curator, Western Australian Herbarium, for providing access to specimens and to Paul Gioia of the Western Australian Wildlife Research Centre for FLORAPLOT computer mapping.

Species' Description and Illustrations

The species are listed in alphabetical order. Unpublished taxa of L. Johnson, D. Blaxell and K. Hill are given a three letter code and referred to as aff. (with affinity to their nearest named relative). Unpublished taxa of Brooker and Hopper are given as manuscript names enclosed in parentheses. For each species (or subspecies), the main identifying features of the plant are indicated on the drawings. Other features, including those which can only be seen in the field are included under "Additional Field Characteristics". If there are similar eucalypts with which the species in question can be confused, these are indicated and their distinguishing features highlighted. In cases where a similar species is common and is thus not included in the field guide, full details of the comparison are given. If a similar species is rare, and is included in the field guide, only a brief comparison is provided. Further details can be found on the relevant page for that species.

All illustrations have been drawn using material from the W.A. Herbarium or from other collections. As it is not possible to show the slight variations of ornamentation which may occur within a species, the most representative specimens have been drawn.

Location Maps

The location maps have been produced from records of specimens lodged at the Western Australian Herbarium, from personal records of M.I.H. Brooker and S.D. Hopper and from information supplied by various wildlife officers and individuals as recorded on the Department of Conservation and Land Management species files. The maps have been compiled on the FLORAPLOT Computer System at the W.A. Wildlife Research Centre.

The maps of species' location are given as a general guide and should not be regarded as covering the entire range of the species.It is hoped that the present survey will either extend the known range or verify the restricted occurrence of certain species. It is also possible that some previously recorded populations or individuals may have disappeared as a result of agricultural clearing, or road widening, or other factors.

Collecting Specimens

Since eucalypts can be difficult to identify and also since we are only looking at rare and poorly known taxa for which confirmed identification is essential, we will be relying greatly on voucher specimens to confirm certain records.

A properly collected, well pressed and labelled specimen will be required in each of the following circumstances:

- For each 'new' species or subspecies recorded by a person e.g. when John Smith records *E. kruseana* for the first time, a voucher specimen is needed.

- For any species or subspecies located a significant distance from its nearest known location (consult the map scale each time as most maps are at different scales). "Significant" may be a few kilometres for an extremely localised species (e.g. *E. 'demissa'*), further for more widespread species.

- Whenever you are unsure of an identification.

The following guidelines suggest techniques for collecting and processing specimens so that they remain in a well preserved, identifiable state.

1. Do you have a collectors permit? This is needed before collecting specimens from publicly owned land. It can be obtained from the Senior Clerk Flora, Department of Conservation and Land Management, 50 Hayman Road, Como. On privately owned land, you should always seek the owners permission. Special Ministerial permits are required to collect Declared rare flora (see Table 1). These may also be applied for from the Senior Clerk Flora, Dept. of Conservation and Land Management, 50 Hayman Rd, Como, W.A.

E. beardiana	*E. steedmanii*
E. bennettiae	*E. suberea*
E. brevipes	*E. synandra* subsp. (wheatbelt)
E. burdettiana	E. sp. 'olivacea'
E. ceracea	E. sp. 'latens'
E. cerasiformis	E. sp. 'pruiniramis'
E. coronata	E. sp. 'bla'
E. crucis subsp. *crucis*	E. sp. 'crispata'
E. erectifolia	E. sp. 'phy'
E. insularis	E. sp. 'pla'
E. johnsoniana	E. sp. 'balanites'
E. lateritica	E. sp. 'absita'
E. merrickiae	E. sp. 'cuprea'
E. mooreana	E. sp. 'argutifolia'
E. rhodantha	E. sp. 'leprophloia'

Table 1. Declared Rare Eucalypts of W.A.

2. Collecting and Pressing

We recommend that you label each specimen collected with a unique number and your initials. For example, John D. Smith's collection of two eucalypt species at the first site he collects would be labelled JDS1 and JDS2. The same number should also be written in your field note book and on the relevant Sight Record Sheet, thus allowing future matching of specimens with recorded information. We also recommend that you collect in duplicate for each of your unique numbers. That is, enough material of each species to enable you to keep an adequate sample and to forward to the Survey Coordinators a duplicate (destined for the W.A. Herbarium) (see Fig. 2).

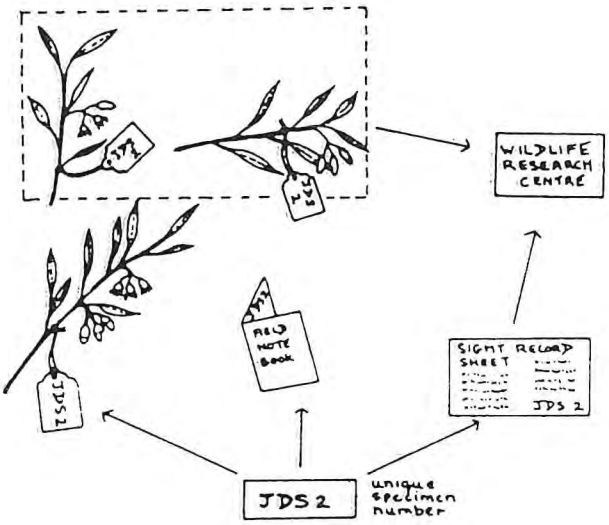


Figure 2. Labelling Plant Specimens

Collections should include leaves, buds and fruits and a small packet of fruits with the seeds enclosed. Where available, juvenile leaves from suckers near the base of the trunk should also be collected. If buds

are not available, a search on the ground may produce shed bud caps which are often an important aid in identification. Bark may be included if it is unusual.

As soon as possible after collection, plant parts should be put between sheets of newspaper, spread out so that they are clearly seen, and pressed. A simple press can be made from two sheets of any non-bending material, strapped together. Some sheets of cardboard, preferable smooth-sided corrugated cardboard, placed between the newspaper sheets will assist air circulation through the press. Drying of plant material occurs within the press and can be facilitated by keeping it in a warm room or in front of a heater and by changing the newspaper daily for the first few days, and then as conditions dictate. Most plants should dry in about a fortnight. Once dried, the plants should be placed between clean, dry sheets of newspaper and suitable measures taken to protect the specimens whilst they are in transit.

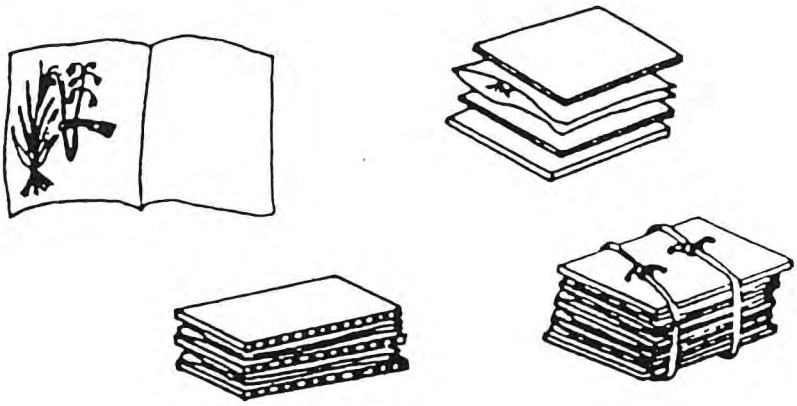


Figure 3. Pressing Plant Specimens

3. Specimen Label Slips

These are standardised recording slips which must accompany any specimen when it is submitted to a

herbarium. These can be filled in by either yourself or the Survey Coordinators (based on information contained on Sight Record Sheets). If you would like to fill in your own Specimen Label Slips, please contact Rare Eucalypt Survey Coordinators, W.A. Wildlife Research Centre, P.O. Box 51, Wanneroo, 6065.

4. Field Notebooks

We recommend the use of field notebooks when recording in the field, with all relevant data being later transferred to Sight Record Sheets. It is important that you make notes on most features illustrated in Fig. 4. when ir the field, especially those difficult or impossible to observe on herbarium specimens (e.g. tree or mallee, habit, height, shape, bark features, leaf glossiness, leaf venation and oil gland pattern, presence of pith glands in branchlets, flower colour etc. Such information should be included on the Sight Record Sheets under "Additional Remarks". If there is insufficient space, please attach an additional sheet of paper. If you have collected a specimen, remember to include its unique number in your field note book for future reference.

5. Where to Send Duplicate Specimens for Identification

Please forward your duplicate specimens with relevant sight record sheets to:

Eucalypt Survey Coordinators
Wildlife Research Centre, C.A.L.M.
P.O. Box 51
Wanneroo W.A. 6065

The coordinators will ensure that your specimens are correctly identified, with the able assistance of botanists Ian Brooker and Stephen Hopper. As mentioned

above, the duplicate you send will be deposited in the Western Australian Herbarium.

6. Confidentiality

We urge contributors to be circumspect in divulging precise locations of the rarest of the eucalypts. Many of these are of considerable horticultural value, and some have been stripped entirely of mature fruits at particular sites by unscrupulous seed collectors in the past. If you consider that a given species might be at risk from such activities, please use general locations (e.g. Ravensthorpe district) when discussing or writing about your survey work. While we require very precise locations on computer sheets to ensure we can determine land status and ownership accurately, publications arising from this survey will not provide accurate details or maps for the rarest species.

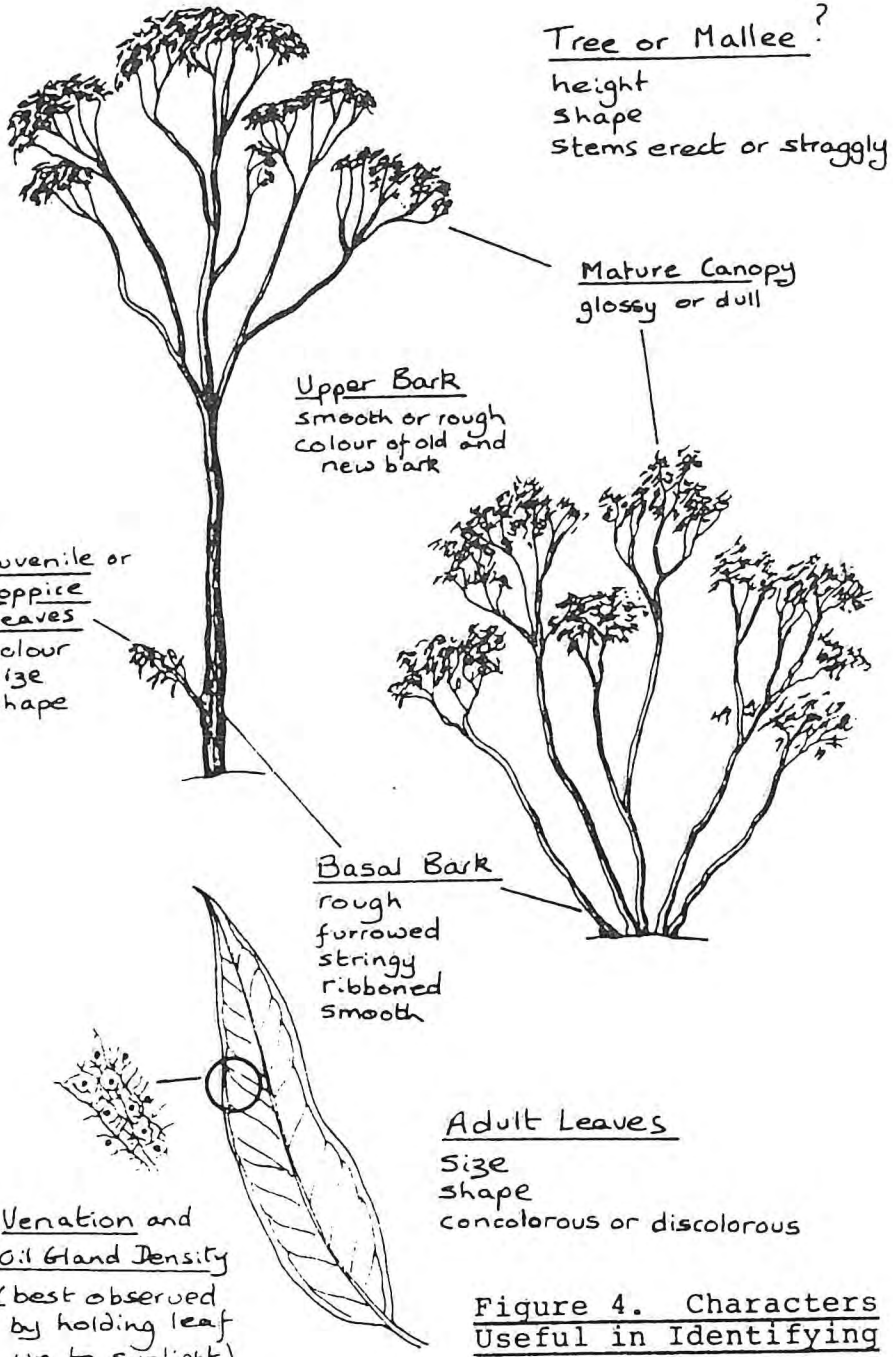
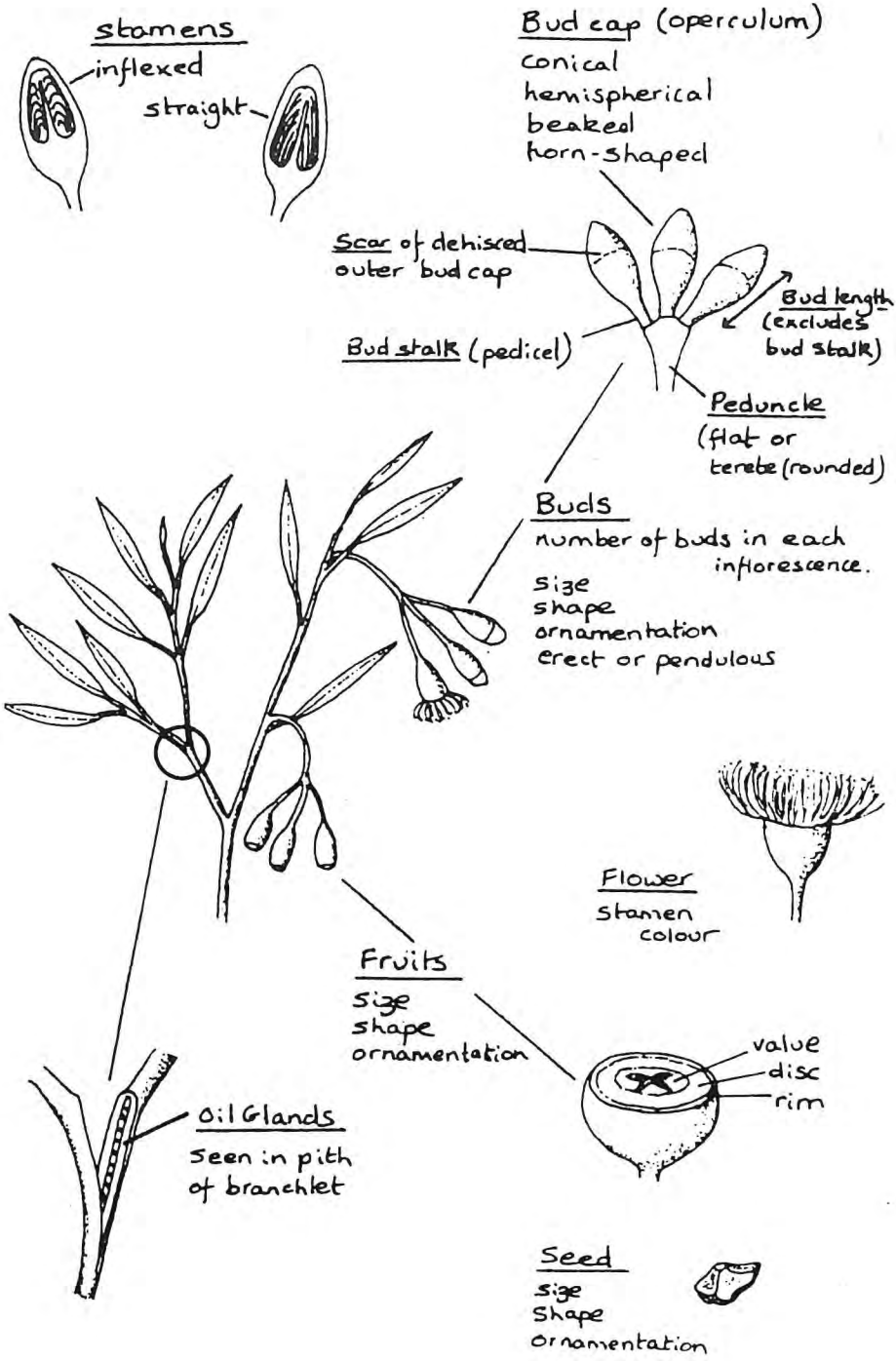


Figure 4. Characters Useful in Identifying Eucalypts


stamens
inflexed
straight
Bud cap (operculum)
conical
hemispherical
beaked
horn-shaped
Scar of dehisced outer bud cap
Bud length (excludes bud stalk)
Bud stalk (pedicel)
Peduncle
(flat or terete (rounded)
Buds
number of buds in each inflorescence.
size
shape
ornamentation
erect or pendulous
Flower
stamen
colour
Fruits
size
shape
ornamentation
valve
disc
rim
Oil Glands
seen in pith of branchlet
Seed
size
shape
ornamentation

GLOSSARY OF TERMS USED

acute	ending in a sharp point
adnate	(of anthers) rigidly fixed at the base (see diagram below)
anthesis	the process of flowering
axillary	in the leaf axil; from where the leaf joins the branchlet
concolorous	leaf with upper and lower sides the same colour
cuboid	resembling a cube
discolorous	leaf with upper and lower sides a different colour
exserted	protruding from the top or opening of the fruit
fertile	(of stamens) having an anther
flanged	a projecting flat rim, collar or rib
glaucous	with a waxy coating giving a white, grey or blue-grey appearance
globoid	of the anthers, somewhat globular in form
hypanthium	the flower receptacle or lower part of the bud
inflorescence	cluster of flowers
mallee	shrub-mallee - has more than one trunk and each trunk is less than 10 cm in diameter tree-mallee - has more than one trunk and each trunk is more than 10 cm in diameter
mallet	small to medium sized tree, usually of steep-branching habit, sometimes fluted at the base of the trunk, and often with a conspicuously dense, terminal crown
obtuse	blunt or rounded at the apex
oil glands	minute oil containing structures seen near the surface of young stems, leaves, buds and fruits
operculum	the bud cap, the upper part of the bud which joins the hypanthium and covers the stamens

panicle	a much-branched inflorescence with flowers on stalks
peduncle	the stalk which holds the cluster of buds; may be terete, stout or flattened
pendulous	weeping habit or downturned
petiole	the leaf stalk which joins it to the branchlet
pith	the inner core of tissue of a plant stem
reticulation	the pattern of leaf veins
scar	the marking left on the bud when the first operculum is shed. If only one operculum is present no true scar is formed although a line of dying tissue which resembles a scar may appear near to flowering
sessile	without a stalk
staminode	a sterile stamen, one without an anther or with a reduced, non-functional anther
striated	marked with almost parallel longitudinal ridges
terete	rounded; used when descirbing stems, peduncles and petioles and referring to a cross-section
truncate	slightly cut off
venation	refers to the pattern of veins in the leaf
versatile	(of anthers) fixed at a central point and able to pivot (see below)

versatile

adnate

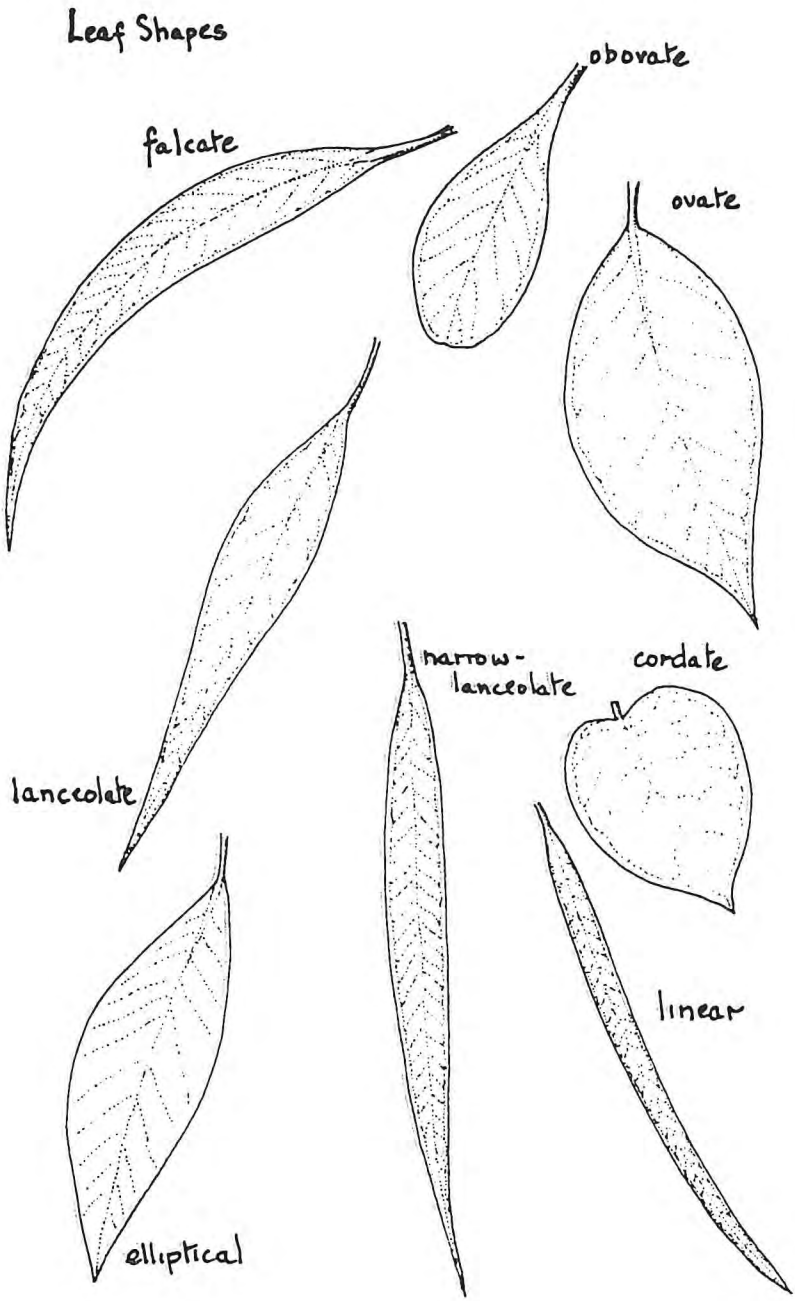
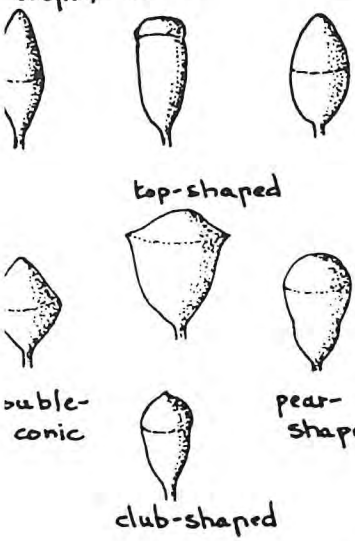
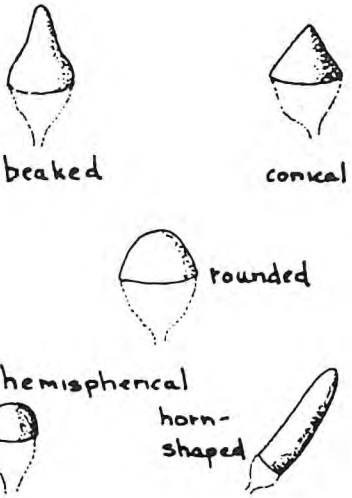


Figure 5. Leaf, bud and fruit shapes

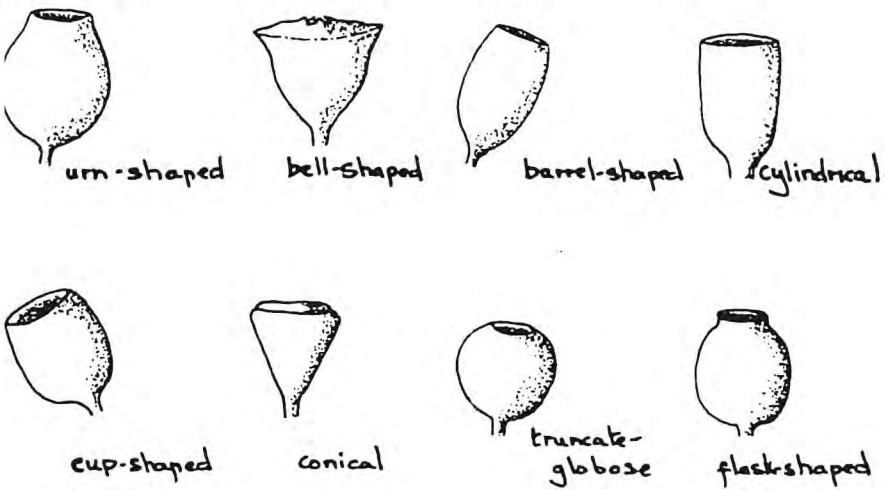
Bud Shapes



Bud Caps (opercula)



Fruits



EUCALYPTUS x. BRACHYPHYLLA Gardner

Binyarinyinna mallee

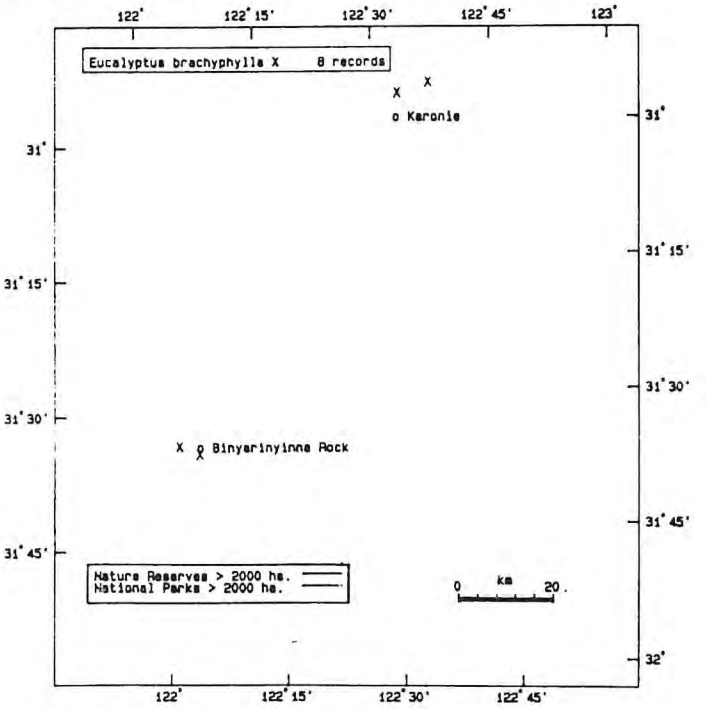
Distribution and Habitat: In the area from Binyarinyinna Rock on the northern tip of Lake Cowan, north-east to near Karonie. Grows in granite soils, usually near rocky outcrops.

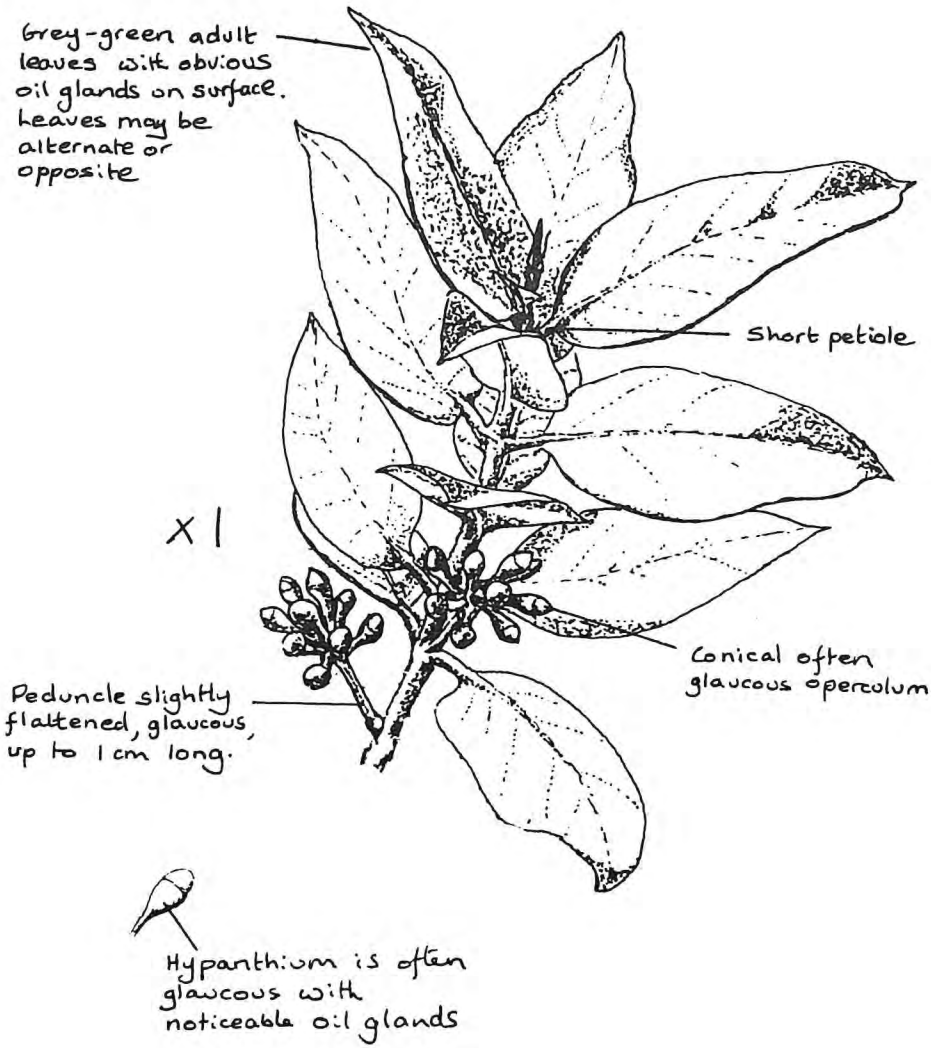
Flowering Period: June-August, sometimes until October.

Additional Field Characteristics: A straggling mallee up to 3.5 m tall with smooth grey brown bark which is deciduous in flakes or plates in late summer, exposing fresh yellow-brown bark beneath. Branchlets are dark red and slightly glaucous. Adult leaves are broadly ovate to broadly elliptical and measure 3-4.6 cm x 1.3-2.8 cm.

E. brachyphylla is believed to be a hybrid of *E. kruseana* and *E. loxophleba*. It occupies almost the exact range of *E. kruseana* and differs from it in its petiolate, ovate leaves which may be alternate or oppositely arranged, whereas those of *kruseana* are always opposite, orbicular, sessile and glaucous. The flowers are also paler than those of *kruseana*.

References: Chippendale (1973), Patrick and Hopper (1982), Gardner (1979) Kelly (1977).




Grey-green adult leaves with obvious oil glands on surface. Leaves may be alternate or opposite
Short petiole
x1
Conical often glaucous opercolum
Peduncle slightly flattened, glaucous, up to 1 cm long.
Hypanthium is often glaucous with noticeable oil glands
stamens creamy yellow
Cylindrical or barrel-shaped fruits, often glaucous.
Thin rim
x1

EUCALYPTUS BROCKWAYI Gardner

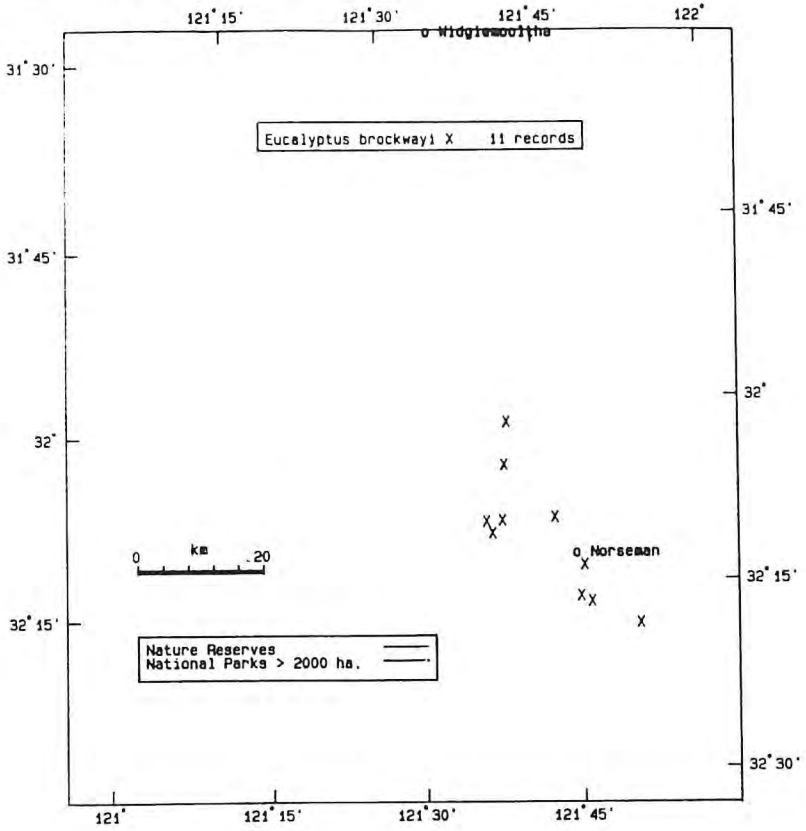
Dundas Mahogany

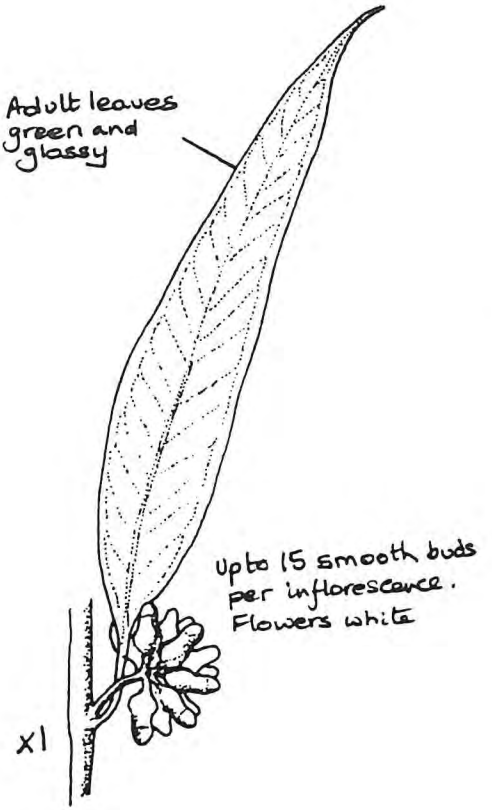
Distribution and Habitat: Occurs around Norseman, and grows in sandy, often gravelly loam, on flat ground or gentle slopes. Associated with *E. dundasii*, *E. flocktoniae*, *E. lesouefii*, *E. griffithsii* and *E. salmonophloia*.

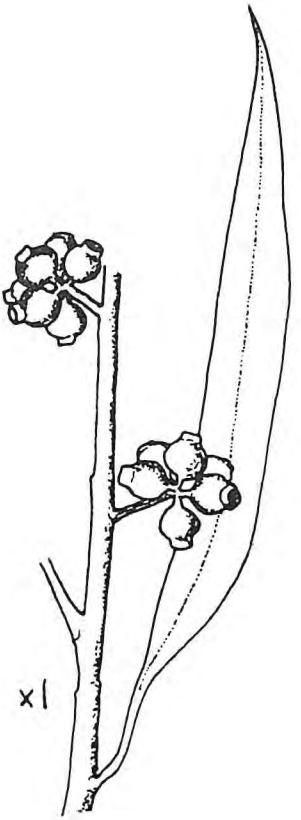
Flowering Period: April to June.

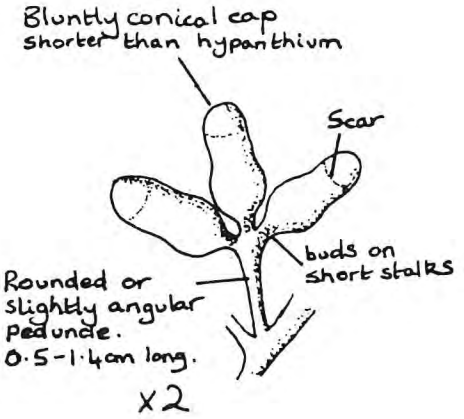
Additional Field Characteristics: A smooth erect tree up to 24 m with smooth to patchy bark, white or grey, falling off in small flakes to expose the salmon pink to bronze fresh bark. The juvenile leaves are hairy, crowded and sessile, linear at first (3 x 0.5 cm) becoming elliptic. Adult leaves are 7-13 x 0.7-1.5 cm with a dense vein network but with apparently no oil glands. The buds are 0.7-0.8 x 0.3-0.4 cm in size. The fruits have a depressed disc and are 0.5-0.7 x 0.5-0.7 cm. The seed is grey.

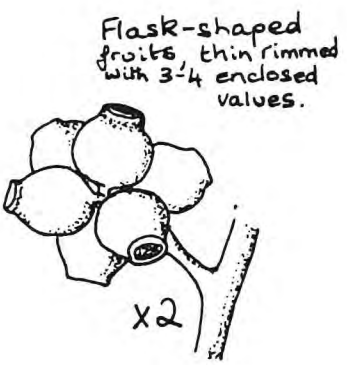
References: Chippendale (1973); Gardner (1942).




Adult leaves green and glassy
Upto 15 smooth buds per inflorescence. Flowers white
x1


x1


Bluntly conical cap shorter than hypanthium
Scar
buds on short stalks
Rounded or slightly angular peduncle. 0.5-1.4cm long.
x2


Flask-shaped fruits, thin rimmed with 3-4 enclosed values.
x2

EUCALYPTUS CORRUGATA Luehm.

Rib-fruited mallee

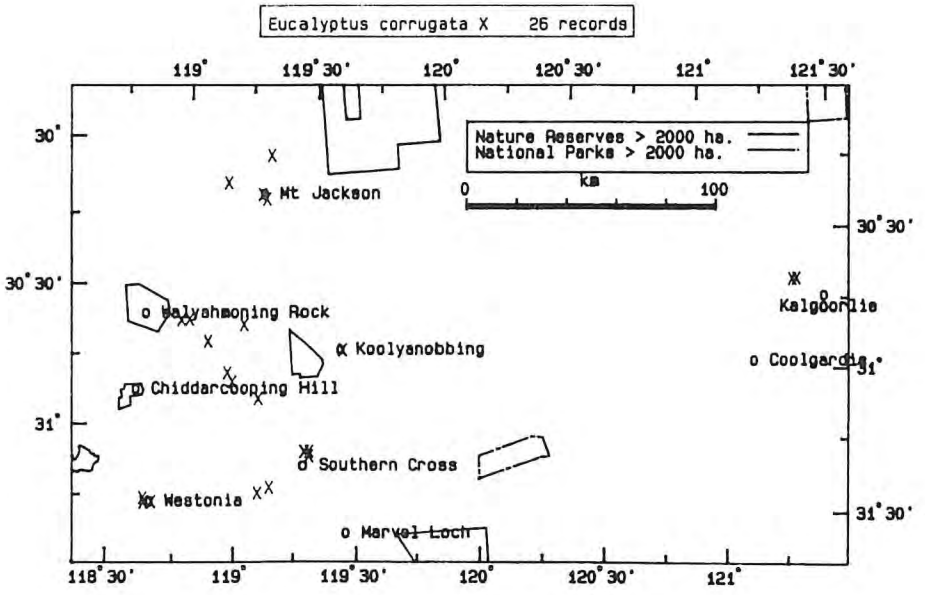
Distribution and Habitat: A scattered distribution between Westonia, Mt. Jackson, Coolgardie and along the Hyden-Norseman track. Occurs on lateritic loams and clays with *E. salmonophloia* and *E. melanoxylon*.

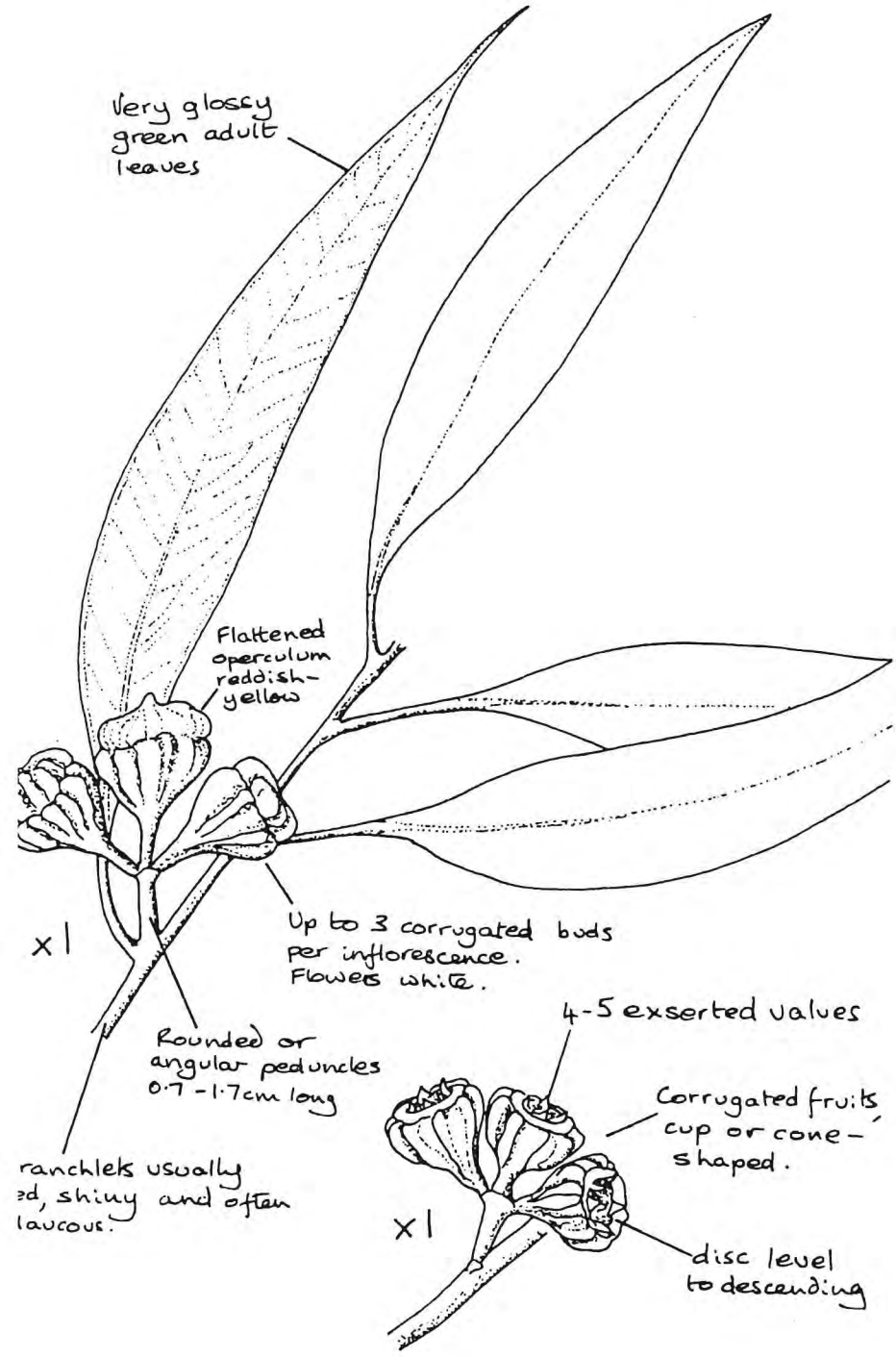
Flowering Period: October-March.

Additional Field Characteristics: A small to medium-sized tree or rarely a mallee. The basal bark is dark grey-black, rough and flaky. The upper bark is smooth, grey or pinkish grey over light salmon pink or white. The juvenile leaves are broad-lanceolate, to 8 x 3.5 cm, glossy green or slightly glaucous. The young stems are yellow or reddish and glaucous. Adult leaves are lanceolate and measure 7-12 x 0.7-2.5 cm. The buds are 1.1-1.8 x 0.8-1.3 cm and the fruits, 0.8-1.5 x 0.9-1.9 cm. The seed is grey, compressed-ovoid and deeply pitted.

E. corrugata is related to *E. griffithsii* but may be distinguished by its larger, more corrugated buds and fruits. With *E. griffithsii*, the operculum is corrugated though the hypanthium and fruits have only two ribs, one either side.

References: Chippendale (1973); Elliott and Jones (1986); Brooker and Kleinig (ms).




Very glossy green adult leaves
Flattened operculum reddish-yellow
Up to 3 corrugated buds per inflorescence. Flowers white.
x1
Rounded or angular peduncles 0·7 - 1·7cm long
branchlets usually ed, shiny and often laucous.
4-5 exserted valves
Corrugated fruits cup or cone-shaped.
x1
disc level to descending

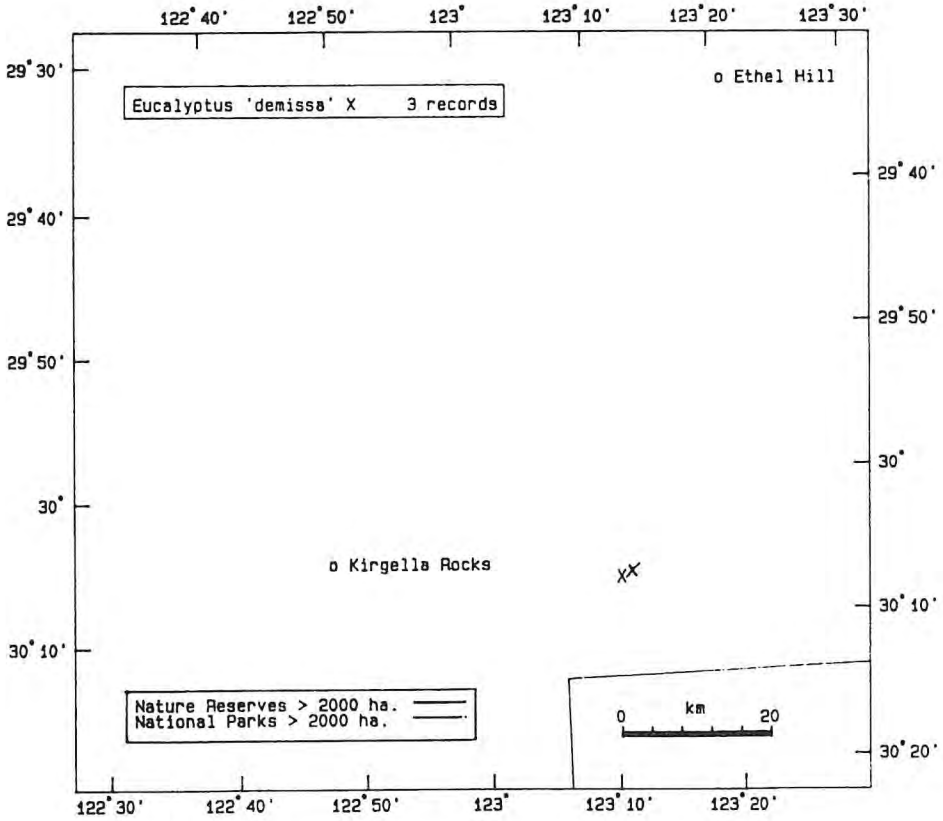
EUCALYPTUS 'DEMISSA' Brooker and Hopper ined.

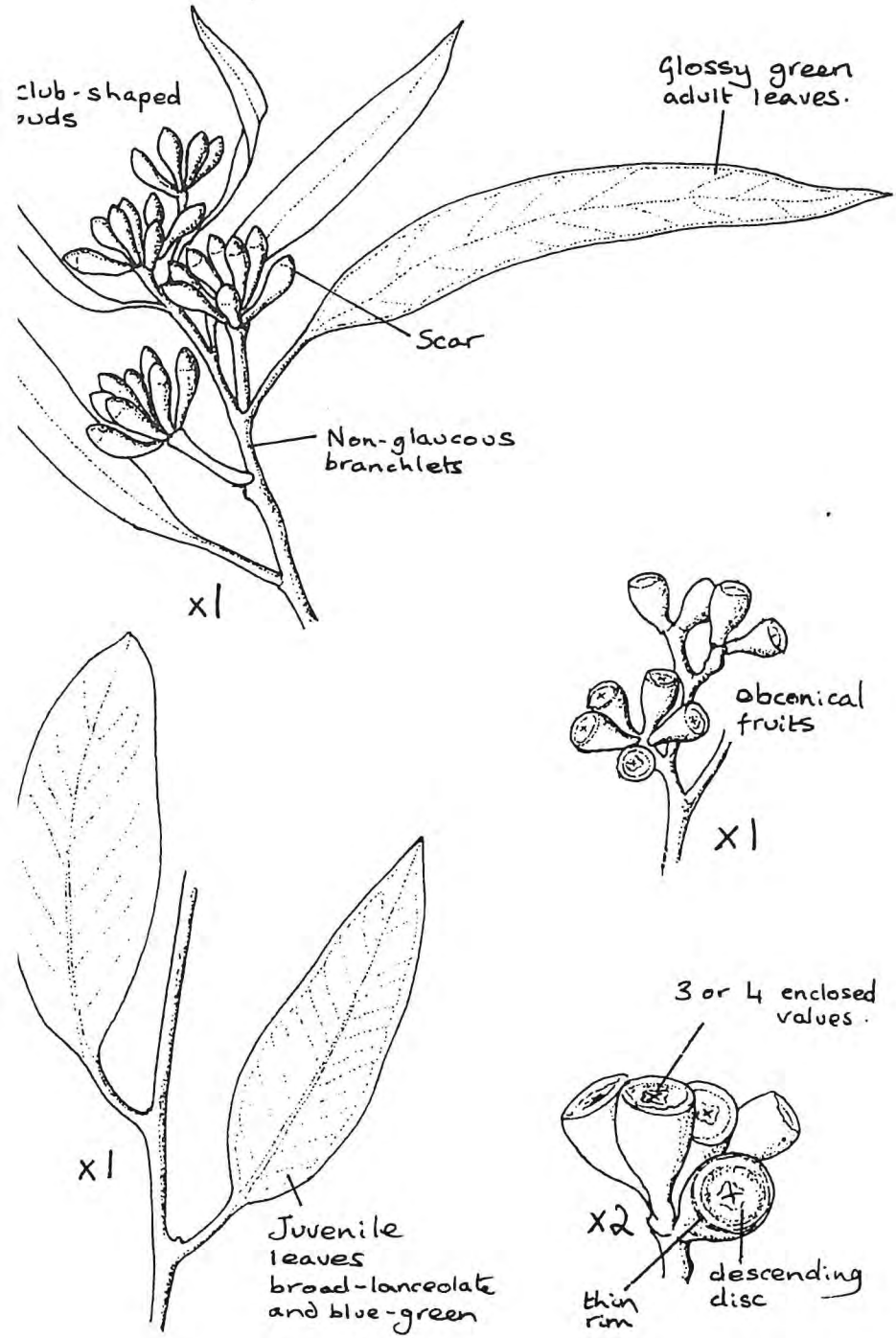
Distribution and Habitat: Known from only two populations south of Lake Minigwal where it occurs on stony ridges or red sand hills. *E. concinna*, *Melaleuca uncinata* and spinifex are associated species.

Flowering Period: Unknown.

Additional Field Characteristics: A straggly spreading mallee to 3 m x 4 m with smooth, shiny, coppery bark and non-glaucous branchlets. *E. 'demissa'* is related to *E. loxophleba* subsp. *lissophloia* ("smooth-barked *loxophleba*") differing in its non-glaucous branchlets and juvenile leaves which are broad lanceolate and blue-green. *E. loxophleba* subsp. *lissophloia* has coppery bark but glaucous branchlets. Its juvenile leaves are large, cordate to ovate, and mealy white.

References: Hopper (field notes).




club-shaped buds
Glossy green adult leaves.
Scar
Non-glaucous branchlets
x1
obconical fruits
x1
x1
Juvenile leaves broad-lanceolate and blue-green
3 or 4 enclosed values.
x2
descending disc
thin rim

EUCALYPTUS 'FLAVIDA' Brooker and Hopper ined.
(= *E. redunca* Schauer var. *oxymitra* Maiden)
Yellow-flowered mallee

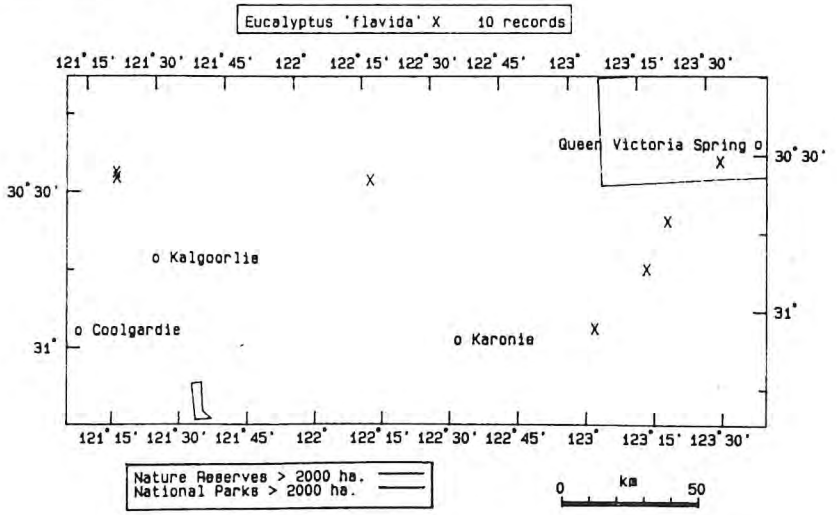
Distribution and Habitat: Known only from a few stands from south-east of Broad Arrow to east of Kalgoorlie where it has been recorded in both rocky and loamy soils.

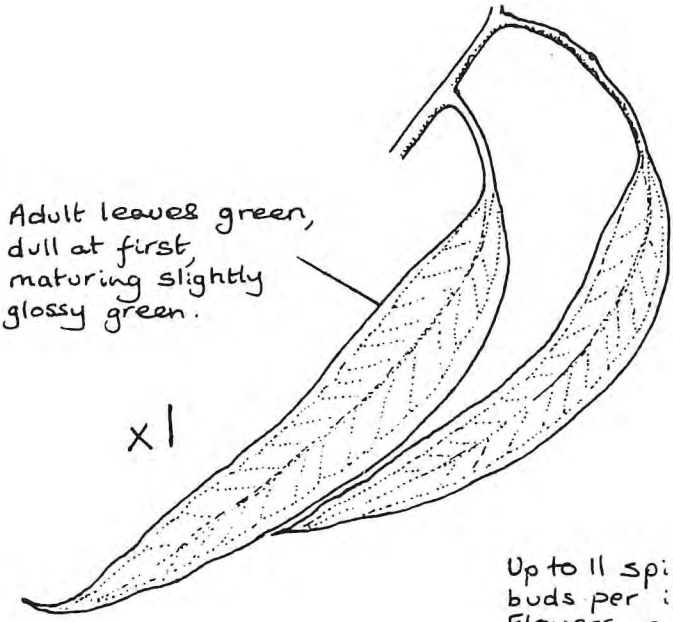
Flowering Period: Nov-Dec.

Additional Field Characteristics: A mallee or tree to 15 m with either a rough, dark, basal stocking or smooth, greyish over pale coppery throughout. Juvenile leaves are lanceolate to broad lanceolate, to 14 x 3.5 cm and glossy, green to dark green. The fruits measure 0.8-1 x 0.4-0.6 cm and have a moderately thick rim and descending disc. Seed is whitish grey to pale grey-brown, smooth and almost spherical.

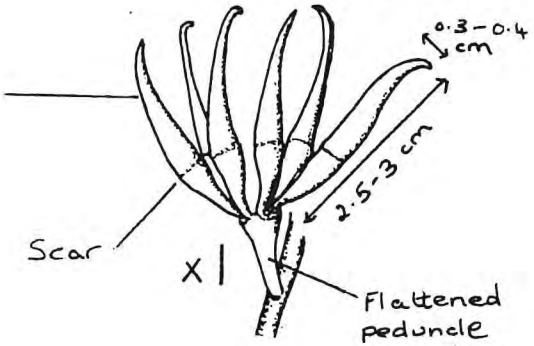
E. flavida is closely related to several unnamed species in the *redunca - gardneri* complex. It is most similar to *E. 'histophylla'*, *E. 'tumida'* and *E. 'phaenophylla'* which all share its mallee habit. Their bark however, is always smooth. Juvenile leaves of *E. 'tumida'* and *E. 'phaenophylla'* are distinct, the former being dull, blue-green, deltoid to ovate and the latter, blue-green, broad-lanceolate to ovate. Adult leaves are also different being glossy green in *E. 'tumida'* and *E. 'phaenophylla'*. In *E. 'histophylla'* they are dull at first, maturing glossy (like *E. 'flavida'*) but are held erect. The buds of *E. 'flavida'* are longer than those of *'tumida'* (1.5-2.5 cm) and *'phaenophylla'* (1-1.5 cm) and slightly longer than those of *'histophylla'* (2-2.5 cm).

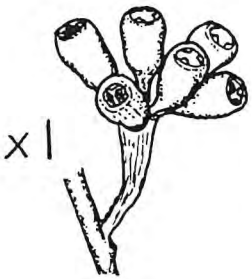
References: Brooker and Hopper (ms).





Up to 11 spindle-shaped buds per inflorescence. Flowers pale yellow.





Cylindrical to barrel-shaped fruits.

EUCALYPTUS FORMANII C.A. Gardner

Forman's mallee

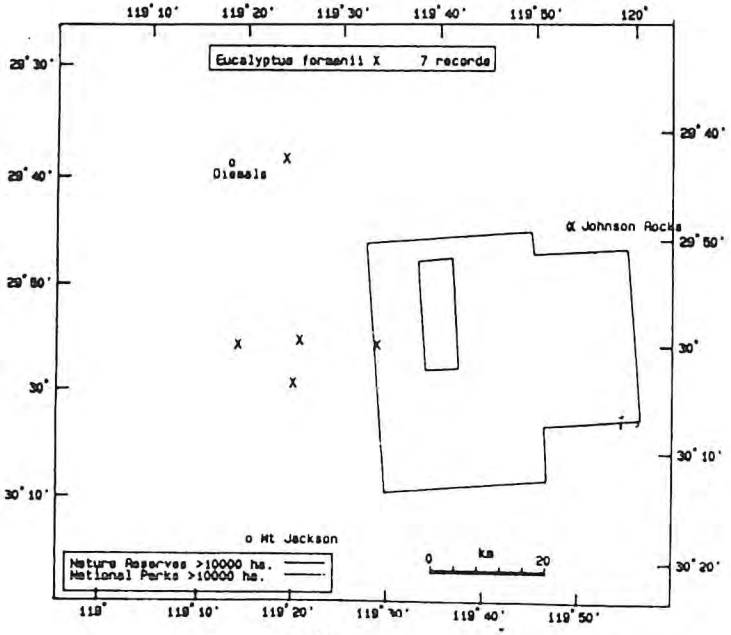
Distribution and Habitat: Occurs only in an area north of Bullfinch to the north and south of the Die Hardy Range. It grows on plains or gentle slopes on lateritic sands or loams with *Acacia* sp. *Triodia* sp. and *Callitris* sp.

Flowering Period: December-April.

Additional Field Characteristics: A small tree or rarely a mallee up to 10 m in height. The basal bark is grey and rough, the upper bark is smooth and salmon pink to bronze. The ovoid to club-shaped buds are 0.5-0.7 x 0.3 cm, and with a slightly beaked operculum. Within the bud the stamens are strongly inflexed and the anthers are adnate. The fruits measure 0.3-0.5 x 0.3-0.4 cm. The seed is grey and smooth with longitudinal grooves.

E. formanii is related to *E. perangusta* but the latter species has smooth bark and green (not greyish-white) juvenile leaves. The peduncles of *E. perangusta* are flattened, 0.2-0.7 cm long and the buds are spindle-shaped and 0.5-0.8 x 0.2-0.3 cm. The seed is pale reddish brown. Fruits are identical. There are up to 7 buds per inflorescence.

References: Elliott and Jones (1986); Chippendale (1973); Brooker and Kleinig (ms).



Whitish-grey juvenile leaves, linear and crowded. Up to 5cm long x 0.4cm wide

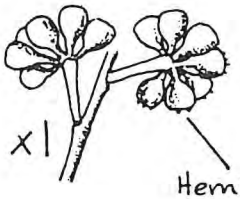
x1

Linear adult leaves. Slightly glossy, light green 3.5-9 x 0.2-0.6 cm

Up to 11 buds per inflorescence. Flowers white, very conspicuous.

Slender peduncle 0.3-1cm long.

x1



x1

3 valves slightly exserted or enclosed.

Level to descending whitish disc.

thick rim

Single Fruit x2

Hemispherical to shortly cylindrical fruits.

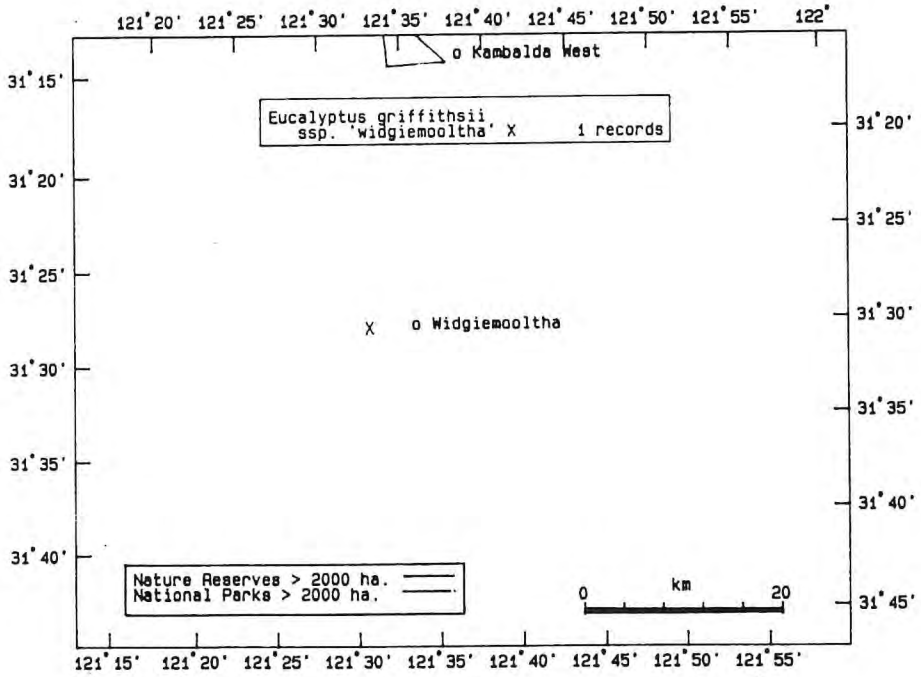
EUCALYPTUS GRIFFITHSII subsp? 'small fruited'

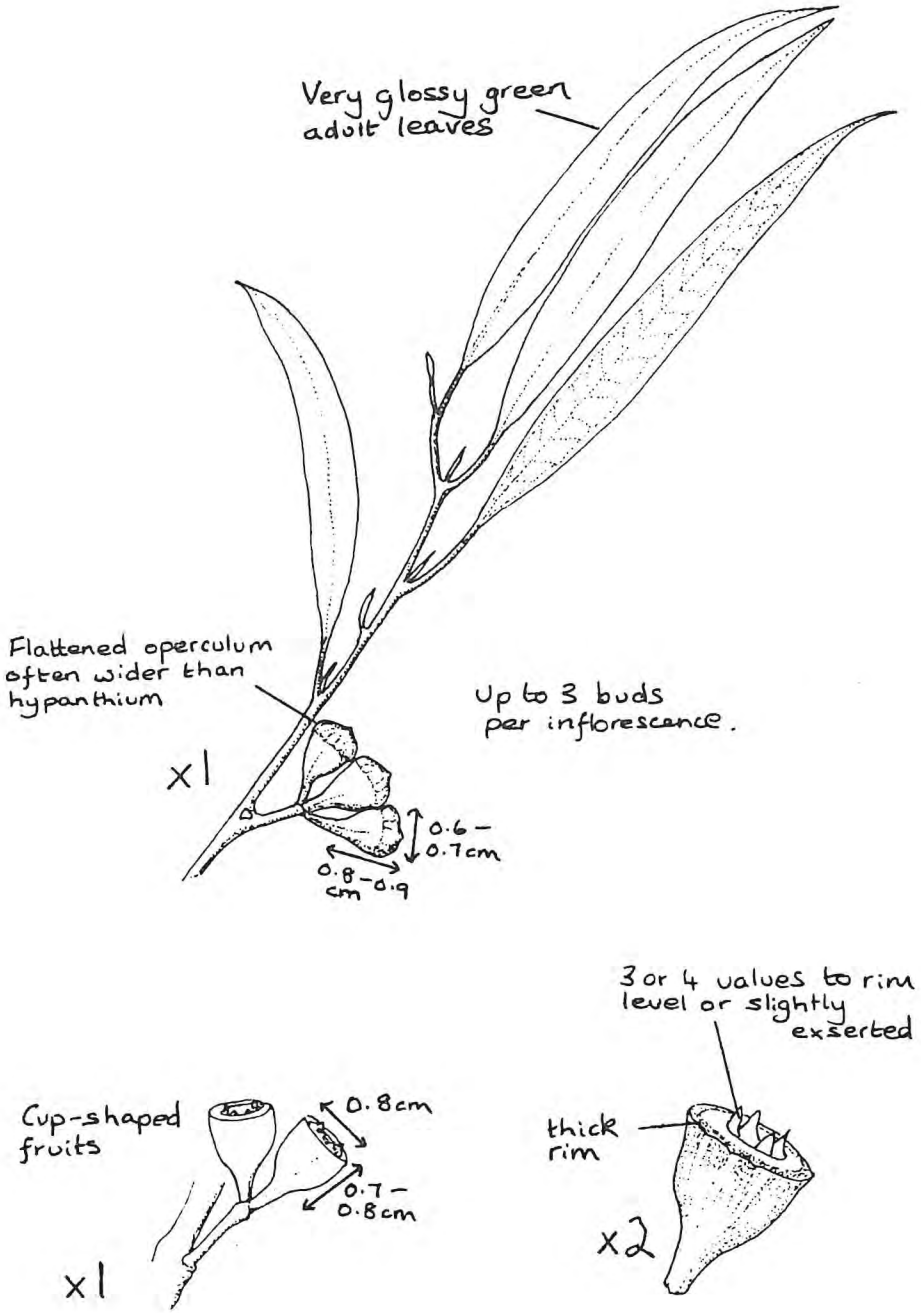
Distribution and Habitat: Known only from a single population in the Widgiemooltha area. Habitat not recorded.

Flowering Period: Not known.

Additional Field Characteristics: A tree to 6 m with either a stocking of rough, flaky bark or smooth, whitish-grey throughout. The Widgiemooltha population differs from *E. griffithsii* in its smaller buds and fruits (*griffithsii* - buds 0.9-1.6 x 0.7-1.3 cm, fruits 0.9-1.5 x 1-1.7 cm). The closely related *E. corrugata* is distinct by its strongly ribbed buds and fruits which are of similar size to those of *E. griffithsii*.

References: Hopper (field notes).




Very glossy green adult leaves
Flattened operculum often wider than hypanthium
Up to 3 buds per inflorescence.
x1
0.6 – 0.7cm
0.8 – 0.9 cm
3 or 4 values to rim level or slightly exserted
thick rim
x2
Cup-shaped fruits
0.8cm
0.7 – 0.8cm
x1

EUCALYPTUS JUTSONII Maiden

Jutson's mallee

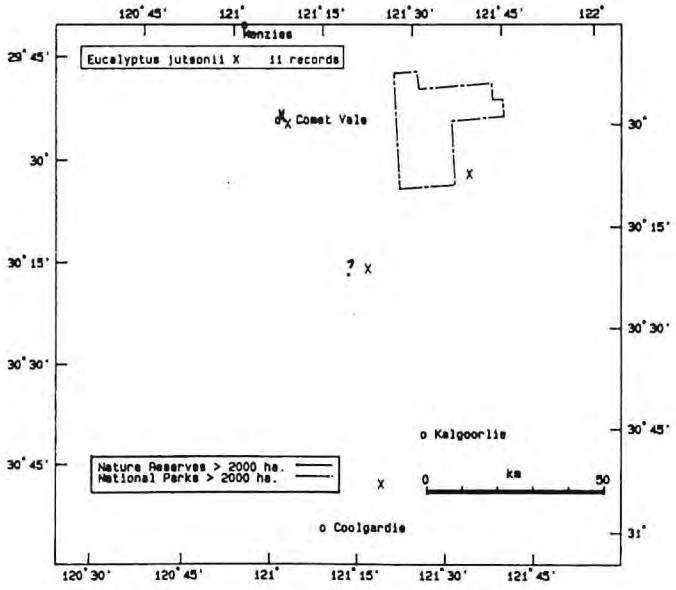
Distribution and Habitat: Known only from the Kalgoorlie to Menzies area (especially around Comet Vale) where it occurs on red sands with species such as *E. oldfieldii, E. leptopoda, E. rigidula.*

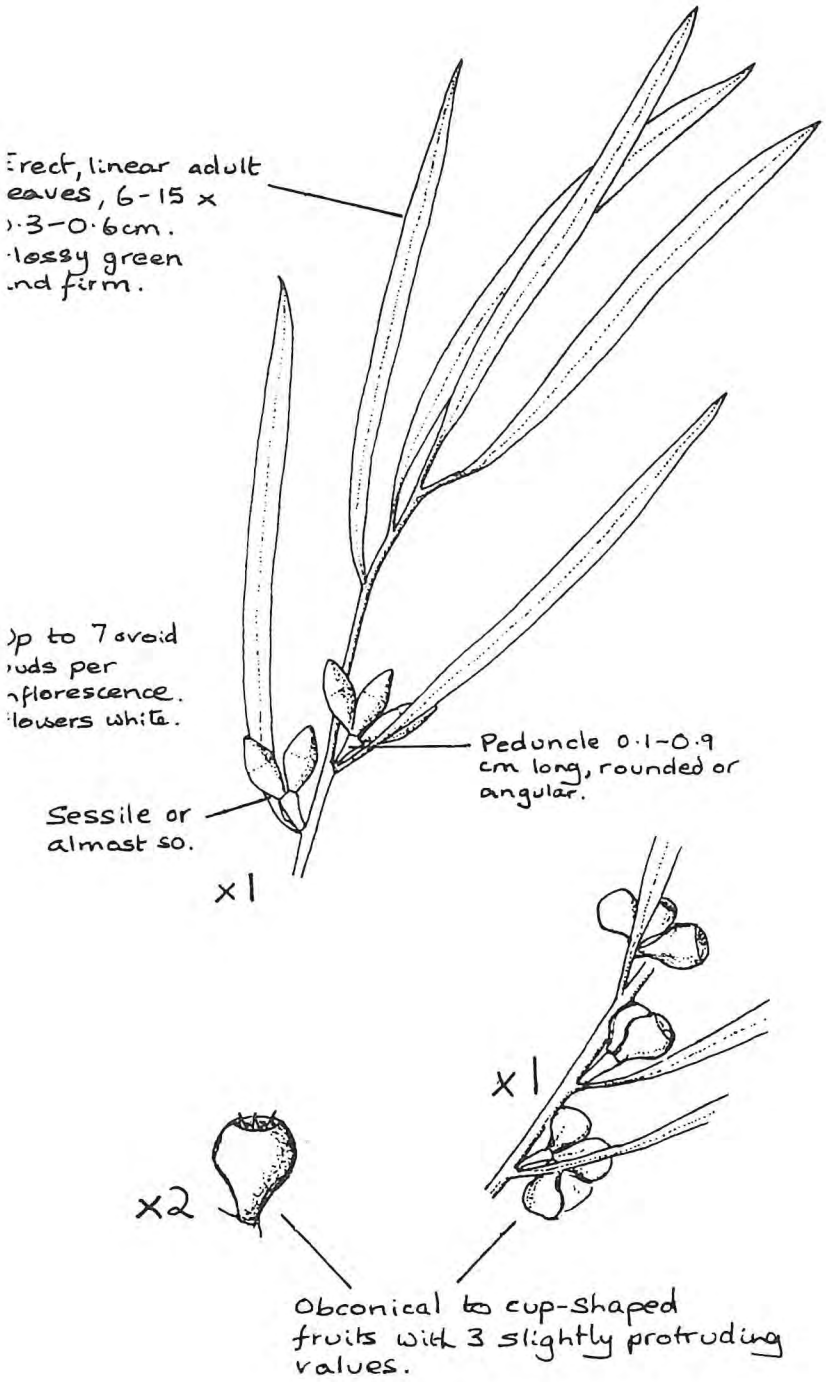
Flowering Period: Nov - ?

Additional Field Characteristics: A mallee or small tree to 8 m with rough, fibrous, dark grey, firm bark on the trunks and stems, smooth and grey to light brown on the branches. Juvenile leaves are linear, pale green and more or less sessile. The ovoid buds measure 0.6-0.9 x 0.3-0.4 cm. The fruits are 0.5-0.6 x 0.5-0.7 cm, with a thick rim and broad, level disc.

E. jutsonii is allied to *E. mannensis* subsp. *'ves'* which only occurs in the Murchison River and Shark Bay areas. The linear adult leaves of the latter measure up to 1 cm in width. They are dull blue-green when immature, maturing glossy green. Juvenile leaves of *E. mannensis* are elliptical to lanceolate, up to 9 x 3 cm, slightly glossy and blue green to glaucous. Buds and fruits of both species are similar but those of *E. mannensis* are generally more pedicellate.

References: Elliott and Jones (1986), Chippendale (1973), Gardner (1979), Kelly (1977), Brooker and Kleinig (ms).




Erect, linear adult leaves, 6-15 x 0·3-0·6cm. Glossy green and firm.
Up to 7 ovoid buds per inflorescence. Flowers white.
Peduncle 0·1-0·9 cm long, rounded or angular.
Sessile or almost so.
x1
x1
x2
Obconical to cup-shaped fruits with 3 slightly protruding valves.

EUCALYPTUS KRUSEANA F. Muell.

Book-leaf mallee

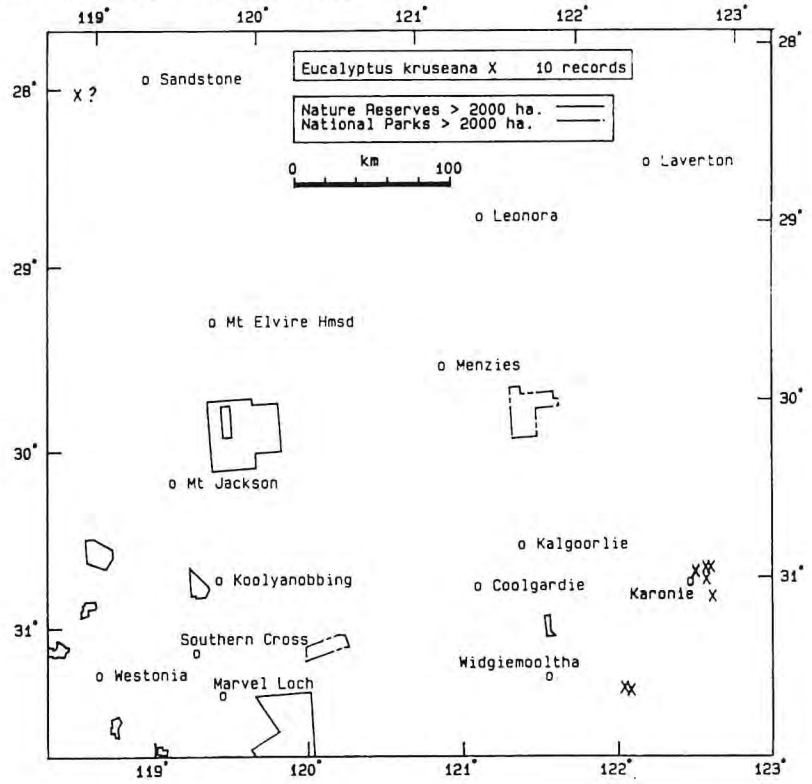
Distribution and Habitat: Has a restricted distribution east and south-east of Kalgoorlie, from Cardunia Rocks to Binyarinyinna Rock. It usually occurs on or near granite with *E. brachyphylla*.

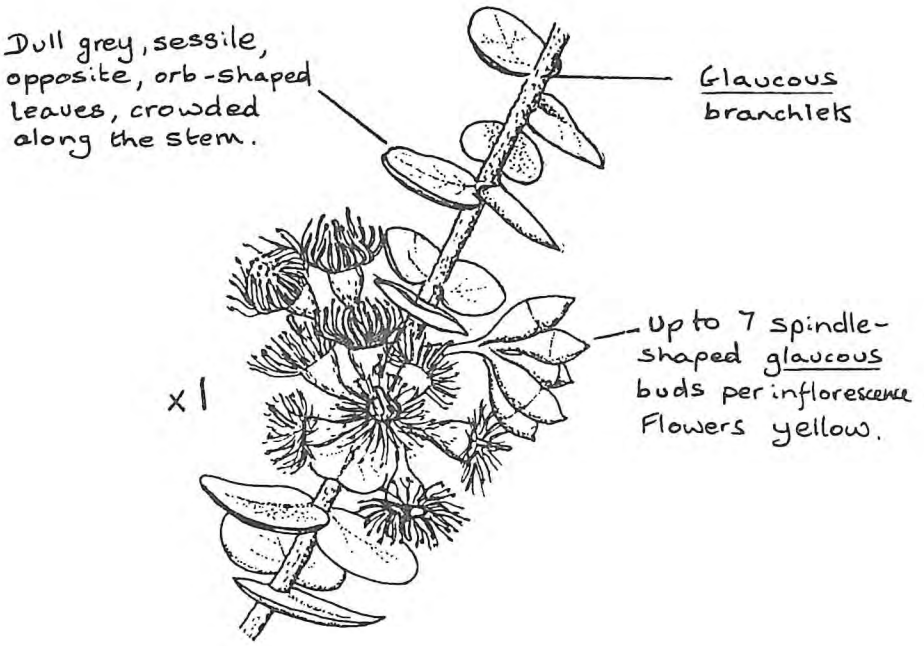
Flowering Period: June-September.

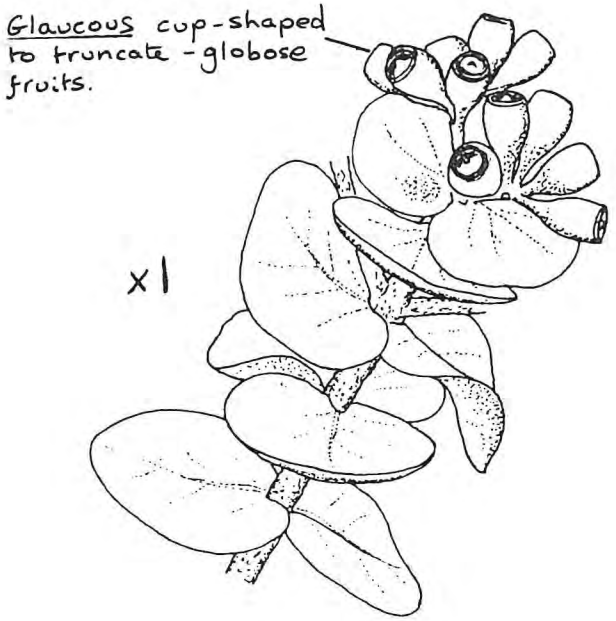
Additional Field Characteristics: A straggly mallee or occasionally a small tree to 3 m with smooth greyish bark. The orb-shaped leaves are 0.8-2.2 x 0.8-2.3 cm. The buds measure 0.7-0.9 x 0.3-0.4 cm, with "sepals" sometimes remaining from the detached outer operculum. The fruits are 0.5-0.9 x 0.5-0.8 cm.

E. kruseana has some similarities to *E.* x *brachyphylla* with which it is frequently associated. *E.* x *brachyphylla* has petiolate, grey-green, ovate leaves which are either alternately or oppositely arranged.

References: Elliott & Jones (1986), Chippendale (1973), Gardner (1979), Kelly (1977).




Dull grey, sessile, opposite, orb-shaped leaves, crowded along the stem.
Glaucous branchlets
Up to 7 spindle-shaped glaucous buds per inflorescence
Flowers yellow.
x1


Glaucous cup-shaped to truncate-globose fruits.
x1

EUCALYPTUS 'NIGRIFUNDA' Brooker & Hopper ined.

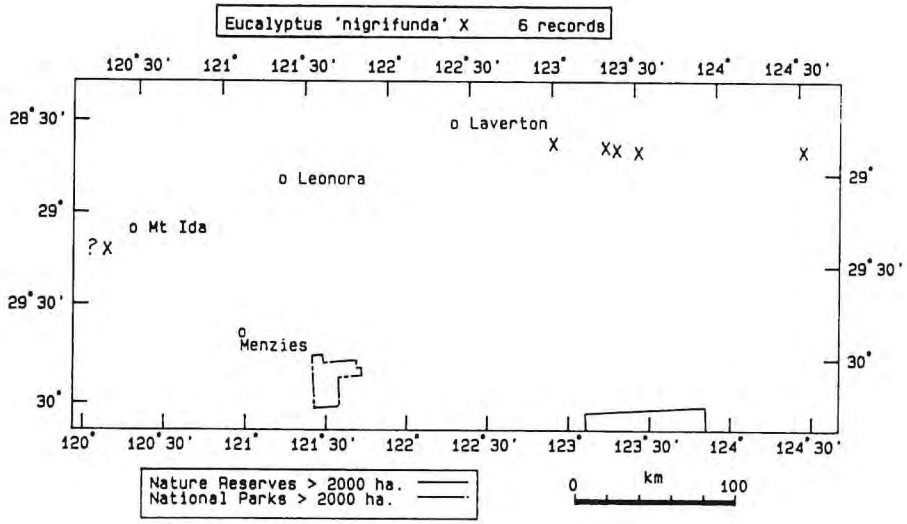
Blackbutt wandoo
Desert wandoo

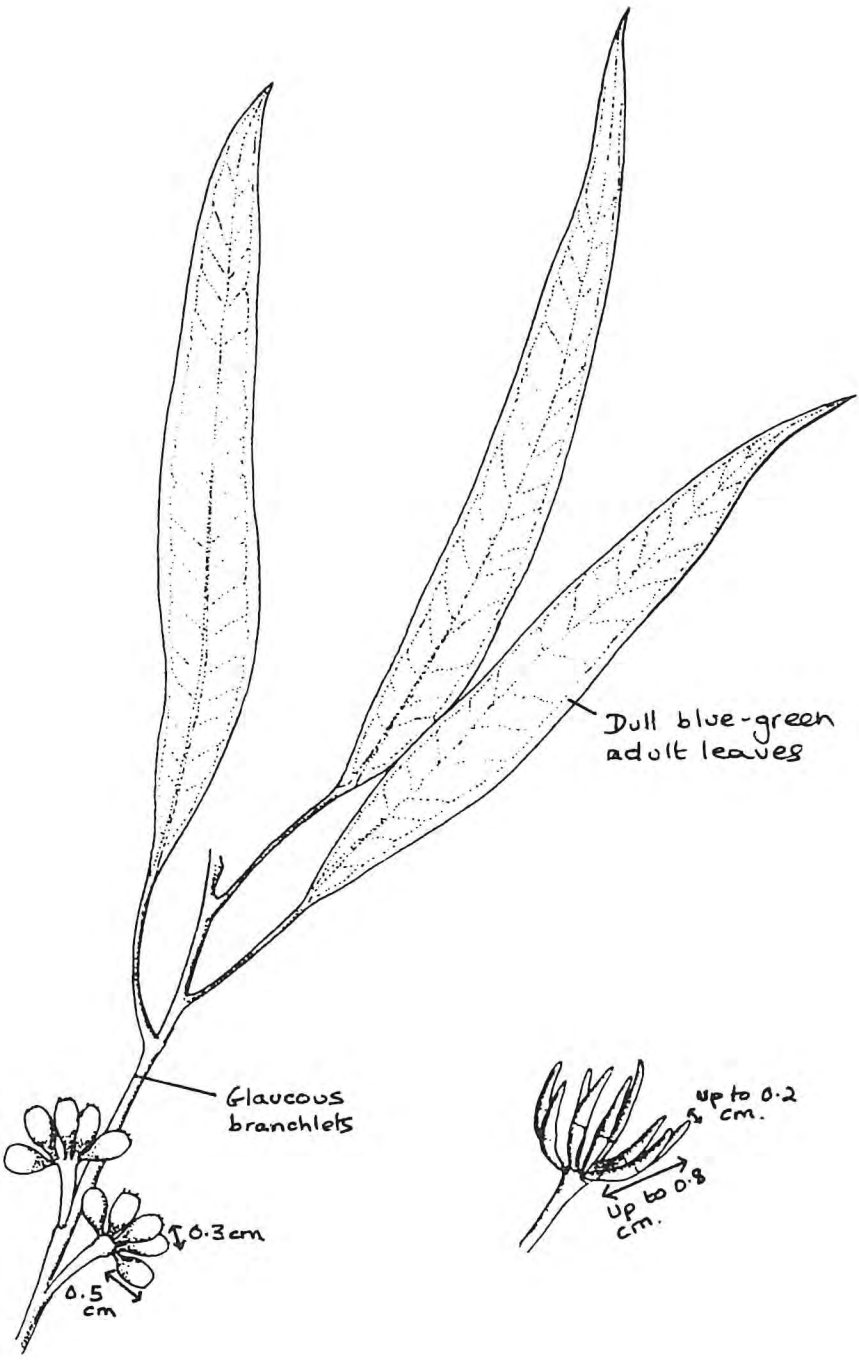
Distribution and Habitat: Known from only a few populations in the Great Victoria Desert and south-east of Lake Barlee where it occurs on low breakaways of decomposed granite and on adjacent flats. Associated species include *E. youngiana*, *E. gongylocarpa*

Flowering Period: Unknown

Additional Field Characteristics: A tree related to *E. wandoo* differing in its dark grey rough basal bark, strongly glaucous branchlets, smaller juvenile leaves (10-12 x 2.5-4.5 cm) and smaller buds and fruits. The juvenile leaves of *E. wandoo* are cordate to broad-lanceolate, blue-green to glaucous and measure 9-15 x 3-7 cm. The buds of *E. wandoo* are 1-1.9 x 0.3-0.4 cm and the fruits 0.4-1 x 0.3-0.6 cm.

References: Brooker and Hopper (ms).




Dull blue-green adult leaves
Glaucous branchlets
0.3cm
0.5 cm
up to 0.2 cm.
up to 0.8 cm.

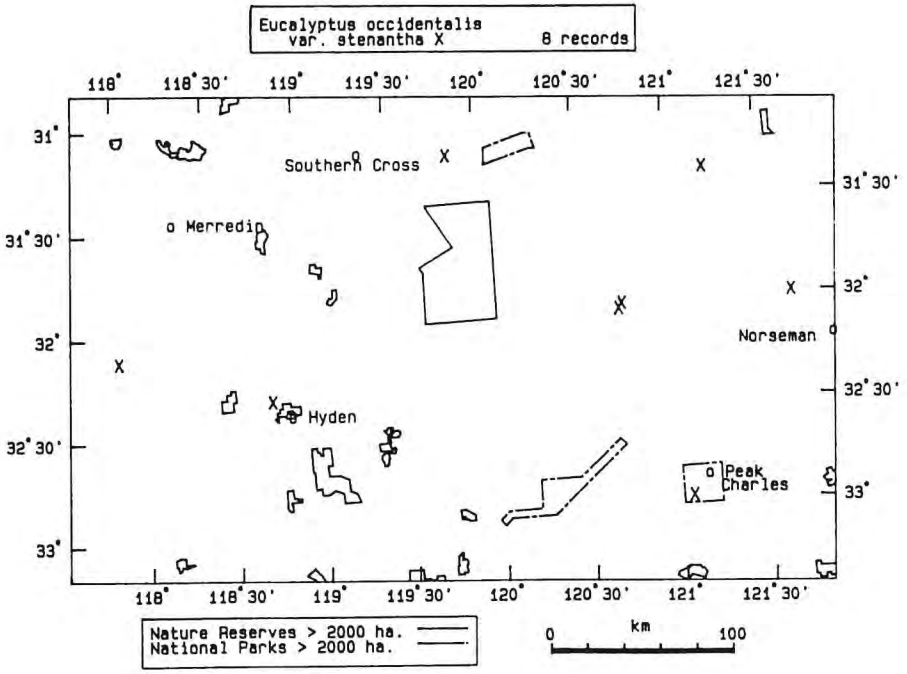
EUCALYPTUS OCCIDENTALIS Endl. var STENANTHA Diels ex Maiden

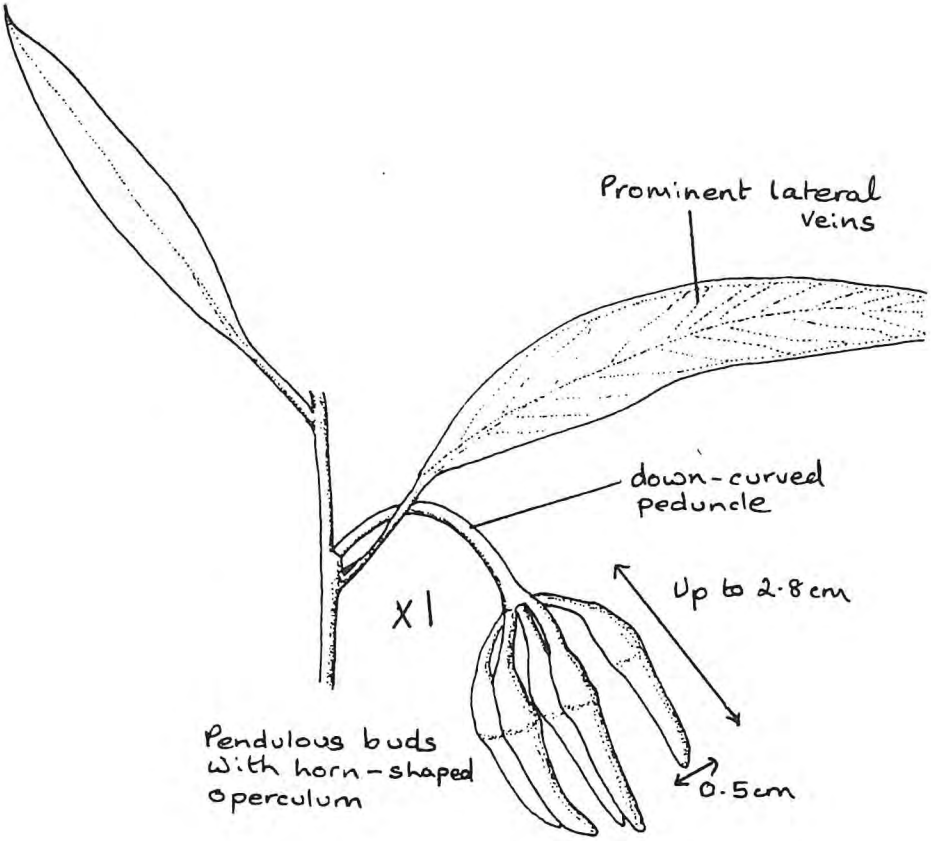
Distribution and Habitat: A scattered occurrence in the central and southern goldfields particularly between Southern Cross and Norseman, usually around granite rocks. Associated species include *E. petraea, E. eremophila, E. tenuis* and *E. loxophleba*.

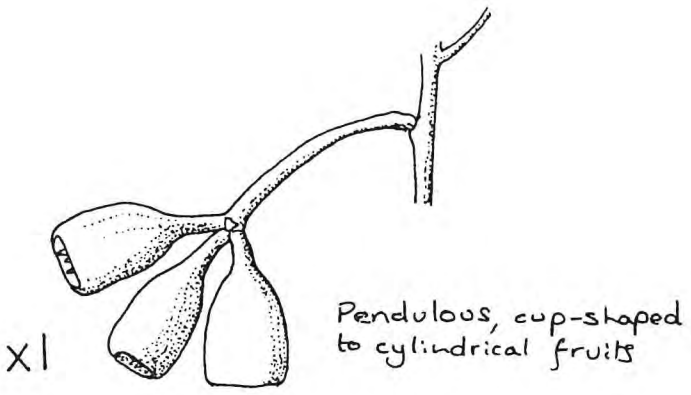
Flowering Period: March-May

Additional Field Characteristics: A mallee or small tree with a thick rough brown-black stocking, smooth grey above. *E. occidentalis* var. *stenantha* differs from *E. occidentalis* in its lower stature, non-swampy habitat, and in its cup-shaped to cylindrical fruits (*occidentalis* - bell shaped fruits). The two taxa have occasionally been recorded together. Var. *stenantha* is also related to *E. eremophila* and its allies but the latter has consistently smooth bark and on its adult leaves the lateral veins are obscured by the numerous round oil glands. A smooth-barked mallee form of *E. occidentalis* is found in south coastal regions. It differs from var. *stenantha* in its smooth bark and bell-shaped fruits.

References: Hopper (field notes), Brooker and Kleinig (ms).




Prominent lateral veins
down-curved peduncle
Up to 2·8 cm
X1
Pendulous buds with horn-shaped operculum
0·5 cm


X1
Pendulous, cup-shaped to cylindrical fruits

EUCALYPTUS ORBIFOLIA F. Muell.

round-leaved mallee

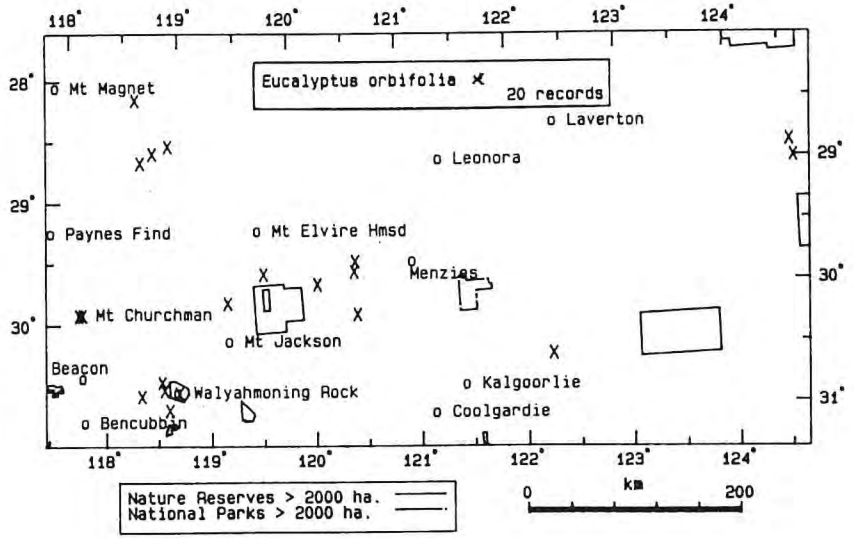
Distribution and Habitat: Occurs at scattered locations in the northern Goldfields, always close to granite outcrops. N.B. There is some confusion between *E. orbifolia* and *E. websteriana* so marked locations may not always be correct.

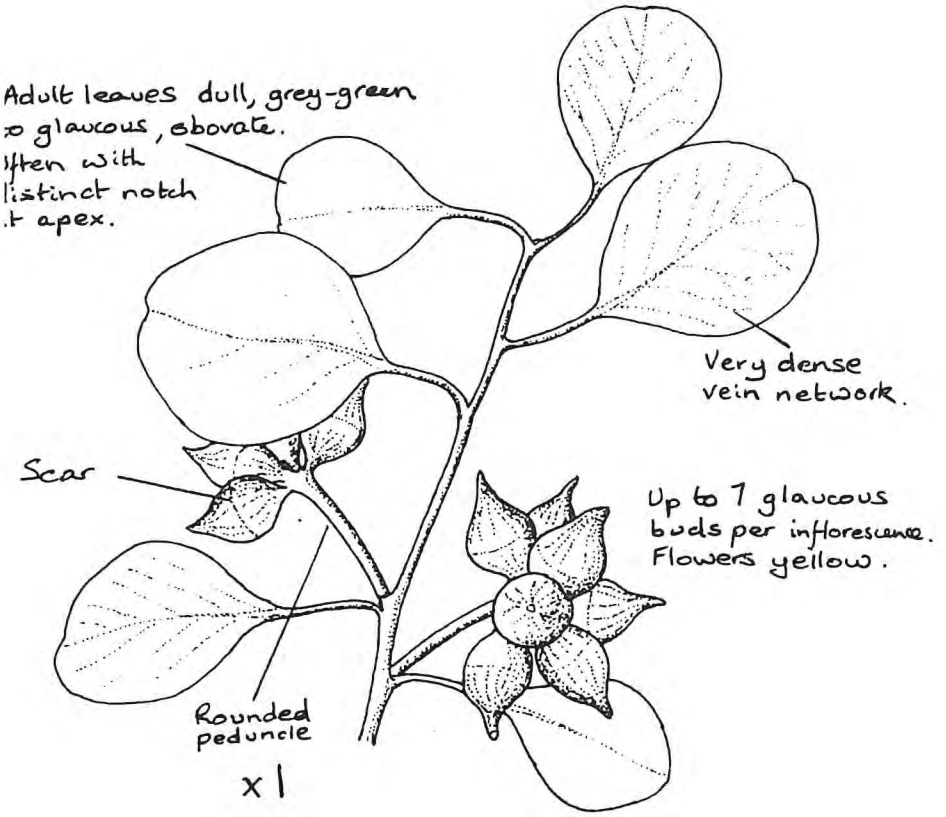
Flowering Period: July-November

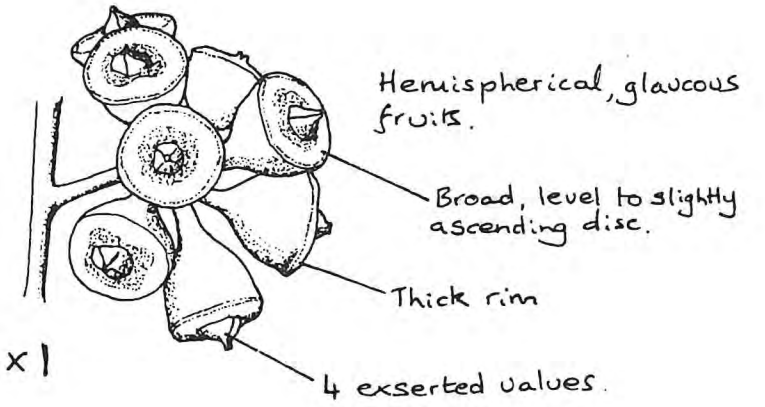
Additional Field Characteristics: A mallee, occasionally a tree up to 6 m, with minorichee bark. The petiolate juvenile leaves are up to 5 x 6 cm. Adult leaves measure 2-5.5 x 1.2-3.7 cm. The buds are double conic, or rarely spindle-shaped and are on short pedicels. The operculum is conical or slightly beaked. The fruits measure 0.5-1 x 0.6-1.4 cm. The seed is grey-brown and the chaff needle-like.

E. orbifolia is related to *E. websteriana* but the latter has non-glaucous buds and fruits with more slender pedicels and generally smaller fruits. *E. orbifolia* also resembles *E. crucis* but the latter has opposite, ovate to orb-shaped leaves which are sessile or almost so. These dull, glaucous leaves are the juvenile leaves which are retained on the mature plant. *E. crucis* has a sprawling habit with rough, dark grey basal bark, and minorichee bark above.

References: Chippendale (1973), Elliott and Jones (1986), Gardner (1979), Kelly (1977), Brooker and Kleinig (ms).




Adult leaves dull, grey-green to glaucous, obovate. often with distinct notch at apex.
Very dense vein network.
Scar
Up to 7 glaucous buds per inflorescence. Flowers yellow.
Rounded peduncle
x1


Hemispherical, glaucous fruits.
Broad, level to slightly ascending disc.
Thick rim
4 exserted values.
x1

EUCALYPTUS 'PLA' aff. diversifolia

Jimberlana mallee

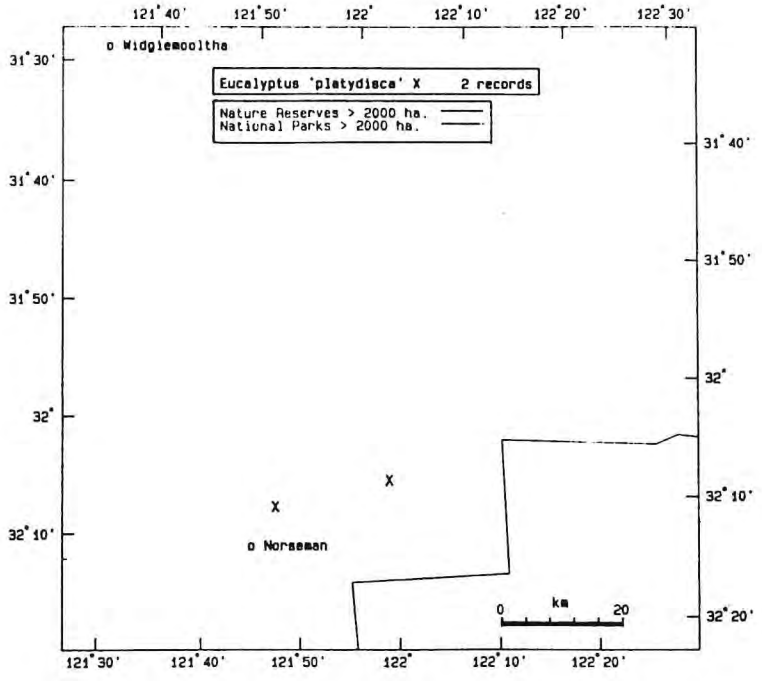
Distribution and Habitat: Known only from Jimberlana Hill and Mt Norcott north-east of Norseman, a geograhpic range of about 18 km. Grows in dark brown sandy loam on rocky slopes amongst granite boulders. Occurs in open shrub-mallee with *E. oleosa*.

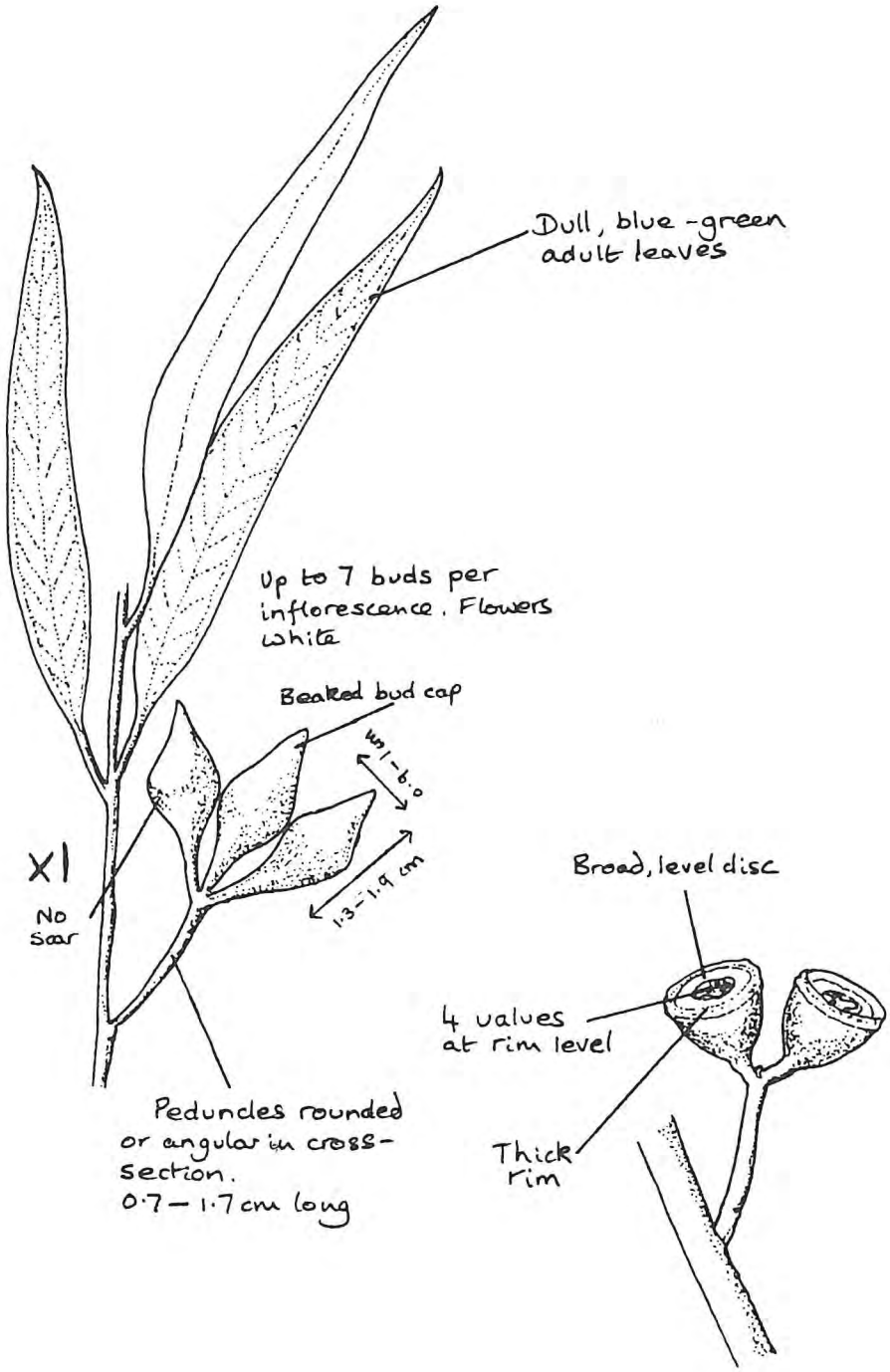
Flowering Period: March - May.

Additional Field Characteristics: A mallee with adult grey bark. The juvenile leaves are elliptic, dull blue-green in colour and to 11 x 5 cm. The adult leaves are dull blue-green, lanceolate, 5-11 x 0.6 - 1.1 cm with a moderate vein network and scattered to numerous, often obscure oil glands. The stamens are variously flexed within the bud. The seed is shining, brown and 'D' shaped.

This species is similar to *E. diversifolia* but differs in its level disc (*diversifolia* level to slightly ascending), larger buds, (*diversifolia* 0.7-1 x 0.5-0.6 cm) and in its very restricted habitat.

References: Brooker and Kleinig (ms); Hopper (field notes).




Dull, blue-green adult leaves
Up to 7 buds per inflorescence. Flowers white
Beaked bud cap
0.9 - 1.3 cm
1.3 - 1.9 cm
X1
No scar
Broad, level disc
4 valves at rim level
Thick rim
Peduncles rounded or angular in cross-section.
0.7 - 1.7 cm long

EUCALYPTUS PIMPINIANA Maiden

Pimpin mallee

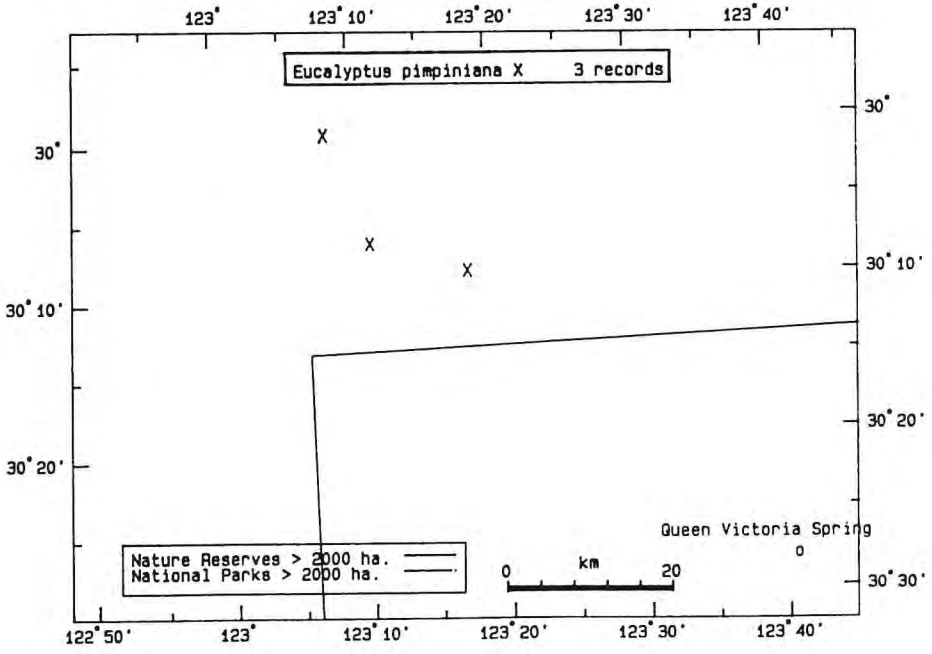
Distribution and Habitat: In Western Australia known only from a few populations south of Lake Minigwal in the Great Victoria Desert where it occurs on red sands with *E. platycorys*, *E. 'opt'* and *E. rigidula*.

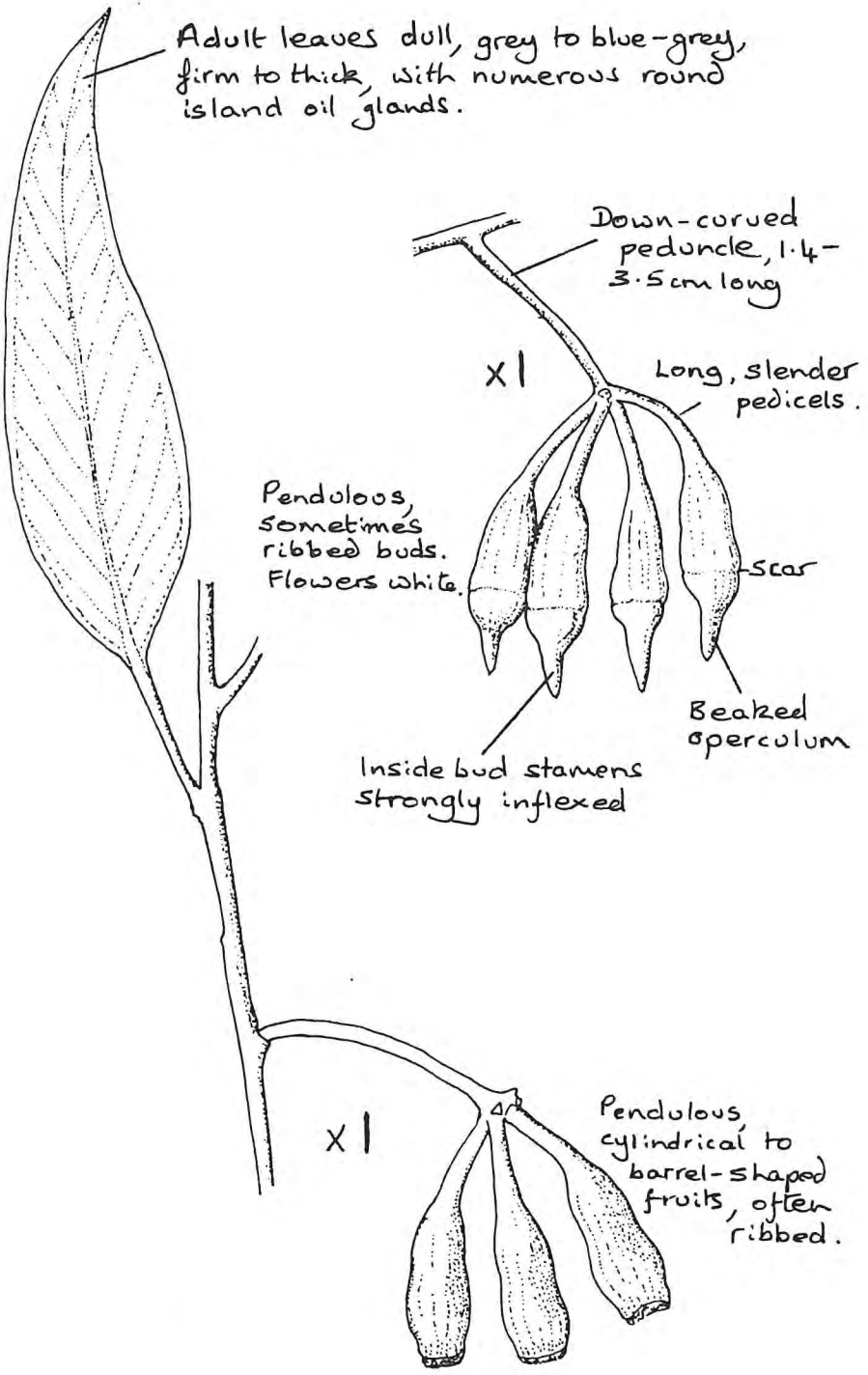
Flowering Period: May-October.

Additional Field Characteristics: A low straggly mallee to 1 m tall with smooth white bark and pendulous buds and fruits. Adult leaves measure 6-11.5 x 1.6-3.3 cm and their venation is obscure. The buds are cylindrical to elongated and measure 2-2.8 x 0.8-1.1 cm. Fruits are cylindrical to barrel-shaped and have a thick rim, descending disc and four enclosed valves. They measure 1.4-2.2 x 0.9-1.3 cm. Seeds are dark brown-black and elongated.

E. pimpiniana is a distinctive species with its low habit, dull greyish leaves and pendulous buds and fruits. It may sometimes be confused with pendulous forms of *E. incrassata* but the latter have glossy green adult leaves with obvious side veins.

References: Elliott and Jones (1986), Kelly (1977), Brooker and Kleinig (ms).




Adult leaves dull, grey to blue-grey, firm to thick, with numerous round island oil glands.
Down-curved peduncle, 1.4–3.5 cm long
x1
Long, slender pedicels.
Pendulous, sometimes ribbed buds. Flowers white.
Scar
Beaked operculum
Inside bud stamens strongly inflexed
x1
Pendulous cylindrical to barrel-shaped fruits, often ribbed.

EUCALYPTUS RAMELIANA F. Muell.

Ramel's mallee

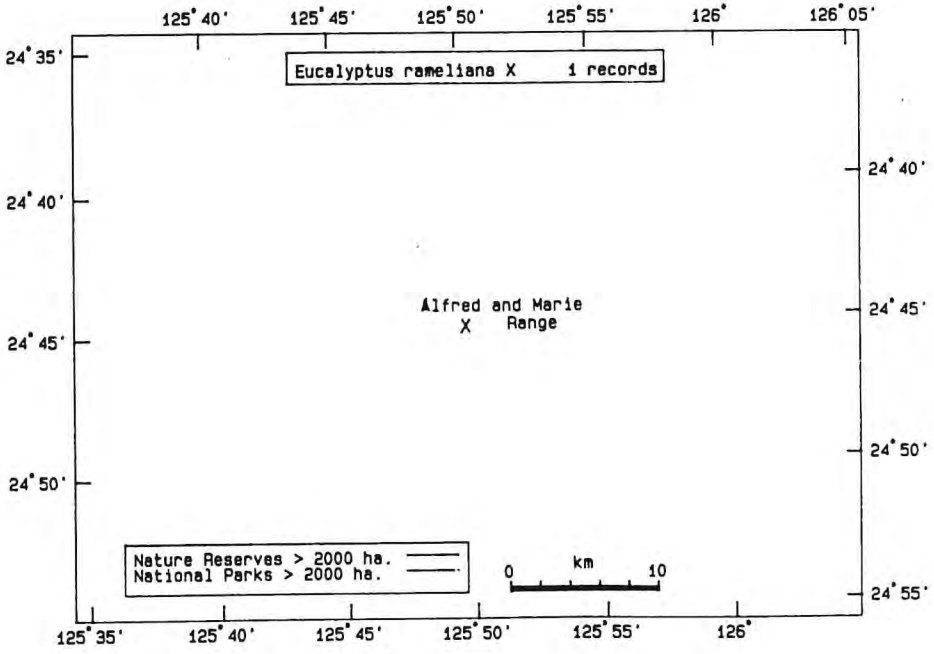
Distribution and Habitat: Known from only one collection of over 100 years age when it was recorded north of the Alfred and Marie Ranges in the Gibson Desert. Recent surveys in the Gibson Desert have failed to locate this species although the Alfred and Marie Ranges have not been searched.

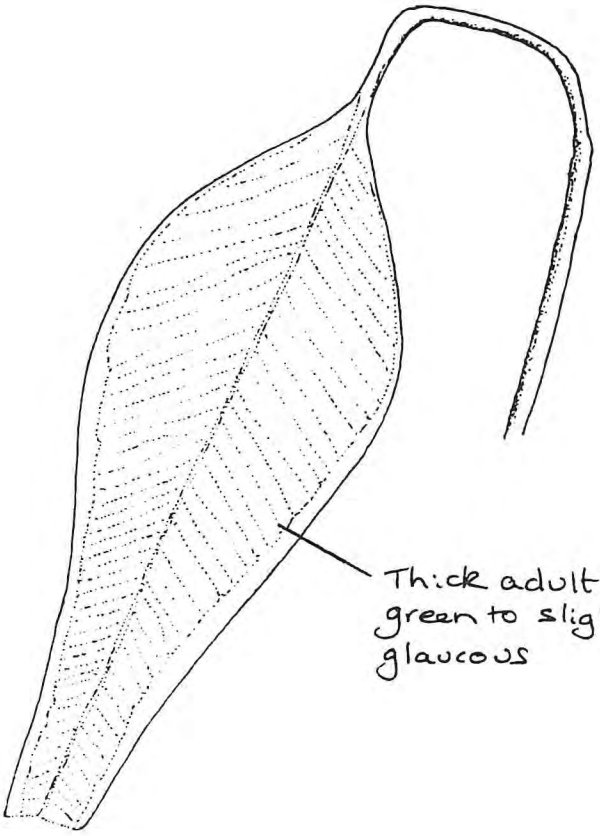
Flowering Period: Unknown.

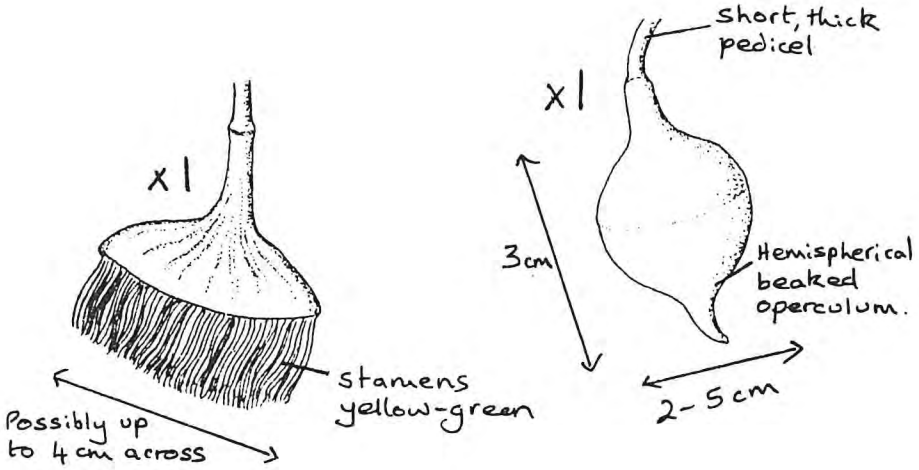
Additional Field Characteristics: A mallee to 4 m with ovate-lanceolate adult leaves to 9 x 3 cm. The inflorescence is on a rounded peduncle to about 1.5 cm long. Neither fruits nor seeds have been seen.

E. rameliana is related to species with large single flowers such as *E. rhodantha* and *E. macrocarpa*. Surveys for this species in the Alfred and Marie Ranges are urgently needed to ascertain whether this species still exists.

References: Elliott and Jones (1986), Kelly (1977).




Thick adult leaves, green to slightly glaucous


x1
stamens yellow-green
Possibly up to 4 cm across
x1
Short, thick pedicel
3cm
Hemispherical beaked operculum.
2-5cm

EUCALYPTUS SPARSA Boomsma

Northern Ranges Box (in reference to its main distribution in the far north-west of South Australia).

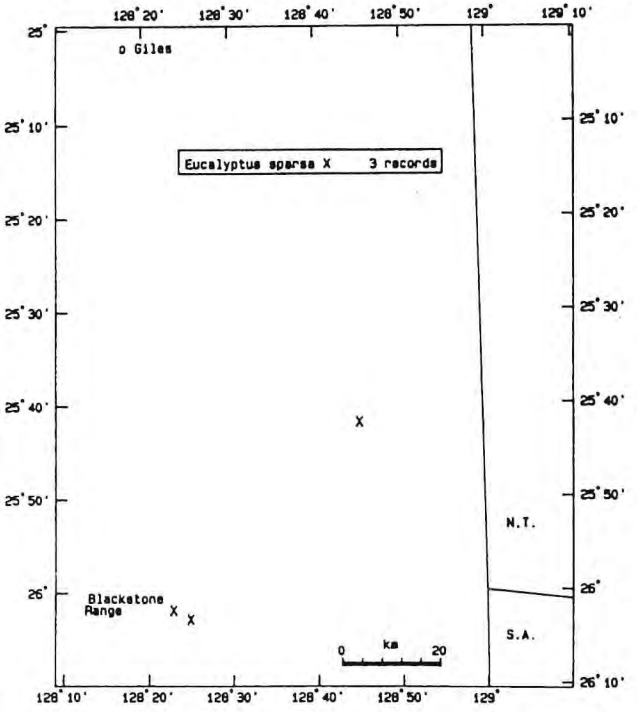
Distribution and Habitat: In Western Australia known only from the Rawlinson and Blackstone Ranges where it grows on hill slopes and on sand plains at the base of the ranges.

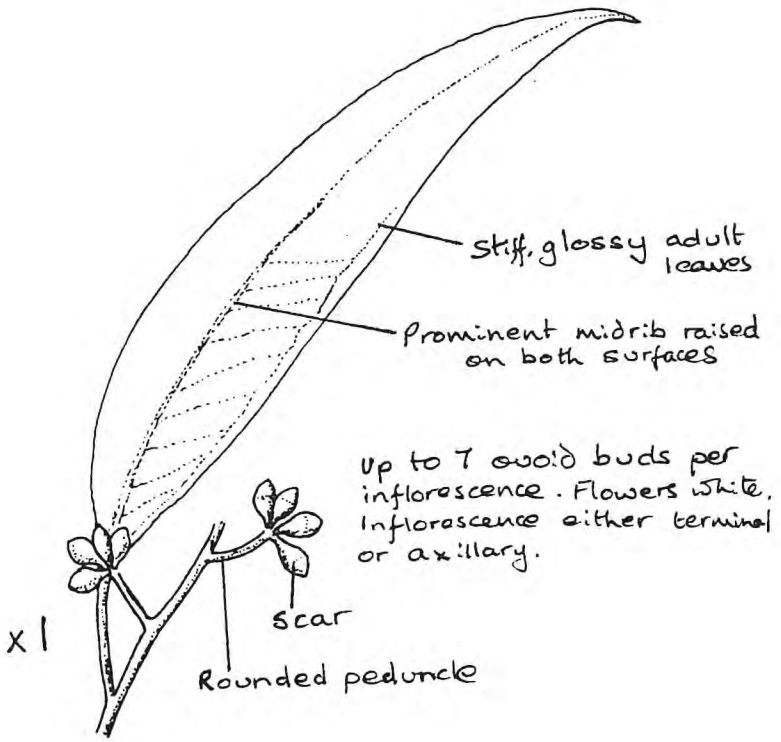
Flowering Period: January-February.

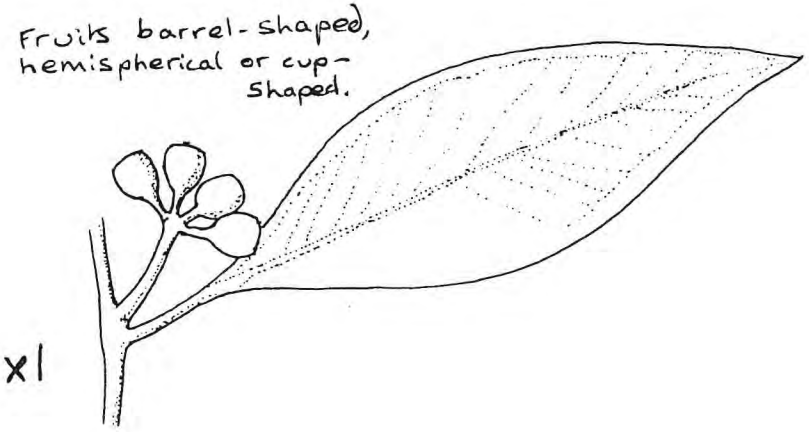
Additional Field Characteristics: Either a small tree or robust mallee to 6 m high with rough grey to grey-brown bark over the lower trunk. Juvenile leaves are petiolate, elliptical to ovate, blue-green at first then becoming glossy green. They measure up to 7 x 5 cm. Adult leaves are lanceolate to broad-lanceolate, 5-12 x 1.5-3.5 cm and with a dense, broken vein network. The ovoid buds are 0.7-0.8 x 0.4-0.5 with a conical operculum. Fruits have a thick rim, descending disc and 3,4 or 5 valves to rim level.

E. sparsa may be confused with *E. behriana* which however has not been recorded in Western Australia. The adult leaves of *E. behriana* are shorter, being 7-7.5 x 1.8-3 cm, their shape either broad lanceolate to ovate.

References: Elliott and Jones (1986), Boomsma (1979).




Stiff, glossy adult leaves
Prominent midrib raised on both surfaces
Up to 7 ovoid buds per inflorescence. Flowers white, Inflorescence either terminal or axillary.
Scar
Rounded peduncle
X1


Fruits barrel-shaped, hemispherical or cup-shaped.
X1

EUCALYPTUS WEBSTERIANA

Webster's mallee

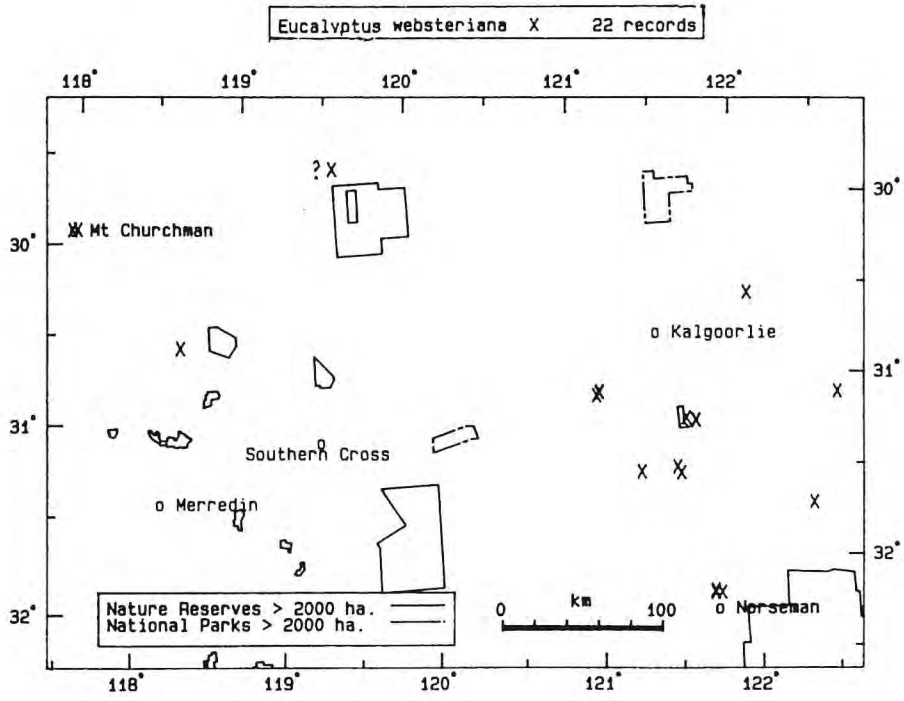
Distribution and Habitat: Occurs at scattered locations over the goldfields, usually near granite outcrops.
N.B. There is some confusion between *E. orbifolia* and *E. websteriana* so marked locations may not always be correct.

Flowering Period: September-November

Additional Field Characteristics: A dense or sometimes straggly mallee to 6 m with minorichee bark. Juvenile leaves are petiolate, elliptic to obovate, up to 4 x 4 cm and notched at the tip.

E. websteriana differs from *E. orbifolia* in its sometimes more elongated, greener adult leaves, and its generally non-glaucous buds and fruits. The long slender pedicels of both buds and fruits are also distinctive. *E. websteriana* also resembles *E. crucis* but the latter has opposite, ovate to orb-shaped leaves which are sessile or almost so. These dull glaucous leaves are the juvenile leaves which are retained on the mature plant.

References: Elliott and Jones (1986), Chippendale (1973), Brooker and Kleinig (ms).

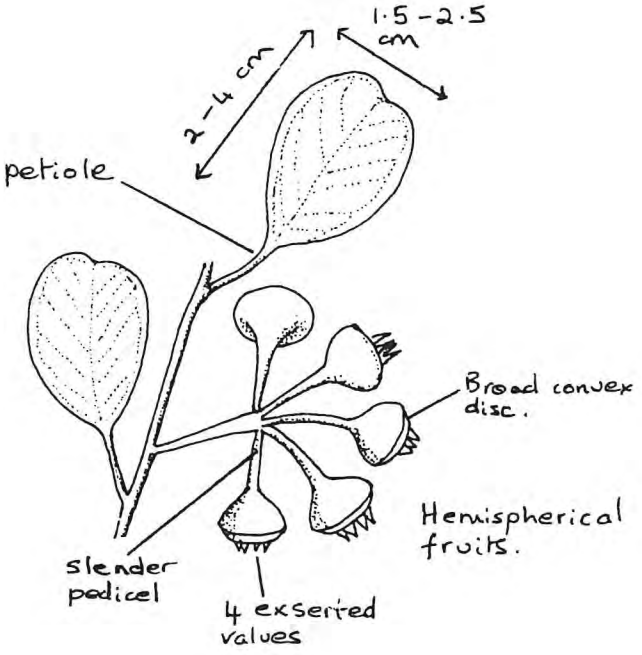


Adult leaves, dull grey-green and obovate, often notched at the apex.

slender pedicel up to 0·8cm long

Up to 7 non-glaucous buds per inflorescence. Flowers cream to yellow.

Operculum variable, either hemispherical, conical or almost globular.



EUCALYPTUS WOODWARDII Maiden

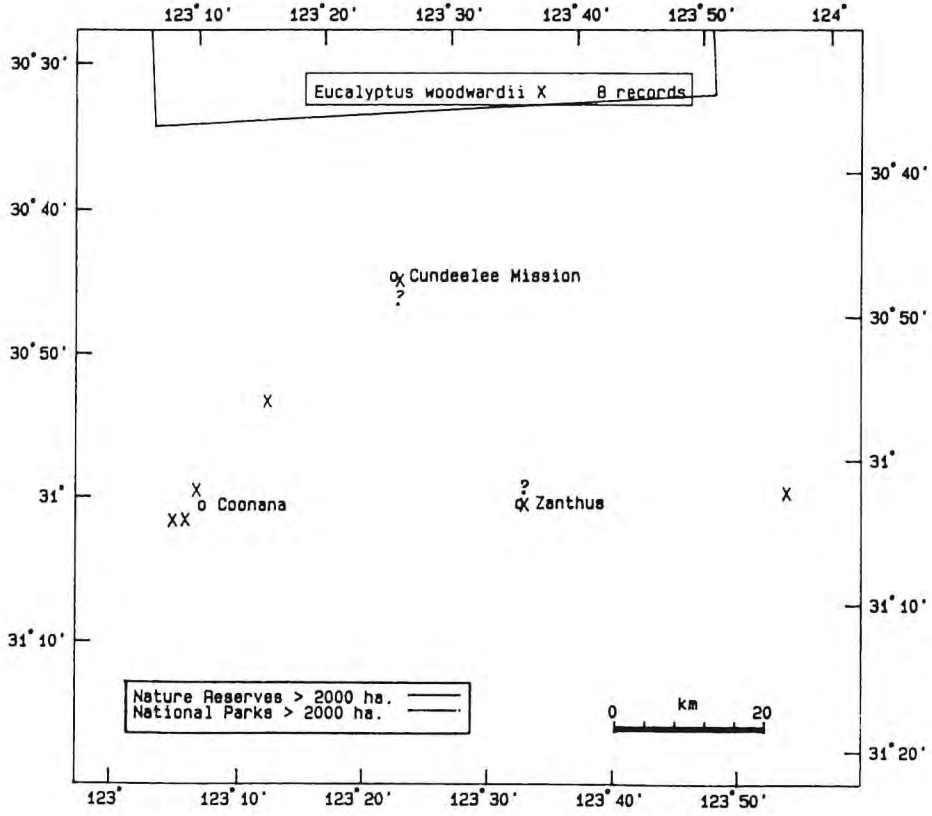
Lemon flowered mallee

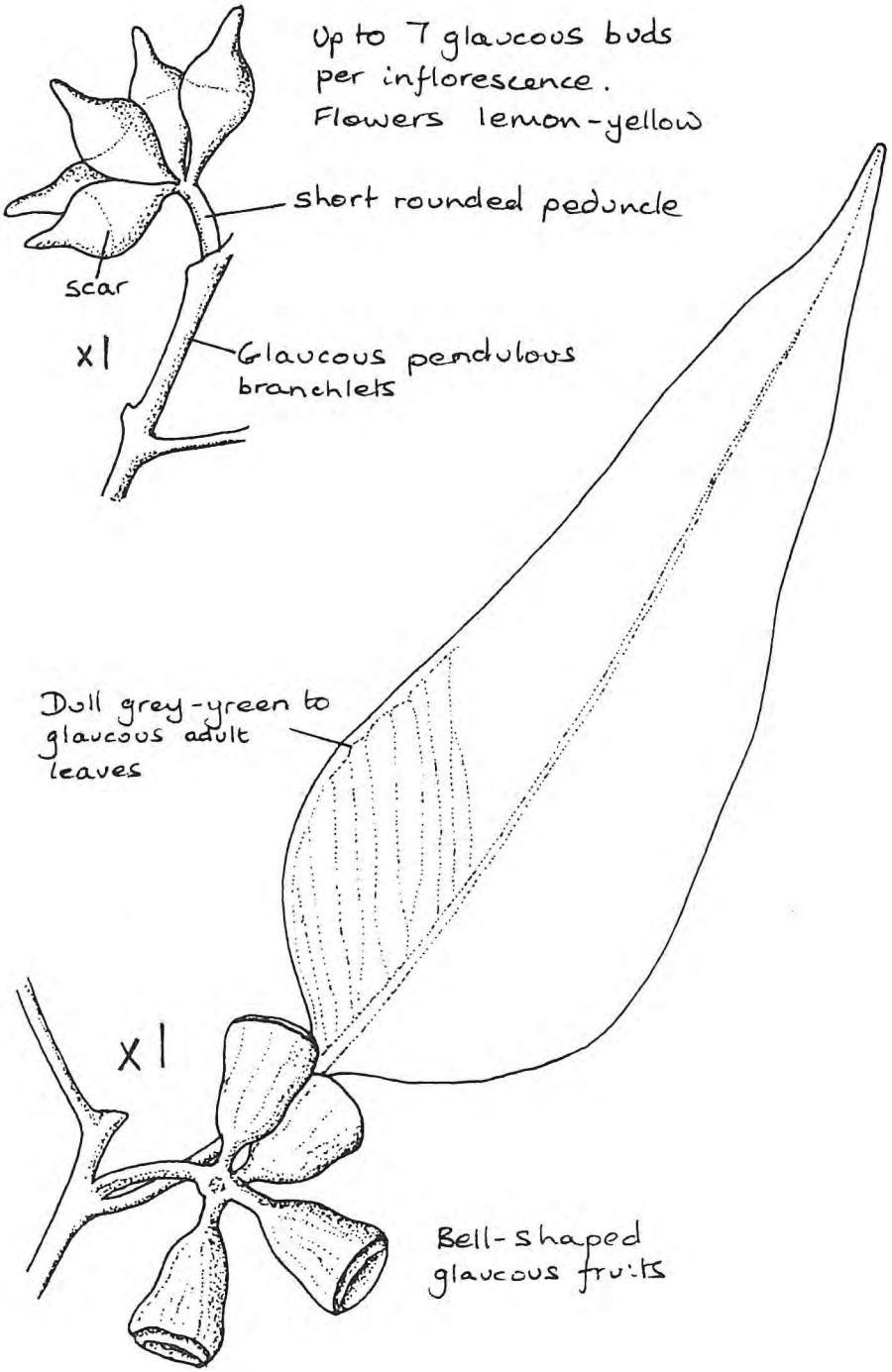
Distribution and Habitat: Known from only a few sites east of Karonie.

Flowering Period: August-November.

Additional Field Characteristics: An upright tree to 15 m with pendulous white to glaucous branchlets. Bark is smooth, white, pink or light coppery and often hanging in ribbons. Adult leaves are broad-lanceolate, 10-18 x 2-5 cm with a dense vein network and numerous oil glands. The buds have an obconical to bell-shaped hypanthium and beaked operculum and measure 1.6-1.7 x 0.9-1.1 cm. The fruits are 1.1-1.3 x 1.1-1.4 with a thick rim, descending disc and 4 or 5 valves to rim level. The seed is ruby red and shiny.

References: Elliott and Jones (1986), Chippendale (1973), Gardner (1979), Kelly (1977).




Up to 7 glaucous buds per inflorescence. Flowers lemon-yellow
short rounded peduncle
scar
x1
Glaucous pendulous branchlets
Dull grey-green to glaucous adult leaves
x1
Bell-shaped glaucous fruits

REFERENCES

Boomsma, C.D. (1979). Four New Species of *Eucalyptus*. J. Adelaide Bot. Gard. 1(6) 363-366.

Chippendale, G.M. (1973). Eucalypts of the Western Australian Goldfields (and the adjacent wheatbelt). Dept. Primary Industry. Aust. Govt. Pub. Serv. Canberra.

Elliott & Jones (1986). Encyclopaedia of Australian Plants, Vol. 4. Lothian.

Gardner, C.A. (1979). Eucalypts of Western Australia. W.A. Dept. Agric. Bull. 4013.

Kelly, S. (1977). Eucalypts. Volume 1. Thomas Nelson (Aust.) Ltd. Melbourne.

Kelly, S. (1978). Eucalypts. Volume 2. Thomas Nelson (Aust,) Ltd. Melbourne.

Patrick, S.J. and Hopper, S.D. (1982). A Guide to the Gazetted Rare Flora of Western Australia. Supp. 1. Dept. Fish. Wildl. Perth.

Dr S.D. Hopper
Wildlife Research Centre
Department of Conservation and Land Management
P.O. Box 51, Wanneroo, W.A., 6065
Ph (09) 405 5100