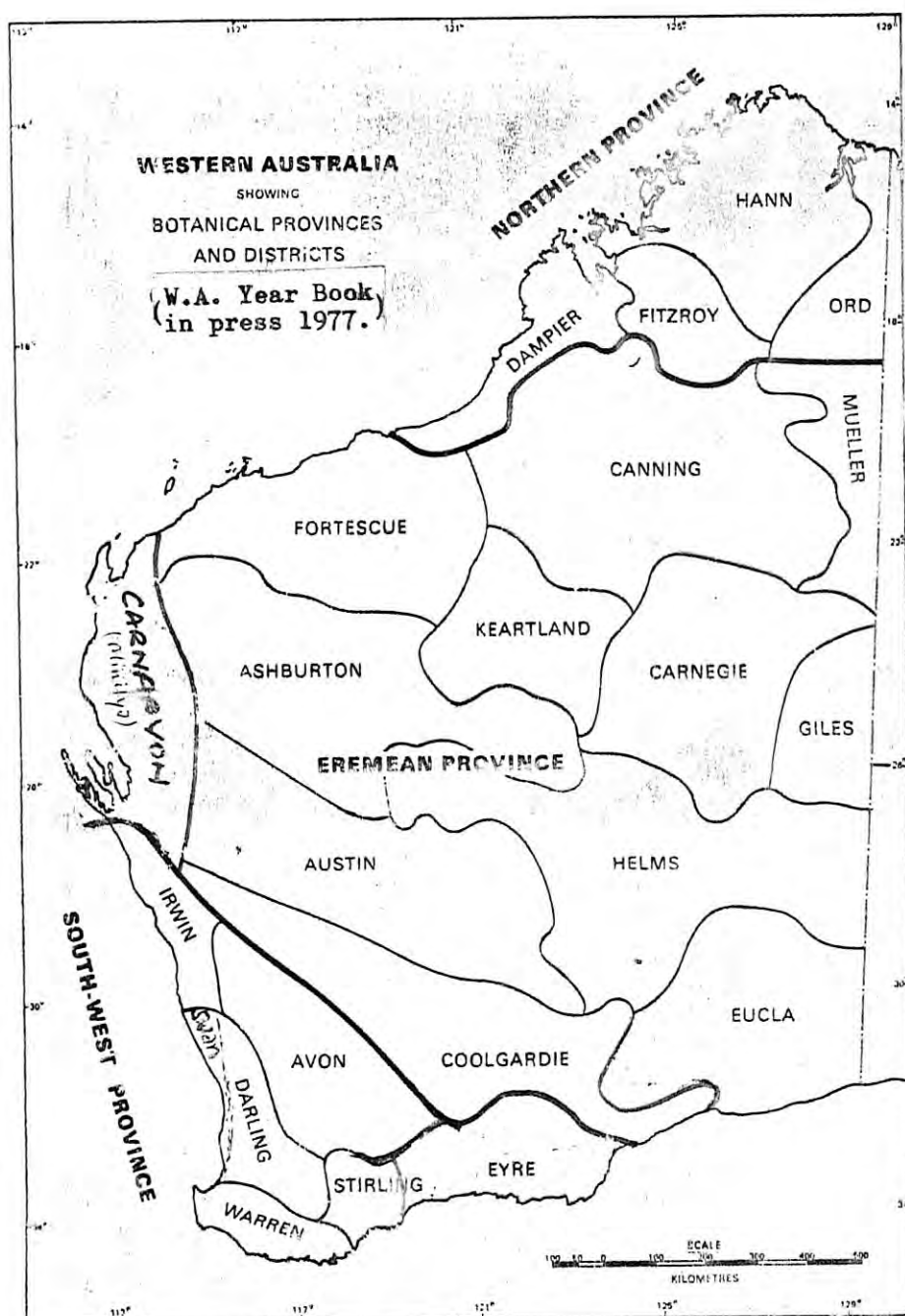


FIELD HERBARIUM FOR EUCALYPT SPECIES OF WESTERN AUSTRALIA

O.W. LONERAGAN AND R.J. EDMISTON



N - NORTHERN PROVINCE 3

N - Northern Province	3.9
h - Hann District	3.1
f - Fitzroy District	3.2
o - Ord District	3.3
d - Dampier District	3.4
k - Kimberley	3.5
(i.e. Hann, Fitzroy and Ord)	

E - EREMEAN PROVINCE 2 and 4

E - Eremean Province 4.9;	2.9
au - Austin District	2.1
as - Ashburton District	2.2
cn - Carnarvon District	2.3
co - Coolgardie District	2.4
eu - Eucla District	2.5
fo - Fortescue District	2.6
ca - Carnegie District	4.1
cg - Canning District	4.2
mu - Mueller District	4.3
gi - Giles District	4.4
he - Helms District	4.5
ke - Kearthland District	4.6

S - SOUTH WESTERN PROVINCE 1

S - South Western Province	1.9
i - Irwin District	1.1
d - Darling District	1.2
a - Avon District	1.3
w - Warren District	1.4
s - Stirling District	1.5
e - Eyre	1.6
n - Swan	1.7

gen. general for districts of province	0.9
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FIELD HERBARIUM FOR EUCALYPT SPECIES
OF WESTERN AUSTRALIA

O.W. Loneragan and R.J. Edmiston

SUMMARY

To facilitate identification of Eucalyptus species, an herbarium of 125 mini-specimens supported by a practical key and photographs has been prepared for easy use in the field. Stress is being placed on development of the collection for 166 eucalypts of the inland Eremean and South Western Provinces. Extension to include 35 species restricted to the Northern Province also is recommended.

The main purpose of the herbarium is to assist reliable identification and collection of the valuable seed of the less known species, particularly at times of change in staff. This is a preliminary step in the continuous work of the clarification of the taxa, or groups of species and varieties, which is essential for conservation of the gene pools as well as for reliable seed collection.

INTRODUCTION

The botanical name is constant for the type specimen and is designated by two names, the first is the genus or a group of allied species, the second is the identity of one species. The species name identifies the population which has developed some barrier generally to interbreeding with other species.

The kingdom of plant families, genera, species and varieties is distinguished, classified and separated by the constancy of the most consistent characters. A useful classification provides a key for identifying the particular population of the species to which a specimen may belong. The plant characters are the hereditary botanical material,

of which the floral and fruiting components show the most consistent features. Nevertheless, each plant which is produced from seed differs in character from every other plant. The unique growth habit of the individual consequently is the result of variability expressed through the interaction of genetic and environmental factors. Using a classified key for sorting the botanical characters of a species for most of us understandably is a hazardous and lengthy process.

Reliable classification of the source of the seed for reproducing the species is essential for local use and for sale, locally and overseas. Classification of the botanical features depends upon a glossary and knowledge of an agreed thesaurus of terms for reference and retrieval. Distinctive features are most useful, but difficulties arise with species which have not been thoroughly sorted or described. An important requirement is to be able to define the variation of species, varieties and hybrids of species which interbreed. A cline, or graded range of characters in a hybrid swarm, may aid identification, but creates confusion should one try to define one parent from a plant specimen. A recognised problem is the unsatisfactory status and confusion concerning the purity of the source of seed of important species, for example Eucalyptus oleosa and Eucalyptus wandoo.

People whose work takes them into the field build up a fund of experience and knowledge, during periods of 3-5 years, on the important species in particular localities. The initial information is based on liaison through the consultant services of the State Herbarium. Subsequently, due to other work requirements and staff changes, this fund of information, within the usual limits of human capabilities, may be overlooked and soon forgotten. Complete botanical material again requires to be collected, labelled

(with description of plant, site and date), analysed and confirmed through the authority of the Government Botanist. To husband these resources and so reduce the continual cost of the overall work, and also to provide for retrieval of the information at times of change of staff, the present writers proposed to build up both office and field herbaria specimens. Those identified by the Government Botanist would be replicated and retained locally and could be referred to, beginning from 1972 here as a reliable source for retrieval of this information. Objectives would be achieved most efficiently if a portable mini-herbarium was made available for ready reference in the field. Separate kits could be prepared, as required, for each group of allied species, starting with Eucalyptus as the most important genus. The field work, which was necessary for the development of a mini-herbarium in the office or laboratory, should continue as often as opportunity offers while working on vegetation surveys or general field reconnaissance. Soon, new staff could become well acquainted with an adequate range of immediately available specimens.

While the above project was being developed, Chippendale (1973) produced a full description and colour plates of 115 species of the goldfields and adjacent wheatbelt areas of south Western Australia. Richmond (1974) summarised useful characteristics of 47 of these, added 5 varieties of interest and the species Eucalyptus gongylocarpa. Colour plates of the growth, buds and fruits of 25 of these species, 5 varieties, a new species (Eucalyptus roycei) plus 3 southwestern species (Eucalyptus calophylla, Eucalyptus ficifolia and Eucalyptus laeliae - also a new species) were described about 1970 (W.A. Forests Department). Smith (1969) listed 45 main honey plants, including earlier information on honey flora by R.S. Coleman and C.A. Gardner. An index to 66 species, fully described by the late Mr Gardner, was published

in 1970 (W.A. Department of Agriculture). Concurrently, another series of 4-page leaflets with descriptions and photos of features was initiated by the Forestry & Timber Bureau (1970).

The botanical keys are the smallest portable kits already available for tracing the identity of Eucalyptus species. The classification of more than 500 species and 138 varieties has been developed for over a century, from its introduction based upon the anthers by G. Bentham in 1866 and subsequent elaboration, mainly by J.H. Maiden & W.F. Blakely, between 1903 and 1934 (Penfold & Willis, 1961). In subsequent studies by Pryor & Johnson (1971) and Johnson (1972) the flower bud and operculum receive prominence.

In the illustrated keys of Blackall & Grieve (1954) 131 species and varieties of Western Australia eucalypts have been classified on the basis of both floral and fruiting features. Previously also, other macroscopic characters and a decimal system of classification for 83 trees and 58 mallees and marlocks (small trees or scrub) was presented by Kessell & Gardner (1924).

When a key is used in an identification, decisions are made by a series of choices between alternative characters. Difficulties in the use of keys always arise at the boundaries between classes where clear-cut decisions are difficult. Where the evidence frequently is inconclusive, mistakes will be made. The user then needs to retrace these steps, if he has the time. Although the classified keys are necessary for those who have the personal interest and the time to use them, operators normally in the field do not have any time at all for this purpose.

METHODS

While being engaged in reconnaissance surveys of ecotypes for conservation of reserves, botanical specimens of Eucalyptus species were collected. Concurrently, when opportunity offered, colour photographs were taken as close as possible to the sample trees to illustrate the habit in size and shape of growth and the type of bark. The specimens were labelled and aluminium discs, with painted numbers (ca 10 cm as a duplicate set) were suspended from hooks on either side of a teepee at the top of a vertical bar and this was placed next to the specimen tree before it was photographed.

Identification of specimens was confirmed through the State Herbarium services. The corresponding photographs and samples were assembled and named in duplicate for two field kits, one for use at field centres and the other for the Research Branch in Perth. The letter code, introduced by Pryor & Johnson (op. cit.) was recorded on the photograph (8 x 12 cm). Samples of the leaf, buds and fruit were glued on to an individual card (10 x 15 cm), and the name of the species was typed on each card. The corresponding photos and cards were then put into separate cellophane bags and held together for each species before preparing a desirable classification for a portable field kit.

The list of 163 species and varieties by Beard (1965) and other recent ones (Brookes 1971, 1972, 1973, 1974; Beard, 1973) were listed by the recognised 3 botanical provinces of Diels (1906) and 17 districts. Two more districts were added by separating the Swan Coastal Plain from the Darling Range and the Minilya district from the Ashburton (Gascoyne) and the Austin (Murchison) districts.

The card index system of classification of Hall & Johnston (1953) was adopted broadly for genus. With modifications for domestic use, the order of classification

stressed six features (Appendix 1) as shown below.

- 1-2 The shape of the fruit and of the operculum.
- 3 The length of the pedicels.
- 4 The relative position of the valves.
- 5-6 The shape and width of the disc of the fruit.

These key numbers were listed for all species which were then rearranged in order of the above classified numbers.

Species with closely corresponding key numbers were grouped in consecutive order up to a maximum of 6 for each board. Each group and board was numbered in sequence. This number was added with the alphabetical list of species for cross reference to the appropriate board (Appendix 2). The natural distribution of species was indicated by a colour system to assist handling of specimens in practice in the field.

Pasteboard sheets (34 x 32 cm) were prepared to carry the specimen cards and photographs for six spaces. The boards were covered with clear contact plastic sheet. Map hanging strips with finger slots for easier handling were added to the top of each board. Positions on each board were allocated in consecutive order also for each species. The corresponding photographs and specimen cards were glued back to back on reverse sides of the appropriate board. Positions were left vacant for missing samples of each species, which were to be added when available. The preliminary colour system indicated the botanical province (red - Northern, yellow - Eremean, green - South Western).

A varnished box (36 x 52 x 39 cm) with aluminium corner strips and lid with hinge, folding arm and handle was made to hold 25 boards (Figure 1). Twenty-six vertical strips of ply 1.5 cm wide in each box were fixed and separated by small slots (0.4 cm) between the strips. These supported the numbered pasteboard sheets in the appropriate positions in the box.

The corresponding key numbers for each group of species were shown on the map-hanging strips for each board (Figure 2 - this is the reverse face of the board on the lid of Figure 1). Colour tapes for the 3 provinces initially are being added to the top of the boards holding all cards of species of the same province. Only the Northern Province is being separated at this stage (cross reference Appendix 3).

RESULTS

A duplicate set of 2 boxes of material have therefore been made available for 125 of the 166 listed species and varieties of eucalypts of the South-Western and Eremean provinces. About half are located in the South-Western Province.

Material for northern species, which have a restricted distribution, has been grouped with cross index on separate boards in one box. Consequently this allows for taking only one box into the field and one can be left at the office; each box contains the appropriate specimens for any two provinces allocated to it.

DISCUSSION

Of the 207 eucalypts listed here in the literature, 9 occur in both the Northern and Eremean provinces, 25 in both the Eremean and South-Western, and 138 are restricted within a province. Although some species extend further eastwards, 82 are in the South-Western, 55 in the Eremean and 36 in the Northern Province.

The nomenclature follows Blakely (1955), revised by Johnston & Narryat (1965). The letter code introduced by Pryor & Johnson (1971), followed by Chippendale (op. cit.) and recorded on the photographs here, is mnemonic and has significance. For example, two species (Eucalyptus caesia and Eucalyptus crucis) are located on granitic sandy soils from Archaean rock (lat. $31\frac{1}{4}^{\circ}\text{S}$ long. $118\frac{3}{4}^{\circ}\text{E}$; 38 km apart north of Westonia). They are unrelated and widely separated in the early taxa (Blakely numbers 88 and 587), but appear as consecutive species of the same subseries in the recent classification (SlVC), as might be expected from the association of locality and site. An expectation of speciation from an unknown superspecies may be interpolated and require testing. The macroscopic characters of the fruit and leaves indicate divergent rates of change during evolution in these two factors, say from a common ancestor. The urceolate fruit of E. caesia is regarded as a primitive or conservative character retained during evolution, and the longitudinal venation of the leaves as a modern or dynamic character developed during evolution from the parallel venation of the primitive parent. Eucalyptus crucis, however, exhibits the juvenile leaf as a conservative character and the modern development of the hemispherical fruit as the dynamic character during parallel evolution, possibly from the same parent stock as E. caesia.

In different botanical districts, different forms may develop. E. caesia, for example, has two distinct forms and variations, from a large-fruited robust habit to a small-fruited fine habit and a fragmentary occurrence over a distance of 550 km (Brookton to Fraser Range). Also, for any species where varieties differ within or between districts, relevant specimens need to be collected, with seed for definition of genetic identity in nursery and

laboratory work later. Taking herbarium specimens into the field consequently would assist grouping varieties and species and their distribution according to the botanical districts.

RECOMMENDATIONS

With time and requirements for further development, the pen-punch method for electronic processing (Eilert, 1970) is recommended for recording other important features to be included in the field descriptions. The classification of Hall & Johnson (op. cit.) might be followed broadly for this purpose. Important features (with minor modifications) include:

- Geographic distribution (1-12):
- Habit (13-15), tree (13), scrub (14), mallee (15):
- Bark (16-21) smooth (gumbark 16); both smooth and rough (half-bark 17); long-fibred (stringy bark 18); weaved, ribboned or matted (peppermint or box 19); hard furrowed (ironbark 20); short-fibred (bloodwood), or papery scaly plated tessellated (lamellar bark), or other bark (21).
- Leaf - shape (22-25 linear; lanceolate; ovate; orbiculate or cordate);
- other (26-30 opposite; sessile; falcate; coriaceous; glaucous); the common alternate and stalked leaf is not coded:
- colour (lustre 31-33), (dull or glaucous 31); bifacial (32); (shiny or intermediate 33):
- venation (33-36, faint; medium; coarse); angle to midrib (37-39), acute longitudinal under 20° (37); middle, $25-60^{\circ}$ (38) obtuse transverse, over 60° (39); distinct separate intramarginal vein (40):

- Inflorescence (41-46, umbel; panicle; corymb; solitary; other; peduncle flattened 46):
- other (47-76, op. cit. appendix 1); (Peduncle angular 77); living bark pink or dark colour 78):
- True wood colour (79-80, pale brown, cream or pink 79; dark brown or red 80).

ACKNOWLEDGEMENTS

The writers wish to thank Mrs A. Ryan for preparation of the specimens, Mr R. Orlowski for construction of the field boxes, field staff (Messrs W. Brennan and P. Richmond) often being present during collection of the specimens, the State Herbarium (Messrs. P. Wilson and A. George) for identifying these species and many other helpers for sundry and valuable assistance.

REFERENCES

- Beard, J.S. (1965). West Australian Plants. Surrey Beatty & Sons, Chipping Norton, N.S.W.
- Beard, J.S. (1973 - The ecology and distribution of E. forrestiana Diels: A progeny trial to obtain evidence of hybridity in two taxa of Eucalyptus: J. Roy. Soc. W.A. 56(3). W.A. Museum, Perth.
- Blackall, W.E. & Grieve, B.J. (1954). How to know Western Australian Wildflowers. West Australian Newspapers Ltd., Perth.
- Blakely, W.F. (1955). A Key to the Eucalypts. Forestry & Timber Bureau, Canberra.
- Brooker, M.I.H. (1971). Studies in the genus Eucalyptus, Series Dumosae, Nuytsia 1(2), Bulletin of W.A. Herbarium. W.A. Dept. of Agriculture, Perth.
-
- Aplin, T.E.H. (1977). A check list of Eucalyptus of Western Australia. Tech. Bull. 33, W.A. Dept. of Agriculture, Perth.

- Brooker, M.I.H. (1972). Four new taxa of Eucalyptus from Western Australia. Nuytsia 1(3) Bulletin of W.A. Herbarium, W.A. Dept. of Agriculture, Perth.
- Brooker, M.I.H. (1973). E. forrestiana sub. sp. dolichorhyncha, a new taxa from Western Australia. Roy. Soc. of W.A. Journ. 56(3). W.A. Museum, Perth.
- Brooker, M.I.H. (1974). Six new species of Eucalyptus from Western Australia. Nuytsia 1(4), Bulletin of W.A. Herbarium, W.A. Dept. of Agriculture, Perth.
- Brooker, M.I.H. (1976). Six new taxa of Eucalyptus from W.A. Nuytsia 2(2). Bulletin of W.A. Herbarium. W.A. Dept. of Agriculture, Perth.
- Chippendale, G.M. (1973). Eucalypts of the Western Australian goldfields (and the adjacent wheatbelt). Forestry & Timber Bureau, Canberra.
- Eilert, A.G. (1970). The pen-punch method of collecting data. Institute of Foresters of Australia Newsletter 11(1), Canberra.
- Forestry & Timber Bureau (1970). Forest Tree Series. Forestry & Timber Bureau, Canberra.
- Gardner, C.A. (1942). The vegetation of Western Australia with special reference to the climate and soils. Presidential Address, Royal Society of W.A. Journal Vol. XXVIII, Perth.
- Hall, N. and Johnston, R.D. (1954). How to use the card sorting key for the identification of the Eucalypts. Leaflet 68, Forestry & Timber Bureau, Canberra.
- Johnson, L.A.S. (1972). Evolution and classification of the Eucalyptus. Presidential Address, Linnean Society of N.S.W. Proceedings: Vol. 97, Pt. 1, Sydney.
- Johnston, R.D. & Marryat, Rosemary (1965). Taxonomy & Nomenclature of Eucalypts. Leaflet 92, Forestry & Timber Bureau, Canberra.

- Kessell, S.L. & Gardner, C.A. (1924). Key to the Eucalypts of Western Australia. Bulletin 35, W.A. Forests Department, Perth.
- Penfold, A.R. & Willis, J.L. (1961). The Eucalypts. Leonard Hill, New York/London.
- Pryor, L.D. & Johnson, L.A.S. (1971). A classification of the Eucalypts. The Australian National University, Canberra.
- Richmond, P.C. (1974). Forest Genetic Resources, Information No. 3 Forestry Occasional Paper 1974/1, Food & Agriculture Organisation of United Nations, Rome.
- Smith, F.G. (1969). Honey plants in Western Australia. Department of Agriculture, Perth.
- Teakle, L.J.H. (1938). A Regional Classification of the Soils of W.A. J. Roy. Soc. XXIV 123-195.
- W.A. Dept. of Agriculture (1970). Trees of Western Australia. Index. Bulletin 3482, Perth.
- W.A. Forests Department (ca 1970). Selected flowering Eucalypts of Western Australia, Perth.

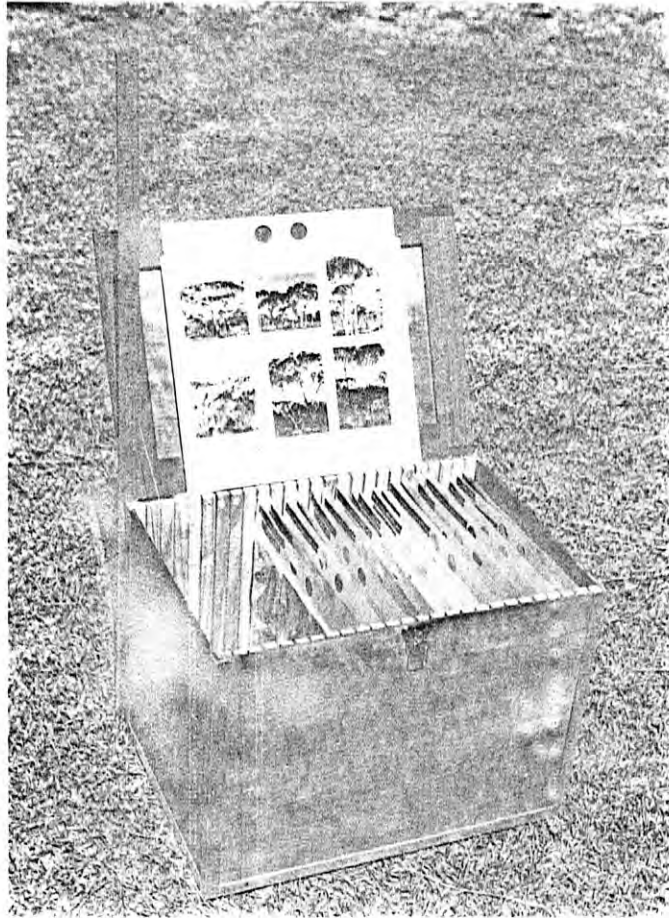


Figure 1 - Portable herbarium for containing samples and photographs of 150 species of Eucalyptus on 25 cards of 6 species

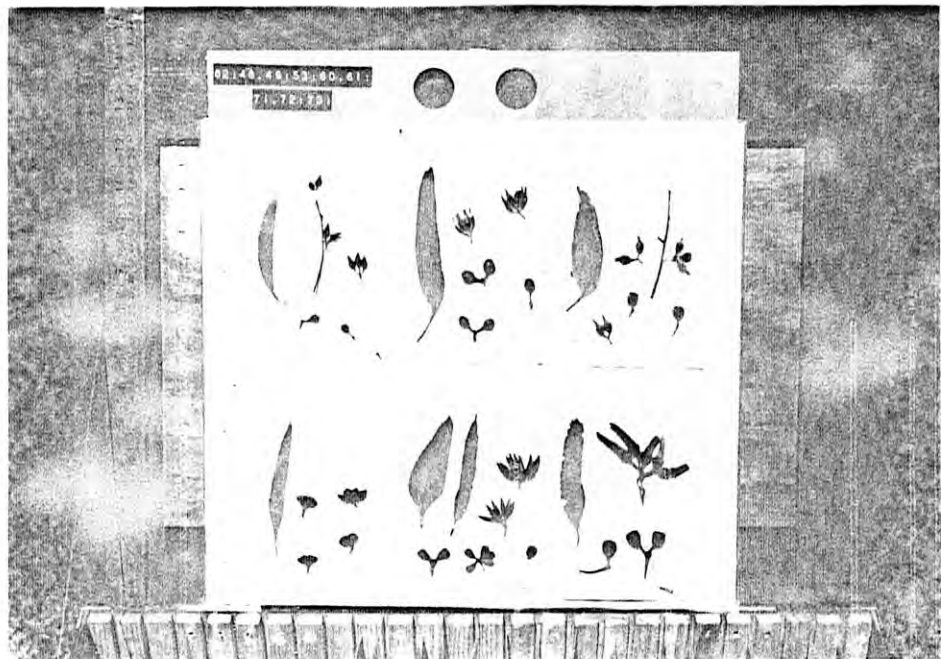


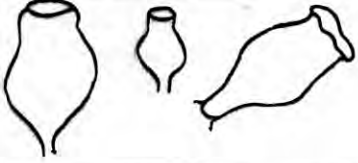
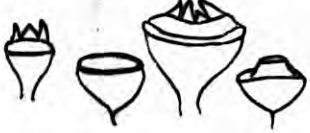
Figure 2 - Close view of reverse side of card (Figure 1) with key numbers pooled for species samples on card

Appendix 1

BOTANICAL KEY

THE SPECIMENS IN THIS MINI-HERBARIUM ARE POSITIONED ACCORDING TO A BOTANICAL KEY BASED FIRSTLY ON FRUIT, THEN WITHIN THAT GROUP ON OPERCULUM THEN PEDICELS ETC. (55-58 Fruit Size not assessed). MATURE SPECIMENS ONLY.

FRUIT

62. GLOBULAR OR PYRIFORM (includes 65)	OF EQUAL SIZE IN ALL DIRECTIONS. SHORTER THAN WIDE OR TAPERING TOWARDS THE PEDICEL.	
63. OVOID	LONGER THEN WIDE. THE SURFACE CONTINUALLY CONVEX.	
64. URCEOLATE	WITH A CONSTRICTION BELOW THE RIM FORMING A NECK.	
66. HEMISPHERICAL (SQUAT) AND FLATTENED	WIDER THAN LONG, WITH THE RIM AT OR ABOUT THE WIDEST PART OF THE FRUIT, THE SURFACE CONVEX.	
67. CYLINDRICAL	DEFINITELY LONGER THAN WIDE, BUT ABOUT THE SAME SIZE TRANSVERSELY THROUGHOUT ITS LENGTH.	
68. CAMPANULATE	DILATED AT OR JUST BELOW THE RIM.	
69. CONIC AND TURBinate	TAPERING TOWARDS THE BASE WITH A UNIFORM TAPER.	
76. FRUITS ANY SHAPE WITH WELL DEFINED RIBBING EITHER STRIATE OR ANGULAR, WARTY OR RUGOSE. (includes 50, 51).		

OPERCULUM

47. HEMISPHERIC TO (SQUAT) DEPRESSED	WHEN THE LENGTH OF THE OPERCULUM IS NOT GREATER THAN ITS DIAMETER.	
48. CONIC TO ACUTE	WHEN THE LENGTH IS GREATER THAN THE DIAMETER BUT NOT MORE THAN TWICE AS GREAT.	
49. ELONGATED (LONG)	WHEN THE LENGTH IS MORE THAN TWICE THE DIAMETER.	

PEDICELS

52. ABSENT OR VERY SHORT (STUNTED)	WHERE THE PRESENCE OF A PEDICEL IS NOT READILY APPARENT, PEDICELS UNDER 1.5 mm INCLUDED	
53. SHORT	THE PEDICEL IS APPARENT BUT IS LESS THAN 6 mm.	
54. LONG	THE PEDICEL IS LONGER THAN 6 mm	

VALVE

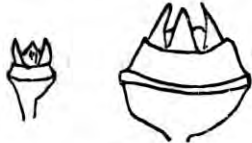
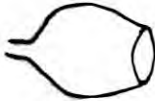
THE POSITION OF THE TIP OF THE VALVES IN THE MATURE FRUIT
IN RELATION TO THE RIM OF THE FRUIT

59. SUNK	WHERE THE VALVES ARE BELOW RIM LEVEL	
60. RIM LEVEL	NOT NOTICEABLY SUNK OR EXSERTED	
61. EXSERTED	WHERE THE TIPS AT LEAST OF THE VALVES ARE NOTICEABLY ABOVE THE LEVEL OF THE RIM.	

Appendix 1 cont.

DISC TYPE (SHAPE)

THE DISC IS THE TISSUE BETWEEN THE STAMINAL RING AND THE LINE OF EMERGENCE OF THE VALVES. IT IS USUALLY DISTINCT IN COLOUR AND TEXTURE AND MAY EXTEND OVER THE BASE OF THE VALVES.

70. RAISED CONVEX	
71 MORE OR LESS FLAT	
72. DEPRESSED	

DISC WIDTH

WIDTH IS CLASSIFIED ACCORDING TO THE RATIO OF DISC WIDTH TO THE RADIUS OF THE FRUIT

73. NARROW	DISC LESS THAN $\frac{1}{4}$ THE RADIUS	
74. INTERMEDIATE	$\frac{1}{4}$ to $\frac{1}{2}$ THE RADIUS	
75. WIDE	MORE THAN $\frac{1}{2}$ THE RADIUS	

EUCALYPTUS

abbreviata	16-42
accedens	13
acies	28
alba	26-47
albida	3
anceps	1
angulosa	28
angulosa var.	
ceratocorys	30
angustissima	9
annulata	12
aquilina	17
argillacea	9-41
aspera	8-41
astringens	25
balladoniensis	19-32*
bigalerita	18-45
brachyandra	8-41
brachycorys	9
brachyphylla	16
brevifolia	2-40
brevistylis	3
brockwayi	16
buprestium	5
burdettiana	25
burracoppinensis	17
caesia	16
calicicola	30
calophylla	15
calycogona	28
camaldulensis	20
campaspe	17
camabyi	18
carnei	21
celastroides	21
clavigera (see	
confertiflora)	
clelandii	10
cliftoniana	4-40
collina	16-44
conitiae-vallis	6
concinna	6
confertiflora	16-43
conglobata	1
conglobata var. <i>duposa</i>	6
conglobata ssp.	
<i>fraseri</i>	26
confluens	26-47
cooperana	8
cornuta	25
corenata	27
corrugata	27
crucis	19
cupularis	26-47
cylindriflora	23
cylindrocarpa	22
deciptens	9
decurva	8
deflexa	22
descendens	9
dichromophloia	16-44
dielsii	25
diptera	18
diversicolor	3
diversifolia	9
dolichoryncha (see	
<i>forrestiana</i>)	
dongarraensis	13
doratoxylon	11
drumondii	18
drumosa (see	
<i>conglobata/sheathiana</i>)	
dumalis	23

Appendix II

eburneensis	2	lirata	22-46	salmonophloia	8
effusa	8-32*	longicornis	11	salubris	20
eremophila	12	loxophleba	26	salubris var.	
<i>grandiflora</i>	12	<i>glauca</i>	19	sargentii	13
erythrandra	30	<i>gratiae</i>	26	scaphocalyx (see	
erythrocarps	27	lucasil	8	<i>merrickiae</i>)	
erythronema	31	macranda	14	sepulcralis	15
erythronema var.		macrocarpa	17	setosa	16-44
<i>marginata</i>	31	marginata	10	sheathiana	21
eudesmoides	21	megacarpa	24	spathulata	13
ewastiana	18	megacornuta	25	<i>grandiflora</i>	14
exilis	5	melanoxydon	20	staeri	10
falcata	12	merrickiae	22	steedmannii	31
ferruginea	16-42	micranthera	2	stenantha (see	
ficifolia	15	microtheca	8-41	<i>occidentalis</i>)	
flocktoniae	16	mineata	27-48	stoatei	27
foecunda	10	mooreana	9-41	stowardii	30
foelchiana	16-43	nutans	13	striatocalyx	22
formanii	10	occidentalis	25	stricklandii	23
forrestiana	31	<i>stenantha</i>	26	tectifica	22-46
forrestiana ssp.		<i>odontocarpa</i>	22-46	terminalis	16-44
<i>dolichoryncha</i>	29	<i>oldfieldii</i>	17	tesselaris	22
gamophylla	21	<i>oleosa</i> var.		tetragona	28
gardneri	26	<i>oleosa</i>	11	tetraptera	29
goniophylla	24	<i>oleosa</i> var.		tetrodonta	24-26
goniantha	9	<i>borealis</i>	7	todtiana	6
goniantha ssp.		<i>oleosa</i> var.		torquata	31
<i>semiglobosa</i>	8-32*	<i>kokkii</i>	7	transcontinentalis	11
gongylocarpa	2	<i>oleosa</i> var.		uncinata	1
gracilis var.		<i>plenissima</i>	8	wandoo	14
<i>gracilis</i>	4	<i>oligantha</i>	8-11	websterana	19
<i>ylgarnensis</i>	4	<i>oraria</i>	3	woodwardii	24
grandifolia	16-43	<i>orbifolia</i>	20	xanthonema	12
griffithsii var.		<i>ovularis</i>	8	youngiana	29
<i>griffithsii</i>	7	oxymitra	40	zygophylla	16-42
griffithsii var.		pachyloma	18		
<i>angustiuscula</i>	7	pachyphylla	30-48		
grossa	22	papua	16-43		
guilfoylei	1	patellaris	24-46		
haematoxylon	15	patens	6		
herbertiana	26-47	pendens	5		
houseana	17-45	perfoliata	16-42		
incrassata	13	phoenicea	29-48		
insularis	3	pileata	2		
intertexta	2	platycorys	5		
jacksonii	5	platypus	23		
jensenii	21-45	platypus var.			
jucunda	6	<i>heterophylla</i>	23		
jutsonii	19	polycarpa	16-43		
kingsmillii	30	preissiana	24		
kondininensis	7	prominens	26		
kruseana	10	pruinosa	21-46		
laeliae	7	pterocarpa	28		
lamprocalyx	1-40	ptychocarpa	28-48		
lane-poolei	18	puncticulata	21		
latifolia	16-43	pyriformis			
lehmannii	31	<i>var. elongata</i>	29		
leptocalyx	23	rameliana	20-45		
leptophylla (see		redunca	14		
<i>foecunda</i>)		redunca var.			
leptopoda	20	<i>melanophloia</i>	14		
lesouefii	30	redunca var.			
leucophloia	7-47	<i>oxymitra</i>	20		
ligulata	29	redunca var.			
		<i>subangusta</i>	14		
		rhodantha	19		
		rhodophloia	2		
		rigidula	11		
		rudis	19		

* add new species to card (32)

62 47-8 53-4 60-1 70-1-2 73-4

effusa E*

goniantha ssp. semiglobosa S*

66 balladoniensis E*

