Field Guide to TREES of Southern Africa

Braam van Wyk
& Piet van Wyk

Field Guide to

TREES

of Southern Africa

Braam van Wyk & Piet van Wyk

Published by Struik Nature (an imprint of Random House Struik (Pty) Ltd)
Reg. No. 1966/003153/07
First Floor, Wembley Square,
Solan Road, Gardens, Cape Town, 8001
PO Box 1144, Cape Town, 8000 South Africa

Visit **www.randomstruik.co.za** and subscribe to our
newsletter for monthly updates and news

First published in 1997
Second edition, fully revised 2013
This ebook edition 2013

Publisher: Pippa Parker
Managing editor: Helen de Villiers
Editor: Colette Alves
Designer: Dominic Robson
Cover design: Janice Evans
Proofreader: Thea Grobbelaar

ISBN 978 1 77007 911 3 (print)
ISBN 978 1 77584 104 3 (ePUB)
ISBN 978 1 77584 105 0 (ePDF)

Also available in Afrikaans as *Veldgids tot Bome van Suider-Afrika*
ISBN 978 1 77007 912 0 (druk)
ISBN 978 1 77584 106 7 (ePUB)
ISBN 978 1 77584 107 4 (ePDF)

Front cover, main photograph: *Adansonia digitata*; insets (left to right): *Grewia pondoensis*, *Ficus ingens*, *Kiggelaria africana*, *Euclea natalensis*, *Ochna pretoriensis*. Title page: *Duvernoia adhatodoides*. Contents page: *Burkea africana*. Back cover, top row (left to right): *Protea angolensis*, *Solanum giganteum*, *Ximenia caffra*, *Encephalartos transvenosus*, *Ehretia rigida* subsp. *rigida*; middle: *Nectaropetalum zuluense*; bottom row (left to right): *Combretum paniculatum*, *Bauhinia bowkeri*, *Balanites angolensis* subsp. *welwitschii*.

CONTENTS

PREFACE TO THE SECOND EDITION

Since publication of the first edition in 1997, *Field Guide to Trees of Southern Africa* has established itself as one of the most popular books for the identification of trees native to the subcontinent. This success can be attributed to, among other things, its easily understood group recognition approach. The species are arranged in groups based on leaf and stem features, each group supported by an icon depicting its principal characters. Paradoxically, the success of the book is partly due to its being incomplete; only the species most likely to be encountered are covered. A complete guide would be much more cumbersome to use because of the large number of native tree species (about 2 100), many of which are rarely, if ever, seen by the average tree enthusiast.

It has been 15 years since publication of the first edition of *Field Guide to Trees of Southern Africa*. The enormous expansion of biological knowledge during this period has also influenced the classification of trees. This second edition brings the names of trees and the families to which they belong in line with modern views. The distribution maps have been updated and photographs added to illustrate certain features better. It was also an opportunity to include a few additional species. Many users have asked for more photographs of actual trees. Hence we have added an appendix with photographs of trees of a large number of species. To reach a wider audience, this new edition is now also available in Afrikaans.

It is hoped that the first edition of this book has contributed in some small measure to the increased interest in the extraordinarily rich tree flora of southern Africa. The second edition has retained all the desirable features of the first, but we have made improvements and additions to make it even more useful. The value of this field guide is enhanced by a complementary volume, *How to Identify Trees in Southern Africa* (2007, Struik Publishers). This latter book presents background information on tree construction, highlights the characters that are important for tree identification and gives a more detailed explanation of the group recognition method. Its use in conjunction with this book is strongly recommended.

Sadly, my co-author, Piet van Wyk, passed away after a short illness in 2006. Piet was not only the prime motivator and inspiration in our venture to write this book, but his unrivalled collection of photographs has actually made it possible. Our collaboration over many years was a most enjoyable and productive one. I am deeply grateful to him. May this book continue to foster his life-work aimed at promoting the enjoyment and appreciation of nature through greater awareness of our trees.

Braam van Wyk
Pretoria, January 2013

PREFACE TO THE FIRST EDITION

This book is intended primarily as a field manual to enable the reader to identify trees in their natural environment. It describes and illustrates about 815 of the most common native and naturalized alien tree species in southern Africa, which is about half the total number of trees known from this botanically diverse part of the continent. In many cases the names and diagnostic characters of closely related species are also mentioned, bringing the total number of trees we cover, and which can be identified with the use of the book, to well over 1 000. We would have liked to include all tree species native to the region, but unfortunately such a volume would have been prohibitively costly to produce and much too unwieldy for practical use.

As an aid to quick and positive identification, the trees in this book have been classified into groups, the arrangement based on easy-to-observe vegetative features. Colour illustrations of flowers and/or fruits, as well as a distribution map, accompany each species. Entries also cover plant usage, and include references to closely related species. Emphasis is placed throughout on family recognition. No keys have been attempted, partly because not all species are included and partly because the botanical detail required makes it impossible to devise a key simple enough to be helpful to the non-botanist.

This book contains the most comprehensive collection of photographs ever published on southern African trees. Most of the slides used were taken specifically for use in the book by one of us (PvW) who, since 1992, has covered over 160 000 km in his bid to photograph every known species of tree native to the region, both in flower and in fruit. These efforts have already yielded a collection of more than 30 000 colour photographs, and the project is continuing.

Trees form a very important part of most natural and artificial landscapes. They are remarkable organisms, commanding respect and admiration for their beauty, size, hardiness and longevity. To study tree diversity and to learn about the very special place they occupy in nature and in human culture is an enriching experience. Tree identification, particularly in a species-rich area such as ours, is intellectually challenging and stimulating. Not only does it involve the physical handling of living organisms usually much older than ourselves, but it also deepens one's appreciation and enjoyment of nature. We hope this book will provide its readers with many hours of pleasure and contribute towards a greater love and a richer understanding of our extraordinarily diverse tree flora.

Braam van Wyk
Piet van Wyk
Pretoria, February 1997

The authors gratefully acknowledge the substantial support – assistance that enabled them to complete the field work for the book – extended by the three Principal Sponsors, namely Total SA (Pty) Ltd (fuel), Mazda Wildlife Fund (transport) and Agfa (film).

MAZDA WILDLIFE FUND

TOTAL SA

AGFA

Generous financial and institutional support were also received from:
APBCO Insurance Brokers • Letaba Tyres • Persetel (Pty) Ltd • Rand Afrikaans University • University of Pretoria • VDO Architects.

INTRODUCTION

For the purposes of this book, southern Africa is defined as the mainland region of the African continent *south* of the Kunene, Okavango and Zambezi rivers, a geopolitical region comprising Namibia, Botswana, Zimbabwe, South Africa, Swaziland, Lesotho and that part of Mozambique south of the Zambezi River.

The distinction between shrubs and trees is somewhat artificial and often breaks down in practice. Here, we define a tree, broadly, as any perennial woody plant growing to a height of at least 2 m. Although a typical tree has a single trunk, it may be multi-stemmed. Our definition also embraces robust, woody climbers.

An estimated 2 100 tree species, subspecies and varieties are native to southern Africa, and well over 100 more, introduced from other parts of the world, are now naturalized in the region. Many of these aliens have become invader weeds, penetrating and replacing indigenous vegetation.

Trees occur in a wide range of vegetation types, with many species found only in specific floristic regions and centres of endemism.

Climatic conditions (rainfall, temperature, the incidence of fire) largely determine the nature of the various principal vegetation types – forest, grassland, savanna, desert, fynbos and so forth – which are so classified according to the general effect produced in a particular area by the growth form of some or all plant species in combination. Large areas that are relatively uniformly covered by any one of these broad vegetation types usually represent major biotic zones and are often referred to as biomes.

Biomes themselves can be divided into smaller, more homogeneous ecological units or vegetation types, based upon such criteria as the dominant plant species, plant density and height. Mopane woodland, thorn bushveld and miombo woodland are examples of such vegetation types found in parts of southern Africa. These types often reflect more localized conditions – mean annual rainfall, for example, and the nature of the soil. A simplified vegetation map of southern Africa appears on page 7. Note, however, that the vegetation depicted is that which would have been prevalent today had the destruction wrought by human encroachment never taken place. At present very little (no more than 10 per cent) remains of some vegetation types, particularly within the Grassland and Fynbos biomes. As may be expected, vegetation types dominated by woody species are usually rich in tree diversity. In southern Africa, the greatest diversity of trees is found mainly within the Forest and Savanna (bushveld) biomes.

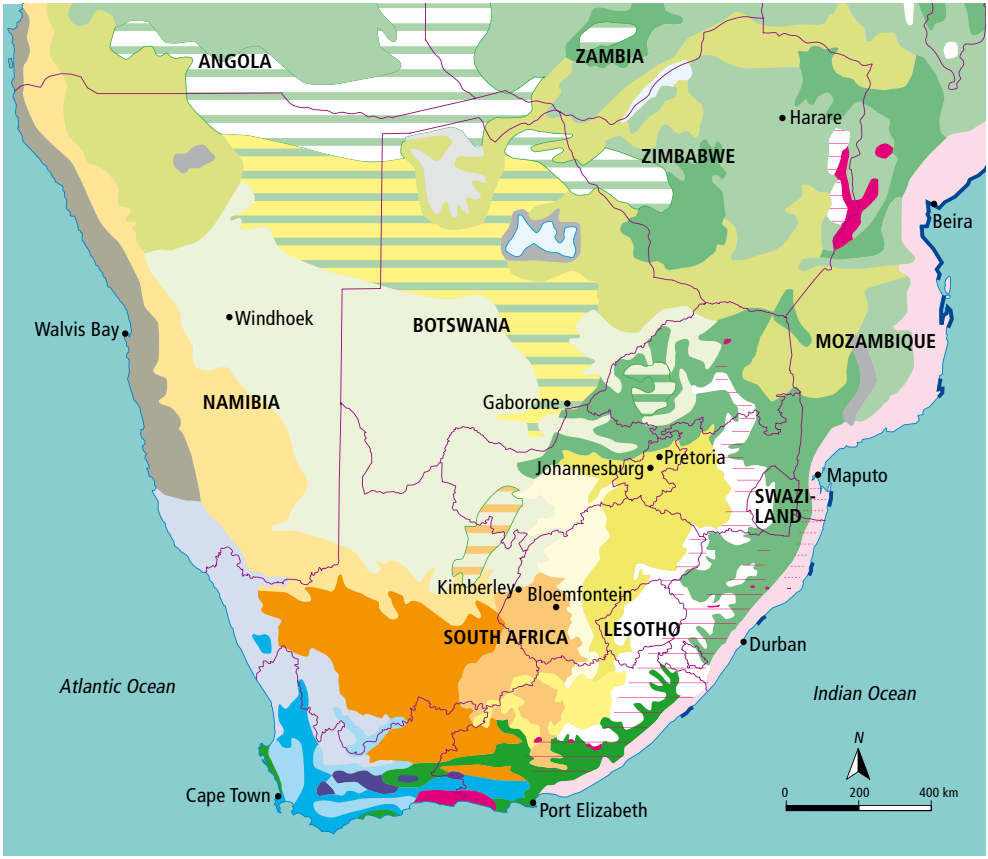
The geographical distribution of individual plant species (which, taken together, comprise the flora of a region) rarely covers precisely the same range as the vegetation type(s). Climate, though the main determinant of vegetation type, is clearly not the only variable to be considered when trying to interpret present-day tree species distributions. A complex combination of many other factors, such as the evolutionary history of the species, continental drift, past climatic change, geology, soil characters, topography and interaction with other plants and animals (including human beings), must also be taken into account.

When the distribution of native plants is mapped, certain recurring patterns emerge within the great diversity. Particularly noteworthy are those areas that tend to embrace high concentrations of species with very restricted distributions. Commonly referred to as centres of endemism, or 'hot spots', these are parts of the region in which rare and unusual trees are most likely to be encountered. Some of the principal floristic centres of endemism in southern Africa are shown in the map on page 8. By far the three richest floristic areas in Africa are embraced within the southern subcontinent. These are: Cape Floristic Region (about 8 600 plant species; this is also one of the world's six Floristic Kingdoms); Maputaland-Pondoland Region (about 7 000 species), and the Succulent Karoo Region (about 5 000 species).

Areas especially rich in restricted range (endemic) trees are the Pondoland, Maputaland, Albany and Kaokoveld centres of endemism. Many southern African tree species also appear to be confined to the Chimanimani-Nyanga Centre of Endemism. In reality, however, most of these are not endemic to that region, but are merely tropical African species at the southernmost limit of their ranges. Because of their restricted distribution, most of these rare endemics and peripheral tropical species have not been included in this book. With at least 600 tree species, the Soutpansberg Centre of Endemism is a notable focal point of tree diversity (besides having a few endemics).

Below: The first map is a simplified representation of the biomes and vegetation types of southern Africa; adapted from White (1983) and Low & Rebelo (1996). The second map *(below)* shows the region's principal regions and centres of endemism; based on Van Wyk & Smith (2001).

BIOMES AND VEGETATION TYPES



FOREST BIOME
Afromontane and inland forest (with grassland/fynbos)
Coastal dune & swamp forest (with grassland/bushveld)
Sand forest

SAVANNA (BUSHVELD) BIOME
Miombo (*Brachystegia–Julbernardia–Isoberlinia*) woodland
Mopane woodland and shrub woodland
Baikiaea plurijuga–Pterocarpus antunesii woodland
Thorn (*Acacia*) bushveld
Acacia–Colophospermum–Terminalia Kalahari bushveld
Undifferentiated bushveld and woodland
East Coast thorn bushveld, valley bushveld & thicket
Waterberg mountain bushveld
Tarchonanthus camphoratus–Grewia flava bushveld

GRASSLAND BIOME
Coastal grassland (associated with forest/bushveld)
Moist mountain grassland (with isolated forest patches)
Dry (Karroid) mountain grassland
Moist Highveld grassland
Dry Highveld grassland

NAMA-KAROO BIOME
Bushy Karoo shrubland
Dwarf Karoo shrubland
Grassy Karoo shrubland

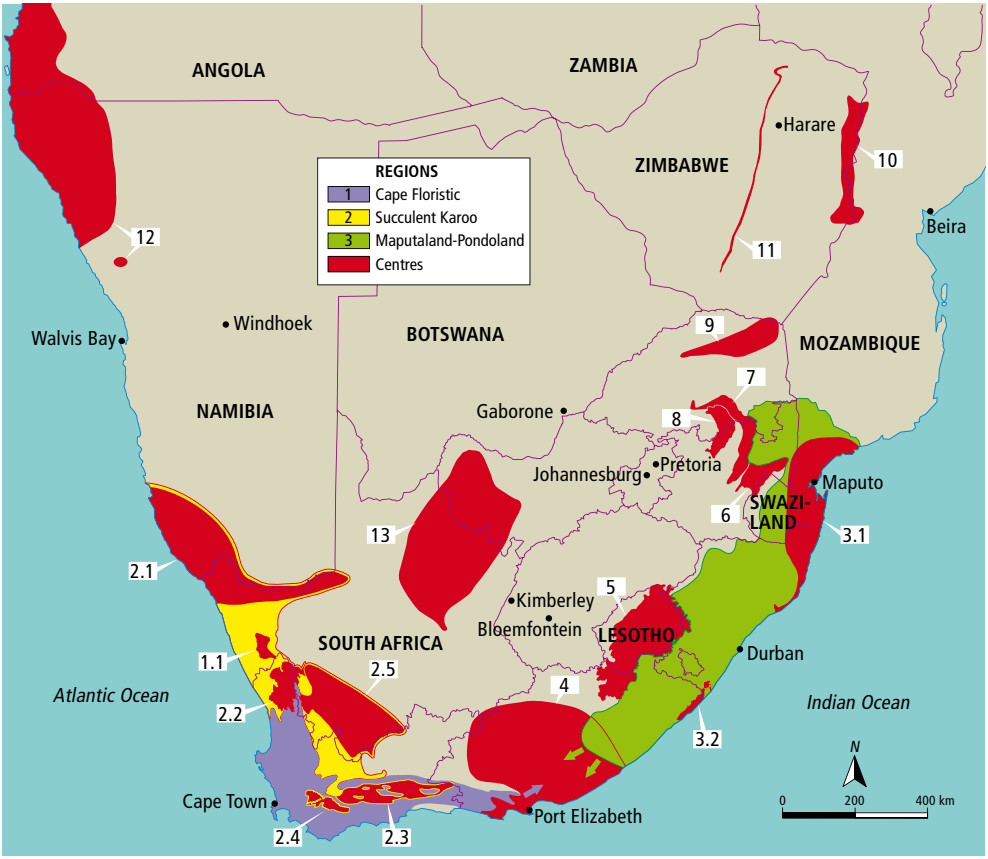
SUCCULENT KAROO BIOME
Succulent Karoo
Little succulent Karoo

DESERT BIOME
Namib Desert

FYNBOS BIOME
Fynbos
Renosterveld

SPECIALIZED VEGETATION
Halophytic (saline soil) vegetation
Swamp vegetation
Mangroves

REGIONS AND CENTRES OF PLANT DIVERSITY AND ENDEMISM



1. Cape Floristic Region
1.1 Kamiesberg Centre
2. Succulent Karoo Region
2.1 Gariep Centre
2.2 Knersvlakte Centre
2.3 Little Karoo Centre
2.4 Worcester–Robertson Karoo Centre
2.5 Hantam–Roggeveld Centre
3. Maputaland–Pondoland Region
3.1 Maputaland Centre
3.2 Pondoland Centre
4. Albany Centre
5. Drakensberg Alpine Centre
6. Barberton Centre
7. Wolkberg Centre
8. Sekhukhuneland Centre
9. Soutpansberg Centre
10. Chimanimani–Nyanga Centre
11. Great Dyke Centre
12. Kaokoveld Centre
13. Griqualand West Centre

(After Van Wyk & Smith 2001)

IDENTIFYING TREES

By observing the many and varied tree identification features, or characters, listed below, you will be able to build a composite picture of, and arrive at a name for, the particular plant you are observing. Turn to the Glossary on pages 703–709 if you are unsure of some of the technical terms (the numbers that appear in square brackets refer to the appropriate Glossary illustrations). *How to Identify Trees in Southern Africa* (Van Wyk & Van Wyk 2007) provides the background knowledge essential for tree identification. It is strongly recommended that you acquire this guide (also available in Afrikaans; Van Wyk & Van Wyk 2008) and use it in conjunction with this book.

Apart from the book itself, the most useful identification equipment is a pair of sharp eyes, along with a retentive mind, and a small field notebook and pencil. A 10x hand lens or a magnifying glass can also be a great help when studying a small object. Alternatively, reverse a pair of binoculars and look though the 'wrong' end. Binoculars are also useful in identifying leaf details, flowers and fruit in the upper parts of trees (and for bird-spotting). A small pair of secateurs and a plastic bag can come in handy when collecting material for later study.

However, you should really accumulate as much information about the tree as you can while you are in the field. Certain characters can only be reliably observed in living specimens (for example, the presence or absence of latex). Positive identification of most trees requires physical handling of the plant material, so do not be afraid to touch and smell as well as look.

Tree size, shape and foliage colour, texture: Note the size and shape of the tree, as well as the colour and texture of the crown. Basic tree shape is genetically determined; each species has a specific tree architecture, though one that can be modified, within limits, by environmental and physiological conditions. Shape, colour and texture are the most useful features for identifying trees, especially in savanna areas, from a distance. The attributes are also used to help form a search image to locate other individuals of an identified tree in the same general area.

Bark: Note the bark of the tree. Every species has its own characteristic mature bark pattern. Mature trees with a flaky or rough and thick covering usually have thin, smooth bark when young. Therefore you should examine only mature specimens when attempting to identify trees by their bark characters.

Branches and twigs: Note the surface texture and colour of branches and twigs. Young twigs are often marked with small, light-coloured pustules called lenticels [45]. Check whether twigs and older branches are round, flattened or more or less square in cross section. In deciduous species, thick twigs tend to indicate compound leaves. Record the presence of any spines or thorns, and note their arrangement.

Latex: Test for the presence of latex [53, 54]. Any abundant liquid exudate, whether watery (clear), cloudy, milky, or otherwise coloured, is here referred to as such. Pick a healthy green leaf, preferably one from an actively growing shoot; break it off at the point where the stalk (petiole) is attached to the stem, and check immediately whether any liquid oozes out at the broken end or from the scar on the stem. The exudate needs to be fairly copious, preferably forming a drop that completely covers the wound. If no latex is detected, check a few other leaves from different parts of the tree to confirm the fact.

Leaf samples: Always examine a variety of leaves, preferably from the canopy of the tree, to determine characters such as size, shape, colour, texture and degree of hairiness. A single leaf can be misleading. Leaves on coppice shoots may differ substantially from those in the canopy.

Simple and compound leaves: Determine at the outset whether the leaves are simple (undivided) [1, 2] or compound (that is, made up of separate leaflets/pinnae) [3–8]. If in doubt, look for the axillary bud to determine whether the leaf is really compound or not. There is a small bud (which can develop into a leafy shoot, or a flower) in the axil between the stem and the petiole, but not between the rachis and stalk of a leaflet (pinna). Moreover, in a compound leaf there is no growing tip at the end of the rachis.

Leaf arrangement: Note how the leaves are arranged on the stem [9–12]. Are they alternate, opposite, or whorled? In compound leaves, these characters refer to the leaves themselves, not the individual leaflets. Clustered leaves are nearly always alternate, unless the clusters themselves are arranged in opposite pairs.

Leaf texture and hairiness: Touch the leaves on both sides. Are they smooth or rough, thin or leathery, woolly, hairless, or sticky?

External glands: Check for the presence of external glands on the leaf. These are often located at the point where the petiole is attached to the blade in

simple leaves, or on the petiole or rachis in the case of compound leaves [55, 56].

Leaf margins: Are the leaf edges smooth, toothed, scalloped, wavy, lobed or rolled under? [35–38]

Venation: Note the venation pattern. Is there only a single midrib, or several veins from the base of the blade? Are the veins prominently raised or obscure on one or both surfaces? Are the lateral veins more or less parallel and terminating at the margin without forming an intramarginal vein? Check for the presence of domatia [57, 58] in the axils of the principal lateral veins.

Secretory cavities: Test for the presence of these cavities in the leaf blade [59]. Hold the leaf up to the sun (other light sources are invariably not bright enough) and look for translucent dots. These are extremely small (the size of pinpricks) and uniformly scattered all over the blade (here, the use of a hand lens is recommended). Practise looking at a leaf known to contain them (for instance, any citrus or eucalypt species).

Bacterial nodules: These nodules [60] are also detected by holding the leaf up to the sun. These structures should be sought only in plants with opposite leaves and interpetiolar stipules [50]. They are much larger than secretory cavities, dark-coloured, not translucent and are easily visible although often confined to a specific area of the blade, particularly towards the midrib.

Odour: Crush the leaf and check its smell. Leaves with secretory cavities are usually strongly aromatic, but not all aromatic leaves have secretory cavities.

Stipules: Check for the presence of stipules at the base of the petiole [1, 46–49]. This is best done with young leaves near the tips of actively growing shoots. These structures can be very small and, again, a hand lens is recommended. Stipules are often deciduous or shrivelled in mature leaves and, if the stipules have been shed, a distinct scar is usually left on the stem. In the case of opposite leaves, look out for the presence of interpetiolar stipules [50, 51].

Flowers: Look carefully for flowers [39], which, on many trees, are small and inconspicuous. Although we have tried to limit the use of floral technicalities in this book, four easy-to-observe characters are particularly useful (especially for family recognition), namely flowers regular or irregular [43, 44]; petals free or united; stamens many (more than 10) or very few (4 or fewer); ovary superior or inferior [41, 42].

Fruit: Examine the tree carefully to establish whether the mature fruit is dry (pod, capsule, nut) or fleshy (berry, drupe). If you don't see any fruit, look on the ground directly beneath the tree: one can often find old pods, capsules, nuts and seeds (in this way, even the leaves of deciduous species can be studied). Make sure you understand the difference between a fruit and a seed; the two concepts are often confused.

Collecting material: It is always worthwhile collecting one or more twigs with a number of leaves attached (a single leaf does not show the leaf arrangement) together with any other fertile material that might be present, for more leisurely examination. These samples may be kept for several days in a moist plastic bag, provided that it is kept cool and not exposed to direct sunlight. If your attempts to identify the tree are unsuccessful, the material can be pressed and dried as a specimen, which you could then submit to an individual expert or herbarium (see next section).

HOW TO USE THIS BOOK

Once you have examined the tree carefully (see previous section), and have material in hand, you are ready to begin the identification process. The following steps will enable you to narrow down the possible species to which a sample may belong.

1. The trees in this book have been classified into 43 groups based on easy-to-observe vegetative features. More details on the groups are supplied by Van Wyk & Van Wyk (2007). Begin with the key on page 15. This key consists of pairs of choices (leads), and employs easily seen vegetative characters, some of which are illustrated in the Glossary (pages 703–709). Start at the first choice and establish which description matches your plant. At the end of each choice, there is either the name of a group, or a line leading to the next pair of choices. After arriving at the name of a group, turn to that particular section in the book.

Each group starts with a concise statement of its diagnostic characters. This statement is essentially a summary of the most important choices you have made in the key. You will appreciate, however, that it takes just

Acacia hebeclada subsp. *hebeclada*

one incorrect choice to arrive at the wrong group. So it is important that you verify the group's identification by checking that it agrees with the group characters. If there is any discrepancy you must, at some point in the key, have gone astray.

In addition, the icon accompanying each group is a pictorial representation that summarizes some of the group's diagnostic features. With a little practice you should be able to recognize the group simply by looking at the icons – which will save you having to work through all the choices. For convenience, all these icons are reproduced, in the form of a quick-reference key, on the inside back cover of the book.

2. Having established the group into which your plant falls, geographical distribution becomes the next clue to its identity (unless, of course, you know its family; see further on). Each species entry in the main section of this book is accompanied by a range map. Concentrate only on those species likely to occur in the area where you have encountered your plant.

3. Compare your plant carefully with the photographs of those species with a relevant geographical distribution. Once you have found a picture that seems to match the material in hand, compare it carefully with the accompanying description. Pay particular attention to those diagnostic features that are highlighted in bold. Check the specimen against the family description (pages 18–33). If you cannot find a matching picture, check the cross-references listed at the beginning of some of the groups.

If you cannot identify the species, don't be disheartened. With so many different trees in southern Africa, even seasoned botanists are quite often totally baffled. Remember also that this book does not feature every southern African tree. Ask a local expert, or try some of the books listed here as references (page 710). If the tree lacks fertile material, revisit it during a different season. You can also send your material to a herbarium that undertakes the naming of plants. Always contact the institution to ask if it would be willing to help (contact addresses are listed on page 711). Establish whether there are any costs involved. Some herbaria charge a so-called handling fee, whereas others provide a free service. Make sure you send your plants in the form of good, properly dried, properly packed herbarium specimens, together with all the relevant data you have.

Knowing the family to which your plant belongs will obviously help a lot to speed up the identification process, but family recognition requires some experience and botanical knowledge and, in any event, it should be possible to identify most specimens without the use of family features. Nevertheless, novices are advised to familiarize themselves with the diagnostic characters of the principal tree families in southern Africa (see pages 18–33). Mastering this skill, indeed, is an essential step towards becoming truly competent in the field of plant identification. With some practice, you may be surprised how quickly you will be able to recognize families on sight. Most of our trees belong to a relatively small number of families, and it is of course much easier to recall the names of families than those of species.

GUIDE TO THE SPECIES ACCOUNTS

In this section the layout of the main text is briefly explained. The species entries, or accounts, contain a wealth of information, which is presented in concise and consistent fashion. To get the most out of the book, it is essential that you understand the meaning of all the various components numbered in the miniaturized sample spread shown on the opposite page. Each is described, under a matching number, below.

1. GROUP The species described in this book are arranged in 43 groups based on easy-to-observe leaf and stem characters. Each group has a number, as well as a common name derived from one of its constituent genera, or an outstanding character of that group. For a key to the groups, see page 15. Diagnostic group characters are summarized at the start of each of the 43 sections and should be used to confirm the options offered in the key. For more detailed information on group identification, see Van Wyk & Van Wyk (2007, 2008).

2. GROUP ICON Each of the 43 groups has its own icon, which appears as an identification and reference aid on every text page. The icons are pictorial representations of plants, or stems with leaves, and they summarize a group's diagnostic characters. As a quick reference to the groups, all the icons are repeated, arranged together, on the inside back cover of the book.

3. FAMILY NAME Just as species are brought together in inclusive units called genera, so genera are arranged in families. Within the 43 groups into which the main part of this book is organized, species appear alphabetically according to family. The families also appear in alphabetical sequence. It should be noted that four of the families represented in this book may also be referred to by alternative names. These families and their alternative names are, respectively, the Compositae/Asteraceae; Guttiferae/Clusiaceae; Palmae/Arecaceae and Umbelliferae/Apiaceae; in each case we have used the second name. We have separated the legumes into three different families: the Mimosaceae, Caesalpiniaceae and the Fabaceae (narrowly defined; also referred to as Papilionaceae). Some authors combine these three families into a single inclusive family, the Leguminosae/Fabaceae (broadly defined).

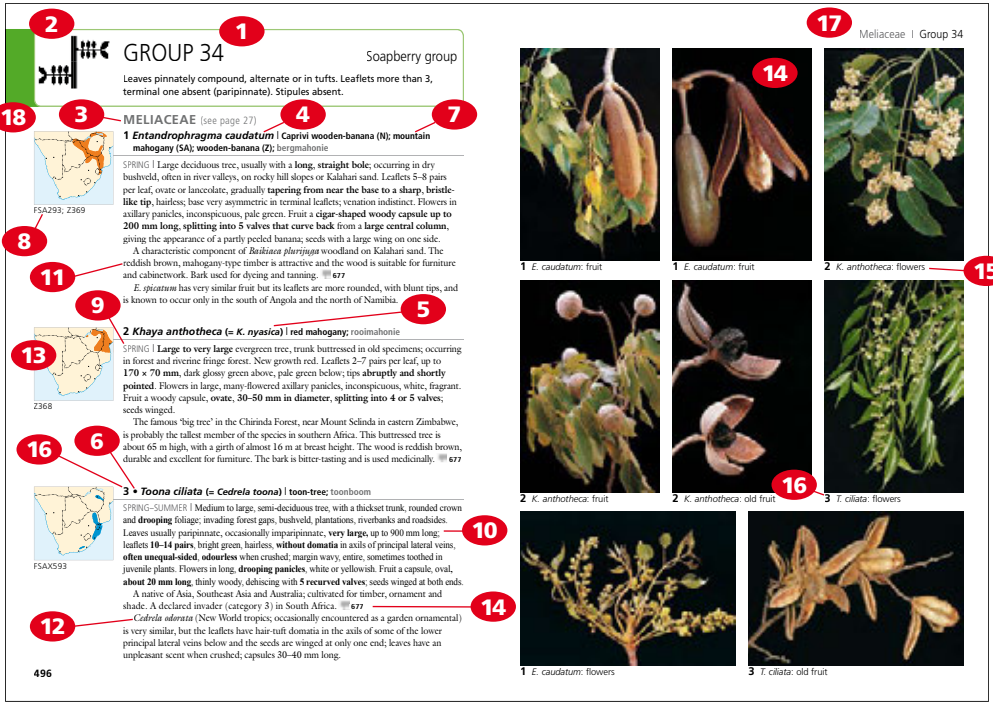
4. SCIENTIFIC NAME A species name is made up of two parts. The first part is the genus name (e.g. *Ficus*; comparable to a person's surname). The second part is the specific epithet (e.g. *lutea*; comparable to a first name). Subspecies or varieties (which are variants within a species) take the name of the species in which they are classified, followed by a word indicating their rank (subsp. or var.), then the subspecific or varietal epithet. For the most part we have followed the scientific names accepted by Van Wyk *et al.* (2011). For reference purposes, scientific names are often followed by one or more personal names, sometimes abbreviated. These so-called authority citations are of little use to laypeople and they have been omitted in this book (but are supplied by Van Wyk *et al.* 2011).

5. SYNONYMS The names under which a plant was previously known, or is alternatively referred to, are its synonyms. Many people find name changes perplexing and even downright annoying, so it is worth outlining briefly why plant names change, or why at any one time a species may have more than one name.

Plants often have to be reclassified following the discovery of new information. As a result, a species may be transferred from one genus to another, or a single species may be split into two or more species. By the same token, two or more species may be combined into a single one, or what has previously been considered a subspecies or variety may be given specific rank. In certain circumstances a name may also change if an older published name is found.

Botanists also differ in their choice of classification systems, and this sometimes means that a single species bears two or more alternative and equally valid names, each one correct within its own particular system. The same applies to the grouping of species into families. One classification system may, for example, emphasize the genealogical sharing of a hypothetical recent common ancestor between certain species, regardless of morphological specialization, and so tend to lump them together (phylogenetic approach). Another may emphasize not only common descent, but also morphological specialization and other structural and behavioural differences between the same species, splitting them up into different entities (evolutionary approach). The tree *Rapanea melanophloeos*, for instance, also bears the name *Myrsine melanophloeos*. The former reflects the morphological differences between this species and other *Myrsine* members; the latter the similarities due to common descent that this species shares with the genus *Myrsine*.

Synonyms are preceded by an equal sign (=) and placed in brackets, e.g. (= *K. nyasica*). In this book we supply very few synonyms and then only from fairly recent name changes. Synonyms may facilitate cross-referencing between this book and other publications on trees, particularly older ones. When searching the literature to find out more about a particular tree species, you should not only use its currently accepted correct name, but also its synonyms.



6. ALIEN SPECIES A bullet (•) preceding a name signifies an alien plant invader. These are non-native plants that have been introduced into southern Africa from other parts of the world, and which have become naturalized – that is, capable of reproducing and spreading without human agency. Although by far the majority of tree species in southern African gardens and parks are aliens (Glen 2002), most have not become naturalized and are therefore not treated in this book. In South Africa, landowners are legally responsible for the control of invasive alien plants on their properties. Under the Conservation of Agricultural Resources Act, declared weeds and invaders (Henderson 2001) have been divided into three categories, namely: **category 1 plants** may not occur on any land and must be controlled; **category 2 plants** are commercially important and may be grown in demarcated areas provided a permit has been obtained and steps are taken to prevent their spread; **category 3 plants** are ornamentals that may no longer be planted or propagated, although existing plants may remain, except within the flood line of watercourses and wetlands.

7. COMMON NAMES Common names are often confusing. The same name may apply to two or more different species, or the same species may have more than one common name. To provide a measure of stability, recommended common names were proposed for many native and alien trees (e.g. Von Breitenbach 1989, 1995; Von Breitenbach *et al.* 2001; Balkwill *et al.* 2004; Curtis & Mannheimer 2005). However, common names for southern African trees are not officially standardized; the choice of name and the way it is spelled remain the privilege of the end user.

In this book we are following, with a few exceptions, the English and Afrikaans common names recommended by Van Wyk *et al.* (2011). Where applicable, the recommended regional common names are reflected in the text as follows: **SA** = South Africa; **N** = Namibia; and **Z** = Zimbabwe. Names in other official and regional languages have been omitted, pending further efforts towards 'standardization', probably and preferably by mother tongue speakers, of tree names in each particular language. Van Wyk *et al.* (2011) provides a comprehensive listing of common names for trees in 30 southern African languages.

8. FSA AND Z TREE NUMBERS These have been proposed as a handy means of marking trees along highways and hiking trails, in nature reserves and recreation resorts, and also as a general quick-reference guide. The FSA numbers – previously referred to as 'national' tree numbers – refer to those proposed for the *Flora of southern Africa* region (South Africa, Namibia, Botswana, Swaziland and Lesotho) and are based on Van Wyk *et al.* (2011) (following Von Breitenbach 1995; Von Breitenbach *et al.* 2001). The allocation of FSA

numbers is administered by the Dendrological Society of South Africa. Numbers of aliens are preceded by an X (Von Breitenbach 1989). The Z numbers refer to the equivalent ones used in Zimbabwe (based on Van Wyk *et al.* 2011). Please note that these numbers replace the Z numbers previously in use (Drummond 1981).

9. FLOWERING TIME In a few tree species the peak flowering time occurs within fairly narrow limits. In many others, however, it may vary significantly from year to year over a species' distribution range, and even between two trees of the same species standing next to each other. We have therefore decided to give seasonal indicators rather than specific months. Our seasonal concepts are intended as a rough guide only: **spring** = August–November; **summer** = November–March; **autumn** = March–May; **winter** = May–August. Fruiting logically follows directly on flowering (except in the case of male trees of unisexual species).

10. DESCRIPTIVE TEXT The text for each species begins with an indication of duration, habit and habitat. Duration (whether deciduous or evergreen) is very variable in some species and not known with certainty in many others, and this aspect is not therefore described consistently. The locations of vegetation types and centres of endemism mentioned in the text are shown in the maps on pages 7 and 8. Salient features of the bark, branchlets, leaves, inflorescence, flowers and fruit are then described. Particularly significant diagnostic characters are printed in bold. These characters, in combination, are normally essential for the positive identification of a species. Although we have tried to use language that can be readily understood by the layperson, some botanical terminology has been unavoidable (see Glossary, page 703). See Van Wyk & Van Wyk (2007, 2008) for background information on tree identification terminology.

11. PLANT USAGE Trees are not, of course, significant only for their place in the natural order and for the grace and beauty they bring to the land. They have immense practical value as food, medicine, tools, furniture, building materials, habitat creation, shelter and fuel. Selective mention is made of specific uses for some of the species. This feature has often had to be kept very short, or even omitted altogether, because of space constraints. Many of the healing properties ascribed to tree parts have not yet been scientifically proven, nor have potentially negative side effects been established. We have therefore refrained from mentioning specific medicinal usages, unless these have been validated by research.

12. RELATED SPECIES Where appropriate, the names of closely related species and their diagnostic characters are provided. The diagnostic characters of easily confused species are also given.

13. DISTRIBUTION MAPS Each species exhibits a certain pattern of distribution, which is one aspect of its definition. The distribution maps are compiled on a range style: the shaded areas are presented as a rough guide to the geographical limits of a particular species. The perimeter of a species' distribution is approximate and, indeed, somewhat arbitrary. It does not indicate specific localities, nor does it give any indication whether a species is evenly spread over the area or occurs only in isolated localities. In the case of entries for some infraspecific taxa, the map shows the range for the species as a whole, rather than for the individual infraspecific taxon, which may be confined to only part of the range shown by the map. In such cases the word 'species' appears in the map box. The colour of the shading will tell you whether a species is endemic – that is, restricted – to southern Africa (**green**), native to the region but also found further north in Africa (**orange**), or a naturalized alien (**blue**).

14. COLOUR PHOTOGRAPHS Each species description is accompanied, on the facing page, by one or more photographs. Illustrations showing features that are particularly helpful in identification (flowers, fruit, vegetative characteristics) have been selected. Growth forms and bark patterns have been included only if these are especially diagnostic. For some species additional photographs of trees are supplied in the Appendix (p. 616). This is indicated by a small tree icon **616**. The main purpose of these photographs is to give an example of an actual tree of the species. Although the impression created by the whole tree is generally not very useful in identifying a species, branching pattern, canopy colour and foliage texture may help to confirm an identification made on the basis of the more detailed features supplied in the descriptive section of the book.

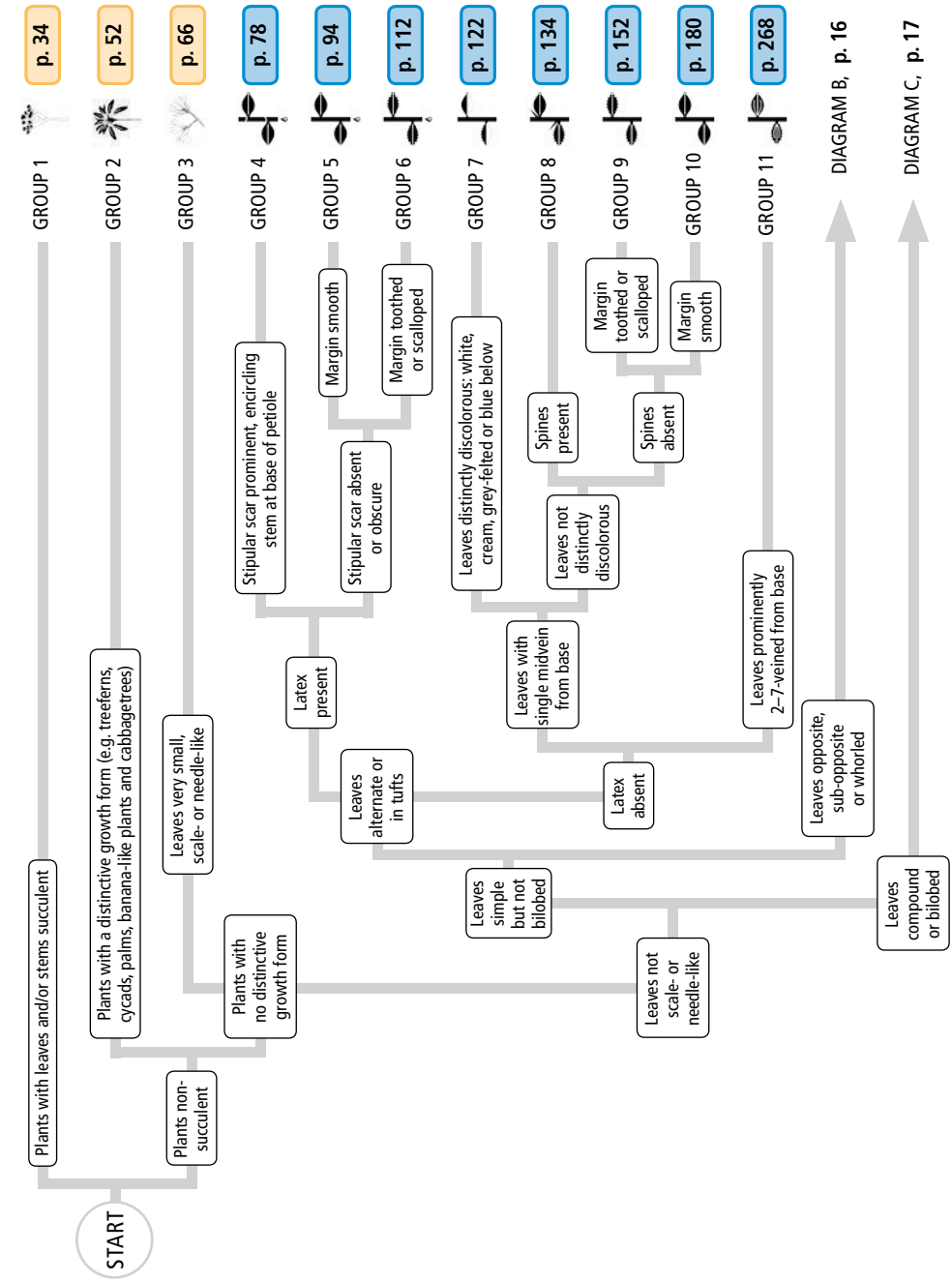
15. CAPTIONS Label captions give the scientific name for the species, and the part(s) illustrated.

16. ENTRY NUMBERS The number adjacent to each species entry corresponds with the number of the species illustration(s) on the opposite page.

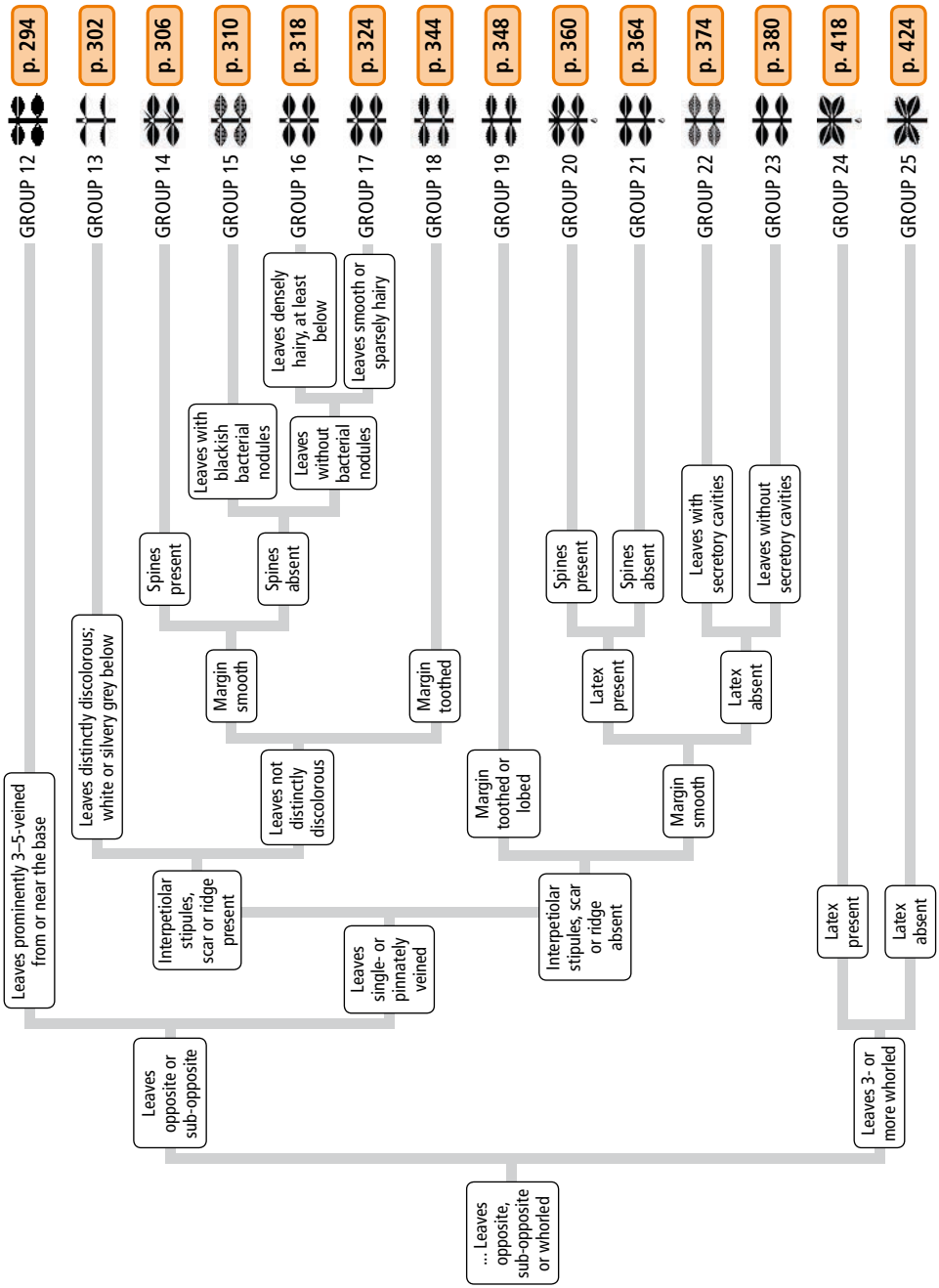
17. RUNNING HEADS These itemize the family or families that feature on the spread, and the group into which they fall.

18. THUMB INDEXES The colour of these corresponds with the colour of the relevant group panel appearing in the Key to the Groups (pages 15–17) and in the Quick Guide on the inside back cover.

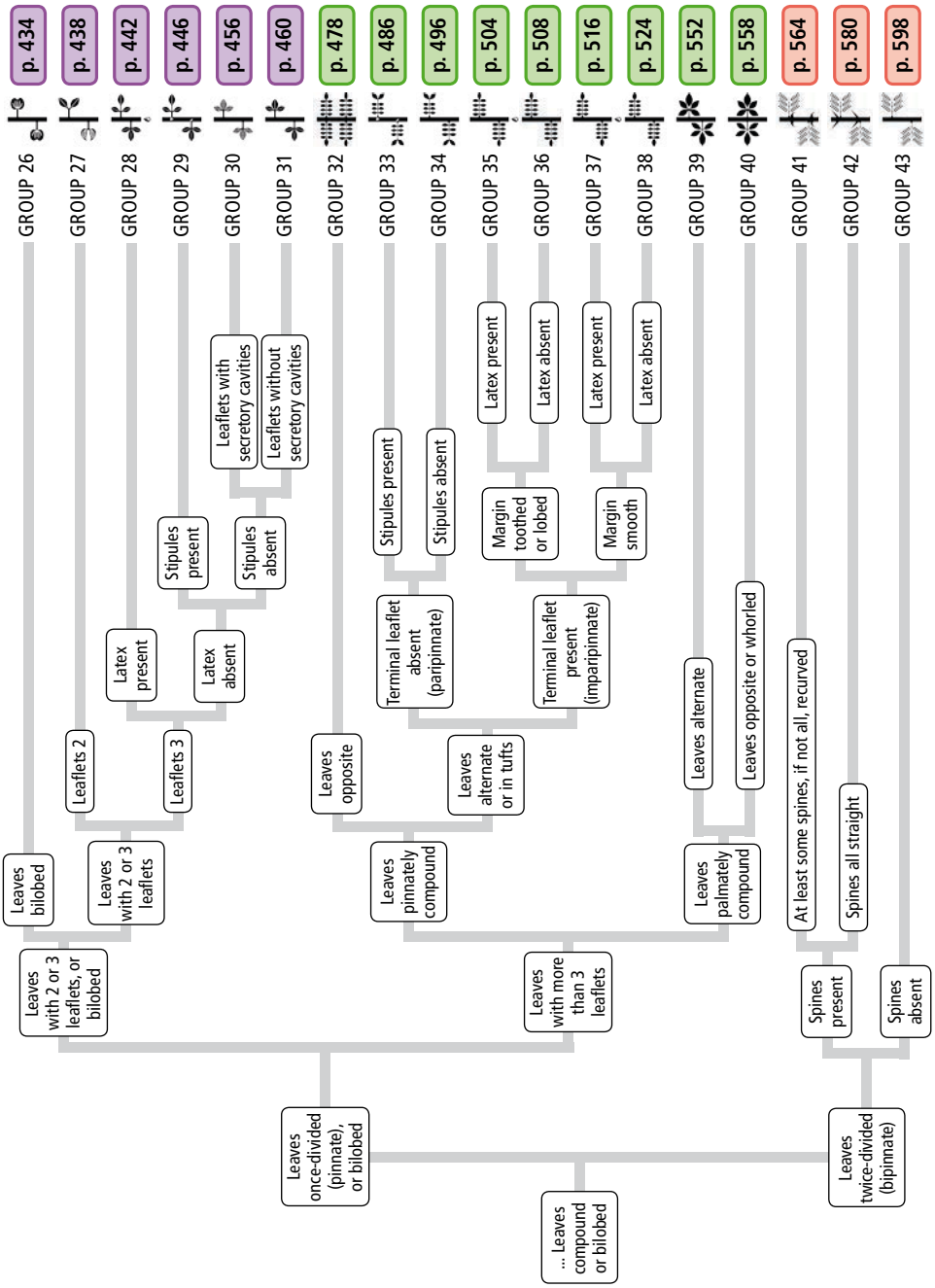
KEY TO THE GROUPS: DIAGRAM A



KEY TO THE GROUPS: DIAGRAM B



KEY TO THE GROUPS: DIAGRAM C



FAMILY DESCRIPTIONS

When identifying trees, a lot of time can be saved if one is familiar with the most important plant families in an area, especially as botanical keys – the formally accepted analytical devices for the determination of plant names – tend to be rather long and difficult to use. Thus anyone interested in southern African trees should be able to recognize, on sight, members of such prominent families as the Rubiaceae, Fabaceae (narrowly defined), Mimosaceae, Celastraceae, Euphorbiaceae (narrowly defined), Anacardiaceae, Proteaceae, Combretaceae, Caesalpiniaceae, Ebenaceae, Asteraceae, Phyllanthaceae, Apocynaceae, Moraceae, Capparaceae, Burseraceae, Lamiaceae, Sparrmanniaceae, Rutaceae and Sapindaceae. Together these 20 families, which we have ranked in descending order of importance, account for more than 1 345 native tree species, or nearly 65 per cent of the region's tree flora.

Each family entry appearing below begins with a brief summary of the features that distinguish its members in southern Africa. In the case of statistics on diversity, infraspecific taxa such as subspecies and varieties have been counted as 'species'. As the technical floral characters by which most plant families are defined are so obscure and esoteric (usually involving a determination of ovule number, placement and orientation), the emphasis here is on the more easily observed features that could assist in field identification. This section is followed by examples of the most important economic plants in each family, with the emphasis on those species and products that are known worldwide and with which readers might be familiar. Numerous examples of local usage are mentioned in the main section of this book.

Acanthaceae LIPFLOWER FAMILY | A family mainly of herbs and shrublets, well represented in southern Africa but with only about 12 species reaching tree size. Readily recognized by the opposite leaves that are without stipules and arise from more or less swollen nodes. Stems are often slightly swollen immediately above each node. Flowers are conspicuously 2-lipped, and usually subtended by conspicuous bracts. The fruit is characteristically narrowly obovate, 2-valved, with elastic dehiscence. ◆ Species from many genera are used as garden ornamentals, among them *Acanthus*, *Barleria*, *Hypoestes*, *Justicia* (including *Beloperone*) and *Thunbergia*. The deeply dissected, spiny leaves of *Acanthus* inspired the ornamental motifs on the Corinthian columns of classical Greek temples. (Groups 19, 23)

Anacardiaceae MANGO FAMILY | This is the sixth largest tree family in southern Africa, comprising at least 80 native tree species. Unfortunately, though, it is rather a difficult family to distinguish. Several members have alternate, imparipinnate leaves with watery, rather than milky latex. Stipules are absent. Crushed leaves usually have a strong turpentine-like or resinous odour. Flowers are small, unisexual and inconspicuous. The genera are much easier to recognize. *Searsia* (= *Rhus*), for instance, has 3-foliolate leaves with a resinous smell; and the leaves of *Ozoroa*, *Protorhus* and *Heeria* are simple with numerous more or less parallel side veins and watery or milky latex. The family can be confused with the latex-containing Burseraceae, but the latter often has bark that flakes in papery pieces. The pinnate leaves are also reminiscent of Sapindaceae and Meliaceae, which both lack any kind of milky latex. ◆ Common edible fruit and seeds are the mango (*Mangifera indica*), pistachio nut (*Pistacia vera*) and cashew nut (*Anacardium occidentale*). The resinous exudate is poisonous in many species, causing severe irritation of the skin, as in poison ivy (*Toxicodendron radicans* = *Rhus radicans*) and the indigenous *Smodingium argutum* and *Trichoscypha ulugurensis*. The peppertree (*Schinus molle*) from South America is widely planted for shade and ornament, particularly in arid regions. (Groups 5, 6, 24, 31, 35, 37)

Annonaceae CUSTARD-APPLE FAMILY | A large family of mainly tropical trees and shrubs. About 20 native species are found in the southern African region. All its members have simple, entire, aromatic leaves arranged in two ranks and without stipules. The flowers, which tend to be greenish and inconspicuous, are usually bent to one side and downwards (nodding). They are very distinctive, with the perianth in two whorls of three, and with numerous, peculiar, short, thick stamens and usually several separate carpels instead of a single ovary (the latter is present in *Monodora*). The separate carpels, which have almost no style, are most prominent during fruiting, often developing into clusters of several fleshy fruits radiating from the tip of the original flower stalk. ◆ Numerous species produce edible fruits, which for the most part are consumed locally rather than marketed for profit, and which are sometimes collectively known as 'custard-apples' (from the custard-like flavour of many of them). Oil of ylang-ylang, one of the principal ingredients of French perfume, is distilled from the flowers of *Cananga odorata* and *Artabotrys odoratissimus*. (Group 10)

Aphloiaceae ALBINOBERRY FAMILY | A monotypic family, namely one with only a single species, *Aphloia theiformis*. The latter occurs in southern and East Africa, Madagascar, Comores, Mascarene Islands (where it is morphologically quite variable) and the Seychelles.

Readily identified by its alternate, simple leaves arranged in two ranks (distichous) and with finely serrate margins and small stipules that continue down the stem as raised lines. It was formerly classified under a broadly defined Flacourtiaceae, but family relationships remain obscure. ◆ The family is of no significant economic importance. (Group 9)

Apiaceae/Umbelliferae CARROT FAMILY | A predominantly herbaceous family with only 13 or so tree species (mostly growing as shrubs) native to the region. Easily distinguished by the alternate, usually much-divided or pinnate leaves, with the petiole forming a sheath at the base. Crushed leaves have a strong, often carrot-like, smell. The flowers, borne in simple or compound umbels, are small, with an inferior ovary and two separate styles. ◆ The family includes vegetables (carrot, parsnip), as well as numerous herbs, spices and flavouring plants (among them celery, parsley, fennel, dill, anise, angelica, coriander, cumin, and caraway). Many species, some of which are poisonous (for example hemlock, which brought about the death of the Athenian philosopher Socrates), are used in the preparation of medicines. (Groups 36, 38)

Apocynaceae narrowly defined OLEANDER FAMILY An easy to recognize, woody plant family with about 44 native tree species in the region. The combination of opposite or whorled leaves and milky or watery latex is definitive. Some of the succulent genera, though, have the leaves alternate or in terminal tufts (*Adenium*, *Pachypodium*). All members have flowers with 5 petals, which are fused into a tube, and twisted when in bud. Clusiaceae has a similar leaf arrangement, but the latex tends to be yellowish. Sometimes broadly defined to include Asclepiadaceae and Periplocaceae, a classification we do not support. ◆ The family is rich in alkaloids, and several members are toxic or are used medicinally. Ornamentals include the oleander (*Nerium oleander*), Madagascar periwinkle (*Catharanthus roseus*), both which have become naturalized in the region, and the frangipani (*Plumeria rubra*). (Groups 1, 20, 21, 24)

Aquifoliaceae HOLLY FAMILY | A widespread family of trees and shrubs, but poorly represented in our region by just a single native species (*Ilex mitis*). Family characteristics are therefore unimportant in the context of this book. ◆ Holly (*Ilex aquifolium*), with its attractive spiny foliage and bright red berries, has become a basic ingredient of Western-style Christmas decorations. (Group 10)

Araliaceae CABBAGETREE FAMILY | Closely related to the Apiaceae, but predominantly woody; with about 17 native species. Plants are usually conspicuous because of their large, palmately or pinnately lobed/compound leaves. The latter are alternate with stipules. The flowers have an inferior ovary, and are usually borne in umbels or spikes, which are often further compounded into large and complex umbels, racemes or panicles. ◆ Cultivars of ivy (*Hedera helix*) are widely grown as ornamentals. Ginseng, a popular traditional medicine, is obtained from the roots of *Panax quinquefolius* and *P. pseudoginseng*. (Groups 2, 11, 38, 39)

Arecaceae/Palmae PALM FAMILY | A distinctive family with an unmistakable habit, poorly represented in our region: there are only seven native species. The leaves are very large, palmately or pinnately divided (simple in Musaceae) and spirally arranged (2-ranked in Strelitziaceae). ◆ Important economic products include coconuts (*Cocos nucifera*), dates (*Phoenix dactylifera*), sago (starch from the stem pith of *Metroxylon* spp., notably *M. sagu*), fibres (coir from husks of coconut; raffia from leaflets of *Raphia*) and rattan cane (stems of *Calamus* spp.). *Elaeis guineensis* (African oil palm) is one of the world's most important sources of edible and soap-making oils. Many palms are cultivated as ornamentals. (Group 2)

Asphodelaceae ALOE FAMILY | This is a family that is not usually associated with trees: members are predominantly herbaceous (often leaf succulents), and many are rhizomatous plants. The tree forms (about 30 species) in the region all belong to the genus *Aloe*, a distinct and easy-to-recognize group. Floral characters, combined with lack of bulbs and tubers, are diagnostic for the family. All have flowers with 6 perianth segments ('petals'), 6 stamens and a 3-chambered, superior ovary. Formerly included in a broadly defined Liliaceae, but this circumscription is no longer supported. Alternatively classified under a broadly defined Xanthorrhoeaceae, or *Aloe* is placed in a family of its own, Aloaceae. ◆ A few members have showy flowers and are used as garden ornamentals, among them aloes (*Aloe*), bulbines (*Bulbine*), bulbinellas or cat-tails (*Bulbinella*) and red-hot pokers (*Kniphofia*). Several species are used medicinally. (Group 1)

Asteraceae/Compositae DAISY FAMILY | Among the largest families of flowering plant in the world, and one that is predominantly herbaceous. Vegetative features are variable and the 50 or so species that reach tree size in the region are best recognized at generic or species level. However, many members tend to have cobwebby hairs on the stems and/or leaves. The small, tubular flowers (called florets) are characteristically clustered in dense heads, subtended by bracts (an

involucre) arranged in one or more whorls, the whole resembling a single flower. The ovary is inferior with a single ovule, and the fruit is small and often tipped by a tuft of hairs. ◆ Important crop plants include lettuce (*Lactuca sativa*) and sunflower (*Helianthus annuus*). Among the many garden ornamentals are all the so-called daisies, everlastings (*Helichrysum*), marigolds (*Tagetes*), chrysanthemums and dahlias. Many common weeds belong to this family, among them cocklebur (*Xanthium*), cosmos (*Bidens formosa*), blackjack (*Bidens pilosa*), triffid or paraffin weed (*Chromolaena odorata*), pompom weed (*Campuloclinium macrocephalum*) and khaki weed (*Tagetes minuta*). (Groups 1, 3, 7, 9, 10, 19)

Avicenniaceae WHITE MANGROVE FAMILY | A small family of about eight tree species of *Avicennia*, all of which are mangroves along tropical coastlines. Only one characteristic member with erect, pencil-like breathing roots (pneumatophores) in our region, therefore no need to focus on family features. Formerly often classified under Verbenaceae, a family from which it differs markedly. ◆ The species are important in coastal ecology and protection, but otherwise the group is of little economic importance. (Group 23)

Balanitaceae TORCHWOOD FAMILY | A small family represented in the region by four species of *Balanites*. These are easily distinguished by their often spiny branchlets and stalked, 2-foliolate leaves. Often included in the Zygophyllaceae, but quite distinct in both vegetative and floral features. ◆ The family is of little economic importance. (Group 27)

Bignoniaceae JACARANDA FAMILY | A distinctive family of woody shrubs, trees and lianas, with about 15 native species. The leaves are pinnately compound, opposite or whorled and without stipules. Flowers are large, bell- or funnel-shaped and very showy. In several species the fruit is dehiscent and resembles a long, narrow pod, usually with winged seeds. ◆ Ornamental trees and shrubs include trumpet trees (*Tabebuia* spp.), Cape honeysuckle (*Tecomaria capensis*), yellow bells (*Tecoma stans*), jacaranda (*Jacaranda mimosifolia*) and the African flame tree (*Spathodea campanulata*). Many garden creepers with showy flowers – including golden shower (*Pyrostegia venusta*), trumpet vine (*Campsis radicans*), Chinese trumpet vine (*C. grandiflora*), cat's claw (*Macfadyena unguis-cati*) and scarlet trumpet vine (*Distictis buccinatoria*) – belong to the family. (Groups 8, 29, 32, 43)

Bombacaceae BAOBAB FAMILY | A small family of tropical trees, with two species native to the region. Many species have thick, bottle-shaped or barrel-shaped trunks. The leaves are alternate, often palmately compound, with stipules. The flowers are large and showy, with 5 free petals and numerous stamens. ◆ Kapok is derived from the fruit of silk cotton trees (*Bombax* spp., *Ceiba pentandra*). The durian (*Durio zibethinus*) is an extremely popular edible fruit in Southeast Asia. *Ochroma pyramidale* is the source of balsa wood. Brazil kapok (*Ceiba speciosa* or *Chorisia speciosa*) is an attractive flowering tree in tropical gardens. (Group 39)

Boraginaceae BORAGE FAMILY | A predominantly herbaceous family with some 21 tree species in the region. The leaves are alternate, simple, without stipules and are often harsh (sandpapery) to the touch. Twigs tend to be round. The flowers are regular, with 5 united petals and 5 stamens arising from the corolla tube. The sepals are often persistent in fruit. ◆ Many members of the family are used as garden ornamentals, among them forget-me-not (*Myosotis*); and in traditional medicine, including comfrey (*Symphytum officinale*) and borage (*Borago officinalis*). (Groups 9, 10, 11)

Buddlejaceae SAGEWOOD FAMILY | A small family represented by 13 or so native tree species, most belonging to the genera *Buddleja* and *Nuxia*. *Buddleja* is easily recognized by the opposite or 3-whorled leaves, often with star-shaped hairs. Interpetiolar stipules, or a stipular ridge, are usually present (particularly in *Buddleja*) between the petioles. Leaf margins are often toothed, which distinguishes them from the Rubiaceae. The flowers have 4 petals, united into a short tube, and 4 free stamens. Formerly often included in Loganiaceae. ◆ Certain species of *Buddleja* are used as garden ornamentals. (Groups 13, 19, 23, 25)

Burseraceae MYRRH FAMILY | *Commiphora*, with about 42 tree species, is the only genus of the family in southern Africa. Species are conspicuous in arid bushveld and semi-desert areas; many are confined to Namibia's Kaokoveld region. Plants of the family are usually easy to recognize by the pinnately compound or 3-foliolate (rarely simple) leaves, and strongly aromatic, often turpentine-like odour. All parts contain a milky or cloudy latex (chemically a resin). Several species have bark that peels in thin, papery pieces, which may help to distinguish them from the closely related Anacardiaceae. The flowers are small and insignificant. Seeds are usually covered by a bright red or yellowish aril-like structure (pseudo-aril). ◆ Frankincense comes from the latex of certain species of *Boswellia*, especially *B. sacra*; myrrh from the latex of *Commiphora abyssinica*, *C. myrrha* and a number of other species cultivated in Ethiopia and Arabia. (Groups 5, 6, 28, 35, 37)

Buxaceae BOXWOOD FAMILY | A small family of evergreen shrubs and trees, represented by only two native species in the region. These are vegetatively indistinct, with opposite, leathery leaves, without stipules. The flowers are inconspicuous, unisexual, with 3-chambered ovaries, the latter developing into very distinct capsules tipped by 3 slender horns. ◆ A few species are grown as foliage plants, often as hedges or border edgings. (Group 23)

Cactaceae CACTUS FAMILY | A large, unmistakable family of mainly leafless stem succulents, almost exclusively confined to the semi-desert regions of North, Central and South America. Only one species, a small herbaceous shrublet or epiphyte, is indigenous to southern Africa. All tree forms in the region have been introduced. Most species have spines, often with tufts of tiny barbed hairs, which arise from cushions or areoles. Some resemble species of *Euphorbia*, but lack milky latex. The ovary is inferior, 1-chambered and many-seeded. ◆ Prickly pears (*Opuntia*) are grown commercially for their fruit. Many species are valued as ornamentals. (Group 1)

Caesalpiniaceae FLAMBOYANT FAMILY | This is one of the ten largest woody plant families in the region (more than 50 species), and is particularly well represented in the miombo woodlands of south-central Africa. The leaves are alternate and characteristically paripinnate with opposite leaflets, 2-foliolate or deeply 2-lobed. A few species have imparipinnate or bipinnate leaves. Stipules are always present, at least in young growth, and are rarely spiny. An outstanding vegetative feature is the pulvinus, a conspicuous thickening at each petiole and petiolule base. The flowers are relatively large and showy, slightly irregular, with 10 or fewer stamens. This is one of three families characterized by a pod (legume) as fruit type, the other two being the Mimosaceae and Fabaceae. They are often combined into a single family, the Leguminosae/Fabaceae (broadly defined). ◆ Garden ornamentals include several species of *Bauhinia*, *Caesalpinia*, *Cassia*, *Senna*, and the flamboyant (*Delonix regia*). Various alkaloids, including the purgative senna, are obtained from species of *Cassia* and *Senna*. (Groups 26, 27, 33, 38, 41, 43)

Capparaceae narrowly defined CAPER FAMILY An important family in southern Africa (about 42 tree species), but difficult to identify in the absence of flowers or fruit. Plants contain mustard oils (glucosinolates). Leaves are alternate, simple, 3-foliolate or palmately compound. Flowers are usually conspicuous, with 4 free petals, numerous long stamens and an ovary that is carried on a distinctive stalk (gynophore). In fruiting material the gynophore is clearly visible as a well-developed neck between the swollen (globose, oval or strongly elongated and pod-like) fruit and the fruit stalk proper, from which it is clearly demarcated by a scar (thickening) left by the receptacle and perianth. ◆ Commercial capers, eaten as a condiment, are derived from the flower buds of *Capparis spinosa*. The spider flower (*Cleome spinosa*) belongs to the closely related Cleomaceae, a family sometimes included in Capparaceae. It is a herbaceous annual grown for its attractive white or pink flowers. (Groups 8, 10, 29, 39)

Casuarinaceae BEEFWOOD FAMILY | A small family of leafless, woody, flowering plants from Australasia and Southeast Asia. Characterized by peculiar jointed branchlets (which function as leaves), superficially resembling pine needles. Represented by introduced species of *Casuarina* in the region. ◆ The wood of several species is extremely hard and valued for furniture. (Group 3)

Cecropiaceae TRUMPET-TREE FAMILY | A woody family often with aerial stilt roots and represented in our region by a single species, *Myrianthus holstii*. Plants have watery latex that turns black on exposure to air, palmately compound leaves and prominent stipules that are stem-clasping at the base. The latex and stipules are reminiscent of the Moraceae, a family that never has palmately compound leaves in the region. Formerly included in Moraceae; alternatively classified under Urticaceae (broadly defined). ◆ The family is of little economic importance, but some members, e.g. Amazon tree-grape (*Pourouma cecropiifolia*), have edible fruit. (Group 39)

Celastraceae, including Hippocrateaceae SPIKETHORN FAMILY | With about 94 tree species in southern Africa, the Celastraceae counts as one of the five largest tree families in the region. This is a rather indistinct family, although familiarity with the group leads to the recognition of a distinct, though difficult to describe, celastraceous 'look'. Young twigs tend to be greenish, somewhat angular, and in *Gymnosporia*, the largest genus in southern Africa, the plants are usually armed with spinescent shoots. The leaves are usually alternate or in clusters, leathery, with the venation on the lower surface somewhat translucent. In a few species elastic (rubbery) threads are visible on breaking the lamina. Stipules are present and usually minute, brown and shrivelled. Although small, the white or greenish flowers are more distinctive, being rather flat with a conspicuous nectar-secreting disc around the ovary, and a very short style. In most species with capsular fruit the seeds are partly or completely covered by a fleshy orange

or whitish aril. ◆ The family is of more local than general economic importance. A few species are grown as ornamentals, mainly for their attractive, often variegated foliage (for example, *Celastrus*, *Euonymus*). The leaves of *Catha edulis*, known as khat, are a popular social drug in the Horn of Africa and parts of the Middle East. (Groups 7, 8, 9, 10, 18, 19, 23)

Celtidaceae WHITE-STINKWOOD FAMILY | A woody family of trees and shrubs; poorly represented in the region (five native species). Leaves are alternate, simple, with toothed margins and often unequal-sided bases, and stipules. The flowers are mostly unisexual (male and female on same plant), greenish and inconspicuous, yet very characteristic in having one stamen opposite each sepal (petals absent) and 2 divergent styles; the fruit is a fleshy drupe. Alternatively classified as subfamily Celtidoideae under a broadly defined Ulmaceae. ◆ Species of *Celtis* are valued as ornamental trees. (Groups 8, 11)

Chenopodiaceae SALTBUSH FAMILY | A large, mainly herbaceous family, with many species capable of growing in saline soils, often in arid regions. The genus *Salsola* has several species in the semi-desert parts of southern Africa, at least two of which may become small trees. They are all rather similar looking, with small, reduced leaves and inconspicuous flowers. ◆ Different cultivars of *Beta vulgaris* (beetroot, sugar beet, spinach beet, chard) and *Spinacia oleracea* (spinach) are of major agricultural importance. A number of species, notably the saltbushes (*Atriplex*), are cultivated as fodder in arid areas. (Groups 3, 10)

Combretaceae *Terminalia randii*

Chrysobalanaceae MOBOLA-PLUM FAMILY
A large tropical family of trees and shrubs. Poorly represented in our region by four native species, three of which reach tree size. A rather indistinct family with alternate, simple and entire leaves, with stipules; closely related to the Rosaceae. Two small glands are often present at the extreme base of the leaf blade (in our region, only in *Maranthes goetzeniana*). The fruit is always single-seeded. ◆ The fruit of several species are edible and consumed locally; the coco-plum (*Chrysobalanus icaco*) is cultivated for this purpose. Timber is provided by a number of species. Oil may be extracted from the seeds of many species. (Group 7)

Clusiaceae/Guttiferae MANGOSTEEN FAMILY
A rather heterogeneous family of about eight native tree species. They have opposite (rarely whorled), entire leaves (almost sessile in *Hypericum*), with very distinctive yellow or orange latex in some genera. Some species of *Garcinia* have leaves with many conspicuously parallel secondary and intersecondary veins. Flowers of *Hypericum* are unmistakable, with 5 free, yellow petals and many stamens, basally united into 5 bundles. ◆ The mangosteen (*Garcinia mangostana*), a delicious fruit from Southeast Asia, is probably the best-known family member. Gamboge, a yellow pigment used in watercolour paints, is prepared from the latex of *Garcinia hanburyi*. It has been used for centuries in the Far East as a dye to colour the orange-brown silk robes of Buddhist monks and priests. Timber and medicines are derived from various lesser-known species. (Groups 21, 23, 24)

Combretaceae BUSHWILLOW FAMILY | This family is well represented in southern Africa, particularly in bushveld. At least 60 species reach tree size or are robust, woody climbers. The leaves are entire, alternate or opposite, and without stipules. *Combretum*, the region's largest genus, has opposite leaves that remind one of Rubiaceae, but it lacks the characteristic stipules of the latter. Members of the second largest genus, *Terminalia*, often have a very distinctive pagoda-like tree architecture, known as Aubréville's Model. The main stem produces whorls of horizontal lateral branches. Each lateral branch is made up of a succession of branchlet units, each with the tip turned up and a cluster of leaves at its apex. The flowers are usually inconspicuous, small, greenish or yellowish white, and

clustered in axillary heads or spikes. The ovary is inferior, elongated, and easily mistaken for the flower stalk. Fruits of *Combretum* are (with one exception) characteristically 4-winged. In most other members the fruit is surrounded by a single wing. ◆ A few species, notably *Terminalia catappa* (Indian almond), are occasionally planted for ornament in the coastal regions of KwaZulu-Natal. The Rangoon creeper, *Quisqualis indica*, is widely grown for its attractive flowers. (Groups 8, 10, 23)

Crassulaceae CRASSULA FAMILY | A large family of mainly succulent-leaved herbs. The native tree-like members (about three species) are recognized by their opposite, simple, succulent leaves and flowers with 5 separate ovaries. Vegetatively very similar to Portulacaceae, which has flowers with a single, 1-chambered ovary. ◆ Popular collector plants among succulent enthusiasts. Some species are valued as rock-garden ornamentals. (Group 1)

Cunoniaceae WILD-ALDER FAMILY | A family of trees and shrubs, mainly from the southern hemisphere. Poorly represented in the region by two native species. Leaves are opposite, 3-foliolate or pinnately compound, the leaflets having toothed margins. Stipules are present, and often large and united in pairs over the growing tips. ◆ The family is of little economic importance. (Groups 29, 32)

Cupressaceae CYPRESS FAMILY | A family of conifers (gymnosperms), usually with scale-like mature leaves arranged in opposite pairs or in whorls. Juvenile leaves tend to be needle-like. Three species are native to the region. The female cones are more or less globose, with the scales arranged in opposite pairs. ◆ Timber is obtained from many species. The family also yields resins and flavourings, and some members are cultivated as ornamentals (including many cultivars of hardy, dwarf conifers with bluish, golden or variegated foliage). (Group 3)

Curtisiaceae ASSEGAI FAMILY | A family with a single species (monotypic family) confined to southern Africa. The only species, *Curtisia dentata*, is easy to identify by its opposite, distinctly toothed, simple leaves and dense cover of brownish hairs on young growth. The flowers are inconspicuous, with an inferior ovary, which develops into white to cream-coloured drupes, characteristically tipped by the calyx, or by a circular scar. It is closely related to Cornaceae under which it was formerly classified. ◆ Yields a valuable timber, though of limited availability and local use. It was once popular for the shafts of assegais and in the construction of wagons. (Group 18)

Cyatheaceae TREEFERN FAMILY | There are about four species of tree fern native to the region, all from forest or wet areas in associated grassland. Tree ferns are unmistakable, having large, much-divided leaves, which unfurl from coiled tips and usually have scales and/or prickles at the base of the petiole. Plants reproduce by means of spores, which are borne in fertile parts (sori) on the lower surface of the leaves. ◆ A few species are grown as ornamentals; the family is otherwise of little economic importance. (Group 2)

Dipterocarpaceae HELICOPTER FAMILY | A woody family centred in the tropical rain forests of Southeast Asia. Poorly represented in southern Africa, with three woodland tree species; easily identified by the large gland at the base of the midrib. The fruit is a nut enclosed in the persistent, winged and membranous calyx. ◆ The family is the world's main source of hardwood timber; among useful genera are *Dipterocarpus*, *Hopea*, *Shorea* (meranti) and *Vatica*. Forest species grow very tall, with straight and unbranched boles and relatively small crowns. (Groups 7, 10)

Dracaenaceae DRAGONTREE FAMILY | A distinct monocot family of large, perennial herbs or small trees, with five native tree species. The leaves are long and tapering, parallel-veined and often clustered in dense terminal rosettes. The flowers are very similar to those of the Asphodelaceae. Formerly classified under Agavaceae; sometimes placed in Convallariaceae. ◆ Ornamentals include species of *Sansevieria* (mother-in-law's tongue), *Cordyline* and *Dracaena* (dragon trees). (Group 2)

Ebenaceae EBONY FAMILY | A woody family with about 35 tree species native to southern Africa. Vegetatively rather indistinct with simple, entire leaves without stipules. The two native genera are much easier to recognize: *Euclea* has hard, leathery leaves that tend to be opposite and often with undulate margins; *Diospyros* has alternate leaves and fruit that is subtended or enclosed by the persistent and enlarged calyx. ◆ Commercial ebony is the hard, black heartwood of certain species of *Diospyros*. The best-known fruits are the persimmons (among others *Diospyros kaki* and *D. virginiana*). (Groups 10, 23)

Ericaceae HEATHER FAMILY | A family with about 800 species in southern Africa (mainly in the Western Cape), but with probably fewer than 20 reaching tree size. Readily recognized (in the region) by the needle-like, leathery and alternate leaves that lack stipules. The flowers are small, with 5 united petals and 10 stamens. The anthers, which open with pores to release the pollen, are distinctive. The family can be confused with

narrow-leaved members of the Rosaceae (with stipules) and Thymelaeaceae (with tough, fibrous bark). ◆ The azaleas (*Rhododendron*) are popular garden ornamentals. Blueberries, cranberries and bilberries are obtained from species of *Vaccinium*. *Arbutus unedo* (strawberry tree) is often cultivated in gardens. (Group 3)

Erythroxylaceae COCAINE FAMILY | A woody, mainly tropical family, poorly represented by about six species in the region. Readily recognized by the alternate, entire leaves with intrapetiolar stipules. *Erythroxylon* has the young stems conspicuously flattened towards the ends, whereas *Nectaropetalum* has its growing buds covered by united stipules, which are conspicuously spike- or horn-like. ◆ The drug cocaine is extracted from the leaves of the South American *Erythroxylon coca*. (Group 10)

Euphorbiaceae narrowly defined EUPHORBIA FAMILY | With about 90 native tree species, this is the fifth largest woody family in southern Africa. Rather heterogeneous, the vegetative and floral structures show great variation. The vast majority of its species can readily be recognized by combinations of milky or watery latex, simple alternate leaves, a pair of glands at the petiole apex or base of leaf blade, and the presence of stipules or stipule scars. However, there are exceptions to each one of these. In the great majority of cases the fruit is characteristically 3-lobed (3-chambered) and often crowned by the 3 persistent stigmas. Each fruit chamber contains 1 ovule (compare Phyllanthaceae). The combination of stem succulence and milky latex, and of toothed leaf margins and milky latex, are definitive for the family. Succulent members are also characterized by specialized inflorescences (cyathia) that mimic flowers. Formerly usually broadly defined to also include Phyllanthaceae, Picrodendraceae and Putranjivaceae. ◆ Most of the world's natural rubber is obtained from *Hevea brasiliensis*. Cassava or tapioca (starchy tubers of *Manihot esculenta*) is a staple food in many tropical countries. Numerous members are poisonous and/or have medicinal uses, including castor oil (*Ricinus communis*). The poinsettia (*Euphorbia pulcherrima*) is widely grown in gardens. (Groups 1, 5, 6, 9, 10, 11, 39)

Fabaceae narrowly defined PEA FAMILY | A well-represented family (sometimes referred to under the name Papilionaceae) in southern Africa, with about 133 tree species (the second largest tree family). The alternate leaves are usually imparipinnate or 3-foliolate, but sometimes simple. Stipules are always present, although deciduous with age in some species. An outstanding vegetative feature is the pulvinus, a conspicuous thickening at each petiole and petiolule base. Easily recognized as a family by the very characteristic butterfly-like flower type. The petals are unequal, with the uppermost (standard or banner) the largest, the two side ones small and stalked (wings), and the two basal ones united into a boat-shaped structure (keel). This is one of three families characterized by a pod (legume) as fruit type, the other two being the Mimosaceae and Caesalpiniaceae. They are often combined into a single family, the Leguminosae/Fabaceae (broadly defined). ◆ Seeds and pods of many of the herbaceous species are sources of human food, including garden pea (*Pisum sativum*), various types of beans (*Glycine*, *Phaseolus*, *Vicia*) and the peanut (*Arachis hypogaea*). The cowpea (*Vigna unguiculata*), clover (*Trifolium*) and lucerne (*Medicago sativa*) are widely used as forage plants. Liquorice is obtained from the dried roots and rhizomes of several *Glycyrrhiza* species. Garden ornamentals include lupin (*Lupinus*), broom (*Cytisus*), sweet pea (*Lathyrus*), blue rain (*Wisteria*) and several coraltrees (*Erythrina*). Most members have root nodules containing nitrogen-fixing bacteria, and play an important role in the nitrogen enrichment of soils. (Groups 10, 29, 33, 38)

Flacourtiaceae narrowly defined KEI-APPLE FAMILY | A family of woody, often spiny plants with about 30 tree species, found mainly in the subtropical parts of the region. This is a difficult family to distinguish, particularly vegetatively. Plants have leaves that are always simple and usually alternate. The flowers (which are often unisexual) tend to have 5 free petals, numerous free stamens, and a superior, 1-chambered ovary (later a 1-chambered fruit). Formerly broadly defined so as to also include Gerrardinaceae and Kiggelariaceae; alternatively classified under a broadly defined Salicaceae. ◆ The fruit of several species are eaten locally (notably the Kei-apple, *Dovyalis caffra*), but otherwise the family contains few plants of economic importance. (Groups 8, 9, 11, 19)

Gentianaceae GENTIAN FAMILY | A mainly herbaceous family, *Anthocleista* (with two species) being the only tree genus in the region. Plants are usually completely hairless (glabrous) with the leaves opposite, simple, entire and usually more or less sessile (without petiole). The stem nodes often have a raised transverse line between opposing leaf bases. The two native tree species are easily recognized by having amongst the largest simple leaves of all woody dicotyledons in the region. Related to Apocynaceae, which has latex, and to Rubiaceae, which has an inferior ovary and interpetiolar stipules. *Anthocleista* was formerly classified under Loganiaceae. ◆ Cultivars of lisianthus (*Eustoma grandiflora*) are very popular in the cut-flower market.

Other ornamentals include gentian (*Gentiana*) and sea rose (*Orphium frutescens*). Widely used medicinally, e.g. 'gentianroot' from *Gentiana lutea*, also the source of 'gentian bitter' which is used as a bitter tonic and in certain aperitifs. (Group 17)

Gerrardinaceae KRANTZBERRY FAMILY | A small, recently described plant family that accommodates *Gerrardina*, a genus of two species from southern and East Africa. The evolutionary relationships of the family are still vague, but formerly the group was included in a broadly defined Flacourtiaceae. Plants have leaves that are simple and alternate with a toothed margin. The teeth have glandular tips (compare Iteaceae) and a side vein runs to each tooth and branches to the vein above. The flowers are small with stalked petals and stamens inserted opposite the petals. ◆ The family is of no economic importance. (Group 9)

Greyiaceae BEACONTREE FAMILY | An exclusively southern African family of one genus (*Greyia*) and three species. Easily recognized by the alternate, simple leaves, with more or less palmate venation, irregularly toothed margins, and sheathing (stem-clasping) bases of the petioles. The scarlet, bell-shaped flowers are arranged in showy heads or spikes. Alternatively classified under Melianthaceae. ◆ Often cultivated as ornamentals. (Group 11)

Hamamelidaceae WITCH-HAZEL FAMILY | A woody family, poorly represented in the region by four forest species, and vegetatively rather indistinct. The flowers in some species (including all native ones) are clustered in dense heads and have very characteristic, ribbon-shaped petals. ◆ Storax, a fragrant gum used in perfumery and medicine, is derived from certain species of *Liquidambar*. This genus also yields excellent timber (American sweet gum or red gum). *Liquidambar styraciflua* (sweet gum) is often cultivated for its ornamental autumn foliage. *Loropetalum chinense* (Chinese fringe flower) is a shrub or small tree with, depending on the cultivar, attractive white or bright pink flowers. Witch hazel lotion, from *Hamamelis virginiana*, is widely used to treat cuts and bruises. (Groups 7, 23)

Helicteraceae ZAMBEZI-OAK FAMILY | A relatively small, woody, tropical family. It is poorly represented in Africa, with a single species, *Triplochiton zambesiacus*, in our region. The leaves are palmately veined with star-shaped hairs and each flower has 5 free petals, a conspicuous stalk (androgynophore) on which the ovary and stamens are borne, and 5 separate ovaries that develop into dry, often winged fruit. Formerly included in a broadly defined Sterculiaceae; alternatively classified under a broadly defined Malvaceae. ◆ Several species produce excellent timber, especially *Triplochiton scleroxylon* and *Mansonia altissima*, with *M. gagei* the source of kalamet, a fragrant wood used as a cosmetic, particularly in Myanmar and India. (Group 11)

Hernandiaceae HERNANDIA FAMILY | A small tropical family with just a single native species in the region. *Gyrocarpus americanus* is a very distinct species and there is no need to dwell on family characters. ◆ The family has no significant economic value. (Group 11)

Heteropyxidaceae LAVENDERTREE FAMILY | A small family (closely related to Myrtaceae) with two species in southern Africa and one in Mauritius. The local genus (*Heteropyxis*) has alternate, entire, simple leaves with secretory cavities. These emit a pleasant smell when crushed. The flowers are small and inconspicuous. Alternatively classified under Myrtaceae. ◆ The family has no significant economic value. (Group 10)

Icacinaceae WHITEPEAR FAMILY | Vegetatively a rather indistinct woody family, poorly represented in the region. The two native tree genera, *Apodytes* (three species) and *Cassinopsis* (two species), are much easier to recognize than the family. ◆ The family has no significant economic value, although a few species yield excellent timber, and several others have local uses. (Groups 10, 17, 18)

Iteaceae FALSE-SHINYLEAF FAMILY | A small, mainly temperate northern hemisphere family of evergreen shrubs and trees. A rather indistinct family, with just one native species, *Itea rhamnoides*; it was formerly placed in Escalloniaceae. The leaves are alternate, simple, with toothed margins, each tooth with a blackish glandular tip (compare Gerrardinaceae). ◆ Species of *Itea* are grown for ornament, otherwise some species mainly of local significance in traditional medicine. (Group 9)

Kiggelariaceae WILDPEACH FAMILY | A mainly tropical family of shrubs or trees chemically characterized by the presence of a specific group of cyanide-producing compounds (cyclopentenoid cyanogenic glycosides; including gynocardin). Four species representing three genera are known from the region. A difficult family to recognize on the basis of morphology alone. All members have alternate, simple leaves, sometimes with small stipules and flowers with the stamens usually more numerous than the petals and with 1-chambered ovaries. The group was formerly classified under a broadly defined Flacourtiaceae; alternatively it is included under a broadly defined Achariaceae. ◆ The family has no significant economic value. (Groups 7, 9, 10)

Kirkiaceae WHITE-SERINGA FAMILY | A small, woody family comprising six species of *Kirkia*. These are mainly confined to southern, East and northeastern Africa, with one species on Madagascar. Represented in southern Africa by four native species. A rather indistinct family with alternate, imparipinnate leaves clustered towards the ends of shoots, without stipules. The leaflets usually have toothed margins, which distinguishes it from Meliaceae. Distinguished from pinnate-leaved Anacardiaceae and Burseraceae by the lack of latex, from Rutaceae by the lack of secretory cavities in the leaves, from Sapindaceae by the lack of the aborted terminal rachis-projection and from Fabaceae by the lack of stipules. Formerly usually included in Simaroubaceae. ◆ *Kirkia wilmsii* (mountain seringa) has showy autumn colours and *K. acuminata* (white-seringa) is an attractive shade tree for frost-free gardens and parks, but the family is otherwise of little economic importance. (Group 36)

Lamiaceae/Labiatae SAGE FAMILY | A large, predominantly herbaceous family. Usually one of the easier families to identify; the opposite (rarely whorled), aromatic leaves with margins usually toothed, more or less 4-angled stems, markedly 2-lipped flowers and distinctly 4-lobed ovary are particularly diagnostic for the bulk of the members. The calyx is persistent and often enlarges in fruit. On the other hand, identification of some of the woody members can be quite tricky. About 40 species reach tree size in the region, many of which were formerly included in the Verbenaceae. Several of the woody species have an unlobed ovary and the flowers are not as pronouncedly tubular as in the herbaceous ones. *Vitex* is rather anomalous in having opposite, palmately compound leaves, making the group particularly easy to identify. ◆ Because of their aromatic properties, many species are extensively used as culinary (e.g. to flavour food) and medicinal herbs, as well as in the perfume industry, e.g. *Lavandula* (lavenders), *Mentha* (mint, spearmint, peppermint), *Ocimum basilicum* (basil), *Origanum* (oregano, marjoram), *Rosmarinus officinalis* (rosemary), *Salvia officinalis* (sage) and *Thymus* (thymes), to name but a few. Also many decorative garden and popular house plants, e.g. *Coleus* (painted nettles), *Phlomis fruticosa* (Jerusalem sage), *Plectranthus* (spurflowers) and *Salvia* (sages). (Groups 19, 25, 40)

Lauraceae LAUREL FAMILY | An almost exclusively woody family, best represented in tropical forests, with about ten native tree species. Vegetatively rather indistinct, with alternate (opposite in *Dahlgrenodendron*), non-2-ranked, simple, entire leaves, and no stipules. A useful diagnostic leaf character is the very fine reticulum of tertiary veins (as in Rhamnaceae). Twigs are usually green and without prominent lenticels. Leaves contain oil cells (very small and not visible against the light unless magnified) and are usually aromatic when crushed. The flowers are small, inconspicuous, with 6 tepals and unmistakable anthers, which dehisce by flap-like valves. ◆ Economic products include cinnamon and camphor (*Cinnamomum*), bay leaves (*Laurus nobilis*), timber (*Ocotea*) and the avocado (*Persea americana*). (Groups 7, 10, 11)

Lecythidaceae BRAZILNUT FAMILY | A family of tropical trees centred in South America, with a single native species in southern Africa. The leaves are alternate, large and simple, usually without stipules. Most species have large, showy but very short-lived flowers. These have a fluffy appearance due to the numerous stamens. Fruits are usually hard and woody, with a lid through which the seeds are released. ◆ Brazil or Pará nuts are the seeds of *Bertholletia excelsa*. (Group 10)

Lythraceae PRIDE-OF-INDIA FAMILY | A mainly tropical family of herbs, trees and shrubs. The single native tree species, *Galpinia transvaalica*, is very distinct, and there is no need to dwell on family characters. ◆ Henna, a reddish brown dye, is obtained from *Lawsonia inermis*. Cultivars of pride-of-India (*Lagerstroemia indica*) are hardy trees with attractive flowers. *Cuphea* species are small shrublets often grown in gardens. (Group 23)

Maesaceae FALSE-ASSEGAI FAMILY | A woody family with a single genus (*Maesa*) and about 150 species in the tropics and subtropics of the Old World. Only two members of the family are native to southern Africa. In the local species the leaves are alternate, simple and toothed, and the flowers are generally small and inconspicuous. Closely related to and formerly included under Myrsinaceae, a family from which Maesaceae differs in having a more or less inferior ovary. ◆ With the exception of a number of local cultural usages, the family is of no significant economic importance. (Group 9)

Malvaceae narrowly defined HIBISCUS FAMILY
For the most part a family of herbs and shrublets, with about eight native tree species. Related to Sparrmanniaceae, Pentapetaceae, Helicteraceae, Sterculiaceae and Bombacaceae, with which it shares alternate, simple, often lobed leaves, which are 3- or more-veined from the base, stipules and star-shaped hairs. The flowers are very distinctive, with 5 free petals and numerous stamens united into a tube around the style, the anthers with a single locule (2 locules in closely related Sterculiaceae); often subtended by an

epicalyx (lower calyx whorl). ◆ Cotton (seed fibres of *Gossypium*) is the most important product. Okra is a common vegetable in tropical regions (young fruit of *Hibiscus esculentus*). The family produces many garden ornamentals, notably species of *Hibiscus* and hollyhocks (*Althaea*). (Group 11)

Melastomataceae, including Memecylaceae ROSE-APPLE FAMILY | A large, mainly tropical family, especially common in South America. Twigs are more or less 4-angled, with simple, glossy and rather leathery, entire leaves. Two of the five native tree species (*Memecylon bachmannii, M. natalense*) have leaves with pinnate venation (rather anomalous for the family). They are vegetatively easily confused with Myrtaceae, but can be distinguished by the lack of secretory cavities. The three remaining species (*Dissotis princeps, Warneckea sansibaricum, W. sousae*) have leaves that are more typically 3-veined from the base, with *Warneckea* resembling the genus *Strychnos*. The ovary is inferior, resulting in a fruit tipped by the persistent calyx. ◆ Several of the herbaceous members and a few woody ones (*Dissotis, Medinilla, Tibouchina*) are cultivated for their showy flowers. (Groups 12, 23)

Meliaceae MAHOGANY FAMILY | A large, tropical, woody family with about 20 native species. Vegetatively rather diverse, with both simple and pinnately compound leaves. These are always alternate and without stipules. Species with compound leaves can be distinguished from the rather similar Anacardiaceae by the lack of latex. They also resemble pinnate-leaved members of the Sapindaceae, but the latter tend to have an aborted rachis apex. The flowers, however, are very distinct, with 5 free petals, and 8–10 stamens, which are united into a cylindrical tube around the style. ◆ A very important tropical timber family. True mahogany is derived from species of *Swietenia* and sapele from *Entandrophragma cylindricum*. The family contains certain bitter-tasting chemical compounds, many of which have insecticidal properties. Langsat (*Lansium domesticum*) is a popular edible fruit in Southeast Asia. *Melia azedarach* is widely cultivated for shade and ornament, and has now become a troublesome invader weed in our region. (Groups 10, 34, 38, 43)

Melianthaceae narrowly defined HONEYFLOWER FAMILY | A small family, endemic to Africa and perhaps best known from the herbaceous genus *Melianthus*. *Bersama*, with five native tree species, is an exclusively woody genus. This is the only family in our region with alternate, pinnately compound leaves, with intrapetiolar stipules. ◆ Species of *Melianthus* are grown as garden ornamentals. *Bersama* bark is widely used in traditional medicine. (Groups 36, 38)

Mimosaceae THORN TREE FAMILY | This is the third largest woody plant family in southern Africa, embracing about 100 tree species. The genera *Acacia* (broadly defined) and *Albizia* are an important ecological component of bushveld vegetation throughout the region. The family is easily recognized by the bipinnate leaves, usually with petiolar or rachis glands. Stipules (or a stipular scar) are always present, and are often modified into thorns or spines (*Acacia*). An outstanding vegetative feature is the pulvinus, a conspicuous thickening at each petiole and petiolule base. The flowers are small, regular, with numerous exserted stamens, and arranged into dense capitate or spicate inflorescences. Many species have leaflets that fold up at night (so-called sleeping movements). This is one of three families characterized by a pod (legume) as fruit type, the other two being the Caesalpiniaceae and Fabaceae. The three are often combined into a single family, the Leguminosae/Fabaceae (broadly defined). ◆ Various commercial products are obtained from *Acacia* (tan-bark, wood, gums) and the family also produces a few ornamentals, including *Calliandra* (powder-puff), *Acacia* and *Albizia*. Gum arabic (from *Acacia senegal*) is used to thicken many convenience foods, pharmaceuticals and cosmetics, and may be a component of watercolour paints and printing inks. The pods of mesquite trees (*Prosopis*) are an important stock feed in arid areas. Most members have root nodules containing nitrogen-fixing bacteria, playing a significant role in the nitrogen enrichment of soils. Several species of *Acacia* from Australia (so-called wattles) have become serious invader weeds in southern Africa. The latter are nearly all spineless. (Groups 10, 11, 41, 42, 43)

Monimiaceae LEMONWOOD FAMILY | A medium-sized family of shrubs and trees, mainly from tropical areas in the southern hemisphere. The leaves are opposite, without stipules, leathery, with toothed margins, and they usually contain aromatic oils. *Xymalos monospora*, a distinct forest species, is the only representative in southern Africa. The latter was previously included in Trimeniaceae (not found in Africa), a family that it resembles in having a superior, single-carpelled ovary. ◆ The family is valued locally for timber, aromatic oils and medicine. (Group 19)

Moraceae FIG FAMILY | This family is well represented in warmer, frost-free parts of the region, particularly so by the genus *Ficus*, which has more than 37 tree species. The family is easily recognized by the combination of alternate leaves, milky latex and a distinctive conical stipule that covers the apical bud. The stipule is deciduous and leaves an obvious circular or semicircular scar on falling. Flowers of all Moraceae

Moraceae *Ficus cordata*

are tiny, inconspicuous, and clustered into often complicated inflorescences – for example a 'fig' – which is a hollow, vase-like receptacle containing numerous tiny flowers. ◆ Edible fruit include breadfruit and jackfruit (*Artocarpus*), figs (*Ficus*) and mulberries (*Morus*). Timber is obtained from *Chlorophora* (iroko-wood or fustic). Several species of *Ficus* are grown for ornamental purposes. The rubber plant (*F. elastica*) and weeping fig (*F. benjamina*) are common indoor and outdoor container plants in southern Africa. (Group 4)

Moringaceae HORSERADISH TREE FAMILY | A small family of about 13 pale-barked, deciduous trees, only one (*Moringa ovalifolia*) of which is native to the region. All have graceful leaves, which are 2 or 3 times pinnate. Fruit is a long, pod-like capsule. ◆ Ben oil, used in salads and soap, comes from *Moringa oleifera* seeds; it is also cultivated locally as a major leaf vegetable crop. (Group 43)

Musaceae BANANA FAMILY | Tropical monocots with an unmistakable habit. *Ensete ventricosum* is the only native representative in southern Africa. All species have large, oblong or oblong-elliptic leaf blades, borne spirally at the end of a pseudostem formed by the tightly overlapping leaf sheaths. The leaves resemble those in tree forms of Strelitziaceae, but the latter has true stems, and leaves arranged in a single plane. ◆ The banana (bred in Southeast Asia from *Musa acuminata* and *M. balbisiana*) and the plantain (*M. ×paradisiaca*) are major food crops. (Group 2)

Myricaceae WAXBERRY FAMILY | A woody family with about five species that reach tree size in our region. The leaves are alternate, simple and leathery, with more or less toothed margins. They are very distinctly dotted with minute, golden yellow glandular hairs (particularly below) and are aromatic when crushed. The flowers are inconspicuous, naked (without perianth) and borne in dense axillary spikes. ◆ In former times the fruit of some species were boiled to produce wax. (Group 9)

Myrsinaceae CAPE-MYRTLE FAMILY | A rather indistinct evergreen woody family, poorly represented in the region. Leaves have secretory cavities and/or ducts (appearing as dots or streaks) containing an often brownish, yellowish or blackish contents. It is nevertheless much easier to familiarize oneself with the diagnostic features of the seven or so native tree species than to try and recognize the family. ◆ Members of *Ardisia* are grown in gardens for their bright red fruit. Otherwise the family is of little economic importance. (Groups 9, 10)

Myrtaceae MYRTLE FAMILY | A predominantly woody family, mostly tropical and subtropical, which is represented by some 25 native tree species. Easily recognized in the region by the combination of opposite, simple, entire leaves with secretory cavities. The flowers tend to have many showy stamens and the ovary is invariably inferior, resulting in fruit tipped by the remains of the calyx. The introduced eucalypts (*Eucalyptus*) are unusual in having mature leaves that are apparently alternate. ◆ The eucalypts (which are predominantly Australian) yield valuable timber, and several species are grown in commercial plantations. Important spices produced by the family include allspice or pimento (*Pimenta dioica*) and cloves (the dry flower buds of *Syzygium aromaticum*; what appears to be a stalk is the inferior ovary). The guava (*Psidium guajava*) is probably the most popular edible fruit. Garden ornamentals include the bottlebrushes (*Callistemon* and *Melaleuca*) and tea bushes (*Leptospermum*). (Groups 10, 22)

Ochnaceae WILD-PLANE FAMILY | A family with about 24 tree species in the region, nearly all of them members of the genus *Ochna*. These are characterized by alternate, simple leaves, with more or less finely toothed margins, and many closely spaced, parallel lateral veins. All species have narrow stipules, often borne somewhat in the leaf axil. The axillary and apical buds tend to be elongated and covered by overlapping, brownish, scale-leaves. The flowers are usually yellow (rarely white to cream or pink), with free, somewhat stalked petals and many free stamens. ◆ The family includes few plants of economic value. (Groups 9, 10)

Olacaceae SOURPLUM FAMILY | A family of woody, often hemiparasitic plants with just seven or so native species. A rather indistinct family in flower or in sterile condition, but the species are easy to recognize. *Ximenia* has branch spines (thorns). ◆ The family is of no major economic value, though some species produce useful timber and edible fruit. (Groups 8, 10)

Oleaceae OLIVE FAMILY | A mainly woody family with about 15 tree species in southern Africa. Rather indistinct vegetatively, with both simple and pinnately compound leaves. These are always opposite, entire-margined and lack stipules. Branchlets almost always have at least a few small, whitish, raised lenticels. The flowers are regular, with 4, 5 or more united petals and 2 stamens arising from the petals. ◆ The family contains several genera of economic or horticultural importance, among them *Olea* (olive), *Fraxinus* (ash), *Jasminum* (jasmine), *Ligustrum* (privet, liguster) and *Syringa* (lilac). The best baseball bats are made from the wood of the ash. (Groups 23, 32)

Oliniaceae HARDPEAR FAMILY | A small family of about ten species of trees and shrubs endemic to southern and eastern Africa. *Olinia* is the only genus. Rather indistinct with opposite, simple, entire leaves, without stipules. The twigs tend to be 4-angled. Crushed leaves often smell of almonds. The flowers have an inferior ovary (fruit tipped by a circular scar). ◆ The family is of no significant economic value. (Group 23)

Pedaliaceae SESAME FAMILY | A small Old World family of mainly annual or perennial herbs, often with mucilage-producing hairs. The four native tree species (*Sesamothamnus*) are spiny (persistent petioles) and easy to identify. The irregular, tubular flowers have 5 united petals and are reminiscent of Scrophulariaceae. The dry fruits are very diverse, often winged, or armed with hooks or spines. ◆ Sesame seed and oil are obtained from *Sesamum indicum*. Tubers of the devil's claw (*Harpagophytum procumbens*) are a widely used herbal remedy. (Group 8)

Pentapetaceae WILDPEAR FAMILY | A family of Old World shrubs and trees centred in Africa, Madagascar and nearby islands. Only the genus *Dombeya*, with about eight species, is represented in the region. The plants resemble Malvaceae (narrowly defined) in having fibrous bark, simple, alternate leaves with three or more prominent veins from the base and star-shaped hairs. The flowers are quite showy, pink or white, regular, with 5 free petals and 10 or more fertile stamens plus 5 sterile ones (staminodia). Formerly classified under a broadly defined Sterculiaceae. ◆ A few species of *Dombeya* are grown in gardens for their showy flowers. (Group 11)

Phyllanthaceae POTATOBUSH FAMILY | A large and diverse family of about 60 genera and 2 000 species. These were formerly usually included in a broadly defined Euphorbiaceae. The family has about 45 native tree species in the region, but is a rather difficult family to recognize. Members differ from Euphorbiaceae (narrowly defined) in rarely being succulent and in never having latex or foliar glands. The relatively small flowers may have 3-lobed ovaries (2- to 5-chambered) as in Euphorbiaceae, but a key character is that they have 2 (instead of 1 as in Euphorbiaceae) ovules per chamber, though only 1 may develop into a seed. ◆ Considering the diversity of the family, it is of surprisingly little economic significance, although many species are of local importance for their edible fruit (*Antidesma*, *Phyllanthus*, *Uapaca*), timber and medicinal properties. (Group 10)

Picrodendraceae LEBOMBO-IRONWOOD FAMILY | A small, pantropical, woody family related to Euphorbiaceae, the family in which it was formerly included, but with ovaries resembling Phyllanthaceae in having 2 ovules (instead of 1) per chamber. The flowers are small, unisexual (local members with sexes on different plants) and without petals. The two species native to the region, *Androstachys johnsonii* and *Hyaenanche globosa*, are both very distinct and much easier to identify than the family; both are wind-pollinated and especially the former grows in dense, almost monospecific stands. ◆ The wood of *Androstachys johnsonii* (Lebombo-ironwood) is very heavy and hard and trunks are widely used for construction and fences in rural areas where the trees grow. Otherwise the family is of little economic importance. (Groups 13, 25)

Pinaceae PINE FAMILY | The largest family of conifers, and one that is essentially confined to the northern hemisphere. There are invasive aliens but no native species in southern Africa. Readily distinguished by the needle-shaped leaves borne in small clusters. Female cones are woody and conspicuous. ◆ This is the most economically important gymnosperm family, providing the bulk of the world's requirements in soft-wood timber and wood pulp. It also yields various oils and turpentine. Species of *Pinus* are extensively grown in commercial plantations in the high-rainfall areas of southern Africa. (Group 3)

Pittosporaceae CHEESEWOOD FAMILY | A medium-sized family of evergreen trees and shrubs, with its greatest diversity in Australia and Southeast Asia. Poorly represented in southern Africa, by a single indigenous species (*Pittosporum viridiflorum*). Crushed leaves have a resinous smell, but otherwise a rather indistinct

family. ◆ *Hymenosporum flavum* (sweet cheesewood) and several species of *Pittosporum* (cheesewood) are cultivated as garden ornamentals. (Group 10)

Podocarpaceae YELLOWWOOD FAMILY | A widespread family of gymnosperms, with four species of *Podocarpus* in the region. The genus is readily distinguished by the alternate, narrow, stiff and leathery, simple leaves, with a strong midvein and indistinct lateral veins. ◆ Several species yield valuable timber; yellowwood was much used in house construction, in the building of wagons and for furniture in the early years of white settlement at the Cape. (Group 10)

Polygalaceae MILKWORT FAMILY | Vegetatively an indistinct family, with about five tree species in the region. The flowers, however, are very characteristic, pea-like, and superficially resemble those of Fabaceae. They are irregular, with 5 sepals, of which the inner two are wing-like and look like petals. The petals are reduced (well developed in Fabaceae), often with a brush-like appendage. The ovary is 2-chambered, unlike that of the 1-chambered Fabaceae. ◆ The family is of little economic importance. (Group 10)

Portulacaceae PURSLANE FAMILY | A family of mainly succulent-leaved herbs, often with hairy leaf axils. About seven tree species representing two genera occur in our region. The opposite and simple succulent leaves of *Portulacaria* are very similar to those of Crassulaceae. Some species of *Ceraria* are very distinctive by virtue of their narrow, cylindrical leaves, which are arranged in clusters. *Ceraria* and *Portulacaria* are sometimes included in Didiereaceae, a family otherwise restricted to Madagascar. ◆ Members of *Portulaca* are valued as ornamentals for their showy flowers. Purslane (*P. oleracea*) is a common weed, widely used as a pot herb. (Groups 1, 3)

Proteaceae PROTEA FAMILY | An ancient, woody, southern hemisphere (Gondwana) family, in our region best represented in the Western Cape. More than 75 species may be considered trees (most rather small), making it the seventh largest tree family in the region. The leaves are simple, alternate, entire, leathery and without stipules (*Brabejum stellatifolium*, with leaves whorled and toothed, is a notable exception). The flowers, which are usually congested in showy heads or spikes, are very characteristic. Each has 4 petal-like sepals with reflexed tips, and 4 stamens that are opposite and fused to the sepals, often with only the anthers free or with very short filaments. The ovary is superior, with a long style. ◆ Plants are mainly cultivated for ornament and cut flowers (e.g. *Banksia*, *Grevillea* and *Protea*). The wood is very distinctive: it has broad rays, and makes beautiful furniture (*Grevillea*, *Faurea*). The macadamia nut (*Macadamia integrifolia*) is the only significant commercially grown food crop. (Groups 3, 10, 25)

Ptaeroxylaceae SNEEZEWOOD FAMILY | A small African family, apparently related to Rutaceae. The single native species (*Ptaeroxylon obliquum*) is rather variable in growth form, but easily recognized by its opposite, imparipinnate leaves. The family is alternatively classified under Rutaceae. ◆ Excellent timber is obtained from *Ptaeroxylon obliquum* (sneezewood); this was formerly extensively used for railway sleepers and for furniture. Otherwise the family is of no significant economic importance. (Group 32)

Putranjivaceae IRONPLUM FAMILY | A small family of tropical woody plants formerly included in Euphorbiaceae. Five species are native to the region. A rather indistinct family, but chemically resembling Capparaceae in containing mustard oils (glucosinolates). This similarity is believed to have evolved independently in the two families and not as a result of the sharing of a recent common ancestor; in other words, it is due to convergent evolution. The leaves are simple, alternate and arranged in 2 rows (distichous) and the fruit is a drupe, unlike the capsules so common in Euphorbiaceae and Phyllanthaceae. ◆ The family is of no significant economic importance. (Group 9)

Rhamnaceae BUFFALO-THORN FAMILY | A woody family with about 22 native tree species. Members are often thorny with simple, glossy leaves. The venation tends to be diagnostic – particularly the tertiary one, which forms a very fine and regular reticulum of minute squares or rectangles. In this respect the family resembles the Lauraceae. The flowers are usually inconspicuous, with a prominent disc, and 5 reduced petals very characteristically borne opposite to, and often embracing, the 5 stamens. Flowers of Celastraceae also have a well-developed disc, but the petals alternate with the stamens. ◆ The family includes few plants of economic value. *Ceanothus* contains many attractive flowering shrubs, which are widely cultivated. Many species are used locally in traditional medicine. (Groups 3, 9, 11, 23)

Rhizophoraceae MANGROVE FAMILY | A predominantly woody tropical family, most notable for the many species known as mangroves. About ten species are native to the region. The leaves are opposite and simple, usually hairless, with interpetiolar stipules, and thus resemble some Rubiaceae. The stipules fall early, leaving a line between the petioles. In *Cassipourea*,

the only inland genus in the region, the leaves are usually more or less toothed and the ovary is superior, so differing from Rubiaceae (which has entire margins and inferior ovaries). ◆ Apart from many local uses (for food, and in traditional medicine), the family is of little economic importance. (Groups 17, 18, 25)

Rosaceae ROSE FAMILY | A family that is at its most abundant in temperate regions of the northern hemisphere; poorly represented in southern Africa, with about 18 native tree species (mostly small in stature) and a number of naturalized aliens. The leaves are alternate, simple or compound, usually with toothed margins (needle-shaped in some species of *Cliffortia*). Stipules are present and often conspicuous. The flowers are showy (unisexual and very inconspicuous in *Cliffortia*), regular, with 5 free, short-stalked petals, numerous free stamens and an often inferior ovary (superior in *Prunus*). ◆ Economically an extremely important family, yielding many fruit crops. Among these are *Prunus* (almond, apricot, cherry, nectarine, peach, plum, prune), *Pyrus* (pear), *Fragaria* (strawberry), *Eriobotrya* (loquat), *Malus* (apple), *Cydonia* (quince), and *Rubus* (blackberry, raspberry). The family also produces many garden ornamentals, most notably the rose (*Rosa*) itself. Rose oil is one of the world's most valuable oils, used as the base for most perfumes; the principal centre of production is Bulgaria. (Groups 7, 9, 36)

Rubiaceae GARDENIA FAMILY | This is the largest family of trees in southern Africa, comprising about 200 native species, and extremely easy to recognize by its opposite leaves and interpetiolar stipules. The leaves are always entire and often have domatia in the axils of the side veins. Interpetiolar stipules occur between the opposite petiole bases, and often fall off at an early stage, leaving a distinct line or scar connecting the opposite petioles. The ovary is inferior, which means the fruit is either crowned by the persistent remains of the calyx, or by a circular scar. Inconspicuous interpetiolar stipules or lines are also found in Acanthaceae, Rhizophoraceae and Buddlejaceae, but these families usually have toothed leaf margins. Many species of *Combretum* (Combretaceae) also have opposite, simple leaves with entire margins, but they lack stipules. ◆ The family is rich in alkaloids and is widely used medicinally. Coffee (mainly from *Coffea arabica* and *C. canephora*), quinine (*Cinchona*) and ipecacuanha (*Psychotria*) are the best-known products. Coffee is said to be one of the highest revenue earners among the world's natural products. Ornamental plants include species of *Gardenia*, *Hamelia*, *Ixora*, *Pentas*, *Rondeletia* and *Serissa*. (Groups 14, 15, 16, 17, 25)

Rutaceae CITRUS FAMILY | About 35 tree species are native to the region. An easy family to recognize vegetatively: trees with palmate, 3-foliolate or pinnate leaves with secretory cavities in the lamina are invariably members of Rutaceae. Crushed leaves, typically, have a pungent, often citrus-like odour. All local members have alternate leaves except *Calodendrum capense*, which is unusual in that it has both opposite and simple leaves, and thus resembles species in the family Myrtaceae. Flowers of Rutaceae usually have 10 or fewer stamens and a superior ovary, whereas those of Myrtaceae have numerous stamens and an inferior ovary. ◆ The family is of great economic importance, yielding various commercial citrus fruits including lemons, oranges, tangerines, mandarins, limes and grapefruit (all species of *Citrus*). Rue (*Ruta graveolens*) is widely grown in herb gardens as a medicinal plant. Numerous species are cultivated for their essential oils (among them bergamot oil) used in perfumes. Some forest species yield attractive, often yellowish, wood that is used for furniture. (Groups 22, 30, 32, 36)

Salicaceae narrowly defined WILLOW FAMILY
A mainly temperate northern hemisphere family of deciduous trees and shrubs. Poorly represented in southern Africa, with four or so native taxa, all confined to the banks of streams or rivers. The leaves are alternate, narrow, toothed and stipulate. Flowers, which lack sepals and petals, are inconspicuous, clustered into erect or pendulous spikes. ◆ Willows (*Salix*) and poplars (*Populus*) provide timber and are also grown for ornament, shade and shelter. Willow wood (*Salix alba* 'Caerulea') is used in the making of cricket bats; poplar wood is used for matches. (Groups 7, 9)

Salvadoraceae MUSTARDTREE FAMILY | A small family of trees and shrubs with four unspectacular native species. An indistinct family with opposite, simple, entire leaves. Best recognized at species level. ◆ The family is of no major economic importance. Leaves and fruit of *Salvadora persica* are claimed by some to be the source of the 'mustard' of biblical times. Present-day mustard is made from the powdered seeds of species of *Brassica* (family Brassicaceae/Cruciferae). (Group 23)

Santalaceae SANDALWOOD FAMILY | A large family of herbs, shrubs and trees, most of which are hemiparasites on the roots of other plants. The two native tree species have bluish green, simple, entire leaves with obscure secondary and tertiary veins. The flowers are inconspicuous with inferior ovaries. The family is closely related to some of the mistletoes (Loranthaceae). ◆ The sandalwood tree (*Santalum album*) is probably the best-known member of the family. It yields sandal oil and a fragrant timber. (Groups 10, 23)

Sapindaceae LITCHI FAMILY | About 30 members of this predominantly woody family occur in the region. The leaves are always alternate and lack stipules. They are usually 3-foliolate, paripinnate or imparipinnate, rarely simple (*Dodonaea* and *Pappea*) or 2-foliolate (*Lepisanthes*). *Allophylus*, with 3-foliolate leaves, resembles species of *Searsia*, but lacks the resinous smell of the latter when crushed. Pinnate leaves often have the rachis ending in a very diagnostic aborted rachis apex (resembling an inactive terminal growth tip). Flowers in local species are small and inconspicuous, and the seeds are often surrounded by a fleshy aril. ◆ The fleshy arils of many species are edible (the best-known example being the litchi, *Litchi chinensis*). *Koelreuteria paniculata* (golden-rain tree) is a popular garden ornamental. (Groups 9, 10, 31, 34, 38)

Sapotaceae MILKWOOD FAMILY | A predominantly woody plant family with about 24 native species, and easily recognized by the combination of milky latex, and simple, entire, alternate leaves, which lack large stipules or conspicuous stipular scars (as in Moraceae). Young growth often has a rusty or brownish colour. All local members have fleshy fruit, and the seeds are shiny and brown, with a broad scar at the point of attachment. ◆ The latex of some species was once a source of various rubber-like substances – used, for example, in golf balls (gutta-percha) and as the elastic component of chewing gum. The coating of top quality golf balls is currently made from balata rubber, prepared from the latex of trees belonging to the genus *Manilkara*. (Group 5)

Scrophulariaceae broadly defined SNAPDRAGON FAMILY | A predominantly herbaceous family, with 14 or so native tree species. Easily recognized from a combination of vegetative and floral features. Leaves opposite or whorled, simple, without stipules. Stems 4-angled. Flowers irregular, 2-lipped, with 5 united petals, 4 stamens (2 longer than the others) attached to the petals. The fruits are many-seeded. ◆ The family produces many garden ornamentals, among them snapdragons (*Antirrhinum*), beard tongues (*Penstemon*) and slipper flowers (*Calceolaria*). The drugs digitalin and digoxin are obtained from *Digitalis*. The family is rich in hemiparasitic plants, including a few troublesome weeds (*Striga*, *Alectra*), but these members are often classified in a separate family, Orobanchaceae. (Groups 19, 23, 25)

Solanaceae POTATO FAMILY | A vegetatively diverse family, poorly represented among native trees (about 18 species). The leaves are simple, alternate, without stipules, often with an unpleasant scent when crushed. They are often spiny in members of *Solanum*. The flowers are regular, with 5 united petals and 5 stamens (often coherent, but not fused in *Solanum*). The fruit is either a many-seeded berry or a capsule. ◆ Food plants include potato (*Solanum tuberosum*), egg fruit (*S. melongena*), tomato (*Lycopersicon esculentum*) and peppers (*Capsicum*). The family is rich in poisonous alkaloids, producing, among others, the nicotine in tobacco (*Nicotiana tabacum*). Many species are used in traditional medicine. *Datura ferox* and *D. stramonium* (thorn-apples) are troublesome weeds. (Groups 7, 8, 10)

Sparrmanniaceae RAISINBUSH FAMILY | A family of mainly tropical trees, shrubs and herbs. Best represented among native trees by the genus *Grewia*, which has more than 30 tree species in the region. The leaves are alternate, in two ranks, usually asymmetrical with toothed margins, 3-veined from the base, with star-shaped hairs and stipules. The flowers are attractive, axillary or leaf-opposed, with many free stamens. Formerly classified under Tiliaceae; alternatively placed in a broadly defined Malvaceae. ◆ Jute is obtained from the bark fibres of *Corchorus* spp. Otherwise the family is of little economic importance, being used mainly for cultural purposes at the local level. (Group 11)

Sterculiaceae COCOA FAMILY | A family with about 10 native tree species. Related to the Malvaceae, Helicteraceae, Pentapetaceae and Sparrmanniaceae, from which it is best distinguished by floral technicalities. Features shared by these families are alternate, simple leaves – which are often lobed and 3- or more-veined from the base – stipules and star-shaped hairs. Sterculiaceae flowers are usually unisexual and the male ones tend to have many (10 or more) stamens often borne on a short stalk (androphore), the anthers having 2 locules (2-thecate); in the closely related Malvaceae the anthers usually have 1 locule (1-thecate). The fruits are usually large and dehiscent, often divided into segments and containing hairs that may cause severe irritation on contact with the skin. Alternatively classified under Malvaceae (broadly defined). ◆ Best-known economic products are cacao (used in the manufacture of chocolate, cocoa powder and cocoa butter), extracted from the seeds (cacao beans) of *Theobroma cacao*, and cola (used in popular beverages) from seeds of *Cola nitida* and *C. acuminata*. Species of *Brachychiton* (flame trees, kurrajong) are widely cultivated for ornament. (Groups 10, 11, 39)

Strelitziaceae STRELITZIA FAMILY | A small family of banana-like plants. The three native tree species are easily recognized by their crowns of alternate, large, simple and distinctly stalked leaves arranged in a fan (2-ranked). The

flowers are borne in large, boat-shaped bracts. ◆ Several species are grown as ornamentals, notably *Strelitzia reginae* (crane-flower or bird of paradise flower) and lobster's claw (*Heliconia*). (Group 2)

Strychnaceae MONKEY-ORANGE FAMILY | A small woody family with about 18 tree or liana species native to southern Africa, all belonging to the genus *Strychnos*. The leaves are unmistakable in being opposite, simple and 3-veined from the base. The lianes often climb by means of curled tendrils. All species have flowers with 4- or 5-lobed tubular corollas, and 4 or 5 stamens that are attached to the petals. Alternatively placed in Loganiaceae. ◆ Many species are rich in alkaloids and extremely poisonous (*Strychnos* species yield strychnine and curare). The toxins seem to be mainly located in the seed. The fruit pulp of a few species of *Strychnos* are consumed by humans in rural parts of the region with those of *S. cocculoides* (corky monkey-orange) being particularly popular. (Group 12)

Tamaricaceae TAMARISK FAMILY | A small family of trees and shrubs, characterized by slender branches with alternate, small, scale-like leaves. Many species can tolerate saline soils (halophytes). The flowers are minute, and either pink or white. Only one species occurs naturally in southern Africa. ◆ Several species of *Tamarix* (tamarisk) are grown for ornament. Manna is an edible, white, sweet, gummy substance secreted by a scale insect, *Trabutina mannifera*, associated with tamarisk in the Middle East; it accumulates when attending ants are absent. (Group 3)

Thymelaeaceae FIBREBARK FAMILY | Well represented in the region by small, more or less woody shrublets. Only about 13 species, however, reach tree size. Members usually have a tough, fibrous bark, making it very difficult to break off twigs (if a leaf is picked, a long strip of bark comes off with it). The leaves are alternate, simple, entire and without stipules. The flowers are tubular (sepals appearing petaloid), except in the wind-pollinated genus *Passerina*, where they are much reduced. ◆ Economically not an important family. It produces a few lesser-known garden ornamentals. (Groups 3, 10, 23)

Urticaceae narrowly defined NETTLE FAMILY | A family of herbs and woody plants, represented by four native tree species. Plants have watery latex and tough, fibrous bark. The leaves are alternate, simple, 3-veined, often armed with coarse, stinging hairs, and stipulate. Flowers are small, greenish and inconspicuous. ◆ Ramie fibre, which is used in the textile industry, is obtained from the bark of *Boehmeria nivea*. *Urtica dioica* and *U. urens* (stinging nettle) are widespread weeds. (Groups 5, 8, 11)

Verbenaceae narrowly defined VERBENA FAMILY Vegetatively a rather indistinct family, with a single native tree species in the region. Most native species formerly placed in this family have been transferred to Lamiaceae. The leaves are opposite and simple. Crushed leaves are usually strongly aromatic and the twigs tend to be 4-angled. The flowers have 5 united petals and are more or less irregular (2-lipped), with 4 stamens arising from the corolla. ◆ A number of species are cultivated for ornament, including the lemon verbena (*Aloysia citrodora*), purple wreath (*Petrea volubilis*) and various species of *Verbena*. *Lantana camara* is a serious alien invader weed in southern Africa. (Group 19)

Violaceae VIOLET FAMILY | Vegetatively an indistinct family; poorly represented in the region by about eight species of forest trees. The leaves are alternate, simple, stipulate and usually toothed. The ovary (fruit) is 1-chambered, with numerous ovules (future seeds) attached to the walls. ◆ Many species of *Viola* (pansies, violets) are grown as garden ornamentals, and for essential oils used in perfumes and toiletries. (Group 9)

Vitaceae GRAPE FAMILY | A distinct family of climbing shrubs or woody vines, with tendrils opposite the leaves and more or less swollen nodes (about 14 native tree species). The leaves are alternate, simple (usually palmately veined) or palmately compound. Inflorescences are borne opposite the leaves. Flowers are small, greenish, inconspicuous, with a ring-like or lobed disc. The stamens are equal in number to the petals and opposite to them (as in Rhamnaceae). ◆ Grapes, wine, raisins, sultanas and currants (from *Vitis vinifera*) are the main economic products. Species of *Parthenocissus* (e.g. Virginia creeper) are widely cultivated to cover fences, pergolas and the walls of buildings. (Groups 1, 11, 29)

Zamiaceae CYCAD FAMILY | Members of this family are living descendants of an ancient group of cone-bearing plants (gymnosperms) that dominated the earth's vegetation about 145 million years ago. Tree forms (at least 22 species in the region) are palm-like, with thickset stems densely covered with persistent leaf bases, and a crown of thick, leathery, pinnately compound leaves. Most species have a very local distribution and are rarely encountered in the wild. The large cones (male and female on separate plants) are very distinctive. ◆ Because of their rarity, many species have acquired considerable monetary value. Illegal removal of plants from the wild has brought certain species to the brink of extinction. (Group 2)

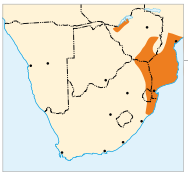
GROUP 1

Succulent group

Plants with leaves and/or stems succulent.

See also Group 3: *Ceraria namaquensis* (p. 72); Group 8: *Lycium horridum* (p. 150), *Sesamothamnus guerichii* (p. 148) and *S. lugardii* (p. 148); Group 9: *Chrysanthemoides monilifera* (p. 152); Group 39: *Adansonia digitata* (p. 552); Group 43: *Moringa ovalifolia* (p. 614).

APOCYNACEAE (see page 19)



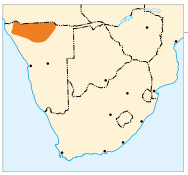
FSA647.3; Z858

1 *Adenium multiflorum* (= *A. obesum* var. *multiflorum*) | impala-lily (SA); Sabi-star (Z); impalalelie

WINTER | Thickset spineless succulent shrub or small tree, with **watery latex**; occurring in hot, low-altitude bushveld, often on brackish flats or in rocky places. Leaves crowded at ends of branches, obovate to oblong-obovate, rather fleshy, **glossy dark green** to bluish green above, hairless; margin entire, wavy. Flowers in clusters, **white or pale pink with a crimson border**, very showy, produced in winter when plants are leafless. Fruit paired cylindrical follicles, each up to 240 mm long, light brown when mature, dehiscent; seeds with a tuft of silky, golden brown hairs at each end.

The plant is browsed by stock and game. Has medicinal applications, although toxic and once used as arrow poison.

A. boehmianum **(1.1)**, found in northern Namibia and southern Angola (with outlier populations in northwestern Botswana), has showy pink to mauve flowers with a darker throat.



FSA648

2 *Pachypodium lealii* | bottletree; bottelboom

WINTER | Thickset spiny succulent shrub or small tree up to 6 m high, with watery latex; trunk often somewhat bottle-shaped with a few upright branches; occurring in semi-desert areas and arid bushveld, usually on rocky hillsides. Spines slender, up to 30 mm long. Leaves **crowded near ends of branchlets**, obovate-oblong, with short hairs on both surfaces; margin entire, **wavy**. Flowers in clusters when trees are leafless, **white**, **flushed with pink on the outside**, showy. Fruit paired cylindrical follicles, each up to 110 mm long, dehiscent; seeds with a tuft of silvery silky hairs at one end.

The latex is toxic, and was once used for arrow poison. **616**

P. namaquanum **(2.1)**, the well-known halfmens tree from the Richtersveld and adjacent areas, has an erect, spiny, succulent stem up to 5 m high, unbranched or with a few short branches near the top. The leaves are crowded at the apex of the stem, which is usually bent towards the north.

1 *A. multiflorum*: flowers

1 *A. multiflorum*: flowers

1.1 *A. boehmianum*: flowers

2 *P. lealii*: paired fruit

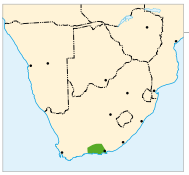
2 *P. lealii*: tree

2 *P. lealii*: flowers

2.1 *P. namaquanum*: tree

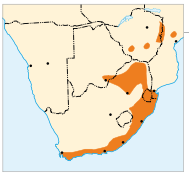
ASPHODELACEAE (see page 19)

There are approximately 150 species of *Aloe* in southern Africa, at least 30 of which may be considered trees or tree-like. Only a small sample number are featured here. West (1992), Van Wyk & Smith (2003) and Rothmann (2004) provide illustrations and descriptions of most Zimbabwean, South African and Namibian species respectively. For a comprehensive worldwide guide to all species, see Carter *et al.* (2011).


FSA28.2

1 *Aloe africana* | Uitenhage aloe; uitenhaagaalwyn

WINTER | **Single-stemmed**, unbranched leaf succulent; stem densely covered with old dry leaves; occurring in valley bushveld. Leaves dull green, spineless on both surfaces, or with a few spines on the midline near the apex; margin with sharp, reddish brown teeth. Inflorescence branched; flower spikes erect, 40–60 mm long; flowers reddish in bud, opening yellow-orange, with an **upturned** tube. Fruit a capsule.

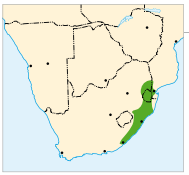

FSA28.1; Z17

2 *Aloe arborescens* | krantz aloe (SA); mountain bush aloe (Z); kransaalwyn

AUTUMN–WINTER | **Much-branched** shrub or small tree with somewhat obliquely disposed leaf rosettes; stem with old, dry leaves below the leaf rosette only; occurring in high-rainfall montane grassland and forest areas, usually in rocky places. Leaves curved, **dull greyish or bluish green**, spineless on both surfaces, margin with pale teeth. Flowers usually in unbranched, erect spikes, 200–300 mm long, 2–4 per rosette; flowers scarlet, orange, pink or yellow. Fruit a capsule.

A decorative garden plant. It is also grown as a live fence around cattle kraals. Pulp from the leaves is used medicinally.

A. mutabilis **(2.1)** is a smaller plant with distinctly bicoloured (buds red; open flowers yellow) inflorescences. It is confined to cliffs to the west of the Great Escarpment in Gauteng, North West, Limpopo and Mpumalanga.


FSA28

3 *Aloe barberae* (= *A. bainesii*) | tree aloe; boomaalwyn

WINTER | Small to medium-sized tree with a **thickset trunk** and **rounded crown**; occurring in wooded ravines and coastal bush. Leaves **deeply channelled**, recurved, dark green, spineless on both surfaces; margin edged with a whitish line and small, brown-tipped teeth. Inflorescence branched; flower spikes erect, **200–300 mm long**; flowers **straight**, **horizontally presented**, **rose-pink** with distinctly exserted stamens. Fruit a capsule.

A. tongaensis is a branched tree associated with coastal and sand forest in the northeastern corner of KwaZulu-Natal and adjacent southern Mozambique (Maputaland Centre of Endemism). It has compact (up to 50 mm long) flower spikes with pendent, distinctly curved, yellowish orange flowers. **616**

1 *A. africana*: tree

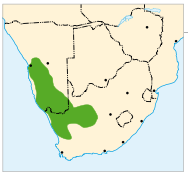
2 *A. arborescens*: flowers

1 *A. africana*: flowers

2.1 *A. mutabilis*: flowers

3 *A. barberae*: tree

3 *A. barberae*: flowers


FSA29

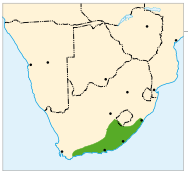
1 *Aloe dichotoma* | quivertree; kokerboom

WINTER | Small tree with a **thickset trunk** and **dense**, **rounded** crown; occurring in desert and semi-desert areas, usually on rocky ridges. Leaves blue-green or yellowish green, spineless on both surfaces; margin with small yellowish brown teeth that may be obscure in old leaves. Inflorescence branched, **borne terminally** above the leaf rosette; flower spikes about 300 mm long; flowers bright yellow. Fruit a capsule.

The soft branches were once used by the San as quivers for their arrows. A favourite nesting site for Sociable Weaver birds.

Closely related to, and often associated with, *A. ramosissima*, a smaller plant that is usually multi-stemmed.

A. pillansii **(1.1)** has a taller trunk with fewer, more erect branches and a sparse crown. The inflorescences are somewhat drooping and borne below the leaf rosette. It is a rare species confined to the Richtersveld and adjacent areas.

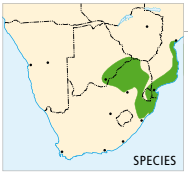

FSA29.2

2 *Aloe ferox* | bitter aloe; bitteraalwyn

WINTER–SPRING | Single-stemmed, unbranched leaf succulent; stem densely covered with old dry leaves; occurring in valley bushveld, karroid vegetation, coastal bush and grassland, usually on rocky hillsides. Leaves dull green, both surfaces with or without spines; margin with stout, brownish red teeth. Inflorescence branched; flower spikes **erect**; flowers golden orange to scarlet, occasionally white, with tips of inner perianth lobes usually **brown or black**. Fruit a capsule.

The yellow sap from the leaves is harvested commercially: it yields a drug known as 'Cape aloes', which is widely used in pharmaceutical preparations. The opaque, jelly-like pulp is an ingredient of health tonics, skin-care products and cosmetics. An excellent jam is prepared from it. Often planted as a live fence around cattle kraals. Ash from dried leaves is mixed with tobacco snuff.

A. candelabrum, found in KwaZulu-Natal, is very similar, but its leaves are slightly recurved and the tips of the inner perianth lobes tend to be white.



FSA29.5

3 *Aloe marlothii* subsp. *marlothii* | mountain aloe; bergaalwyn

AUTUMN–WINTER | Single-stemmed, unbranched leaf succulent; stem densely covered with old dry leaves, usually taller than 2 m; occurring in bushveld, usually on rocky hillsides. Leaves dull grey-green to green, both surfaces usually with **many sharp**, **hard spines**; margin with sharp, reddish brown teeth. Inflorescence branched; flower spikes carried **more or less horizontally**; flowers borne **vertically** on spike axis, purplish in bud, opening orange, with purple stamens. Fruit a capsule. Subsp. *orientalis* (Swaziland, Maputaland and southern Mozambique) tends to grow in clumps with stems shorter than 2 m and leaves with few surface spines.

Ash from the dried leaves is mixed with tobacco snuff. The leaves and sap are used medicinally.

1 *A. dichotoma*: tree

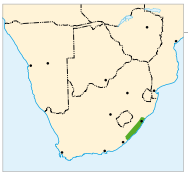
1.1 *A. pillansii*: tree

1 *A. dichotoma*: flowers

2 *A. ferox*: trees

2 *A. ferox*: tree

3 *A. marlothii*: tree

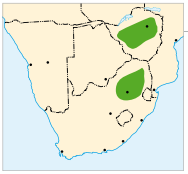

FSA30.7

1 *Aloe thraskii* | beach aloe; strandaalwyn

WINTER | Single-stemmed, unbranched leaf succulent; stem densely covered with old dry leaves; occurring **on coastal dunes seldom more than a few hundred metres from the sea**, often directly exposed to the salt-laden spray. Leaves **deeply channelled**, **recurved**, bright green to yellowish grey-green, spineless above, with a few spines on the midline towards the apex below; margin with small reddish teeth. Inflorescence branched; flower spikes erect, about 250 mm long; flowers greenish yellow in bud, opening deep yellow, with bright orange stamens. Fruit a capsule.

A most decorative garden plant, best grown within sight of the sea.

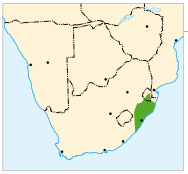
ASTERACEAE (see page 19)


FSA738; Z1071

2 *Lopholaena coriifolia* | small-leaved fluffbush; kleinblaarpluisbos

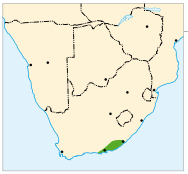
WINTER–SPRING | Soft-wooded shrub or rarely a small tree; occurring in rocky grassland and open areas in bushveld, often near the summit of rocky ridges. Leaves alternate, **sessile**, **30–50 × 15–25 mm**, stiff and fleshy, more or less strap-shaped, waxy grey, **stem-clasping** at the base and with a rounded tip. Flowerheads in loose terminal clusters, white, often tinged with pink. Fruit a small nutlet, tipped with a tuft of silky hairs.

Although naturally growing in large numbers together, plants tend to proliferate even more in veld that has been overgrazed over a period of time.


FSA738.1

3 *Lopholaena platyphylla* | broad-leaved fluffbush; breëblaarpluisbos

WINTER | **Soft-wooded** shrub or small tree with a sparse and rather untidy crown; occurring on grassy hillsides in bushveld. Branchlets rough with persistent leaf bases. Leaves alternate, **sessile**, clustered towards ends of shoots, soft and fleshy, broadly elliptic to obovate, **60–180 × 30–120 mm**, light green to grey-green, hairless; margin entire. Flowerheads in axillary clusters, whitish to pale orange. Fruit a small nutlet, tipped with a tuft of silky hairs.


FSA741

4 *Othonna triplinervia* | thicket baboon-cabbage; ruigtebobbejaankool

WINTER–SPRING | Soft-wooded shrub, or **sparsely branched** small tree; occurring in thicket, usually in rocky places and on the south-facing aspect of hills. Stems with bark **thin**, **papery**, **brown**. Leaves **crowded at branch tips**, alternate, obovate, semi-fleshy, blue-green. Flowerheads borne in clusters on **long stalks** at the end of branches, daisy-like, yellow, about 30 mm in diameter. Fruit tipped with a tuft of silky hairs.

O. arbuscula, from arid rocky slopes in Namaqualand, is a smaller plant (rarely exceeding 1 m). The yellow flowerheads are borne singly on long stalks and consist of disc flowers only.

1 *A. thraskii*: flowers

1 *A. thraskii*: tree

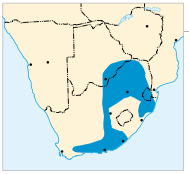
2 *L. coriifolia*: fruit

2 *L. coriifolia*: flowers

3 *L. platyphylla*: flowerhead

4 *O. triplinervia*: flowers

CACTACEAE (see page 21)

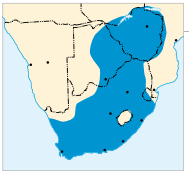

FSAX757

1 • *Cereus jamacaru* | queen of the night; nagblom

SUMMER | Small tree with **upright succulent stems** and a short, woody trunk; invading bushveld, particularly on rocky ridges. Branches blue-green to green, 4–9-angled, constricted at intervals; margin with **straight spines, arranged in tufts of 5–10**. Flowers **up to 250 mm long**, white, showy, opening at night. Fruit a berry, usually pink or red, oval, about 60 mm long, with white flesh and numerous black seeds.

A native of South America; cultivated for ornament and hedging. A declared weed (category 1) in South Africa. Previously incorrectly referred to as *C. peruvianus*.

Resembles the indigenous *Euphorbia ingens* (p. 46), which is distinguished by milky latex exuding from cut stems, and by spines arranged in pairs.


FSAX759

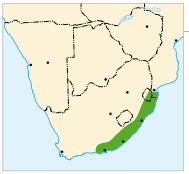
2 • *Opuntia ficus-indica* | sweet prickly pear; boereturksvy

SPRING | Branched, succulent shrub or small tree, with some of the **branches flattened to form leaf-like structures (cladodes)**; invading arid bushveld, thicket and karroid vegetation. Cladodes greyish green, 300–600 × 60–150 mm, with tufts of sturdy spines or almost spineless. Flowers borne on cladode margins, yellow or orange. Fruit a berry, oval, about 80 mm long, ripening through yellow to reddish, with tufts of minute spines that irritate skin on contact.

A native of Central America; cultivated for its edible fruit, as animal fodder and as security hedging. This is a declared weed (category 1) in South Africa, but all spineless cultivars and selections are excluded.

O. lindheimeri is low-growing (rarely more than 1.5 m high) with smaller (± 200 × 160 mm), flattened and rounded cladodes whose spines are up to 50 mm long, usually single, rarely up to 3 per tuft. An invader of thicket in the Eastern Cape. *O. imbricata* is a shrub up to 3 m tall with the branches cylindrical and rope-like in appearance, and purple-red flowers.

CRASSULACEAE (see page 23)


FSA137.3

3 *Crassula ovata* (= *C. portulacea*) | kerkybush; kerkeibos

WINTER | Shrub or small sturdy tree up to 5 m high; occurring on rocky outcrops in thicket, dry river valleys and sand forest. Leaves sessile, succulent, **elliptic to elliptic-oblanceolate**, about **20–40 × 10–22 mm**, glossy green, **usually without a white, powdery coating**; apex rounded with a distinct point; margin entire, with or without red horny edge. Flowers in dense roundish terminal clusters, white to pink. Fruit 3–5 separate follicles, oval, up to 6 mm long, dehiscent.

Widely grown in gardens. The young leaves are eaten by stock and game. Roots once eaten by the Khoe; used medicinally.

C. arborescens has leaves that are round to broadly obovate, about 20–50 × 20–50 mm, grey-green with a distinct white, powdery coating. It flowers in late spring and summer.

1 *C. jamacaru*: tree

1 *C. jamacaru*: flower

1 *C. jamacaru*: fruit

2 *O. ficus-indica*: flowers

3 *C. ovata*: flowers

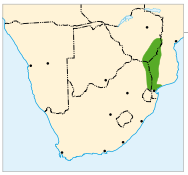
2 *O. ficus-indica*: tree

3 *C. ovata*: tree

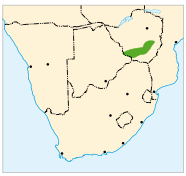
3 *C. ovata*: trunk

EUPHORBIACEAE (see page 24)

Members of the *Euphorbia* genus contain a milky latex that is poisonous and may cause damage to the eyes and intense irritation to the skin. These plants should therefore be handled with caution. Tree euphorbias are especially common in the valley bushveld of the Eastern Cape and are often difficult to identify as belonging to particular species without expert knowledge.



confinalis
FSA345; Z428



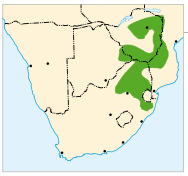
rhodesiaca
Z429

1 *Euphorbia confinalis*

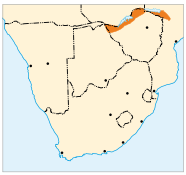
subsp. ***confinalis*** | **confinalis (Z); Lebombo euphorbia (SA); lebombo-naboom**
subsp. ***rhodesiaca*** | **confinalis (Z); confinalis-naboom**
WINTER | Spiny, succulent candelabra-like tree up to 10 m high, with a sturdy main stem and **small**, **rounded crown**, often with secondary stems along main trunk; occurring in bushveld, usually on rocky hill slopes and associated with the Lebombo Range. Branchlets 3- or 4-angled (subsp. *confinalis*), **40–70 mm in diameter**, constricted at intervals, forming segments with parallel sides; spines paired, slender, up to 6 mm long, borne on an **interrupted horny strip** along each ridge. Flowers in clusters, greenish yellow. Fruit a 3-lobed capsule, up to 10 mm in diameter, wine-red. **616** Subsp. *rhodesiaca* from Zimbabwe is more robust, with a branched stem and 5- or 6-angled branches.

E. zoutpansbergensis is a more graceful plant, with branches 6-angled and much more slender (20–35 mm in diameter), and is confined to the Soutpansberg Centre of Endemism.

E. sekukuniensis **(1.1)**, from the Steelpoort River Valley (Sekhukhuneland Centre of Endemism) and adjacent areas, has 4- or 5-angled, slightly constricted branches which are even more slender (15–20 mm in diameter), with a continuous horny strip along each margin. **616**



cooperi
FSA346; Z431



calidicola
Z430

2 *Euphorbia cooperi*

var. ***cooperi*** | **bushveld candelabra-tree; candelabra-tree; bosveldkandelaarnaboom**
var. ***calidicola*** | **northern candelabra-tree; kleinkandelaarnaboom**
SPRING | Spiny, succulent candelabra-like tree up to 7 m high, with a sturdy main stem and **large**, **rounded crown**; occurring in bushveld, usually on rocky hill slopes. Branchlets 4–6-angled, **up to 120 mm in diameter**, deeply constricted at intervals, forming **heart-shaped** segments 50–150 mm long; spines paired, slender, up to 8 mm long, borne on a **continuous horny strip** along each ridge. Flowers in clusters, greenish yellow. Fruit a 3-lobed capsule, up to 10 mm in diameter, dull red. Branchlets 4–6-angled with wing margins 5–6 mm wide in var. *cooperi* (widespread), 3- or 4-angled and 3 mm wide in var. *calidicola* (confined to Zambezi Valley).

The latex is highly toxic, and has an acrid smell; used as fish poison. **616**

E. otjingandu is a robust succulent tree only known from the Namibian part of the Kaokoveld Centre of Endemism. It has a short trunk, spiny, 4–8-winged, conspicuously segmented branches and a flat-topped candelabra-like habit.

1 *E. confinalis*: flowers

1 *E. confinalis*: fruit

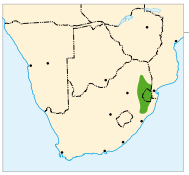
1.1 *E. sekukuniensis*: tree

1 *E. confinalis*: trees

2 *E. cooperi*: trees

2 *E. cooperi*: flowers

2 *E. cooperi*: fruit

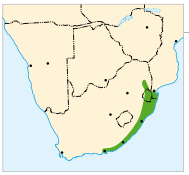

FSA348

1 *Euphorbia evansii* | lowveld euphorbia; laeveldnaboom

SPRING | Spiny, succulent tree **up to 10 m high**, with a sturdy main stem and **several trunk-like branches**, **each ending in a candelabra-like crown of slender**, **erect branches**; occurring in bushveld, usually on rocky hill slopes. Branchlets 3- or 4-angled, 15–20 mm in diameter, **not segmented**, twisted; spines paired, slender, up to 6 mm long, borne on an **interrupted** horny strip along each ridge. Flowers in clusters of 3, greenish yellow. Fruit a 3-lobed capsule, up to 6 mm in diameter, green, flushed with red.

The young shoots are eaten by livestock in times of drought.

Compare *E. grandidens* (below).

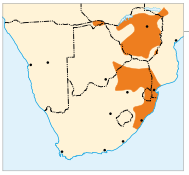

FSA350

2 *Euphorbia grandidens* | valleybush euphorbia; valleibosnaboom

SPRING | Spiny, succulent tree **up to 16 m high**, with a **sturdy main stem and often with several stem-like branches**, **each topped with a small candelabra-like crown**; occurring in dry bushveld and forest in hot valleys, usually in rocky places. Branchlets 2- or 3-angled, 10–20 mm in diameter, **not segmented**; spines paired, slender, up to 6 mm long, borne on **interrupted** horny cushions along each ridge, frequently **with a pair of tiny prickles** above them, sinuate between the spine protuberances. Flowers in clusters of 3, greenish yellow. Fruit a 3-lobed capsule, up to 8 mm in diameter, maroon-red.

The latex has been used as a glue, and to seal the hulls of boats.

Compare *E. evansii* (above).


FSA351; Z437

3 *Euphorbia ingens* | giant euphorbia (N, Z); naboom (SA); naboom

AUTUMN–WINTER | Spiny, succulent tree up to 10 m high, with a short stem and **massive**, dark green crown; **lower branches not shed with age** as in other species; occurring in bushveld, often on rocky outcrops or deep sand, also on termitaria. Branchlets 4- or 5-angled, up to 120 mm in diameter, irregularly constricted, forming **segments with parallel sides**; spines paired, reduced, up to 2 mm long, borne on separate cushions that do not form a continuous ridge. Flowers in clusters, greenish yellow. Fruit an almost globose capsule, up to 15 mm in diameter, reddish.

The latex is very toxic and caustic; used medicinally and as a fish poison. The town of Mookgophong (formerly Naboomspruit) in Limpopo derives its name (present and past) from this tree; from the Northern Sotho 'mookgopho' and the Afrikaans 'naboom'. 616

1 *E. evansii*: tree

1 *E. evansii*: flowers

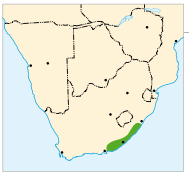
2 *E. grandidens*: fruit

2 *E. grandidens*: fleshy stems

3 *E. ingens*: tree

3 *E. ingens*: fruit

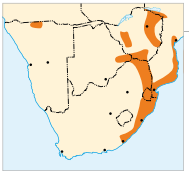
3 *E. ingens*: flowers


FSA354

1 *Euphorbia tetragona* | honey euphorbia; heuningnaboom

WINTER–SPRING | Spiny, succulent tree up to 13 m high; main stem single or branched, each with a small, candelabra-like crown; occurring in valley bushveld, often in dense stands. Branchlets 4- or 5-angled with **flat sides** (appearing square-shaped), 25–50 mm in diameter, **shallowly constricted** at intervals; spines paired, up to 12 mm long, borne on **separate horny cushions**, sometimes spineless. Flowers in clusters of 3, greenish yellow. Fruit an almost globose capsule, up to 10 mm in diameter, reddish.

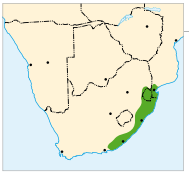
The latex is used medicinally. Honey (known as 'noors honey') is made from the flowers of this and several other members of *Euphorbia*, though it is unpleasantly flavoured and causes a hot, burning sensation in the mouth.


FSA355; Z441

2 *Euphorbia tirucalli* | hedge euphorbia (SA); rubber-hedge (Z); kraalnaboom

SUMMER | **Spineless** shrub or small to medium-sized succulent tree, with a rounded crown; occurring in bushveld, usually on rocky hill slopes and at old kraal-sites; widely used as a hedge around homesteads. Branchlets **cylindrical**, 5–8 mm in diameter, smooth. Leaves small and slender, up to 12 × 2 mm, fall very early and are rarely seen. Flowers in clusters towards tips of branches, yellowish green. Fruit a weakly 3-lobed capsule, about 12 mm in diameter, green, often flushed with pink.

The latex is toxic; used medicinally, to repel or kill insects and as a fish poison. Browsed by black (hook-lipped) rhinoceros. Reportedly effective in keeping moles away. 616


FSA356

3 *Euphorbia triangularis* | river euphorbia; riviernaboom

WINTER | Spiny, succulent tree up to 18 m high; main stem single or branched, each with a small, **yellowish green**, candelabra-like crown with **branches tending to ascend from the base**; occurring in valley bushveld, often in dense stands, particularly common in the Eastern Cape. Branchlets are 3-angled (mainly Eastern Cape) or 5-angled (mainly KwaZulu-Natal), 40–90 mm in diameter, angles **wing-like**, **deeply constricted** at intervals, forming segments 50–300 mm long, with parallel sides and somewhat wavy margins; spines paired, slender, up to 8 mm long, borne on separate or continuous horny cushions. Flowers in clusters, greenish yellow. Fruit an almost globose capsule, up to 8 mm in diameter, **distinctly stalked**, reddish.

The tree is traditionally planted, by the Xhosa of the Eastern Cape, outside their huts after the birth of twins, to protect them.

E. curvirama (from the Eastern Cape) has darker green stems, which arise horizontally from the main stem before curving upwards, and almost stalkless fruit. 616

1 *E. tetragona*: fruit

2 *E. tirucalli*: flowers

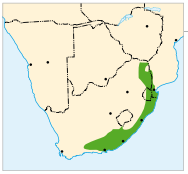
2 *E. tirucalli*: flowers & fruit

3 *E. triangularis*: stem & leaves

3 *E. triangularis*: fruit

3 *E. triangularis*: tree

PORTULACACEAE (see page 30)

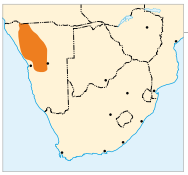

FSA104

1 *Portulacaria afra* | spekboom; spekboom

SUMMER | Sprawling shrub or small tree; occurring in karroid areas and bushveld, usually in rocky places; dominant in parts of the Eastern Cape (spekboomveld). Leaves **opposite**, **almost circular or obovate**, **up to 25 × 17 mm**, fresh green or pale grey, fleshy. Flowers in many-flowered panicles, small, pale pink to purplish. Fruit a small capsule, about 5 mm long, 3-winged.

The leaves are edible, with a pleasant acid taste earlier in the day, less acidic towards evening. Heavily browsed by game and stock and a valuable fodder plant in parts of the eastern Karoo. Leaves used medicinally. Dried stems flattened and used as thatch. Host to the mistletoe, *Viscum crassulae*, which has remarkably similar succulent leaves.

VITACEAE (see page 33)


FSA456

2 *Cyphostemma currorii* | cobas; kobas

SPRING | Thickset succulent tree up to 7 m high; occurring in semi-desert areas, usually on rocky hillsides. Bark **peeling in yellow papery pieces**, revealing a whitish to pinkish surface. Leaves **3-foliolate**; leaflets elliptic, large, **up to 300 × 200 mm**, thick, fleshy, **light green**; petiole **not winged**. Flowers in terminal, flat-topped, branched heads, small, yellowish green. Fruit a berry, oval, about 10 mm in diameter, red.

Sap from trunk is used medicinally and for veterinary purposes.

Three other tree-like cyphostemmas occur in Namibia. *C. bainesii* is rarely more than 1 m high, its leaflets up to 270 × 110 mm, bright green to bluish green, often with a red margin. *C. juttae* has blue-green leaves, simple and deeply lobed when juvenile, 3-foliolate when mature, with stalks winged. *C. uter* has 5-foliolate leaves.

1 *P. afra*: fruit

2 *C. currorii*: tree

2 *C. currorii*: tree

2 *C. currorii*: flowers

2 *C. currorii*: leaf

1 *P. afra*: flowers

1 *P. afra*: tree

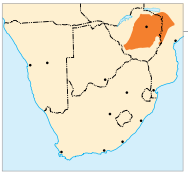
GROUP 2

Palm group

Plants with a distinctive growth form, usually unbranched or only sparingly branched. Leaves large, usually in terminal clusters.

See also Group 11: *Cussonia natalensis* (p. 268); Group 39: *Adansonia digitata* (p. 552); Group 41: *Acacia robynsiana* (p. 576); Group 43: *Moringa ovalifolia* (p. 614).

ARALIACEAE (see page 19)

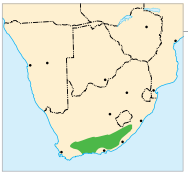


Z748

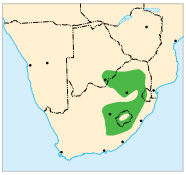
1 *Cussonia arborea* | octopus cabbagetree; seekatkiepersol

SPRING | Small to medium-sized deciduous tree; occurring in *Brachystegia* woodland, often in rocky places. Bark corky, rough and light brown. Leaves palmately compound with 5 or more leaflets, **simple** and variously lobed in young plants or sucker shoots, **250–500 mm in diameter**; leaflets with margin **scalloped or toothed**; petiole up to 300 mm long. Flowers in terminal groups of **slender spikes**, each **up to 600 mm long** (reminiscent of octopus arms, hence the common names), yellowish green. Fruit fleshy, almost globose, up to 7 mm in diameter, dark purple.

The wood is light and strong; used for cupboards and traditional xylophone keys.



paniculata
FSA563.1



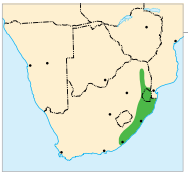
sinuata
FSA563

2 *Cussonia paniculata*

subsp. ***paniculata*** | **Karoo cabbagetree; karookiepersol**
subsp. ***sinuata*** | **highveld cabbagetree; hoëveldkiepersol**

SUMMER–WINTER | Small tree with a sturdy trunk, sparsely branched; occurring in bushveld and wooded grassland, usually in rocky places. Leaves clustered near ends of branches, **once compound**, with 7–11 radiating leaflets which are **not subdivided**; leaflets blue-green. Flowers in a branched **panicle of spikes**, greenish yellow. Fruit a fleshy drupe, globose, purple. Margin of leaflets deeply lobed or wavy in subsp. *sinuata* (found in central and northern parts of range), entire or sparsely toothed in subsp. *paniculata* (mainly southern Karoo and Eastern Cape).

The wood is soft, light, and was once used for the brake blocks of wagons. A decorative and frost-tolerant garden feature plant. 617



FSA564.2

3 *Cussonia sphaerocephala* | forest cabbagetree; boskiepersol

SUMMER | Tall, slender, **sparsely branched**, evergreen tree; occurring in forest. Leaves clustered in **neat round heads** at ends of stems, **twice compound**, with 6–12 subdivided primary leaflets, leathery, glossy dark green above. Flowers in terminal **double umbels** of short, thick spikes, each 80–140 × 40–60 mm, greenish yellow. Fruit a fleshy drupe, obconical, about 6 mm in diameter, purplish. 617

1 *C. arborea*: leaves

2 *C. paniculata*: flowers

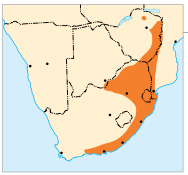
1 *C. arborea*: flowers

2 *C. paniculata*: tree

3 *C. sphaerocephala*: leaf

3 *C. sphaerocephala*: tree

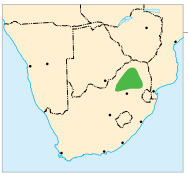
3 *C. sphaerocephala*: trees


FSA564; Z750

1 *Cussonia spicata* | cabbagetree; kiepersol

SPRING–SUMMER | Small to medium-sized evergreen tree, with spreading, **much-branched**, rounded crown; occurring in bushveld, on forest margins and on rocky outcrops in grassland. Leaves clustered at ends of branches, **twice compound**, with 5–9 subdivided primary leaflets, thickly leathery, **dark green**. Flowers in terminal **double umbels** of 8–12 spikes per unit, each 50–150 × 15–40 mm, greenish yellow. Fruit a fleshy drupe, round to angular, about 6 mm in diameter, purplish.

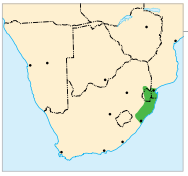
The root is poisonous, but is used medicinally. Cultivated in gardens; frost-tender. Stems are split, hollowed out and used as feeding trays for pigs and chickens. 617


FSA564.3

2 *Cussonia transvaalensis* | Waterberg cabbagetree; waterbergkiepersol

SPRING–SUMMER | Small to medium-sized evergreen tree, usually single-stemmed, with a small, **sparsely branched** crown; occurring in bushveld, usually on rocky ridges of quartzite or sandstone. Leaves clustered in rosettes at ends of branches, **twice compound**, with 7–9 subdivided primary leaflets, leathery, **blue- to grey-green**. Flowers in terminal **double umbels** of 7–11 spikes per unit, each 115–150 mm long, greenish yellow. Fruit a fleshy drupe, conical, about 10 mm long, purple.

An attractive, frost-tolerant garden subject.


FSA561

3 *Cussonia zuluensis* | Zulu cabbagetree; zulukiepersol

SPRING | Small, multi-stemmed, sparsely branched tree with a **rather spindly** shape; occurring in bushveld and coastal scrub and forest. Leaves clustered near ends of branches, **twice compound**, with 8–12 subdivided primary leaflets, leathery, **glossy dark green** above. Flowers in terminal **simple umbels** of 8–26 spikes, each 200–300 × 30–50 mm, greenish yellow, on stalks up to 20 mm long. Fruit a fleshy drupe, goblet-shaped, about 8 × 5 mm, mauve.

Closely related to *C. nicholsonii* from southern KwaZulu-Natal, which has stalkless flowers and obconical fruit. *C. arenicola* is a small, slender, single-stemmed, usually understorey shrub endemic to Maputaland's sand and coastal forests.

1 *C. spicata*: tree

1 *C. spicata*: flowers & fruit

2 *C. transvaalensis*: leaf segment

2 *C. transvaalensis*: flowers

2 *C. transvaalensis*: tree

3 *C. zuluensis*: flowers

ARECACEAE (see page 19)


FSA23

1 *Hyphaene coriacea* (= *H. crinita; H. natalensis*) | lala palm; lalapalm

SPRING | Palm **3–7 m high**; stem erect or reclining, often suckering and forming clumps; sexes separate, on different trees; occurring in low-altitude bushveld and coastal bush, often forming extensive stands in coastal grassland, particularly in Maputaland. Leaves **fan-shaped**, 1.5–2 m long (including petiole), **greyish green**; leaflets with base asymmetric; petiole with **black thorns**. Flowers in drooping clusters. Fruit small, oval to **somewhat pear-shaped**, **40–60 mm in diameter**, ripening from green through orange to glossy dark brown.

The tree is heavily browsed by elephant. The sap is tapped to produce palm wine (an important local industry in coastal areas of Maputaland). Hard white kernel of the seed ('vegetable ivory') is carved into small ornaments and used to adorn walking sticks. African Palm Swifts (*Cypsiurus parvus*) roost and nest in these trees. Leaves extensively used for such woven items as mats, baskets and hats.

Borassus aethiopum **(1.1)**, a similar-looking tree from low-altitude bushveld, often along rivers and mainly north of the Limpopo River, has an erect stem up to 20 m in height, with a prominent swelling about halfway up. The fruit is globose and considerably larger (120–180 mm in diameter).


FSA24; Z14

2 *Hyphaene petersiana* (= *H. benguellensis* var. *ventricosa*) | makalani palm (N); northern lala palm (SA); vegetable-ivory palm (Z); noordelike lalapalm

SPRING | Palm **up to 18 m** high; stem usually erect, often suckering and forming clumps, occasionally with a bulge near the middle or in the upper parts; sexes separate on different trees; occurring in low-altitude bushveld and along swamps, pans and rivers, often forming extensive stands. Leaves **fan-shaped**, 1.5–2 m long (including petiole), greyish green; leaflets with base asymmetric; petiole with **black thorns**. Flowers in drooping clusters. Fruit small, more or less globose, 40–60 mm in diameter, ripening from green through orange to glossy dark brown.

The kernel (pith) of the stem and the young leaves are edible. The leaves are also shredded into thin strips and used for weaving baskets. Sap is tapped to make palm wine. Seeds eaten in times of famine; liquid inside the kernel resembles coconut milk in flavour and colour. **617**

For uses by animals see *H. coriacea* (above).

1 *H. coriacea*: tree

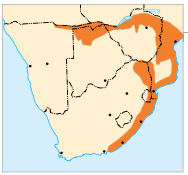
1 *H. coriacea*: fruit

1.1 *B. aethiopum*: tree

2 *H. petersiana*: fruit

2 *H. petersiana*: trees

2 *H. petersiana*: leaf bases


FSA22; Z13

1 *Phoenix reclinata* | wild datepalm; wildededadelpalm

SPRING | Palm up to 10 m high; stem **slender** (up to 300 mm in diameter), erect or reclining, suckering and **forming dense clumps**; sexes separate on different trees; occurring in low-altitude bushveld, especially along rivers and on coastal dunes. Leaves **feather-shaped (pinnate)**, 3–4 m long, arching, **glossy light to dark green**, lower leaflets reduced to **yellowish spines**. Flowers in bunches. Fruit a drupe, **oval (date-like)**, up to **15 mm long**, orange-brown.

The tree is browsed by elephant. Fruit edible, sweet-tasting and reminiscent of dates. Stems frayed by pounding and made into brooms. Rachis of leaves used as uprights to construct fish kraals at Kosi Bay. Kernels of stems and stem apex are sometimes eaten. Sap tapped to make palm wine. Leaves used to make baskets. Spines on petiole used medicinally. Larval food plant for the butterfly *Zophopetes dysmephila*. 617

Lower leaflets of *Jubaeopsis caffra* are not reduced to spines and the fruit is round and fibrous, about 20 mm in diameter. This rare species is restricted to sandstone cliffs close to the Msikaba and Mtentu river mouths in the Pondoland Centre of Endemism. 617


FSA26

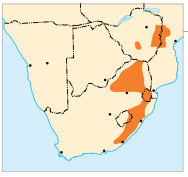
2 *Raphia australis* | Kosi palm; kosipalm

IRREGULAR | **Massive palm up to 24 m high**; stem erect, not suckering, usually with breathing roots growing up from the soil below the tree; plants flower once, after about 30 years, and then die after setting fruit; occurring in **swamp forest**, often in dense groves. Leaves **feather-shaped (pinnate)**, very large, **up to 10 m long**, spreading, dark green to bluish green, with midrib (rachis) often **reddish**; leaflets with margin and midrib spiny. Flowers in a massive (up to 3 m high), conical, **apical inflorescence exserted above the crown of leaves**. Fruit oval, about 90 mm long, shiny brown, with conspicuous, thick, **overlapping scales**. 617

The leaves are used as a thatch material, and the petioles for hut construction, fences and rafts. Palm-nut Vultures (*Gypohierax angolensis*) nest in the trees and feed on the fruit.

R. farinifera (found in eastern and northern Zimbabwe) has less impressive, drooping inflorescences produced from the axils of the leaves. 617

CYATHEACEAE (see page 23)


FSA1; Z2

3 *Cyathea dregei* (= *Alsophila dregei*) | grassland treefern; grasveldboomvaring

SPORULATING ALL YEAR | Tree fern up to 5 m high, stem erect, usually unbranched, **200–450 mm in diameter**; occurring on forest margins and along streams in ravines and montane grassland. Leaves arching, up to 3 m long, **leathery**; leaflets hairless or with loose, minute, brownish, hair-like scales below, basal leaflets **do not form root-like structures**, the ultimate segments in mature foliage are entire or weakly toothed.

C. thomsonii (found in the Eastern Highlands of Zimbabwe) is very similar, but with slender stems (about 100 mm in diameter) and leaflets with minute, pale, stiff, twisted hairs along the veins on the lower surface.

C. capensis **(3.1)** has slender (100–150 mm in diameter) stems and thinly textured, arching leaves with the basal leaflets modified into a tangled mass of green or brown root-like structures. It occurs in shaded, moist, forested ravines. 618 *C. manniana* (from the Eastern Highlands of Zimbabwe) has slender (about 100 mm in diameter), often reclining stems with sharp prickles. The prickles are also present on the petiole and rachis.

1 *P. reclinata*: tree

1 *P. reclinata*: fruit

1 *P. reclinata*: flowers

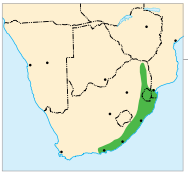
2 *R. australis*: inflorescence

3 *C. dregei*: trees

3.1 *C. capensis*: tree

2 *R. australis*: fruit

DRACAENACEAE (see page 23)


FSA30.9

1 *Dracaena aletriformis* (= *D. hookeriana*) | large-leaved dragontree; grootblaardrakeboom

SUMMER | Shrub or small tree up to about 5 m high; stem unbranched or branched, stout; occurring in coastal bush, montane forest and bushveld, usually in shady places. Leaves clustered towards ends of stems, narrow to broadly strap-shaped, **500–1 000 × 25–110 mm**, leathery, **bright green**, with conspicuous **white edges**. Flowers in large, loose, terminal panicles (with **greenish branches**) up to 1.5 m long, greenish white, opening at night, sweetly scented. Fruit a berry, globose or 2- or 3-lobed, up to 20 mm in diameter, **smooth**, orange or red.

An excellent indoor and outdoor subject for shady places. Larval food plant for the butterfly *Artitropa erinnys erinnys*.

Often confused with *D. transvaalensis*, a species associated with exposed hot, dry conditions, and restricted to a small area between the Dublin Mine in Limpopo and the Penge area of Mpumalanga. It is a much-branched, small tree with greyish green, stiff, long and narrow leaves in dense rosettes, and fruit with numerous small, soft protuberances.

D. steudneri **(1.1)** is a sparsely branched tree up to 12 m high (from the Eastern Highlands of Zimbabwe), with leaves in terminal rosettes, up to 800 × 100 mm, and large terminal inflorescences with orange-yellow branches. An attractive garden subject widely cultivated in Zimbabwe.

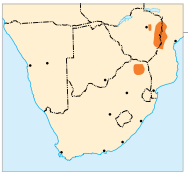

FSA30.8; Z23

2 *Dracaena mannii* (= *D. usambarensis*) | small-leaved dragontree; kleinblaardrakeboom

SPRING | Shrub or small tree up to about 5 m high; stem often **much-branched**, **slender**; occurring in swamp and dune forest, usually in moist places. Leaves clustered towards ends of stems, narrowly oblong-elliptic with a stem-clasping base, **up to 400 × 20 mm**, stiff and thinly leathery, glossy dark green to grey-green, **without white edges**. Flowers in terminal panicles (with yellow to orange branches) up to 0.5 m long, greenish white to cream, opening at night, sweetly scented. Fruit a berry, globose or 2- or 3-lobed, 10–30 mm in diameter, ripening through brown to orange-red.

A decorative plant for frost-free gardens. **618**

MUSACEAE (see page 28)


FSA31; Z25

3 *Ensete ventricosum* | wild banana; wildepiesang

SPRING | Banana-like tree with a thickset stem of tightly overlapping leaf bases and **spirally** arranged leaves; flowers once after about 8 years and then dies after fruiting; occurring in forest, usually along streams. Leaves large and banana-like, about 2.5 × 1 m, fresh green with a **pinkish red** midrib; petiole almost absent. Flowers in **large**, **drooping racemes**, cream, concealed by large, maroon bracts. Fruit leathery, resembling small bananas, with hard globose seeds.

Widely cultivated as an accent plant in gardens, fast-growing but frost-sensitive. Easily grown from seed. **618**

1 *D. aletriformis*: flowers

1 *D. aletriformis*: fruit

1.1 *D. steudneri*: tree

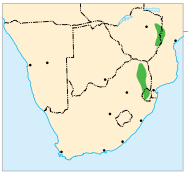
2 *D. mannii*: fruit

2 *D. mannii*: flowers

3 *E. ventricosum*: tree

3 *E. ventricosum*: inflorescence

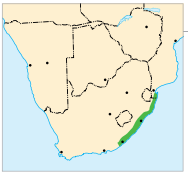
STRELITZIACEAE (see page 32)


FSA33; Z26

1 *Strelitzia caudata* | mountain strelitzia; bergstrelitzia

SPRING | Banana-like tree up to 6 m high, with a conspicuous **fan-shaped** crown, usually growing in dense clumps; occurring **in areas of montane forest**, usually found between rocks on steep, grassy slopes. Leaves arranged in two vertical ranks, up to 2 × 0.6 m, grey-green, blade becoming split by the wind, with a distinct, channelled petiole. Inflorescence simple, consisting of a **single**, purplish blue, **boat-shaped spathe**; flowers several per spathe, opening in succession, white, with spreading sepals and a narrow, blue, arrow-shaped structure formed by the petals, lowest sepal **with slender tail-like projection** from middle of keel below. Fruit a woody capsule, 3-lobed, dehiscent; seeds black with a tuft of bright orange hairs.

Closely related to *S. alba* (found in the Knysna-Humansdorp districts of the southern coastal region), all of whose sepals and petals are white. The plants that grow in the Eastern Highlands of Zimbabwe are *S. caudata* and not, as has been claimed in older literature, *S. nicolai*.


FSA34

2 *Strelitzia nicolai* | coastal strelitzia; kusstrelitzia

SPRING–SUMMER | Banana-like tree up to 12 m high, with a conspicuous **fan-shaped** crown, usually growing in dense clumps; occurring in **coastal dune vegetation** and **adjacent inland areas**. Leaves arranged in two vertical ranks, up to 2 × 0.6 m, glossy green, blade becoming split by the wind, with a distinct, channelled petiole. Inflorescence compound, consisting of **up to 5** purplish-blue, **boat-shaped spathes**, each one arising at right angles from the preceding one; flowers several per spathe, opening in succession, white, with spreading sepals and a narrow, blue, arrow-shaped structure formed by the petals. Fruit a woody capsule, 3-lobed, dehiscent; seeds black with a tuft of bright orange hairs (aril).

The plant is widely cultivated in gardens. Dried petioles are used as a binding material. Immature seeds edible, with a pleasant taste. The orange pigment in the seed aril of strelitzias is bilirubin, a compound otherwise only known as an excretory product in the bile of animals. Larval food plant for the butterfly *Moltena fiara*. **618**

1 *S. caudata*: flowers

2 *S. nicolai*: flowers

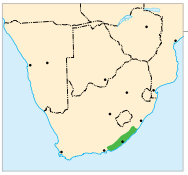
2 *S. nicolai*: trees

2 *S. nicolai*: fan-shaped crown

2 *S. nicolai*: dehisced fruit showing seeds with bright orange arils

ZAMIACEAE (see page 33)

Although only two species of *Encephalartos* are illustrated in this book, about 18 more may attain tree-size in southern Africa. Most species have a restricted range and are rarely encountered in the wild. Reliable identification often requires expert knowledge. Goode (1989) provides illustrations and descriptions of all the members of the group known at the time. A few more have subsequently been described. An informative, more recent account is by Grobbelaar (2002).

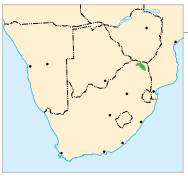

FSA3

1 *Encephalartos altensteinii* | Eastern Cape cycad; Oos-Kaapse broodboom

IRREGULAR | Palm-like tree up to 7 m high; stem usually unbranched, covered with persistent leaf bases; sexes separate, on different plants; occurring in coastal grassland and scrub forest, usually on rocky hillsides. Leaves crowded at the stem apex, up to 3.5 m long; leaflets up to 150 × 25 mm, dark green, lowermost ones **not reduced to a series of spines**, with 2–5 teeth along both margins. Cones yellowish green when mature, hairless. Seeds oval, about 25 mm long, scarlet.

The fleshy outer layer of the seeds is edible, but the kernel should be considered poisonous.

E. natalensis (widespread in KwaZulu-Natal) and *E. senticosus* (Lebombo Mountains) are very similar, both with their lowermost leaflets reduced to a series of spines. Leaflets in the former are broader (up to 45 mm wide) than those in the latter (not more than 25 mm wide).


FSA13

2 *Encephalartos transvenosus* | Modjadji cycad; modjadjebroodboom

IRREGULAR | Palm-like tree up to 13 m high; stem occasionally branched, erect, with golden brown woolly crown; sexes separate, on different plants; occurring on forest margins and in bushveld on rocky hillsides. Leaves clustered towards the stem apex, up to 2.5 m long, glossy dark green; leaflets 100–200 × 20–35 mm, with 2–5 small teeth along upper and 1–3 along the lower margin, lowermost leaflets **reduced to spines**. Cones golden yellow, hairless when mature. Seeds oval, up to 50 mm long, orange-red, rarely yellow.

The fleshy outer layer of the seeds is eaten by children. Substantial numbers of this cycad occur in the Modjadji Nature Reserve near Modjadjiskloof (formerly Duiwelskloof) in Limpopo. Here, plants of the species have been protected by the Rain Queens of the Lovedu Tribe.

1 *E. altensteinii*: trees

1 *E. altensteinii*: female cones

1 *E. altensteinii*: male cones

2 *E. transvenosus*: trees

2 *E. transvenosus*: female cones

2 *E. transvenosus*: trees with cones

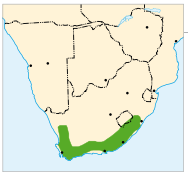
GROUP 3

Cedar group

Leaves very small, scale- or needle-like.

See also Group 10: *Podocarpus falcatus* (p. 246); Group 38: *Parkinsonia africana* (p. 526).

ASTERACEAE (see page 19)



FSA736

1 *Metalasia muricata* | white flowerbush; witblombos

ALL YEAR | Much-branched rounded shrub or small tree, with **erect branches**; occurring on coastal dunes and in mountainous areas, often along streams or between rocks. Branchlets **white-felted**. Leaves in tufts or scattered, sessile, somewhat twisted, up to 18 × 2 mm, **sharp-tipped**, often with white woolly hairs; margin rolled under. Flowers in **branched**, **terminal heads**, white, often tinged with pink or purple, sweetly scented. Fruit a small nutlet with a crown of bristles.

At least six more species of *Metalasia* (mainly confined to the Cape Floristic Region) may grow into small trees. They are all very similar looking and expert knowledge is often required for correct identification.

The tree is browsed by stock. Leaves used as a kind of tea. Plays a useful role in the stabilization of coastal dunes.

CASUARINACEAE (see page 21)

FSAX245

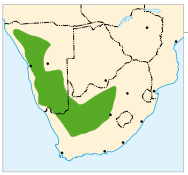
2 • *Casuarina cunninghamiana* | beefwood; kasuarisboom

WINTER | Evergreen, pine-like tree, with large, rather untidy, greyish green crown; invading coastal dunes and riverbeds. What appear to be needle-shaped leaves are in fact short branches, clearly distinguished from pine needles by being **jointed**, with several nodes and internodes; internodes longitudinally grooved, with the ridges **rounded**; true leaves reduced to a whorl of minute scales at each node, blackish with a **transverse brown band**. Flowers in small yellowish spikes (male) or globose heads (female), small, inconspicuous. The fruit resembles a small cone, oval, about 20 mm long, brown.

A native of Australia; cultivated for dune stabilization, ornament and shelter. A declared invader (category 2) in South Africa. Considered one of the best fuel woods in the world.

C. equisetifolia is very similar, but the whorls of minute scale leaves are uniformly pale, with the internodes of the needle-shaped twigs sharply ribbed.

CHENOPODIACEAE (see page 22)



FSA103.3

3 *Salsola aphylla* | lye ganna; seepganna

SPRING | Shrublet, shrub or small, sprawling tree with a **pale greyish** appearance; occurring in semi-desert areas, often along dry watercourses and on associated flood plains. Leaves **tightly packed** along the branches, **about 2 mm long**, thick and fleshy, appearing hairless. Flowers very small, inconspicuous, greenish yellow. Fruit enclosed in persistent perianth, the five segments of which develop into petal-like, papery wings and are then easily mistaken for flowers.

The plant is heavily browsed by game and stock. Its white, fluffy, globose insect galls may be mistaken for flowers or fruit. The ash produces a strong lye for making soap, hence the common names. 618

S. arborea is restricted to Namibia and has hairier branchlets and leaves.

1 *M. muricata*: flowers

2 *C. cunninghamiana*: fruit

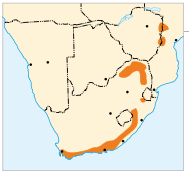
1 *M. muricata*: tree

3 *S. aphylla*: fruit

3 *S. aphylla*: trunk

3 *S. aphylla*: flowers

CUPRESSACEAE (see page 23)


FSA20; Z9

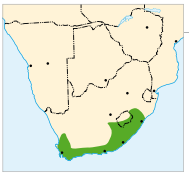
1 *Widdringtonia nodiflora* | mountain cedar (Z); mountain cypress (SA); bergsipres

SPRING | Evergreen shrub or small tree, usually with a **column-like** shape; sexes separate on the same plant; occurring at high altitude in mountainous areas. Juvenile leaves needle-like, spirally arranged, up to 20 mm long. Adult leaves **scale-like**, **about 2 mm long**, pressed tightly against the branchlets, hairless. Male cones up to 4 mm long; female cones globose, up to 20 mm in diameter, greyish green, becoming dark brown with age; scales (valves) 4, surface **smooth or wrinkled**, **with a few warts**. Seeds blackish with a reddish wing.

The wood is used in hut construction. Often grown in gardens.

W. cedarbergensis is mainly restricted to the Cederberg Mountains in the Western Cape. It has a more spreading crown, and the valves of the female cones are conspicuously rough and warty. Similar cones are found in *W. schwarzii*, a rare species from rocky ravines in the Eastern Cape's Baviaanskloof and Kouga mountains.

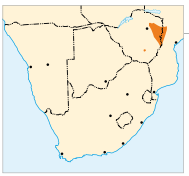
ERICACEAE (see page 23)


FSA572

2 *Erica caffra* | water tree erica; waterboomheide

SPRING | Evergreen shrub or small tree, with strong, twisted branches; occurring in ravines and on cliffs, usually **along streams or in damp places**. Leaves **3-whorled**, **needle-like**, about 10 mm long, with short hairs; margin rolled under. Flowers axillary towards ends of branches, small (up to 7 mm long), **white**, fading through cream to pale brown, tubular with small, spreading lobes, up to 7 mm long; old flowers persist for a long time on the plant. Fruit a capsule, about 3 mm long. **619**

E. canaliculata (found in the dry shrub forest between George and Port Elizabeth) has 3-whorled leaves, and purplish pink flowers with very long, protruding styles. *E. caffrorum* (mainly Drakensberg Escarpment) has 4-whorled leaves and pink or whitish flowers each about 3 mm long. *E. pleiotricha* (= *E. thryptomenoides*), from the Eastern Highlands of Zimbabwe, has 3-whorled leaves and pink flowers with brown to maroon anthers equalling or exceeding the tips of the corolla lobes.


Z760

3 *Erica hexandra* (= *Philippia hexandra*) | petrolbush; petrolbos

SUMMER–WINTER | Evergreen shrub or small tree; occurring at high altitude on mountain slopes, often forming dense thickets among rocks or along streams. Leaves **4-whorled**, densely crowded along branches, **needle-like**, up to 2 mm long. Flowers in clusters of 4–16 at tips of branchlets, inconspicuous, greenish tinged with red, produced in profusion; anthers remain fused after anthesis; style **protruding** from the flower, **up to 1 mm long**, with stigma **saucer-shaped**; pollen **powdery**, **released in clouds when branches are shaken**. Fruit a minute capsule.

The dry wood burns easily and rapidly, hence the common names.

Similar to *E. benguelensis*, which has joined anthers, style up to 0.3 mm long and the stigma included within the floral tube. The plant is fairly common in the Eastern Highlands of Zimbabwe. *E. mannii*, from the same area, has branchlets with very short, white hairs with side branches to the tip, anthers free, and tends to flower earlier (late winter and spring). *E. simii*, from Zimbabwe, coastal Mozambique and the northeastern Drakensberg Escarpment, has branchlets with very short, white hairs, leaves in whorls of 3 and anthers that are free shortly after the buds have opened.

1 *W. nodiflora*: male cones

2 *E. caffra*: flowers

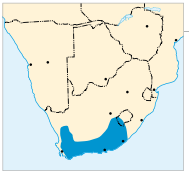
1 *W. nodiflora*: trees

1 *W. nodiflora*: tree sprouting after fire

1 *W. nodiflora*: female cones

3 *E. hexandra*: flowers

PINACEAE (see page 29)

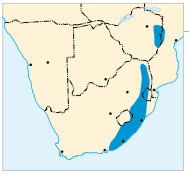

FSAX31

1 • *Pinus halepensis* | Aleppo pine; aleppoden

SPRING | Medium to large coniferous tree, conical with a short trunk when young, old specimens with an open crown; invading fynbos and grassland. Bark silver-grey. Needles in **clusters of 2**, **short (40–80 mm long)**, **slender and stiff**, **grey-green to yellow-green**. Cones woody, conic-ovoid, 80–100 mm long, reddish brown, glossy; cone scales **smooth** or with a slight transverse ridge.

A native of Europe (Mediterranean); cultivated for shelter, poles and firewood. A declared invader (category 2) in South Africa.

P. canariensis is an invader (category 2) of fynbos on the arid mountain slopes of the southwestern areas of the Western Cape; needles long (150–300 mm), slender, in clusters of 3, somewhat drooping, blue-green when young, becoming bright green with age; cones light brown with cone scales sharply cross-keeled.


FSAX35

2 • *Pinus patula* | patula pine; treurden

SPRING | Medium to large coniferous tree with **drooping foliage**, conical with a short trunk when young, mature specimens with a dense, rounded crown; invading forest margins, moist grassland and road cuttings. Bark brownish grey. Needles in **clusters of 3**, **long (120–300 mm)**, **slender and drooping**, **bright green**. Cones woody, conic-ovoid, 70–100 mm long, in clusters of 2–5, pale brown, strongly reflexed on very short stalks; cone scales with sunken centre and **minute**, **deciduous prickles**.

A native of Central America; cultivated for timber in commercial plantations, particularly in the summer-rainfall regions. A declared invader (category 2) in South Africa. **618**

P. elliottii (declared invader, category 2) is an escapee from commercial plantations, particularly along the northeastern Drakensberg Escarpment. Its needles are crowded towards the ends of branches, not notably drooping, 2- or 3-clustered, 180–300 mm long, dark green, course and stiff; cone scales are tipped with a blunt, greyish prickle, thus differing from *P. taeda* (declared invader, category 2), which has a sharp, recurved prickle up to 7 mm long. **618**


FSAX36

3 • *Pinus pinaster* | cluster pine; trosden

SPRING | Medium to large coniferous tree, conical when young, becoming cylindrical with a tall, bare trunk; invading mountain and lowland fynbos. Bark reddish brown, deeply cracked into a grid-like pattern. Needles in **clusters of 2**, **long (80–240 mm)**, **thick and rigid**, **dull grey-green**. Cones woody, conic-ovoid, 90–180 mm long, purple when young, becoming light brown when mature; cone scales with a **prominent ridge**, ending in a short, curved point.

A native of Europe (Mediterranean); cultivated for timber in commercial plantations. This is a declared invader (category 2) in South Africa. **619**

P. pinea has an umbrella-shaped crown and needles in clusters of 2, light green, thick and rigid, 50–150 mm long; mainly an invader in the Western Cape and southern Drakensberg. *P. radiata* (declared invader, category 2) has a conical canopy in plantations, but a rounded one when in the open; needles usually in clusters of 3, 60–150 mm long, slender, very densely arranged along twigs; cone scales with a fine thorn; invading predominantly fynbos and forest on the moist mountain slopes of the Western and Eastern Cape.

1 *P. halepensis*: female cone

1 *P. halepensis*: male cones

2 *P. patula*: trees

2 *P. patula*: adult female cone

2 *P. patula*: young female cone

3 *P. pinaster*: bark

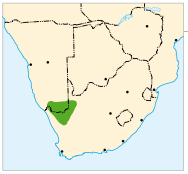
2 *P. patula*: male cones

3 *P. pinaster*: male cones

3 *P. pinaster*: old female cone

3 *P. pinaster*: female cone

PORTULACACEAE (see page 30)


FSA104.1

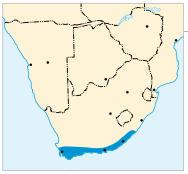
1 *Ceraria namaquensis* | Namaqua porkbush; wolftoon

SUMMER | Shrub or small tree; occurring in semi-desert areas, usually in rocky places. Branches **silvery grey**, **smooth and waxy** with scattered, slightly raised, **black pustules** (extremely reduced side shoots). Leaves clustered on black pustules, almost **cylindrical**, up to 5 × 2 mm, **fleshy**. Flowers small, pink, short-lived. Fruit very small, with pinkish brown wing.

The bark is used as cordage. **618**

C. kaokoensis and *C. longipedunculata* are shrubs or small trees from the Kaokoveld Centre of Endemism. Branchlets are more conventional looking, but the leaves are also narrow (linear) and slightly fleshy, being flattened in *C. kaokoensis*, more or less cylindrical in *C. longipedunculata*. Both have pink flowers; *C. kaokoensis* is easily recognized due to its profuse flowering.

PROTEACEAE (see page 30)


FSAX352

2 • *Hakea sericea* | silky hakea; silwerhakea

WINTER–SPRING | Evergreen shrub or small tree, much-branched and **very prickly**; invading mountain fynbos and coastal grassland. Branchlets with short hairs, becoming **hairless with age**. Leaves needle-shaped, up to 40 mm long, dark green to grey-green, hairless, **sharp-pointed**. Flowers clustered in leaf axils, small, cream. Fruit a woody capsule, unevenly rounded, with 2 apical horns, wrinkled, purplish brown with paler markings, becoming grey with age; seeds winged.

A native of Australia; once cultivated for dune reclamation, ornament and hedging. This is a declared weed (category 1) in South Africa.

H. gibbosa has densely hairy branches (both the young and older ones) as well as hairy young leaves. *H. drupacea* has leaves that are divided into several upright, needle-shaped segments. Both are declared weeds (category 1) in South Africa.