

How to use a key

A botanical key is a series of choices that help you identify an unknown plant. The key below uses vegetative characteristics such as leaves, bark, etc. because flowers and/or fruit are often not present. Obviously it will not work in winter for deciduous species. Sometimes it is just not possible to separate similar species without flowers or fruit and so, where it was unavoidable, these characters have been included in places. When using the key, **please check the whole** plant, or a decent piece of it, not just one stem or one leaf, and always look at several mature leaves, not very young or very old ones.

Traditionally, keys are dichotomous (having only two choices at each step). However, at several points in this key, you will find more than two choices. Each set of choices starts with the same number, with each choice given a letter, e.g. 1a, 1b, 1c. You should always read through **all** the alternative choices per number carefully before deciding which best describes your plant.

At each point, your choice will lead you to a taxon (a family, a genus, a species), a number or a box. If it leads you to one taxon only, go to the page number given. If it takes you to more than one, then look at both/all and decide which fits best. If you are led to a family or genus, you must then go to the key to that family or genus in the body of the book and work through it to identify the species.

Where your choice leads you to a number, go straight to that number in the key, ignoring all the others in between. Continue to do this until you reach a taxon. When you are referred to a box, go to that box (on the pages opposite the key, highlighted in different colours) and continue to key out your specimen as described above.

Having arrived at a species, **first check the map**. Is the species found in, or near, the area? If not, try another species. Then look at the pictures **and read the text**. Plants are variable and we cannot include a photo of all the variants. If none of the plants is correct, you will have to go back to the key again. If there was a particular point where you were not certain how to proceed, go back there and try a different option. If you do not understand a term in the key, consult the glossary (p. xvii) or take a look at the species to which it refers so as to see what is meant by the term.

For this key, it is **essential** for readers to understand **the difference between simple leaves and the various types of compound leaves** (see below and p. xxii).

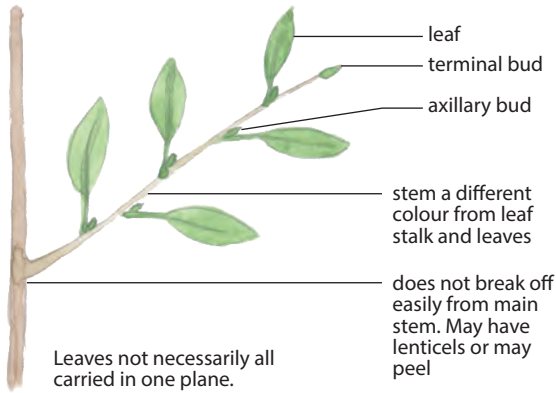
SIMPLE OR COMPOUND LEAVES. A simple leaf is a 'typical' leaf with a blade and leaf stalk (petiole) (see p. xxi). The blade may be deeply lobed, but it is still a single entity. A compound leaf is made up of two or more leaflets. Individual leaflets look like simple leaves, but all of them together make up one leaf, with one petiole. Sometimes the leaflets are attached directly to the rachis or the end of the petiole, and other times each leaflet has its own leaflet stalk (petiolule).

With large compound leaves it is often difficult to decide whether you are looking at a single big leaf with leaflets or many simple leaves. The following tips can help you to decide which type of leaf you are looking at:

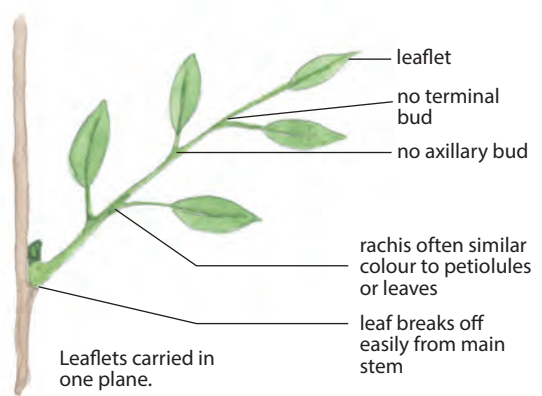
- Leaves often have a small bud in the angle between the petiole and the plant stem that leaflets do not have.
- Leaflets on a compound leaf are always held in one plane; they are never spiral, whorled or clustered.
- Often the stem is a different colour from the leaves and their petioles. The petiole and rachis of a compound leaf are often (although not always) the same colour as the leaflets.
- A stem with simple leaves often has leaves of different ages, whereas the leaflets of a compound leaf are all the same age, although they may not all be the same size and shape.

NB: A leaflet is NOT a small or young leaf. Some leaves are extremely small and some leaflets are very large (e.g. the leaflets of a palm tree).

Five simple leaves



Compound leaf with five leaflets



Key to families, genera and some species

NOTE THAT SOME STEPS OF THIS KEY HAVE ONLY TWO CHOICES, OTHERS HAVE MORE THAN TWO CHOICES.

1. a) Tree with unusual growth form:
 - Sprawling, with long, leathery, twisted leaves, and cones – *Welwitschia* (p. 2)
 - Tree with crown of very long, fibrous leaves (palms) – *Arecaceae* (p. 2)
 - Tree or shrub with very large, fleshy, boat-shaped leaves – *Aloe*, *Alloidendron* (p. 6)
 - Cactus-like with large, fleshy, spiny stems – *Euphorbia* (p. 245), *Cactaceae* (p. 511)
 - Large tree with massive trunk, digitate leaves – *Adansonia* (p. 344)
 - Twining strangler with thick stem - *Fockea* (p. 428), *Strophanthus* (p. 426)
- b) Trunk swollen (pachycaul), but not a strangler..... Box A
- c) Not as above..... 2 (p. xxvi)

Box A. Pachycauls – Plants with thick, swollen stems

1. a) Branches spiny – *Pachypodium* (spines long, slender, straight) (p. 422), *Sesamothamnus* (spines shorter and thicker, some slightly curved) (p. 466)
- b) Branches not spiny 2
2. a) Bark peeling 3
- b) Bark not peeling 4
3. a) Bark peeling in yellow, papery pieces; leaves succulent – *Tylecodon* (leaves 50 – 80 mm long) (p. 76), *Cyphostemma* (leaves very large) (p. 318)
- b) Bark peeling in thin, flat strips or woody discs, stem white or purple, leaves palmately lobed – *Sterculia* (p. 346)
- c) Bark peeling in small pieces or long strings..... *Commiphora* (p. 200)
4. a) Tree with white stem and large compound leaves *Moringa* (p. 74)
- b) Shrub with slightly succulent, grey-brown to reddish stem; large, soft, velvety, simple leaves – *Adenium* (p. 422)
- c) Low, round, swollen stem with short green stems and few leaves – *Adenia* (p. 358)

2. a) Plant leafless or appearing leafless (in summer) 3
 b) Leaves tiny, scale-like, forming knobs on stems – *Salsola* (p. 38), *Tamarix* (p. 354)
 c) Leaves thread-like – *Parkinsonia* (p. 136), *Commiphora kraueseliana* (p. 200)
 d) Leaves not as above..... 4



Scale-like *Salsola* leaves

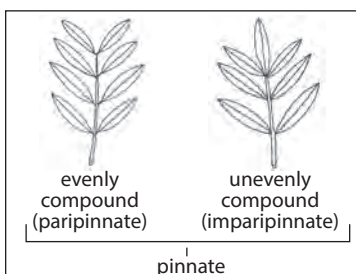
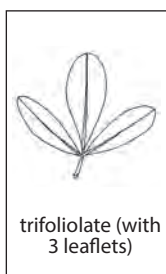
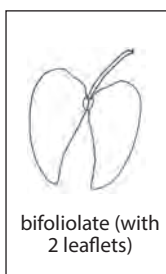
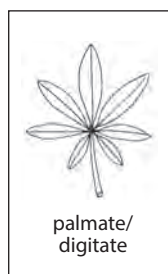


Scale-like *Tamarix* leaves

3. a) Untidy, many-stemmed shrub – *Cadaba* (p. 66), *Sisyndite* (p. 190)
 b) Many-stemmed succulent with milky latex (*Euphorbia* (p. 244) or spiny, mound-forming shrub (*Acanthosicyos* p. 488) 5
 4. a) Leaves very succulent 5
 b) Leaves not or only slightly succulent 10
 5. a) Leaves cylindrical, finger-like – *Stoeberia* (p. 42), *Mestoklema* (p. 498), *Ceraria* (p. 46)
 b) Leaves not cylindrical 6
 6. a) Leaves boat-like, margins with hard teeth – *Aloe* (p. 6)
 b) Leaves not as above..... 7
 7. a) Mature leaves usually longer than 50 mm – *Tylecodon paniculatus* (p. 76)
 b) Mature leaves usually shorter than 50 mm 8
 8. a) Leaves bifoliolate or circular – *Zygophyllum* (p. 182)
 b) Leaves flat or very small 9
 9. a) Mature leaves longer than 20 mm – *Tetragonia* (p. 40)
 b) Mature leaves shorter than 20 mm – *Ceraria* (p. 46)

NB for the following steps it is essential that the reader can distinguish between simple and compound leaves, and the types of compound leaf. See glossary and box above on p. xxv.

10. a) Leaves compound 11
 b) Leaves simple 12 (p. xxi)
 11. a) Leaves bifoliolate (with two distinct leaflets, NOT bilobed)..... Box B
 b) Leaves trifoliolate (with three distinct leaflets, NOT trilobed) Box C
 c) Leaves bipinnate or tripinnate Box D
 d) Leaves pinnate Box E
 e) Leaves digitately compound (NOT lobed) – *Schinziophyton* (p. 270), *Adansonia* (p. 344), *Vitex* (p. 438)





Bifoliolate leaf



Bilobed leaf



Trifoliolate leaf



Trilobed leaf



Digitately compound leaf



Digitately lobed leaf



Digitately compound leaf

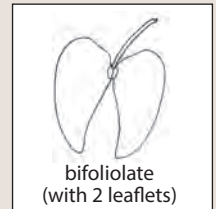


Trifoliolate leaf

COMPOUND LEAVES

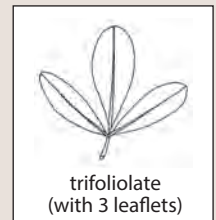
Box B. Leaves bifoliolate (having two distinct leaflets)

1. a) Leaflets sickle-shaped, generally larger than 60 mm long 2
- b) Leaflets not sickle-shaped, often less than 60 mm long 3
2. a) Tree or shrub with dull green leaves; aromatic – *Colophospermum* (p. 142)
- b) Tree with drooping crown; shiny, dark green leaves with skew midrib; only in north-east – *Guibourtia* (p. 144)
3. a) Spiny tree with small leathery-succulent, yellow-green leaves – *Balanites* (p. 192)
- b) Shrub with fleshy leaves – *Zygodphyllum* (p. 182)



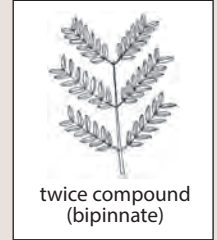
Box C. Trifoliolate leaves (with three distinct leaflets)

1. a) Leaflet margin entire (smooth) 2
- b) Leaflet margin not entire (smooth) ... *Commiphora* (p. 230), *Searsia* (p. 288), *Allophyllus* (p. 310)
2. a) Leaves and leaflets large and very succulent; pachycaul – *Cyphostemma* (p. 318)
- b) Leaves and leaflets large, leaflets not arising from one point 3
- c) Leaves < 140 mm long, leaflets arising from one point 4
3. a) Hooked thorns on stems and leaves, leaflets diamond-shaped – *Erythrina decora* (p. 180)
- b) Thorns absent, leaflets longer than wide – *Philenoptera violacea* (p. 178)
4. a) Leaves grey-green; black glands present – *Gossypium triphyllum* (p. 342)
- b) Sap fragrant; flowers small (< 10 mm); fruit small – *Searsia* (p. 288), *Commiphora* (p. 230)
- c) Leaflets long and slender (mostly > 40 mm); some leaves simple; often a scrambler; flowers with many long stamens; fruit egg-like – *Maerua juncea* (p. 68)
- d) Leaflets < 20 mm long; flowers bright yellow, showy; fruit a thin, horn-like capsule; extreme NW – *Rhigozum virgatum* (p. 460)



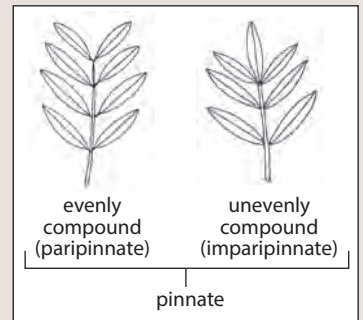
Box D. Leaves bipinnately (twice divided) and tripinnately (divided 3x) compound

1. a) Leaves tripinnate, very large – *Moringa oleifera* (p. 506)
- b) Leaves bipinnate 2
2. a) Leaves large, up to 500 mm including long petiole, unevenly compound, leaflets noticeably discoloured, margins scalloped or toothed – *Melia azedarach* (p. 508)
- b) Leaves large, up to 800 mm, unevenly compound, leaflet margins entire (smooth) – *Moringa ovalifolia* (p. 74)
- c) Leaves up to 450 mm, seldom to never unevenly compound, leaflet margins entire (smooth) – Mimosoidae (p. 82), Caesalpinioideae (p. 158), *Jacaranda mimosifolia* (p. 160)



Box E. Leaves pinnate (divided once along a central axis)

1. a) Leaves paripinnate (evenly compound, not ending in a terminal leaflet)..... 2
- b) Leaves imparipinnate (unevenly compound, ending in a terminal leaflet)..... 3
2. a) Leaflets markedly asymmetric, rachis slightly winged; north-west only *Ptaeroxylon* (p. 234)
- b) Small shrub confined to south; leaves few; stem green; fruit with stiff hairs *Sisyndite* (p. 190)
- c) Not as above – Caesalpinioideae (p. 508), *Entandrophragma* (p. 236)
3. a) Leaflet margins entire (smooth, not toothed) 4
- b) Leaflet margins not entire 13
4. a) Armed with spiny shoots bearing leaves; north-east – *Dalbergia melanoxylon* (p. 170)
- b) Armed with leafless axillary spines; Fish River – *Neoluederitzia* (p. 190)
- c) Not armed 5
5. a) Shrub, occasionally a small tree 6
- b) Generally a tree 9
6. a) Leaflets needle-like or thread-like; bark peeling – *Commiphora kraeuseliana* (p. 218)
- b) 7–16 leaflet pairs – *Ormocarpum* (north-west) (p. 170); *Rourea* (Zambezi Region) (p. 80)
- c) Rachis winged; Naukluft – *Erythrophysa alata* (p. 502)
- d) Not as above 7
7. a) Mature leaves > 400 mm long (including petiole) – *Markhamia* (p. 462)
- b) Mature leaves < 250 mm long 8
8. a) Branches long & slender; extreme north-west – *Rhigozum virgatum* (p. 460)
- b) Softly woody; leaflets at least 5 times longer than wide; uncommon to rare – *Heteropmorpha* (p. 390)
- c) Leaflets at most 3 times longer than wide; leaves shiny dark green – *Mundulea* (p. 166)



9. a) Leaflets (NOT leaves) alternate – *Swartzia* (p. 164), *Pterocarpus angolensis* (p. 172)
 b) Leaflets opposite at leaf base, becoming alternate towards the tip, < 6 mm wide; aromatic – *Schinus molle* (p. 510)
 c) Leaflets opposite to sub-opposite; leaflets oblong to ovate to almost round; pods roundish with circular wing – *Pterocarpus lucens*, *P. rotundifolia* (p. 174)
 d) Leaflets opposite..... 10
10. a) Rachis narrowly winged between last pinna pair and terminal leaflet; base of paired leaflets asymmetric; aromatic – *Schinus terebinthifolius* (p. 510)
 b) Rachis winged between each pinna pair; Naukluft – *Erythrophysa alata* (p. 502)
 c) Rachis not winged 11
11. a) Leaves with 1–2 leaflet pairs; terminal leaflet much larger than lateral ones... *Philenoptera violaceae* (p. 178)
 b) Leaves with more than 2 leaflet pairs..... 12
12. a) All leaflets with very short petiolules to sessile – *Dialium* (p. 154), *Xeroderris* (p. 178), *Trichilia* (p. 240)
 b) Terminal petiolule much longer than others – *Kigelia* (leaflets large, stiff, leathery; fruit large, woody, sausage-like) (p. 464), *Lannea* (leaflets not leathery; fruit a berry, c. 10 mm) (p. 278)
 c) All petiolules 2–50 mm long; leaflets blue-green, ovate, often undulate – *Sclerocarya* (p. 276)
13. a) Plants armed with thorns or spines, bruised leaves smell of citrus – Rutaceae (p. 194)
 b) Plants unarmed 14
14. a) Small tree with white stem; leaflets soft, drooping, fringed with long, soft hairs – *Steganotaenia* (p. 392)
 b) Shrub; leaflets large, velvety, folded along midrib, margin deeply toothed – *Melianthus* (p. 312)
 c) Dwarf shrub or small tree; aromatic resin; often with peeling bark – *Commiphora* (p. 200)
 d) Not as above 15
15. a) Leaves and leaflets opposite, sessile, deeply toothed; fruit a long, slender pod; flowers bright yellow – *Tecoma stans* (p. 515)
 b) Leaves clustered on ends of shoots, alternate to whorled; leaflets sub-opposite, with short petiole; small flowers and fruit – *Kirkia* (p. 196)
 c) Leaves in whorls of 3; leaflets opposite, large, stiff, leathery; fruit large, woody, sausage-like – *Kigelia* (p. 464)

SIMPLE LEAVES

12. a) Stipule, ridge or scar present between the petiole bases of two opposite leaves (p. xxii) – Strychnaceae (p. 410), Apocynaceae (p. 416), Rubiaceae (p. 470)
 b) Not as above..... 13 (p. XX)
13. a) Leaves bilobed – *Adenolobus* (p. 148), *Bauhinia* (p. 136), *Piliostigma* (p. 152)
 b) Leaves digitately lobed or 3-lobed..... Box F
 c) Leaves pinnately lobed – *Commiphora wildii* (p. 230), *Antiphiona* (p. 494), *Datura* (p. 514)
 d) Leaves irregularly lobed – *Commiphora cervifolia* (p. 208), *Antiphiona* (p. 494)
 e) Leaves not lobed..... 14 (p. XX)
14. a) Plant with milky latex Box G
 b) Plant lacking milky latex (may have clear sap)..... 15 (p. XX)

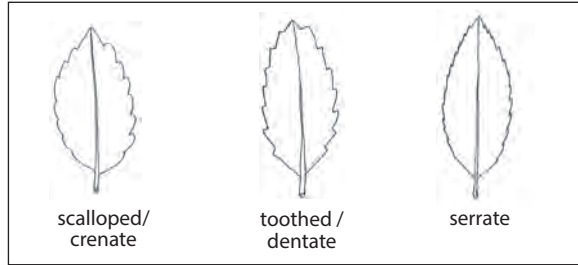
Box F. Leaves simple, digitately lobed or 3-lobed

1. a) Plant with milky latex; introduced in the north - *Jatropha* (p. 509)
b) Sap not milky.....2
2. a) Leaves shallowly 3-lobed; lobes pointed; 3 veins from base; – *Gyrocarpus* (p. 54)
b) Leaves 3-5-lobed.....3
c) Leaves with > 5 deeply incised lobes; margins deeply toothed; invasive in rivers and other water points – *Ricinus* (p. 509)
3. a) Leaves almost circular with rounded lobes; long slit in midrib below – *Azanza* (p. 338)
b) Leaves with pointed lobes; rough hairs – *Sterculia* (p. 348)
c) Leaves with lobes extending halfway or more to base; soft hairs – *Gossypium* (p. 340)

Box G. Leaves simple, unlobed; milky latex

1. a) Spines present – *Euphorbia matabelensis* (p. 500), *Carissa* (p. 418)
b) Spines absent..... 2
 2. a) Leaf margins entire (smooth)..... 3
b) Leaf margins not entire – *Excoecaria* (p. 270), *Spirostachys* (p. 272)
 3. a) Stem peeling – *Euphorbia guerichiana* (p. 248), *E. ohiva* (p. 252), *E. spinosa* (stem succulent) (p. 500)
b) Stem not peeling 4
 4. a) Leaves and branches drooping – *Diplorhynchus* (p. 420), *Maprounea* (p. 500), *Cryptostegia* (p. 513)
b) Not as above 5
 5. a) Leaves large, velvety, often folded along the midrib, with undulate margins – *Adenium* (p. 422)
b) Leaves stiff; stipules covering apical and leaf buds conspicuous, falling to leave a scar; bark generally pale and relatively smooth; fruit a fig – *Ficus* (p. 18)
c) Leaves opposite – *Ectadium* (p. 428), *Cryptostegia* (p. 513)
d) Leaves not opposite; stems knobbly – *Euphorbia transvaalense* (p. 254)
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15. a) Stems and leaves covered in fine, sharp, irritating prickles – *Obetia* (p. 28)
b) Leaf margins with many long, sharp, fine spines – *Berkheya* (p. 496)
c) Plant not as above 16
 16. a) Leaf margins slightly or distinctly serrate, dentate or crenate, at least on some leaves..... 17
b) Leaf margins entire (smooth) but may be wavy or undulate 19 (p. XX)
 17. a) Plant armed with spines, thorns or prickles Box H
b) Plant unarmed 18 (p. XX)
 18. a) Leaves mostly opposite..... Box I
b) Leaves mostly not opposite.....Box J
 19. a) Plant armed with thorns, spines or spine-tipped branches.....Box K
b) Plant lacking thorns, spines and spine-tipped branches.....20 (p. XX)

LEAVES SIMPLE, MARGINS NOT ENTIRE



Box H. Leaves simple, margins not entire; stems with spines, thorns or prickles

1. a) Thorns or prickles scattered along stems – *Lantana* (p. 514)
 b) Thorns paired at nodes, one curved and one straight – *Ziziphus* (p. 314)
 c) Thorns or spines straight 2
2. a) Leaves and spines with successive pairs at right angles to each other; leaves grey, furry – *Catophractes* (p. 460)
 b) Leaves large, broadly ovate, up to 120 mm long; eastern Zambezi Region – *Flacourtia*, *Oncoba* (p. 356)
 c) Leaves slender, > 3x longer than wide, not broadly ovate – *Gymnosporia* (p. 302)
 d) Leaves not slender, < 3x longer than wide, obovate; aromatic resin – *Commiphora* (p. 200)



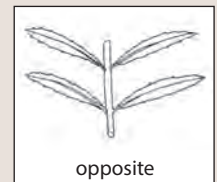
Spines with successive pairs at right angles, *Catophractes alexandri*



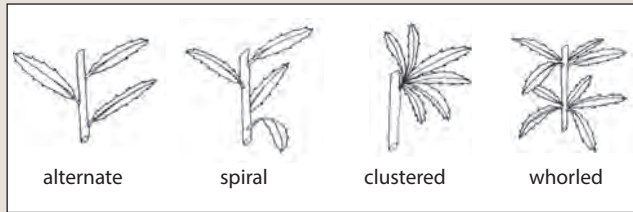
Leaves with successive pairs at right angles, *Crossopteryx febrifuga*

Box I. Leaves simple, margins not entire; stems lacking spines, thorns or prickles; leaves mostly opposite

1. a) Leaves bright green, slightly succulent, apex sometimes spine-tipped; extreme south west – *Didelta* (p. 496)
 b) Not as above 2
2. a) Leaves at least 3x longer than wide 3
 b) Leaves at most 2x longer than wide 4
3. a) Leaves lanceolate, narrowly tapering to base, soft-textured, drooping, often in opposite clusters; young branches squarish – *Manuleopsis* (p. 454)
 b) Leaves long & narrow, stiff-textured, successive pairs at right angles to each other – *Nuxia* (p. 416)
4. a) Leaves soft, dark green, ovate, opposite or in whorls of 3, distinctly discolorous, woolly below; stinks – *Rothea* (p. 442)
 b) Leaves variable, stiff, rough-textured, not discolorous or smelly – *Cordia* (p. 432)

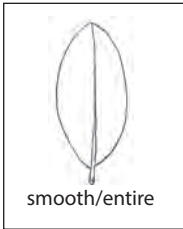


Box J. Leaves simple, margins not entire; stems lacking spines, thorns or prickles; leaves alternate, spiral, whorled, clustered



1. a) Plant a climber, with tendrils; leaves heart-shaped, margins with hair-like tips – *Cissus* (p. 316)
b) Not as above2
2. a) Leaves < 10 mm long – *Searsia problematodes* (p. 296)
b) Leaves > 10 mm long3
3. a) Drooping tree found along banks of perennial rivers4
b) Not as above5
4. a) Leaves long and narrow; petiole < 10 mm – *Salix* (p. 12)
b) Leaves elliptic-ovate or elliptic-lanceolate; petiole > 10 mm; NE only – *Croton leuconurus* (p. 266), *C. megalobotrys* (p. 266)
5. a) Leaves discolorous (upper and lower surface different colours) 6
b) Leaves more or less the same colour on both sides 7
6. a) Leaves alternate, held on one plane (distichous), very soft with sunken veins, narrowly ovate; Erongo Mountains – *Trema* (p. 16)
b) Leaves alternate or spirally arranged, sometimes distichous, 3 major veins from base, base usually asymmetric – *Grewia* (p. 322)
c) Leaves spirally arranged, long and narrow, grey-green, velvety; common shrub on Khomas Hochland – *Tarchonanthus* (p. 490)
7. a) Leaves long and narrow with conspicuous golden glands below; banks of perennial rivers in NE – *Morella* (p. 14)
b) Leaves small with two large, flat, sessile glands at leaf base; shrub with knobby stems – *Turnera* (p. 358)
c) Leaves lacking glands 8
8. a) Leaves very thin-textured, distinctly undulate – *Ochna cinnabarina* (p. 350)
b) Leaves sessile or almost so, dark grey-green; twiggy shrub; branches white, furry – *Vernonia* (p. 494)
c) Leaves almost as wide as long, 5–7 veined from base, stiff, sandpapery – *Dombeya* (p. 346)
d) Leaves narrow, finely toothed, glossy above with conspicuous, long, hair-like stipules; low-growing suffrutex – *Brackenridgea* (p. 352)
e) Leaves leathery, coarsely serrate, apex often abruptly tapering – *Mystroxydon* (p. 308)
f) Not as above – *Pappea* (p. 310), *Ehretia* (p. 434), *Elaeodendron* (p. 306)

LEAVES SIMPLE, MARGINS ENTIRE



Furry cushion



Spine-tipped (spinescent) branches

Box K. Leaves simple, margins entire; plant with thorns, spines or spine-tipped (spinescent) branches

1. a) Four long, sharp spines at each node – *Azima* (p. 408)
 b) Thorns curved and paired at nodes 2
 c) Thorns straight or spine-tipped branches present..... 4
2. a) Thorns short, sharply hooked, velvety; often a scrambler on termite mounds and floodplains; leaves alternate, downy – *Capparis tomentosa* (p. 58)
 b) Thorns gently curved, up to 10 mm long; leaves opposite 3
3. a) Scrambler or shrub with long, twining branches; leaves broadly elliptic to subcircular, leathery, somewhat puckered – *Combretum mossambicense* (p. 370)
 b) Tree up to 5 m high; leaves 3–7 veined from base, downy to hairless, never puckered; fruit large, round, edible, with hard shell – *Strychnos* (p. 410)
4. a) Stems branch in 3s, 4s or 5s; branches spine-tipped*Rhigozum trichotomum* (p. 456)
 b) Not as above 5
5. a) Leaves < 3x longer than wide 6
 b) Leaves > 3x or more longer than wide..... 7
6. a) Leaves slightly fleshy; with waxy bloom or hairy; fruit an edible berry *Ximenia* (p. 34)
 b) Leaves dark green, base tapering; mostly clustered on short, stubby, sometimes spine-tipped shoots; purple to dark red fruit, wing round the whole seed *Terminalia prunioides* (p. 380)
 c) Leaves usually grey-green, scaly (appears finely dotted), especially below; margin undulate; leaves and stems with successive pairs at right angles to each other; 4–5 winged fruit *Combretum imberbe* (p. 372)
 d) Leaves yellow-green to blue-green, base wedge-shaped to blunt; older branches spine-tipped; wing extends from one side of seed; flowers pink to lilac*Securidaca* (p. 242)
 e) Leaves opposite to clustered, papery or leathery, dark green above, duller below; uncommon in Zambezi – *Strychnos* (p. 410)
7. a) Leaves narrow, clustered on pale, furry cushion; densely downy; folded along midrib; flowers large, yellow; fruit a slender capsule *Rhigozum brevispinosum* (p. 456)
 b) Leaves up to 4 mm wide, clustered on spine-tipped branches; fruit 4-winged, strikingly pink when fresh..... *Phaeoptilum* (p. 40)
 c) Leaves clustered on short shoots; often somewhat fleshy; flowers small, tubular or bell-shaped; fruit a small berry, orange-red when ripe *Lycium* (p. 446)
 d) Leaves variable, slender, obovate to linear, often clustered on spine-tipped branches; flowers very small, star-like, in dense clusters; fruit a small capsule*Gymnosporia* (p. 302)

- 20. a) Bark on trunk or main branches peeling (e.g. p. 201)..... 21
- b) Bark on trunk and main branches not peeling 23
- 21. a) Bark peeling in long threads or tubular segments Combretaceae (p. 260)
- b) Bark peeling in papery strips or long strings or round discs; plant with aromatic resin – *Commiphora* (p. 230)
- c) Bark peeling in thick, dark strips or flakes to reveal a cream or orange under-bark 22
- 22. a) Leaves stiff, petiole 4–5 mm long; growth of successive years differentiated by colour.... – *Ochna pulchra* (p. 352)
- b) Leaves drooping; petiole 5–12 mm long *Erythroxylum* (p. 180)
- 23. a) Secondary veins distinctly parallel virtually and straight to leaf margin 24
- b) Secondary veins not distinctly parallel..... 27
- 24. a) Leaves discolorous (upper and lower surfaces different colours)..... 25
- b) Leaves not discolorous 26
- 25. a) Leaves & young branchlets often whorled in 3s or 4s; leaves stiff, shiny green above – *Garcinia* (p. 354)
- b) Not as above..... *Parinari* (p. 78), *Ozoroa* (p. 280)
- 26. a) Leaves held on one plane; veins loop near margin *Bridelia* (p. 262)
- b) Not as above..... *Baphia* (p. 164), *Berchemia* (p. 316), *Croton gratissimus* (p. 264)

Parallel lateral (secondary) veins



Berchemia discolor



Ozoroa longipes



Bridelia tenuifolia



Croton gratissimus

- 27. a) Drooping tree with most branches hanging vertically down 28
- b) Plant not as above 29
- 28. a) Growing along verge of perennial watercourses – *Salix* (p. 12)
- b) Usually growing near ephemeral watercourses or pans – *Euclea pseudebenus* (p. 396)
- 29. a) Mature leaves mostly < 20 mm long 30
- b) Most leaves > 20 mm 31 (p. xx)
- 30. a) Leaves obovate, shiny, sticky-looking, very undulate – *Rhigozum trichotomum* (p. 458)
- b) Leaves generally very narrow to linear Box L

Box L. Leaves simple, entire, mostly < 20 mm long, generally very narrow to linear; plant without thorns, spines or spine-tipped branches

1. a) Small, round, much-branched sub-shrub; leaves at most 6 x 1 mm; calyx densely bristly; south *Gaillonia* (p. 486)
- b) Leaves linear-oblong, elliptic or broadly lanceolate; dull waxy covering; flowers small, white; fruit an ovoid capsule on the ends of branchlets.....*Montinia* (p. 76)
- c) Leaves clustered.....2
2. a) Leaves up to 9 x 3 mm; fruit a 2-valved capsule; SE – *Rhigozum obovatum* (p. 458), *Antherothamnus* (p. 454)
- b) Leaves 10–20 mm long, leathery; flowers and fruit bright red – *Nymania* (p. 328)
- c) Leaves 3–10 mm long, up to 4 mm wide; flowers with many stamens, no petals – *Boscia foetida* (p. 62), *Maerua parvifolia* p. 70)
31. a) At least some leaves with fine, hair-like tip or spine at apex – Cappareae (p. 56), *Combretum* (p. 360), *Adenium boehmianum* (p. 422)
- b) Leaf apex not as above32

Hair-like leaf tip



Combretum imberbe



Ozoroa insignis

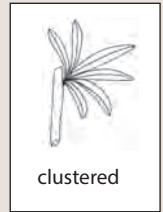


Boscia mossambicensis
(Cappareae)

32. a) Leaves distinctly grey, elliptic-obovate, contrasting with very dark stem; shrub; NW – *Cadaba schroepelii* (p. 66)
- b) Leaves not as above.....33
33. a) Leaves and/or branches in whorls of 3s or 4s.....34
- b) Leaves and branches not as above35
34. a) Leaves and branches whorled, rigid; leaves shiny, dark green; fruit an orange berry; NE – *Garcinia* (p. 354)
- b) Branches whorled, rigid; leaves small, clustered; subshrub – *Rhigozum trichotomum* (p. 458)
- c) At least some leaves whorled – *Ozoroa schinzii* (p. 286), *Combretum* (p. 360), *Clerodendrum* (p. 442), *Premna sinensis* (p. 504)
35. a) Leaves mostly clusteredBox M
- b) Leaves not distinctly clustered36 (p. xx)
36. a) Leaves distinctly opposite Box N
- b) Leaves not distinctly opposite37 (p. xx)

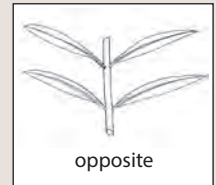
Box M. Leaves simple, clustered, margins entire

1. a) Leaves discoloured – *Elaeodendron* (p. 306), *Tarchonanthus* (p. 490), *Ozoroa crassinervia* (p. 280)
b) Leaves not discoloured 2
2. a) Leaves clustered on short, warty shoots and branch tips; leaf apex blunt or often shallowly notched; far NW and E Zambezi Region – *Manilkara* (p. 392)
b) Not as above 3
3. a) Leaves large (60–200 mm long), velvety, mostly with distinctly undulate margins, usually clustered at branch tips – *Adenium* (p. 422)
b) Leaves very large (750–1500 mm long), hairless, base running down petiole; E Zambezi Region – *Anthocleista* (p. 503)
c) Not as above 4
4. a) Fruit winged – *Securidaca* (p. 242), *Terminalia* (p. 380)
b) Not winged 5
5. a) Fruit a capsule, splitting open when ripe; ovary inferior – *Montinia* (p. 76)
b) Fruit a berry 6
6. a) Berry > 10 mm long; cupped by a persistent calyx – *Diospyros* (p. 398)
b) Berry < 7 mm long, or if longer, lacking calyx – *Ehretia* (p. 434), *Boscia albitrunca* (p. 60)



Box N. Leaves simple, distinctly opposite, margins entire

1. a) Leaves long and narrow, never hairy – *Olea* (p. 406), *Euclea* (p. 394)
b) Not as above 2
 2. a) Young bark often peeling in threads or discs; leaves sometimes in whorls of 3 or 4; fruit winged – *Combretum* (p. 360), *Pteleopsis* (p. 503)
b) Not as above 3
 3. a) Leaves leathery with conspicuous venation, veins sunken above, mucronate – *Psidium* (p. 512)
b) Not as above 4
 4. a) Leaves semi-succulent, smooth; common in ephemeral rivers – *Salvadora* (p. 408)
b) Leaves hairy, venation prominent below – *Schrebera* (p. 406)
c) On banks of perennial rivers in north; flowers fluffy; fruit fleshy – *Syzygium* (p. 386)
d) Not as above – *Tinnea* (p. 444)
-
37. a) Leaves mostly long and narrow, with sides virtually parallel 38
b) Not as above 40
 38. a) Leaves up to 3 mm wide, 7–40 mm long; far NW – *Boscia microphylla* (p. 62)
b) Leaves > 3 mm wide 39
 39. a) Leaves aromatic and hairy – *Tarchonanthus* (p. 490), *Pechuel-Loeschea* (p. 492)
b) Tall, erect tree near water; bark dark, rough; leaves dark, leathery, shiny dark green above – *Diospyros mespiliformis* (p. 402)
c) Not as above – *Protea* (p. 30)
 40. a) Leaves seldom longer than 50 mm, stiffish, margins usually very undulate – *Euclea* (p. 394)
b) Not as above 41



41. a) Leaf surface with sandpapery or harsh texture – *Cordia* (p. 432)
 b) Leaf surface not as above 42
42. a) Leaves much paler below than above – *Pouzolzia* (p. 30); *Croton* (p. 264); *Ozoroa crassinervia* (p. 282)
 b) Leaves not much paler below than above 43
43. a) Mature leaves thick, with leathery texture – *Philenoptera nelsii* (p. 176); *Antidesma* (p. 260); *Ozoroa crassinervia* (p. 282)
 b) Mature leaves not thick and leathery 44
44. a) Leaves alternate and distichous (carried in one plane) Box O
 b) Leaves not as above 45 (p. XX)

Box O. Leaves simple, alternate with all leaves held on one plain (distichous), margins entire

1. a) Leaves slightly fleshy; stiffly branched, untidy shrub, often with many dead-looking branches – *Opilia* (p. 32)
 b) Not as above 2
2. a) Leaf apex narrow; leaf curved backwards, often folded along midrib – *Olax* (p. 34)
 b) Leaf apex broad; leaf seldom curved or folded – *Annonaceae* (p. 498), *Phyllanthus* (p. 258), *Margaritaria* (p. 260), *Bridelia* (p. 262)

Leaves held on one plain



Bridelia tenuifolia



Olax dissitiflora



Flueggea virosa

45. a) Mature leaves large (up to 100 x 50 mm); grows near water; Zambezi Region – *Antidesma* (p. 260), *Turraea* (p. 240)
 b) Mature leaves < 60 mm long or < 20 mm wide 46
46. a) Leaves thin-textured, obovate; fruit a small, white berry – *Flueggea* (p. 258)
 b) Not as above 47
47. a) Leaves long, slender, drooping; bark often peeling in large strips; tall tree – *Eucalyptus* (p. 512)
 b) Leaves undulate, stiff, hard, thick, leathery – *Euclea asperima* (p. 394)
 c) Leaves shiny, lacquered, often carried erect – *Dodonaea* (p. 510)
 d) Leaves downy, underside and petiole with rust-brown hairs, apex notched – *Pseudolachnostylis* (p. 256)
 e) Leaves slightly fleshy, waxy; young branches angular; flowers tiny, with 4 petals – *Osyris* (p. 32), *Montinia* (p. 76)
 f) Not as above – *Boscia tomentosa* (p. 64), *Maerua schinzii* (p. 72), *Diospyros* (p. 398), *Ipomoea* (p. 430)