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A key to the species of bluebushes (*Maireana* species) of the arid southern shrublands of Western Australia

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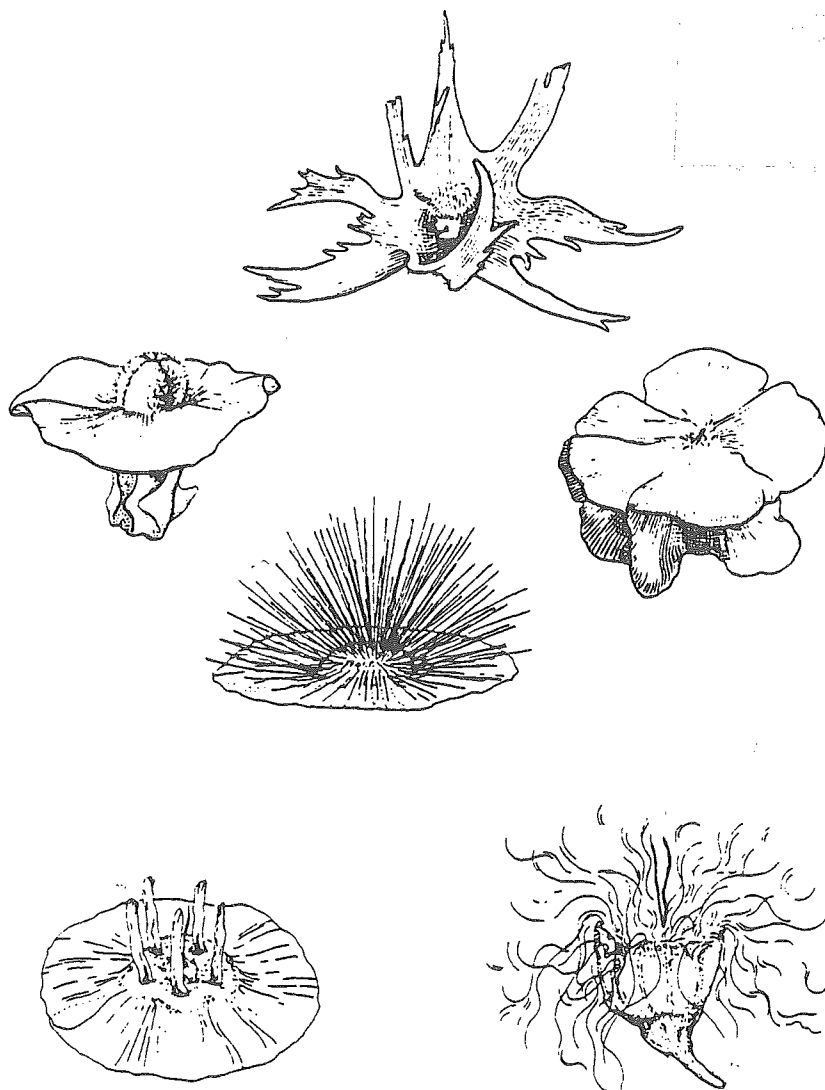
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A KEY TO THE SPECIES OF BLUEBUSHES
(*MAIREANA* SPECIES)
OF THE ARID SOUTHERN SHRUBLANDS OF
WESTERN AUSTRALIA

Hugh Pringle and Ray Cranfield



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**A KEY TO THE BLUEBUSHES (*MAIREANA* SPECIES)
OF THE ARID SHRUBLANDS REGION OF WESTERN AUSTRALIA**

**Adapted from Paul Wilson's treatment of chenopods
in Volume 4, Flora of Australia 1984**

by Hugh Pringle¹ and Ray Cranfield²

1 Natural Resources Assessment Group, Western Australian Department of Agriculture

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March 1995

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Introduction

This field key has been produced to make identification of *Maireana* species (the bluebushes) easier in the arid shrublands region of Western Australia. It attempts to use everyday terms rather than technical botanical terms wherever possible and includes an illustrated diagram for ease of identification. A flow diagram – as opposed to traditional botanical keys – allows for visual tracking of steps taken in the key and hence makes it easier to backtrack if the final identified species seem incorrect.

Fruit characters alluded to at various steps in the key are also presented, and drawings of each species' fruits are also included to provide a quick check of final identifications. Once a species is identified, more information about it can be obtained in the section describing each species' appearance, habitat, distribution and pastoral and ecological indicator value (where known).

A section on common taxonomic teasers – those species which are most commonly confused – is presented. Vegetative as well as fruit characteristics are provided for discriminating between species in these difficult groups. The key has been adapted from Paul Wilson's key published in Volume 4 of the Flora of Australia series in 1984.

The genus *Maireana* of the chenopod family was named after French naturalist Charles Lemaire (1800–1871). The species of this genus are collectively known as the bluebushes, and they form an important part of many native plant communities in mainland Australia, particularly in uncleared inland areas. Bluebushes vary from small annual or biennial herbs such as cottony bluebush (*M. carnosa*) to very long-lived woody shrubs over a metre in height such as pearl bluebush (*M. sedifolia*).

Bluebushes generally carry both male and female flowering parts, although in some species such as Gascoyne bluebush (*M. polypterygia*) and often spiny bluebush (*M. aphylla*) there are male and female plants. Fruits are essential to correctly identify many bluebush species, however people with experience in the field can usually tell most of them apart on habit, branchlet and leaf characteristics. It is worthwhile regularly checking field identifications with fruit characteristics in a key to make sure unfamiliar species are not being 'lumped' with a familiar species.

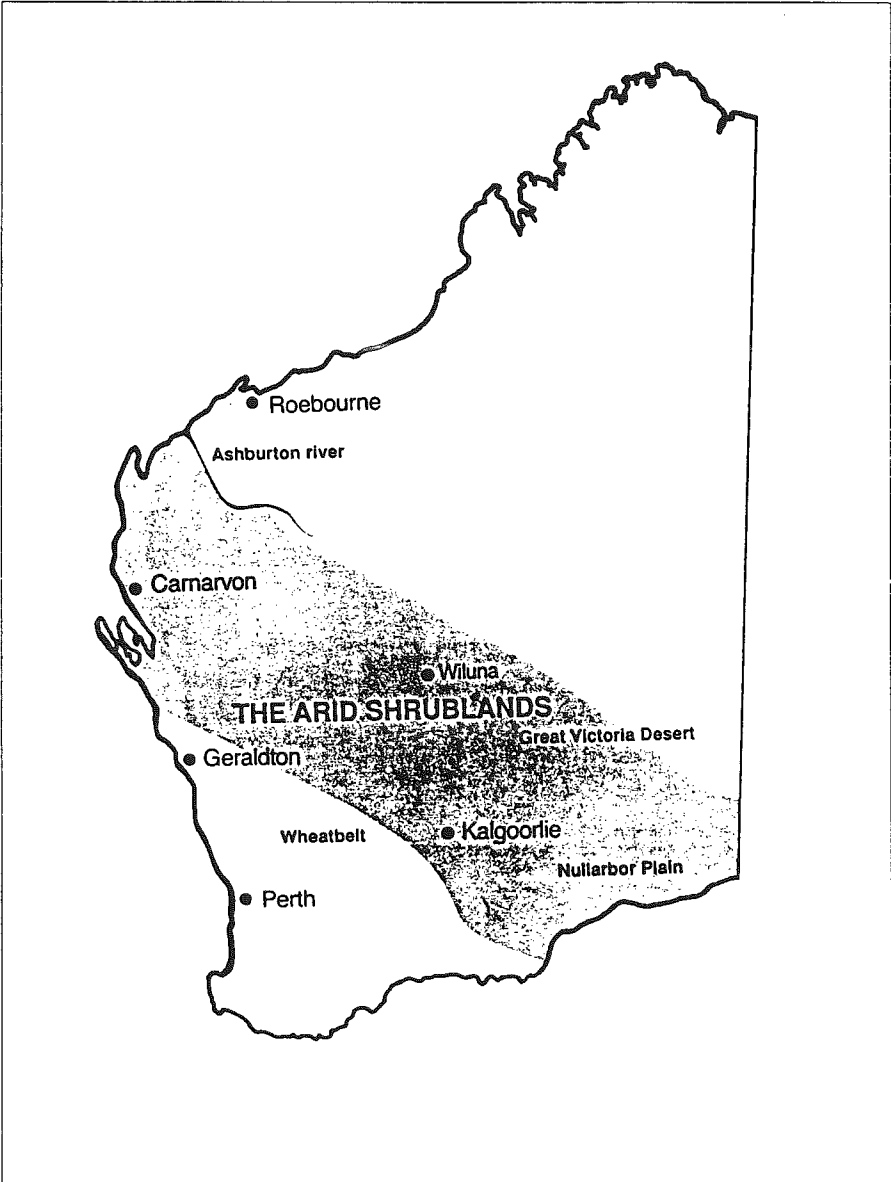
There are several plants that can be confused with bluebushes. The most common of these are the bindiis (*Sclerolaena* species), ruby saltbush (*Enchylaena tomentosa*), wallaby saltbush (*Threlkeldia diffusa*), roly poly (*Salsola kali*), cannon balls (*Dissocarpus paradoxus*) and false blue bush (*Cratystylis conocephala*).

Bindiis have prickly fruits which usually leave pronounced scars down the branchlets of these plants. Ruby saltbush has a fleshy yellow, orange or red fruit. It is most similar to golden bluebush, but has smooth dark main branches (sometimes slightly red, but not untidy from old leaves like three winged bluebush). It extends to the Kimberley. Wallaby saltbush is a coastal plant with a hard rounded fruit (unlike the winged bluebush fruits). Roly poly is a short-lived plant with a prickly spine on the end of each leaf. Cannon balls occurs on clay and calcareous soils and have large prickly spherical fruits – hence the name. False bluebush is easily mistaken for pearl bluebush at a glance. However, it is a daisy and its daisy flowers are very different to blue bush fruits. Its leaves also have an aromatic smell when crushed.

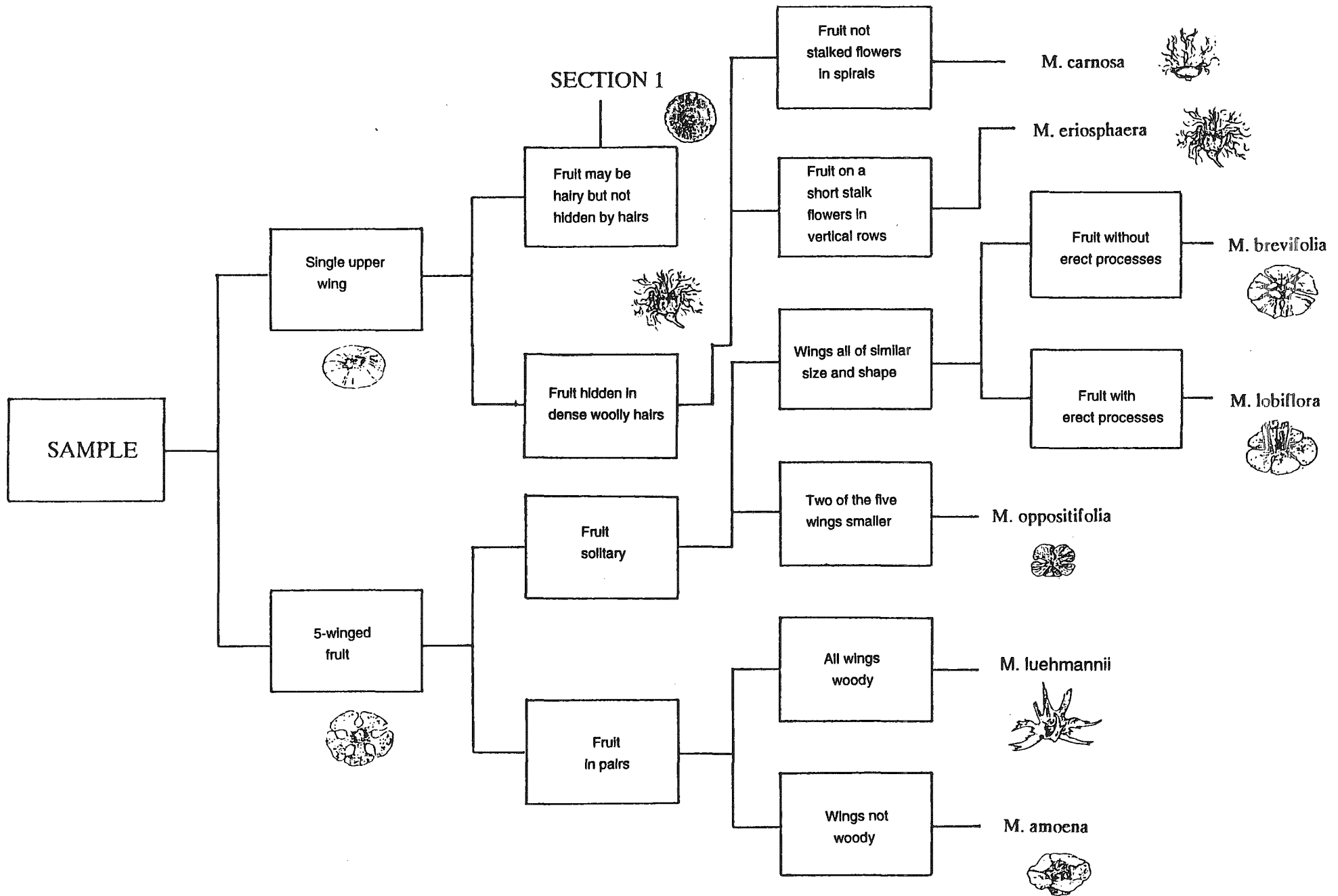
The area covered by this key is the arid shrublands region of Western Australia which extends from the Nullarbor Plain to the Pilbara, abutting the north-eastern agricultural areas of the south west of the State, and deserts east of the Pilbara, Gascoyne, Murchison and Goldfields and north of the Nullarbor Plain (Fig. 1). Golden bluebush (*M. georgei*) is the only bluebush found in the Kimberley region.

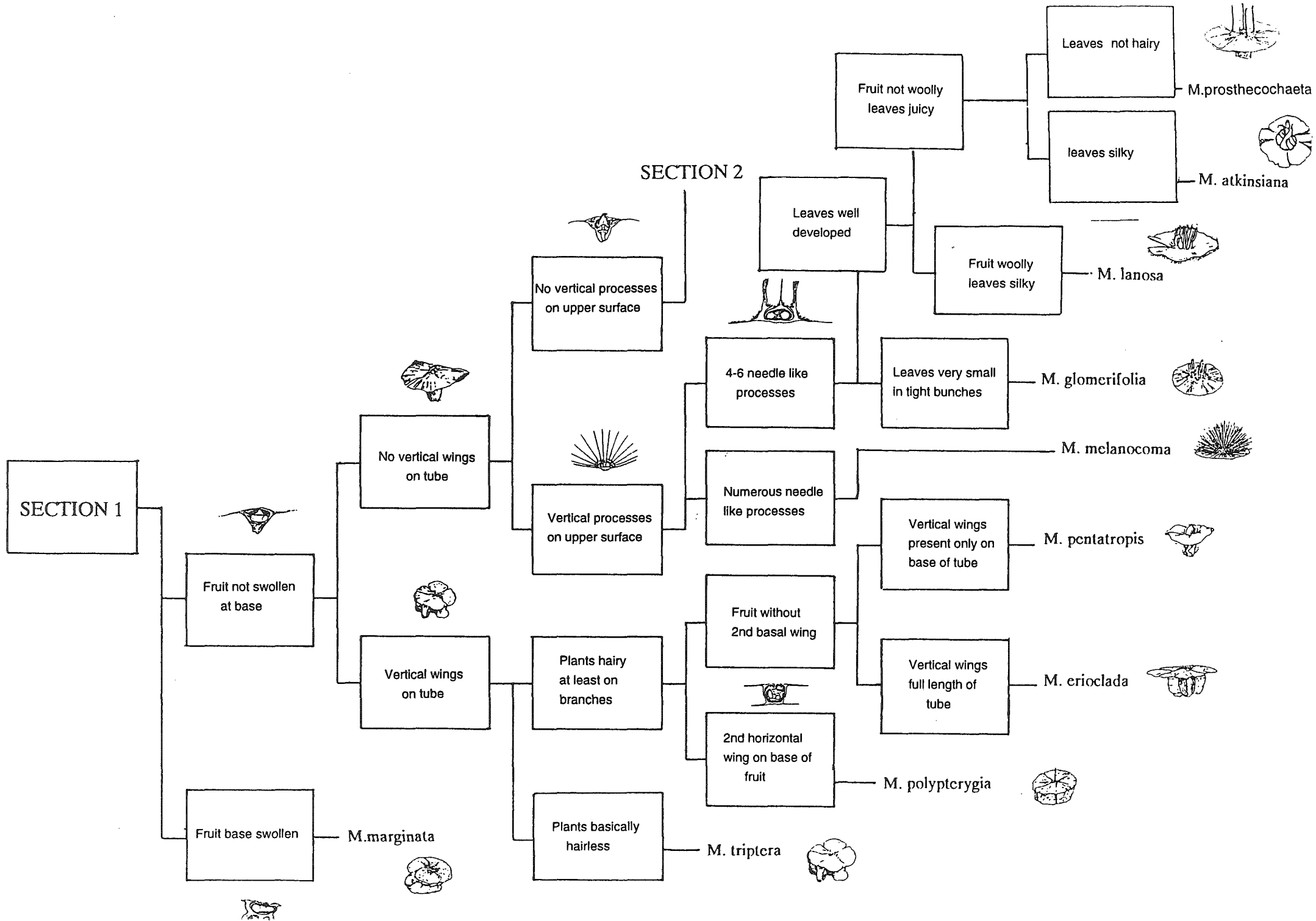
The species descriptions are brief, references are provided for more detailed taxonomic and general information.

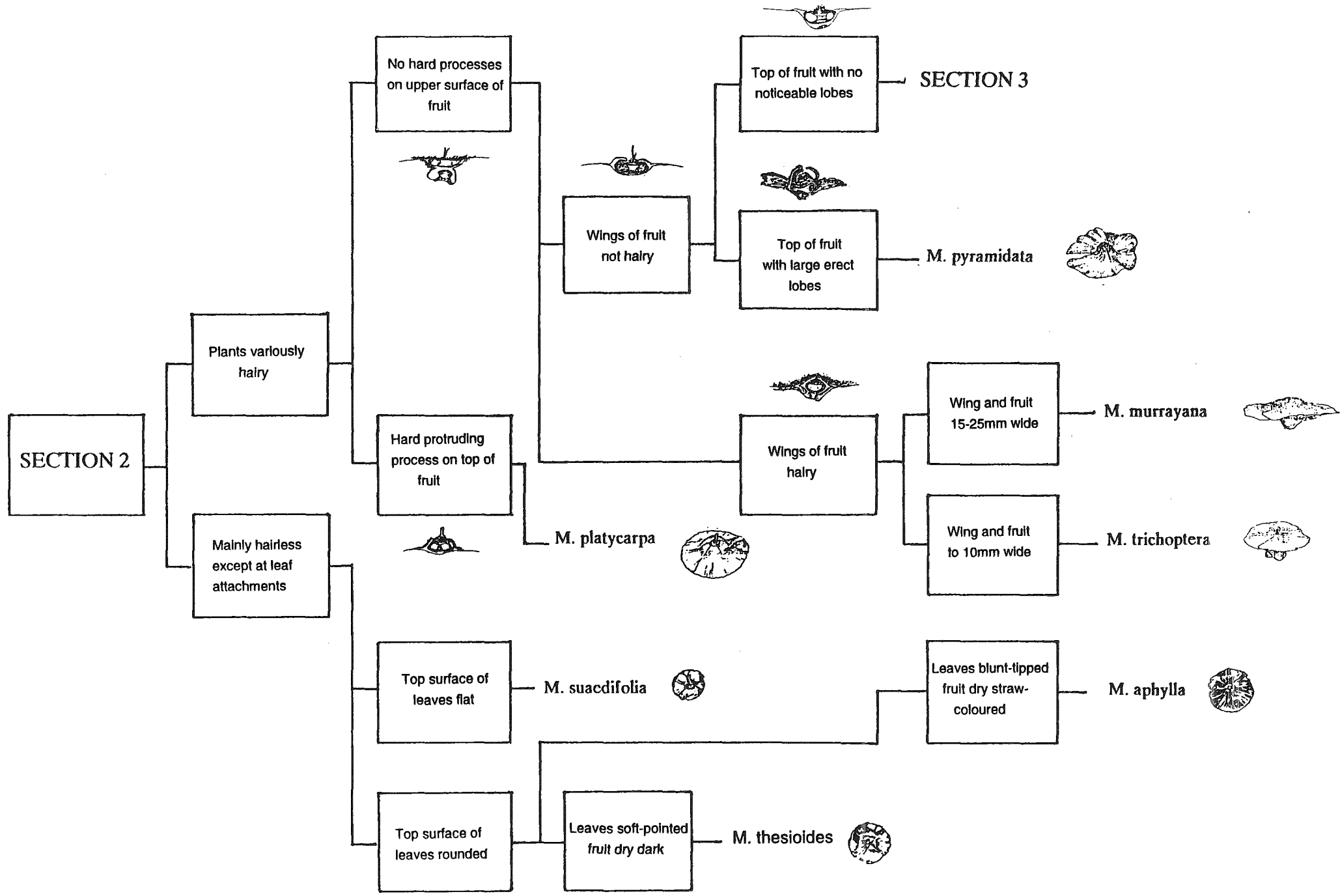
Figure 1. The arid shrublands of Western Australia (from Mitchell and Wilcox 1988)

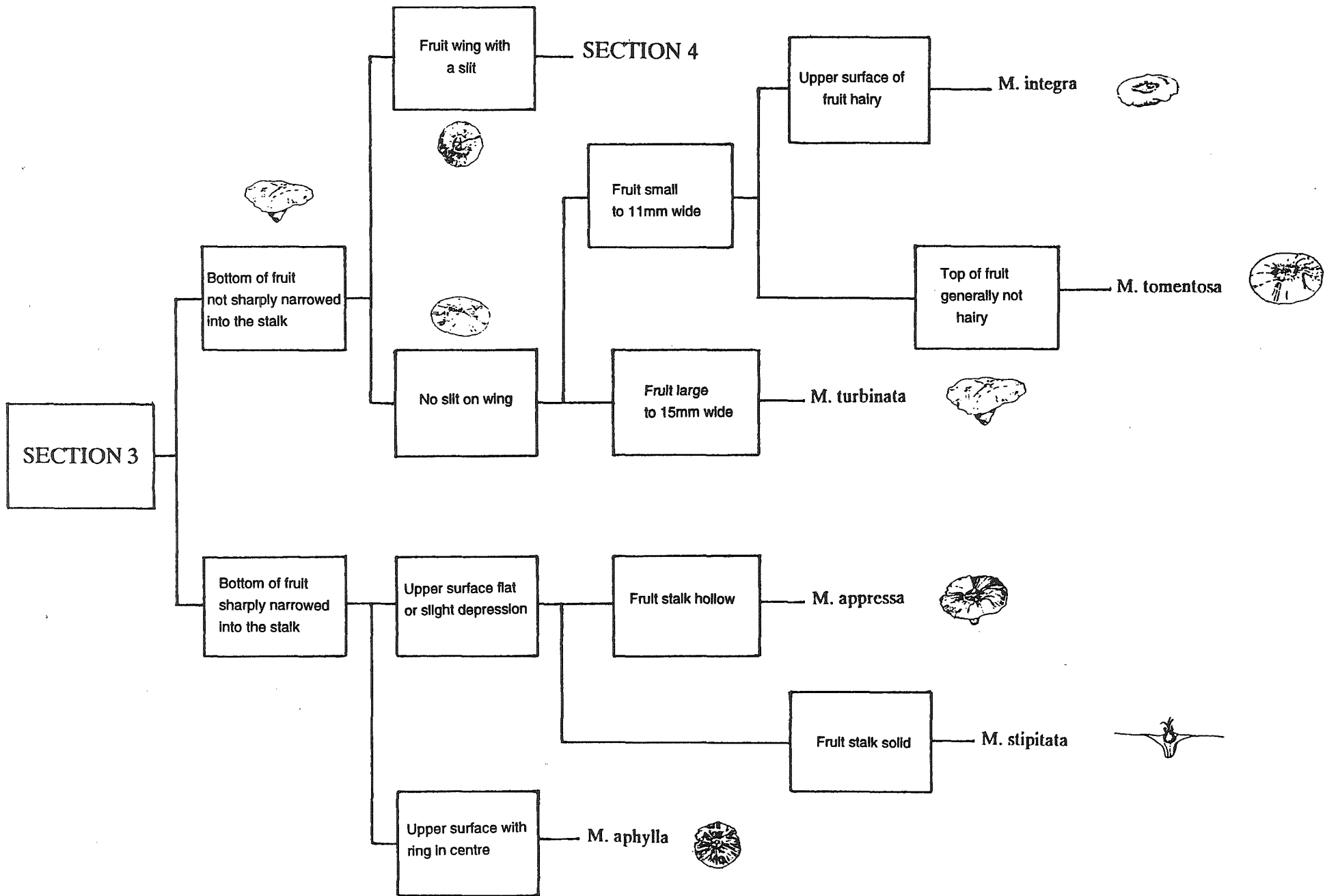


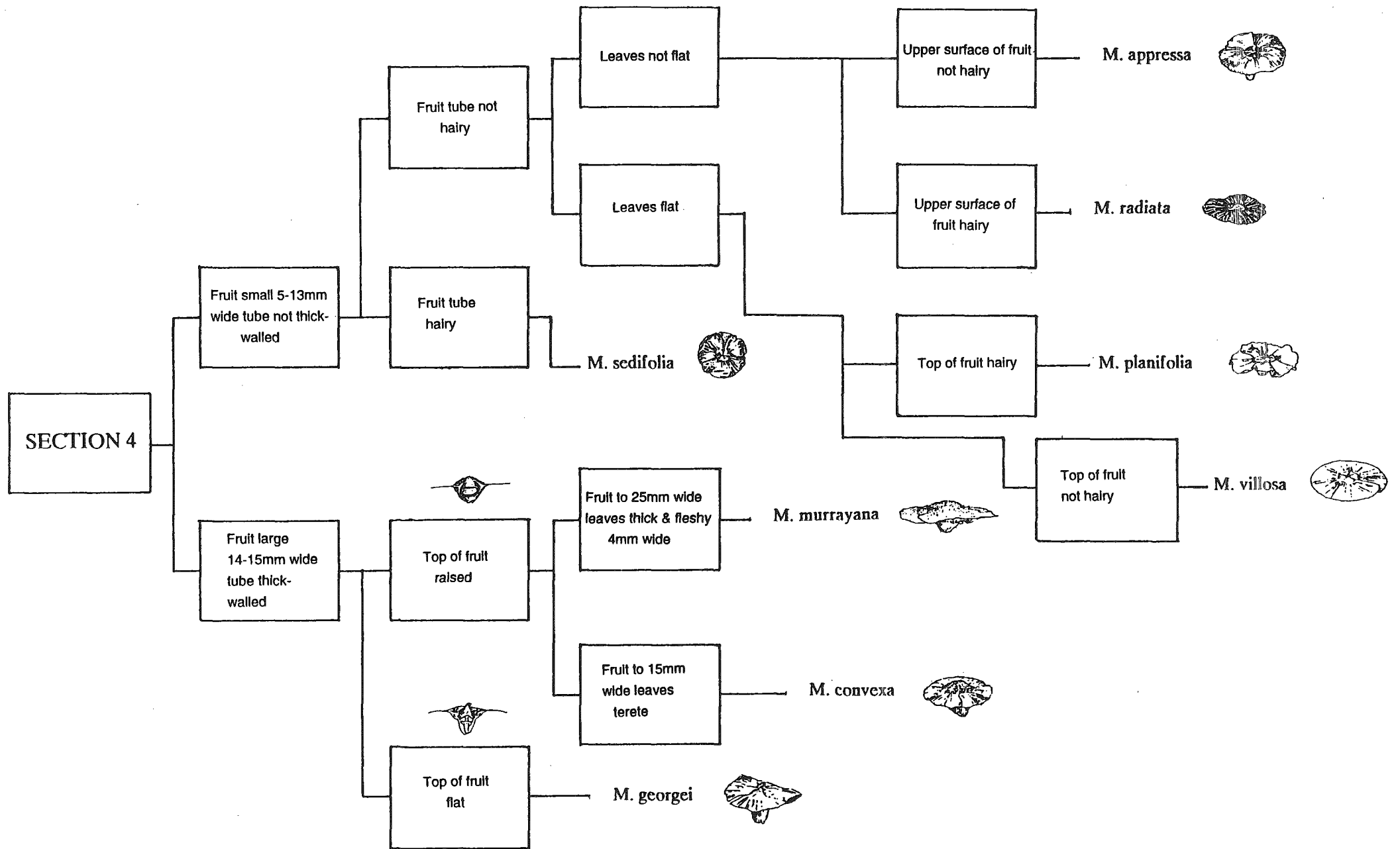
Illustrated key











Species descriptions

Maireana amoena

Brittle bluebush



(x6)

Habit: Brittle shrub to 40 cm high. Leaves fleshy, bright green, short (less than 6 mm long), hairless to fine hairs. Fruit tubes hairless, woolly or hairy, woody, wings (papery) 5 horizontal 1.5–3 mm long usually with 5 radial ridges.

Habitat: Brittle bluebush occurs on saline texture contrast soils, around salt lakes. It is usually found growing within larger, longer-lived low shrubs.

Pastoral and ecological indicator value: Brittle bluebush is attractive to stock and is usually grazed back to the level of the larger shrubs in which it grows. It is one of the shorter-lived perennial species and hence its abundance is to a large extent determined by recent seasons.

Distribution: Brittle bluebush is found inland in the Gascoyne, Murchison and Goldfields regions of Western Australia.

References: Wilson (1984) p. 188
George (1981) p. 60

Maireana aphylla

Spiny bluebush



(x3.5)

Habit: Erect spreading spiny shrub to 2 m high (but usually around a metre high). Leaves woolly, nearly cylindrical, spurred at base, 1–4 mm long. Fruit tube hairless, wing simple, papery, horizontal, 8 mm diam., single slit. Top of fruit with a raised circular disc in the middle, hairy.

Habitat: Spiny bluebush occurs on floodplains with heavy soils.

Pastoral and ecological indicator value: Young spiny bluebush plants are attractive to stock and are nutritious. Crude protein values of approximately 15% have been recorded for fresh growth. As plants mature they become more spiny, less attractive to stock and more tolerant to grazing. Grazing can suppress recruitment and widespread deaths of plants from grazing would indicate particularly severe overgrazing. Spiny bluebush does not usually increase in abundance due to excessive grazing, however its occasional abundance in heavily grazed areas around water points indicates it does sometimes act as an increaser.

Distribution: Spiny bluebush occurs on coastal plains around Carnarvon and in isolated pockets further east to Wiluna. It also occurs in all mainland states.

References: Wilson (1984) p. 212
Mitchell and Wilcox (1988) p. 194
George (1981) p. 64

Maireana appressa



Habit: Tangled white woolly branched shrub 10–60 cm high. Leaves narrow, fattening towards the tips, 2–5 mm long. Fruit tube on a hollow stalk (1 mm long), thin walled, wing simple, papery, horizontal, 10 mm diam., faintly nerved, with a single slit. Top of fruit sunken with 5 ridges extending between lobes.

Habitat: *M. appressa* occurs on saline alluvial plains with texture contrast soils and on gypseous soils, particularly around salt lakes.

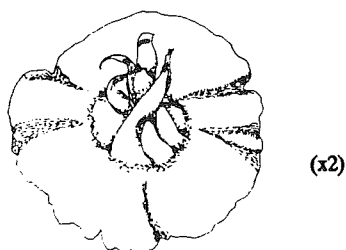
Pastoral and ecological indicator value: *M. appressa* is not readily grazed by stock and being one of the shorter-lived bluebushes, its abundance is influenced considerably by recent seasonal history.

Distribution: *M. appressa* occurs through the southern shrublands from Camarvon almost through to Esperance, but not extending onto the Nullarbor karst. Also found in all other mainland states.

References: Wilson (1984) p. 212
George (1981) p. 64

Maireana atkinsiana

Bronze bluebush



Habit: Erect brittle tangled slightly woolly branched shrub to 60 cm high. Leaves fleshy, slightly hairy, fattening towards the tips, 5–10 mm long. Fruit tube hairless, thin walled, pink to red, when immature and bronze at maturity, 10 ribbed, wing simple, horizontal, 18 mm diam. Top of fruit domed, woolly, 5 lobed, 2 of the lobes with a pair of erect narrow processes, 6 mm high, 1 lobe with a single process, the other two without.

Habitat: Bronze bluebush is commonly found on alluvial plains with texture contrast saline soils, particularly surrounding salt lake systems.

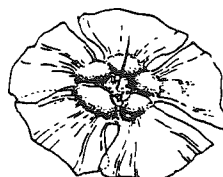
Pastoral and ecological indicator value: Bronze bluebush is a highly palatable perennial shrub and is a reliable indicator of range condition. It is susceptible to overgrazing and often shelters palatable short-lived species such as brittle bluebush (*M. amoena*) and *Sclerolaena eurotioides*.

Distribution: Bronze bluebush occurs through the southern shrublands from Camarvon to the western margin of the Nullarbor karst and east to the edge of the Great Victorian Desert.

References: Wilson (1984) p. 204

Maireana brevifolia

Small leaf bluebush



(x4.5)

Habit: Erect slender shrub with striped, sparsely woolly branches to 1 m high. Leaves fleshy, nearly cylindrical, fatter in middle, 2–5 mm long, hairless. Fruit tubes hairless, thin walled, wings 5, fan shaped, horizontal 2–3 mm long with brown veins.

Habitat: Small leaf bluebush occurs on alluvial plains with weakly saline soils.

Pastoral and ecological indicator value: Small leaf bluebush is grazed by sheep, particularly in poor seasons. It aggressively invades degraded or disturbed areas and its predominance indicates sub-optimal range condition.

Distribution: Small leaf bluebush occurs from Carnarvon to the south coast and in south eastern Australia. It is also very common around the townsite and mine sites of Kalgoorlie (almost certainly introduced).

References: Wilson (1984) p. 188
George (1981) p. 60

Maireana carnosa

Cottony bluebush or rope plant



(x5)

Habit: Erect woolly branched weakly perennial shrub to 30 cm high but usually 15–20 cm high. Leaves thicker in the middle, with pointed tips, 10 mm long, silky to woolly or almost hairless. Fruit tubes covered in a thick mass of wool 8 mm diam., which are held spirally on erect stems.

Habitat: Cottony bluebush occurs in a wide variety of habitats, favouring run-on areas, which sometimes have weakly to moderately saline soils.

Pastoral and ecological indicator value: Cottony bluebush is grazed by sheep, however it is a seasonal species and hence best indicates current or very recent seasonal conditions.

Distribution: Cottony bluebush is found from the Exmouth peninsula and inland to south of Kalgoorlie but not extending onto the Nullarbor karst.

References: Wilson (1984) p. 193
Mitchell and Wilcox (1988) p. 46
George (1981) p. 60

Maireana convexa

Mulga bluebush



(x2.5)

Habit: Erect open spreading, woolly branched perennial shrub 1–2 m high. Leaves fleshy, nearly cylindrical, 10–20 mm long sparsely hairy. Fruit tubes hairless, thick walled, wing 15 mm diam., papery, horizontal with a single slit. Top of fruit woolly with a central dome.

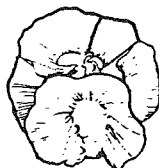
Habitat: Mulga bluebush is found on neutral to acidic soils ranging from hillslopes to broad hardpan plains, usually with mulga (*Acacia aneura*).

Pastoral and ecological indicator value: Mulga bluebush is preferentially grazed by sheep, but is apparently not as attractive to cattle. Its removal from communities indicates excessive grazing pressure, however its presence does not necessarily indicate good range condition as it appears to volunteer quite readily in good seasons (particularly on disturbed areas such as old mine sites and road verges). In undisturbed areas with a good mix of other palatable species its presence indicates very good range condition; it is generally the first species removed from the types of community in which it is found.

Distribution: Mulga bluebush is found in the southern (hardpan plain) shrublands north of Kalgoorlie towards, but not including coastal plains south of the Pilbara.

References: Wilson (1984) p. 197
Mitchell and Wilcox (1988) p. 196
George (1981) p. 62

Maireana erioclada



(x1.5)

Habit: Erect white woolly branched shrub to 60 cm high. Leaves fleshy, hairless, nearly cylindrical, but often thicker nearer the tip, 10 mm long. Fruit tube hairless with 5 vertical wings that are attached to the horizontal wing. Horizontal wing simple, 12 mm diam., with a single slit. Top of fruit domed, wing margins ciliated.

Habitat: *M. erioclada* is most frequently observed in disturbed areas along roads and tracks.

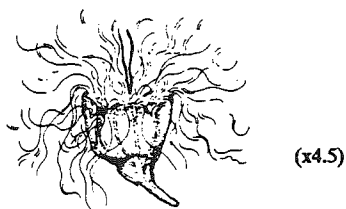
Pastoral and ecological indicator value: It is not known whether *M. erioclada* is grazed by stock, it is an invader of disturbed areas.

Distribution: *M. erioclada* occurs in the extreme south of Western Australia extending through to South Australia, Victoria and New South Wales.

References: Wilson (1984) p. 201

Maireana eriosphaera

Silky bluebush



Habit: Erect open woolly branched perennial shrub to 30 cm high. Leaves thin and straight, sometimes slightly thicker in the middle with pointed tips, 10 mm long, silky. Fruit tubes stalked, covered in dense long silky wool, thin walled, wing horizontal. Topped with 5 pointed lobes 1 mm long, hidden in dense long hair.

Habitat: Silky bluebush favours saline soils such as those found below breakaways and surrounding salt lakes.

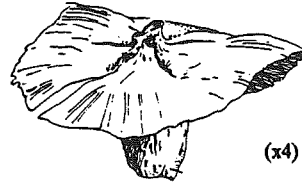
Pastoral and ecological indicator value: Silky bluebush is grazed by sheep but the predominant influence on its abundance is season. It provides a useful indicator of current grazing pressure.

Distribution: Silky bluebush is found in the eastern shrublands extending onto the north western edge of the Nullarbor karst.

References: Wilson (1984) p. 193
George (1981) p. 60

Maireana georgei

Golden bluebush or George's bluebush



Habit: Rounded woolly branched perennial shrub to 50 cm high, but usually 20–30 cm high. Leaves fleshy, slender, nearly cylindrical, 8–15 mm long, sparse to dense silky hairs. Fruit tubes hairless, thick walled, wing 15–20 mm diam., horizontal with a single slit, top flat.

Habitat: Golden bluebush is found in a variety of habitats ranging from breakaway footslopes and salt lake margins with saline soils to (presumably) non-saline soils supporting mulga (*Acacia aneura*) communities.

Pastoral and ecological indicator value: Golden bluebush is grazed by stock, more readily than most other bluebushes but not in preference to fresh herbage. Its attractiveness to stock is much greater in mulga communities and in stony upland areas than it is on highly saline breakaway footslope or adjacent to salt lakes. It is a sensitive indicator of good range condition in stony chenopod communities, however its absence from mulga communities is probably quite natural.

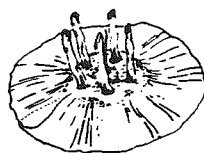
This species appeared not to be grazed by stock around Lake Ballard and further south, where it would hence appear not to be a reliable indicator of range condition.

Distribution: Golden bluebush is common in inland areas south of Roebourne and extending to south of Kalgoorlie and the Nullarbor. It is widespread in the drier parts of the other mainland states of Australia.

References: Wilson (1984) p. 196
Mitchell and Wilcox (1988) p. 198
George (1981) p. 62

Maireana glomerifolia

Ball leaf bluebush



(x2.5)

Habit: Erect open spreading, woolly branched shrub to 60 cm high. Leaves fleshy, woolly in tight ball like structures, 1.5 mm long. Fruit tube thin walled, hairless, wing simple or 5 lobed, horizontal, 15 mm diam., with a single slit (simple wing form). Top of fruit woolly, domed, 5 lobed, 2 lobes paired with erect oblong processes to 6 mm high, 1 lobe with a process others without any process.

Habitat: Ball leaf bluebush occurs on saline soils fringing salt lakes, below breakaways and on stony plains and lower footslopes of weathered hills.

Pastoral and ecological indicator value: Ball leaf bluebush is preferentially grazed in many of the types of community in which it is found. Although it is reasonably tolerant to grazing, it can be removed by excessive grazing.

Distribution: Ball leaf bluebush occurs in inland areas of the southern shrublands north west of the Nullarbor karst and south of Carnarvon.

References: Wilson (1984) p. 203
Mitchell and Wilcox (1988) p. 200
George (1981) p. 63

Maireana integra



(x2.5)

Habit: Erect woolly branched shrub to 1 m high. Leaves woolly, nearly cylindrical, 5–14 mm long. Fruit tube hairless, wing simple, horizontal, 10 mm diam., top of fruit flat, hairy.

Habitat: *M. integra* is found on a variety of weakly saline and non-saline soils with mulga (*Acacia aneura*).

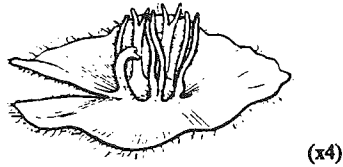
Pastoral and ecological indicator value:

Distribution: *M. integra* occurs in the southern Goldfields of Western Australia, extending eastwards through South Australia and the Northern Territory to the rangelands on New South Wales.

References: Wilson (1984) p. 209
 George (1981) p. 63

Maireana lanosa

Woolly bluebush



Habit: Small spreading woolly branched shrub to 50 cm high. Leaves, nearly cylindrical, often thicker towards middle or tip, 4–20 mm long, with silky hairs. Fruit tubes few haired, leathery, wing simple, 7–12 mm diam., horizontal, with a single slit. Topped with 4 + 2 erect processes 3–4 mm long on either side of slit.

Habitat: Woolly bluebush is found on non-saline loamy to sandy soils on plains.

Pastoral and ecological indicator value: Woolly bluebush is not generally grazed by stock on the Carnarvon coastal plain but is readily grazed on the Ashburton flood plain.

Distribution: Woolly bluebush occurs in the north west of Western Australia, and also in the other mainland states.

References: Wilson (1984) p. 190
Mitchell and Wilcox (1988) p. 202
George (1981) p. 60

Maireana lobiflora
Flannel flower bluebush



(x3)

Habit: Spreading perennial herb or shrub to 50 cm high with woolly branches. Leaves long and thin, sometimes slightly tapered at each end, 7–15 mm long. Fruit tubes leathery, woolly, wings 5, horizontal, spathulate to fan shaped, to 10 mm diam. with 4 + 2 erect processes 4 mm long.

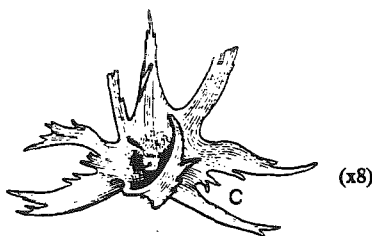
Habitat: *M. lobiflora* occurs on saline alluvial plains.

Pastoral and ecological indicator value:

Distribution: *M. lobiflora* occurs inland of Shark Bay, and in small areas in the interior and on the south coast near Esperance. It is considerably more widespread in south eastern Australia.

References: Wilson (1984) p. 190
George (1981) p. 60

Maireana luehmannii



Habit: Woody spreading branched perennial to 40 cm high. Leaves alternate, fleshy, to 5 mm long. Fruit tubes hairless, flattened, 10 ribbed, wings 5 (woody) 2–3 mm long often divided into 2 or more lobes.

Habitat: *M. luehmannii* occurs on alluvial plains and sandy rises around salt lakes.

Pastoral and ecological indicator value:

Distribution: *M. luehmannii* has been collected in the upper Ashburton River catchment and extends eastwards into the Northern Territory and South Australia. It is not a common plant in the Ashburton River catchment.

References: Wilson (1984) p. 185
George (1981) p. 59

Maireana marginata



(x6)

Habit: Prostrate to spreading perennial herb to 3 cm high. Leaves fleshy, thin and straight, sometimes slightly thicker in the middle, 5–10 mm long, hairy. Fruit tubes fleshy, constricted in middle, base swollen, 10 rounded ribs, slightly hairy, wing 4–5 mm diam., horizontal.

Habitat: *M. marginata* occurs on heavy loams with gum trees such as York gum (*Eucalyptus loxophleba*).

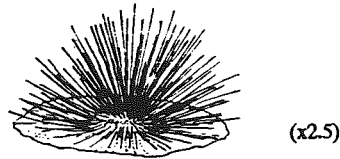
Pastoral and ecological indicator value: Not known.

Distribution: *M. marginata* is found in the south western limits of Western Australia's rangelands around Morawa.

References: Wilson (1984) p. 194

Maireana melanocoma

Pussy bluebush



Habit: Erect weak hairless shrub to 50 cm high. Leaves hairless, nearly cylindrical and often tapering at each end, pointed, 10–20 mm long. Fruit tube hairless, black (dry), gold to red (fresh), thick walled, wing horizontal, simple, 12–16 mm diam. Top of fruit domed with many hair like processes to 6 mm long.

Habitat: Pussy bluebush is found in upland, often stony areas, with a thin veneer of soil on unweathered rock, and occasionally on hardpan plains with mulga.

Pastoral and ecological indicator value: Pussy bluebush is a highly palatable species sensitive to grazing and hence is a reliable indicator of good range condition. Its distribution is rather patchy and hence its absence from an area should not necessarily be interpreted as an indication of grazing impact.

Distribution: Pussy bluebush extends from the Exmouth Gulf to south of Wiluna.

References: Wilson (1984) p. 203
Mitchell and Wilcox (1988) p. 204

Maireana murrayana



Habit: Erect woolly branched shrub 30 cm high. Leaves woolly, thick and fleshy, narrow but broadening towards the tips, 20 mm long. Fruit tubes hairless, woody, wing 20 mm diam., simple, horizontal with a single slit. Top of fruit densely woolly with a slight central dome.

Habitat: *M. murrayana* occurs on sandstone uplands.

Pastoral and ecological indicator value: Not known.

Distribution: *M. murrayana* is a rare plant found inland of Shark Bay.

References: Wilson (1984) p. 197

Maireana oppositifolia



(x4)

Habit: Erect dense shrub to 1 m high. Leaves opposite, spurred, almost oval to 4 mm long, slightly hairy. Fruit tubes hairless, thin walled, wings 5, thin, fan shaped, to 7 mm diam. with obvious veins.

Habitat: *M. oppositifolia* occurs on saline alluvial plains around salt lakes and on coastal mud flats.

Pastoral and ecological indicator value: Not known.

Distribution: *M. oppositifolia* extends in a narrow band from near Shark Bay to the Nullarbor (and west of Esperance), through to South Australia and western Victoria. Its southern occurrences are generally coastal.

References: Wilson (1984) p. 189

Maireana pentatropis
Five winged bluebush



(x2.5)

Habit: Erect woolly branched shrub 60 cm high. Leaves fleshy, hairless, nearly cylindrical 10 mm long. Fruit tube hairless with 3–5 fan shaped vertical wings usually on lower half of tube. Horizontal wing simple 12 mm diam., with a single slit. Top of fruit domed, wing margins hairy.

Habitat: Five winged bluebush is found on calcrete platforms and kopi dunes.

Pastoral and ecological indicator value: Five winged bluebush is not readily grazed by stock and has no value as an indicator of range condition.

Distribution: Five winged bluebush extends from the western Nullarbor and the south coast near Esperance to the interior of Western Australia east of Shark Bay. It has disjunct distributions in south eastern and central Australia.

References: Wilson (1984) p. 201
George (1981) p. 62

Maireana planifolia
Flat leaved bluebush



(x3)

Habit: Erect open woolly branched shrub to 1 m high. Leaves hairy, flattened, slightly thickened toward tips, 8–15 mm long. Fruit tubes hairless, smooth or faintly ribbed, thin walled, wing simple horizontal, 10–14 mm diam., with a single slit. Top of fruit flat, woolly.

Habitat: Flat leaved bluebush is found on non-saline soils, often on hardpan or rock. It is often found with mulga (*Acacia aneura*) on plains and cotton bush (*Ptilotus obovatus*) in upland areas.

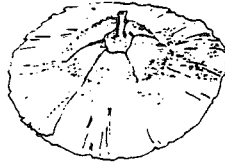
Pastoral and ecological indicator value: Flat leaved bluebush is readily grazed by sheep but is reasonably tolerant of grazing. Its removal from an area would indicate excessive grazing pressure.

Distribution: Flat leaved bluebush extends from the Pilbara coast south to the wheatbelt and east to the Northern Territory and South Australia.

References: Wilson (1984) p. 210
Mitchell and Wilcox (1988) p. 206
George (1981) p. 63

Maireana platycarpa

Shy bluebush



(x1.5)

Habit: Erect brittle woolly branched shrub to 60 cm high. Leaves nearly cylindrical, pointed, silky, 7–12 mm long. Fruit tube hairless, wing simple, horizontal, 15–23 mm diam. Top of fruit domed woolly, style hard and exerted.

Habitat: Shy bluebush occurs on saline texture contrast alluvial soils on floodplains, surrounding salt lakes and less frequently below breakaways.

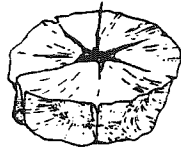
Pastoral and ecological indicator value: Shy bluebush is one of the most preferentially grazed perennial shrubs in the southern shrublands of Western Australia. It is an indicator of good or very good range condition and its decline is a sensitive indicator of grazing impact.

Distribution: Shy bluebush extends from the Gascoyne coast inland towards but not onto the Nullarbor karst.

References: Wilson (1984) p. 203
Mitchell and Wilcox (1988) p. 208
George (1981) p. 63

Maireana polypterygia

Gascoyne bluebush



(x2.5)

Habit: Erect woolly branched shrub to 1 m high. Leaves nearly cylindrical to spatula-like, 8–15 mm long, hairy. Fruit tubes hairless, horizontal wing at base and top with several imperfect vertical papery wings (2 + 4). Upper wing 7–17 mm diam., papery with single slit.

Habitat: Gascoyne bluebush occurs on saline, often alkaline soils on alluvial plains and in narrow upland drainage tracts.

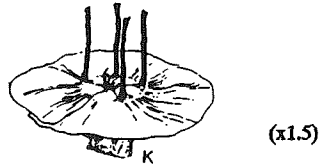
Pastoral and ecological indicator value: Gascoyne bluebush is a highly saline plant however, sheep graze it when they have access to fresh water. Like sago bush, it is fairly tolerant to grazing and hence the less grazing tolerant plants with which it occurs are more reliable indicators of range condition.

Distribution: Gascoyne bluebush occurs in the Gascoyne region of Western Australia, extending along the coast from Shark Bay to the Exmouth gulf.

References: Wilson (1984) p. 200
Mitchell and Wilcox (1988) p. 210

Maireana prosthecochoeta

Killara cactus



Habit: Erect open fleshy branched, densely leaved shrub to 60 cm high. Leaves fleshy, hairless, nearly cylindrical, pointed, 40 mm long. Fruit tube hairless, wing horizontal simple, 15 mm diam., slit only partial. Top of fruit flat 5 lobed with 4 erect linear processes.

Habitat: Saline breakaway footslopes on fine sedimentary rocks and kopi dunes adjacent to salt lakes.

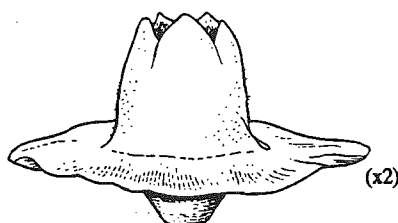
Pastoral and ecological indicator value: Killara cactus is a sensitive decreaser species which may be removed from areas under heavy grazing pressure. It is rarely abundant.

Distribution: From Cue north to the Ashburton River headwaters, inland habitats. The rarity of this plant is probably due to its habitat (soil) specificity.

References: Wilson (1984) p. 204

Maireana pyramidata

Sago bush (or black bluebush in the Eastern States)



Habit: Erect spreading woolly branched shrub to 1.5 m high, but occasionally taller. Leaves nearly cylindrical, pointed, 2–6 mm long, with scattered hairs. Fruit tube pale brown to black, thin walled, few haired, wings papery, horizontal, simple, 12 mm diam., with a single slit. Top of fruit erect 2–4 mm high, hairy.

Habitat: Sago bush occurs on weakly saline texture contrast or clay soils, often over hardpan on alluvial plains around salt lakes, on the footslopes of weathered greenstone hills, and in alluvial pockets in saline granite country.

Pastoral and ecological indicator value: Sago bush is readily grazed immediately following season breaking rains as it responds rapidly. Sheep generally prefer less saline herbage and more palatable perennials such as shy bluebush or saltbushes. Sago bush is drought resistant and provides valuable forage in such times. It takes extremely high (excessive) grazing pressure to adversely affect sago bush. Areas in which sago bush predominates with few other palatable shrubs may be assessed as being poor range condition. In the eastern states, sago bush is regarded as an increaser species at the expense of saltbushes under excessive grazing pressure.

Distribution: Sago bush is common in the Goldfields of Western Australia and occurs in South Australia, New South Wales and Victoria.

References: Wilson (1984) p. 202
Mitchell and Wilcox (1988) p. 212
George (1981) p. 62

Maireana radiata



Habit: Erect dense, woolly branched shrub to 30 cm high. Wool on branches at first white then aging brown. Leaves fleshy, woolly, nearly cylindrical, sometimes thicker near base, 2–4 mm long. Fruit tube hairless, faintly ribbed, wing simple, papery, horizontal, 4–6 mm diam., with a single slit. Top of fruit slightly domed, densely woolly.

Habitat: *M. radiata* occurs on slightly saline or alkaline sandy loams.

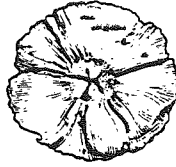
Pastoral and ecological indicator value: Not known.

Distribution: *M. radiata* extends from near Ravensthorpe along the southern coast into South Australia, Victoria and southern New South Wales.

References: Wilson (1984) p. 210
George (1981) p. 64

Maireana sedifolia

Pearl bluebush



(25)

Habit: Erect dense spreading bluish-grey woolly branched perennial shrub to 1.5 m high. Leaves fleshy, hairy, slightly club-shaped, 4–8 mm long rounded at tip. Fruit tubes sparsely woolly, thin walled, wing 10 mm diam., simple, papery, horizontal with a single slit. Top of fruit flat, closely woolly.

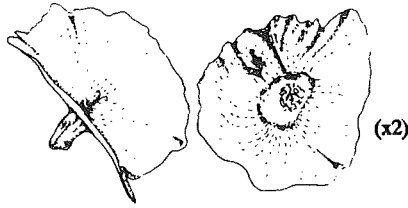
Habitat: Pearl bluebush occurs predominantly on shallow calcareous soils on limestone, calcrete platforms and weathered greenstone hillsides.

Pastoral and ecological indicator value: Pearl bluebush is not readily grazed by stock in most instances, however during prolonged poor seasons sheep have been known to pull through by grazing this shrub. Pearl bluebush is fairly tolerant of grazing and is a very long-lived species, consequently it has little indicator value. It takes persistent overgrazing to remove pearl bluebush, areas in which this has occurred are in extremely poor range condition. Pure stands of pearl bluebush indicate previous overgrazing as there is usually a mix of smaller, more palatable shrubs between pearl bluebushes. Pearl bluebush does not recruit readily and grazing pressure should be lightened when substantial germinations occur. New shoots on old bush mounds are often resprouts rather than germinants, resprouting confers some tolerance to fire and hail storms. It flowers in response to late spring rains, which occur infrequently. It is easily confused with false blue bush (*Cratystylis conocephala*) in the Goldfields. The latter is a perennial daisy.

Distribution: Pearl bluebush extends from the Nullarbor limestone to calcrete platforms and greenstones towards Wiluna. It is also found in South Australia, Northern Territory, New South Wales and Victoria.

References: Wilson (1984) p. 198
Mitchell and Wilcox (1988) p. 214
George (1981) p.
Wotton (unpublished thesis)

Maireana stipitata



Habit: Erect spreading white woolly branched shrub to 1 m high. Leaves fleshy, hairy, nearly cylindrical, 6–10 mm long. Fruit tube compressed, hairy, thin walled, thick stalk, (1.5–3 mm long), wing simple, papery, wavy, horizontal, 10–14 mm diam., with a single slit. Top of fruit either hairy in centre or all over bordered by an erect ring of tissue.

Habitat: *M. stipitata* occurs on weakly saline soils.

Pastoral and ecological indicator value: Not known.

Distribution: *M. stipitata* is restricted to the Shark Bay region and around the Dampier Archipelago.

References: Wilson (1984) p. 213

Maireana suaedifolia

Lax bluebush



(x2.5)

Habit: Erect weak spreading bluish green, hairless, striate branched shrub to 80 cm high. Leaves fleshy, nearly cylindrical, tapering towards each end, 5 mm long to 25 mm long on main branches. Fruit tube hairless, thin walled, wing simple, thin, horizontal, 8–12 mm diam., with a single slit.

Note: *M. thesioides* is also known as lax bluebush and occurs mainly further north and west of this species. *M. thesioides* usually has drooping branches.

Habitat: Lax bluebush occurs on non-saline and weakly saline soils on sandy banks around salt lakes and on alluvial plains.

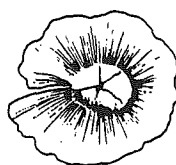
Pastoral and ecological indicator value: Lax bluebush is not particularly attractive to stock and consequently has little indicator value.

Distribution: Lax bluebush extends from the south coast into the Goldfields and eastern wheatbelt. It also occurs in South Australia.

References: Wilson (1984) p. 206

Maireana thesioides

Lax bluebush



(x2)

Habit: Erect weak straggly shrub with parallel lines down drooping branches, hairless shrub 1.5 m high. Leaves fleshy, narrow, nearly cylindrical, tapering towards each end, 5–15 mm long. Fruit tube hairless, wing simple thin, horizontal, 10–15 mm diam., with a single slit, top of fruit domed.

Note: *M. suaedifolia* is also known as lax bluebush.

Habitat: Lax bluebush occurs in a variety of generally non-saline environments, often with a mulga overstorey. It occurs both on hardpan plains and further upslope on stony plains and hills.

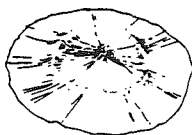
Pastoral and ecological indicator value: Lax bluebush is attractive to stock and is a sensitive indicator of range trend. Its abundance would indicate good to very good range condition.

Distribution: Lax bluebush extends from Menzies through to the Gascoyne and southern Pilbara.

References: Wilson (1984) p. 206
Mitchell and Wilcox (1988) p. 216

Maireana tomentosa* subsp. *tomentosa

Felty bluebush



(x4)

Habit: Erect open woolly branched shrub, 30 to 100 cm high. Leaves fleshy, woolly, nearly cylindrical, 5–8 mm long. Fruit tube hairless, woody, wing simple, horizontal, 8–11 mm diam. Top of fruit flat or raised to form a disc, woolly otherwise hairless.

Note: In the north-west it grows to a metre tall, but is usually less than 30 cm on breakaway footslopes in the Goldfields.

Habitat: Felty bluebush occurs on a wide variety of soils and land surfaces including saline breakaway footslopes and hardpan plains with mulga (*Acacia aneura*).

Pastoral and ecological indicator value: Felty bluebush is attractive to stock in all but very saline environments. Its abundance is highly influenced by season and hence it is not a good indicator of range condition. Seasonally, it is a good indication of forage availability and utilisation.

Distribution: Felty bluebush is extremely widespread in Western Australia, ranging from the Nullarbor to the Pilbara and through the desert inland to the Northern Territory, South Australia and New South Wales. *M. tomentosa* subsp. *tomentosa* is the subspecies found in Western Australia and extending into the Northern Territory.

References: Wilson (1984) p. 208
Mitchell and Wilcox (1988) p. 218
George (1981) p. 63

Maireana trichoptera

Pink seeded bluebush or downy bluebush



Habit: Erect woolly branched weakly perennial shrub to 40 cm high. Leaves fleshy, nearly cylindrical, 5–10 mm long hairy. Fruit tubes hairy, constricted in middle, lower part expanded (hollow), wing 10 mm diam., simple, thin, horizontal with reticulate veins.

Habitat: Pink seeded bluebush occurs on a variety of land surfaces, it is common on calcareous soils in the southern Goldfields and Nullarbor.

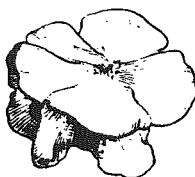
Pastoral and ecological indicator value: Pink seeded bluebush is attractive to stock and provides a good indicator of forage availability and utilisation. It is short-lived and hence its abundance is to a large extent seasonally rather than management influenced.

Distribution: Pink seeded bluebush extends from the Nullarbor towards Carnarvon.

References: Wilson (1984) p. 194
Mitchell and Wilcox (1988) p. 220
George (1981) p. 60

Maireana triptera

Three winged bluebush



(x3.5)

Habit: Erect dense bluish green hairless shrub 50 cm high. Leaves dense, slender and nearly cylindrical, acute, 10 mm long. Stems are often stripey and have black shrivelled old leaves which give the plant an untidy appearance. Fruit tubes hairless, glossy dark brown to black, wings papery. Vertical wings 5 (2 of which may not develop), horizontal wings simple, 8 mm diam. Top of fruit flat hairless.

Habitat: Three winged bluebush occurs on a variety of mainly saline soils, ranging from alluvial plains and around salt lakes to weakly saline stony plains and hillsides. It is often found with golden bluebush (*M. georgei*).

Pastoral and ecological indicator value: Three winged bluebush is not particularly attractive to stock, however fence effects clearly illustrate that it is grazed. It is often found in abundance on severely degraded areas, where it plays an important role in the early stages of rangeland regeneration. Differences in the abundance of this species either side of a fenceline indicate that on the side of the fence where it is scarce there has either been degradation of the soil such that three winged bluebush cannot recruit successfully, or more likely, that current management continues to retard rehabilitation. It is susceptible to drought and recruits prolifically in good seasons, hence it is not a reliable indicator of range condition. In mulga (*Acacia aneura*) communities, its abundance indicates that conservative stocking rates have been applied in recent times.

Distribution: Three winged bluebush extends from the southern Goldfields to the Exmouth Gulf and upper Gascoyne. It is also found in the Northern Territory, Queensland and Victoria.

References: Wilson (1984) p. 201
Mitchell and Wilcox (1988) p. 222
George (1981) p. 62

Maireana turbinata



(x2.5)

Habit: Spreading woolly branched shrub to 30–60 cm high. Leaves fleshy, nearly cylindrical, 5–7 mm long, hairy. Fruit tubes hairless, golden brown, wing 14–20 mm diam., papery, horizontal. Top of fruit flat, sparsely woolly.

Habitat: *M. turbinata* occurs on heavy calcareous loams.

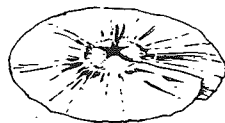
Pastoral and ecological indicator value: Not known.

Distribution: *M. turbinata* is restricted to the south–east coast of Western Australia, extending eastwards into South Australia, Victoria, New South Wales and Queensland.

Note: *M. turbinata* hybridises with berry saltbush (*Enchylaena tomentosa*) to produce a shrub with fleshy fruits and an erect wing.

References: Wilson (1984) p. 197
 George (1981) p. 62

Maireana villosa



(x3)

Habit: Erect open lightly woolly branched shrub to 50 cm high. Leaves hairy, linear to slightly thicker towards the tip, pointed, 5–12 mm long. Fruit tube thin walled, wing simple, papery, horizontal, 7–10 mm diam., with a single slit. Top of fruit flat, hairless to slightly hairy.

Habitat: *M. villosa* is frequently found on hardpan plains beneath mulga (*Acacia aneura*) tall shrubs, and on stony hillsides. It prefers non-saline, non alkaline soils.

Pastoral and ecological indicator value: *M. villosa* is readily grazed by stock and provides a useful indicator of current forage availability and utilisation. It is a short-lived perennial species and its abundance is largely a function of recent seasons.

Distribution: *M. villosa* is widespread in inland Australia.

Note: There are intermediates between *M. villosa* and flat leaved bluebush (*M. planifolia*), which have variously hairy leaves and may represent a new species or sub-species.

References: Wilson (1984) p. 209
George (1981) p. 63

Common taxonomic teasers

Common taxonomic teasers

1. *M. georgei*, *M. convexa*, *M. triptera*, *M. platycarpa* and *M. tomentosa*

M. triptera comes out easily – its branchlets are green/red without hairs and are stripy.

M. platycarpa has fatter, often paired upper leaves which come to a hairy point. The larger leaves have a subtle groove on their under sides. Where fruit is available there is no problem, *M. platycarpa* has hard protuberances on the upper surface.

M. georgei is a more compact, lower shrub with finer leaves than *M. convexa*. With fruits the distinction is much clearer, *M. convexa* has an upwelled (convex) upper surface which is widely hairy, as opposed to the flat fruit of *M. georgei*, where hairs are few and restricted to the edges of the lobes on the upper surface. *M. georgei*'s fruit tube becomes wrinkled on drying.

M. tomentosa is most easily distinguished from the others in that it has a small fruit (< 15 mm across) and has very woolly branches and small woolly leaves (5–8 mm).

2. *M. villosa*, *M. planifolia*, *M. tomentosa* and *M. integra*

With fruits available the situation is quite simple; *M. tomentosa* and *M. integra* have no radial slits in their wings, the upper fruit surface on *M. integra* is conspicuously hairy, whilst there are dissimilarly, few or no hairs in the case of *M. tomentosa*. Again, hairiness of the upper fruit surface is the key between *M. villosa* and *M. planifolia*. *M. villosa* has no or very few hairs, whilst *M. planifolia* has plentiful woolly hairs.

So, firstly, split on the presence or absence of a wing slit and then on hairiness of the fruits upper surface, remembering that the names related to hairiness (*villosa* and *tomentosa*) have fewer hairs!!

Without fruits the situation is more complicated.

M. villosa and *M. planifolia* have flattened leaves, *M. planifolia* has hairy leaves whilst the hairs on *M. villosa* leaves are closely pressed down to the leaf. The leaf in *M. planifolia* is "broader" than linear, whilst in *M. villosa* it does not widen out. *M. integra* and *M. tomentosa* are more difficult to separate on vegetative characteristics, partly because *M. tomentosa* is very variable. Generally, *M. tomentosa* has a shorter (5–8 mm) leaf than *M. integra* (5–14 mm), and *M. integra* has a rounded leaf tip ('obtuse').

Intermediates between *M. villosa* and *M. planifolia* may represent a separate species or sub-species (Wilson, 1984).

Acknowledgements

The authors are very grateful for constructive criticism and support from Paul Wilson and staff at district offices of the Department of Agriculture, who kindly reviewed this work. Permission to use fruit diagrams from the Flora of Australia Volume 4 (Wilson 1984) and the Flora of Central Austral Australia (George 1981) is acknowledged.

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APPENDIX – DICHOTOMOUS KEY

Section 1: Species with five-winged fruits.

Section 2: Species whose fruits have single upper wings.

Section 1: Species with five-winged fruits

Top of fruit surrounded by five horizontal wings.

a) Fruits occur in pairs:

b) Each wing has woody points.

M. luehmannii

b) Wings are not woody.

M. amoena

a) Fruits solitary.

b) Two of the five wings smaller, approaching erect.

M. oppositifolia

b) Wings all of similar size and shape.

c) Fruits have erect bristles (processes) on top surface.

M. lobiflora

c) Fruits without erect processes on top surface.

M. brevifolia

Section 2: Species whose fruits have single upper wings (lower wings may be present)

- a) Fruit enveloped in dense, long woolly hairs, difficult to see:
 - b) Fruit on a short stalk, the fruit tube is top-shaped. *M. eriosphaera*
 - b) Fruit not stalked, flowers in a spiral. *M. carnosia*
- a) Fruit not enveloped in long woolly hairs, though woolly hairs may be present (e.g. *M. lanosa*).
 - b) Fruit base swollen. *M. marginata*
 - b) Fruit base not swollen.
 - c) Vertical wings present on the fruit tube.
 - d) Plant basically devoid of hairs. *M. triptera*
 - d) Plant hairy, at least on branchlets.
 - e) Second horizontal wing at fruit base. *M. polypterygia*
 - e) No basal horizontal wing present. *M. pentatropis*
 - c) No vertical wings present on fruit tube.
 - d) Vertical processes present on the upper surface of the fruit.
 - e) Numerous processes fine, needle-like. *M. melanocoma*
 - e) Only four to six processes, not needle-like.
 - f) Leaves very small and in tight bunches (glomerules) along stem. *M. glomerifolia*
 - f) Leaves well developed.
 - g) Fruit woolly, leaves silky. *M. lanosa*
 - g) Fruit not woolly, leaves succulent, sparse hairs.

- h) Leaves with sparse long hairs, fat. *M. atkinsiana*
- h) Leaves narrow, hairless, pointed tips. *M. prosthecochaeta*
- d) No vertical processes on upper surface of the fruit.
- e) Plant not hairy (except perhaps woolly tufts at leaf attachments to stems).
- f) Top surface of fruit curves upwards (convex), fruits wing is 8–15 mm wide when mature.
- g) Leaf narrows to a soft point (fruit to 15 mm), dry fruit dark. *M. thesioides*
- g) Leaf nearly circular in cross-section (fruit about 8 mm across), dry fruit straw coloured. *M. aphylla*
- f) Top surface of fruit flat. *M. suaedifolia*
- e) Plant variously hairy.
- f) Leaves arranged in opposite pairs. *M. platycarpa*
- f) Leaves all or mostly scattered, not in pairs.
- g) Female appendage on top of fruit hard, protruding from upper surface. *M. platycarpa*
- g) Upper surface without a hard protruding appendage.
- h) Wing of fruit hairy.
- i) Wing up to 10 mm in diameter. *M. trichoptera*
- i) Wing wider, 15–25 mm in diameter, thick fleshy leaves. *M. murrayana*
- h) Wing of fruit not hairy.

- i) Top surface of fruit has large erect lobes. *M. pyramidata*
- i) Top surface without prominent lobes.
- j) Bottom of fruit narrowed into a stalk (2–3 mm long).
- k) Top surface convex, centre markedly indented. *M. aphylla*
- k) Top surface flat or slightly depressed, not indented.
- l) Leaf hairs branched, fruit stalk solid. *M. stipitata*
- l) Leaf hairs simple, fruit stalk hollow. *M. appressa*
- j) Bottom of fruit tube not narrowed into a stalk.
- k) Wing on fruit with a radial slit (break).
- l) Fruit large, about 15 mm across or more, tube thick walled.
- m) Top surface of fruit flat, hairs restricted to margins of lobes. *M. georgei*
- m) Top surface of fruit raised (convex), with variously dense hairs.

- n) Fruit to 15 mm across, leaves linear to circular in cross-section. *M. convexa*
- n) Fruit to 25 mm across, thick leaves to 20 mm long. *M. murrayana*
- l) Fruit 5–14 mm across (including wing), not thick walled.
- m) Tube of fruit hairy, upper surface flat. *M. sedifolia*
- m) Tube of fruit not conspicuously hair.
- n) Leaf flattened.
 - o) Top surface of fruit hairless. *M. villosa*
 - o) Top surface of fruit hairy. *M. planifolia*
- n) Leaf not flattened.
 - o) Upper surface of fruit very hairy, wing veined. *M. radiata*
 - o) Upper surface of fruit not hairy, perhaps a few simple hairs. *M. appressa*
- k) Wing of fruit entire, no slits.
- l) Fruit large, about 15 mm across, tube gradually narrows to base. *M. turbinata*
- l) Fruit small, to 11 mm across, tube cup or hemispherically shaped.
- m) Top surface of fruit conspicuously hairy. *M. integra*
- m) Top surface generally hairless except perhaps fine hairs on lobes. *M. tomentosa*