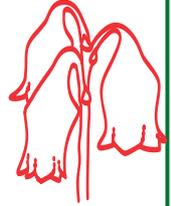




Topics 5 and 20: BANKSIAS, GREVILLEAS and HAKEAS (Proteaceae)



Australian Plants Society NORTH SHORE GROUP
Ku-ring-gai Wildflower Garden

Did you know that,

- There are about 900 Proteaceae species in all states of Australia
- The Banksia flower spike bears many individual flowers, from hundreds to thousands, but only a few produce seeds.
- Grevilleas are often called Spider Flowers
- Grevilleas and Hakeas are nectar sources for mammals, birds and insects.
- Many new cultivars of grevilleas are produced by specialist propagators.
- Banksias do not occur in Central Australia, but Hakeas are more widespread

The Proteaceae Family

This botanical family contains a diverse group of plants which includes Banksias, Grevilleas, Waratah, Hakeas, Woody Pear, Geebung and many more. The family existed widely in Gondwana over 50 million years ago. After its breakup, members of the family were still present in South America and South Africa as well as Australia. Members of the family common then were however closer to today's tropical and sub-tropical rainforest. The 'Proteaceae' name comes from the genus *Protea*, a South African member of the family. Incidentally, African plants of this family are often wrongly included amongst the Australian natives in nurseries or florists.

Characteristics and Classification of Banksias, Grevilleas and Hakeas

Banksias, Grevilleas and Hakeas are in a Proteaceae sub-family (Grevilleoideae) which has paired flowers, distinctive styles, follicle fruits and cluster roots. This sub-family has a wide range of forms and appearances, nearly all members have a common floral arrangement.

1. Instead of having separate petals and sepals they have four petal-like parts called 'tepals'. {Collectively these are sometimes called the 'perianth segment' as 'perianth' is the term used to describe the collection of petals and sepals.) These tepals can be free, joined or partially joined in a tube.
2. Anthers, instead of being free and arising from the receptacle, are attached to the ends of the tepals. (There are exceptions to this character however.)
3. A long, protruding style.

Flower of *Banksia ericifolia* – a typical member of the Proteaceae family



Banksias

Characteristics

Banksias are plants with woody stems ranging from trees to prostrate shrubs. The flower [spikes](#) are conspicuous and contain between 100 and 6000 individual flowers. As described above each flower holds a single style and four tepals to which anthers are attached. When a flower is in bud the end of the style and all the tepals are attached to each other so the style picks up pollen from the anthers. The style then breaks free and projects itself further out from the banksia spike. The end of the style now carries pollen (it is called the 'pollen presenter') and mammals, birds and insects landing there pick up pollen which then becomes transferred to other banksia flowers. (Surprisingly, there is little self-pollination, possibly due to the stigmas not at first being receptive to pollination.)



Normally only a small proportion of the flowers will produce the woody seed [follicles](#) embedded transversely on a central woody cone. These follicles take a year or two to mature and may, depending upon the species, stay on the plant for many years awaiting the heat of bushfire or even the death of the plant. Two winged seeds are released from each follicle when they are opened.

Distribution

Some references say there are 78 species of Banksia in Australia and some say 172. In early 2007 Mast & Thiele suggested that Dryandra be merged into the Banksia genus on the basis of extensive molecular and morphological evidence. There is a great deal of debate about this. However, Dryandras (some 90 odd species) occur only in Western Australia. There are 16 Banksias in eastern Australia and 1 across the north of Australia (*Banksia dentata*). This tropical species also occurs in New Guinea and the Aru Islands.

Pollinators

The main pollinators are bees, nectar-eating birds and small mammals- Brown Antechinus, Pygmy Possum and Sugar Glider. The plentiful supply of nectar is especially fortuitous for birds in winter.

Regeneration after Fire

B. ericifolia is killed by fire, but regenerates from seed released from the woody fruit by the fire's heat. (This may take as long as 7-8 years from germination to the new plant's seeding so fires in quick succession may eliminate *B. ericifolia* from an area.) There is also a fire sensitive variant of *B. marginata* having no [lignotuber](#) which regenerates only from seed. The other KWG banksias regenerate from seed too, but some can also regrow from underground lignotubers. *B. serrata*, *B. aemula* and *B. integrifolia* resprout from [epicormic](#) buds beneath the bark of their trunks. Thick corky bark like that of *B. serrata* is very effective in this regard.



Ku-ring-gai Wildflower Garden Banksias

Banksias growing naturally in the Garden are:-

<i>B. serrata</i>	Recorded flowering time	November to March
<i>B. ericifolia</i>	" "	" March to July
<i>B. marginata</i>	" "	" January to July
<i>B. oblongifolia</i>	" "	" February to June
<i>B. spinulosa</i> (var. <i>spinulosa</i>)	" "	" March to August

Banksias which have been introduced into KWG are:

B. robur, *B. integrifolia*, *B. aemula* and *B. spinulosa* var. *collina*, but all occur naturally in the Sydney Region. These are indicated by * before the name.

Flowers with hooked styles

[B. ericifolia](#) ("heath leaved")

Heath-leaved Banksia

Bushy shrub or small tree to about 6 m tall. Small crowded narrow leaves, margins revolute, apex has 2 small teeth; light green when young. Attractive orange-red flower spikes to 20 cm with hooked styles produce copious amounts of nectar, attracting birds, insects and small mammals. March-August flowering. Solid, woody seed cones follow. Grows in heath and woodland in sandy coastal areas and Sydney district plateaux.

[B. spinulosa](#) var. [spinulosa](#) ("small spine")

Hairpin

Banksia

Spreading shrub to about 3m high, with lignotuber and often multi-stemmed. Leaves long, dark green, narrow, stiff and finely toothed near apex; margins revolute, whitish green underneath. Yellow reddish flower spikes; hooked styles, red to black. March-August flowering. NSW and Qld.



****B. spinulosa* var. *collina*** ("of hills")

This variety is much the same as *var. spinulosa*, but has wider leaves and finely toothed recurved margins. It is generally found north of the Hawkesbury River. Flowers April-August

Left of coin *B. spinulosa* leaves
Right of coin *B. spinulosa* var *collina*



Flowers with straight styles – leaf white underside

B. marginata ("marginated" i.e. recurved margins) Silver Banksia
Branched shrub or small tree to about 5 or 6m locally, although reported to grow to 12m in deep rich soil. Leaves vary between 3-10 mm wide and 3-9 cm long; upper surface dark green with recessed midvein, undersurface is silver grey with raised midvein extending just past the apex. Margins are recurved, but variable as to teeth (from none to many)- generally the younger plants have toothed margins. Late summer to early winter flowering; yellow spikes about 8cm. Scattered through Sydney heath and woodland.



B. oblongifolia ("oblong leaf") Rock Banksia

A multi stemmed shrub to about 3m tall with dark brown/grey bark, arising from a lignotuber. Its new growth is a ready identifier, having a dense covering of felt-like rusty brown hairs, which persist on the branchlets (see image left). Leaves are dark green above, and pale green under, with prominent raised midvein and distinctive venation; margins are generally sharply toothed. Woody seed cone has spiny protruding bracts, following a February to June flowering of greenish / yellow to yellow spikes. Grows in woodlands and open forest. It can survive well on rocky sites and on the margins of swamps or wet places



****Banksia integrifolia*** ("entire leaf" refers to margins of adult leaves)

Coast Banksia

Small to large tree, 3m -20m high, depending upon where growing e.g. stunted on exposed headland. Young trees may have brown trunk with small horizontal grey dashes; older trees have rough, furrowed, sometimes tessellated grey bark. Adult leaves are in whorls, dark green with entire margins, the underside being a silvery light grey. In contrast, juvenile leaves are irregularly toothed, often with a 'cut off' apex. An abundance of small spikes, densely packed with yellow flowers are produced, January to July. Woody follicles follow, but these, unlike other Banksias, release their winged seeds when ripe.



Common on coastal scrubs, open forest, behind sand dunes or on coastal headlands and beside tidal estuaries e.g. Marramarra and Berowra Creeks. *B. integrifolia* is an adaptable Banksia tolerating a variety of soil types and differing locations, from windswept ocean headlands to sheltered slopes below cliffs or behind dunes.

Flowers with straight styles – leaf non-white underside

Banksia serrata ("saw-edged" referring to the saw-toothed margins of leaves).

Old Man Banksia

A thick-trunked shrub to small gnarled tree up to about 8m tall; has brown/grey, warty, thick bark. Leaves are tough and leathery, often undulate with coarsely serrated margins; glossy, dark green above, light green under; prominent mid-vein extending just beyond the apex of the leaf. It likes the coastal sandstone soils and rocky sites in heaths, woodland and open forest. Flower spikes are dove grey becoming yellow as flowers open in summer (November to April).



****B. robur*** ("Strong" referring to the leaves)

Swamp or Large Leaf Banksia



B. robur spike

Spreading or erect shrub, 1-2m tall with single or several grey/brown stems arising from a lignotuber. Leaves are very large, dark green with sharply serrated margins and a raised midvein especially on the light green underside, which may also have rusty felt-like hairs. Flowers January to July; spikes up to 12cm long; blue/green flowers turn yellow/brown with age. Scattered distribution both north and south of Sydney, along creek lines or hanging swamps in moist sandy or peaty soils. However *B. robur* can tolerate a range of conditions under cultivation.

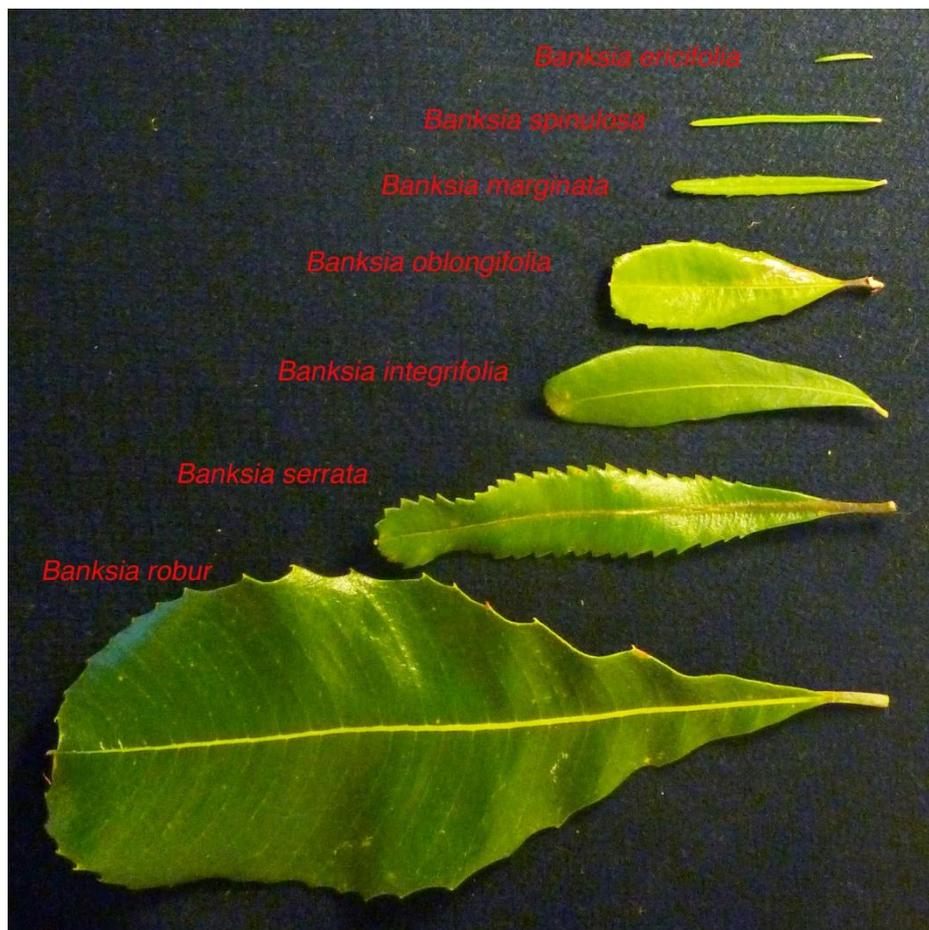
****B. aemula* ("like" referring to similarity to *B. serrata*)**

As the name suggests, *B. aemula* is very similar to *B. serrata*. However its leaves are generally narrower. The best identifier is its pollen presenter, which is only about 1mm long and club shaped whilst that of *B. serrata* is 2-3mm long and cylindrical. *B. aemula* grows in the coastal area north from La Perouse and also at Agnes Banks. Flowers February to June.

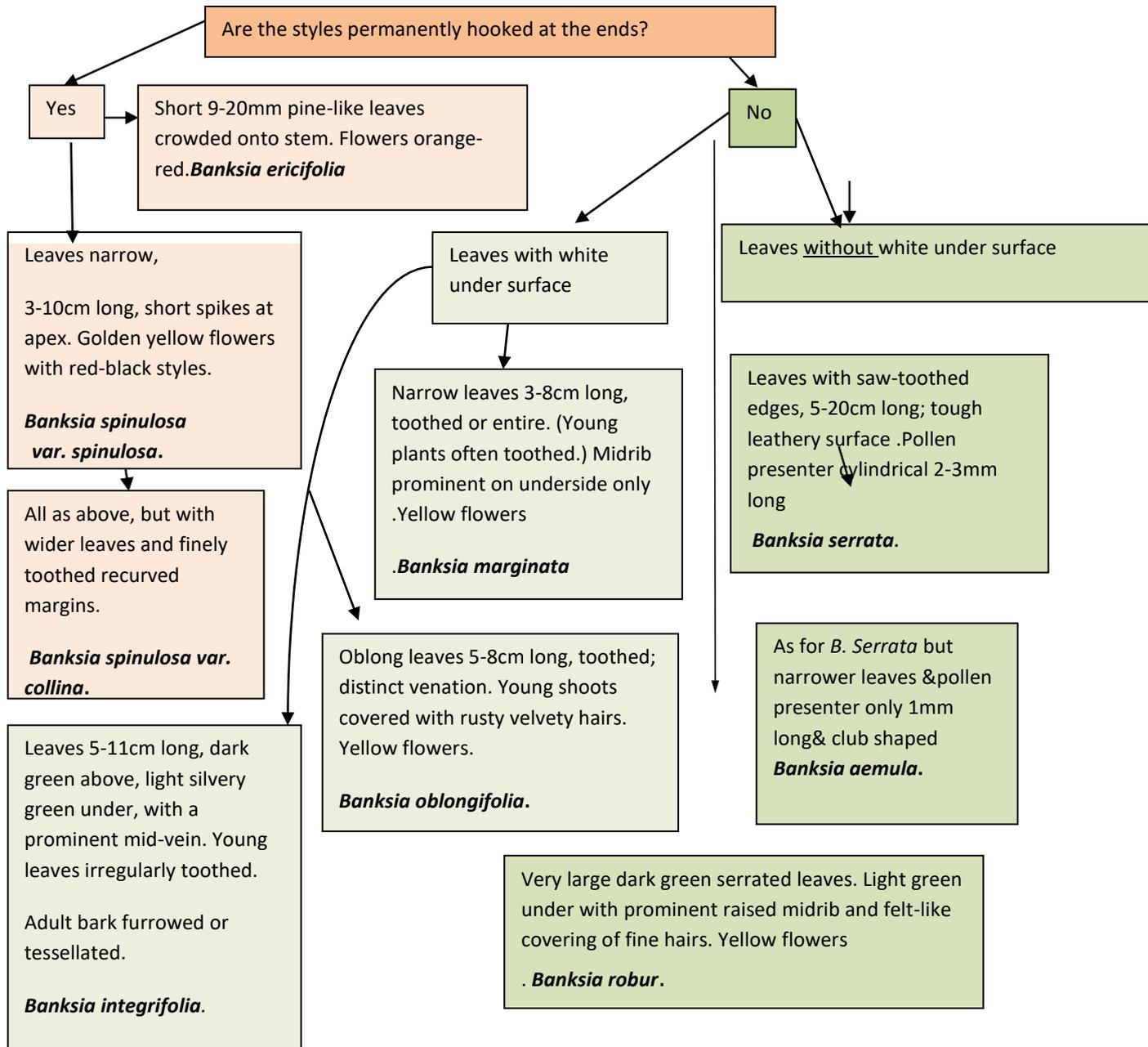
Wallum Banksia



Banksia Leaves Compared



KEY TO BANKSIA SPECIES –KWG.



Grevilleas

Grevillea was named as a tribute to the Hon. Charles Greville, an 18th century collector and propagator and Vice-President of the Royal Society.



Grevilleas – their characteristics

Grevilleas are plants with woody stems and range from prostrate shrubs to small trees. Their leaves are alternately arranged on the branch and may be paler on the underside. Many individual flowers make up the flower-head ([conflorescence](#)). The flowers are stalked and often are grouped in pairs.

Each flower has a structure and development similar to those of Banksias.. The flowers however are arranged in [racemes](#) which may be short and umbel-like (spiders), elongated and secund (toothbrushes) or cylindrical in shape.

Birds are the main pollinators. The fruit is a thin-walled follicle with a persistent style. At maturity it splits into 2 halves and releases 2 seeds with little or no wing. Local species grow well in home gardens.

Distribution

Australia has 357 of the world's 362 grevilleas species, and they occur in all states.

Grevilleas of Ku-ring-gai Wildflower Garden

Local grevilleas are growing naturally. Specimen plants of some of the rarer grevilleas as well as some popular hybrids and cultivars have been planted near the buildings and on The Knoll. These are indicated by * before the name.

Grevillea buxifolia

Grey Spider Flower

Erect shrub to 2m. Leaves are similar to Buxus (box family).
Leaves: small, elliptical to 4cm long, hairy beneath.
Flowers: grey, hairy spider flowers in dense terminal heads. The style has a distinctive horn-like appendage beyond the stigma.
Occurs: woodland or heath on Sydney sandstone, NSW.
Flowering: July to November.



Grevillea linearifolia

Linear-leaf Grevillea

Graceful, pendant shrub to 2m.
Leaves: long and slender to 9cm in length, silky hairs below.
Flowers: white, or rarely pink spider flowers in terminal heads.
Occurs: forest or heath, central and south coast, NSW.
Flowering: August to December.



Grevillea speciosa

Red Spider Flower

Shrub to 3m.
Leaves: small, elliptical to 4cm long, slightly hairy beneath.
Flowers: bright crimson, in conspicuous terminal spiders, hanging on stalks from the ends of side branches.
Occurs: moist areas of forest or heath, on Sydney sandstone.
Flowering: most of year, best in June to September.



* **Grevillea caleyi**

Caley's Grevillea

Endangered, less than 1000 plants, restricted area.
Shrub to 3m.
Leaves: deeply divided with parallel sides
Flowers: deep red with hairy perianth.
Occurs: isolated locations on ridge tops in Terrey Hills area.
Flowering: August to April.



* **Grevillea sericea**

Pink Spider Flower

Shrub to 2m.
Leaves: in whorls of three, narrow, elliptical to 9cm long, tough, hard pointed tips, with grey silky hairs below, margins curved.
Flowers: pink with silky hairs, the style is 1- 1.5cm long.
Occurs: forest on Sydney sandstone, NSW.
Flowering: most of year, best in August to December.



Hakeas

Hakea was named as a tribute to Baron von Hake, an 18th century Hanoverian patron of botany. The first plant described was eventually named *Hakea teretifolia*.

Characteristics

Hakea flowers, while similar to Grevilleas, are axillary while Grevillea flowers form a terminal conflorescence.

Hakeas are plants with woody stems and range from shrubs to small trees. Their leaves are alternately arranged on the branch and they are either terete or flat with both surfaces similar in colour.

The conflorescences are composed of groups of individual flowers in axillary clusters (in the [axil](#) of the leaf). The perianths of the local species can be white, cream or pink. The hakea perianth segments roll back and separate as the flower opens. The ovary and style are always hairless (glabrous). Insects are the main pollinators.

The fruit ([follicle](#)) is woody and splits into 2 halves, releasing two broad winged seeds. Release happens when the fruit dries or the plant dies. Most hakeas can be destroyed by fire but the seeds are protected within the follicle and in most species, new plants grow from these released seeds. Some species regenerate from a [lignotuber](#) after fire has destroyed the above-ground part of the plant.



Distribution

The genus [Hakea](#) is found only in Australia and there are about 37 species in NSW and 150 species in Australia. Nine species of [Hakea](#) are found in the Central Coast Botanic Region which includes Sydney.

Hakeas of Ku-ring-gai Wildflower Garden

Terete or needle-leaved species:

(Terete describes the long, cylindrical shape of the leaves. They end in a sharp point.)

* [Hakea bakeriana](#)

Low growing shrub 1-3m.

Planted in the KWG.

Leaves: terete, 5-7mm long, glabrescent (hairy).

Flowers: pink to red inflorescences on old wood, darkening with age and fragrant, the fruit: rough, warty, very large, to 7cm by 4cm. seed is retained on the shrub

Habitat: heath and woodland.

Range: Sydney to Newcastle coast and ranges, flowering: May to August for 2-3 weeks.

Grows from a lignotuber, many branches.



Hakea gibbosa Hairy Hakea

gibbosa refers to the shape of the fruit, similar to that of the gibbous (3/4) moon.

Compact shrub to 3m. conifer like, viciously prickly

Leaves: terete, hairy, 2-8cm long, grooved on the under surface.

Stems: hairy.

Flowers: small, white or cream, in axial clusters.

Fruit: large, grey and woody, to 3cm across, distinctly beaked and horned. Seeds retained

Habitat: heath and sandstone ridges.

Range: NSW central and south coast.

Flowering: June to September.



Hakea propinqua

Conifer like shrub or tree to 3m without a lignotuber, with deep red branchlets.

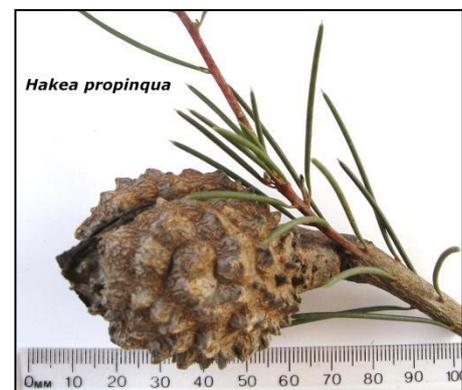
Leaves: terete, 2-5cm long usually curve outwards.

Flowers: white near the coast, yellow forms near Blackheath.

Fruit: globose, to 3cm across, rough deeply wrinkled and warty 2 small horns that often wear off. Seed is retained.

Range: Sydney region to Blue Mountains of NSW in sand or light loam over sandstone.

Flowering: June to October.



Hakea sericea Silky Hakea

'sericea' refers to the silky hairs on the new leaves

Shrub to 3m.

Leaves: terete, 2-7cm long, under 1mm thick, finely hairy when new, grooved on the under surface.

Flowers: small, white or cream, in axial clusters.

Fruit: ovate, globular, about 2cm across with a short, smooth beak.

Habitat: heath and forest.

Range: coast and ranges NSW, Vic, Qld.

Flowering: June to September.



Hakea teretifolia Dagger Hakea

Dense, rigid shrub to 3m with numerous near-horizontal or slightly upward tending long branchlets covered in silky hairs.

Leaves: terete, 2-5cm long, 2mm thick, viciously pointed.

Flowers: small, white, with soft, hairy perianth, in axial clusters.

Fruit: lance shaped tapering to a long sharp beak.

Seed is retained.

Habitat: damp sites in heath and scrub. Range: coast and ranges NSW, Vic, Tas.

Flowering: January to April.



Flat leaved species:

[Hakea dactyloides](#)

Finger Hakea

Shrub to 3m with no lignotuber, killed by fire.

Leaves: Narrow, to 15cm long, with 3 prominent longitudinal veins.

Flowers: cream-white.

Fruit: 20-30mm long, 15-18mm wide, warty with short beak. They retain their seed.

Habitat: rocky hillsides, heath, woodland and forest.

Range: NSW, Vic.

Flowering: September to October.



[Hakea laevipes](#)

Multi-stemmed, lignotuberous shrub to 3m, branchlets with persistent dark brown hairs.

Resprouts after fire.

Leaves: to 12cm long, with 3-5 longitudinal veins and conspicuous secondary veins.

Flowers: cream-white.

Fruit: 20-30mm long, 13-21mm wide, warty, no beak or horns.

Habitat: heath, woodland and forest.

Range: coast and ranges, NSW, Qld.

Flowering: October to January.



[Hakea salicifolia](#)

Willow-leaved Hakea

Tall shrub to small tree 3-5m tall.

Leaves: lanceolate, flat, drooping 5-12cm long, main vein only distinct.

Flowers: white, hairless in cluster of 16 to 28.

Fruit: ovate, about 2cm across, prominent warts, distinct beak. The seed is retained.

Habitat: gullies and sheltered places.

Range: NSW coast to Qld.

Flowering: September to November.



Hakea Fruits



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For general access to PlantNET see also <http://plantnet.rbg Syd.nsw.gov.au/>

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