

Beautiful *Banksia* for Horticulture®

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INTRODUCTION

Banksia belongs to the most famous southern hemisphere angiosperm family, Proteaceae. The family contains 73 genera, with Australia having 42 genera and South Africa 14. None of the South African genera occur in Australia. South America with 7 genera, shares 3 with Australia Gondwana continent connection. Joseph Banks and Daniel Solander, sailing with Captain James Cook on the Endeavour, collected the first *Banksia* specimens in 1770 at Botany Bay, Sydney.

This unique Australian genus has fascinated botanists and plant people ever since. Currently there are 78 species with 61 species occurring in South West Australia. The tropical species grow in north western Australia and across Cape York in North East Queensland. There is one species in New Guinea; the 16 eastern species are spread down the eastern seaboard from North Queensland to Victoria, Tasmania, and South Australia.

WHAT MAKES A BANKSIA UNIQUE?

Banksias are woody plants ranging from prostrate shrubs to 30-m high trees. Evolving in a drying fire prone climate they have developed two types of growth. About half the species are killed by fire and regenerate from seed. The others survive fire by re-sprouting from an under-ground lignotuber, this type are longer lived, possibly hundreds of years and can be pruned hard.

The Flower. The banksia's flower is a cylindrical spike, bearing several hundred to 6,000 flowers in long spikes of *B. grandis*. In most species the flower spike takes 8–16 weeks to develop and the basal flowers open first. It can take up to 2 weeks for all flowers to open on the spike. The arrangement of the flowers is complex and creates a double spiral pattern on the spike. Each flower is a tubular perianth with four segments, called tepals, containing the anthers. The single pistil is thin and wiry. After pollination, woody follicles develop, containing two winged seeds and a stiff separator. Maturity takes 1–2 years. The seed is then released or stored on the plant and released after fire.

Banksia Leaves. All have two distinct surfaces, the upper green, the lower lighter and frequently with hair protecting the stomata. Leaf thickness is another adaptation to the dry environment, the size, shape, and texture of the leaves is extremely variable. Developing new leaves are often densely hairy and brightly coloured.

Proteoid Roots. Like their South African cousins, *Banksia* develops proteoid roots that help the plant adapt to low nutrient soils and dry conditions. These are found near the surface, often in the deep leaf-litter layer where nutrients are high. The mass of rootlets gives increased contact for absorption. Proteoid roots are short lived and appear to be produced seasonally with growth flushes after winter rain. The Proteaceae family is considered to have evolved very early in the history of flowering plants. A fossilized fruiting cone found in 1983 in Western Australia is estimated to be 50 million years old and indicates that the genus has been fairly stable over a long period, being very similar to the present day *B. grandis*.

DISTRIBUTION

The genus is well represented around the better watered coastal regions of Australia with the greatest diversity in south west and Western Australia with the greatest concentration between latitude 26–35°S.

Only one species is common to both east and Western Australia, *B. dentata*. With the exception of the rainforest genera, the banksias usually occur in infertile, sandy soils, and lateritic gravel. In Western Australia deep sand, sand over clay or limestone, and laterite are the common soil types.

In eastern Australia sandy soils derived from sandstone are favored. These soils are usually well drained and acidic. Like South African Proteaceae, banksias are sensitive to high levels of phosphorus, because they have evolved in old and poor soils. The geographical range of species varies greatly, some being widespread and often locally common while others have a very restricted range.

PROPAGATION

Seed. Most banksias are grown from seed. Wild collection requires a license. Seed can be purchased from reliable seed suppliers. Fresh is best.

Some species shed seed as it matures while others retain it in closed follicles.

Extraction can be difficult as heat treatment is needed. The cones may be placed in a hot oven (120 °C) for 30–60 min. Any longer may cook the seed. Burning, although messy can be quicker and less likely to damage the seed. Place the cones in wire racks and insert into a hot fire or use a flame thrower.

The follicles should open allowing the seed to be shaken out. If follicles open but seed isn't shed, soak the cones in water for 1/2 h, then air dry. The hygroscopic action of the separator between the seeds may free them. These steps may be repeated.

Germination is good for most species with no further treatment required.

Smoke water recommended for many Australian seeds is not required, possibly due to smoking during extraction of the seed. We use cutting-mix of coir peat, sand, and perlite for sowing. Sow in your standard seeding mix with pH 5.6–6. Best in autumn or spring and covered lightly with medium sand.

Germination takes 3–6 weeks with bottom heat of 22 °C and spring is preferable if winters are long and cold. Keep moist and prick out into a low phosphorus seeding mix in 5-cm tubes within 2 weeks of germination as a taproot will develop rapidly. Watch for damping-off and use a fungicide at pricking out.

Once established and hardened off, the seedlings can be potted on or planted out from tubes.

Banksias have been successfully grown to flower in large tubs in Europe so they may be brought inside for the winter months.

Cutting Production. Some species can be readily grown from cuttings. The most reliable are those species with relatively slender, not velvety stems — mostly from the eastern seaboard. Selections of *B. ericifolia* (eastern states), *B. spinulosa*, *B. pulchella*, *B. nutans*, *B. integrifolia*, *B. seminuda*, and *B. occidentalis* (western) will give good results.

Semihardwood material should be used and selected from strong growing stock in mid-summer to autumn. Cuttings are made 5–10 cm and seem to be best without hormone, in particular preparations with alcohol, which burns them (we are trialing powders and gels at the moment). Sand and core peat mix pH 5.5–6 under prop house conditions, may take 3 months to strike.

Unfortunately the desirable Western Australian species are most difficult from cuttings, reacting like some South African Proteaceae. *Banksia coccinea* can be struck but results are poor and re-growth slow, this possibly due to thick hairy stems, results can be better with tenting rather than using fog.

Grafting. Some attempts have been made over the last 20 years to develop grafting protocols. The aims: use phytophthora-resistant rootstock to increase success of Western Australian species in the eastern states and to allow selection and development of cultivars. Approach and wedge grafting techniques have been used. Tissue culture has been investigated but it's also difficult and research funding is scarce. Scion and stock should match in diameter. The process must be done quickly to prevent drying, then bound and sealed.

A zip-lock bag placed over the scion will help retain moisture. Keep the grafted plant in a humid propagation house. Remove tape when growth begins.

Seedling grafting is another technique but this requires a steady hand and a good eye, and preferably a jeweler's magnifying glass.

Stock and scion seedlings must be raised. The scion is removed at the first true-leaf stage and inserted into a slit made between the cotyledons of the stock species after removing the growing stock. Tomato seedlings can be used for practice. A surgical scalpel should be used. No, I have not perfected this technique!

CULTIVATION

Success in growing *Banksia* is dependant on understanding the environment the species comes from and selecting those that will fit your local conditions. The Western Australian species are more variable and possibly more desirable for ornamental horticulture. Western Australia has lower rainfall, mostly in winter, with hot dry summers. Regions where most banksias are may receive 300–800 mm of rain. By contrast, the eastern states receive more rain with a peak in summer, creating warm humid conditions which shorten the life of many of the desirable West Australian species. Soils are poor, well drained, and often deep sand.

SELECTING FOR ORNAMENTAL USE

Ground Covering.

- ***Banksia repens.*** A shrub with lignotuber stems prostrate and underground from southwest coast of Western Australia. Leaves are erect to 30 cm long and 1.8 cm wide and deeply lobed. Flowers, develop at ground level, are cream and pink 6–10 cm long and 6–7 cm wide; old flowers persistent. A slow-growing, creeping species that prefers deep sand with pH 5.5–7, sunny or partial shade, and may spread 3 m. Leaves have been used in floriculture. This species must be grown from seed.
- ***Banksia integrifolia* Roller Coaster™ banksia.** Species is native to the east coast; however, this prostrate form of the usual 25-m tree was selected by Austriflora. Roller Coaster™ will cover 2–3 m in a tangle of cascading green and silver, dotted with pale yellow flowers 5–12 cm. This coastal species is possibly the hardiest of the banksias and is reliable as grafting root stock. Roller Coaster™ banksia is readily propagated from semi-ripe cuttings.

Eastern Species for Horticulture.

- ***Banksia ericifolia* (heath leaved).** A shrub to 6 m, non-lig-notuber type with leaves small, green, and silver. Heath leaved banksias is from central coast New South Wales, growing in deep sand, rainfall of 800–900 mm/year. It flowers during April–August. Heath leaved banksias is adaptable and variable species tolerating humidity and cold of -6 °C. Species grows readily from seed.
- Numerous forms have been selected and two examples are:
 - ‘Birthday Candles’, 1 m, terminal flowers and adaptable for container culture.
 - ‘Giant Candles’, a hybrid between *B. ericifolia* and *B. spinulosa* that grows to 6 m with large orange flowers.
- These selections are grown from tip cuttings in autumn; need to be kept moist and cool with fog and hormone and honey are beneficial.
- ***Banksia serrata* (saw banksia).** One of the first banksias collected from Botany Bay (1770) and type species for genus. It may be a shrub of 1–3 m or a robust tree to 16 m. Flowers are large, cream/grey to 15 cm; fruit is large. Leaves are broad leathery with a serrated margin. A coastal species found from south Queensland to Victoria and Tasmania. It is a hardy, slow growing, fire-tolerant species that grows on consolidated dunes; rainfall is in the 800–1200 mm per year range. This banksias is useful in coastal gardens and excellent for bonsai.
- Grows steadily from seed but difficult from cuttings.

Western Species for Horticulture.

- ***Banksia occidentalis* (red swamp banksia).** Red swamp banksia is a shrub to small tree (7 m) with leaves linear and silver beneath, flowers gold, pistil metallic red, spike 4–10 cm. It grows in sandy, coastal seepages, south coast 350–800 mm rain per year. Red swamp banksia is a fast-growing ornamental from seed or cuttings.
- ***Banksia praemorsa* (bitten off).** Bitten off is a shrub to 4 m with leaves short, serrated, stiff and a flower spike 10–20 cm. Flower colour varies from pale to bright yellow, lemon pink to burgundy, or wine red. Terminal flowering forms are used for floriculture. It is a frost-hardy, fast-growing, bushy shrub from south coast, growing in deep acidic sand; withstands salt spray. Bitten off banksia develops into a dense hedge.
- ***Banksia baueri* (possum banksia).** Possum banksia is a shrub to 2 m with leaves stiff and long. It is a fast-growing shrub with large, soft, woolly flowers 17 × 12 cm. Flowers are cream or rusty with grey nestled inside plant; they have a musky scent, and are pollinated by marsupials rather than birds.
- ***Banksia brownii* (feather leaf banksia).** A shrub to 4 m with leaves unusual — divided to midrib and soft. Flowers are pale brown/grey with pistils metallic red and 6–9 cm in length. Feather leaf banksia occurs in the Stirling Range and south coast, growing in sparse woodland. Foliage is used fresh and dried for floriculture.

Cut-Flowers. Banksias have long been used as cut-flower, both fresh and dried.

The most suitable are those producing terminal flower spikes with good shape, size, and colour, primarily from the southwest of Western Australian.

In Australia, wild harvesting, using a permit system was the major source of flowers. Plantations are now being developed to produce selected species and to protect the remaining wild habitat. Production also occurs in Israel, South Africa, and the U.S.A.

Banksia ashbyi. *Banksia ashbyi* has proven the most suitable for high pH soils. Site selection is critical for success particularly in eastern Australia where summer rain and high humidity do not suit Western Australian species. A pH 5.5–7 and good drainage are also essential.

This is a tree to 8 m with leaves 10–30 cm long and deeply serrated. Flower is terminal, 6–15 cm, and bright orange. Native to central west coast of Western Australia, growing on deep red sand on dunes and plains receiving 250–350 mm rain; it is winter flowering. *Banksia ashbyi* is seed propagated.

Banksia coccinea (scarlet banksia). This is a small tree to 8 m with no lignotuber and leaves short, oblong, and stiff. Flowers are terminal, grey/brown, scarlet, and occasionally dark red or orange. Found in south Western Australia in deep white sand with a pH 5, 400–800 mm of rain. Flowers open in June–January and the plant prefers a cool Mediterranean climate type.

Tip prune when young to encourage strong basal branch development. Pick at half-open stage, leaving three strong leaves at the base for re-growth. This species tolerates light frost but fails in humid regions with summer rain. Scarlet banksias is grown from seed and cuttings; difficult, try autumn. Grafting is also difficult.

Banksia menziesii (firewood banksia). Firewood banksia is a tree to 10 m with leaves oblong to 20 cm. Terminal flowers to 12 cm, silver in young stage becoming pink with yellow pollen present. Buds are beautifully patterned; large flowers are two tones and acorn shaped. Old flowers fall, leaving attractive mottled grey and silver patterns, and developing follicles exposed. From west coast of Western Australia, growing in deep sand in low woodland 350–900 mm rainfall. Firewood banksia can be slow and difficult outside its natural habitat. It is grown from seed.

I have all these species growing in deep sand at 42°S, where annual rainfall is around 300 mm. At 7 years, all have flowered and most have set seed. This is a private trial collection which will ultimately provide a seed source.

ADDITIONAL READING MATERIAL

Australian Native Plants Society. <<http://asgap.org.au>>.

Collins, K., C. Collins, and A. George. 2008. Banksias. Bloomings Books, Richmond, Victoria.

George, A.S. 1997. The Banksia book 3rd ed. Kangaroo Press Pty Ltd, Kenthurst, Australia.