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A TREESMART FACTSHEET

Corymbia maculata, *Corymbia citriodora* subsp. *variegata* and *Corymbia henryi*

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Primary Industries Science & Research**Country of Origin:** Australia**Common name/s:** Spotted Gum, Large-leaved Spotted Gum, Broad-leaved Spotted Gum**Synonyms:** *Eucalyptus maculata*, *E. henryi***Species Summary**

Spotted gum (*Corymbia* spp.) is an important and commonly planted commercial timber species capable of producing excellent sawn timber for a range of uses. It is adapted to a wide range of soils, with reasonable growth rates and good form achievable on poorer sites, but best performance is on moist well-drained, moderately heavy soils. Considerable variation exists in form, growth rate and frost tolerance, so correct provenance selection is important. Spotted gum is susceptible to shoot blight, especially when young, and to some leaf pests, but is moderately drought tolerant.

C. maculata and *C. citriodora* subsp. *variegata* were previously known as *Eucalyptus maculata* or Spotted Gum. The natural distribution of *E. maculata* was regarded as ranging from eastern Victoria (VIC) to central Queensland (QLD). A taxonomic revision placed *E. maculata* into the genus *Corymbia* and further classified it into *C. maculata* in the south of its range and *C. citriodora* subsp. *variegata* (the non-lemon-scented form of Lemon-scented Gum, *C. citriodora*

subsp. *citriodora*) in the north of its range. Another *Corymbia* species from coastal areas of northern NSW and southern QLD is *C. henryi* or Large-leaved Spotted Gum (previously known as *Eucalyptus henryi*). The three species are closely related and their timber is jointly marketed as spotted gum.

Description and Form

Spotted gums are tall trees on favourable sites, usually attaining 35–45 m in height and 1–1.3 m diameter at breast height over bark (dbhob). Exceptional specimens may reach 70 m in height and 3 m dbhob. On drier and poorer sites they may be 20–35 m in height or even smaller on exposed coastal headlands. Spotted gums are attractive, moderately fast growing trees, generally of good form. Trunks are relatively long and usually clean and straight without branches for more than half their height. Bark is smooth to ground level and greenish cream when fresh. It is shed in small irregular patches, leaving dimples that age to cream, grey, pink or coppery brown, giving trunks their characteristic spotted appearance. The bark generally grows very thick (to around 25 mm), making it very resistant to fire. All three species develop lignotubers and can regenerate readily from coppice.

Leaf and fruit characteristics of the three spotted gums are very similar, although the leaves of *C. henryi* are larger and thicker at all stages from seedling through to adult and are generally glossier green. Adult leaves: *C. henryi* (5–7 cm wide), *C. maculata* (1.2–3 cm wide), *C. citriodora* subsp. *variegata* (0.5–1.8 cm wide). Fruits of all three species are urn-shaped woody capsules, slightly larger in *C. henryi* (0.9–1.6 cm wide) than *C. maculata* (0.8–1.3 cm wide) and *C. citriodora* subsp. *variegata* (0.7–1.2 cm wide).

Weediness and Toxicity

C. maculata has naturalised in Western Australia (WA). In some areas of VIC, away from its natural range, it is regarded as an environmental weed posing a serious threat to lowland grasslands and associated woodlands

Natural and Planted Distribution

C. maculata is widespread in coastal areas of NSW, extending from near Bega to south of Coffs Harbour. An isolated stand also occurs in the Mottle Range near Orbost in far eastern VIC. *C. maculata* grows mainly on valley slopes and ridges where soils are not too dry. It occurs on a wide range of soil types including slates and sandstones, but shows best development on well-drained soils of moderately heavy texture derived from shales.

C. citriodora subsp. *variegata* extends from Coffs Harbour, NSW, to the Springsure–Maryborough region in central-eastern QLD. It generally occurs on ridges and steep hills on well-drained gravelly soils. It tends to favour clay loams but also occurs on basaltic or metasedimentary ranges.

C. henryi has a more restricted distribution from south of Grafton, NSW, into south-eastern QLD around the Brisbane region and west to Toowoomba. It occurs mainly on sub-coastal plains and in the foothills of adjacent ranges. Soils range from sandy loams to clays and are often derived from granite or shale.

Between Kempsey and Grafton, any of the three spotted gum species or their hybrids can occur and these are very difficult to differentiate in the field.

Spotted gum will grow on poorly-drained low-fertility sites, grows well on sandstone soils, and can tolerate a shallow hard-pan. It has been selected for plantations on poor quality sites such as sandstone soils of the Clarence and Richmond Valleys in NSW. Encouraging growth rates have been noted when grown 'off-site' on better red soils of the NSW North Coast. Spotted gums were first planted in WA and South Australia (SA) in the early 1900's. They have been established in inland areas of NSW, VIC, SA and WA in increasing numbers over the last decade due to recognition of their potential for farm forestry and mine rehabilitation in the medium rainfall regions, and under irrigation in lower-rainfall regions. Future commercial plantations are expected to be established in central and southern QLD in the 600–1200 mm/year rainfall zone. Plantations have been established in South Africa, Brazil and Israel, some of these under irrigation.

Limiting Factors

Spotted gums are frost sensitive when young.

Seedlings and young trees can be highly susceptible to Quambalaria shoot blight

Spotted gums have low tolerance of poor drainage; wet/heavy clay soils are detrimental to good growth.

Environmental Limits		
	Min	Max
Rainfall (mm)	600	1700
Temperature (°C)*	0	32
Altitude (m)	0	1100
* Mean monthly temperature		

Products and Services

Commercial Products	Suitability
Solid Timber (construction, furniture, packaging, posts, rails & poles, fencing, firewood, specialty timber and cabinet timber)	✓✓
Wood Panels (particleboard, fibreboard and panelling)	✓
Processed Wood (woodchips, pulp, paper, activated carbon and charcoal)	✓✓
Veneer (face veneer, rotary peeled veneer and laminated veneer)	✓✓
Chemical (tannins, oil, gum and latex)	✓
Flowers / Foliage (ornamental)	-
Food (bush food, fruit)	-
Honey (honey, pollen and nectar)	✓✓
Medicinal	-
Seed	-
Environmental Services	Suitability
Habitat	✓✓
Nitrogen Fixing	-
Salinity Control	✓
Shade / Shelter	✓
Soil / Water Conservation	-
Windbreak	✓
✓ = Potentially Suitable ✓✓ = Very suitable	

Wood Density			
	Min	Max	Mean
Green	-	-	1150
Air-dry *	800	1080	950
Basic	642	-	740

* At 12% moisture content

Commercial Product Information

Spotted gum is an important commercial timber species capable of producing excellent sawn timber for a wide range of uses. Heartwood is pale to dark brown and slightly 'greasy'. Sapwood is distinctively paler than the heartwood and up to 80 mm wide, although width is highly variable depending on site conditions. Texture is moderately coarse, the grain variable and often wavy, producing an attractive 'fiddleback' figure. Heartwood is moderately durable with northern material usually slightly denser, stronger and more durable than southern material. Air-dry density of wood from native forests is about 950 kg/m³ with a basic density of 740 kg/m³. Younger plantation-grown wood has a lower air-dry density of around 800 kg/m³, with a basic density of 642 kg/m³.

Uses include heavy construction, piles, poles, high strength trusses, house fabrication, flooring, veneer, plywood and boat building. Spotted gum is the main Australian species for high-impact tool handles, e.g., axe handles, and is also used for polo sticks and diving boards. In the food industry it is used for butcher's skewers and the dry sawdust is a favoured smoking and curing medium. As a fuel, it burns well when dry, burning slowly and producing great heat. It is favoured for preservative-treated poles in eastern Australia because it has wider sapwood than usual for eucalypts and produces good logs of pole form. Spotted gum components 18 mm thick or greater do not require fire-retardant treatment for use in construction in bush-fire prone areas. The lower basic density of plantation-grown wood at 12 years means it is also suitable for export woodchip and for the production of fine papers.

Timber needs care in drying, with shrinkage about 4.5% radial and 6% tangential. It is not hard to work and is satisfactory for steam bending. It is a minimal staining timber, being less prone to bleed-through of tannins than other species. Heartwood is resistant to impregnation with preservatives. The wide sapwood band is very susceptible to attack by lyctid borers and must be treated with approved preservatives prior to sale in accordance with the NSW *Timber Marketing Act 1977*.

Spotted gum provides a good source of nectar and pollen during heavy flowering seasons and is a good honey producer. In NSW it is a valuable source of winter nectar for commercial apiarists.

Environmental Services Information

Spotted gum is useful in multiple-row windbreaks with other lower-growing 'draught stopper' species. It is also attractive for ornamental plantings and open-grown trees provide good shade.

Flowers are a valuable food source for nectar-feeding birds and insects and for gliders and flying foxes. Flowers also attract insect-eating birds. Seed is a food source for native birds and insects.

Spotted gums are a favoured habitat tree for koalas.

Diseases and Pests

Due to widespread planting and use, there is considerable disease and pest information known about this species.

Spotted gum is highly susceptible to attack by Quambalaria blight (also known as Ramularia shoot blight). It is caused by the fungus *Quambalaria pitereka* (formerly known as *Ramularia pitereka* or *Sporothrix pitereka*) and can severely damage young trees by killing the growing points. Seedlings and young trees up to three years of age in high-rainfall regions (especially summer-dominant rainfall) can be highly susceptible to the blight. There is provenance variation for resistance to the disease and the Queensland Forest Research Institute has identified provenances of *C. citriodora* subsp. *variegata* as the most tolerant of the three spotted gum species.

Spotted gum is moderately susceptible to cup moth (*Doratifera* spp.), Christmas beetle (*Anoplognathus* spp.), spring beetle (*Automolus* spp., *Liparetrus* spp.), sawfly (*Perga* spp.), bullseye borer (*Phoracantha acanthocera*) and ringbarking borer (*Phoracantha* spp.). In plantations in WA it is also susceptible to parrot and cockatoo damage which can affect form and growth rates.

Flowers, Seed and Propagation

Flowers are cream, in groups of 3 (occasionally 7 for *C. maculata*), appearing from May to September (*C. maculata*), from June to November (*C. citriodora* subsp. *variegata*) and from November to January (*C. henryi*). Flowering occurs annually and at least 14 months after bud appearance. Prolific flowering and heavy seed set occurs on an irregular interval every 5–8 years in natural stands. Pollination is predominantly by insects and birds. Fruits are barrel-shaped to urn-shaped woody capsules with

3–4 deeply enclosed valves. They mature approximately 6–8 months after flowering and the seed is shed about six months after maturity, although some seed-bearing capsules may be retained on the tree for up to 3 years. Seed is glossy red-brown, 2–3 mm long x 1.5–2.5 mm wide. There are 60–150 viable seeds/g. No pre-treatment is required for propagation.

Flowering and Seed Collecting Periods

	J	F	M	A	M	J	J	A	S	O	N	D
Flower	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓
Seed	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Silviculture and Management

Spotted gum can be successfully established with similar preparation and treatments as many other eucalypts, but it is important to ensure that selected planting sites do not include frost pockets or hollows. Seedlings can be either hand or mechanically planted. To allow machinery to be used, a spacing of 3–5 m between rows is required.

Spacings and planting designs vary, but suitable initial spacings for woodlots are 3 m x 3 m (1111 trees/ha) and 4 m x 2.5 m (1000 trees/ha). These spacings encourage rapid canopy closure, reduce weed problems, promote good form and allow ample selection for a final stocking of 200–300 trees/ha. Planting time depends on location and moisture availability. In southern NSW, seedlings should be planted during winter–spring, taking care to avoid frosty periods. In northern NSW, planting is generally spring–summer although the recognised planting window for commercial plantations is January to March as the survival and growth of plantations established outside of this period are always sub-optimal. Mounding and the use of tree guards can increase survival and growth of seedlings planted in frost-prone areas. Fertiliser can be applied early to promote growth and health of trees. Weed control is critical as spotted gums have weak competitive ability and weed competition suppresses growth.

In forest situations, spotted gums self-prune and only simple pruning is required to achieve a clean knot-free bole. However plantation-grown trees in cooler areas often have their growing tips damaged by frost and this may result in double leaders. If sawn timber is to be produced, then form-pruning will be needed to ensure a single stem. Double leaders should be pruned out after 3–5 years, leaving the lead stem to give a straight trunk. Thinning of trees will be required over time to

provide adequate space for maximum growth potential.

Considerable variation has been recorded in form and growth rate of material collected from natural stands. Trials in the high summer rainfall regions of Australia have concentrated on *C. citriodora* subsp. *variegata* and *C. henryi* due to the susceptibility of *C. maculata* to Quambalaria blight in the 900 mm plus rainfall zone. The provenance with the highest resistance to the blight to date is the 'Woondum' QLD provenance of *C. citriodora* subsp. *variegata*. The 'Richmond Range' NSW provenance of *C. citriodora* subsp. *variegata* is preferred for timber plantations on the north coast of NSW

In trials in western VIC, *C. maculata* has shown better growth and survival than the other two spotted gum species with the 'Batemans Bay' NSW and 'Orbost' VIC provenances performing best overall. In trials in southern NSW, provenances of all three species of spotted gum are performing well. These include the 'Wingello', 'Kioloa' and 'Bodalla' provenances of *C. maculata* from NSW, the 'Grafton' and 'Ewingar' provenances of *C. henryi* from NSW and the 'Warwick' and 'Chinchilla' provenances of *C. citriodora* subsp. *variegata* from QLD. More information on various provenances can be found in the reference *Clarke et al. (2009)*. Specialist advice should be sought for information on the best provenance for any particular situation.

Economic Information

Spotted gum is one of the important commercial hardwood species of eastern Australia. Interest in planting the species for timber has increased since 1992. It has gained popularity due to its fast early growth, relatively good form and good quality general-use timber. Regrowth forest will also yield commercially viable supplies of timber if well managed. Prices received for wood products are variable and dependent on local market conditions.

Spotted gum appears to allow good pasture growth right up to the trunk when open-grown, and therefore has good potential for agroforestry.

Tolerance Information

Soil Depth

Shallow:	Tolerates
Moderate:	Prefers
Deep:	Prefers

Soil Fertility

Low: **Tolerates**

Moderate: **Prefers**

High: -

Soil pH

Very acid (<4): -

Acid (4-6): **Prefers**

Neutral (6-8): **Prefers**

Alkaline (8-10): **Prefers**

Very alkaline (>10): -

Soil Salinity (dS/m)

Slight (2-4): **Tolerates**

Moderate (4-8): **Avoid**

High (8-16): **Avoid**

Extreme (>16): **Avoid**

Surface Soil Texture

Light: **Tolerates**

Medium: **Prefers**

Heavy: **Tolerates**

Drainage

Rapid: **Prefers**

Good: **Prefers**

Poor: **Tolerates**

Inundation

Short Term: **Tolerates**

Long Term: **Avoid**

Landscape Position

Ridge Top: **Prefers**

Upper Slope: **Prefers**

Mid Slope: **Prefers**

Lower Slope: **Tolerates**

Flat: **Tolerates**

Creek / River side: -

Frost (min Temp °C)

Light (> 2): **Tolerates**

Medium (2 to -2): **Tolerates**

Heavy (-2 to -6): **Avoid**

Extreme (>-6): -

Qualifying Tolerance Information

Frost is a major issue, especially for establishment in inland areas of southern Australia with winter-dominant rainfall. The first two to three years is the main danger period. To minimise frost damage, spotted gum plantings should be restricted to upper-slope or ridge sites with ample air drainage, out of range of most frosts. Variation in frost tolerance within and between species has been identified. Glasshouse trials on the frost sensitivity of seedlings found that *C. citriodora* subsp. *variegata* is generally more frost tolerant than *C. maculata* and inland high-altitude provenances of both species are more tolerant than coastal provenances. The most frost tolerant provenance of *C. citriodora* subsp. *variegata* was found to be 'Paddys Land' from Guyra NSW (1000 m altitude) and the most frost tolerant provenance of *C. maculata* was 'Curryall' from near Dunedoo NSW (650 m altitude).

Suitable planting areas for spotted gum include 600–900 mm annual rainfall areas in inland southern Australia and 600–1200 mm rainfall areas in eastern NSW and central and southern QLD; however the selection of appropriate species and provenances within these areas is crucial for plantation success.

Depending on provenance, spotted gum is moderately drought tolerant and slightly salt-tolerant. It is generally intolerant of waterlogging although some tolerance to short-term waterlogging has been reported.

Glossary

A glossary of terms is available on our website.

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