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FOR PROFITABLE, ADAPTIVE AND SUSTAINABLE PRIMARY INDUSTRIES

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Eucalyptus cladocalyx

Lynne McMahon
Farm Forestry Extension Officer

Brendan George
Industry Leader Bioenergy & Private Forestry

Industry Development, Agriculture & Forestry

Robyn Hean
Natural Resource Economist

Primary Industries Science & Research

Country of Origin: Australia

Common name/s: Sugar Gum, Dwarf Sugar Gum

Species Summary

A hardy, small to medium tree with moderate growth rate and good form with select provenances. One of the best South Australian (SA) hardwoods; it grows well in hot, dry conditions and is suited to lower rainfall areas. Marketed as a premium timber, it has a high durability rating and is suitable for a range of uses, particularly outdoor applications. Thrives on a wide variety of soils and is drought tolerant. There is marked provenance variation in growth and form, so selection of planting stock is important. Foliage may be poisonous to stock and it has a spreading, competitive root system. Planted extensively in south-eastern Australia and overseas for timber and amenity uses.

Description and Form

The form of *E. cladocalyx* is variable, depending upon its provenance. Material from the Eyre Peninsula grows as a small to medium tree of spreading and sometimes multi-stemmed habit, generally 5–15 m in height and up to 0.4 m diameter at breast height over bark (dbhob). A dwarf form from the Eyre Peninsula, often referred to as var. *'nana'*, is a smaller, more spreading tree with a bushier habit, making it more suitable for shelterbelts and garden plantings.

Material from the southern Flinders Ranges and Kangaroo Island is much taller and can reach 35 m with a dbhob of 1–1.5 m on favourable sites. The Kangaroo Island material tends to be heavier-branched than that of the southern Flinders Ranges. Bark is smooth throughout and sheds in large irregular plates producing a colourful, mottled surface of off-white, yellowish grey and bluish grey. Leaves are dark glossy green on the upper surface and much paler below. At maturity, foliage is clustered at branch ends giving trees an umbrella or storied look.

E. cladocalyx is moderately fast-growing and coppices well.

Weediness and Toxicity

Naturalised in Victoria (VIC) and outside the range of its natural distribution in SA. Naturalised and listed as an environmental weed in Western Australia (WA).

Wilted young growth and mature leaves are reported to have caused the death of domestic animals such as cattle, sheep and goats.

Natural and Planted Distribution

E. cladocalyx is endemic to SA, where it occurs in three disjunct (disconnected) areas. Trees of the best growth and form occur in the southern Flinders Ranges towards the top and east of Spencer Gulf. The other localities are Kangaroo Island and the Eyre Peninsula. It grows on ridge tops and upper slopes throughout its range, except on Kangaroo Island where it grows near creeks. Altitudinal range is from near sea level to 600 m. *E. cladocalyx* occurs naturally on skeletal soils, which are often rather shallow, and less commonly on solonised brown soils or deep sands. It also grows on ironstone gravels.

E. cladocalyx is extensively planted on farms in western VIC and parts of southern inland New South Wales (NSW). It is a priority species for

planting in low rainfall areas of southern Australia and thrives on a wide variety of soils including gravels, clay loams, sandy loams, and sands, although it grows poorly on very fine sands.

E. cladocalyx is successful in plantations overseas, mostly in areas with 400–600 mm winter maximum rainfall such as Africa, Spain and Portugal.

Environmental Limits		
	Min	**Max**
Rainfall (mm)	350	1010
Temperature (°C)*	1	34
Altitude (m)	0	600
* 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 (pulp, paper, woodchips, activated carbon and charcoal)	✓
Veneer (face veneer, rotary peeled veneer and laminated veneer)	✓
Chemical (tannins, oil, gum and latex)	-
Flowers / Foliage (ornamental)	✓
Fodder	-
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	

Commercial Product Information

Heartwood is pale yellow-brown with a fine, uniform texture. It is hard, heavy, of moderate strength and one of the most durable and termite resistant eucalypts. Basic density is about 750 kg/m^3; air-dry density about 1100 kg/m^3; wood from young trees has a lower density of around 850 kg/m^3. Wood is used for posts, poles, general construction, railway sleepers, farm timber and firewood. It can also be sawn for appearance-grade products and polishes to a superb finish for the production of quality flooring, veneer and bench tops. Timber should be dried carefully and slowly to avoid surface checking, but glues easily, stains well and has good wearing and weathering properties. It is particularly suited to external applications such as decking, cladding, outdoor furniture and fence pickets. Sapwood is 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*.

E. cladocalyx is an excellent source of nectar and produces good quality honey. It is also a useful species for charcoal production.

E. cladocalyx, although having high pulp yields, has been considered too dense to use in conventional pulp mills for papermaking. However, recent studies reported variants of *E. cladocalyx* with lower wood densities which may have potential for pulp.

Wood Density			
	Min	**Max**	**Mean**
Green	-	-	1200
Air-dry *	850	1100	-
Basic	-	-	750
* At 12% moisture content			

Environmental Services Information

E. cladocalyx is planted extensively as a windbreak and shelterbelt species in south-eastern Australia. It is often managed on a coppice system for firewood and farm timber.

E. cladocalyx is ranked as one of the most promising species (in terms of growth and water use) for the reclamation of saline seeps in the 400 mm rainfall region of south-western Australia.

In natural stands, *E. cladocalyx* provides habitat and a food source for a range of native birds and insects and for mammals such as pygmy possums and sugar gliders.

Limiting Factors

E. cladocalyx has a spreading and competitive root system.

Requires good drainage; does not tolerate wet heavy soils.

Sensitive to frosts when young.

Not suitable for fodder as sheep, cattle and goats have died after eating wilted foliage.

Diseases and Pests

E. cladocalyx is generally a robust species and is rarely affected by insects or pathogens to any significant extent. The main insect pests are Christmas beetle (*Anoplognathus* spp.), gumtree scale *(Eriococcus coriaceus)*, leaf beetle (*Chrysophtharta* spp*., Paropsis* spp.) and sawfly (*Perga* spp.).

Flowers, Seed and Propagation

Flowers are white, appearing January to April in clusters of 7–11 or more. Fruit are ovoid to bell-shaped and ribbed (especially when dry) with 3–4 deeply enclosed valves. Seed is available for collection 12 months after flowering and may be retained on the tree for 3–4 years. There are about 120–150 viable seeds/g. After air-drying, seed can be refrigerated in airtight containers to maintain in good condition for several years. No pre-treatment is required for propagation. *E. cladocalyx* is easily raised in containers in the nursery and shows good survival in direct seeding mixtures.

Flowering and Seed Collecting Periods

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

Silviculture and Management

E. cladocalyx can be successfully established with similar preparation and treatments as many other eucalypts. 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 or shelterbelts are 3 m x 3 m (1111 trees/ha) and 4 m x 2.5 m (1000 trees/ha), extending to 7 m x 7 m for drier areas. Note that *E. cladocalyx* is intolerant of excessive competition and can become whippy if grown in dense stands, developing a disproportionately small crown.

Planting times vary depending on rainfall and the severity of frosts and minimum temperatures experienced. In VIC and NSW, planting is mainly done in September, or July/August in warmer districts where soils dry out earlier. In general, when warmer weather commences in late winter to early spring, combined with some rainfall but avoiding waterlogging is suitable. A 'starter dose' of fertiliser is recommended for early growth.

Young trees are largely self-pruning, and if *E. cladocalyx is* managed on a clear-felling and coppice system for firewood, then pruning is not needed. For clearwood production, progressive thinning and pruning will be needed. For sawlogs, reduce to a final stocking rate of 100–300 trees/ha.

E. cladocalyx is *o*ne of the species under genetic improvement for low to medium rainfall zones and improved seed is now available. The ‘Lismore’ landrace (from near Ballarat, VIC and based on ‘Wirrabara’ provenance) has performed best in Victorian plantings and successfully in overseas plantations. The ‘Port Lincoln’ (SA) provenance has proven most drought-tolerant in WA plantings. For farm forestry purposes, 'Wirrabara', ‘Flinders Ranges’ and 'Kangaroo Island' provenances are recommended, based on preliminary trial information collected by the Australian Low Rainfall Tree Improvement Group.

Economic Information

E. cladocalyx is marketed as a premium timber for furniture, flooring and stair treads. It is emerging as one of the best commercial farm forestry species in the 450–650 mm rainfall zone as it grows well in hot, dry conditions and is hardy. Interest has been shown in the timber by exporters due to its colour and polish. Prices received for timber are variable and dependent on local market conditions. Mean annual increments vary with age and rainfall from 2–3 m^3/ha/year to14 m^3/ha/year.

Tolerance Information

Soil Depth	
Shallow:	Tolerates
Moderate:	Prefers
Deep:	Prefers

Soil Salinity (dS/m)	
Slight (2-4):	Tolerates
Moderate (4-8):	Tolerates
High (8-16):	Avoid
Extreme (>16):	Avoid

Soil pH	
Very acid (<4):	-
Acid (4-6):	Prefers
Neutral (6-8):	Prefers
Alkaline (8-10):	Prefers
Very alkaline (>10):	Tolerates

Soil Fertility	
Low:	Tolerates
Moderate:	Prefers
High:	Avoid

Surface Soil Texture	
Light:	Tolerates
Medium:	Prefers
Heavy:	Avoid

Drainage	
Rapid:	Prefers
Good:	Prefers
Poor:	Avoid

Inundation	
Short Term:	Avoid
Long Term:	Avoid

Landscape Position	
Ridge Top:	Tolerates
Upper Slope:	Tolerates
Mid Slope:	Prefers
Lower Slope:	Prefers
Flat:	Prefers
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

Thrives on a wide variety of soils - gravels, clay loams, sandy loams, and sands but grows poorly on very fine sandy soils.

Tolerates a wide range in soil pH and has been grown successfully on soils with high lime content. Drought tolerant; tolerates shallow soils and low to moderate salinity.

Generally intolerant of waterlogging; performs well under irrigation but is not suitable for wet or waterlogged soils as mature trees can die.

Sensitive to frosts when young, but develops tolerance with maturity; avoid planting on flats and depressions if there is a risk of frost.

Glossary

A glossary of terms is available on our website

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