

# Private Forestry Guidance Materials

## Information Sheet 20: Shining gum

### Overview

Shining gum (*Eucalyptus nitens*) is the second most commonly grown hardwood plantation species in Australia. It is the preferred hardwood plantation species in Tasmania and colder parts of Victoria due to its fast growth rate and cold tolerance. Shining gum was initially grown in plantations as a short rotation (10-15 year) crop to produce pulp for paper manufacturing, however in Tasmania there is increasing focus on alternative uses.

### Species characteristics

Endemic to Victoria and New South Wales, this straight, gum-barked tree grows in pure stands of tall open forest native vegetation types. As a long-lived tree, under natural conditions maximum heights of 40–70 m are reached.<sup>1</sup> The species has fast early growth with mean annual increments of 15–35 m<sup>3</sup>/ha/yr over a range of altitudes in Australia.<sup>2</sup> Shining gum prefers cool wet slopes, deep, well-drained and fertile soils, high and evenly distributed rainfall. It tolerates very cold conditions including severe frost and snow.

Environmental factor	Variables
Mean minimum temperature	-3-4 °C <sup>3</sup>
Mean maximum temperature	19-29 °C <sup>3</sup>
Optimal temperatures for photosynthesis	14-20 °C
Annual rainfall	>800 mm preferred, intolerant <600mm (DPI)
Frost	Tolerates numerous and severe frosts, and snow Prefers <50 per year, intolerant of >60 per year (DPI)
Rainfall and dry season	Prefers even rainfall distribution with few months of <50 mm rainfall (Boland et al. 1984), drought intolerant
Soil depth	>40 cm minimum, prefers >60 cm (DPI)
Soil texture	Prefers loams, intolerant of very sandy and very clay soil (DPI), better growth on soils with high water-holding capacity and clay subsoil <sup>4</sup>
Drainage	Prefers well drained, intolerant of waterlogging (DPI)
Soil chemistry	Prefers pH 5.5-7, intolerant of pH <4 or >8 (DPI), poor growth on soils with low Nitrogen
Salinity EC	Low to moderate salt tolerance, prefers <1.2, intolerant >2 (DPI)

Table 1: Environmental requirements for shining gum.

## Current estate extent and location

Natural stands of shining gum occur in native forests in eastern Victorian highlands and the coastal ranges of New South Wales above 600 m elevation. In June 2021 the total area of shining gum plantations was 182,300 ha nationally, with 165,400 ha in Tasmania, 15,200 ha in Victoria and small areas in South Australia and New South Wales. The species makes up 84% of the hardwood plantation estate in Tasmania.<sup>5</sup> Of this area, an estimated 15% is managed to produce high-value sawlogs.<sup>6</sup> The potential range for new plantation developments is at cooler higher elevations on the Great Dividing Range. Shining gum is one of the most widely grown eucalypt plantation species of the world, with extensive plantation estates in New Zealand, Chile, South Africa and Spain (INFOR 2014).

## Products, properties and markets

Shining gum sawn timber is produced from native grown and plantation sources. The timber is pale pink in colour with a straight grain and moderately high strength. It is suitable for internal uses including general building, flooring, joinery, panelling, furniture and framing. However, its low durability and susceptibility to termites and lyctid borers makes it unsuitable for external use. Smaller diameter plantation grown logs require advanced sawing technology and drying strategies that involve reconditioning for effective recovery.<sup>7, 8, 9</sup> Plantation grown shining gum can also be used to manufacture structural plywood using rotary peeled veneers and a small proportion of manian oak. It is considered a good-quality (but not premium) pulping species. It has short, low-density fibre and high pulp yield.

Pulpwood is currently the main commodity product in Australia for plantation-grown shining gum. Established markets for this product are wood chip exporters based in Victoria and Tasmania. Tasmania has invested considerable research into value-added product development for the species, identifying opportunities including engineered timbers and structural veneer. Markets for saw logs include hardwood sawmills in Victoria, Tasmania and New South Wales. Tasmanian processors are working with plantation grown shining gum to develop efficient sawing and drying strategies.

## Ecosystem services and community benefits

Shining gum plantations provide similar ecosystem benefits to other types of eucalypt plantations. Benefits include shade and shelter, generation of carbon credits and wildlife habitat provision.

Eucalypt plantations can be integrated with agricultural enterprises either as woodlots, wide shelterbelts or plantations with wide-spaced rows. Strategically placed plantings benefit pasture and crop growth and improve growing conditions for livestock through provision of shade, shelter or refuge.

There are several opportunities for eucalypt plantations to generate Australian Carbon Credit Units under the Carbon Farming Initiative – Plantation Forestry. These include:

1. The establishment of new plantations on non-forested or wetland areas.
2. The decision to continue a plantation rather than convert it to other land use because the opportunity to participate in the Emissions Reduction Fund (ERF) makes it viable to continue managing the land as a plantation.
3. Transition of the plantation to permanent forest.

Eucalypt plantations support wildlife populations by extending habitat around native vegetation remnants and providing landscape connectivity.<sup>10 11</sup>

## Risks and their management

Shining gum plantations are subject to a range of risks common to Australian forestry including fire and climatic extremes; neighbourhood issues relating to chemical spraying; streamflow, noise, dust and amenity issues; and unsuitable local road infrastructure. Species-specific forest health risks are also worth noting.

Shining gum is vulnerable to several biological damage agents. In Tasmania the main factors are heavy browsing by wallabies and possums and defoliation by Chysomelid leaf beetles. It is also vulnerable to several pathogens. *Kirramyces* and *teratosphaeria* fungal leaf pathogens can cause extensive severe defoliation in wet summers. These impacts can be minimised with routine monitoring following establishment and timely control action when damage exceeds economic thresholds.<sup>12</sup> *Phytophthora* root rot causes mortality in Victorian and northern Tasmanian plantations particularly when planted in lower, less suitable elevations.<sup>13</sup>

Shining gum is not an effective self-pruning species. Plantations grown for solid wood (sawlogs and veneer) require pruning. However, thinning timing is very important, as removal of large branches from age 5 onwards can result in infection leading to defect and internal rot.

## Management practices

Economy of scale is an important consideration for hardwood plantation growers. The minimum viable area for harvest is 10-15 ha for a productive site that is close to market with no significant challenges associated with access and harvest. Larger areas would be required for economy of scale for more challenging sites that are further from market. The species is typically grown industrially as plantations. Other configurations suitable for farm forestry include multiple smaller woodlots, wide shelterbelts, plantations with wide spaced rows.

Most shining gum plantations were established from 1995 onwards and are grown under unthinned and unpruned regimes<sup>9</sup> for pulpwood markets, however in Tasmania increasing proportions are harvested for veneer logs and 25,000 ha are managed using silvicultural systems aimed at producing sawn timbers.<sup>6</sup>

A typical silvicultural regime involves the following steps.

- Site preparation, usually involving cultivation to provide suitable soil and microclimate for seedlings.
- Pre-plant weed control.
- Planting of seedlings at a density of 1,100 stems per hectare in winter to early spring.<sup>1</sup>
- Establishment fertiliser, may not be required depending on fertiliser history.
- Insect control, which can involve physical barriers or soil injected insecticide.
- Regular monitoring for insects, disease and weed competition which may trigger further treatment.
- Pre-harvest inventory to determine the potential harvest volume.
- Harvest (see below).
- Slash treatment such as chopper rolling, heaping or possibly burning.

### Pulpwood regimes

- No thinning or pruning.
- Clear fall harvesting and onsite processing of pulplog or chip, generally from 15-20 years.<sup>9</sup>

### Solid wood regimes

- Pre-commercial thinning to 1000 stems/ha at age 3 or 4.
- Commercial thinning to 300 stems/ha at age 7-12 years.
- Pruning at age 3 and 5-6 to 6.4 m.

## Financial returns

The financial profile for shining gum will depend on whether it is a long rotation saw log plantation or short rotation pulpwood plantation. Additionally, factors such as proximity to market and plantation productivity will influence final returns. The analysis below presents the financial profile for a sawlog rotation, growing at 17 m<sup>3</sup>/ha/yr. The plantation is pruned in three lifts between ages three and five. A commercial thinning operation is undertaken at age 10 and clearfall at age 25. Pulp markets are 50 km away and sawlog markets 70 km. Delivered price for pulplog is \$60/green metric tonne and for sawlog, \$120/m<sup>3</sup>.

Year	Establishment	Inventory	Annual maintenance	Pruning	First Thin			Clearfall			Total
					Harvest & Load	Haulage	Revenue	Harvest & Load	Haulage	Revenue	
0	-2,400		-40								-2,440
1	-250		-40								-290
2			-40								-40
3			-40	-250							-290
4			-40	-250							-290
5			-40	-250							-290
6			-40								-40
7			-40								-40
8			-40								-40
9		-20	-40								-60
10			-40		-1,680	-800	4,800				2,280
11			-40								-40
12			-40								-40
13			-40								-40
14			-40								-40
15			-40								-40
16			-40								-40
17			-40								-40
18			-40								-40
19			-40								-40
20			-40								-40
21			-40								-40
22			-40								-40
23			-40								-40
24		-20	-40								-60
25			-40					-5,250	-4,100	30,000	20,610
<b>Total</b>	<b>-2,650</b>	<b>-40</b>	<b>-1,040</b>		<b>-1,680</b>	<b>-800</b>	<b>4,800</b>	<b>-5,250</b>	<b>-4,100</b>	<b>30,000</b>	<b>18,490</b>

## Bibliography and further reading

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- <sup>7</sup> WoodSolutions website, <https://www.woodsolutions.com.au/wood-species>.
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- <sup>11</sup> Olsen, P.F. (2022) Bird Monitoring in Plantations – BirdLife Australia and PF Olsen Australia bird monitoring program presentation. [https://pfolsen.blob.core.windows.net/productionmedia/5596/bird-monitoring-in-plantations\\_april2022.pdf](https://pfolsen.blob.core.windows.net/productionmedia/5596/bird-monitoring-in-plantations_april2022.pdf).
- <sup>12</sup> (FPA) Forest Practices Authority (2017) State of the forests Tasmania 2017.
- <sup>13</sup> (Australian Government) Montreal Process Implementation Group for Australia and National Forest Inventory Steering Committee (2018) Australia's State of the Forests Report 2018, ABARES, Canberra, December.
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