Agriculture WESTERN AUSTRALIA

Farm Forestry Advisory Service

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

TreeNote

No. 27
August 1999

Growing Tasmanian blue gum — overview

in the greater than 600 mm rainfall zone

Introduction

Tasmanian blue gum (*Eucalyptus globulus*) is now a major tree crop in southern Western Australia. Since 1988 about 130,000 ha have been planted to produce pulpwood for high quality paper manufacture in Asia.

By 2001, blue gum woodchips will be processed for export by new chip mills near Albany and Bunbury, existing mills at Manjimup and Greenbushes, and perhaps by mobile chippers as well. Annual pulpwood production could reach 2 million tonnes by 2004 and rise to 4 million tonnes a decade later.

This TreeNote gives a brief summary of blue gum growing. Some topics are covered in more detail in separate TreeNotes.

Why grow Tasmanian blue gum?

Blue gums grows very rapidly on good sites with adequate moisture. Blue gum produces pulpwood with a high pulp yield and it attracts a better price than pulpwood from other species.

Blue gum is also suitable for solid wood products. It produces strong, light-coloured wood and it has bright prospects as a sawn timber. Small logs from 10-year-old trees have been sawn to produce strong, attractive flooring and furniture. Wood from even younger trees has been tested successfully in the outer layers of laminated floor panels.

Integrating trees with farming

Blue gum is a profitable crop in its own right but its value to farmers can be even greater if planted in strategic parts of the landscape. Its rapid growth rate and high water use can give additional benefits such as shelter for crops or stock, and groundwater control to save land from salinity and waterlogging. Trees can be planted in belts of varying width, spacing and orientation, or in blocks occupying corners or whole paddocks. Graziers who incorporate blue gum timber belts into their farm plan can continue to run stock as well as profiting from their tree crop.

Growing blue gum for pulpwood

On good sites blue gum can be ready to harvest when only eight to 10 years old. Areas with slower growth rates may need 10 to 15 years. When grown for pulpwood, blue gum needs little regular management other than checking for pests and diseases and monitoring growth and nutrition. Trees grown in blocks at close spacing need no thinning or pruning.

A second crop (or 'rotation') can be grown from coppice on the original stump in about the same time as the first crop. Coppice regrowth needs thinning to one or two new stems per stump but it is a cheaper alternative than cleaning up the site and planting new seedlings. However, replanting may be preferable if better genetic material is available.

Growing blue gum for sawlogs

Sawlog stands need thinning to maximise the growth

Blue gum belts integrated with a beef farm near Albany. Multiple benefits include financial diversification, land conservation and stock shelter.

Continued overleaf...

of the best trees. Remaining trees should be pruned to remove branches that would otherwise produce large knots. Stands grown primarily for sawlogs can produce income along the way if thinnings are sold for pulpwood or for posts. On good sites, blue gum can produce small sawlogs in ten years and large sawlogs in about 20 years.

Local milling and seasoning studies using young farm-grown sawlogs have been encouraging, although some modifications to traditional methods may be needed to maximise recovery of high-value timber from young trees. Further developmental work is under way including work by CSIRO researchers in Victoria.

Market outlook

Local growers have an opportunity to exploit the projected growth of global demand for timber products. Australia is already a significant exporter of woodchips and is expected to become a net exporter of sawlogs, sawn timber and panel boards before 2010.

Two cooperatives are operating in Western Australia to help tree farmers maximise their returns and to coordinate the harvesting and marketing of their trees.

Pulpwood

All blue gum grown in Western Australia for pulpwood is intended for export. In 1998 Japan took 99 per cent of Australia's total woodchip exports, while Australia supplied 29 per cent of Japan's imported hardwood woodchips. As a low cost supplier (at current exchange rates), this may help Australia increase its share of the Japanese market. However, the upside could be limited if Japanese buyers choose to maintain diverse sources of supply.

Looking ahead, Western Australian blue gum woodchips will be sold into a competitive world market as large areas of blue gum plantation mature in other parts of Australia and other regions, especially South America. The Australian Bureau of Agricultural and Resource Economics (ABARE) has forecast a decline in the price paid by Japanese importers of 15 per cent by 2010 (in A$).

Solid wood products

Prospects for both local and export markets are good if sufficient timber becomes available. Local blue gum could become widely used for flooring, panelling and joinery in Western Australia and be exported into growing markets in the Asia-Pacific region as sawlogs, sawn timber and manufactured products. Although most existing blue gum plantations were established for the pulpwood market, a rise in demand for solid wood products could encourage some growers to manage their trees to produce a combination of sawlogs and pulplogs.

Other products

Blue gum thinnings have been tested as treated posts. The timber is strong and absorbs preservative satisfactorily but has a tendency to split longitudinally during drying, reducing its visual appeal.

Blue gum is used for rayon manufacture in India and is suitable for use in panel board manufacture. However, these industries offer lower prices than those currently paid by pulp manufacturers.

Site selection for a pulpwood crop

The most profitable sites have at least 800 mm of annual rainfall, a good fertiliser history, soil at least 3.5 m deep (but not deep sand), and no salinity or permanent waterlogging. A site survey is essential (about one observation point every 1 to 2 ha) to identify and exclude shallow, saline, sandy and waterlogged soils.

Water availability

Blue gums use large amounts of water, and are prone to drought death, especially during the peak growth period from 2 to 6 years. They need adequate rainfall and sufficient soil storage to provide year-round water availability.

Blue gum survival and growth is best in areas with low evaporation rates and rainfall of more than 800 mm. Sites with rainfall as low as 600 mm may be satisfactory if the soil is deep but below 600 mm most sites suffer from low survival rates or uneconomic growth rates.

Soil depth (in regard to blue gums) is the depth to a layer impenetrable to roots, such as bedrock (granite, siltstone, limestone) or a hardpan (laterite, coffee rock). Most growers use drilling rigs or backhoes to check soil depth when assessing sites. The accepted minimum depth has been 2 m but many growers now reject sites with less than 3.5 m of soil (this further reduces drought risk and excludes less profitable areas). Except in water-gaining areas, growth is always relatively poor on sands deeper than 1 to 2 m.

On sites with marginal water availability, reducing the number of trees per hectare can reduce the risk of drought deaths but total yield is also reduced. A better option is to grow trees in belts. This minimises the risk of drought death while maximising yield from the area planted.

Salinity and waterlogging

Growth is substantially reduced at salinity levels above 50 mS/m (25 mS/m in deep sands), as measured by an EM38 instrument. Blue gums may also be sensitive to waterlogging, especially when combined with salinity. Trees have died on sites where perched watertables persist for 2 to 3 months within 0.5 m of ground level.

Other factors

Fertile soils are more profitable than low fertility soils, especially where rainfall is above 800 mm.

Sites selected for blue gums also need to:

- have reasonable access for establishment and harvesting
- be large enough (1 or 2 ha at least) to attract timber buyers and harvesting crews
- be close enough to markets to be profitable

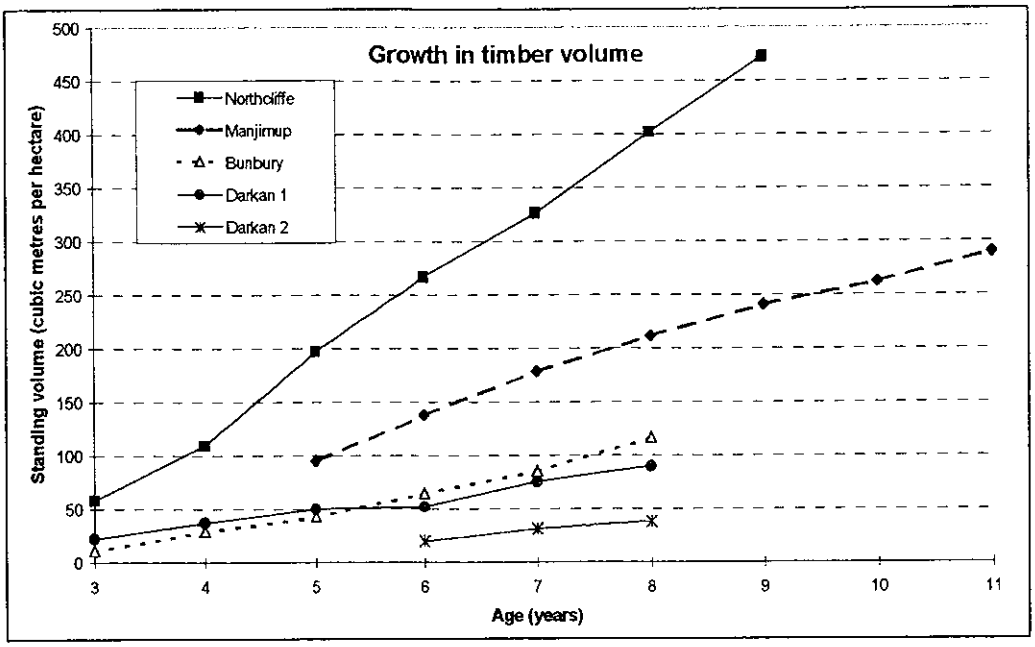

Figure 1. Growth in timber volume measured at five sites with different rainfall and soil.
Data courtesy of Steve Quain snr.

Northcliffe	1400 mm	1667 trees/ha	karri loam
Manjimup	1000 mm	1250 trees/ha	sandy gravel over deep lateritic soil
Bunbury	850 mm	1250 trees/ha	Tuart sand over limestone
Darkan 1	650 mm	833 trees/ha	gravel over laterite, some massive ironstone
Darkan 2	650 mm	833 trees/ha	sand over clay, salt affected

Note: 1 cubic metre = 1.06 green tonnes at harvest.

Timber yield

Fully stocked stands on good sites with more than 800 mm of rain can produce over 300 tonnes of pulpwood per hectare from a 10-year rotation. At the minimum recommended rainfall of 600 mm, most sites yield less than 150 t/ha and may not be economic. Some measured growth rates are shown in Figure 1.

Blue gums grow faster in belts than in block plantings because edge trees in belts can utilise water and nutrients from the adjoining pasture. For example, David and Dianne Jenkins (Bridgetown) harvested 250 tonnes of timber per hectare when they thinned two-thirds of the trees from their three-row belts at ages 8 and 10 years.

Establishment

To maximise production, each planted area should be 'fully stocked,' that is, have a high survival rate at the chosen planting density. Good ground preparation and weed control are the keys to maximising tree survival and early growth.

Most sites require ripping and mounding (or furrowlining on sands), and herbicide application. After seedlings are planted in winter at 1250 stems per hectare, protection from rabbits and stock is essential.

Specialised contractors and consultants are available for site assessment, site preparation, planting, fertilising and spraying. Nurseries can advise on suitable blue gum provenances for particular sites and purposes. CALM has developed a 'Western Blue Gum' using seed selected from blue gums with superior performance under local conditions.

Nutrition

Blue gums planted into well-fertilised pastures rarely suffer phosphorus deficiency. However, sites with a poor fertiliser history usually lack phosphorus and nitrogen, while sandy soils are often deficient in potassium. Some sites also lack trace elements.

Testing the soil for N, P and K before planting will identify any need for added fertiliser. Added phosphorus is most effective if incorporated into the soil along the tree rows before planting, while nitrogen and potassium can be applied to the surface in spring after the trees are established. Sites deficient in potassium often produce poor yields and may not be economic to plant.

After the first year macro nutrient and trace element deficiencies can be detected by monitoring growth rates, testing leaf nutrient concentrations and checking for visual symptoms. Trees respond poorly to added nutrients on sites where growth is limited by water (shallow soils or rainfall less than 800 mm).

Hazards

Once trees are established, hazards that need managing include weeds, fire, insect pests, parrots, and grazing by stock. As blue gums are a relatively new crop in Western Australia, new hazards may emerge, requiring new solutions.

Fire

Experience to date indicates that well managed blue gum plantations usually escape major damage because they have little fuel at ground level, the dense canopy

Continued overleaf...

reduces wind speed among the trees and blue gum foliage is not highly flammable.

Insects

Insects which damage seedlings include Spring beetle (*Liparetrus jenkinsi* and others), African black beetle (*Heteronychus arator*), Wingless grasshopper (*Phaulacridium vittatum*), and Plague locust (*Chortoicetes terminifera*).

Foliage pests, in order of importance, are Autumn gum moth (*Mnesampela privata*), Leafblister sawfly (*Phylacteophaga spp.*), and Chrysomelids.

Timely spraying is effective for most of these insect pests but is only a short-term solution until integrated pest management strategies are developed.

The major plantation companies formed an Industry Pest Management Group in 1997 to coordinate surveillance and monitoring. A CSIRO entomologist has been employed at Manjimup to coordinate research in Western Australia on insect pests in blue gums.

Parrots

Port Lincoln ringneck parrots have devastated some blue gum plantations and are a major pest in the Darkan and Boyup Brook areas. The most effective remedies at present are to minimise parrot numbers by restricting their access to grain and to shoot parrots when damage occurs.

A regional trial was set up in Kojonup Shire to test the effectiveness of trapping. Results are expected later in 1999.

Costs

Using contractors, blue gum crops cost about $1200 per hectare to establish and a further $700 per hectare as the trees grow: for monitoring, fertilising, fire prevention, fence maintenance, and control of weeds, pests and diseases. For each subsequent rotation, total costs are about $1200 per hectare, mostly for coppice thinning and fertilising. Farmers can grow trees for a lower cash cost if they are able to do some or all of the work themselves.

Harvesting contractors charge about $15 per tonne to harvest and extract logs, while road transport to a mill costs 10 to 12 cents per tonne per km, plus $2 per tonne for loading.

Returns

Presently (1999), the only mill processing blue gum pulplogs is Diamond Mill near Manjimup, operated by Bunnings Pulpwood Operations. The current mill door price for debarked pulplogs (August 1999) is $43 per green tonne. Most growers sell their logs on the farm, and are paid a stumpage price (the price paid for timber standing in the paddock). Stumpage is calculated by deducting the costs of harvest, supervision and haulage from the mill-door price.

The domestic market for blue gum sawlogs is still in its infancy. Small unpruned sawlogs 50 km from a mill have attracted stumpages up to $31 per cubic metre. At this stage it is unclear what future prices will be paid for large pruned logs.

Profitability

A timber belt, grown in two rotations over 18 years on a site with a modest growth rate of 20 tonnes per hectare per year would produce an annual net return of $172 per hectare. This figure takes into account secondary effects on the surrounding grazing enterprise, and is based on a stumpage of $25 per tonne and a discount rate of 6 per cent. Very high quality sites yielding 40 tonnes per hectare per year would return $548 per hectare per year under the same assumptions.

Financing and management options

Landowners can finance and manage tree crops independently, or invite varying contributions of labour, finance and management from outside.

Some South West graziers and orchardists have already shown that they can finance, plant and manage their own blue gum crops and produce economic and environmental benefits. Although independent growers maximise their returns, they also carry all the risk.

At the other end of the scale, leasing and sharefarming are useful options for landowners who prefer to grow trees with little or no cash outlay, management effort or market risk. Plantation companies such as CALM Sharefarms, Bunnings Treefarms and Integrated Tree Cropping will take care of tree establishment, management, harvesting and marketing. In return they offer annual payments of $120 to $250 per hectare depending on location and estimated growth rates. Of the 90 to 95 per cent of Western Australia's blue gums that are managed by plantation companies, about half are grown under leasing or sharefarming agreements with farmers.

Shire requirements

Planning and fire control requirements for plantations and the definition of 'plantation' vary from Shire to Shire. Most Shires have some zones in which plantations are not permitted and other zones (such as 'rural' or 'general farming') in which plantations are permitted subject to a development application being submitted for approval. Seek advice from your Shire.

Supported by:

AGRICULTURE, FISHERIES AND FORESTRY - AUSTRALIA

ISSN 1329-3273 Print Post Approved 606811/00013

8/99TN27DT-2500