



## CHAPTER 15 - SUMMARY

Blackwood has an extensive natural distribution in Australia, and is tolerant of adverse sites. However, commercial production is restricted to specific sites. It needs adequate rainfall, shelter, good soils and moderate temperatures. Blackwood occurs throughout eastern Australia, but most commercial production is in Tasmania and Victoria. Blackwood is established as an exotic plantation species in South Africa, India, Chile, Hawaii and China. Blackwood is now well established as a minor exotic species in the New Zealand forestry scene, especially at the farm forestry level.

### Timber

Blackwood is a medium weight timber that is easy to work, turns and bends well, and dresses to a smooth finish. It has even texture, with usually straight, but sometimes wavy grain. Blackwood timber is extremely variable in wood density, colour and heartwood percentage. However, growth rate has little bearing on wood quality. It is viewed as an alternative to rimu.

### Markets

The Australian market is cyclical and reflects the Australian economy, but blackwood is exported to at least five countries from Australia. Blackwood is developing a market following in New Zealand, where current demand is outstripping supply.

### Resource

The resource in Australia is based on sustainable production from natural forests, and from plantations (when they mature



between 2018-2048). Tasmania provides most of the resource. The resource in New Zealand, estimated at approximately 3,000 ha, is young but capable of supporting an industry in the future.

### Siting

Blackwood requires careful siting. It grows best and produces its best form in sheltered areas. Blackwood sites should provide adequate moisture for optimum growth. Frost prone locations should be avoided.

## Land uses

Blackwood can be suitable for a wide range of land uses, such as: plantations, scrub enrichment, riparian planting, open grown trees, shelterbelts, waste water schemes and erosion control, for both timber and nontimber values. Blackwood is a useful agroforestry species, but must be properly sited. Blackwood has less impact on pasture than some other tree species. Total soil nitrogen and nitrogen availability increases with increasing tree stocking rate. Understorey soil moisture is unaffected by tree stocking rate, indicating that trees are not competing with understorey pasture species for moisture.

## Genetics

Blackwood shows great genetic variation, both between and within provenances, but there is a lack of research results to guide the establishment of plantations and breeding programmes. Studies conducted have often been limited in scope, particularly with regard to the number of representative provenances. The variation in blackwood growth habit and wood properties lends itself to a clonal propagation system. The heritability of selected attributes and the influence of site on inherent properties are unknown. Clonal selections will require assessment of their performance on a range of sites before they can be considered more than experimental.

## Establishment

The most important aspect to plantation success is siting. Seed requires treatment to ensure uniform germination. Seedling type is not critical to success. Nutrient deficiency levels are unknown. Studies suggest that foliage collection for nutrient analysis should be carried out in the month of April.

Fertiliser is not always necessary, although phosphorous and sulphur should be applied on phosphorous deficient soils. If fertiliser is applied it should be in conjunction with weed control. Seedlings need protection from stock/wildlife during establishment. Initial stockings of 800 stems/ha, associated with

form pruning, for either row or group planting is recommended.

## Health

Insect damage is present in all blackwood stands. The most damaging effect of insect predators (usually psyllids and/or leaf miners) on blackwood is their contribution to leader dieback and multileading. They are therefore important in the early stages of growth. Due to New Zealand's proximity to Australia blackwood plantations will always be threatened with the establishment of new insect pests. Well sited, well established and well managed blackwood can produce excellent sawlog material, although growth reduction from insect pests during the rotation has not been quantified. Mature and healthy trees on good sites show little damage.

## Management options

Blackwood can be grown in plantations, but form pruning is an essential component in all blackwood management options. The use of a trainer species can result in improved stem form. However, the method has pitfalls, and requires attention to detail. The temptation to retain the trainer species after the blackwood butt log is formed must be resisted. An attempt to extract commercial timber from the trainer species is unlikely to succeed, and can compromise good blackwood management.

Enrichment planting in indigenous scrub can be very effective, but can raise environmental concerns.

## Growth Habit

Blackwood shows a striking versatility in its form and growth rate in response to site factors (in particular moisture, shelter, light, and soil type). The seeds are long-lived in the soil. Once established, blackwood is therefore likely to persist on a site. The extensive root system gives blackwood a role in soil stabilisation, and in riparian planting.



Blackwood is moderately shade-tolerant when young, but requires light as it matures. Advantage should be taken of the capacity for rapid extension growth and reduced branching, which occur during the juvenile growth phase. The coppice response varies between seasons. There is, therefore, an optimal time to cut when either thinning, or encouraging new growth (autumn and spring respectively). In New Zealand conditions, the recommended period for annual assessments of both diameter and height for blackwood is during June and July.

#### Malformation

Malformation is inevitable in plantation grown

trees, but stem malformation can be reduced by encouraging vigorous juvenile growth. Multiple leaders, stem kinks and rogue branches can be controlled by form pruning. Form pruning through selective branch removal is essential. A combination of leader training and gauge pruning is recommended and should be carried out annually during the formation of the 6 metre stem. It is recommended to leave 3 m of green crown when lift pruning. Competing leaders at the crown base above 6 m should be removed or shortened.

Crown malformation, especially a fork at the base of the crown, can lead to crown disintegration. It can be reduced by pruning and thinning over time, and by ensuring even

spacing between final crop trees.

Thinning should not be too heavy, or early. It is important to thin on time, to prevent the adverse effects of crown competition.

### Models, yields and regimes

A preliminary growth model for stand prediction has been developed. However, future model predictions should be reviewed and updated periodically as more growth data becomes available. Site indices suggest that, depending on the site, a range of heights from 15-45 m at age 30 could be expected.

Assessment of recoverable yields suggests large butt-log diameter should be targeted.

A target tree of 60 cm DBH, pruned to 6 m, with a rotation length of 35-40 years is suggested.

A regime starting at 800 stems/ha, with form pruning, clearwood pruning, and thinning to 200 stems/ha by age 10, is outlined. As more data is collected, preferred regimes are likely to be updated, so be sure to seek up-to-date advice.

Total yields of approx 500 cubic metres are anticipated with a possible merchantable yield of 300 cubic metres of sawlog material.

### Economics

Economic analyses in New Zealand are difficult because of uncertain data, particularly with respect to

silvicultural costs and recoverable yields. Blackwood economic evaluations have returned positive values, usually with IRR of 5-8% . In previous New Zealand studies, blackwood returns appeared less profitable than radiata pine. A current base case evaluation suggests returns of 7-10% are possible.

### Utilisation

New Zealand plantation blackwood has been successfully sawn although heartwood percentage is variable. Some tension in logs occurs, and this is also variable. No major problems have been encountered with drying or machining. Processors should ensure a dust free work environment to avoid blackwood allergies.

New Zealand plantation material is being converted to furniture and sold in the market place. Well tended New Zealand plantation blackwood has not been available for evaluation to date.

