



TreeNote

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Farmer experiences in farm forestry

Rob and Mary Johnstone, Neridup via Esperance

By Neil Coy, Esperance

Rob Johnstone's name is synonymous with the development of agroforestry in the Esperance region. Rob was the inaugural chairman of the South East Forest Foundation, a position he held for seven years after he helped to form the group in 1992. Farmers in the region who have undertaken agroforestry programs gratefully acknowledge Rob's willing contributions.

Rob, his wife Mary and growing family, have also had their share of hands-on experience on their 720 ha holding at Neridup, in a 550 mm rainfall zone, 42 km north-east of Esperance. Their experiences of tree farming have followed a similar path to other farmers who have introduced trees to their properties on the Esperance sandplain.

First steps

Rob and Mary began farming in 1978 on an isolated new land block at Mt Beaumont, 110 km north-east of Esperance. In 1988 they were pleased to procure their present property at Neridup, where they grazed 5000 sheep and introduced a barley:lupin rotation on one-third (240 ha) of their land. However, Rob and Mary were interested in diversifying away from traditional agricultural practices to help secure the future of their farming operation. This interest became more focused when there was a downturn in the wool market in the early 1990s.

In November 1991 an industry seminar on farm forestry was held in Esperance which heralded the beginnings of a new local industry. Rob pursued commercial trees as a multi-purpose tree crop option. The methodology behind the Johnstone's farm forestry design has been to integrate commercial trees with agricultural systems.

Non-commercial farm trees

In 1989 Rob and Mary planted a range of the then recommended, non-commercial farm trees for erosion and windbreak purposes. These were river red gum (*Eucalyptus camaldulensis*), dwarf sugar gum (*E. cladocalyx* var. *nana*), Bald Island marlock (*E. conferruminata*), South Australian blue gum (*E. leucoxydon*) and swamp sheoak (*Casuarina obesa*). Unfortunately these seedlings fell prey to the 1990 locust plague. The same species of trees were planted again in mid-1991.

Trial plots

In the winter of 1992, the South East Forest Foundation collaborated with CALM to establish 25 trial plots across the Esperance region. Species planted were Tasmanian blue gum (*Eucalyptus globulus*), rose gum (*E. grandis*), maritime pine (*Pinus pinaster*) and radiata pine (*P. radiata*).

One 4 ha trial plot was established in an alley layout on the Johnstone's farm. This plot has provided an opportunity to establish different silvicultural regimes using the four species.



Rob Johnstone measuring a rose gum (*E. grandis*) planted in 1992. These trees have been pruned to 6 m and at 200 stems/ha in May 2000, measured 20 m high with a diameter at breast height over bark (DBHOB) of 30 cm.

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Contributing to the Western Australian Salinity Action Plan



Rob Johnstone shows the results of pruning – this 8-year-old rose gum now has excellent form as a future sawlog. These rose gums (left) and the radiata pines (right) are on deep sand and growing strongly as the result of an excellent water supply. In future Rob says it would be better not to have two different management regimes side by side owing to their different susceptibilities to chemicals.

Blue gum alley plantings for pulpwood

The following winter (1993) Rob machine-planted 16,000 blue gums in three 60 m timber belts, with 200 m wide alleys between the belts, intending to harvest the trees for pulpwood in 10 years. Crops were grown in the alleys. The tree belts, running north-east/south-west, parallel to Savages Road, were planted at 5 m x 2.5 m spacings, creating a total of 25 ha of trees.

After ripping the erodable sandy and duplex soils, Rob waited for germination of weeds before spraying with a mix of glyphosate and simazine. Seedlings were then planted and fertilised with 150 grams of 'Horticultural Special' per tree, after the next substantial rain in June. The following summer (1993-94), sheep were introduced to the non-fenced plantations at which stage the blue gums were 1 to 1.5 m tall.

The trees grew well over a fresh water 'lens' of perched water in the deep sands; much better than in nearby gravelly duplex soil. A severe infestation of leaf blister sawfly (*Phylacteophaga froggati*) had a

Rob Johnstone with an 'edge' Tasmanian blue gum which has typically produced more wood volume than trees growing in inner rows of this 12-row tree belt (planted in 1993).



negative effect on growth but all trees recovered. Because the sawfly hatching coincided with the arrival of a large flock of finches, Rob decided not to spray with insecticide.

In 1997 the Johnstones planted a well-drained, sandy hill slope with sugar gum (*E. cladocalyx*) and southern mahogany (*E. botryoides*) which will be pruned in late 2000 for future saw logs. Establishment practices were similar to those for the blue gum, though they were hand planted with a 'pottiputki'.

The logging option

Although the simplicity of a pulpwood regime is attractive, Rob believes this is outweighed by a forecast of lower pulpwood prices with the potential of a glut on the market.



Hamish Johnstone pruning a 3-year-old southern mahogany (E. botryoides).

Since 1992 Rob has continued to source information on supply and demand trends for forest products. He has furthered his knowledge of agroforestry by completing a Certificate in Forest Science and the Master Tree Grower course, both courses conducted by Melbourne University.

In regard to agroforestry decisions, Rob says farmers are faced with the problem of identifying commercial

tree species that are compatible with local conditions while providing a diversity of product options. He says one also needs to select a management regime that is complementary to the existing farming operation.

Growing for sawlogs

Today, (in 2000) Rob is thinning his blue gums to 150 to 175 stems per hectare and high pruning them to 6 m so that they may produce high quality sawlogs in future. Some thinnings have been CCA-treated at Esperance Treated Timbers. A trial treatment was successful with satisfactory impregnation of CCA into the sapwood. However, there was substantial end-splitting during the drying process after treatment.

Growth plots have been established and measurements are taken annually. This provides information on site productivity which is useful for estimating harvest times and volumes. This data can also be used for selecting suitable sites for future plantings.



▲ *Alistair Johnstone monitoring the end-splitting of blue gum posts cut from thinnings. Note the mixed tree plot of rose gum (E. grandis) and radiata pine (Pinus radiata) in the background.*



◀ *Blue gum stand (1993 planting) pruned to 6 m for sawlogs and thinned in 2000 to 150 to 175 stems per hectare.*



Effects of differences in soil type on growth rate: taller blue gums to the left are growing more strongly on deep sand (1.5 m to water) – those on right are on a duplex soil (sand over gravel over clay) with 4 m to water.

Indications to date suggest that blue gums are best suited to well drained soils free of a root-impeding layer. Trees on the deeper, sandy soils (more than 2 m deep) have produced four times the volume of timber of those that are on shallow duplex soils.

Watertables

Ten bore holes, drilled to the watertable and cased in 1992, have been consistently monitored by Agriculture Western Australia and more recently by Hamish Johnstone. Potable water (90 mS/L) in the deep sand was only 2.5 m beneath the surface in April 2000.

The watertable has on occasions risen by about 0.5 m in a year, with a more pronounced rise in the past two years because of successive record wet summers on the Esperance sandplain. Rob is subsequently fearful that the radiata pines may be getting 'wet feet' in some situations and could therefore be susceptible to waterlogging.

Growth: deep sands vs gravelly duplex soils

Since 1991 it has been noted that trees are performing better on the deeper, sandy soils which are less suited to traditional agriculture.

The blue gums on the deeper sands with free access to water, (from the 1992 trial plot), are now growing at an average rate of 22 cubic metres of wood per hectare per year, that is, 22 MAI (Mean Annual Increment). In comparison, those on the duplex soils have an MAI of only 5 to 6. In 1996 the rose gums were thinned to 200 stems per hectare: trees are 20 m tall and 30 cm diameter at breast height over bark (DBHOB).

Pros and cons

The microclimate created by the Johnstone's alley farming has not affected overall crop yields. However, close to the trees, crop yield is significantly less.

Rob Johnstone says tree belts provide improved conditions for working the land and have a positive influence on wind and water erosion. There are also more windows of opportunity for such tasks as spraying, and the visual, or aesthetic effect on the landscape is very pleasing.

What are the options?

Rob Johnstone's interest in agroforestry, especially in the South East region, has him searching for other options. He sees the likelihood of higher prices for better managed trees. He thinks value-added logs harvested at 25 years should attract good demand by the timber trade. By contrast he sees woodchip trees harvested at 10 years as being at the lower end of the price scale for wood products.

Enterprise diversification

Rob sees a definite need to create a diversity of options that will bring greater returns for the farm forestry industry. In that regard he supports the concept of a growers' cooperative that would give farmers a sense of industry ownership while increasing potential returns to the grower. He feels there is a definite need to look at different markets, away from mainstream products, rather than just the woodchip option.

He also sees a need for the further integration of trees into current agricultural systems, for both environmental reasons and for enterprise diversification.

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