



Issue No 2, July 1994.

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5.4 Sandalwood (*Santalum spp.*)

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Sandalwood has long been used by man and it plays an important role as a ceremonial burning material during religious rites of Hindus, Buddhists, Parsis and Moslems in South-east Asia. The high value of the wood and the oil has led to a steady decline of native sandalwood trees and increasing efforts to establish plantations. Work is being undertaken in the Ord River Irrigation Area (ORIA) to grow sandalwood under irrigated plantation conditions.

Sandalwood is the source of sandalwood oil, a high value oil used in perfumes, soaps and incenses. The wood itself is also prized for woodcarving. Some thirty species of sandalwood occur throughout Asia, Australia and the Pacific region; six species are native to Australia. One species, *Santalum spicatum*, is presently being harvested in the Goldfields region of Western Australia and sells for about \$10 000 per tonne.

Santalum album, a native of Indonesia, is the most valuable species, with the wood containing about 7% oil. It is currently being harvested from natural stands in Indonesia and sells for \$23 000 per tonne. Unfortunately, the resource is being rapidly depleted due to unsustainable harvesting. The perceived rotation length of *S. album* in Indonesia and the ORIA in northern Australia is 20 to 30 years which is much shorter than the 100 years for the native Australian species, *Santalum spicatum*.

Australian research on *Santalum album* began in 1983 in the ORIA with some 150

trees being planted. Plantings have steadily increased in recent years. Results of the preliminary plantings were sufficiently encouraging for the Department of Conservation and Land Management (CALM) to appoint a full time research officer in 1992 to work on the sandalwood program.

An important characteristic of sandalwood is that it is a parasite that attaches to the root system of the host tree. Fortunately, the host range appears to be wide, offering the possibility of growing sandalwood in combination with horticultural tree crops, such as mango and cashews or tropical timber species, such as mahogany and teak.

It is not known how long the sandalwood trees grown under irrigated plantation conditions will take to reach maturity, but it is expected to be at least 20 years. Sandalwood oil is produced only in the heartwood so current research is examining the rate of growth of heartwood and the changes in oil content over time, to determine the optimum time to harvest the crop.

As the world's native sandalwood resources decline, prices can be expected to rise substantially over time. While the commercial prospects appear very encouraging at this stage, much more research is required to establish viable production systems.

Forestry: an exotic investment

John Wilkinson

<http://www.moneymanagement.com.au/articles/35/0c03cb35.asp>

Forestry managed investment schemes have become the most popular segment of the agribusiness asset class. But there are different sub-segments in the forestry segment and, in recent years, a number of products featuring more exotic species have appeared, offering an alternative to blue gum plantations.

Indian sandalwood

Tropical Forestry Services (TFS) has offered an Indian sandalwood scheme based in the Ord River irrigation area of Kununurra in Western Australia. Sandalwood schemes are not new, and a native version of the tree grows in Western Australia.

In the late 90s, another manager began planting sandalwood trees in the Ord River based on research by the research arm of the WA Government – CALM.

Sandalwood is a parasite and needs a host tree to provide water and nutrients via the root system. Usually, the sandalwood tree kills the host, so investment schemes feature a variety of host trees.

The original thinking was to host the sandalwood trees with mahogany trees but as TFS chief executive officer Tom Cullity explained, this did not work out as planned. "The mahogany trees were not killed off by the sandalwood and, in fact, the reverse has happened with the mahogany trees being much stronger than the parasite," he says.

TFS has started again and, after testing, uses three host trees during the early growth phase of the sandalwood tree's life. It has also built a nursery at Kununurra to grow sandalwood seedlings and the host trees.

"The nursery has the capacity to supply 150 hectares of sandalwood seedlings, but we are expanding that to a 200 hectares capacity," Cullity says.

"We have planted 92,000 sandalwood seedlings during the first eight months of this year, which includes making good for lost trees on existing schemes."

Cultivation improvements

The success rate for seedlings is 94 per cent, although FTS is looking to push this to 99 per cent with improvements in cultivation.

The hosts are planted at the same time and gradually the sandalwood feeds off each one, killing them one-by-one until the investor is left with just the sandalwood crop.

While TFS sells plots to investors, the company retains 30 per cent of the sandalwood tree itself. Cullity says this ensures the manager has a vested interest in seeing the trees reach maturity, which will be 15 years after planting. However, this might drop to 14 years based on further research.

"We are growing the trees for both timber and oil although the managed investment schemes are just for timber," he says.

The timber is used for carvings, coffins in China and incense sticks. The main supplies of sandalwood come from India and Indonesia.

Price increases

Cullity says because the Indian market is state controlled and with limited exports, sandalwood timber prices have been rising steadily.

"The benchmark price of Indian Sandalwood heartwood continues to rise, with the July 2005 government auction price in Tamil Nadu, India, reaching \$93,000 per tonne, indicating continuing pressure on world supply," he says.

According to a sandalwood market overview by the Australian Agribusiness Group (AAG), legally sourced Indian sandalwood trades at between \$30,000 to \$85,000 a

tonne. "Such price increases have resulted from large market demands and the continued rapid decline in the global resource," the AAG report says.

"As a result of this, it is not known how the international market will react when significant volumes of the [Australian] product comes onto the market from plantations."

The value of sandalwood is not just the timber, the trees produce oil that is highly sought for use in perfume, aromatherapy and fragrant body care products. The oil is extracted by crushing the tree and roots.

TFS is currently investigating building a crusher plant at Kununurra. The oil content of Australian-grown sandalwood trees is between 1-2 per cent, which compares to 6 per cent from Indian trees. Although it is early days, TFS is hoping to achieve an oil production figure closer to the Indian trees.

AAG found prices paid for the oil were hard to determine, as sales figures usually are for whole logs, which are subsequently crushed. However, the company is confident of future markets and has launched another sandalwood project for this year.

New projects

TFS has been actively promoting the sale of the first 50 hectares of the latest project that could eventually see up to 250 hectares cultivated. TFS expects to see this latest project completely sold by the end of June next year.

With the company's experience in managing sandalwood plantations, the growing period has been cut back to 14 years and each half-hectare plot is expected to yield 5.9 tonnes of wood.

This latest TFS sandalwood scheme has been reviewed by Lonsec and given a 'recommended' rating – the same rating as earlier schemes.

Lonsec Agribusiness Research head of agribusiness Jim Blackburn says the researcher has been optimistic and positive about TFS' previous schemes. "Sandalwood is a boutique forestry product and we are interested in the operational management of the schemes," he says.

"Sandalwood needs to be intensely managed and the management of the tree relationships (host and parasite) is crucial, as we have seen with past attempts."

Blackburn says Lonsec has been impressed with the way TFS has set up the operational management team in Kununurra. "Tom has built a tight team on the ground and has got good on-ground management despite the difficulty getting proficient staff in the area," he says.

Water recycling

Lonsec was also impressed with the recycled water program the company is developing for future plantations. Despite the Ord River enjoying good rainfall, 800mm a year, there has been a growing problem with the water table in the area rising due to intense cultivation of cash crops.

The tree plantations, including sandalwood, have been lowering the water table, which is being welcomed by water conservation teams in the region. "These are all key points in favour of the scheme," says Blackburn.

"Although they have still got to manage risks to the trees carefully, we have seen the company putting in supplementary watering where the soils are less friable."

Because the sandalwood trees are still young, no contracts for the sale of the timber have been agreed to. Cullity says the plan is to deal directly with the end user and cut out the middleman. "Middlemen only tie up companies while taking an extra fee, and that is the downside," he says.

"When we start harvesting trees, TFS will be a significant player in sandalwood with about 15,000 hectares of plantations eventually," he says.

Buyer relationships

Blackburn admits the question of building relationships with potential markets has not been tested yet and this would be one of the risks of the project. "It is a popular misconception that if the timber has a high value, there is no volatility in buyer relationships, but this hasn't been addressed by TFS yet," he says.

"At present, the ongoing good management at TFS is positive and we would expect them soon to be defining their strategy and putting into effect sales and marketing agreements."

Sandalwood seems to have overcome early growing problems, but now the question will be: Will Australian producers achieve the high prices or flood the market? It is a question that will not be answered for a few more years.

17 February 2006