



# The Australian Sandalwooder

Welcome to the 15th issue of the Australian Sandalwooder, a  
produced by the Australian Sandalwood Network Inc.

Winter 2012

## From the Chair

Tim Emmott ASN Chairman

For the last 6mths the ASN and particularly Bob and Ros Huxley have been beavering away in implementing the SCIP project funded by WBNRM in the Mt Marshall area .

Mt Marshall Sandalwood is on the verge of becoming incorporated in its own right and planning to make Mt Marshall the sandalwood shire. The executive committee voted to give them a donation of \$400 to get them started.

Every week the Executive officer gets emails from People wanting to buy sandalwood. With very little available to buy the demand is being filled by illegal harvesting of beautiful old trees in shire reserves and road sides.

In the rangelands pastoralists are wanting to be able to harvest sandalwood rather than the it just being the domain of the FPC. The ASN has a position on this if any members would like a copy. At our AGM on the 5th October in Calingiri we will be visiting Aaron Edmonds property for a field visit and Rob and Ros Huxley will be talking about the Mt Marshall sandalwood project.

Our website has been revamped and updated a few months ago and is now easier to access and update and read address is [www.sandalwood.org.au](http://www.sandalwood.org.au)  
And don't forget Mt Marshall Sandalwood has its own website at [www.mtmarshallsandalwood.org.au](http://www.mtmarshallsandalwood.org.au)

Hope to see you at the AGM and look forward to receiving your membership renewals

**12/13 Memberships are now due**

**Memberships will lapse on October 1<sup>st</sup> if not renewed**

**AGM will be held on October 5<sup>th</sup> in Calingiri**

*Photos of illegal sandalwood cutting in, York area, July 2012, read more inside*



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# The Importance of Pruning Sandalwood

Grant Pronk GP Forestry Consulting

Essential to the success of all commercial tree plantations is the requirement of a sound maintenance programme. Maintenance programmes can be as simple or as complex as the individual grower likes, however the key to the most successful programmes is that the realisation and correct attention has been given to all aspects that jeopardize the life of the plantation, influences the health of the trees or affects the quality of the end products.

Most sandalwood plantation owners have established or purchased their plantation with an expectation to eventually harvest and sell the resulting aromatic timber products. Studies have shown that growers who maintain their plantation through to at least 20 years of age have a better chance of producing greater amounts of valuable heartwood.

Traditional Asian incense markets have been long-time buyers of all grades of Western Australian Sandalwood with prices varying accordingly. One of the most valuable raw sandalwood products that are not directed into the incense market is carving logs. Prices paid for quality carving logs in Asia are significantly higher than the average price paid for raw sandalwood incense ingredients.

Western Australian Sandalwood growers are able to enter the carving log market if attention is given to produce a straight log with minimal defect and a good proportion of heartwood. The carving market will accept small, clear lengths as short as 300 mm with a diameter of 100mm (includes sapwood), however higher premiums are paid for clear logs over 1.2 metre in length or better.

Apart from the financial benefits of producing carving logs, pruning sandalwood trees has many other advantages, including greater access to the fallen seed resource, better application of herbicides or mowing around the base of trees, reduction in fire hazard, better access along narrow rows and being aesthetically pleasing. **Pictures below show before and after pruning.**



**How to prune your trees?** The following information is provided from an account of personal experiences and should only be regarded as a suggested guideline.

At the age of around 2 to 3 years Western Australian Sandalwood trees will start producing rough, dark and fibrous bark starting from the base of the tree progressing slowly up the trunk. This rough bark does not appear to be as readily stripped away from the trees by parrots as compared to smooth juvenile bark. For this reason it is advised to only prune branches that protrude from a rough barked trunk. Pruning branches from a smooth barked trunk will open up the tree exposing the juvenile bark to the destruction of parrots. Pruning cuts are to be flush with the trunk i.e. no "coat pegs". A flush, flat cut will heal over quickly and reduces the size of defects in the final log product.

In many cases trees will have multiple stems and will require a decision of which stem to retain and which to remove. A basic rule of thumb is leaving the straightest and longest stem and removes all others. The stem that is left must have the greatest potential to become a long, clear and straight log. Trees that are left with multiple stems will distribute growth over the stems; therefore diameter growth is likely to be restricted as compared to single stemmed trees. Reduced diameter growth may not see the tree make the specification of a carving log over the life of the plantation.

If pruning is performed with the development of the fibrous rough bark then the majority of the pruning should be completed during the first 4 to 10 years of the plantation's life.

A number of tools can be used to prune a sandalwood tree. Small limbs up to 20mm in diameter are best pruned with a pair of sharp secateurs, sharp hand pruning saw are ideal for limbs from 20 mm to around 50 mm. Larger branches are best removed with a small pruning chainsaw, be sure all the appropriate personal protection equipment is worn as accidents do happen and they can be very nasty.

The pruned branches will consist of almost 100% sapwood and in today's market this product has a low commercial value. It is likely that the costs associated with pruning, debarking and further processing for the market will outweigh the possible return.

Cut branches are best left in the plantation and incorporated in the plantation's general management system i.e. placed strategically in the plantation to be collected at a later date when the bark has aged and fallen off. These branches may be added to the products produced at the time of the final harvest. The removal of the cut branches at time of pruning will obviously reduce the fire risk within the plantation.

Heavy pruning can be stressful to a tree therefore it is important to prune the tree when it is thriving. Pruning during the heat and dry of summer is likely to cause additional stress to a tree and may restrict growth or even cause tree death in more severe cases.

Pruning is an essential part of a commercial sandalwood plantation. Pruning provides the grower the ability to produce high grade products that are in high demand, growers that prune their trees will have greater options when the time to harvest and selling arrives.

# What is a wodjil soil - taken from Soils of the Northam Advisory District the zone of Ancient drainage by Neil Lantzke

Sandalwood seems to grow well on these soils but they are more problematic for traditional crops. Wodjil soil is the term for deep yellow acid sand soils found in the north east and far east of the wheatbelt. The soils typically have a deep profile of earthy yellow sand and may contain small amounts of ironstone gravel at depth. The subsoil is acid and the pH is generally less than 4.3.

The native vegetation found on these soils is referred to as wodjil scrub, referring to the number species of Acacia which grow on these soils such as *Acacia resinomarginea*, *Acacia assimilis*, *Acacia neurophylla* and *Acacia signata*. *Eucalyptus leptopoda* can also be found on these soils. The acidity can cause phosphorous, calcium, molybdenum or magnesium to be deficient. Aluminium toxicity is the main cause of poor yields on these soils it reduces growth and the ability of crops to take up water and nutrients. Molybdenum deficiency is also a limiting factor to growth on these soils.

Soil acidity reduces the ability of rhizobia to form nodules and fix nitrogen but the native acacia species obviously have a wider tolerance to this acidity. Crop plants on these soils produce poor subsoil root growth caused by the aluminium toxicity, and are usually drought stressed by early spring even though these soils have quite good water holding capacity.

## Other problems

These soils will develop a traffic compaction pan if continually cultivated. The poor crop growth exposes the soil surface to wind and water erosion and hence poor water usage makes these soils when cleared contribute considerably to recharge. They do not become waterlogged however and can be worked easily after heavy rain fall.

Wodjil soil is a poor agricultural soil for conventional crops. Clovers produce poor growth and don't set seed in most years. Pastures are usually dominated by ryegrass, capeweed and wild radish.

Serradella seems tolerant but cost of establishment seems to limit its use. Cereals produce average yields in high rain fall seasons but cereal rye, triticale and oats perform better.

Lime rarely improves production as it is insoluble. Other perennial species which have performed well in trials include *Acacia brumalis*, *Acacia saligna* and *Tagasaste*.

## Related soil types

- The Shallow Mottled Zone consists of 5-15cm of greyish brown loamy sand over thin yellowish clayey sand over a mottled zone restricts root growth even further. These soils are often found on ridge crests and upper slopes. Apart from the Wodjil Acacia species the tammar (*Allocasuarina campestris*) and black tammar (*Allocasuarina acutivalis*) are the dominant vegetation types. This soil is often associated with Yellow graditional loamy sand.
- Yellow graditional loamy sand contains the better quality sandplain soils. The topsoil is a brownish sand which overlays a yellowish clay sand grading into a sandy clay loam. It may look similar from the surface to the shallow mottled zone. Gravelly phases often contain tammar vegetation and non-gravelly phases support Dowerin rose, tussock grasses, *Acacia* sp and Quandong. Compared to the other soil types this soil is quite productive but is at high risk of surface and subsurface acidification. Due to the high percentages of gravel root growth is not restricted. Phosphate fertilisers are often fixed in these soils by the ironstone gravel and trace elements may be required. When left exposed as in drought years or cultivated these soils are prone to wind erosion. Because of adequate plant growth they don't contribute so much to recharge.

# “UNPRECEDENTED INCREASE IN ILLEGAL SANDALWOOD CUTTING IN WHEATBELT”

Over the past 6 months reports and evidence of illegal sandalwood cutting throughout the wheatbelt have been increasing at an alarming rate. Illegal cutting has been observed and recorded in the shires of York, Quairading, Tammin, Beverley, Mt Marshal and Koorda, from nature reserves, shire reserves, and vacant crown land and road sides.

Natural stands of West Australian sandalwood (*Santalum spicatum*) in the WA wheatbelt are rare and vulnerable and the Australian Sandalwood Network (ASN) is very concerned that this illegal cutting is occurring and is offering a \$500 reward for information leading to the conviction of the person / persons involved in illegal WA sandalwood cutting in the WA wheatbelt.

The ASN supports the legal, sustainable and managed harvesting under licence of native stands of WA sandalwood in Western Australia. However illegal sandalwood cutting is highly damaging to our industry, including the permanent destruction of the last remaining sandalwood stands in the wheatbelt, the risk of those involved in illegal sandalwood cutting moving to cutting both natural and plantation grown trees from private land, and the disruption caused to export markets.

The ASN encourages wheatbelt residents to be vigilant of suspicious activity that may involve illegal sandalwood cutting, and to report any evidence of illegal sandalwood cutting to the ASN or to the Department of Conservation and Land Management (vehicle licence plates, times, locations etc).

**Email: [Maxine.Birkin@dec.wa.gov.au](mailto:Maxine.Birkin@dec.wa.gov.au)**

ASN has decided to take a role in documenting and forwarding any information about these activities on to the Dept of Environment and Conservation (DEC) in the hope that these people will be caught . Unfortunately the fines as shown below are not a huge disincentive but the act of stealing sandalwood will evoke several of the offences which could add up a \$20,000 penalty.

DEC don't have the staff to catch these people so it is up to the public to spot them and report .

Offence	Legislation	Penalties
section 23D- a person shall not take any protected flora on private property	<b>Wildlife Conservation Act 1950</b>	\$4000
section 23E- a person shall not sell protected flora unless the sale is lawful by virtue of the provisions of section 23C & 23D	<b>Wildlife Conservation Act 1950</b>	\$4000
section 23B-protected flora on Crown land not to be taken without a licence	<b>Wildlife Conservation Act 1950</b>	\$4000
Section 3- no person shall remove or pull sandalwood from Crown Land, except under a licence or; from alienated land, unless such is authorised by a licence.	<b>Sandalwood Act 1929</b>	\$200
Regulation 8- a person must not, without lawful authority, take any flora on CALM land.	<b>Conservation and Land Management Regulations 2002</b>	
section 103-a person shall not, without lawful authority, fell, cut, injure, destroy, obtain, or remove any forest produce in, on, or from any land to which this section applies	<b>Conservation and Land Management Act 1984</b>	\$10,000 and imprisonment for one year

## Remember Your Roots:

# Greenhills Sandalwood Field Day honours the past and hails the future

*Susan Gribble*

Have integrity when dealing with your buyers, remember the proud heritage of the WA sandalwooders and manage your plantations skilfully, including early thinning - these were the key messages that came through loud and clear at the Australian Sandalwood Network field day in Greenhills on Thursday 29<sup>th</sup> March.

Building good relationships with buyers based on trust and integrity helped Keith and Pam McQueen of Mundaring to run a successful wild sandalwood export business for over 10 years. Keith explained that the buyers are looking for the heartwood, where the best oil comes from, and if you say you are sending a container of high quality heartwood, and then you better make sure that's what you send. Why? Because buyers talk to each other and if you try and pull the wool over one, you'll lose them all. And how do you ensure you get the best heartwood? Leave it in the ground as long as you can! According to Keith and Pam, sandalwood growers need to take a long term view as the trees will not be truly valuable for at least 20 years.

Pamela Stratham Drew, a WA historian and researcher, brought to life the fascinating history of the sandalwooders in WA. There have been many peaks and troughs since it all began in the early 1840's but sandalwood has a long and proud heritage in the state, and was the main revenue earner for our fledgling state for a number of years. Pamela expressed excitement about the potential of the plantation sandalwood industry to bring the same boom as the wild sandalwood harvesting did for many decades.

There is a worldwide shortage of sandalwood as India and Indonesia are users of the tree for the highly sought after oil and cannot grow enough to supply the demand. A third generation sandalwood buyer from India attended the day and was enthusiastic about the potential of the WA industry to supply the world market. He agreed with both Pamela and Keith that there is high demand for high quality wood, and hence the more work done on understanding how to manage plantations to get the best heartwood, the better.

A trip out to Marty and Connie Winch-Buist's Greenhills property to see their sandalwood plantation again emphasised the importance of skilled plantation management. Thinning the plantation early and ensuring you pull the trees out by the roots were two key messages. If you simply chop at ground level, the trees often sprout back and the job may not be done and it's much easier to pull them out at the roots when they are young! An overstocked plantation is at risk of total collapse, according to research done by the Department of Agriculture and Food, so thinning is crucial



***Marty Winch-Buist and Tim Emmott from the Australian Sandalwood Network thin and sample a four year old tree. Getting this tree out of the ground took a lot of work – bringing home the message that the earlier you thin, the better!***

# Effect of age on sandalwood oil yield and quality

Jon Brand Senior Forester, Department of Agriculture and Food, 3 Baron-Hay Court, South Perth WA 6151

Wood quality from plantation grown sandalwood (*Santalum spicatum*) appears to improve with age, with a recent study indicating that it is best to wait until the trees are aged at least 25 years before harvesting (Brand and Pronk, 2011). This study found that trees aged 8-11 years contained only low grade wood, those aged 14 years contained only 12 % high grade wood (butt wood only), while those aged 26 years contained 67 % high grade wood in the butt, roots and large stems. However, even the best quality wood from the 26-year-old trees was still below that harvested from the wild, which on average would be aged over 100 years. For the wood to be of high value, it needs to contain both a relatively high oil concentration (2-3 %) and a high santalol concentration ( $\alpha$ - and  $\beta$ -santalol). The butts of trees aged 26 years had 2.6 % oil, which was comparable to wild trees (2.0-3.5 %), but had a lower mean  $\alpha$ -santalol concentration (9 %) than wild trees (10-30 %).

Wescorp also found that wood quality in 14 year-old sandalwood trees was low, except for the butt (Coakley and Hettiarachchi, 2010). Their measurements showed that the concentration in the butt was only 1 %, but one of the trees sampled had an  $\alpha$ -santalol concentration of 41 %, which was well above that from wild trees. However, the overall value of the 14-year-old wood was still only worth \$1,000 per tonne, de-barked and delivered to the factory. In comparison, wild wood can receive up to \$10,000 per tonne. This study also suggested that it was advisable to wait until the sandalwood trees were aged approximately 25 years before harvesting.

To provide the best chance for a plantation to reach 25 years, it is important not to over-stock the site with sandalwood and also to have a sufficient number of long-lived host trees, such as *Acacia acuminata* and *Acacia aneura*. Preliminary observations from a Forest Products Commission (FPC) trial near Narrogin indicate that sandalwood planted at a high density (600 trees/ha) and with a sandalwood-to-host ratio of only 1:1 were under stress between ages 5-10 years. Whereas, on the same site, sandalwood planted at a lower density (300 trees/ha) and a sandalwood to host ratio of 1:2, had higher survival and growth rates. It should be noted that these results are from only one trial, and at present there are not many mature plantations that can be assessed. However, it appears advisable to have no more than 400 sandalwood/ha in the medium average annual rainfall zone (400-600 mm), and maybe no more than 300 sandalwood/ha in the low average annual rainfall zone (300-400 mm). Each plantation should also contain an adequate number of long-lived host trees, with a sandalwood-to-host ratio of approximately 1:3, so as to maximize sandalwood growth and survival throughout its rotation.

## References

Brand, J.E. and Pronk, G.M. (2011). Influence of age on sandalwood (*Santalum spicatum*) oil content within different wood grades from five plantations, in Western Australia. *Australian Forestry* **74**: 141-148.

Coakley, T. and Hettiarachchi, D.S. (2010). Quality analysis of cultivated sandalwood trees from the wheatbelt region of Western Australia for ASN by Wescorp. *The Australian Sandalwooder* 10.



figure 1. Dean Irving (FPC) near a freshly de-barked 26-year-old sandalwood tree.

## Availability of Insurance

JLT as Cover holder to Lloyd's of London manage an insurance facility which has been developed over the years for Hardwood and Softwood Plantations in states endorsed by the Australian Forest Growers Australia-wide. Lloyd's of London is the world's leading insurance market, which transacts business worth millions of dollars in premium each year. Lloyd's itself does not accept insurance risks this is done by individual and corporate underwriting members.

In 2008, the Australian Forest Growers commissioned Forest Pacific Pty Ltd to provide valuations for each state for Hardwood and Softwood plantations in the various forest growing areas of Australia, which were agreed to by Lloyd's of London Underwriters and are the pre-agreed values that AFG members can adopt.

Should the pre-agreed values not suit the circumstances of a particular grower, they can obtain a valuation from an independent forestry consultant to apply to their plantation (s) which is submitted to underwriters for agreement. Valuation levels in the current AFG booklet are currently separated into Low, Medium and High valued plantations. The appropriate value should be determined on the quality of establishment techniques, ongoing management, productivity of the site and distance from processing. The distance from processing is based on the assumption that stumpage rates reflect haulage distance.

The insurance facility has included Sandalwood plantations; and has in the past included MIS Indian Sandalwood plantations in Western Australia and Queensland that had their own valuations.

However in order to include privately owned native sandalwood plantations, it would necessitate preparation of valuations from an Independent Forestry Consultant to be submitted to underwriters for their agreement.

The current Insured Perils insured under the insurance facility are as follows:-

1. Fire resulting from explosion or otherwise
2. Lightning
3. Aircraft or other aerial devices and/or articles dropped therefrom
4. Windstorm (prior submission basis only).

The policy also contains the following extensions which can be purchased for extra premiums:-



1. Removal of Debris of 10% of the plantation value, not exceeding A\$250,000 any one plantation (compulsory)
2. Claims Preparation Costs in Excess of \$5,000 (subject to an overall maximum amount of A\$30,000)
3. Loss Mitigation Expenses (Minimum Cover A\$25,000, Maximum A\$100,000)
4. Re-establishment Costs up to A\$500,000 in the annual aggregate but not more than 5% of the total value.

The policy notably contains the following Special Conditions which must be complied with in order for the Insured to be covered under the policy:-

***The Insured must take all reasonable steps to maintain and keep clear, in accordance with sound forestry practice, all fire breaks and have in operation a fire hazard reduction programme.***

***Maximum area undivided by fire breaks shall not exceed 125 hectares.***

***Each plantation shall be provided with fire breaks to the satisfaction of the relevant responsible authority but in any event internal fire breaks shall be at least 4.5 metres wide and boundary fire breaks shall be at least 6 metres wide and kept clear and accessible at all times.***

***Fire break, shall be maintained to a width of 6 metres on both sides from the centre of any powerlines through any plantation.***

***Should normal timber harvesting practice require that some fire breaks have temporary harvesting debris on them, cover will be maintained provided suitable fire fighting equipment is readily available on site and operators comply at all times with the applicable authority by-laws.***

## **How do I insure my sandalwood plantation?**

1] Contact JLT (Jardine Lloyd Thompson) on either [murray.turner@jlta.com.au](mailto:murray.turner@jlta.com.au) or [stuart.sharp@jlta.com.au](mailto:stuart.sharp@jlta.com.au) and ask for a proposal.

2] Consider the offer and how you can meet the criteria to provide an independent valuation. This can be done in two ways, either by choosing to adopt the Agreed AFG Valuation Schedule (if it exists- see below) or – if you disagree with that value or that schedule does not exist – engage an appropriately qualified forest valuation consultant to provide a valuation for your plantation.

3] Confirm your cover with JLT by 1 December 2012

4] Pay your premium and sleep more soundly.

Note AFG have developed valuation schedules for plantations of pine and of eucalypt pulp wood which are widely used and highly regarded by growers. The advantage of these schedules, particularly for small scale growers, is that they will be accepted and agreed by the insurers prior to their publication and it therefore removes a significant cost to the individual in meeting the requirements of the insurer. At the time of writing Australian Forest Growers are actively considering having these tables developed for WA sandalwood. An early response from anyone considering insurance, thus giving AFG some confidence that there is a market need, would be greatly appreciated.

### **Expression of Interest**

**GP Forestry is keen to speak with growers looking to sell sandalwood seed, interested parties can contact Grant Pronk on 040 988 2280 for further details.**

**Grant will be speaking about this at our AGM on 5<sup>th</sup> October**



# Mt Marshall Sandalwood Field Day, Bencubbin Recreation Centre, 2 March 2012

Presentation by Jon Brand

## Sandalwood growth rates on Wodjil soils in Mt Marshall Region

Jon Brand, Peter Ritson, Len Norris, Department of Agriculture and Food

During October-November 2011, permanent inventory plots were established on five separate sites in the Mt Marshall region. Four sites contained wodjil soils and the other site consisted of hard setting clay (Gimlet country). Trees were aged between 3 and 14 years.

At each site, both sandalwood & host plants were measured for growth and tree stocking (trees/ha)

Mixture of host species were measured including *Acacia acuminata*, *A. assimilis*, *A. brumalis*, *A. burkittii*, *A. colletioides*, *A. coolgardiensis*, *A. gibbosa*, *A. hemiteles*, *A. jibberdingensis*, *A. lasiocalyx*, *A. microbotrya*, *A. multispicata*, *A. neurophylla*, *A. resinimarginea*, *A. sessilispica*, *A. yorkrakinensis*, *Allocasuarina acutivalvis*, *A. campestris* and *Hakea invaginata*

Host densities were highly variable between sites ranging from 700 to 4,200 trees/ha. Sandalwood densities were also highly variable ranging from 100 to 700 trees/ha

Sandalwood growth rates were lower than those measured in trials established in the higher rainfall areas (Narrogin – Katanning)

Previous studies indicate that sandalwood trees require approximately 25 years producing reliable quantities of good quality wood.

Recommend planting sandalwood at low densities (perhaps only 150-250 stems/ha) in the Mt Marshall region to provide the best chance for the trees to survive and grow successfully for 25 years.

Long rotations also need a sufficient number of long-lived (> 20 years) hosts, with a sandalwood-to-host ratio of approximately 1:3; however this will vary if a lot of short-term hosts are incorporated into the planting.

Plantation design should contain some structure to know approximately how many sandalwood are established per hectare.

Picture below shows a group inspecting 2011 established plantation at Gerald Sachse property just outside Bencubbin. Typical wodjil country in the back ground

