



The Sandalwooder

Welcome to the 7th Edition of The Sandalwooder, a newsletter produced by the Australian Sandalwood Network Inc. This issue is produced thanks to funding from the Avon Catchment Council

From the Chair

Aaron Edmonds, ASN Chairman

2008 is shaping up to be a good year for sandalwood establishment. Most areas are carrying significant subsoil moisture, a key recipe for success but also a key ingredient for rampant weed growth once the winter arrives.

This brings us to a very major set of developments relevant to the cost base of establishing and managing Australian sandalwood and that is input costs and availability. Herbicide prices have risen sharply as global inventories tighten on the back of robust farmer purchasing and declining output capacity from the world's chemical factories. China recently shut down the world's largest glyphosate factory in its push to clean up the air around Beijing. This has seen glyphosate prices surge from \$4.50/L to today's price of around \$18/L. This rise in just under a year is nothing short of gobsmacking.

And of course price rises are one thing, physical shortages are another world indeed. The supply of triazine chemicals such as simazine and atrazine has completely dried up in Australia. Huge planting intentions for triazine tolerant canola has seen all stock gobbled up by broadacre farmers wanting to capture record high prices. So the moral of the story is that all herbicides will likely be increasingly more expensive to use in the season and years ahead. This is not surprising when you also consider these chemicals are generally made from fossil fuels such as oil or natural gas. In the case of glyphosate, one of its main ingredients is derived from phosphate, a mineral fertilizer.

Speaking of fertilizers, we have also witnessed spectacular rises in fertilizer prices, in particular phosphate fertilizer. Rock phosphate is the primary mineral used for all DAP, MAP and superphosphate products. Its prices has surged from US\$40/t just over a year ago to today's price range of US\$350-400/t. That's nearly a 1000% jump! Similarly potash fertilizer recently doubled from US\$300/t to now around the US\$650/t level. Nitrogen fertilizers will likely be the next major group to see rises to the painful side as they are the most dependent on natural gas for manufacture. These price rises will take many years to subside unless crop values deteriorate and with global food supplies at less than 45 days it is hard to see this occurring.



Disclaimer: The information in this newsletter has been collated from the best information available at the time. The ASN does not accept any liability for possible inaccurate information provided by contributors.

These developments highlight the need to move more land into sandalwood production in order to prepare for rapidly rising cost bases in farming. A fully grazable established sandalwood orchard requires no herbicides and will only likely require a fraction of the phosphate and potash needs over time of grain crops.

The Industry Development Plan is in its final stages of completion and we would be hoping to see this available to the industry in the coming months so the direction the whole industry needs to follow is clearly mapped out and consensus amongst industry participants is achieved.

The ASN now also has a new Executive Assistant in Bethan Lloyd and I would like to warmly congratulate her on gaining this position. I have every confidence she will competently continue to help organise the ASN's daily workings.

I'll take this opportunity to thank all committee members for their efforts with the ASN of late and especially Monica Durcan and Lorna Timbers who work tirelessly behind the scenes to keep the ASN growing. I wish all members a productive and successful year in 2008.



Chairman, Aaron Edmonds, and ASN Secretary, Lorna Timbers, help Autumn Field Day participants over the fence



Introducing the new ASN Executive Assistant

Bethan Lloyd, ASN Executive Assistant

PO Box 184, NORTHAM WA 6401

Phone: (08) 9574 5882(h), Mob: 0409 681 655

Email: exec@sandalwood.org.au



Bethan Lloyd

I have been in Australia for 21 years coming from a small country town on the Welsh English borders. I first came to Toodyay in 2000 as the Community Landcare Coordinator and live on small property of 14 hectares on the Toodyay Goomalling Road. Here I have six hectares of sandalwood, three hectares of which is a biodiverse hosting arrangement established by direct seeding in 2006. The other two hectares has hosts of mostly *A. acuminata* with some *A. saligna*, and *A. pulchella* with a few Hakeas and Allocasuarinas and was established using tubestock in 2004.

I also have three hectares of Salmon gum, a small orchard of pistachio trees and the usual array of stock and garden with the aim of being as self sufficient as possible. Sandalwood of course is my main interest which fits in with what I am trying to achieve very well: a native crop with a possible return as well as conservation benefits.

I have been a member of the ASN since 2004 and am one of the Peer Mentors. Coming to help the ASN in the last few months has been a challenge, the enthusiasm and the potential for the growth of this industry is exciting. Our strength is in our membership and I encourage members to provide support and comments to the committee and myself whenever possible about anything that they think is important.

We need to keep the ASN relevant to all members. We need to improve our knowledge through supporting and encouraging collaborative research to help develop the sandalwood industry for the medium and long term. In the short term we need to generate some income so that we can continue to operate and support all the growers in the network.

Future directions for the ASN

Bethan Lloyd, ASN Executive Assistant

Email: exec@sandalwood.org.au

While Tim Emmott's assistance is still sorely missed within the ASN, his departure has highlighted the need for the ASN to become self-governing and to find our own funds to do so. This will help to maintain the high level of credibility the ASN has in the professional Sandalwood world and ensure that we are able to continue as a strong representative body for Sandalwood growers.

Our goal now is to provide a professional level of services for our membership. This may include some fee-for-service arrangements, accreditation, inventory analysis and potentially increased membership fees.

We need to establish a complete picture of the Sandalwood resource, particularly from private growers. This should include size, age and condition to ascertain when certain products may come onto the market and in what volumes. I am hoping that members will be able to provide us with accurate information to complete this task. A form will be included with this newsletter and will be on the website.

Long term the aim is to set up a cooperative for the ASN to market nuts, timber and jam trees. In the short term we hope to develop a model for a functional and financially profitable cooperative and to set up a small scale seed pooling operation this year for those who are interested. Besides selling nuts to the ASN there will be opportunities for members to donate their time, seeds or skills to the ASN. Anyone who is interested in helping set this system up or has good ideas should contact me.

Support is needed for research to develop products and markets from the sandalwood nut. To this end an original application by Geoff Woodall has been re submitted by to the West Australian Regional Initiatives Scheme. Also expressions of interest have been sent to AusIndustry and Horticulture Australia.

Mapping and managing remnant and relict populations of Sandalwood is also required, with the aim to protect these populations for genetic research.

Enquiries regarding funding through natural resource and biodiversity funding avenues are being explored.

Investigation and development of Codes of Practice and Certified seed criteria, standard operating procedures and eventual accreditation of growers are steps along the way to ensuring that those who buy from the ASN in the future whether its nuts, wood or host plants can be assured of a consistent quality.

Membership fees are being reviewed and are likely to rise. We are likely to restructure the membership to have grower, associate, family and corporate membership. Our aim is to offer more benefits to members through improving extension services and the peer mentoring group, providing better information to growers from funded research, assisting growers in marketing of seeds and include entrance to field days. We hope current members will find the new membership fees good value for money and continue to support us.

Raising the profile of the ASN is essential for us to move forward. Letters of introduction have been sent to scientific, research and conservation organisations, grower groups, politicians, NRMO groups and Development Commissions to make sure that everyone is aware of what we are aiming to achieve and hopefully give us some assistance.

Constructive feedback on any of these items is welcome. Funding to support the Executive Assistant role officially runs out at the end of June. I am hoping I can find funding to continue the position but I will still be investigating funding opportunities and assisting with membership after that date.

Currently final feedback from stakeholders regarding the Industry Development plan is being collated so the final version should be available soon.

Other matters

Low Rainfall Sandalwood Demonstration sites – Avon Catchment Council

This project will see at least 10 demonstration sites between 5 and 10 hectares established this year through provision of 85,000 subsidised host seedlings funded by the Avon Catchment Council. Sites have been chosen in high recharge areas to assist with the management of dry land salinity. Most of the sites are by new growers and many are in visible sites and there is a good spread of locations.

Thanks to all members for their support in recent months. Especially Lorna and Monica

Hope you all have good season

Why grow Sandalwood on Wodjil soil types?

Bob Huxley, ASN Committee member

Email: bob_huxley@bigpond.com

The first host trees I planted were on Gimlet country - red loamy soil over clay. It is excellent wheat country so I thought Sandalwoods should grow well there too. It proved to be a difficult thing to achieve first up. An application of gypsum and reticulation was required to establish both hosts and pre germinated Sandalwood seeds. Not enough host trees, too many Salignas, grasshoppers and droughts had me and the neighbours thinking I'd had just one too many crazy ideas.

After a couple of years my tactful brother-in-law Nev said nothing and just showed me a paragraph in Frank Broomhall's book on the History of Mount Marshall. It was in the chapter on Sandalwooders and Sheep Men on page 19 and was part of a conversation Frank had with an early 'Sandalwood Shire' Sandalwooder, Arthur Clamp. Sandalwooding was a thriving industry in Bencubbin in the 1920's and the sandalwooders made a substantial contribution to opening up the Mount Marshall district for farming.

"Arthur told me that Wodjil country is where you get the really big Sandalwood trees – as much as a ton in one tree"

I have always had respect for the men and women who pioneered the wheatbelt – they were resourceful and most times 'got it right'. So I started to notice the benefits in growing trees on the deep acidic Wodjil sand.

The soil is the least profitable for traditional wheat and sheep farming. Yet it is very user friendly and easy to establish host trees and sandalwood. Wodjil is a high recharge part of the landscape and revegetation has obvious environmental benefits.

My guess is that at least 5-10% of wheatbelt country would be Wodjil or similar deep sand. The soil seems to act as a deep 'water store' and the occasional thunderstorm or cyclonic rainfall event seems to store moisture for years for the deep roots of the Acacias and other host trees.

The summer warmth makes for quick growth for the trees when rain comes. If climate change continues, with more summer rain events, then the trees will get extra benefit.

Weed and insect control on the gutless sand is easy. Nothing much except the host trees and Sandalwoods seem to thrive in Wodjil country.

I reckon God made the crappy Wodjil country by mistake and then created the sandalwood tree so something could thrive there!

My fantasy is that one day, the major forestry players will notice how much more profit they can make growing sandalwood on the low rainfall, cheap, user friendly Wodjil soil types. Then we might get some serious revegetation and income from sandalwood agroforestry in the wheatbelt.

Acacia acuminata seed: An alternative approach to combat dwindling stocks?

Lorna M Timbers, Project Administrator, Greening Australia WA

Phone: (08) 9621 2400, Email: ltimbers@gawa.org.au

A common and popular host tree for sandalwood seedlings (*Santalum spicatum*) is the typical variant of jam tree, *Acacia acuminata*. The increased interest in the plantation sandalwood industry, for potential profit and as a means to combat environmental degradation of cleared land throughout South West WA over recent years, has resulted in escalating demands for *A. acuminata* seedlings. Seed suppliers and farm tree nurseries are certainly feeling this pressure.

The past few years have seen very poor seed production and or quality of seed produced from natural stands of *A. acuminata* throughout the Wheatbelt. Last year was no exception and reports across many of the successful Farm Tree Nurseries through the central and eastern Wheatbelt have expressed concerns at being able to obtain enough seed to fill this year's orders. Whereas many nurserymen like to keep a few kilos in storage for the following growing season, 2007 has seen these supplies used to meet the demand for 2008 plantings. Seed suppliers have had an equally difficult job of seeking out locations for good seed stock, which can be a particularly time consuming, and expensive task. A somewhat delayed start to the summer this year saw some trees with plenty of seed but not ripening. Towards the end of December a series of very hot, dry days meant that the seed on the trees ripened rapidly. Strong winds around the Christmas and New Year period proved problematic to standard seed collection methods, impacting significantly on collectors' abilities to collect large quantities of viable seed.

It has been suggested that collecting *A. acuminata* seed from plantations may be a solution to the seed shortage problem. However there are a number of legal, conservation and quality assurance issues surrounding this proposal. Whereas it may be a

positive step for the sandalwood industry to allow licensed seed collectors onto plantations in order to boost the amount of seed available to the nurseries, it cannot be ignored that there would be repercussions on the entire revegetation industry if landholders began collecting their own seed.

Aside from introducing quality assurance and control issues, especially where correct seed identification, provenance, disease, pests and viability is concerned, collecting your own seed and selling it on to the nurseries could be damaging to seed supplier companies. This could impact on the nurseries who may be unable to obtain the quantities or provenance specific seed from other native species to complete more biodiverse orders. This could consequently mean a reduction in income from a large sector of the specialist, conservation and commercial revegetation market sectors.

Conditions inherent in the Commercial Purposes Licensing specify the rules of collecting material from native plants, with particular regard to Declared Rare or Threatened Flora species. Conservation issues surround the removal of native flora, whether it is leaf or branch specimens, seed or flowers. Research conducted in association with the Botanic Parks Authority, has highlighted the importance of provenance to conservation of plant species through slight variations in genetic makeup of seed, its germination and subsequent long term health and ecological influence in particular environments.

It is considered important that only those with the correct Commercial Purposes License, issued by the Department of Environment and Conservation's (DEC) Wildlife Licensing division, and appropriate botanical knowledge and experience, perform seed collection activities in the countryside. Permission must always be sought to conduct collections on the roadside of main highways, Crown land, Shire regulated land, or from privately owned properties.

From an ethical and environmental perspective, we would propose that Landholders could assist with the seed shortage crisis by reporting locations of jam trees where seed stocks look good to reputable seed collectors. The Environmental Services Unit at Greening Australia has a modest native seed collection unit and seed bank. Our staff our highly experienced in native seed collection and processing methods and have received professional training in botany and seed technology. Greening Australia WA would be happy to provide advice or further information on the subject of native seed.

For further information contact the ESU at Greening Australia WA on (08) 9621 1809 or email: ltimbers@gawa.org.au.

Variation in the productivity of sandalwood (*S. spicatum*) plantations

Melinda Moule and Geoff Woodall, Centre of Excellence in Natural Resource Management (CENRM), UWA, Albany

Phone: (08) 9892 8585

Email: melinda.moule@uwa.edu.au

The aim of this study was to investigate the productive capacity of sandalwood plantations. Nine plantations in the Avon, Southwest and South Coast regions, with 3 – 10 year old sandalwood, were surveyed. 2-6 quadrats between 400-600m² were established in each site, the number of quadrats was broadly determined by the size of the plantation. Rudimentary mapping sections of plantation with similar growth were made then quadrats located in each section were used to determine the productivity of that section of the plantation. In each quadrat the diameter of sandalwood stems at 150mm above the soil surface were then measured and the data used to provide information on potential product yield (Jones 2001; Loneragan 1990), and sandalwood stocking density. The productivity of the best performing quadrat was used to represent “potential productivity” and assumes best performance occurred across the entire plantation. **Actual productivity** was calculated to be the mean growth for subunit 1 x it’s proportion of total plantation area + mean growth for subunit 2 x it’s proportion of total plantation area +etc.

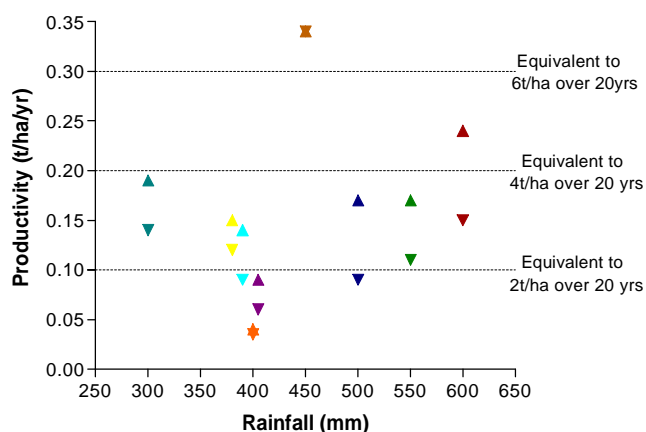


Figure 1. Potential and actual productivity of sites versus rainfall.

A linear relationship between rainfall and productivity was not found (Figure 1). Productivity was found to be highly variable within sites and production equal to a sites potential (best performance) was rarely observed across an entire plantation.

Sandalwood stocking density was highly variable ranging from over 1000 stems/ha to less than 40, even though all plantations have had multiple sowing events (Figure 2). Site 9, had an infilling and thinning program, resulting in less variability (within site) in comparison to the other plantations. In one case the degree of variation in productivity between the best and worst sections of a plantation was 10 fold, and the portion of the site with sub-optimal production due to change of soil type was equal to one third of the total plantation area.

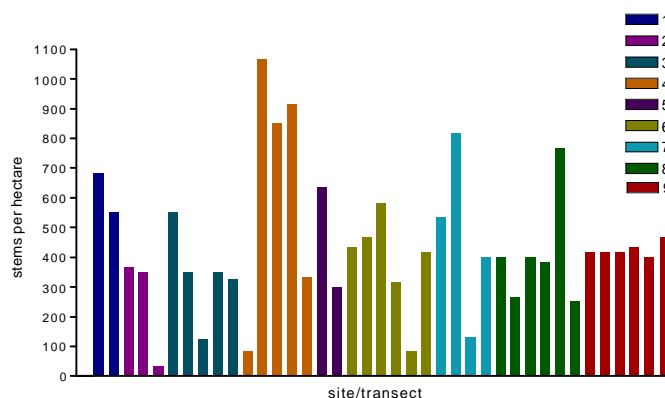


Figure 2. Variability in sandalwood stocking density within and between plantations.

This preliminary investigation suggests that:

- High variability in sandalwood stocking density and productive capacity occurs within and between sites.
- Most sites are on track to produce three or less t/ha over 20 years.
- Sandalwood plantation establishment should include both sandalwood infilling (2-3yrs) and thinning operations to achieve a recommended 300-400 stems/ha.
- Applying simplistic production calculations to a proposed plantation is not likely to provide an accurate estimation of potential product yield.
- Plantation/site partitioning is required to gain a more accurate insight into overall capacity.
- Rainfall alone is likely to be a poor indicator of potential productivity.

References

Jones GP 2001 Estimating Returns on Plantation Grown Sandalwood (*Santalum spicatum*). Sandalwood Information Sheet Issue 3, Forest Products Commission, Western Australia.

Loneragan OW 1990 Historical Review of Sandalwood (*Santalum spicatum*) Research in Western Australia. Conservation and Land Management Research Bulletin No. 4, December 1990.

For further information contact: E: melinda.moule@uwa.edu.au Ph: 9892 8585



Funding provided through the Avon Catchment Council, South Coast NRM Inc. with the support of the Western Australian and Australian Governments through the joint National Action Plan for Salinity and Water Quality program and the Natural Heritage Trust

Tandem conservation of the Woylie and *Santalum spicatum* in WA

Lorna M Timbers, Greening Australia WA and ASN Secretary

Phone: (08) 9621 2400, Email: ltimbers@gawa.org.au

On a recent camping whim I found myself at the Dryandra Woodland reserve close to the small Wheatbelt town of Cuballing about 165 KM north east of Perth. A section of the Dryandra reserve has been set aside as something of an animal sanctuary, managed by the Department of Environment and Conservation. It is part of a biodiversity conservation management strategy aiming to re-introduce native wildlife species which have become threatened by the loss of habitat, through extensive clearing, an increase in bush fires and introduced predatory species such as the fox and feral cats in Western Australia following European settlement.

Over the last century there has been a significant decrease in natural regeneration of sandalwood remnants, despite efforts being taken to ensure responsible harvesting of sandalwood stands. The intriguing contribution one creature can make to stabilize a sensitive and co-dependent ecosystem involving sandalwood in south western Australia brought the Woylie to my attention.

The Woylie, *Bettongia penicillata* (or 'brush tailed bettong') is one of the endangered marsupial species which has flourished in the conservation effort at the DEC reserves of Dryandra. From this successful re-introduction a clear relationship between woylie populations and Sandalwood *Santalum spicatum* regeneration has sparked an extension of research programmes in this area.

This research underpins observations of sandalwood seedlings emerging relatively long distances from mature trees, even across bitumen roads into isolated road reserves where no mature sandalwood trees exist. At Dryandra you can see evidence of this from the roadside. Studies of woylie behaviour, of which Marie Murphy of the Murdoch University has become a central driving force over recent years, have demonstrated a 'squirreling' adaptation, apparently common to several marsupial species, present in woylies. This is whereby they collect, carry and stash seeds from a variety of plants, including *Gastrolobium* species as well as quandong (*Santalum acuminata*) and Western Australian sandalwood (*S. spicatum*), as a food reserve. They do not tend to cover the buried seeds but the deliberately dug holes become covered with leaves and other plant material within a few days. Whilst this is a good strategy to retain food supply

options, they tend to forget the locations of their 'cache' allowing germination when the conditions are favourable.

The characteristic woylie diggings can be seen throughout the serene walk trails through the Dryandra Woodland, and on closer investigation show the woylie to be a significant link in a larger ecosystem. Woylies also feed on underground fungi and bulbs, and their nocturnal digging activity can assist rainfall in penetrating the top layers of soil and contributes to the exchange of nutrients through the soil's substructure. It is now thought that low woylie populations may be one of the most significant factors in the decline in natural sandalwood stands at an ecological level.

Replanting programmes impersonating woylie behaviour have already shown a huge increase in regeneration rates of sandalwood. It is ironic however that, if sandalwood were not an economically driven crop, intervention in conservation and regeneration would not have occurred to such an extent. We should be concerned for all threatened species of plant and animal life which risk ceasing to exist because conservation efforts have not been made in time.

What I love about this story is how the value of biodiverse plantings and the fine balance of natural ecosystems are so interconnected. It is possible that regeneration of natural stands of sandalwood could spread out from plantations into adjacent reserve lands and existing bush if they were suitable habitats to support woylies. On the other hand this could also mean that amongst a plantation scenario, we had sandalwood popping up in places we were not expecting!

Disappointingly I didn't arrive early enough to book myself on one of the night tours of Barna Mia but it seems like a great excuse for another weekend away where I will be more determined to catch a sighting of one of these special little rat-kangaroos!



Reviewing the potential of *Acacia saligna* as a Sandalwood host

Wayne O'Sullivan



Growth rates of sandalwood hosted on *Acacia saligna* are significantly greater than those observed for other host species. *Acacia saligna*, or 'Koojong' grows rapidly, reaching a height of two meters or more in its first year on good sites. The plant has a broad natural distribution across the agricultural zone of Western Australia, and a reasonable tolerance of a range of adverse environmental conditions. It produces large amounts of seed from an early age, which is easy to collect, germinate and grow.

While these attributes suggest it should have an important role as a host plant for *Santalum spicatum*, there are also some limitations, the most significant of which is that the plant is frequently short lived-too short to support the rotation length of a sandalwood crop. Additionally, the dense, spreading form of the *Acacia saligna* trialled to date combined with its fast growth rate, means that the slower growing sandalwood plant can be overwhelmed and forced to compete for light. The large dense crown of the host creates a risk that the crop plants will put on more and smaller branches, reducing heartwood yield. In trial work this has been managed by trimming the *Acacia saligna*.

There have been some recent developments in research on *Acacia saligna* that may produce positive outcomes for sandalwood growers. A review of the taxonomy of the species has shown that what was a single widespread and highly variable entity can be seen as a number of different subspecies. Unravelling

this taxonomy has also highlighted the tremendous variation in growth habit and form, not only between subspecies, but between provenances within the subspecies. Much of this variation has now been bought together in two replicated provenance and family trial sites in the central and southern Wheatbelt, to objectively assess the degree to which this variation is genetically controlled. These trials are an opportunity to observe the variation between individuals in their resistance to those factors that appear to limit the life span of the plants, especially fungal and insect pests. The trial plots will be evaluated over the next year, from which we may be able to obtain guidance for the selection of specific lines to test for sandalwood production.

There may be scope to select from what is now known to be a wide and diverse genetic base, plants that display all the positive host plant attributes, with few if any of the disadvantages. For example there are provenances and individual plants that have a single stemmed, erect, tree or columnar form, which will reduce shading. Alternatively, there are prostrate forms that will stay below the height of the sandalwood and other co-hosts. Also, there appears to be greater resistance in some individuals to the pests and diseases which limit the plants lifespan. Elsewhere in the world where it is free of these pathogens, *Acacia saligna* is considered a long-lived plant.

While the species is widely planted in WA and elsewhere, it should be noted that *Acacia saligna* is one of the world's more serious environmental weeds, so caution should be exercised in using this plant outside its natural range.



Preliminary oil results from young sandalwood plantations

Jon Brand, Forest Products Commission, Locked Bag 888, Perth BC, WA 6849, Australia,
Email: jon.brand@fpc.wa.gov.au

During 2004, the Forest Products Commission measured oil concentration and oil quality from 36 *Santalum spicatum* and five *Santalum album* trees growing in plantations and natural stands. Four *S. spicatum* plantations aged 8-25 years were sampled from three separate sites in the Wheatbelt (W1, W2, and W3) and one at Curtin University. Two natural *S. spicatum* stands, age over 50 years, were sampled near Paynes Find and Menzies. One *S. album* plantation, age 15 years, was also sampled at Curtin University.

Core samples were taken from each tree at 150 mm and 700 mm above ground. The cores contained both heartwood and sapwood. These samples were used to examine heartwood percentage; oil concentration; and oil quality (amount of α -santalol and β -santalol). The oils were extracted from the core samples using ethanol and the chemical composition was determined using a gas chromatography flame ionization detector (GC-FID) and a mass-selective detector (GC-MS).

The mean proportion of heartwood in the *S. spicatum* trees at 150 mm and 700 mm from the ground was 28-48 % in the Wheatbelt plantations, 61-69 % at Curtin University and 64-70 % in the natural stands. The *S. album* contained 57-59 % heartwood.

The mean oil concentration (at 150 mm and 700 mm) from *S. spicatum* plantations growing at Curtin University, W1 and W2 was 2-3 %, but W3 had less than 1 % oil. The natural stands had 2-3 % oil. The *S. album* plantation had a mean oil concentration of 1-2 %.

Within the oil, W1 and Curtin University plantations had 6-27 % α -santalol and 2-10 % β -santalol. However, W2 had poor oil quality with only 0-2 % α -santalol and less than 1 % β -santalol. The natural stands had 3-8 % α -santalol and 1-3 % β -santalol. The *S. album* had superior oil quality with 42-47 % α -santalol and 22-24 % β -santalol.

Although these results are not conclusive, due to the small sample size, they are encouraging because they indicate that *S. spicatum* plantations are capable of producing a range of marketable wood in the stems at 150-700 mm above the ground, by age 8-25 years. This study also confirmed that heartwood percentage, oil concentration and oil quality were all lower further

up the tree (700 mm) than near the base (150 mm). At age 10 years, there may only be a small proportion of wood near the base (e.g. below 700 mm) with relatively good value. Sandalwood value is related to heartwood percentage, oil concentration and oil quality. Assuming that these three commercial traits will all increase with age, it appears that waiting until *S. spicatum* plantations are age 20 years before harvesting should provide a far greater tonnage with greater mean values per tonne.

The results from this study will be combined with future harvesting and oil sampling studies to help estimate sandalwood yields and returns.

More detailed information on this study is published in Australian Forestry:

Brand, J.E., Fox, J.E.D., Pronk, G. and Cornwell, C. (2007) Comparison of oil concentration and oil quality from 8 to 25-year-old *Santalum spicatum* and *Santalum album* plantations with those from mature *S. spicatum* natural stands. *Australian Forestry* 70 (4), 235-241.



WESCORP SANDALWOOD PTY LTD Buyers of Private Property Sandalwood

Wescorp Sandalwood would like to hear from all interested licensed private sandalwood harvesters interested in selling sandalwood.

If you are wanting the best prices for your sandalwood, contact

Norman Butler
(08) 9418 2888
041 1102 338

Fruit Tree Borer (*Maroga melanostigma*)

Geoff Woodall, Centre of Excellence in Natural Resource Management (CENRM), UWA, Albany
Phone: (08) 9892 8427

The larval stage of *Maroga melanostigma* has been identified as causing severe damage and death to broad leaved jam (*A. acuminata*) in at least one sandalwood plantation in the north eastern Wheatbelt of WA. The insect occurs across southern Australia. It is a native lepidopterous pest known to attack many native (preference for black wattles) and exotic trees (including fruit trees). It has a typical moth life cycle but the number of instars and flight times are not known. Infected branches collected in October contained pupae from which moths emerged some 4-6 weeks later. The longest period of its life cycle, while the pest is in the larval stages, is thought to last up to two years and during this time larvae are sheltered in tunnels within the sapwood and are difficult to control. No chemicals are registered for control though parasitoid wasps are a likely biological control agents (*Trichogramma spp.*).

Within and adjacent to the site it was noted that local acacias were not infected, including the local form of fine leaved jam (*Acacia acuminata*). A viable management option would be to replace the susceptible western broad leaved form of jam with resistant local forms of the same species and other resistant local species.

The author wishes to thank Mark Whinnen (CENRM), Matsuki, Mamoru (CRC Entomology) and Andras Szito (Department of Agriculture and Food Western Australia) for their assistance.



Figure 2. The Fruit Tree Borer (in adult moth form). 10-15mm in length



WESCORP SANDALWOOD Sandalwood Analysis

Our laboratory is glad to offer the following services to organisations and individuals in the sandalwood industry.

1. Gas Chromatographic (GS) analysis of wood and oil.
2. Essential oil yield by hydro distillation, steam distillation (semi-Industrial) or solvent extraction.
3. Contract research (chemical) on projects of your interest.

Further information contact:

Dhanushka Hettiarachchi (Danny)

danny@wescorp.com.au

(08) 9418 2888



Funding provided through the Avon Catchment Council, South Coast NRM Inc. with the support of the Western Australian and Australian Governments through the joint National Action Plan for Salinity and Water Quality program and the Natural Heritage Trust



Figure 1. Jam (*A. acuminata*) sapwood damage caused by the Fruit Tree Borer (*Maroga melanostigma*) in its larval stage.



On-ground support



Antony Crum is the new Farm Forestry Development Officer for the Avon NRM Region. He comes to us from the Forest Products Commission's (FPC) Katanning office. Antony has a Degree in Environmental Science from Curtin University with a focus on NRM. He spent the past year working as an FPC Operations Officer, looking after the on-ground works for their sharefarming operations in that region. His main tasks were planning, supervision of contractors and monitoring.

His new role as full time Farm Forestry Development Officer for the Avon NRM region will be to provide on-ground support for land managers wishing to incorporate tree crops in their farming systems. He will also be placing the 85,000 Avon Catchment Council funded Sandalwood hosts and mapping existing demonstration sites in the Avon.

Antony's position is funded by the Avon Catchment Council but is hosted by FPC so that we as a region have access to the best farm forestry technical advice available. He is based at the Avon Catchment Council Offices at Northam but will be travelling around the region visiting land managers wishing to incorporate tree crops into their farming systems. Antony 'wants to make a difference' and is looking forward to tackling the environmental issues in the Avon with positive solutions.

Antony can be contacted on 9690 2268 or
Email: antony.crum@fpc.wa.gov.au

Disclaimer: The information in this newsletter has been collated from the best information available at the time. The ASN does not accept any liability for possible inaccurate information provided by contributors.

Sandalwood Peer Mentoring Program

The University of Melbourne's Master TreeGrower Program has provided funds to trial a Sandalwood Peer Mentoring Program. The funds will enable the Mentors to be paid for the time they spend with land managers. The Program is for, particularly new growers, seeking some support when starting out on their Sandalwood venture.

Fifteen experienced Sandalwood growers have offered to be Peer Mentors, have undergone specialised training and are ready to help.

Mentors are not to be seen as experts or as a replacement for a paid consultant. They are willing to share their experiences to help growers on their way to establishing their plantations.

The Peer Mentoring Program is open to members of the ASN only, so non-members will need to join before they can take advantage of the Program. To be linked with a Peer Mentor, contact AVONGRO Executive Officer, Monica Durcan. Monica will fax, post or email a Landholder Forum. Once this form has been returned and membership confirmed, Monica will then contact the closest mentor. Mentors will log their hours and will be able to be paid for the time spent with the landholder they are mentoring.

To register your interest in the Sandalwood Peer Mentoring Program and obtain the appropriate forms, contact:
Monica Durcan: phone/fax: 9291 8249
Email: mdurcan@inet.net.au



Felicity Eddnie-Brown measuring plantation growth

Western Australian Tree Farmer of the Year Award

By Paul Hodges, Mt Marshall NRMO

Phone: (08) 9685 1202, Mobile: 0407 851 113

Email: nrmo@mtmarshall.wa.gov.au



Bob Huxley

Our very own Bob Huxley was a finalist in the prestigious 'Tree Farmer of the Year Award'. While in the end Bob did not win the ultimate prize, he only came second by a whisker and was awarded a 'Highly Commended' by the judges.

Bob has been working tirelessly in and around the Bencubbin area, promoting the growing of Sandalwood for environmental reasons as well as for long-term investments. The following is an excerpt from Bob's submission for the Tree Farmer of the Year Award which was put together by Mt Marshall Natural Resource Management Officer, Paul Hodges.

'Up until 1997 Bob Huxley was purely a wheat and sheep farmer. However, he was conscious of climatic and seasonal change. He was also aware of the increase in salinity in the region. He wanted to make his property more environmentally and economically sustainable.

In 1997 Bob took his first steps in tree planting. He planted a mixture of local provenance native tree seedlings to thicken up the remnant vegetation on his home block. Due to a number of factors this attempt was spectacularly unsuccessful. Rather than deter Bob, this experience made him more determined to succeed in tree planting.

From these first shaky steps, in 10 years Bob has become a pioneer in Sandalwood agroforestry in the central Wheatbelt. Sandalwood industry observers did not believe that growing Sandalwood was a viable option in this region that receives average annual rainfall of 320mm. Bob has now planted over 200 hectares of Sandalwood in this region and is

continually improving his operation through experience and collaboration with friends he has made through the Australian Sandalwood Network (of which he is a founding member).

The environmental benefits to Bob's property have been numerous. These benefits include protection of soil, crops, pasture and livestock (once the trees are mature enough to have sheep around them). Bob has also noticed the return of native fauna including echidna and native marsupials on his property.

Although Sandalwood takes 20 to 25 years to reach a harvestable size, Bob has already started earning money from the Sandalwood seeds. At 5 years old the trees start producing seeds in harvestable quantities. At the current price of \$50/kg, this part of the enterprise has proven quite lucrative.

Bob's value to the Shire of Mt Marshall and surrounds is enormous. He takes every opportunity to encourage, assist and support people who are involved in the Sandalwood industry or are interested in becoming involved. He is not afraid to share what he has learnt and welcomes people to his property to show them what can be achieved. He has assisted many landholders, in the region, establish Sandalwood plantations and genuinely enjoys helping others. I believe Bob would be a very worthy recipient of the WA Tree Farmer of the Year Award.'

We in the ASN agree with you Paul and are proud to have Bob as an ASN member and as a Sandalwood Peer Mentor. The judges of the Award encourage him to apply again next time around.



Highlights from the ASN 2008 Research Update and Autumn Field Day – April 7th

Seventy-five members attended the 2008 Research Update and Autumn Field Day at Beverley on Monday April 7th. The focus of the morning session was presentations by

- Geoff Woodall (Centre of Excellence in NRM, Albany): *Developing bulk commodities from sandalwood fruit: biodiesel case study*
New information on Acacia saligna as a host
- Dr Liz Barbour (Forest Products Commission): *Genetic and deployment improvement of Sandalwood*
- Paul Brennan: (Forest Products Commission): *Sandalwood's potential for carbon offsets.*

Copies of the presentations can be provided by contacting the ASN Executive Officer, Bethan Lloyd: exec@sandalwood.org.au.

After lunch, a tour of the Whispering Gums NLP sandalwood plantation. A plantation that demonstrates positive and negative aspects of the twin row plantation layout and the biodiverse host concept. It was established as part of a project funded by the National Landcare Program (run by Woodall and Emmott). Other plantations established by Jim were also viewed from the bus, followed by a tour of his commercial nursery.



A feature of the day, both in the presentations and in the field was the demonstration of the affect of *Acacia saligna* on growth rates of Sandalwood. A visit to Bert and Norma Wansbrough showed just how *A. saligna* can boost the growth rates of young Sandalwood initially. *A. saligna* is very short lived and can be removed after five to seven years. It rots down well, leaving young vigorous Sandalwood plants to carry on growing on more longer-lived hosts.



WILDTHING TREEPLANTERS



*Easy to use, hand or foot operated, handheld tree or seed planters

*No more back bending when planting trees

*All steel construction, strong but lightweight

*Useful in areas inaccessible to machinery

*Made locally, in Western Australia

*Can be customised to your requirements

Sizes:

30mm Seedplanter

50mm, 54mm Treeplanter

\$198.00 (inc GST)

For more information contact

Chris & Janice Wilding

Wongan Hills

Ph: (08) 9671 1183

Fax: (08) 9671 1683

wildones@bbnet.com.au

Mobile: 0427 711 183

This newsletter has been produced with funding provided by the Avon Catchment Council with investment from the State and Australian Government through the National Action Plan for Salinity and Water Quality.

Photos courtesy of: Wayne O'Sullivan, Jon Brand, Geoff Woodall, Lorna Timbers, Richard Moore, Paul Hodges, Monica Durcan

