Essential

Oil distilled from the paperbark tree is enriching the lives of villagers in Papua New Guinea's Western Province. **Robin Taylor** reports.





In a remote village in Papua New Guinea's Western Province, villagers are celebrating the 'mol' tree and its gift of a new industry.

Decorated with garlands of colourful flowers, they perform a special dance and sing a song dedicated to the tree. The performance celebrates the fledgling essential oil industry and a new source of income for the villagers, who previously have relied on sales of yam suckers, cassowary meat and crocodile skins to maintain their subsistence lifestyle.

Eight years ago, part-time CSIRO forester, David Lea was collecting seed in Western Province for the Australian Tree Seed Centre, part of CSIRO Forestry and Forest Products. Back in Australia, Dr John Doran, a researcher in the same group, was busy screening melaleucas and other species for their potential to produce essential oils. Doran asked Lea to collect leaves from PNG paperbark species which he could assess for oil potential.

After gathering the leaves, Lea used a portable still to produce some oil 'on the spot', a feat that impressed the villagers and sparked their interest in oil production.

Although the researchers hadn't considered setting up stills in PNG, when the villagers requested assistance they were happy to help. With funding from the PNG Biological Foundation, CSIRO started a local project in partnership with the PNG National Forest Authority.

The species *Asteromyrtus symphyocarpa*, known locally as the 'mol' or 'waria waria' tree, produces an oil similar to eucalyptus oil, with high levels of the desirable therapeutic chemical, 1, 8 cineole.

The villagers had used the leaves as an inhalant to relieve coughs and colds, and

o i l

as a muscle rub for aches and pains, but the oil was something new. They were familiar with essential oils, however, which are imported to PNG from South East Asia and sniffed to relieve coughs, particularly in the dry season.

Soon the villagers were bottling the oil, which they labelled 'waria waria' oil, and selling it across Western Province.

'There is a great interest in the product,' Doran says. 'Because it comes from their own bush they believe it is very powerful.'

Last year, (2001), the project achieved a marketing breakthrough with the appointment of PNG Franchise Pty Ltd, a retailer with outlets throughout the country, as the distributor of the oil.

'This is a huge step forward,' Doran says. 'The villagers now have an assured market. Before they were bottling at the village and sales were sporadic. There were also problems with quality control.'

Lea transported a group of villagers to the provincial capital Daru for the first delivery of oil, a trip involving two days on unmade roads and then two hours downriver in a dinghy to reach the offshore capital.

They delivered 77 litres of oil, which was tested for purity and quality before being taken to Port Moresby for bottling and distribution.



Left: The still produced 77 litres of oil for the villagers' first commercial delivery. Below: Villagers celebrate the 'mol' tree and its gift of a new industry. Bottom: Families working on the oil project share the profits from oil sales.





Lea hopes that PNG Franchise will be able to take all the oil that is produced.

'It depends how the first intake sells,' he says. 'The oils are ready in Port Moresby. The company has come up with a label and will market the product through chemist chains and supermarkets.'

The villagers are paid in cash and the money divided up among the families who worked on the oil project. The additional

Below: Asteromyrtus symphyocarpa, known locally as the 'mol' or 'waria waria' tree, produces an oil similar to eucalyptus oil, with high levels of the desirable therapeutic chemical, 1, 8 cineole.



income will be spent on immediate needs, such as children's education.

Following the project's success in three villages where stills have been introduced, other communities are keen to join the network. But the researchers do not want to extend the operation too far until they know whether it is ecologically sustainable.

With funding from The Australian Centre for International Agricultural Research (ACIAR), work began in January 2000 to gather this critical information.

An important component of the ACIAR project was a socioeconomic study which identified the best village structure to build a successful oil industry. The main finding was the need for a strong leader and unity among the participants.

'Out of three villages where stills have been established, one provides a successful model while the others have problems due to clan and family divisions,' Doran says.

'The "model village" has a strong effective councillor and a still committee that runs the show. The income from the oil is divided very fairly and the leader of the still committee documents everything.'

A desirable feature of the paperbark species in terms of sustainability is that the trees regenerate profusely after cutting.

Lea has established plots of species of interest to test different methods of harvesting to develop best-practice recommendations.

'Our initial work suggests that something greater than a three-year cutting cycle will allow sufficient regeneration. There is plenty of resource for the villagers to cut without ecological damage.'

The information gathered will help the researchers and villagers to develop harvesting methods to ensure the longterm sustainability of the industry.

A vegetation survey being carried out by Dr Nicholas Coops of CSIRO Forestry and Forest Products will provide a basis for establishing physical limits to commercial harvesting for oil production. But, for the industry to continue to prosper, the villagers will need ongoing help.

'They don't have technical resources to carry out still repairs, there are no welding skills and no equipment,' Doran says.

'To overcome the transport problem is a huge thing for them and it can sap away their income.'

Abstract: The PNG Biological Foundation, CSIRO and the PNG National Forest Authority have joined in a project to produce oil with a high concentration of 1, 8 cineole from the paperbark tree, Asteromyrtus symphyocarpa. Three villages in PNG's Western Province have secured a retailer to distribute the oil throughout the country. Contributing families spend the profits on immediate needs, such as children's education. ACIAR is funding research on the sustainability of the industry in preparation for its expansion. It covers socioeconomic and environmental issues. A related project is surveying and mapping the region's biological resources.

K e y w o r d s : essential oils, mol tree, waria waria, melaleucas, Western Province, PNG, village-based industry.





Seeking truth by bike

FOR THE laconic David Lea, who after eight years visiting Western Province describes himself as 'almost a local', working in Papua New Guinea is like a boy's own adventure.

He lives in a bark hut in the village of Kwiwang and disappears for weeks at a time, riding his mountain bike into the forest to carry out survey mapping for the project.

Lea has spent months surveying and mapping the region's biological resources, in particular the distribution of *A*. *symphyocarpa*, and another promising species, *Melaleuca quinquenervia*.

He is also maintaining the search for new oils, returning to Australia each year with bags of leaves for distillation and chemical analysis. With the help of some local knowledge, he recently discovered the presence of sandalwood – a high value oil – in Western Province.

Lea has travelled hundreds of kilometres throughout the Province, from the border with West Papua in the west, to Malam in the east, using a global positioning system to provide 'ground truthing' information on tree distribution needed to verify data from 'Landsat' satellite images.

'We have to cover a wide area and put in numerous plots, so we decided that bikes would suit the work,' Lea says.

The difficult terrain, where access can be hampered by all sorts of obstacles, such as

swamps and burnt bridges, also made bikes a better choice than vehicles.

But Lea says, the environment is hard on the equipment. 'You are forever replacing broken spokes and buckled wheels,' he laments.

Thanks to Lea's efforts, next time a new village wants to join the oil program, the scientists will have a distribution map to pinpoint the nearest stands of suitable trees.

And after months in Western Province, eating the local diet of yams, what David Lea most looks forward to when he gets back to Australia is a big salad!



David Lea (pictured below centre) has travelled hundreds of kilometres throughout the Province, using a global positioning system to provide 'ground truthing' information on tree distribution. He and his colleagues ride mountain bikes through the difficult terrain.

