



Pine prospects

Robin Taylor
describes an epic
journey to save a
rare stand of
natural radiata pine
from destruction by
feral goats.

As the weary group struggled into camp, too tired to heat their evening meal, Colin Matheson wondered what he had got himself into.

Matheson, a scientist with CSIRO Forestry and Forest Products, was taking part in a seed-collecting expedition to remote islands off the Pacific coast of Mexico. The international group included researchers from the University of California and Mexico's Colegio de Postgraduados.

What began as a bar room conversation between Matheson and Dr Guerra Santos of the Colegio de Postgraduados in California three years ago had finally come to fruition. Last year, (2001), seven scientists, five volunteers and two Mexican observers joined forces to gather seed on the islands of Guadalupe and Cedros.

Radiata pine, sometimes known in Australia as the 'green weed' is one of the most widely grown exotic trees in the world. But, while plantations cover an area of about four million hectares, only five natural stands of radiata exist. Three of these, on the Californian coast, are under threat from urban expansion and disease, while another population on the Pacific island of Guadalupe is in danger from feral goats.

It was after meeting at a conference in California that Matheson first jokingly suggested to Guerra that he should enlist some Australian expertise to fence off the Guadalupe trees from goats, which were eating all the young seedlings. (The goats are descendants of a population reputedly introduced by Captain Cook to provide food for future explorers.)



The radiata pines on Guadalupe Island are more than 150 years old, nearing the end of their lives.

'It stayed in the back of our minds and the idea was reignited by Dr Deborah Rogers who has a deep interest in the conservation of Monterey (radiata) pine. She really put the expedition together,' Matheson says.

Although it soon became clear that fences were not practical on much of the island's difficult terrain, the Mexican Government is removing the goats, and since last year's expedition some of the most vulnerable trees have been fenced off with the help of a volunteer organisation.

The population on Guadalupe Island is in serious decline because of the goats. The 200-odd trees are all more than 150 years old, nearing the end of their lives, and there is no regeneration.

'We wanted to make a collection with the purpose of going back and planting trees on the island if all the mother trees died before the goats were removed,' Matheson explained.

As team leader of CSIRO's softwood breeding program, Matheson was

Holiday with a difference

EVER thought about joining one of those scientific expeditions where you pay a small fortune for the privilege of helping scientists carry out fieldwork? It's sure to be a rewarding experience, but you may need a holiday to recover afterwards!

For Dr Colin Matheson, team leader with the softwoods breeding program at CSIRO Forestry and Forest Products, taking part in the recent expedition was a physically challenging experience, but one that has certainly given him a huge sense of accomplishment.

On Guadalupe Island, the party set up their tents in the lunar looking landscape of a volcanic crater. Each morning they set out about 7 am for the walk up a 300 m cliff to allow enough time to carry out the day's work, and return as the sun was setting, about 6-7 pm.

Matheson recalls the downcast spirits of the first evening when the group felt daunted by the task they had set themselves.

'The ship gave us great packages of pre-cooked pasta so all we had to do was empty them into a saucepan and boil it up,' he says.

'The first night we were all absolutely stuffed and there wasn't a hot meal when we got back. We had cold pasta and we were all a bit miserable. We realised what we had struck.

'The going was very fierce and I didn't know how on earth I was going to face the next day because I was just completely exhausted, my legs were worn out and I didn't know where I was going to get the energy from.'

By the second day the spirit had improved. After doing a good day's work – and leaving someone in the camp to heat the pasta – things were definitely looking up.

As well as the seven scientists, five volunteers joined the group as paying members, helping to fund the trip.

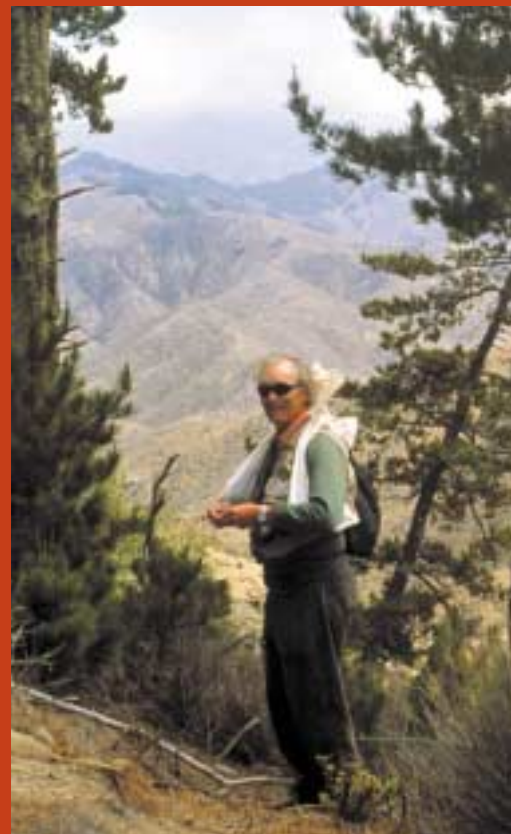
And they, and the two Mexican observers, worked as hard as anybody, Matheson says.

'The fact that some people had paid to be part of the expedition while others were professional researchers had the potential for disaster.

'But in fact it was as harmonious a group and working team as I've ever worked with. The ones who had paid US\$3000 worked as hard as anyone.

'We had days of 13-14 hours, it was confronting at times when we were climbing up those spurs and people were scared but the camaraderie in the group was fantastic.'

It took more than 12 months to obtain the necessary permits to carry out the expedition on Guadalupe and Cedros Islands and it is unlikely that such a trip will be possible again for a long time, thus emphasising the unique experience and importance of the mission.





interested in taking part for another reason besides helping to conserve the island population of trees.

'We are looking for new species and new populations to grow in plantations and for farm forestry in some of the lower rainfall areas (400–600 mm) of southern Australia,' he says.

'Guadalupe is a dry place and the trees there have greater resistance to drought than other radiata which could make them more suitable for expanding Australia's plantation resource into drier areas.'

To reach Guadalupe, which is 250 kilometres out to sea, the group travelled for 22 hours by boat from San Diego. Once on the island they enlisted the help of local

fishermen and a rancher who was capturing goats to reach their campsite in a barren and rocky volcanic crater.

From there they could see the pine trees, growing along a ridge which forms the rim of the volcano, 300 metres above. To reach them required a steep climb up a rocky cliff along meandering goat tracks.

'It was rough as hell, very hard walking; we didn't realise how hard it was going to be,' says Matheson, who had been riding his bike to work in preparation for the trip but 'not training desperately seriously'.

Once they reached the ridge, two people went ahead, numbering and tagging all the trees from which collection was possible. Matheson and a colleague

Above: During their four days on the island, the group collected seed from 85 trees. Even counting the trees was a challenging task because of a thick fog, which frequently obscured the view.

Left: The cone collection team collected cones and described the trees, carrying the cones back down the mountain each night in several hundred calico bags.

Above right: Once on the island, the team enlisted the help of local fishermen and a rancher to reach their campsite in a barren and rocky volcanic crater.

followed, mapping the position of the numbered trees using hand-held global positioning devices.

They now have a map pinpointing the position of each tree. The seed from each tree will be kept separate so that any future replanting program will be able to replant seedlings in the exact position of the 'mother tree'. Matheson says this is important to re-establish the stand without changing its 'genetic structure'.

The cone collection team collected cones and described the trees, carrying the cones back down the mountain each night in several hundred calico bags. While usually they could collect cones from the well-stocked trees with the help of six-metre long poles, one of the volunteers was a professional seed collector who had no qualms about climbing up trees when the cones were out of reach.



'Our idea was to collect cones from all the 200 trees on the island but some were inaccessible,' Matheson says.

During their four days on the island, the group collected seed from 85 trees. Even counting the trees was a challenging task because of a thick fog, which frequently obscured the view.

'There will be thousands of seeds from each tree, some of which will be put into long-term storage in a seed bank and some will be used for conservation, grown in small plantations in Mexico,' Matheson says. 'Others will be left in storage for reforestation on the island and we hope to bring a small proportion to Australia although there are quarantine issues.'

The trees, which grow only at one end of the island, are nurtured by the fog, which rolls in from the west each day. As the air rises over the ridges the fog condenses and the pine needles collect the moisture. Moisture from the fog drips off the branches, creating a separate ecosystem under the trees, which supports populations of birds and other animals.

'Even around trees isolated by many hundreds of metres societies of birds seemed to thrive,' Matheson says.

After leaving Guadalupe, the group travelled to Cedros Island, which is close to the Mexican coast. Here they found the radiata pines were in good shape and regenerating. They collected seed from about 100 trees on this island.

The seeds collected on the expedition are being extracted from their cones by the Mexican Program for National Reforestation and Matheson hopes to have them passed through Australian quarantine in time for sowing at trial sites around the country next winter (2002). The aim of the project is to identify trees that will grow and produce a commercial product in a 400–700 mm rainfall environment.

Although he doesn't believe the seed from Cedros Island will grow as well as the seed from Guadalupe, Matheson says both populations are important to provide the maximum breadth of genetic diversity.

'Other collections have been made on Cedros since the 1950s or even earlier and we have tried growing them in places like the hills behind Canberra where the rainfall might be greater than 1000 mm,' he says.

'At the only dry place where it has been tried, in South Australia, it grew as well as

the others and so it may improve prospects for extending plantations into drier regions of Australia.'

The Guadalupe and Cedros islands expedition was funded by the UC MEXUS fund of the University of California, Australia's Department of Industry, Science and Resources and the UN Food and Agriculture Organisation, as well as the participants' institutions.

Abstract: In 2001, seven scientists, volunteers and observers gathered *Pinus radiata* seed on the Mexican islands of Guadalupe and Cedros. Only five natural stands of radiata exist and four are under threat from land degradation. The population on Guadalupe Island is in serious decline due to feral goats. The mission was to help conserve the islands trees, and seek new seed sources to grow commercially in lower rainfall areas of southern Australia. The radiata trees in Guadalupe have high drought resistance. Seeds collected on the expedition will be sowed at Australian trial sites this winter (2002).

Keywords: pines, radiata pine, seed collections, scientific expeditions, Guadalupe Island, Mexico, Cedros Island, Mexico.