BOMBERS AND SAPPERS

Plugging heaters into trees and bombing pine needles is the basis for new silvicultural research by the Department of Conservation and Land Management (CALM) in pine plantations near Harvey.

"Bombing" the pine needles is carried out with the use of a Scholander pressure bomb, which measures how well-watered the pine trees are.

The "heater" is the latest and best in heat pulse velocity probes which measure the amount of water a tree transpires through its leaves; it is plugged into the sapwood of the tree trunk, heating the sap for use as a "tracer" that can show the flow of water up the tree.

The probe is connected to a data logger that can record continuously for up to six weeks —a vast improvement on former manual methods when researchers sat by trees, taking measurements every hour for days or even months.

It will probably take a year for operators to become fully conversant with this new equipment, but the knowledge will be usefull when measuring transpiration in other plant species, particularly where we want to maximise trees as pumps in salt problem areas.

Researchers are also using a neutron probe to monitor soil water to a depth of eight metres.

The three activities are part of a research project, aimed at measuring tree-growth response to thinning and to the application of fertiliser.

CALM already knows a great deal about how trees respond to fertiliser; now plantation managers want to know how much and the best times to apply it, and what is the optimum number of trees that can be grown on a given area.

Dwellingup-based forest scientist and plant physiologist Stuart Crombie says CALM wants to work out the most economical way to manage plantations, and maximise wood production.

"By understanding how trees manage their nutrient and water supply, we can adjust the number of trees on a site to produce the maximum amount of wood to the required specification," he says.

"It's no use whacking on large amounts of fertiliser, if the trees grow so rapidly they run out of water and die."

CALM tree nutritionist and joint project leader of the trial John McGrath says fertiliser increases a tree's leaf area.

"Increasing leaf area means the trees grow more rapidly, but they also transpire more water," John says.

"Thinning trees reduces competition for the available soil water and allows those left standing to absorb fertiliser more effectively.

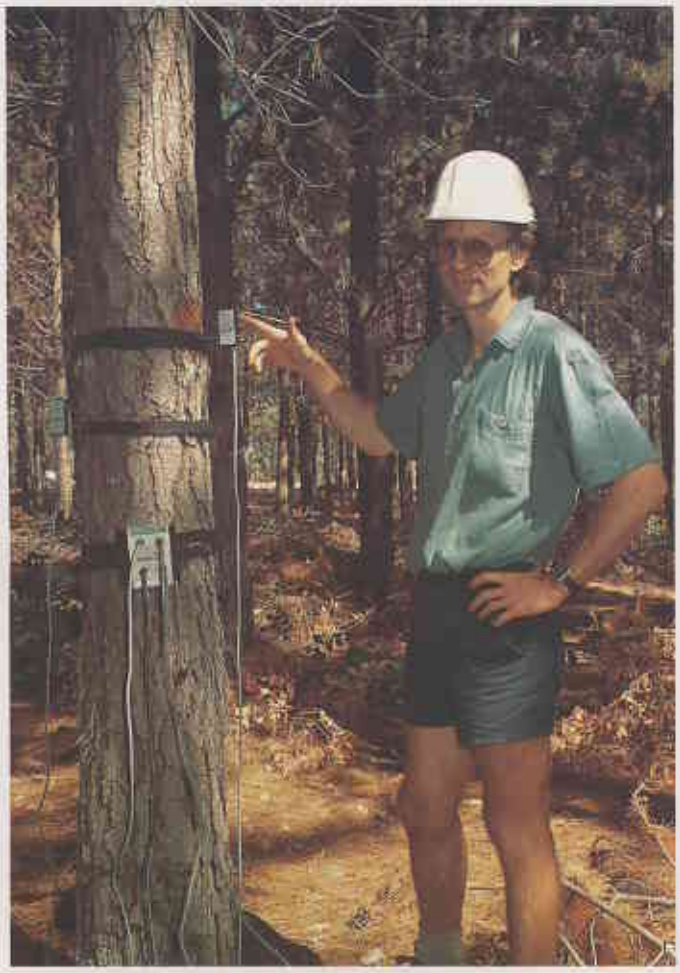
"The riddle yet to be unravelled is the relationship between wood production and water use of different species of trees."

A three-year plan to monitor 36 plots began in the 1993-94 summer season after the trees were thinned to varying densities of trees to the hectare.

John McGrath shares with us the following observations to date:

"*Pinus radiata* seems to absorb more soil water than does *Pinus pinaster*, but it may run the risk of running out of water before summer ends, particularly if there's been a drought," he says.

Pinus pinaster appears to conserve water by having a much smaller leaf area and by its greater ability to reduce water loss during transpiration by controlling the porousness of the pine needles. It may avoid drought death by leaving more water in the ground over summer, but at the cost of growing less wood than *Pinus radiata*.



Left: Joe Kinal points to a sap-flow meter inserted into a radiata pine.

Below: Stuart Crombie (foreground) and Ian Dumbrell measuring the water stress of pine needles with a Scholander Pressure Bomb.
Photos - Barbara Giles

Yellow-billed spoonbills have visited Star Swamp for the last three years. They sift small crustaceans from the shallow water. The story of this suburban wetland is told on page 45.

About a quarter of Stirling Range National Park has been closed to protect its unique flora from dieback desease. Turn to page 10 to discover these plants on the edge.

LANDSCOPE

VOLUME TEN NO. 1 SPRING ISSUE 1994

A marine park is proposed to adjoin the Prince Regent Nature Reserve. The Complex Coast (page 49) discusses the need for integrated management of land and sea around our coast.

Found all over Australia, short-beaked echidnas are one of two Australian egg-laying mammals. They still occur around Perth. See page 18.

The orange-bellied frog is part of the South West's fine-scale richness and variety. Find out more about these fascinating creatures on page 35.

FEATURES

REGULARS

SPECIALS

COVER

The coral gardens in the sheltered lagoons of the Rowley Shoals contain dozens of different varieties of staghorn coral and are inhabited by a huge range of colourful reef fish. See 'Coral for Keeps' on page 28.

The illustration is by Philippa Nikulinsky.

Managing Editor: Ron Kawalilak
Editor: David Gough
Contributing Editors: Verna Costello, Kate Hooper, Carolyn Thomson
Scientific and technical advice: Andrew Burbidge, Tony Start
Design and production: Maria Duthie, Stacey Strickland
Finished art: Gooitzen van der Meer
Illustration: Gooitzen van der Meer
Cartography: Land Information Branch CALM, Promaco Geodraft
Marketing: Estelle de San Miguel ☎ (09) 334 0296 Fax: 334 0489
Subscription enquiries: ☎ (09) 334 0481
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