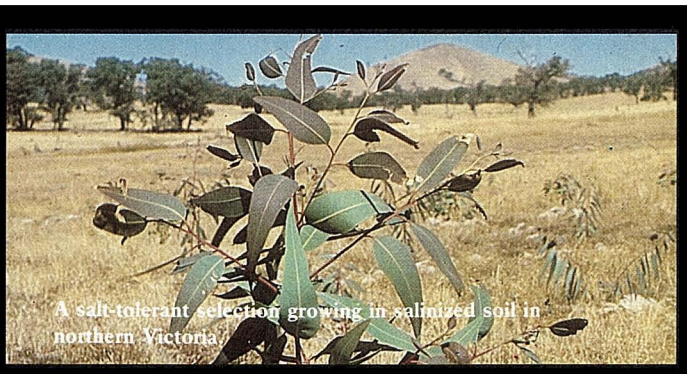
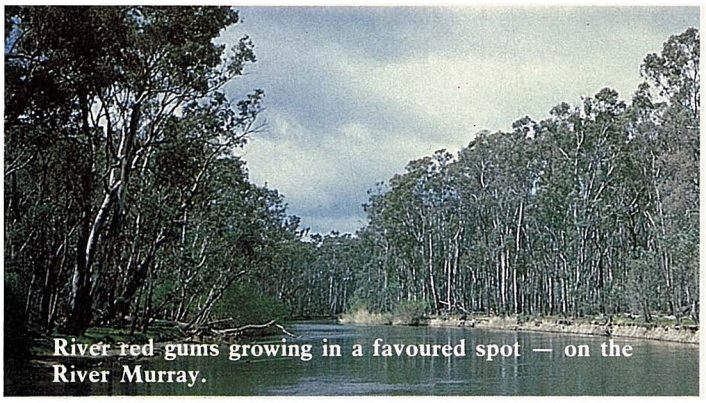
BACK BOX

River gums for saline soils



A salt-tolerant selection growing in salinized soil in northern Victoria.



River red gums growing in a favoured spot — on the River Murray.

Slow salinization of prime agricultural land causes fruit trees, cereal crops, and pastures to be replaced by useless, stumpy, salt-tolerant shrubs and grasses. The development of such wastelands is a major problem in Australia, and in the world.

It has been estimated that one-third of the world's irrigation area is variously affected by salinity. Moreover in Australia, apart from the irrigation areas, 167 000 ha of dryland farming area in Western Australia and 85 000 ha of drylands in Victoria have been salt-afflicted.

Rising water tables, following clearing of native vegetation, and the unusual hydrology imposed on once-dry areas by irrigation schemes bring the salt. As the waters rise to the surface, evaporation leaves behind a crusty residue of once deeply hidden salts to hinder plant growth.

Two main approaches have been used to lower water tables. One is to improve drainage; the other involves using the natural pumping action of plants. In most cases a combination of the two is best, but this strategy has been hindered by the lack of salt-tolerant shrubs and trees that can give the farmer some return while the water table is being lowered.

If salt-tolerant trees with useful timber were available, they would be good candidates for reclamation of salinized soils. Mr Lex Thomson from the School of Agriculture and Forestry at the University of Melbourne chose to look into the possibility.

Using collections of seed from river red gums (*Eucalyptus camaldulensis*) growing in a wide range of environments (including naturally saline soils) and exposing the young seedlings to increasing salt concentrations, he selected a few plants that would grow in a liquid culture that was effectively half-strength sea water (1·8% salt). By way of contrast, salt-sensitive crop plants like beans will suffer growth retardation at 0·006% salt.

River red gums show wide variation in their salt tolerance, so obviously fairly strong selection within their populations has been practised — by both Nature and Mr Thomson.

But selecting trees is one thing; propagating and putting them into the field is another bundle of problems. Eucalypts are notoriously difficult to propagate vegetatively, and growth from expensive cuttings is unreliable and slow.

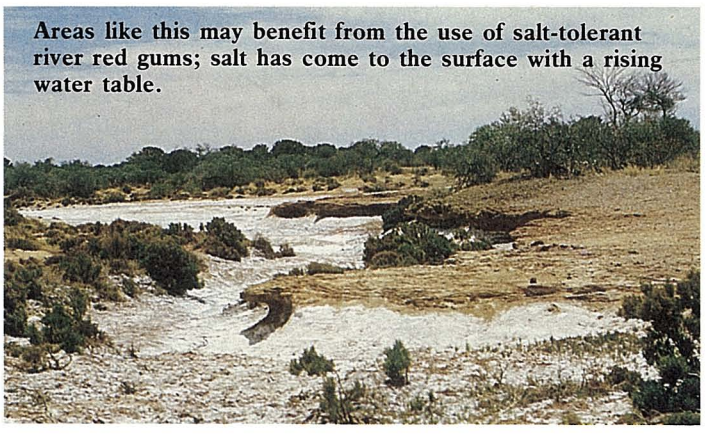
Foresters have long desired to tissue-culture desirable eucalypt specimens, in much the same way that many ornamentals and other crop plants have been cultured. However, the eucalypts have proved very refractory about growing in test-tube culture and it is only in recent years that a successful tissue-culture recipe has been devised.

Mr Vic Hartney of the CSIRO Division of Forest Research, who is engaged in various tissue-culture experiments, co-operated with Mr Thomson in multiplying the selections through the use of such techniques.

By dissecting young buds from the gum trees and growing them under sterile conditions on a jelly-like medium containing essential salts, sugars, vitamins, and growth factors, the team achieved rapid multiplication of the salt-tolerant gums. According to Mr Hartney, tissue-culture techniques can give billion-fold increases in plant numbers per year, while cuttings can only multiply numbers by hundreds in a year.

It appears that Mr Thomson and Mr Hartney may need those numbers: salt-tolerant river red gums are now growing in salinized soils in Victoria, while a small shipment is also off to Israel to see how they perform in salinized irrigation areas there.

Wayne Ralph



Areas like this may benefit from the use of salt-tolerant river red gums; salt has come to the surface with a rising water table.

Vegetative propagation of the eucalypts. V.J. Hartney. *Australian Forest Research*, 1980, **10**, 191–211.