ASSESSMENT OF CERTAIN NATIVE AUSTRALIAN SPECIES IN SALT-AFFECTED AREAS AND THEIR PROPAGATION TECHNIQUES

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Commercial tissue culture propagation of salt-tolerant clones of eucalypts has been started by a South Australian nursery company, Land Energy Laboratories, Pty Ltd. Clones of salt tolerant genotypes of *Eucalyptus camaldulensis* and *E. occidentalis* will have an application in salt land reclamation, and in mine dump rehabilitation applications.

The clones could feasibly produce a biomass energy tree crop on large areas of abandoned irrigation farmland affected by increasing salinity and rising water tables. There is a perceived future in using superior clonal eucalypt material to rehabilitate degraded lands not only in Australia but also overseas.

A tissue culture laboratory has been established at Macclesfield to complement the existing tubestock nursery operated there by its affiliate, Land Energy Pty Ltd.

Young seedlings of selected species and provenances are first screened for their ability to survive and grow in increasing concentrations of salt water, as high as 80,000 EC (electrical conductivity) units for about 12 weeks. Those individuals that perform best under salt water screening are then clonally propagated using techniques developed primarily by CSIRO's Division of Forest Research.

Once developed, the tiny plantlets are transferred from the laboratory into tube containers for hardening off and growing on in the nursery environment. From four to six months is required from the start of tissue culturing to the time the material is ready for field planting (Figure 1.)

Several clones of *E. camaldulensis* have been planted over the last year in field trials, along with seedlings of other species and provenances, to determine the most suitable trees for the production of fuelwood on marginal lands. Funded by a State Energy Research grant (SENRAC), Land Energy will establish some 30 different clones and provenances on seven trial sites in various areas in South Australia.

Although there are a number of different genera represented in these trials the main emphasis is on *E. camaldulensis* because of that species' capacity to remove water from the ground into the atmosphere (evapo-transpiration).

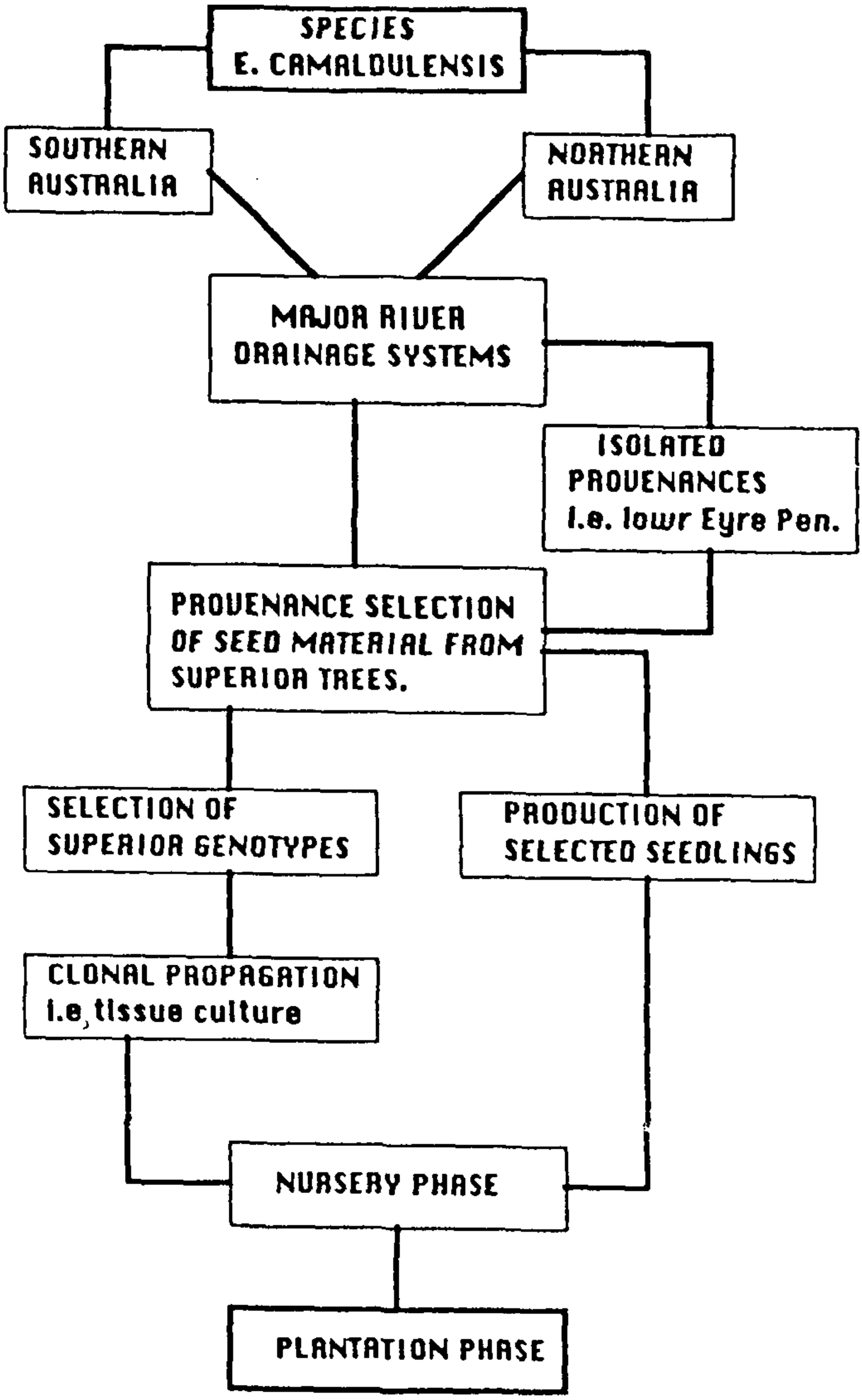

Figure 1. Plant material selection model

VARIATION IN *E. CAMALDULENSIS.*

This species of eucalyptus, of the 511 currently described, is the most widespread geographically. It is always associated with water, either river systems or accessible groundwater, hence it's colloquial name "River Red Gum." Because of its wide range there is significant variation in its growth response in a managed environment.

Variation in red gum is well known. Perhaps the most formative work done in this area was carried out by the Food and Agriculture Organisation of the U.N. in the 1970's under the supervision of a French scientist, J. F. Lacaze.

Lacaze planted trials consisting of 44 collections from 34 provenances in 39 trials in 21 countries in Asia, Africa, and in the Mediteranean Basin. His early assessment indicated that the difference in growth performance between the best and worst was at the ratio of 8:1. Similar trials in Israel (Karschon) and in California and Australia support these findings.

Several of the sites, including a site at Lake Bonney near Barmera are affected by severe soil salinity and high water tables resulting from a range of factors including lateral seepage of irrigation water from adjacent orchards and vineyards.

It is estimated that in the Riverland region alone, there are now thousands of hectares that have been rendered unproductive due primarily to irrigation-induced salinity. Data from each trial site will be processed and the results will provide information on the survival and growth parameters of each species and provenance. Furthermore, the results in time will show the potential for the economic reclamation of these degraded lands through the establishment of a fuelwood growing industry.

The same basic approach can be used for the identification and propagation of a range of salt tolerant ornamental species. The major difference here is that these species can usually be propagated using conventional vegetative methods. (e.g. mist propagation). Eucalypts, on the other hand, do not normally respond to these methods, hence the need for a micropropagation approach.