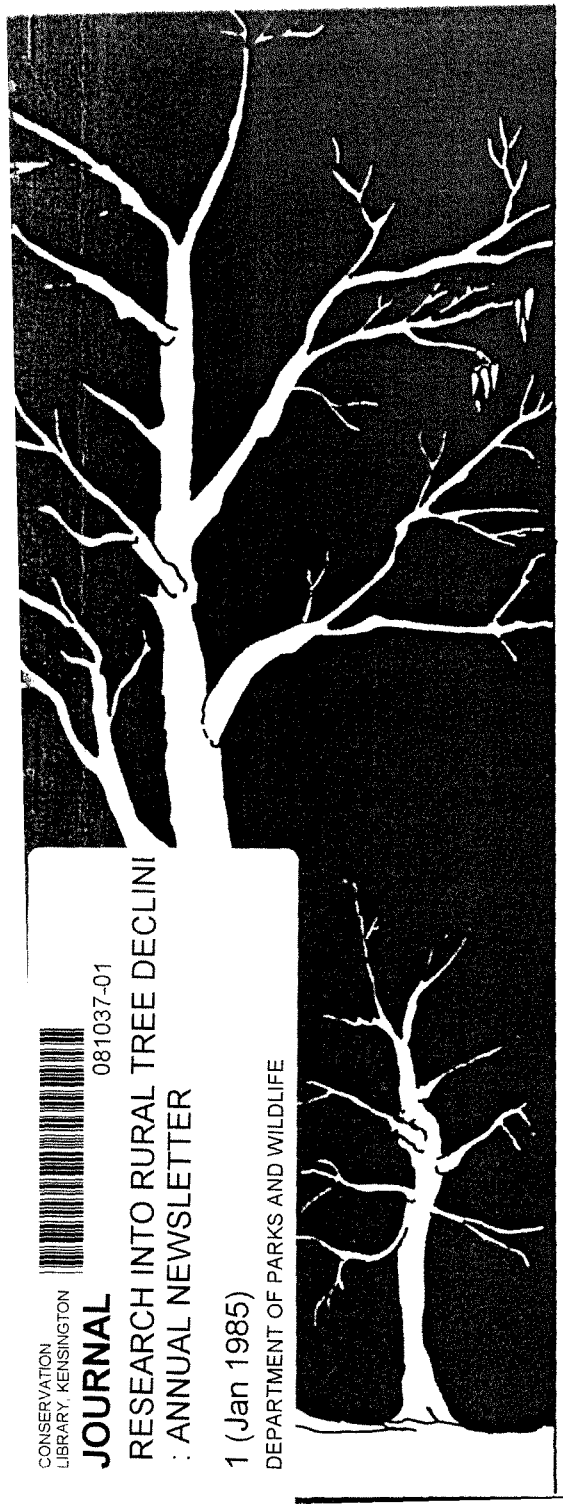

Research into

RURAL TREE DECLINE

ANNUAL NEWSLETTER

VOLUME ONE

JANUARY 1985

This is the first issue of what I hope will become an annual newsletter. It's obviously rough; we pasted contributions together and photocopied the result (much helped by those people who had followed the guidelines). 118 people were sent copies of the first circular letter; 54 replied, of whom 26 had items to contribute. I'm sure to have missed some others who also have an interest in rural tree decline. My apologies to them. I'm hoping for a lot of positive feedback from this issue, so that the next one can be much better. The purpose of the newsletter is to increase communication amongst people with a common research interest. Please write to each other and help spread the word.

Whether I will be able to compile the 1986 issue depends on where I am working then; I'm attempting to finish my PhD by the end of 1985. I'm happy to continue if circumstances permit. I'm also happy to relinquish the position to anyone who would like to take it on. This issue was possible because of the generous support of the Department of Environmental Biology, Australian National University. Susan Allen, in particular, has helped immensely. Thanks too, to Val Lyon, Department of Geography, A.N.U., who designed the cover.

Jill Landsberg

Department of Environmental Biology
Research School of Biological Sciences
Australian National University
Canberra, ACT 2601

January, 1985.

These were all the formal contributions but several people included comments of general interest in their letters :

Extent and Severity of Tree Decline in Agricultural Regions of South Australia

J. Venning

Conservation Projects Branch, Department of Environment and Planning, G.P.O. Box 667, Adelaide, S.A. 5001

During 1982-83 studies were undertaken in South Australia to determine the severity of tree decline, the rate of decline, and those factors contributing to the problem.

Eleven sample sites were selected from the Mt Lofty Ranges and South-East in open woodlands predominantly of *Eucalyptus camaldulensis* and/or *E. leucoxylon*. Initially counts were taken from the earliest and latest aerial photographs available, allowing tree losses to be determined over periods of 29 - 43 years. A later study took five of the 11 sample sites and assessed tree losses over approximately 10 year intervals from 1940s to 1980s to determine changes in the rate of decline.

Net tree losses from 1940s to 1980s varied from 8 - 64 percent. There has been no particular period since 1930s when tree decline has been consistently more prevalent. Although not conclusive due to the small number of sites sampled, it appears that tree decline has accelerated since late 1960s.

The causal factors identified were insect attack, secondary clearance, ringbarking, old age, exposure, fertiliser application, root trampling, mistletoe infestation, wildlife damage and soil salting.

As trees are lost from the rural landscape and are not replaced, the environment will become less favourable for those trees remaining. Replacement of lost and dying trees is imperative if the rate of tree decline is to be stemmed.

Research to develop direct seeding and natural regeneration techniques suitable for local conditions is being carried out by the Department. These revegetation methods are cheap and easy to implement and have the potential to facilitate the establishment of trees on rural areas.

Relevant publications from the Department of Environment and Planning, South Australia:

Sullivan P.L. & Venning J.(1982) The extent and severity of tree decline in agricultural regions of South Australia. Department of Environment and Planning, Adelaide.

Croft T.S. & Venning J.(1983) The extent and severity of tree decline in agricultural regions of South Australia. Supplement. Department of Environment and Planning, Adelaide.

Sullivan P.L. & Venning J.(in press) Tree decline in South Australia. Habitat

PROJECT NAME: Eucalyptus tetrodonta dieback study - Gove

PROJECT DESCRIPTION:

Initial investigations are aimed at determining the causative agent and delineating affected areas. Laboratory studies have been undertaken to check on possible *Phytophthora cinnamomi* infection, and a baiting technique based on *E. tetrodonta* cotyledons has been developed. Transects have been established to monitor spread and changes in species composition.

PROJECT LEADER: G. DAVIS

NAME OF CONTACT FOR THIS PROGRAM: G. DAVIS

ADDRESS AND PHONE NUMBER: Forestry Unit Conservation Commission of the Northern Territory, P.O. Box 38496, WINNELLIE. N.T. 5789. Telephone (089) 220 211.

PRESENT STATUS OF THE PROJECT: Ongoing

Jarrah, Waterlogging and Phytophthora cinnamomi.

E.M. Davison,
Dept. of Conservation & Environment, 1 Mount Street, Perth, WA.

Crown decline of jarrah (Eucalyptus marginata), tree death and understory death were believed to be symptoms of a simple disorder "Jarrah Dieback", caused by Phytophthora cinnamomi. However, because of the infrequence with which P. cinnamomi had originally been isolated from jarrah roots, it was premature at this time to conclude that P. cinnamomi killed jarrah trees; although this fungus was associated with tree death, the mechanism by which jarrah died was not understood.

In 1980, a dendrometer band trial was set up to compare the growth of jarrah in a dieback site with trees of similar diameter in the adjacent, uninfested forest. After one year's growth the trees in the most open part of the stand, the dieback site where P. cinnamomi was present, had grown faster than the trees in the adjacent forest, and this result was repeated in 1981-83. The rate of jarrah growth was related to stand density, and the pattern of growth was correlated with rainfall. Because these results were at variance with published data, a second dendrometer band trial was set up by CSIRO in 1981. In this trial, between 1981 and 1983, the trees in the most open part of the stand, when P. cinnamomi was present did not grow more rapidly than matched trees in the adjacent uninfested forest. The rate of growth was not related to stand density, and the pattern of growth was poorly correlated with rainfall. A comparison of the two sites has shown that although they are similar in many respects, they differ in their drainage characteristics, the first site was well drained, perched watertables developed on the second site.

Early, unpublished work had shown that jarrah is sensitive to waterlogging, and it normally grows in well drained situations in the Darling Range. P. cinnamomi is a water mould which has the potential to produce large numbers of zoospores in wet soil if aeration is adequate and the temperature high enough.

Glasshouse experiments have been used to study the effect of temporary waterlogging on jarrah, the effect of temporary waterlogging on the infection of jarrah roots by P. cinnamomi and laboratory studies will be carried out on the effect of low O_2 concentrations on sporulation, germination and growth of P. cinnamomi.

It is hoped that these studies will assist in the [illegible]

Dieback of pine and cypress windbreaks in southern Victoria

J D Morris
Research Branch, State Forests and Lands Service,
Department of Conservation, Forests and Lands. P.O. Box 4018,
Melbourne, Vic. 3000.

Since late 1983 severe dieback and death of trees in exotic windbreaks have occurred over a wide area of southern Victoria, extending from South Gippsland to the South Australian border. The major species involved are *Pinus radiata* and *Cupressus macrocarpa*. The intensity of occurrence of the disorder ranges from browning of single branches to death of complete windbreaks. It appears likely that the onset of the dieback was triggered by weather conditions in the previous 12 to 24 months, including the severe drought of 1982 and the wet winter of 1983. The dieback could be ascribed to the effects of local waterlogging on trees whose root systems were damaged or forced to extend to greater depth during the drought. However, foliar analysis has revealed high chloride concentrations in affected trees, reaching as much as 8% of dry weight. Salt toxicity is therefore also implicated. There is a further possibility that the effect is aggravated by root damage due to *Phytophthora cinnamomi* or other pathogens. The interactions of *P. cinnamomi*, salinity and waterlogging on chloride uptake by *P. radiata* seedlings are being examined in growth room trials, and some preliminary investigation of the use of electromagnetic induction techniques as a means of assessing the salinity hazard of proposed farm planting sites has been carried out. Further study of the extent of variation in foliar chloride levels within and between trees of the affected species is proposed, to allow more effective diagnosis of the cause of dieback in future occurrences.

Soil weathering stage, vegetation succession and canopy die-back

Joe Walker*, Cliff Thompson+ and Walter Jehne+
*CSIRO Div. Water and Land Resources, Canberra, A.C.T.
+CSIRO Div. Soils, Cunningham Lab., Brisbane, Qld

Our interests in rural tree decline are at a very broadscale. The concept is that as landscapes and soils age their resistance to stress decreases, as a consequence some rural tree declines may be related to induced landscape senility.

The following abstract (title as above) is from a paper presented at the Pacific Science Congress in Dunedin February 1983 and published in Pacific Science 37 471-481. Other papers in this volume of Pacific Science by Mueller-Dombois and his co-workers on Ohio dieback lend support to the concept.

"A conceptual model that provides a means of viewing changes in vegetation as responses to weathering of soil mantles over thousands of years has been developed from investigations of vegetation communities on a soil chronosequence on sand dunes extending back in time to at least the last interglacial. Progressive and retrogressive phases in natural plant succession are indicated by this sequence. A similar model is used to postulate that the various canopy dieback symptoms and agents observed in the New England tablelands of New South Wales, Australia, represent the mechanisms by which changes are occurring in retrogressive ecosystems that have been disturbed by human land use. We suggest that investigations of the etiology of diebacks need to be made in the context of temporal changes in soil fertility associated with the degree of soil weathering."

The concept has been built into a broader theory of what we term 'Ecological time in relation to disturbance and succession'. The paper by J. Walker, C. Thompson and P. Sharpe will be published as part of a proceedings on Disturbance Theory (Ecol. Soc. America) later this year.

Insect Herbivory in Eucalypts of the New England Tablelands

M.D. Lowman & H.H. Heatwole
Zoology Department
University of New England
Armidale 2351 NSW

The aim of this project is to quantify the relationships between trees and their insect herbivores, especially in conjunction with the eucalypt dieback situation. The project entails 3 major aspects:

1. to examine insect grazing intensities on forests, woodlands, and pastureland trees in New England, including spatial variation at 4 scales (between individual trees, canopy heights, sites and forest types); and temporal variation at 2 scales (monthly and annually). The third season of field work is in progress, and this data set is crucial, as we have had one extremely wet and one extremely dry year previously. Insect damage increased considerably during 1983-4 (over 1982-3), after the drought ended.

2. to assess the populations of insect herbivores on trees, including their distribution and abundance throughout the year in relation to tree growth and defoliation. Methods used include light trapping, sweep netting, beating trays, and observations.

and 3. to expand our studies on regenerative capacities of eucalypts after insect attack, by establishing experimental plots to observe growth and mortality of seedlings in relation to dieback.

We hope that these intensive studies on insects in eucalypts of New England will provide us with quantified information on whether insects do indeed defoliate dieback trees entirely, or whether dieback involves causes other than insect defoliation of the canopies. We anticipate analyses of our data and subsequent publication after the third year of fieldwork.

Total Insect Damage to Eucalypts suffering from Rural Dieback

M.D. Lowman
Zoology Department
University of New England
Armidale 2351

During January 1985 and subsequent months, I shall be examining entire tree damage by insects on E. nova-anglica, which is severely affected by dieback in the New England tablelands. This project is conducted with the assistance of Earthwatch funding, whereby volunteers from outside the academic spheres offer their manpower to investigate this ecological problem. Using approximately 30 'volunteers", I plan to excavate two trees in entirety: complete analyses of the leaves for defoliation damage; dissection and weighing of the woody parts for borers and fungal infection; and careful root excavation for possible root mortality from grubs and fungal pathogens. The trees chosen for excavation include one healthy (or apparently so) pasture peppermint tree, and one dying peppermint tree, growing within 200 m proximity on "Ruby Hills" near Walcha. From this intensive search, we hope to determine the biomass of a eucalypt, with relative amounts of living and dead and dying tissue, as well as to quantify the damage caused by different insects. In conjunction with Cliff Ohmart (CSIRO), I hope to further examine the accuracy of different canopy sampling techniqes associated with the measurement of insect herbivory. This exercise will involve the additional voluntary assistance of members of the University of New England faculty, Forestry, and Dept. of Agriculture who have expressed personal interest in certain aspects of this tree excavation. I would welcome anyone else who has a specialty (particularly fungal pathogens) and may wish to extract samples from this study.

Dieback of rural eucalypts: Quality of foliage as food for leaf feeding insects

Jill Landsberg
Research School of Biological Sciences, Australian National University, P O Box 475, Canberra, ACT 2601

This is a PhD project which was begun in April 1982. Healthy and dieback Eucalyptus blakelyi trees are being studied on two grazing properties at Hall, ACT. The first stage of the project is to identify leaf properties which correlate with extent of insect damage to leaves. Samples of foliage have been collected at regular intervals and stored. These samples are now being analyzed for insect damage and for 'food quality' factors (leaf size, shape and specific leaf weight, and amounts of water, nitrogen, soluble sugars, tannins, fibre and volatile oils). Concurrent measurements have been made of leaf growth, insect damage and insect populations on tagged branches of selected trees. The next stage of the project is the determination of causes of differences between trees in those leaf properties which are correlated with heavy insect damage. Initially this is being investigated in glasshouse experiments in which the supply of water and nutrients to seedlings is manipulated. The seed was collected from two isolated stands near the study sites. In one all the trees had moderate to severe dieback, in the other they were all healthy. Clones are being grown from shoots taken from 3 dieback and 3 healthy trees at the field sites (this is being done by members of CSIRO Division of Forest Research). I hope to manipulate leaf properties of these clones and use them in feeding trials at the field sites this summer.

Comparisons of levels of damage inflicted by herbivorous insects on *Eucalyptus obliqua* L'Herit. in forest and pasture environments near Mt Torrens, South Australia

David Peak-Jones
Department of Zoology, University of Adelaide,
G.P.O. Box 498, Adelaide, 5001

This was an Honours project conducted between March and November, 1984. The study 1) compared levels of damage due to leaf-chewing insects in forest and pasture environments, 2) examined the distribution of damage by insects with respect to height and radial position in the canopies of individual trees, 3) examined variation in the levels of damage between trees and 4) examined the location of damage on individual leaves.

Samples of leaves were taken from four trees in pasture and four in forest, at a single site near Mt Torrens in the Mt Lofty Ranges, South Australia, during June 1984. The sampling scheme was stratified to allow examination of variation due to height, radial position and aspect. For each leaf I measured the proportion of potential leaf area missing (PROP) and the number of "damage events" (indentations) in the distal and basal halves of the leaf (D_1 and D_2). Means of these values were calculated for samples of 30-50 leaves and used in statistical analysis.

The number of damage events was significantly greater for forest than for pasture trees, but the proportions of leaf area missing were not significantly different between the two situations. Both indices of damage differed significantly between trees and varied with height in the canopy. Only the number of damage events varied with radial position. Neither index of damage varied with aspect. Damage events were concentrated toward the tips of leaves, but less so in the forest than in the pasture trees.

Problems in the study included failure to control leaf age distributions in samples, and possible bias introduced by abscission of leaves, which was not measured.

The general conclusion is that trees in the pasture at Mt Torrens did not show evidence of being more heavily damaged by grazing insects than trees in the adjacent forest. Areas such as New England may represent very different systems to which the conclusions of this study are not directly applicable.

Insect grazing on jarrah leaves, with particular reference to jarrah leaf miner

Ian Abbott
Institute of Forest Research, Hayman Road, Como 6152 W.A.

This project was begun in October 1984 near Manjimup, W.A. The aims are to determine normal levels of insect damage to the leaves of jarrah *Eucalyptus marginata*, whether insect grazing causes premature death of jarrah leaves and which insects have most impact, and when.

Also being investigated is whether leaf age affects grazing, which leaf and stand characteristics inhibit grazing, and whether jarrah leaf miner adversely affects the growth of the incipient ground coppice stage of jarrah.

I hope to be able to determine how much dieback and deterioration of tree crowns in the southern jarrah forest can be ascribed to insects.

The biology of the *Eucalyptus saligna* leafminer (Lepidoptera: Incurvariidae) at Cumberland Forest.

Diane Campbell
Wood Technology and Forest Research Division, Forestry Commission of N.S.W., P.O. Box 100, Beecroft, N.S.W., 2119.

This is an M.Sc. (Agr.) programme commenced 1984. *Eucalyptus saligna* Smith at Cumberland Forest has been attacked by a leafmining moth, *Perthida* (?) sp. (Lepidoptera: Incurvariidae) causing moderate to severe crown damage. Stage one of the project is to determine the life cycle of the insect and its distribution in the forest in relation to geographical factors. Larval and pupal morphology is also being studied. The life cycle is being studied by regular sampling of larval mines from the leaf litter, use of cone traps to determine periods of mine excision from the leaf, then inverted to determine moth emergence, and mine development by foliage sampling using bow and arrow technique. Life history studies are also being carried out in a glasshouse culture to verify field results. The crown height preference, age of leaf preference mating behaviour, oviposition, parasites and predators are to be determined. The second stage of the project is to discover mechanisms of host resistance. Stage three will examine insect mechanisms of detoxifying leaf phenols.

Birds in relation to rural dieback

Hugh A. Ford

Department of Zoology, University of New England, Armidale

This is a continuing study started in 1979. Herbivorous insects have been heavily implicated in the death of eucalypts in rural areas, especially in New England. Various hypotheses have been proposed to explain the apparent increase in damage to trees caused by insects. One hypothesis is that their natural predators, in particular birds, have suffered through land changes brought about by partial clearing of eucalypts and grazing. The overall aim of this study is to assess the role that birds play in controlling the populations of herbivorous insects in healthy woodland.

Specific aims are to:

i) estimate densities of birds in eucalypt woodland
ii) record their foraging behaviour
iii) quantify their food
iv) estimate the energy demand of the bird community and the biomass of insects they consume
v) relate the above estimate to the overall biomass and productivity of insects.

Preliminary results indicate that birds take a significant proportion of insects in woodland that is not suffering from dieback.

In addition to the above aims I plan to assess the effect of clearing, grazing and dieback on bird populations and to propose ways in which requirements for the birds can be accommodated into a regeneration programme for eucalypts on farmland.

Taxonomic studies on Australian leaf-inhabiting fungi.

H.J. Swart,
Botany School, University of Melbourne, Parkville, Vic., 3052

This is a long-term project, in which research students are from time to time involved. At present the emphasis is very much on ascomycetes and coelomycetes parasitising eucalypt leaves. Some coelomycetes new to science are awaiting formal description. A study of Microthyrium-like fungi is almost completed, but some synonymies have to be confirmed from a study of type material. It appears that only two species are involved. One is a parasite with a thin subcuticular mycelium (often overlooked) and with ascocarps often appearing in concentric circles; the other is epiphytic with distinct dark hyphae, forming small colonies which somewhat disfigure the leaf without causing any damage.

Eucalypt-Fungi Interactions

Joanna Tippett
Forests Department of Western Australia, Research Branch,
50 Hayman Road, Como, W.A. 6152.

Eucalyptus spp. vary in their susceptibility to fungal pathogens. The mechanisms of resistance both active and passive, effective against canker organisms are of interest. The pathological anatomy of lesion caused by a range of fungi are being compared in E. wandoo, E. calophylla and E. marginata (in collaboration with David Murray, CSIRO D.F.R. Wembley). A minor study on formation and fate of kino veins in numerous eucalypts is being completed.

Seasonal changes in vulnerability of tissues to invasion by fungi are also being studied. Phenological changes influence pathogensis. Seasonal changes in levels of phloem phenolics and soluble sugars are being monitored in E. marginata (jarrah) as part of the main jarrah dieback programme. Also, although it has been noted that vigorous trees may exhibit greater resistance than suppressed trees this is not always the case.

National Tree Program

Gerry Morvell
Department of Home Affairs and Environment
GPO Box 1252
CANBERRA ACT 2601

The NTP is a program which has the objectives of promoting coordinated action by individuals, Government and the community generally to conserve, regenerate, plant and maintain trees and developing public awareness of the value of trees.

In 1984/85 the Commonwealth allocated $520,000 for demonstration projects, a national information program and support of government and non-government committees in each State/Territory.

Information materials currently available include:

- Papers from a Workshop on the Benefits of Trees on Farms: an Environmental Perspective.
- Tree decline information sheet
- Paper on priorities for tree establishment: Areas of high tree loss, salinity and soil erosion.
- National Tree Program Reporter - reprint of selected entries in the NTP Journalism Award.
- Farm Tree case study: Fassifern Valley
- Natures Boarding House poster
- Desert Oak poster.

Assessment of Weedicides to promote Broadscale Revegetation by Direct Seeding

Stephen McMurray/Julianne Venning
Conservation Projects Branch, Department of Environment and Planning, Box 667, GPO. Adelaide 5001.

The project is part of the Department's research programme to develop broadscale revegetation techniques and will run for six months to May, 1985. It aims to assess a range of selective post-emergent herbicides for use with native plant seedlings established from seed on site.

Experiments run by the Department have shown clearly that weed competition significantly hampers revegetation efforts using direct seeding. Recently released selective herbicides (e.g. Fusillade (R)) hold much promise for containing the weed problem. However, though tested for use with crops and pastures prior to their release, they are rarely tested for use with native plants.

The identification of a suitable herbicide for use with native plants would enhance the survival of seedlings established on site using traditional farm practices and thereby facilitate broadscale farm revegetation.

Pot trials have been established using fourteen tree and shrub species for testing with post-emergent herbicides.

A Farm Tree Regeneration Project - "Koolewong", Borenore, NSW

Chris Pratten
The National Trust of Australia (New South Wales), Observatory Hill, Sydney.

"Koolewong" is an 1150 ha beef cattle property situated on the western fall of the New South Wales Central Tablelands. The original woodlands covering the property were cleared approximately 100 years ago. 80 ha of a sedimentary ridge containing remnants of the original flora were withdrawn from grazing 25 years ago, allowing extensive natural regeneration. Other Australian plants, especially from central-western New South Wales, have been established, and are themselves regenerating from seed. About 40 species of Eucalypt, both within the regeneration area and on other sites on the property, have been scored for leaf defoliation by insects and larvae. Some interesting site differences within property, and between districts, have resulted: eg Eucalyptus punctata has been repeatedly defoliated and killed in a paddock situation, whilst other individuals planted at the same time within the regeneration area flourish. Eucalyptus nova-anglia, on the other hand, is relatively little defoliated in a paddock situation. The results of the work carried out support the hypothesis that, in areas subject to Rural Dieback, some promising regeneration may be achieved by careful site selection, retaining a relatively large area ungrazed, and encouraging herb and shrub species assisted by introductory plantings if necessary.

Establishing Streamside Vegetation in Victoria

John Tilleard
Ian Drummond and Associates Pty. Ltd.
P.O. Box 165, WANGARATTA, VIC 3677

Ovens and King River Trust
Kiewa River Improvement Trust
Fifteen Mile Creek Improvement Trust
Black Dog Creek Improvement Trust
Seymour Shire River Improvement Trust

This is not primarily a research project although various experimental plots will be progressively established.

As part of normal works programmes supplemented by other funding sources where available, these River Trusts are attempting to re-establish verges of indigenous streamside vegetation. Seed is collected locally and tube stock is produced in small nurseries. Some direct seeding has also been tried and further trials are planned.

Species currently under trial include : Eucalyptus camaldulensis, E. camphora, E. viminalis, E. melliodora and E. microcarpa; Acacia melanoxylon, A. mearnsi and A. pravissima; Callistemon palludosus; Melelunca ericifolia; Leptospermum phylicoides, L. obavatum and L. lanigernum.

Trials are intended to investigate the effectiveness of various planting methods, mulching methods, fertiliser, watering and guards, and species selection, and the effectiveness of verges of native vegetation as an erosion prevention measure.

Selection of tree species suitable for replanting in farmland

John Bartle
Research Station, Forests Department, Dwellingup
Western Australia, 6213

The phenomenon of rural tree decline may indicate that agricultural development has so altered the native environment that native species cannot be presumed to be the most appropriate for replanting. In addition, some of the objectives of replanting may not be attainable with native species. This project addresses these problems by screening a wide range of eucalypts for their replanting potential. The specific aim is to identify species able to prevent or ameliorate salinity in the low rainfall (< 900 mm p.a.) zone of Western Australian water supply catchments.
An arboretum of some 80 Eucalyptus species was established in 1979 in 15 year old pasture land. The area previously carried wandoo forest on the lower slopes merging into jarrah on mid slopes. It had been extensively degraded by salinity. The arboretum area receives 750 mm rainfall p.a., is at latitude 35°5', longitude 116°28' and elevation 275 m. Plots are square and 0.5 ha in area to minimize edge effects. Up to 4 seed lots of major species have been included, giving 130 plots in all. The site is equipped with a borefield from which seasonal and long term fluctuation in groundwater levels for any plot can be inferred.

Evaluation to date has consisted of biennial aerial photography to monitor crown development. The first measurements of height and trunk diameter are currently underway. During 1985, intensive measurement of leaf conductance, leaf water potential, leaf area, and soil water of some 20 to 30 species is planned. This latter work will be done in conjunction with the W. A. Public Works Department and is supported by a research grant from the Australian Water Resources Council

Regeneration of Native Trees on New England Pasturelands

Andrew Burgess and Meg Lowman
"Ruby Hills"
Walcha NSW

We are monitoring the growth and mortality of a number of native tree and shrub species on our Walcha pasturelands, as part of the New England Dieback Committee's tableland regeneration experimental scheme. In one plot , we are testing the following factors that may affect tree growth and survival: water; density of planting; insects (exclusion with insecticide); and species. In a second experiment, we are testing other factors: mulching (with manure); herbicide (to exclude weeds around the trees); and once again, species. The trees are being measured regularly for height growth, number of apical meristems that are active, and defoliation. It is hoped that this practical information may assist in other longterm regeneration plans for landowners in the New England region.

Project STAG (Soil, tree and grass)

David Cameron, David Charles-Edwards and Roy Prebble
Division of Forest Research, CSIRO Cunningham Laboratory,
306 Carmody Road, St. Lucia, Qld. 4067

This is a joint research project of the CSIRO Divisions of Forest Research, Tropical Crops and Pastures, Soils and Mathematics and Statistics with the active participation of research groups from the Universities of Queensland and Griffith. In November 1983, Eucalyptus grandis and Leucaena leucocephala were planted into a pasture using a Nelder design giving stockings varying from about 60 to 3,000 trees per hectare. An improved understanding of tree/pasture interactions is aimed at through regular measurements of tree and pasture growth and biomass. Soil depth, chemical and physical properties have been measured and soil water monitored regularly using neutron probes. It is planned to investigate the nutrient content, water potential and photosynthetic behaviour of leaves. From these studies it is hoped to assess water consumption by trees at different stockings and to examine the relationships between photosynthesis and foliar nutrition.

Regenerate 40 hectares of dry monsoon rainforest

George Brown
G P O Box 4341, DARWIN, N.T., 5794

This is a project jointly funded by Darwin City Council and the Community Employment Programme (C.E.P.) which seeks to increase the area of dry monsoon forest on a major recreation reserve for the purposes of increasing the habitat for the animal (mainly wallaby) and bird populations. At the same time, the completion of the project will improve the recreation ammenity for the public.

It is considered impracticable, in terms of time, to simply fence the area and then to wait on nature.
The total area will be deep-ripped to a depth of one metre in two directions and 4,000 trees planted at random but spaced approximately ten metres apart. The establishment tree species will be the dominant canopy species natural to the reserve: Acacia aurricularformis, Ficus virens, Peltophorum pterocarpum, Alstonia actinophylla. Seed of lower storey species will be collected from the existing forest and sown directly into the ripped ground. It is reasoned that perching birds will introduce foreign as well as forest species by way of voided seed. Species foreign to the forest will be eliminated. Herbs and aroids will be introduced when their survival is assured. The area will be fenced and fire-protected until established. It is not intended that dry-season watering will be carried out but provision has been made for it should it prove to be necessary. Records will be kept of species introduced artificaially and naturally and comparisons made between the existing and regenerated areas.

Victorian Farmers & Graziers Association

HOW TO FORM A FARM TREES GROUP

1. Call a meeting of your VFGA Branch.

2. Discuss the use of trees on farms and local needs for information, funding, servicing etc.

3. If there is sufficient interest (say 6 or 8 people who are really keen) you have the basis of a Farm Trees Group.

4. Contact your municipality and ask that they will support a Farm Trees Group, perhaps together with other nearby municipalities.

5. Call your most interested Government people: For instance, Department of Forests, Agriculture, Soil, Water, Wildlife or Planning, to see that an officer is willing to be involved.

6. Call a public meeting so that interested people other than only VFGA members can be involved. Have a guest speaker who can explain the benefits of the Farm Trees Groups and the method of formation and operation to address the meeting. Organise a good Chairman.

   Your Guest Speaker could be the Executive Officer, Farm Trees Program, a VFGA Field Officer or a member of another Farm Trees Group.

7. Appoint a Committee to steer the group. The positions usually appointed are Chairman, Vice Chairman (in case the Chairman is away), Secretary (who is prepared to take minutes of meetings in an infromal way). Either the Secretary or a Government or Municipal appointee may assist greatly with the administrative work which would not normally be done by farmers. A Committee of about six is advised.

   There is no need to have a formal constitution but two or three short sentences describing the objectives of the group would be worthwhile.

   Activities usually carried out by a Farm Trees Group are the organisation of discussion days, farm walks and seminars, the assessment of priorities in the area for tree re-instatement. The main objective should of course be to get trees back on farms, in preference to putting trees back on public land, although any project can include both.

   It is a good idea to appoint a VFGA member to report regularly to the local District Commodity Council on the activities of the Farm Trees Group, in order to keep motivation high amongst VFGA members who are not in the Farm Trees Group.

8. Set the date of the next meeting, which may include an activity.

Advance Agriculture.

9. Put on the Agenda the assessment for priorities for your group. This usually includes mapping the area of highest priority for tree re-instatement, and you can usually be assisted by a Government or Municipal Officer.

10. Decide on individual projects which can be combined to form a large project over a number of years. This could be the subject of a community employment program application, as this is the main means of considerable sized funding through the Federal Government. It is not necessary to tackle a lot in the initial stages. You may be content with a Field Day for a start, to see how things go.

11. Send a copy of your minutes to the:

    Executive Officer,
    Farm Trees Program,
    24-28 Collins Street,
    Melbourne 3000

    Ph.: (03) 63 9261

    and one to each of the other Farm Trees Groups.

12. Seek local or regional sponsorship.

Please do not hesitate to be in touch if you have any problems. The above points are derived from the successes of Farm Trees Groups which have already formed, but it is recognised that every group is different from another.

The last think that remains it to wish you success at Greening Australia in Victoria the Garden State.

Ed Adamson,
Executive Officer,
FARM TREES PROGRAM.

Farrer House, 24-28 Collins Street, Melbourne, 3000. Telephone: (03) 63 9261. Telex: AA37226.

These were all the formal contributions but several people included comments of general interest in their letters :

P.Bulman, Manager, Murray Bridge Native Plant Propogation Centre, Box 752 Murray Bridge SA 5253

has been undertaking developmental work with another 'direct seeding machine' and investigating uses of herbicides in native species, He is also active in farm extension activies.

David Debenham, 'Lara', Ten Mile Road, Tarwin Lower, Vic 3956

is developing economic techniques for direct seeding of native trees. This has involved the formation of a group of Western Victorian landholders into a syndicate, 'The Western Tree Sowing Syndicate' (Chairman is Richard Weatherly of Mortlake), who have built a prototype machine to cultivate a strip, sow seed and roll the strip. Several trials areas have been sown and experiments with different techniques are continuing. Many native species respond well to seedcoating with microfine balanced nutrient powders. David also commented that they have been able to eradicate insect damage in seedling E. camaldulensis and in mature E. obliqua trees by balanced foliar nutrition. Extreme symptoms of dieback in a mature E. obliqua suffering severe stresses have been reversed by this method. This effect has not diminished though only a single application of nutrients was made 8 years ago. Further, an adjoining Messmate which was untreated has continued to decline over the period. Despite interlocking branches, the untreated tree is decimated by insects and the treated tree remains unaffected by insects.

Brian Roberts, Dean : School of Applied Science, Darling Downs Institute of Advanced Education, Toowoomba, QLD 4350

sent a copy of a paper he gave at the 'Soil Degradation Conference' held at the Australian National University on November 25th,1984. The paper is titled 'Land Ethics - A Necessary Addition To Australian Values'. The paper is 18 pages long, so a summary would hardly do it justice. Suffice to say that the author develops a detailed discussion of the way in which Australian attitudes to the land have shaped the problems of soil degradation which we now face. I'll send copies of the paper to people who request them.

R.J.Manderson, Sub District Forester, PO Box 582, Mackay, Q 4740

has received several inquiries regarding dieback from local rural landholders . During the dry season of 1983/4 these were particularly concerned with dieback in Casuarina cunninghamiana along creeks and Eucalyptus tessellaris on flats and ridges.

P.J.McNamara, Acting Conservator of Forests, Forests Department, PO Box 104, Como, WA 6152

mentioned that a survey on tree decline was done in the wheatbelt area in 1982, but that this has not yet been officially released (something for the 1986 issue). Other work has included investigations into specific amounts of weedicides used in areas where native trees are affected by decline, and the consequent levels of toxins in plant tissue.

These are the people who received copies of the initial circular letter. Their responses, as at the 31st of January 1985, are indicated by the initials in brackets thus :

R C - Reply and contribution received
R - Reply received (no contribution)
NR - No reply received

I.J. Abbott, COMO, WA 6152. (R C)
R. Adamson, MELBOURNE,VIC 3000. (R C)
J. Banks, CANBERRA, ACT 2601. (R)
J.R. Bartle, COMO, WA 6152. (R C)
H. Bayly-Stark, SANDY BAY, TAS 7005. (R)
D.J. Bevege, Beecroft, NSW 2119. (R)
J. Borough, CANBERRA, ACT 2600. (R)
R.A. Boyd, ARMIDALE, NSW 2351. (NR)
J. Brown, DARWIN, NT 5794. (R C)
P. Bulman, PENOLA, SA 5277. (R C)
R. Bungey, ADELAIDE SA 5000. (NR)
M.W. Burns, MUSWELLBROOK, NSW 2333. (NR)
D.M. Cameron, SAMFORD, QLD 4520. (R C)
A.J. Campbell, ARMIDALE, NSW 2350. (NR)
D. Campbell, BEECROFT, NSW 2119. (R C)
P. Chambers, MELBOURNE, VIC. (NR)
R.V. Clark, BEECROFT, NSW 2119. (NR)
C. Clifton, PARKVILLE, VIC 2357. (R C)
G. Corman, OSBORNE PARK, WA 6017. (NR)
R. Coventry, TARAGO, NSW 2580. (NR)
W.J.B. Crane, CANBERRA CITY ACT 2601. (R)
S. Crombie, ARMIDALE, NSW 2357. (R C)
S.J. Curry, SOUTH PERTH, WA 6157. (NR)
R.L. Davidson, ARMIDALE, NSW 2357. (NR)
E. Davison, MURDOCH, WA 6150. (R C)
G. Davis, WINNELLIE, NT 5789. (R C)
J. de Salis, OSBORNE PARK WA 6017. (R)
D. Debenham, TARWIN LOWER, VIC 3956. (R C)
G.W. Douglas, SPRINGVALE, VIC 3171. (NR)
J.A. Duggin, ARMIDALE, NSW 2351. (NR)
M. Eldridge, BEECROFT NSW 2119. (NR)
R. Elliot, HOBART TAS 7001. (NR)
[illegible], ARMIDALE, NSW 2351. (NR)
J.D. Farr, GLEN OSMOND, SA 5064. (NR)
R. Farrow, CANBERRA CITY, ACT 2601. (NR)
A. Fearnside, CANBERRA, ACT 2601. (NR)
A. Flint, IVANHOE, VIC 3079. (NR)
H. Ford, ARMIDALE NSW 2350. (R C)
J.R.J. French, HIGHETT VIC 3190. (NR)
J. Fryer, WESTON, ACT 2611. (NR)
M. Gallen, WINNELLIE, NT 5789. (R)
T. Geard, HOBART, TAS 7001. (NR)
P.J. Greig, MELBOURNE, VIC 3000. (R)
R.H. Groves, CANBERRA ACT 2601. (NR)
R. Haney, FINGAL, TAS 7214. (R)
B.R. Hardy, SEACLIFF SA 5049. (R)
H. Harrison, RAYWOOD, VIC 3570. (NR)
A. Hart, COMO, WA 6152. (NR)
A. Holmes, WANGARATTA, VIC 3677. (NR)
A. Irving, NANANGO, QLD 4351. (NR)
F.M. Irving, WOODSIDE, VIC 3874. (NR)
R. Jamieson, DARLINGTON, VIC 3171. (NR)
P.J.M. Johnston, BRISBANE, Q 4000. (R)
P.J. Keane, BUNDOORA, VIC 3083. (NR)
G. Kile, HOBART TAS 7000. (R)
P. Kimber, PERTH, WA 6000. (R)
P.A. Langley, MELBOURNE, VIC 3000. (NR)
B. Lay, ADELAIDE SA 5000. (NR)
P.R. Lind, BEECROFT, NSW 2119. (NR)
J.A. Lothian, ADELAIDE, SA 5001. (R)
M. Lowman, ARMIDALE, NSW 2351. (R C)
R. Loyn, SHERBROOKE, VIC 3789. (NR)
S.M. Mackay, BEECROFT, NSW 2119. (NR)
C. Malcolm, SOUTH PERTH, WA 6151. (NR)
R. Manderson, MACKAY, QLD 4740. (R C)
G.C. Marks, MELBOURNE, VIC 3000. (NR)
Z. Mazanec, WEMBLEY, WA 6014. (NR)
S.K. McMurray, HOBART, TAS. (NR)
P.J. McNamara, COMO, WA 6152. (R C)
W.G.D. Middleton, HORSHAM, VIC 3400. (NR)
J. Morris, MELBOURNE, VIC 3001. (R C)
G. Morvell, CANBERRA CITY, ACT 2601. (R C)
C. Nadolny, ARMIDALE, NSW 2357. (NR)
F.G. Neumann, SHERBROOKE, VIC 3789. (NR)
D.W. Nicholson, BEECROFT, NSW 2119. (NR)
C.P. Ohmart, CANBERRA, ACT 2602. (R)
K.M. Old, CANBERRA, ACT 2602. (NR)
A.J. Page, GOULBOURN, NSW 2580. (NR)
L. Paijmans, THARWA, ACT 2620. (NR)
C. Palzer, HOBART, TAS 7001. (NR)
R.F. Park, BUNDOORA, VIC 3083. (NR)
N. Parker, SOUTH LAUNCESTON, TAS 7250. (NR)
D. Peake-Jones, ADELAIDE SA 5001. (R C)
M.A. Picard, ADELAIDE, 5000. (R)
F.D. Podger, HOBART, TAS 7000. (R)
E.W. Pook, CANBERRA CITY, ACT 2601. (R)
C.H. Pratten, SYDNEY, NSW 2000. (R C)
V.W. Read, NEDLANDS WA 6009. (R)
B.N. Richards, ARMIDALE, NSW 2351. (NR)
R.J. Roberts, CANBERRA CITY, ACT 2601. (NR)
B.R. Roberts, TOOWOOMBA, QLD 4350. (R C)
A.D. Sands, QUIRINDI, NSW 2343. (R)
N.L. Sawtell, ARMIDALE, NSW 2350. (NR)
R. Scott, ST KILDA, VIC 3182. (NR)
J.A. Simpson, BEECROFT NSW 2119. (R)
T. Stadler, DYNNRNE, TAS 7005. (R)
H.J. Swart, PARKVILLE, VIC 3052. (R C)
P. Taylor, ADELAIDE SA 5000. (NR)
J.F. Taylor, HARDEN, NSW 2587. (R)
A. Thatcher, MELBOURNE, VIC 3000. (R)
I. Thomas, BRIGHTON, VIC 3186. (NR)
L. Thomson, PARKVILLE, VIC 3052. (NR)
J.W. Tilleard, WANGARATTA, VIC 3677. (R C)
J. Tippett, COMO, WA 6152. (R C)
A. Turner, SYDNEY, NSW 2001. (NR)
F. Van de Sommen, ROSEWORTHY SA 5731. (NR)
J. Venning, ADELAIDE, SA 5001. (R C)
J. Waayers, YARRAM, VIC 3971. (NR)
J. Walker, CANBERRA ACT 2601. (R C)
G. Wallace, BALARAT, VIC 3350. (NR)
R. Weatherly, MORTLAKE, VIC 3272. (NR)
K.F. Wells, CANBERRA ACT 2601. (R)
T.C.R. White, WAGGA WAGGA NSW 2650. (R)
J.B. Williams, ARMIDALE, NSW 2351. (NR)
O.B. Williams, CANBERRA ACT 2601. (NR)
N. Wood, CANBERRA ACT 2601. (NR)
F.R. Wylie, INDOOROOPILLY, QLD 4068. (R)
R. Youl, MELBOURNE, VIC 3001. (R)