

REVEGETATION

TREE PLANTING IN WESTERN AUSTRALIA: ENHANCING THE OPPORTUNITIES FOR CONSERVATION OF BIODIVERSITY

Jonathan Majer and Harry Recher



A planted area of mixed, local eucalypt species – a combination that should guarantee the food resource for insectivorous birds.



Rebecca Graham tools up to sample the canopy invertebrates on trees along the Great Eastern Highway.

MOST of the natural vegetation in the Western Australian wheatbelt has been cleared for agriculture. Throughout the wheatbelt, native trees remain only in isolated, often small, and frequently degraded remnants of native vegetation, as single trees in paddocks, and in narrow, discontinuous strips along roads and drainage lines. Now, there are extensive revegetation programs in the wheatbelt. Revegetation has many objectives, including lowering water tables to combat waterlogging and soil salinisation, improving agricultural productivity, and producing a commercial crop of trees for harvesting. Tree planting is also carried out by farmers, conservation groups and government authorities to rehabilitate, beautify and manage degraded agricultural land, parks and road verges. In addition to improving plant diversity and restoring ecosystem functions, revegetation is an opportunity to provide food and habitat for wildlife and to conserve regional biodiversity. In 1999, the

Gordon Reid Foundation made a grant to the Northam Land Conservation District Committee (LCDC) to investigate how effective the trees planted in the Northam District were in supporting invertebrates, an important food resource of insectivorous birds and the most important part of biodiversity. The Northam LCDC contracted the project to Jonathan Majer (Curtin University of Technology) and Harry Recher (Edith Cowan University).

The objective of the study was to investigate whether the tree species planted in the wheatbelt are being colonised by insects and spiders and whether the abundance and variety of invertebrates on planted trees differs between tree species and between revegetation and remnant native vegetation. The study also investigated the use of revegetation by birds and compared this to bird communities in remnant vegetation. Invertebrates were sampled on trees planted along the Great Eastern Highway as part of the Main Roads

Department 'Ribbons of Green' program, as well as trees planted by community groups and Greening Australia W.A. The question asked was whether the best species of trees were being planted to restore and enhance regional biodiversity.

A team, led by Rebecca Graham, was assembled to sample the invertebrates, and Alexander Watson designed and carried out the bird surveys. The canopy invertebrate fauna of 10 trees of each of eight species of Eucalyptus and jam wattle (*Acacia acuminata*) was sampled by chemical knockdown. Jam wattle and three of the eucalypts, including wandoo (*E. wandoo*), were indigenous to the Northam District. Three of the eucalypts were indigenous to the south coast of Western Australia, one to northwestern Western Australia, and the eighth was indigenous to coastal South Australia. Wandoo was sampled in both revegetation and remnant natural vegetation. In addition to sampling invertebrates, leaf toughness and levels of foliar

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nutrients (NPK) were measured for all tree species. Leaf toughness and foliar nutrients were measured as other studies had found relationships between toughness and nutrients, with the abundance and variety of canopy invertebrates.

Moderate to high invertebrate densities were found on all tree species. Indigenous trees tended to support the most diverse and abundant invertebrate faunas: species originating from southern coastal regions and northwestern Western Australia supported the least. Wandoo trees in revegetation tended to have higher populations of some insects than wandoo growing in remnant vegetation. Leaf toughness appeared to affect the size of invertebrate populations on some eucalypt species, but the effects of foliar nutrients were inconsistent, possibly because nutrient levels were elevated as a result of fertiliser applications.

During winter (June), three patches of remnant vegetation and seven replanted areas were surveyed for birds. Twenty-five species of birds were recorded of which three were found only in remnant vegetation and six were found only on the replanted areas. However, all species recorded are widely distributed throughout the Western Australian wheatbelt and, with the possible exception of the White-browed Babbler (*Pomatostomus super-cilosus*), no significance can be attributed to the differences in bird species composition between remnant and replanted areas: at least in winter, birds are as likely to use revegetated areas as remnant vegetation. The absence of the babbler from revegetated areas is possibly due to the lack of logs and woody debris on the planted sites. Sixteen of the 25 bird species are predominantly insectivorous, four are nectar feeders, four are seed-eaters, and one is a frugivore, which feeds mainly on mistletoe fruits. This suggests that a similar range of foraging resources are available in both remnant vegetation and revegetation.

To restore and enhance regional biodiversity, the study team recommended that revegetation

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programs, including commercial plantings, should use a variety of tree species and emphasise regional species. Where this is not possible, species from nearby regions should be used. Planted areas should also be diversified by using a variety of indigenous shrubs and herbs as well as trees, and by adding logs and coarse woody debris to the area planted. Provision of nest boxes would accelerate the colonization of revegetated areas by hole-nesting birds.

The full report of this study can be

read in the following publication:

Majer, J. D., Recher, H. F., Graham, R. and Watson, A. (2001). The potential of revegetation programs to encourage invertebrates and insectivorous birds. Curtin University of Technology School of Environmental Biology Bulletin No. 20. 32pp.

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STOP PRESS - LANDCARE AWARDS!



Congratulations Jenny!

Jenny Dewing, *Land for Wildlife* Officer at Bridgetown, was 'runner-up' in the inaugural Soil and Land Conservation Council 'Landcare Professional Award'.

The Minister for the Environment, Dr. Judy Edwards, presented her with a certificate at the State Landcare Conference Gala Dinner in Mandurah on 13th Sept. 2001.

Jenny is an outstanding officer, but then, so are all the rest of the *LFW* team of highly professional people - and we are all delighted that she was adjudged so highly.

We won! 'Western Wildlife' wins WA section of the Sigma Landcare Media Award!



Ben Toric, Organiser, Landcare Awards; Penny Hussey, Editor, 'Western Wildlife'; Elmo de Alwiss, Managing Director, Sigma Pharmaceuticals.

We received a certificate, a cheque for \$500 and a trophy - a beautiful glass artwork, made by Suzi Rowley of Trengarrin Stained Glass in Narrogin. It's very appropriate that the sponsor should be a Pharmaceutical company, since WA is a world hot-spot of biodiversity - with who knows what pharmaceutical uses? More about the sponsors next issue.

Now for the national competition at the National Landcare Conference in Canberra next March - wish us luck!