



*fostering research into
the biology and cultivation
of the Australian flora*

Newsletter

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Website

The Foundation's website is now well established and can be accessed at www.aff.org.au

The site contains a wealth of information. If you would like to find out about current happenings, grants recently awarded, research reports, how to apply for grants, how to sponsor research projects or how to make tax deductible donations, then you can look it up here. Since his 'retirement', Peter Goodwin has spent a great deal of time developing and updating the site, and thanks to Peter's dedication and expertise it is full of relevant material, is easy to navigate and is well worth a visit.

Bill Payne

The Australian Flora Foundation has lost one of its stalwarts in Bill Payne, who passed away in November 2005. Bill was a foundation member of the Foundation, and remained a member of Council until the time of his death.

Bill was born in 1926 in what was then the outlying, 'railway support' suburb of Enfield, 10 km west of Sydney's centre. In his teenage years he took up an electrical apprenticeship at Clyde Engineering, a company which was a major supplier to the New South Wales railway network. He went on to complete a TAFE Diploma in Electrical Engineering, and used his qualifications to obtain a position with Sydney County Council, the main electricity distributor. He rose to become engineer in charge of substations for the Western Sydney area.

Bill became passionately involved in the promotion of native Australian plants, at a time when they were little known and unfashionable. Nowadays of course much more information is readily available about them, and many species of natives are regarded as extremely desirable by the current generation of landscapers and gardeners. Selections of native plants at nurseries are now much more comprehensive. As editor of the journal "Australian Plants" for 43 years Bill contributed enormously to the vastly enlarged information bank, and to the favourable change in perception by the public towards native plants. He retained his burning passion for Australia's flora to the end.

'Bill attended inaugural meetings of the Society for Growing Australian Plants in Melbourne and Sydney and in October 1957 founded with others the East Hills District Group, of which he remained a member continuously from its inception. He became editor of the Federal body's Journal in September 1959 and produced the first edition of Australian Plants in December of that year. He was also for one year President of the Society in New South Wales (1976-77) and was made a Life Member in March 1972, nominated by his friend of many years Noel Gane, a co-worker with similar interests. He received the Australian Plants Award in the Amateur Category in 1993.' Quoted from the tribute by Peter Olde.

Of particular significance to the development of the Australian Flora Foundation, he also was committed to promoting research on Australian plants, and with other like minded lay people, nursery industry members, and professional scientists, formed the Australian Flora Foundation on August 14, 1981. He was a foundation Vice President of the Council, and served on the Council continuously from 1981 to 2005.

Bill was very effective in obtaining financial support for the work of the Foundation from regions and groups of the Society for Growing Australian Plants/Australian Plants Society, funding which was critical to the Foundation fulfilling its mission. He was also a great provider of fundraising ideas at meetings of the Council of the Foundation, as well as promoting research in areas which he felt needed more work, or which he thought would attract research funding. Bill will be greatly missed by his colleagues.

Meet the Councillors

In this issue we again feature a member of Council

Dr David Murray

David Murray has been a Councillor of the Australian Flora Foundation since 1986. With a background in plant sciences and microbiology, David's special interests lie in legumes, iris, and the impact of elevated concentrations of carbon dioxide on plant composition. David has edited or written ten books.

David is currently President of the Linnean Society of NSW, having served on the Executive of the Linnean Society since 1992. He was a member of the Executive of the Nature Conservation Council of NSW for 13 years (1993-2005) and during that time was an NCC representative on bodies such as the Noxious Weeds Advisory Committee (1993-2003) and the first Biodiversity Advisory Council (1996-1999).

Since 2000 David has been the representative of the Australian Plants Society NSW on the Australian Cultivar Registration Authority. He is President of the Iris Society of Australia (NSW Region), a Life Member of the Australian Conservation Foundation, and Scientific Adviser on Plants to the Wildlife Preservation Society of Australia.

Summaries of Final Reports

Each year the Australian Flora Foundation funds a number of grants for research into the biology and cultivation of the Australian flora. While the grants are not usually large, they are often vital

in enabling such projects to be undertaken. Many of the projects are conducted by honours or postgraduate students, hopefully stimulating their interest in research into the flora. This work is only made possible by the generous support of donors and benefactors.

Presented here are brief summaries of two completed projects. Full reports of these and other projects are available for viewing on the Foundation's website www.aff.org.au

Hybridisation in three sympatric *Persoonia* species: *P. chamaepitys*, *P. myrtilloides* and *P. levis*

Chris Nancarrow

Institute for Conservation Biology and Law, University of Wollongong.

Although hybridisation is commonly used to develop plants more suited for commercial use, we have little understanding of hybridisation in nature. The genus *Persoonia* contains a number of species which appear to have evolved in the same location (sympatric speciation), and which produce intermediates which may be hybrids. The species provide good material to examine the processes of natural hybridisation. The three *Persoonia* species chosen for study were *P. chamaepitys*, *P. myrtilloides* and *P. levis* all of which occur in the Blue Mountains region in eastern Australia (100 km west of Sydney). *Persoonia chamaepitys* is not known to hybridise in the wild, whereas *P. levis* and *P. myrtilloides* both appear to generate hybrids when in sympatry with other *Persoonia* species.

This project was a study to examine two questions: (i) Can putative hybrids be identified in the field, based on vegetative and floral characteristics? (ii) What is the potential for interspecific pollination to produce fruits and therefore hybrid offspring?

It was found that there appears to be considerable potential for hybridisation between *Persoonia myrtilloides* and *P. levis* in areas of the Blue Mountains where these species co-occur. In some sites, there are adult plants with morphological characteristics that are intermediate between plants of either species in pure stands. Leaf characters, especially leaf length, provided the greatest discrimination. Hand pollination studies confirmed that plants in these two *Persoonia* species are self-incompatible and therefore require pollinators to transfer pollen between plants. The potential for gene exchange between these two species in creating a hybrid zone appears to be asymmetrical. There was a greater likelihood of pollination and fertilisation being successful with *P. levis* as mothers than *P. myrtilloides*.

Modelling interactions of fire and rainforest

John Crockett, Brendan Mackey and Julian Ash

School of Botany and Zoology, Australian National University

This project was undertaken to examine the potential importance of fire in governing the relative distribution of rainforest and sclerophyll forest, and the width and position of the boundary between them. Rainforest patches in south coastal N.S.W. were studied. The aim of the project was to use a general fire model to examine the factors important to suppressing fire in rainforest, that is to determine the effect of rainforest vegetation on certain key variables important to determining fire behaviour. Microclimates in the rainforest, sclerophyll forest and the boundary between were characterised and compared. It was shown that there are consistent differences in the microclimates of the vegetation types studied: the microclimate of the rainforest is more buffered from extremes in external conditions than sclerophyll forest or the boundary vegetation.

A litter moisture model was developed and used to examine the effect of altered microclimatic conditions and canopy cover on fuel drying in the different vegetation types. Modelling litter moisture shows that microclimatic conditions in the rainforest cause leaf litter to retain moisture for longer than litter in the other vegetation types. Work also focused on determining the possible effects of live rainforest and boundary vegetation on fire suppression. A leaf flammability experiment was conducted to test the ignitability of leaves from rainforest and sclerophyll species in a muffle furnace. An experimental burn was conducted to test the effect vines, common to rainforest boundaries, have on the forward progress of a fire burning through sclerophyll forest. Vegetation surveys were conducted at the line of extinguishment of past fires to examine if there were differences in the structure of the understorey vegetation between rainforest, rainforest boundaries and sclerophyll forest that may influence where fires of different intensities go out. This surveying and experimentation showed that differences in the nature of the live vegetation between rainforest, boundaries and sclerophyll forest directly contribute to the flammability of the vegetation.

By examining what suppresses fire in rainforest, and using the fire model to examine when rainforest is likely to burn, it is possible to gain insights into the importance of fire in determining the relative distribution of rainforest and sclerophyll forest in temperate areas, and in governing the position and width of rainforest boundaries. It was found that rainforest and rainforest boundaries will burn when litter moisture is very low, however, the flammability of rainforest and rainforest boundaries remains well below those of sclerophyll forest even during extreme fire weather and fuel dryness conditions. It is concluded that increasing the frequency of fire may impact upon rainforest distribution or the nature of the boundary. The techniques used in the study may be used for the control or prevention of fire in disturbed rainforest or in mixed vegetation containing rainforest. Information regarding the suppressive effect of vines may be useful to the identification of fire retardant vegetation for use in minimising damage to property and from bushfires

Endangered plant discovered

By Steve Douglas, PhD Candidate (Australian National University)

A recent ecological survey of degraded remnant woodland at the former Catholic monastery at Galong NSW resulted in the discovery of the endangered plant *Cullen parvum* as confirmed by Dave Mallinson of the National Herbarium. The location, NNW of Yass, is a significant range extension for this species, which was previously unknown from the NSW Southern Tablelands botanical division. *Cullen parvum* is recognised as endangered in NSW, threatened in Victoria and South Australia and was previously listed as endangered under the EPBC Act. (Ed: *Cullen parvum* is a blue-flowering herb from the family Fabaceae.)

The survey was undertaken as part of my research into the potential for identifying and protecting significant ecological values on land owned by religious institutions that have undergone an 'ecological reformation'. The survey was conducted with the assistance of volunteers from the Australian Native Plant Society (Canberra Region) and the Friends of Grasslands. Margaret Ning of FOG discovered the *Cullen* and pursued its identification.

The remnant woodland patch is recognised as an endangered community in NSW and nationally ('box/gum grassy woodland') and was also being used by the threatened Superb Parrot. The remnant is to be protected under a Voluntary Conservation Agreement between the Catholic

Church (Diocese of Canberra & Goulburn) and the NSW Minister for Environment. The former monastery, now a multi-faith retreat centre with an ecological focus, is also being declared a Wildlife Refuge under the National Parks & Wildlife Act. Farming lands on the ~650 acre site are planned to be converted to 'organic' practices along with undergoing replanting to address dryland salinity and other land management issues.

Other ecologically significant properties owned by religious organisations in eastern Australia have been identified and it is hoped that these will be progressively surveyed and protected. Professional and amateur ecologists and field naturalists are encouraged to promote such outcomes by working with local religious groups that are amenable to such projects. I can be contacted (Steve.Douglas@anu.edu.au) to provide connections to and between interested individuals and groups.

New Projects for 2006

The Foundation is sponsoring the following three new projects in 2006:

Dr M. Denton and Dr M. Ryan (UWA): Harnessing native Fabaceae for agriculture - the importance of mycorrhizal fungi. \$6,842 in 2005/06 and \$5,118 in 2006/07.

Dr C. Linde (ANU): Identification of fungal mycorrhizal species associated with increased plant growth of the rare Fabaceae species *Gastrolobium vestitum*. \$12,110

Dr C. Morris (UWS): Do heat and smoke affect the permeability of the *Grevillea* seed coat to large molecular weight compounds? \$14,000

Young Scientist Awards

Two prizes are awarded by the Australian Flora Foundation at each annual meeting of the Ecological Society of Australia, and two at each biennial meeting of the Australian Society of Horticultural Science. At each meeting, one prize is awarded to the under or postgraduate student who gives the best talk, and one to the under or postgraduate student who presents the best poster, provided the Society considers the presentations are of suitable merit.

The Foundation congratulates the following prizewinners for 2005:

Ecological Society of Australia

Predicting changes in seedling recruitment and distribution with a changing climate using a natural gradient and 'space for time' substitution. Talk: Suzanne Venn, La Trobe University.

Effectiveness of rehabilitation treatments on bulldozed fire control lines in the north-east Victorian mountains. Poster: Seraphina Cutler, La Trobe University.

Australian Native Flower Conference

Acquisition and transport of phosphorus in the Australian koala fern *Caustis blakei* (Cyperaceae), a role for specialised dauciform roots. Talk: Cameron Playsted, University of Queensland.

Thanks to donors

The Council of the Australian Flora Foundation would like to sincerely thank the following people or organizations who made recent donations to the Research Fund:

Dr Greg Kirby, Dr T J and Mrs S Wood, Australian Plants Society NSW, E L King, SGAP Mackay Branch, H T Clifford, W Reed, P V Lightfoot, P Esdale, P Urbonas, P Goodwin, P McGee, F and M Watts, A Ashford, A Taji, D. Snape, J Scown, F Gleason, M L Reed, M E Johnston, B Buchanan, Wildflower Society of WA, R Smyth-Kirk, W K O'Brien, G Long, G Unwin, R Daniels, A Wheeler, Australian Plants Society Newcastle Branch, Australian Plants Society South Australia, A Segal.

The Foundation would not be able to carry out its research objectives without the support of donors and benefactors. Donations for research of \$2 and over are tax deductible.

The Council

The Council is the governing body of the Australian Flora Foundation. The current members of the Council are:

Professor Richard Williams (President), Dr Peter Goodwin (Vice-President and Secretary), Dr Margaret Johnston (Treasurer), Dr E Charles Morris (Vice-President), Mr Ian Cox, Dr Elwyn Hegarty (ASGAP representative), Dr Jenny Jobling, Dr David Murray, Dr Robyn McConchie, Mr Ross Smyth-Kirk, Professor Acram Taji.

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