fostering research into the biology and cultivation of the Australian flora

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Meet the Councillors

In this issue we again feature two members of Council

Professor Richard Williams, President

Richard Williams is Professor of Horticulture at the University of Queensland based at the Gatton Campus. He is a graduate (PhD) of the University of Adelaide. He has been involved in research into the native flora since his time as a horticultural scientist with the Queensland DPI working on macadamias.

In 1979 Richard was appointed Senior Scientist to set up and lead the native plants research program at the Black Hill Native Flora Centre in the Adelaide foothills. This research, aimed at cultivation and conservation the flora, continued during his time at the University of New England (NSW) and now at UQ, working within the Centre for Native Floriculture where the emphasis is on developing the horticultural potential of native plants.

Richard has been an active member of the Australian Flora Foundation since its inception, serving on the Board / Council for most of this time and chairing the Scientific Committee. He has been President of the Foundation since 1998.

Dr Peter Goodwin, Vice President and Secretary

Peter Goodwin was born in Sydney and introduced to the bush from an early age, collecting maidenhair fern in bush near his grandparents' house in Bankstown, and going on picnics and bush walks in the national parks around Sydney. Always fascinated by plants, he was keen to try and understand how they worked. After completing a Bachelor of Science in Agriculture at Sydney University, and then a Masters, he went overseas, to Nottingham University, to complete a PhD. The PhD led to postdoctoral positions in Dundee and Canberra, and finally a lecturing

position in the Faculty of Agriculture at Sydney University in 1974, and Reader in Horticulture in 1986. Peter retired in 2001.

Peter began research on native Australian plants in 1981. He carried out work on the fertiliser requirements of a number of species, on the screening of genera for those of ornamental value as cut flowers, flowering pot plants, foliage plants or bedding plants, and on methods for the efficient production of likely species. Disease resistant, compact types of kangaroo paw (*Anigozanthos* spp) were bred, which have gone into commercial production. Superior waratah (*Telopea speciosissima*) clones were identified and registered for Plant Variety Rights. He worked on export technology for *Blandfordia grandiflora* and *Telopea speciosissima* and on the control of flowering in *Anigozanthos*, *Blandfordia* and *Telopea*. Work on the mechanism of seed dormancy in flannel flower *(Actinotus helianthi)* was funded by a grant from the Australian Flora Foundation.

Since retirement Peter has been able to more effectively support the Australian Flora Foundation, and has lead a team including Ian Cox, Bill Payne and the late Val Williams in developing the website for the Foundation. This has enabled the results of the research funded by the Foundation to be readily available to the public.

SeedQuest NSW project is up and running

by Amelia Martyn

SeedQuest NSW is a collaborative project between the NSW Seedbank at Mount Annan Botanic Garden and the Royal Botanic Gardens, Kew (UK). The project is part of a global conservation effort that aims to have 10% of the world's flora held as conservation seed collections by 2010. Through the SeedQuest project, which commenced in 2004, funding has been provided for an extensive state-wide field collecting program over six years. After collection, the wild-sourced seed are dried to a low moisture content, cleaned of debris and stored at -20°C, with collections split between the NSW Seedbank and Millennium Seedbank (UK). The cold, dry conditions preserve seed in a state of 'suspended animation' with minimal metabolic activity and deterioration, to be used tens or even hundreds of years later for research, restoration and other activities.

The SeedQuest NSW project also provides funding for a seed science program to investigate NSW plant groups of importance for conservation and horticulture. The research aims to improve the quality of seed collections to ensure optimal long term storage; determine the best methods to germinate seed by mimicking environmental cues experienced by seed in the field, including breaking dormancy in some species; and estimate how long seeds are likely to survive in storage and in the field.

The Seedquest NSW research team works closely with scientists studying native seed biology in other parts of Australia, as well as with the Millennium Seed Bank team in the UK. Researchers at Mount Annan Botanic Garden also study the seed biology of species in the local Cumberland Plain Woodland and the biology and storage of seed of terrestrial orchids.

For more information, contact Amelia Martyn, Seed Research Officer at Mount Annan Botanic Garden on amelia.martyn@rbgsyd.nsw.gov.au

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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.

Presented here are brief summaries of a selection of completed projects. Full reports of these and other projects are available for viewing on the Foundation's website www.aghort.uq.edu.au/aff/

This work is only made possible by the generous support of donors and benefactors.

The role of the phytohormone auxin in adventitious rhizogenesis in *Grevillea*

Santi Krisantini1, 2, Margaret Johnston 1, Christine Beveridge 2, & Richard Williams 1
1: School of Agriculture and Horticulture, NRAVS, UQ
2: School of Integrative Biology Department of Botany, ComBinE, BACS, UQ.

Grevillea (Proteaceae) is one of the woody Australian native species that have high commercial value in the floriculture market. *Grevillea* spp. vary greatly in their ease of propagation from cuttings, and some *Grevillea* cultivars are generally considered to be difficult-to-root. Efforts to improve propagation success will be essential in the development of these species for commercial production. The objectives in this study were to study the response of *Grevillea* cuttings to auxin application, and to determine whether or not rooting differences between difficult and easy-to-root cultivars can be explained by differences in the endogenous auxin levels, or the capability to take up and transport applied auxin.

GC-MS analysis was used to measure the levels of auxin in the rooting zones. The level of auxin in the endogenous pool was measured by adding 13C-labelled IAA (13C6-IAA) and 13C-labelled IBA (13C6-IBA) as internal standards for quantitative mass-spectral analysis. The cultivars *G.* 'Royal Mantle'' (easy-to-root) and *G*. 'Coastal Dawn' (difficult-to -root) were used for the comparisons. The capacity for auxin transport in cuttings of the two *Grevillea* cultivars was estimated by applying labeled auxin with high specific activity (3H-IBA, Bioscientific Pty) to the cuttings. Distribution of radioactivity was determined in the base of the cuttings, their leaves and the rest of the stems harvested at various periods after applying auxin.

Apical auxin application to the difficult-to-root cultivar 'Coastal Dawn' resulted in a higher or comparable percentage of rooting compared to basal application and might potentially reduce the amount of auxin used to induce rooting. Rooting differences between the difficult and easy-to-root *Grevillea* cultivars did not appear to be related to their endogenous auxin levels or their ability to take up the applied auxin. There were no significant differences in the endogenous IAA and IBA levels between the easy and difficult-to-root cultivars, and both cultivars demonstrated an increase in endogenous IAA and IBA levels following IBA application. However, a different distribution pattern of the top applied [3H]-IBA was noted between the difficult- and easy-to-root cultivars. The applied IBA in the difficult-to-root cultivar resided in the leaf whereas in the easy-to-root cultivar in the stem base. These studies suggest auxin distribution patterns may be an important factor in adventitious root formation.

Stirlingia latifolia establishment

Aileen Reid and Alison Fuss,
Horticultural Industries Branch, Department of Agriculture, Western. Australia

Stirlingia latifolia is one of the most important crops currently bushpicked for export yet the horticulture and biology of this crop is still poorly understood. Knowledge of the flowering biology of *S. latifolia* helps us understand why so few ''bobbles'' are produced in relation to the apparently large number of flowers. Studies of growth and flowering have shown how important fire is in regeneration of this species, but pruning and clipping trials have failed to duplicate this response. In pot trials, *S. latifolia* responds to applications of nitrogen, potassium and phosphorus and it is likely that a significant part of the growth response following fire is due to a renewed supply of nutrients.

For propagation the best cutting material is from new sprouting material of *Stirlingia latifolia* following a fire or perhaps other disturbance. Or better still use *in vitro* shoots, preferably unrooted as the number of roots per propagule following auxin treatment appears to be superior to *in vitro* rooted shoots and much better than conventional cuttings. Clonal differences may have a bearing on success with this species and further testing on different populations of *Stirlingia latifolia* would be advisable before commitment to procedures followed in this study.

Much of the research conducted to date and reported here has focussed on *S. latifolia* as a member of the Proteaceae and also as a typical resprouter. The implications of these findings are discussed in the context of *S. latifolia* as a potential row crop and quality export floral product.

Development of Reliable Techniques for the Propagation of *Persoonia* and *Conospermum*

Steven Trueman and Fiona Perry, School of Botany, La Trobe University

Lack of knowledge of the propagation requirements of many Australian native plants has limited their development as cut flowers or ornamental species. The propagation requirements of *Conospermum mitchellii* were examined, focusing on the effects of auxin treatment, air and root zone temperatures and cutting type (softwood, semi-hardwood or hardwood) on the percentage rooting and death of stem cuttings. Anatomical studies were carried out to determine whether the stem anatomy of *Conospermum mitchellii* influences rooting ability. Preliminary investigations were made of the effects of auxin treatment and air temperature on the rooting and death of *Conospermum patens* and *Persoonia pinifolia*.

Indole-butyric acid (IBA) was found to be the most effective auxin in stimulating rooting of cuttings of all three species, while naphthalene acetic acid (NAA) had an adverse effect on cutting survival of the two *Conospermun* species. Softwood cuttings gave the highest rooting percentage, and the use of root zone heating was found to be beneficial for propagation of *Conospermum mitchellii.*

Conference Report

by Dr Margaret Johnston

Rural Industries Research and Development Corporation and the Queensland Department of Primary Industries and Fisheries sponsored the 7th Australian Native Flower Conference, which was held in Brisbane during May 25th-28th at the Bardon Conference Centre, Mt Coot-tha, Brisbane. The conference was organised in partnership between The University of Queensland Centre for Native Floriculture and the Flower Association of Queensland Inc. The Conference was well attended and attracted 137 participants from Australia, Chile, China, Israel, Japan and New Caledonia. In addition to presentations, there were 8 workshop sessions on a diverse array of topics including; Nursery Accreditation, New Growers, Managing for Profit, Marketing and

Export Trends, Postharvest and Quality Assurance, Value Chain Management, Pest and Disease Management and Water Management for Flower Growers**.** Two field trips to commercial flower growers in the Gatton and the Sunshine Coast were organised.

The AFF Young Scientist Award was award to Mr Cameron Playsted for his paper on the "Acquisition and transport of phosphorus in the Australian koala fern *Caustis blakei* (Cyperaceae), a role for specialised dauciform roots". RIRDC awards for the best papers were made to Amelia Martyn for her presentation on "Light damage associated with bract browning in waratahs (*Telopea* spp.)" and Craig Firrell was awarded second prize for his paper "An evaluation of the process used in the application of value chain management principles to the development of an export market for a new native flower product".

Professor Abe Halevy from the Hebrew University of Jerusalem was the keynote speaker on the first day of the conference. His presentation was called "Australian native plants as commercial floricultural crops – the Israeli experience: culture and research". The second keynote address was by Mr Mike Fowler, Global Foresight who challenged the industry to think differently in order to create a better future in a changing world. This was certainly a thought provoking presentation, relevant to all in the audience. Queensland's native plant expert Mr David Hockings gave the keynote presentation on the second day of the conference. David gave a wonderful presentation called "Developing the gene pool" highlighting the potential of several Queensland species. At the conference dinner attended by the Minister for Primary Industries and Fisheries Hon Henry Palaszczuk MP, an Industry Award was made to David and Olive Hockings in recognition of their long and outstanding service to the Queensland Native Flower Industry.

Thanks are due to Jacky Rainbow, Shane Holborn and all of the organising committee for their efforts .

Thanks to donors

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Australian Flora Foundation
PO Box 1566
University of Queensland, Gatton Qld 4343.
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