



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

Newsletter

No. 5

New Series

January 2007

New Council Executive for 2007

At the AGM in November 2006 Professor Richard Williams advised that he would like to stand down as President of the Australian Flora Foundation, as his obligations at the University of Queensland made it difficult for him to continue in that position. A motion of thanks to Richard was passed in appreciation of his eight years of dedicated service as President. Richard will continue on the Council as a Vice President, and as chair of the Scientific Research Committee.

Dr Peter Goodwin was elected as our new President. Peter has been a Vice President of the Foundation for some time and secretary for the last two years

Our treasurer, Dr Margaret Johnston has also resigned, both as treasurer and as member of the Council, due to work pressures. Margaret has served as treasurer for four years. We sincerely thank Margaret for her years of service to the Council.

The new Council is:

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

President's Message

Greetings to you as a fellow member of the Australian Flora Foundation! The new executive aims to continue the good work of the previous executive: to fulfil our mission of '*fostering research into the biology and cultivation of the Australian flora*'.

In essence we act as a link between people who want to support research into the Australian flora, which includes you, and research workers who have good ideas for research. To see the results of your investment into research, you can read the Newsletter and consult our website <http://www.aff.org.au/>

We would like to see an increase in membership in the Foundation. Could I encourage each of you to try and interest a colleague in joining? The membership form can be found at http://www.aff.org.au/AFF2_Membership_Form.htm

The form makes reference to the Memorandum and Articles of Association. I will put a copy of this on the website within the next month.

Peter Goodwin, President

Valette Williams honoured

One of the Louisiana irises that David Murray has registered this year has been named after Val Williams, Secretary of the Australian Flora Foundation for many years and a former President of the Australian Plants Society NSW Region.

This iris is one of several bred by David's mother more than 25 years ago, in Sydney, but not previously registered. So this is an Australian cultivar of an American plant. The flower is blue-violet, with golden 'signals' on the sepals, and a cream centre. Claudia and Dion, Val's children, are delighted that their mother has been remembered in this way.

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 Australia's flora. This work is only made possible by the generous support of donors and benefactors.

Presented here are brief summaries of completed projects. Full reports of these and other projects can be looked up on the Foundation's website www.aff.org.au

Seed production of pink paper daisy (<i>Rhodanthe chlorocephala</i> subsp. <i>rosea</i>) and yellow strawflower <i>Schoenia filifolia</i> subsp. <i>subulifolia</i> (Asteraceae)

Julie A. Plummer, David T. Turner and D. Cheongsat
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Plant Biology, Faculty of Natural and Agricultural Sciences, The University of Western Australia.

Everlasting daisies provide a stunning display of flowers in Western Australia during the wildflower season. Two of these species, Pink paper daisy (*Rhodanthe chlorocephala* subsp. *rosea*) and yellow strawflower (*Schoenia filifolia* subsp. *Subulifolia*) have recently been brought into cultivation.

The impact of water deficit on plant growth, flowering and seed yield were examined in both glasshouse and field experiments. Adequate watering, particularly during early seedling growth, was essential for high yield. Water deficit modified the plant canopy by reducing stem number and branching which limited the sites for terminal inflorescence and seed production. The same proportion of stems produced inflorescences in well-watered and water-deficit plants and stem number contributed more to seed yield than any other component. Water deficit reduced seed weight of *R. chorocephala* but only at the lowest level of irrigation (25% of A pan evaporation). Well-watered *R. chorocephala* produced more seeds per plant than water-deficient plants. Differences in seed number were entirely due to differences in stem number. In contrast, water deficit reduced seed number per inflorescence and seed weight in *S. filifolia*. Severe water deficit inhibited branching in *S. filifolia*, and this effect was more profound than in *R. chorocephala*. Water deficit had no consequent effect on *R. chorocephala* seed quality measured as seed germination. This contrasted with *S. filifolia* where water deficit reduced seed viability 6 months after harvest.

Germination of seeds of both *R. chorocephala* and *S. filifolia* were poor at harvest. Seeds were stored at a range of temperatures (5-65°C) for 10 months. Rhodanthe seeds lost dormancy within two months when stored at room temperature (25°C). They withstood storage temperatures up to 55°C and after ten months at this temperature, germination was still 90%. Yellow strawflower was 100% dormant at harvest and required a long period of dry storage (3 months at 25-40°C) to overcome dormancy. Heat (65-105°C for 12 h to 13 d) was further investigated as a means of overcoming dormancy. Seeds exposed to 80°C for 11 days germinated (88%). Seeds exposed to >80°C had reduced germinability due to reduced viability.

The mechanisms of dormancy were further investigated. Seedcoats of *S. filifolia* were permeable to water and dormancy was imposed by the embryo. Exogenous gibberellic acid (30 µM GA3) alone, or in combination with KNO₃ (10 mM), broke dormancy in intact seeds. Chloromequat and paclobutrazol, which interfere with gibberellin biosynthesis, reduced germination in seeds in which dormancy had been broken by either dry storage or heat. Applied GA3 reversed this inhibitory effect. Thus GA biosynthesis was required for the germination of dormant *S. filifolia* seeds. Dry storage or heat facilitated the transition of seeds from a dormant to a non-dormant stage by increasing the ability of seeds to synthesize endogenous gibberellins.

Propagation of *Persoonia virgata* for the development of a new floricultural export crop.

Lynda Bauer (nee Ketelhohn) and Margaret Johnston,
School of Land and Food, The University of Queensland.

A study of the propagation, growth and development of *Persoonia virgata* was conducted to form a basis for the domestication of this species. *P. virgata* is an attractive, yellow-flowered shrub endemic to Australia. Stems are harvested commercially from naturally-occurring populations all year round, and sold on both the export and domestic flower markets. The cultivation of *P. virgata* as a floricultural crop is currently restricted by propagation difficulties.

Consistent results from the seed germination experiments showed that at least half removal of the endocarp from the *P. virgata* fruit is essential for germination. This was attributed to the endocarp restricting embryo expansion and development. The morphology of *Persoonia* fruit makes the endocarp removal process extremely difficult. The endocarp is extremely hard and 1 - 2 mm thick, and is surrounded by 6 - 8 mm of mesocarp. Nonetheless, it was shown that by first removing the mesocarp, and then using pliers of correct size (by a skilled operator), the endocarp could be cracked open and the seed released. The success of germination also relied upon

minimising the microbial contamination of the seeds. This can be aided by removing the mesocarp using hydrochloric acid, and disinfesting the seed and the endocarp with a 2 hour soak in bleach before culturing aseptically.

Rooting success of *P. virgata* cuttings was highly dependent on the use of juvenile cutting material, which was supported by the success of rooting seedling explants and the complete failure of rooting mature explants *in vitro*. Cuttings from the different seedling genotypes showed a high variation in rooting success.

This study showed that the propagation of *P. virgata*, both sexually and asexually, is possible. Further research is required to make the propagation methods outlined more commercially viable.

An investigation of morphological variation in the salt-tolerant grass *Sporobolus virginicus* from coastal NSW and its possible application as a turf grass

Anthony R Smith-White

School of Biological Sciences, University of New South Wales

The objective of this project was to investigate the potential of *Sporobolus virginicus* in the turf grass industry for use in saline or salt affected areas. Two distinct forms of the species occur naturally in coastal areas of NSW however this study considered only the smaller form described as type 1 by Smith-White (1988) and as var. minor by others. Thirty six accessions (clones) of the grass were collected from the NSW coast between Lake Wonboyn, near the Victorian border and Nambucca Heads in northern NSW. Clonal individuals were established and cultivated in sand in a glasshouse at the University of NSW.

The trial clearly demonstrated a high level of genetically-controlled morphological variation within this species that is available for horticulturalists to draw on for special purposes. For the specimens used in the trial the one standing out as having real potential for cultivation as a lawn grass is the triploid number 22665. This clone was collected from an estuarine sand habitat at the mouth of Coila River in southern NSW. Ecotypic adaptation in this species is very developed, and for any serious attempt to utilize naturally-occurring accessions for specific purposes, larger trials using greater plant numbers and with a range of differing salinity treatments would seem essential. Clonal spread in all chromosome races is predominately by rhizomatous growth and whilst both diploid and tetraploid races are sexually fertile, the triploid race is sexually sterile. Triploids however may at times produce seed by agamospermy (Smith-White 1988). Should a triploid accession be used for cultivation it would have the advantage of being genetically isolated and therefore retain its character over time.

New Projects for 2007

The Australian Flora Foundation has agreed to fund the following research projects on the grounds of scientific merit and relevance to AFF's stated objectives:

Mycorrhizal associations in the Fabaceae: are they really needed?

Dr Tina Bell, School of Forest and Ecosystem Science, University of Melbourne.

The conservation status of the rare desert tree *Acacia peuce* in Queensland

Dr Jon Luly, TESAG, James Cook University, Townsville.

Mechanical constraint model of seed coat dormancy in *Grevillea*

Dr E. Charles Morris, School of Natural Sciences, Hawkesbury Campus (K12), University of Western Sydney.

Reproductive biology and improvement of Australian tropical sandalwood *Santalum lanceolatum*

Dr Tony Page, James Cook University, Cairns.

Pollination biology of *Ptilotus axillaris*

Dr Melinda Perkins, Centre for Native Floriculture, School of Agronomy and Horticulture, University of Queensland, Gatton campus.

Thanks to donors

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

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.

Meet the Councillors

In this issue we feature two members of Council

Dr E. Charles Morris

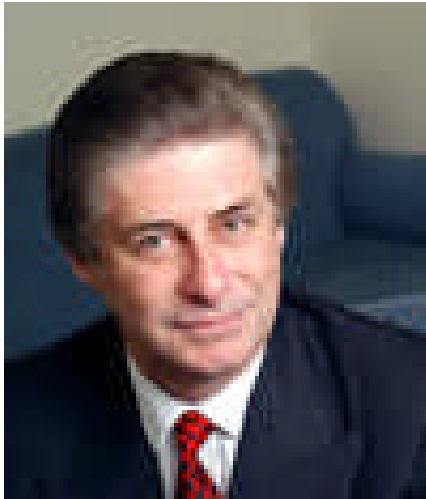


Charles is currently a Senior Lecturer in the School of Natural Sciences at the University of Western Sydney, Hawkesbury Campus at Richmond NSW. He has been involved with the Council of the Australian Flora Foundation since 1995, serving as Treasurer from 1996 to 2003.

Prior to coming to UWS, Charles worked at The University of New South Wales and The University of Sydney. He completed his undergraduate degree in Botany and Zoology at UNSW 1972 – 5, and his Ph. D. in plant ecology at The University of Sydney 1976 – 80, under Dr Peter Myerscough.

His initial research area was plant competition, specifically the process known as self-thinning in monocultures. In more recent years, he has been conducting research on germination of native plants, and currently has a Research Grant from the Australian Flora Foundation looking at how fire cues such as heat and smoke affect the seed coat of *Grevillea*.

Ross Smyth-Kirk B Com, CPA, ASIA



Ross was a founding director of the former leading investment management company, Clayton Robard Management Limited and has had extensive experience over a number of years in investment management including a close involvement with the minerals and mining sectors. He has been a director of a number of companies in Australia and the UK over many years.

Ross is an enthusiast for the growing and promotion of Australian native plants, and is a long time member of the Harbourside Group of the Australian Plants Society. He was Treasurer of the Australian Plants Society NSW Region for four years and is currently on the NSW Council. He has served as a Councillor of the Australian Flora Foundation

since 1997.

Thanks to members

The Council is appreciative of and thanks its members, whose annual membership fees help defray the Foundation's administration costs. We are always seeking new members. Readers who would like to become members can download an application form from our website at http://www.aff.org.au/AFF2_Membership_Form.htm

Feedback is welcome

If you have comments or questions, please feel free to contact the editor by email – itcox@bigpond.com. Articles for the next newsletter are also very welcome.

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