fostering research into the biology and cultivation of Australian plants

Newsletter No. 1 New Series

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Research Projects approved for funding in 2003-04

The Council and the Scientific Research Committee of the Foundation have approved for funding the following research proposals and the Foundation is now seeking sponsors for these research projects. Have you ever thought of being a sponsor for a whole project? It is an exciting prospect to have such an important role in furthering research. Contact the Foundation prior to 31st December, 2003, just remember that it has to be for the whole amount.

The following summaries of the original proposals by the researchers have been written by Dr. Elwyn Hegarty, Technical Officer, SGAP Qld Region Inc.

1. Plasma discharge treatment for improved germination of seeds and killing of fungal spores on seed coats $5,000

Chief Investigators: Prof. Hans J. Griesser, Ian Wark Research Institute, University of South Australia and Prof. Margaret Sedgley, Dept of Plant Science, University of Adelaide.

This project will develop a novel method for the treatment of seeds of Australian plants. It is designed to deliver benefits in terms of improved germination of seeds that do not germinate well without treatment, as well as enhancing survival of seedlings by the effective killing of fungal spores on seed coats. Partial support for a one-year Honours project has been awarded.

Using existing methods, hard seed coats, germination inhibitors and fungal infections, such as damping off and collar rot, limit the propagation of various native species for conservation, re-vegetation and horticultural use. Plasma glow discharges will be used to etch seed coats and fungal spore coats. This is similar to their use to etch types of commercial plastics, which have some similar chemical and physical properties. If successful, and provided suitable scales of treatment can be established, this method offers a rapid and cost-effective method of improving germination and survival rates of larger and more diverse batches of seed. As well as seeds of some rare species, *Grevilleas* and some species which require pre-germination treatment, those of some *Eremophila* species which contain germination inhibitors will be tested. Suitable conditions will be sought to ensure that the UV light generated in plasma discharges will combine with etching to kill fungal spores without over-treating the seeds.

2. Exploring the Horticultural Potential of Native Australian Flowering Shrubs in the *Solanum brownii* Group $8,400

Andrew Perkins, George Orel, Gillian Towler and Adam Marchant from the Royal Botanic Gardens, Sydney, and the Centre for Horticulture and Plant Sciences, University of Western Sydney, Richmond.

The aim is to bring out the potential of *Solanum brownii* (or related species in the *S. brownii* group) as a flowering shrub for the nursery trade. *Solanum brownii* is a perennial shrub, native to the temperate eastern coastal region of Australia. Following a recent taxonomic revision, the *S.brownii* group now contains ten species, some of which are considered to be 'vulnerable' or 'endangered'. They have very attractive purple or blue flowers up to four centimetres across. *S. brownii* has occasionally been used as a garden ornamental. However, the plants are often spiny, which limits their appeal to the nursery industry. Initial research will investigate natural variations, especially in important characters, such as flower size, colour, and reduced prickliness. Seed and cuttings will be collected non-destructively from wild plants, propagated and scored for various desirable traits including frost-tolerance. Experimental crosses will be set up, and the next generation evaluated. Selected plants will then be propagated using vegetative techniques, and their acceptance in the nursery market will be tested.

While this study promises benefits for use of *S. brownii* in horticulture and conservation, it will also be associated with evolutionary genetic investigations of native *Solanum* species being conducted by Adam Marchant.

3. The Role of Phytohormone Auxin in Adventitious Rhizogenesis in *Grevillea* $6,100

Ms Krisantini Sanjaya, School of Agriculture and Horticulture, University of Queensland, Gatton Qld 4343. (Supervisors Dr M Johnston, Prof. R.Williams & Dr C Beveridge, University of Queensland).

One of the limiting factors in the cultivation of Australian native species in general, and of *Grevillea* (Proteaceae) in particular, is the difficulty of adventitious root induction for vegetative propagation and seasonal rooting. Auxins (phytohormones) have long been implicated in this process but past research has focussed on empirical studies of applied auxin (phytohormone) levels rather than auxin physiology. Preliminary research on *Grevillea* 'Royal Mantle' and *G.* 'Coastal Dawn' suggests auxin transport, distribution patterns and metabolism may be one of the problems for propagators.

This one-year project aims to extend the basic understanding of auxin uptake, transport and metabolism, and the control of root formation (rhizogenesis) in *Grevillea* species. It involves examining the distribution of auxins within the plant, patterns of auxin transport and metabolism, and determination of relationships between differences in seasonal rooting ability and variations in endogenous auxin levels (i.e.those within the plant). Labelled (exogenous) auxins, IBA and IAA, will be used to track and explain the patterns of transport and metabolism of the same compounds within the untreated plant.

Further work will quantify and compare levels of auxin in the root zones, and examine the metabolism of labelled IBA and its effect on IAA levels and transport. This project will lead to a better understanding of auxin uptake, transport and metabolism in *Grevillea* species, and some theoretical and practical problems in plant science and horticulture.

Unravelling these problems would have a major impact on propagation for difficult-to-root woody species used in floriculture, essential oils and forestry.

New member, Scientific Research Committee

The Committee is an accredited panel of scientists who, as required under the Income Tax Assessment Act, must approve all projects to be funded from the Foundation's Research Fund. They assess the scientific merit and technical feasibility of research proposals. The newest member of the Committee is Dr. Trevor P. Whiffin who was appointed in November 2002. Dr. Whiffin completed his Ph.D. in plant taxonomy at the University of Texas in 1972 and has since been at the Department of Botany in the School of Life Sciences at LaTrobe University in Melbourne. He has undertaken research in angiosperm taxonomy, chemical and numerical taxonomy, variation, evolution and biogeography of the Australia flora, especially the rainforest flora and *Eucalyptus*. Dr. Whiffin is one of the compilers of the interactive key on CD ROM, *Australian Tropical Rain Forest Trees and Shrubs*.

Call for Applications for Research Grants 2004

The Call for Applications will be distributed to researchers soon and is expected to be similar to last year's. To date, the Foundation has helped fund 66 research projects.

Many thanks

Donations to the Foundation's research grants have been received from the Australian Plants Society NSW (Newcastle District Group), Australian Plants Society Vic. (Hamilton Branch), Australian Plants Society NSW and the Ian Potter Foundation. Donations over $2 to the Foundation are tax deductible. The Australian Flora Foundation is not registered for GST so every dollar of your donation goes to its programme of activities.

The Foundation needs more Members

Do you know someone who is interested in research into Australian plants? Members help with the work of the Foundation by becoming office bearers, by their Membership Fee which goes towards administration expenses, by helping with publicity or just being well informed ambassadors for the Foundation. The last page of this Newsletter is a Membership Form; please give it to a friend or colleague who would be interested in helping the Foundation promote research into the Australian flora.

Letters to the Editor?

Maybe you have something to say about the state of research into Australian plants. Is funding declining? Are there interesting new facilities or programmes? Write to us.

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APPLICATION FOR MEMBERSHIP

I, Dr/Mr/Mrs/Ms (full name of applicant)

Address

Postcode

email phone

hereby apply to become a Member of the Australian Flora Foundation. I agree to be bound by the rules as expressed in the Memorandum and Articles of Association dated April, 2002. Please find enclosed my Membership Fee of $25, due each January, with my tax-deductible donation to the Research Fund of $

Total: $ Signature

NOMINATION

I (full name)

Signature

being a Member of the Foundation nominate the applicant.

and

I (full name)

Signature

being a member of the Foundation second the nomination of the applicant.

Send with your payment, made out to the Australian Flora Foundation, to:

Hon. Treasurer, Australian Flora Foundation, PO Box 1566, University of Queensland, Gatton, Q., 4343.

If you do not know any Members of the Foundation, we will find a nominator and seconder for you.