International Protea Conference Maui, USA

Travel Report presented to RIRDC

by Dr Cathy Offord

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In submitting this report, the researcher has agreed to RIRDC publishing this material in its edited form.

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Foreword

This report gives an overview of Dr Cathy Offord's attendance at the International Protea Association (IPA) conference. Dr Offord made presentations on waratah reproductive biology, advances in breeding, and the effects of shade cloth, calcium and irrigation frequency in lessening the occurrence and severity of bract browning in waratahs.

This project was funded from RIRDC Core Funds which are provided by the Federal Government.

This report, a new addition to RIRDC's diverse range of over 800 research publications, forms part of our Wildflower & Native Plants R&D program, which aims to improve the profitability, productivity and sustainability of the Australian wildflower and native plant industry.

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Simon Hearn
Managing Director
Rural Industries Research and Development Corporation

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Executive summary

Dr Cathy Offord travelled to the island of Maui (Hawaii, USA) to attend the 11th International Protea Conference and 6th International Protea Working Group Symposium, 9-14th March 2002. The total period of travel was 8-18th March. The main purpose for attending the conference was to make presentations on waratah reproductive biology, advances in breeding, and the effects of shade cloth, calcium and irrigation frequency in lessening the occurrence and severity of bract browning in waratahs. Questions and comments on these projects helped to further the progress of this research in its various phases. Additionally, Dr Offord was able to contribute to the Protea Research Working Group meeting and will be an active member from this point. Discussions with other scientists and Proteaceae growers, contributed to Dr Offord's research capabilities in this area, including possible cooperative projects and sharing of information. A field trip to the University of Hawaii Protea Research station and a number of cooperating growers properties provided information on a model for development of new Proteaceae varieties and associated scientific research. A number of recommendations are made at the end of this report arising from information gathered during the course of this trip.

Itinerary

Friday March 8 2002
Travel on QF3 from Sydney to Honolulu arriving midnight, overnight Honolulu Airport Hotel.

Saturday March 9
Travel on Hawaiian Airlines from Honolulu to Maui and transfer via taxi to Wailea Renaissance Hotel the venue for the conference.

Sunday March 10
Registration (am) and reception (pm)

Monday March 11
Conference sessions

- Opening ceremony
- Keynote speakers on the past present and future of Proteaceae in horticulture and marketing
- Reports by geographic region on cultivation, marketing and research

Tuesday March 12
Conference sessions

- Nutrition, crop management, marketing, propagation
- Oral presentation of posters

International Protea Research Working Group meeting

Wednesday March 13
Field trip to Kula Research Station (University of Hawaii), and three Proteaceae growers.

Thursday March 14
Conference sessions

- Diseases, insects, post-harvest

Friday March 15
Conference sessions

- Breeding and cultivar evaluation, marketing

International Protea Association General meeting
Conference Dinner

Weekend

Monday March 16
Travel from Maui to Honolulu, overnight at Best Western Airport Plaza Hotel

Tuesday March 17
Travel Honolulu to Sydney, arrive Wednesday am (March 18).

Primary purpose of travel

To attend the International Protea conference (incorporating the International Protea Research Working Group Symposium) to make a presentation on recently completed work on the reproductive biology and genetics of the waratah (*Telopea* spp). This work is included in my recent PhD thesis and I am currently in the process of writing articles for refereed and industry journals. The title of the thesis and of my presentation was 'Waratahs: horticultural improvement through breeding'. Of particular interest to the Australian and international cut-flower industry is the development of base-line information on the inheritance of traits such as colour and small flowers. This project was not funded by RIRDC, but addresses issues under Objective Two of the 2000-2005 RIRDC R&D plan (Improvement of existing products and develop new ones). Additionally, I presented work at the conference, on progress with the control of bract browning in *T. speciosissima*, for PhD student Amelia Martyn who has a stipend partially funded by RIRDC.

I have worked with waratah species for over 15 years and have an ongoing program of study of the biology of the taxon especially in relation to horticultural improvement. A the conference I was able to consult with scientific colleagues and industry members on future work on Australian Proteaceae species, such as Waratah and Grevillea (the RBG is a partner in the Grevillea improvement program with PBI). I am particularly interested in the areas of extension of waratah flowering period and grafting for hardiness.

Major Achievements/findings

The presentations on waratah research and development were well received by conference delegates. The success of the presentations was gauged by the number and type of questions immediately following the presentations and in subsequent discussions with delegates. Waratahs have not been grown to any great extent outside of Australia and New Zealand. It was generally agreed that if waratahs are to be as commerically successful as some other Proteaceae species that they needed to be grown in a range of biogeographical regions to approach year-round supply. Of the growers and researchers I talked to from countries other than Australia, the main problem appears to be the lack of improved material available. Even within Australia and New Zealand there is a perception that there has been insufficient targeted Proteaceae breeding for production or that breeding programs stall due to long-term commitment to breeding and improvement. I presented breeding techniques and baseline genetic information that can be used to advance the targeted development of waratah varieties. More research of this type is required. Results of similar studies in other Proteaceae were presented at this and the previous IPA conferences. In particular coordinated efforts in South Africa by ARC and by the University of Hawaii that have resulted in major improvements in the number and quality of cultivars available for growers from which major industries have been

established. Germplasm conservation also needs to be addressed in Australia, as it has been in South Africa where a dedicated collection is used for breeding and long-term conservation of disappearing genotypes.

Both Australian and New Zealand growers reported bract browning as a significant problem for production and export of this crop. In our poster presentation, shading, calcium sprays and frequent irrigation were shown to decrease the occurrence and severity of bract browning. During the oral presentation of this poster I also informed the conference of the latest results of this work on the effects of shading on decreasing the severity of browning. One NZ grower reported that a windbreak around his plants has recently grown high enough to shade his waratahs from morning sun and these are the only waratahs on his plantation that do not suffer from bract browning. He and several Australian and NZ growers will increase the shade around their waratahs and will report back in the next flowering season on the success of this measure on increasing the saleability of their product.

Benefits to person travelling

- Valuable contacts were made with other scientists working with Proteaceae as well as with growers. I am now an active member of the Protea Research Working group that aiims to collectively discuss and focus horticultural research on Proteaceae species. Involvement with on-going projects was discussed with a number of growers and researchers. I am currently writing up a large body of work for publication in various journals and it was useful to be able to discuss aspects of publication with a number of scientific colleagues.

- Insights were gained into research being conducted on other Proteaceae species and how this might be applied to waratahs and other Australian species. This was particularly in the area of plant breeding where the most successful programs are based on scientific investigation of breeding systems and systematic testing of established and well-managed germplasm collections. Disease resistance and horticultural characteristics such as long-narrow stems, long internodes and small narrow leaves are of particular importance as well as early and late season flowering. Breeders placed great importance on early screening of crosses for these characters. For example, University of Hawaii has a research station dedicated to Proteaceae, managed by 7 staff. Over 4000 plants have been screened by this station and less than 1% are released to growers to test. This is a manageable number for testing (less than four varieties per year).

- The Conservation and Horticulture group of RBG Sydney is seen to be significantly contributing to research on Proteaceae, particularly waratahs. Attendance at this conference has helped in the planning of further investigations of the genetics, reproductive biology and physiology of the waratah and other Proteaceae species, an area in which I am becoming specialised.

Benefits to the industry

- A number of waratah growers were present at the conference and they were very interested in applying the results of this research, particularly in the area of bract browning minimisiation. One large Proteaceae propagator/nursery in Australia is interested in trialling F_1 and F_2 crosses from the breeding work with a view to release as cultivars.

- There was free and open exchange between researchers and growers on topics of common concern. The international nature of the conference added different perspectives to the discussions and resulting outcomes. This was particularly emphasized in the area of international marketing and targeting crops from different regions to complement each other rather than the perception of being in competition. There was even agreement that Australia and New Zealand have much to offer each other in the way of 'piggy-back' marketing.

- The information and contacts gained at this conference will be used to further my work in the development of waratahs and other Australian plants. This will be in a number of ways but includes contributing to strategic planning through the Waratah Industry Network and with current and future scientific collaborators to work on specific industry related development. An area of interest, particularly from the Royal Botanic Gardens Point of view, is in enhancing the sustainability and minimising environmental impact of the Australian flower industry. The RBG can be a major contributor in this area by ensuring that maximum benefit is derived from the smallest amount of input, and with the least effect on the continued survival of native species in their natural habitats.

- Acknowledgement of RIRDC in my presentations reinforced the role of this organisation in supporting fundamental and applied research.

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Recommendations to RIRDC

Encourage research and development in the following areas:

1. Breeding and adoption of disease resistant, small-flowered waratahs with long flowering periods and long vase life;
2. Grafted waratahs to overcome dieback problems and impart vigour;
3. More fundamental research is required into breeding systems and plant physiology generally to enhance production e.g. bract browning study is showing applicable results;
4. Encourage long-term breeding programs with associated germplasm conservation and agronomic development. Short term (3-6 year) programs cannot achieve adequate outcomes as plants take this long from seed to flowering, allow for subsequent backcrosses to achieve outcomes. Recommend supporting long-term projects (10-20 years +).

5. Trans-Tasman and northern hemisphere production of waratahs and marketing support to fully capitalise on the unique nature of the product and provide steady supply for the world market.