ECONOMIC VALUE OF BIODIVERSITY

COMMERCIALISING NATIVE FLORA PROFITABLY

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Commercialising our Australian flora is a long and complex task. To ensure that native flora can be grown profitably involves many years of plant selection and breeding, years of development of agronomic packages and a good understanding of the cost and returns associated with the product.

Mechanical pruning of *Banksia coccinea* on the South Coast.

Western Australian flora has been of interest for cutflowers and amenity planting for over 50 years. The American cutflower industry adopted *Chamelaucium* (waxflower) and developed a large industry which currently produces 300,000,000 to 500,000,000 stems annually. Waxflower is the largest export product in the cutflower industry in Australia. This species has also extended to Israel, Africa and South America with small interest in Portugal, India, Thailand and China. Other products commercialised are *Verticordia*, *Boronia*, *Banksia* and kangaroo paw. A wide range of foliage products is also produced.

In WA the exports initially came from bush harvested products, but as demand increased, the need for more consistent quality product and the reduction in available bushland for harvesting created increased interest in cultivation. The commercial cultivation of these plants soon led to a need for a wider range of flowering times, different colours and product with better vase life. Better agronomic knowledge of irrigation, nutrition and pruning, as well as post harvest management, meant that research was required. The demand for potted colour and amenity plants has also increased, resulting in work to develop appropriate forms and management protocols.

Production of better planting material and the associated agronomic packages to improve quality and yield and correct post harvest management does not always translate into grower profit. Grower management is vital to any successful production. Growers need to examine their production costs and returns and make decisions on which crops to grow. Reducing costs is fundamental to profitability. Growing old varieties may eventually lead to reduced profit and adopting new varieties may maintain current profit margins.

The Floriculture Group of the Western Australian Department of Agriculture (DOA) has specialised in commercialising the flora of WA. Capturing the horticultural benefits of the biodiversity of Western Australian flora and turning it into a viable commercial crop for Australian growers is the principle activity of this dynamic group. In recent years the Floriculture Group has worked on a wide range of species which have cutflower and amenity horticultural applications. This has included selecting material from the vast genetic resources throughout the State. Waxflower, *Boronia*, Yellow Bells, *Verticordia*, smokebush and everlasting daisies are some of the plants selected, brought into nursery cultivation, crossed, hybridised and in many cases commercialized.

As part of the full commercialisation of native plants the viability of the industry needs to be assured.

Domestication of native flora

The Department has looked at a wide range of native flora with the aim of developing commercial product. The process requires time and skills to recognise the commercial possibilities. Most of the work has been focused on Waxflower, *Verticordia*, *Boronia*, *Scholtzia*, smokebush and Qualup bell. These have been initially evaluated for their cutflower potentials, but are also tried as 'potted colour'.

Smokebush (*Conospermum* spp.) is one example. There are over 50 different species including white and blue flowered forms. A project managed by Dr Kevin Seaton evaluated the available range and selected 12 species that had some potential. Further selection work was backed up by agronomic, vaselife, production and market suitability studies. Three species were released in 2002. Propagation of cuttings is still one of the constraints on this product line.

Developing new plants and hybrids

Exporters and growers continually call for new forms, colours, improved quality and new product to improve their capacity to sell our native flora on the export market in the face of stiff competition from southern hemisphere producing countries.

New seedlings of waxflower are generated in an uncontrolled way in the wild and in plantations. The

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general understanding of 'hybrid' is a cross between two different species (or genera). This is rare 'in the wild', but happens more frequently in plantations or gardens, or where there has been roadside disturbance (eg Southern Stars). Some of these new seedlings have characteristics which make them suitable for the cutflower market. However a deliberate breeding program enables specific characteristics such as colour, maturity and yield to be focused on. The Pearlflower series developed by the Department under Digby Growns' management is a good example. They are crosses between *Chamelaucium megalopetalum* found in the south with *C. uncinatum* growing on the west coast. The hybrid has shiny white petals and a green centre with a terminal flower form, excellent vase life and good yields.

The program has released varieties with a range of flowering times – these include Esperance Pearl, Denmark Pearl, Albany Pearl, Crystal Pearl, Bridal Pearl and the latest Laura Mae Pearl. Ivory Pearl and Blondie are similar hybrids developed by private breeders.

This program requires large numbers of crosses, carried out manually and under controlled conditions. The hybrid seeds are often dormant or recalcitrant and may not germinate. Since each cross and seed is a potential new commercial variety the program employs embryo rescue techniques at an early stage to ensure success. The material is then propagated in tissue culture before testing in the field. The current program achieved 20,000 such crosses last year, with about a 5% success rate for producing seed.

A further 5-7 years of evaluation and testing (including cutflower appearance, yield and post-harvest requirements) with strong culling of material on a wide range of parameters may see 1-2 varieties released.

Developing and using technology to help commercialise native flora

Each new domesticated species has its own problems. Poor propagation by cuttings is often a feature of plants that traditionally propagate from seed. To gain the benefit of the intensive selection, clones from the original superior selection are required. A number of techniques have been developed in WA to increase development of roots on cuttings.

One such technique has been named IVS (In Vitro Soil-less) that has increased propagation success of tissue cultured material from unacceptably low levels (<20%) to commercial levels (>90%). Although it was developed from the waxflower breeding program it has been developed further to solve similar problems in other horticultural and tree crops, including sandalwood.

Another technique is the use of somatic fusion to develop totally new forms and colours of the plants. This sophisticated technique has been tried with some preliminary success. The Holy Grail of a red or orange waxflower will still be many years away.

In the case of potted colour, Max Crowhurst has been working with the arid zone daisy to improve its germination to levels suitable for mechanical seeding in commercial nurseries. He has improved germination of the usually dormant seed from 20% to 98%. The varieties he has developed are commercialised by licensing nursery operators and by the DOA providing treated seed.

Agronomic management is critical to successful cutflower enterprises.

Generating new varieties is only part of the commercialisation process. It is equally important for new hybrids to be supported by appropriate agronomic techniques and information. Integrating research and development with industry development is critical to a new plant's commercial success.

Hybrids will have different agronomic features which need to be catered for. They may require different climatic conditions to maximise yield, they may need closer spacing to maximise labour efficiency and they will require appropriate nutrients and irrigation.

A project on nutrition in waxflower, is in its early stages clearly showing the benefits of good nutrition management. Gone are the days when waxflower was considered a native flower that did not need extra fertiliser. Preliminary results by Kevin Seaton indicate that fertigation and good irrigation are essential to maximising yield and quality of waxflower. It may also impact on the time of flowering.

To maximise the gain from new varieties, and especially the hybrids, growers need to get the management right. Irrespective of the cutflower grown there is a best bet system available, but that system can and should be refined to maximise returns. Growers must search for the information they need – it generally will not come on a plate.

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DOA also produces a newsletter called 'Floriculture News' which is available on their website at www.agric.wa.gov.au.