The Development of Australian Plants for Foods and Flavourings

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THE BUSHFOOD INDUSTRY

In recent years a small, but growing, industry has developed in Australia based around "Bushtucker" or "Bushfood" plants. There are currently up to 30 or more Australian plants being used for a range of products, from fresh and dried plant parts to plant essences and flavourings. The development of this industry has been influenced by a number of factors including adventurous chefs using the plant products in the first place; community concerns over "clean" and environmentally friendly foods; the new tastes and flavours available; and the unique Australian nature of the product (assisted in part by "The Bushtucker Man" television series). A recent report identified 14 of the most commonly used plant species and provided some financial estimates for intensive cultivation of these species (RIRDC, 1997).

There is certainly demand for the plant products. In 1995-96 the total sales value through the food processing part of the industry was AUS$4.5 million (Econsult, 1996), while the total sales of bushfood products in 1996 were over AUS$14 million (The Age, 13 Jan. 1997).

BUSHFOOD PLANT SPECIES

Many bushfood plants have not had extensive horticultural cultivation and exposure, except through native plant enthusiasts. The plant origins are diverse and include many common vegetation communities across the continent, including tropical rainforest, coastal heathland, open woodland, and semi-arid habitats. Aboriginal use of different food plants was extensive. In Victoria up to 140 different plant species have been identified as food resources by local aboriginal peoples (Gott, 1993), demonstrating the enormous potential that exists for further development.

A good example of a bushfood plant and perhaps the most widely planted species at present is the quandong or native peach (*Santalum acuminatum*). It is found throughout the semi-arid zones of the Australian continent. Being a partial root parasite, it would seem an unlikely species for horticultural exploitation. However the orange-red fruit has a sweet outer layer (and oily, edible kernal) which was prized by aboriginal people and later by early Australian settlers. The fruit is mainly used as a dried product and in a processed form, although there is also demand for fresh fruit. The development of cultivars through the Commonwealth Science and Industry Research Organisation (CSIRO) and Sunraysia Nurseries, together with improved propagation methods (Smith, 1994), has led to an increase in quandong plantings. The Australian Quandong Industry Association has estimated that between 40,000 and 50,000 trees have now been planted in Australia, with the vast majority planted in the last 4 years (RIRDC, 1997).

A recent survey of growers identifies the main plant species currently being cultivated in Southern Australia (Table 1).

Table 1. Main bushfood plant species cultivated by Southern Bushfood Association (SBA) growers (SBA newsletter and survey results, 1997).

Tubers, rhizomes, and allies
Arthropodium milleflorum, mountain vanilla lily
Microseris lanceolata, murnong or yam daisy
Triglochin procera, water ribbons
Typha domingensis, cumbungi

Fruits and seeds
Acacia spp, wattleseed
Acronychia imperforata, lemon aspen
Austromyrtus dulcis, midyim berry
Billardiera scandens, appleberry
Dianella revoluta (syn. *D. longifolia*), pale flax lily
Eremocitrus glauca and *Microcitrus* spp., wild limes
Kunzea pomifera, muntries
Nitraria billardieri, nitre or dillon bush
Podocarpus elatus, illawarra plum
Sambucus gaudichaudiana, native elderberries
Solanum spp., kangaroo apples
Syzygium leuhmannii, riberry

Herbs and foliage
Apium prostratum, sea parsley
Backhousia citriodora, lemon-scented myrtle
Correa alba, white correa
Drimys lanceolata (syn. *Tasmannia lanceolata*), mountain pepper
Mentha australis, native mint
Prostanthera spp., mintbush
Tetragonia tetragonioides, warrigul spinach or greens

CULTIVATION OF BUSHFOOD PLANTS

The types of plant products finding their way into the marketplace include both wild-harvested materials and increasing amounts of cultivated plant materials. The amount of bushfood still being wild harvested is a concern, both from a plant conservation viewpoint and because of quality and continuity of supply. There is some cultivation information for bushfood species (ANPI, 1994; RIRDC, 1997), but it is still very generalised and lacks significant cultural information. What is needed is basic agronomic information for bushfood species, particularly the optimum environmental and cultural requirements for plant performance and harvest details. Postharvest information, especially treatments that will maximise product quality and uniformity, is also needed. Growers experiences with different crops are providing a means of assisting the exchange of information where so little exists.

Growers however are currently mostly small-scale and lack capital investment for their enterprises. Within the SBA, a recent survey of growers indicated that most operate mixed enterprises, the average size for production is 8 hectares, 30

species were under cultivation (reperesenting approximately 350 kg of product), and 19 species were being wild harvested (reperesenting approximately 300 kg of product) (SBA newsletter and survey results, 1997).

RESEARCH AND DEVELOPMENT

Current research and development activities in the Bushfoods industry is minimal.

Plant Propagation. There is little information in the public domain on suitable propagation methods for most bushfood species. Many plants are unavailable in nurseries, so uncertain origin of materials and difficulties in vegetative propagation are common. For most plants a clonal propagation method will need to be developed to assist with utilising improved forms of the plant (through breeding and selection). A recent paper on the propagation of bushfood plants (McCarthey, 1995) outlines some of the issues associated with the propagation of five different plant species/ groups. Results of cuttings trials undertaken at Burnley College, University of Melbourne, of three bushfood species showed that slowness to strike (more than 15 weeks) was a significant problem with two of the species trialled (*Acronychia oblongifolia* and *Kunzea pomifera*) despite a range of treatments applied. In the third, *Tasmannia lancolata* (mountain pepper), however, 70% of the cuttings rooted after 7 weeks with 3000 ppm IBA application. Clearly more propagation research would be useful for those in the nursery industry.

CSIRO is undertaking a number of different research projects associated with bushfood plants. This ranges from entomology to soil management projects (Boland, 1997).

Plant Improvement. Activities have included *Santalum acuminatum* (quandong) and more recently *Eremocitrus glauca* and *Microcitrus* sp. (wild lime). Australian Native Produce Industries (whose Red Ochre Grill restaurants have been utilising Bushfood ingredients for years) have also been involved in the development of improved plant selections. They currently have seven protected cultivars of bushfood plants for sale through their nursery in South Australia.

Food Processing and Toxological Research. This has been very limited to date. A detailed paper on the chemical constituents and potential toxicities of bushfood plants (Plantchem, 1996) provided a useful background to the main issues associated with plant usage. Research undertaken by the University of Tasmania with *Drimys lanceolata* (syn. *Tasmannia lanceolata*) (mountain pepper) has looked at essential oil production and is now leading to the establishment of clonal plantations of mountain pepper throughout the state.

THE FUTURE FOR BUSHFOODS

Apart from greater research and development into bushfood production, there are other challenges facing the bushfoods industry. The problems of supply and demand need to be carefully considered. While there is demand for many products, some estimates of industry growth may be extravagent and there are already forecasts of overplanting with some species (RIRDC, 1997). Increasing demand for products will be essential for plant producers.

The grouping of a national alliance of regional grower-based groups (Australian Bushfoods Federation) is also crucial to the development of the industry. This group consists, at present, of the Australian Rainforest Bushfood Industry Association

(ARBIA), Southern Bushfood Network, and the Queensland Bushfood Cooperative society. The federation, as it evolves, will be in a position to look at national issues facing the industry (particularly the development of a new research and development plan) and hopefully act as a catalyst for increasing and disseminating information on the horticultural production of bushfood plants.

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