

## Birds for profit?

THROUGHOUT history, birds have been used for religious, decorative, sporting and tourism purposes, in traditional medicine, as currency, and of course, food. In many cases, the birds were and still are utilised in a sustainable way. But until recently, the idea of sustainable utilisation was tied to conservation. Now, Dr Alan Kemp, from the Department of Birds at the Transvaal Museum in South Africa, suggests that birds can be sustainably utilised as an economic product.

Kemp expands on this idea by relating a feasibility study conducted with the Makuleke people living alongside the Kruger National Park, a nature reserve in north-east South Africa.

The Makuleke people harvested second-hatched chicks (which are normally killed by their older siblings) of the southern ground hornbill, African hawk-eagle and milky eagle owl. The chicks were then raised to independence and released. In the process, the Makuleke community benefited from the hire of a hut in which to raise the birds, the sale of rats bred as food, the hire of labour to assist with rearing and release and publicity from the project.

In addition, the Makuleke can offer their intimate knowledge of birds to ecotourism ventures, photographers and birdwatchers. They can extend their hunting

rights to offer wing-shooting for more common species of gamebird and waterfowl. And they can offer such birds on any indigenous menu served at their lodges.

The conflicting demands of conservation and economics mean that the risk to birds must be evaluated if such projects are to go ahead. Kemp outlines a number of ways to do this. He also reviews avian qualities, which would affect the utilisation of birds. These include their generally small size, which makes them easy to manage, and flexible behaviour, which allows many species to be domesticated or trained.

If birds are to be viewed as a potential economic product, rather than a conservation resource, Kemp says further research must be conducted. This research would address issues such as the optimum size and time of harvest, husbandry techniques, customer requirements and the natural processes and behaviour of target species.

Kemp A (2000) The Sustainable Utilisation of Birds. *EMU* 100:355-365.

Wendy Pyper

## Cool kangaroos

AUSTRALIAN native flowers are a popular product in the cut flower market. And what could be more Australian than the kangaroo paw? Getting these attractive flowers to distant markets in perfect

condition however, requires suitable post-harvest storage and transport procedures. But getting the flowers to last for a week or more in the vase, after weeks in storage, is an exacting science.

Compared with other Australian native cut flowers, kangaroo paws deteriorate quickly following removal from cold storage. Preliminary studies suggested the flowers were sensitive to storage at 0 or 1°C, a practice that reduces post-harvest respiration and transpiration, and prolongs longevity in many cut flower species. So scientists from the University of Queensland, Cranfield University (UK) and CSIRO Tropical Agriculture considered the problem in detail.

The scientists examined flowers from the commercial kangaroo paw cultivar, 'Bush Dawn', harvested from a glasshouse, shadehouse and open air flower bed and kept at 0, 7.5 or 13°C for one, two, three or four weeks. To determine the condition of the flowers grown and stored in these different environments, they measured the fluorescence from chloroplasts in the flowers.

Fluorescence results when the chlorophyll in chloroplasts absorbs light and then releases it. Healthy plant tissue uses light for photosynthetic reactions. But when the tissue is stressed, the dissipation of absorbed light as heat or fluorescence increases.

The scientists found that fluorescence in flowers stored at 0°C for one to four weeks was higher than that in flowers stored at 7.5 and 13°C. Further analysis showed that flowers stored at 7.5°C lived longest in the vase. These results confirmed that the Bush Dawn cultivar was chilling sensitive. Vase life also decreased the longer flowers were in storage. And flowers harvested from the shadehouse lasted longer than flowers harvested from the glasshouse or open air.

JH Miranda, DC Joyce, SE Hetherington and PN Jones (2000). Cold-storage-induced changes in chlorophyll fluorescence of kangaroo paw Bush Dawn flowers. *Australian Journal of Experimental Agriculture*, 40: 1151-1155.

Wendy Pyper

## Fire cues for seed germination

MEMBERS of the family Epacridaceae are dominant heath plants that typically have a seed dormancy that needs to be broken by environmental cues before germination will occur. Knowing these requirements helps in propagation of seedlings for horticulture and in rehabilitation or conservation of heath communities.

Botanists at the University of Tasmania, Craig Gilmour, Dr Ronald Crowden and Dr Anthony Koutoulis, recently investigated the influence of heat-shock, darkness, direct smoke and smoke solutions in promoting germination in the Epacridaceae. They focussed mainly on fiery germination cues in Tasman heath (*Epacris tasmanica*).

The experiments revealed that a small proportion (5%) of Tasman heath seeds are non-dormant, germinating without any fire-related cues. This is probably an adaptation allowing some reproduction even in the absence of periodic fire. But the best dormancy 'buster' proved to be the direct smoke treatment, promoting seed germination to about 74%. Interestingly, exposure to smoke caused a concentrated flush of germination after three to five weeks, about two weeks later than normal.

Combined treatments boosted germination, with significant interactions between the heat-shock, darkness and smoke solution treatments. The most effective combination was 5% smoked water in conjunction with darkness and heat-shock. In nature, this would mean that, after fire, heath seeds that are buried in the soil, where it is dark and where rain has fallen and percolated through the ash-covered soil, would have their dormancy broken.

Gilmour CA Crowden RK and Koutoulis A (2000) Heat shock, smoke and darkness: partner cues in promoting seed germination in *Epacris tasmanica* (Epacridaceae). *Australian Journal of Botany*, 48:603-609.

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Kangaroo paws deteriorate quickly following removal from cold storage.