



Dr Craig Hardner and technician Jodie Neal amidst the macadamia germplasm collection.

Squirrelling the macadamia

Australia's macadamia nut has been a great success story worldwide, but the rainforest trees that gave rise to this thriving industry are under threat from clearing and fragmentation of lowland rainforests on the eastern coast.

The loss of these trees has serious consequences for the macadamia industry, as well as for species conservation. Genetic diversity among wild macadamias has been described as Australia's 'secret weapon' in the competitive battle with nut producers in several other countries.

Nine species of macadamia occur worldwide, but seven of these occur naturally only in Australia and, of these, just two are edible: *Macadamia integrifolia* and *M. tetraphylla*. So the international macadamia industry has been built on a limited genetic base. This is where the domestic industry sees opportunities and it has taken the initiative in establishing the National Macadamia Germplasm Conservation Program.

The program, a joint effort involving the Australian macadamia industry, Horticulture Australia and CSIRO, was launched earlier this year. In a bid to preserve wild macadamia varieties (relatives of banksias, grevilleas and hakeas) 'gene banks' or plantations have been established at three sites: Caboolture and Tiaro in Queensland, and Alstonville in New South Wales.

'At each site, growing in typical orchard configuration, we have 700 trees propagated

from cuttings collected from wild populations of macadamia,' Dr Craig Hardner of CSIRO Plant Industry says.

'We are trying to preserve a representative sample of genetic material from some 75 populations. We feel that we are preserving part of Australia's heritage – indigenous Australians have been picking the nuts for millenia – and at the same time establishing a resource that researchers can access to study the genetic characteristics of wild macadamia varieties.'

The gene banks will be used as a source of traits in breeding programs aiming to develop new varieties for commercial orchards. For example, plant breeders can dip into the macadamia gene pool to develop new commercial varieties and then select for macadamias with better flavour, thinner shells for easy cracking (the protective shells are rock hard) or regional suitability. Growers might also benefit from higher yields and perhaps smaller trees that are easier to harvest and manage.

What's important is that the potential for these improvements and the inherent value of these rainforest dwellers are not lost. The tree collections will act both as a significant resource for plant breeders and as an insurance policy for wild species of macadamia.

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Hard facts

- Seven species of macadamia tree (family Proteaceae) occur in Australia.
- Macadamia nuts are Australia's most commercially successful plant-derived bush food.
- In Australia, nuts are produced from some four million trees in about 14 000 hectares of orchard.
- Australia is the world's largest producer with export value exceeding \$80 million dollars last year.
- The United States, Germany and Japan are major overseas markets for kernels.
- Product segments include chocolate confectionery, bakery, snacks, food service and ice-cream.
- Australia's main production competitors are Hawaii, South Africa and Kenya, using commercial lines developed from our native species, *Macadamia integrifolia*.
- Macadamias represent less than 2% of world nut tree nut consumption, so there is ample potential for expansion.