



Macadamia research – making the most of our native nut

Macadamia trees are native to Australia – indeed they are the only major horticultural crop to be developed from the Australian flora. The first macadamia orchard was established in Australia during the 1880s and Australia is now the world's largest macadamia producer.

About 50 - 60 per cent of macadamias are exported and the entire Australian industry, including value-adding, is worth about \$120 million per year.

CSIRO Plant Industry is helping the industry by breeding better varieties of macadamia trees, developing effective ways to manage macadamias and developing techniques to maximise returns from value adding.

Breeding better macadamia trees

As Australia is the native home of macadamias many macadamias grow naturally in the bush. Within these populations of wild macadamias there is genetic diversity and associated favourable characteristics that may not have been used in the development of commercial varieties of macadamias. There is great potential to use this diversity to breed more profitable and tastier macadamia varieties.

Macadamia research highlights

- Established the National Macadamia Germplasm Conservation Program to protect and preserve the diversity of wild macadamia varieties.
- Conservation program has led to a 50 per cent increase in the genetic diversity of wild and cultivated collections available for use in macadamia breeding.
- Established an integrated research program to maximise commercial impact over the whole-of-value chain for macadamia from farm to consumer.
- Optimised orchard design by incorporating mixed cultivars of macadamias for achieving the most successful pollination rates.
- Developed recommendations for orchard pruning and hedging by mechanical means that do not harm the trees.



Australia is the world's largest producer of macadamias.

With the macadamia industry, CSIRO Plant Industry has established a macadamia conservation program.

This will lead to an understanding of how genetic characteristics of macadamia contribute to the profitability of the industry and the breeding of favourable characteristics into new varieties.

Already some macadamias lines in CSIRO Plant Industry trials are showing a marked increase in yield compared to varieties currently used by the industry.

The sort of rootstock that a macadamia is grafted on to also affects their performance. Macadamias are typically grown on one sort of seedling rootstock. CSIRO Plant Industry is looking at different types of rootstock to identify those that combine most effectively with different macadamia varieties.

Improving macadamia nut quality

Processing specifications for macadamia kernel quality are very tight and require minimal levels of 'excessive browning' of the kernel during roasting or else whole batches are rejected. Some kernels are more likely to brown than others. CSIRO Plant Industry has developed a test that can predict the roasted colour of a kernel before it is roasted and is looking to make the test available to the industry.

By monitoring kernel colour at different temperatures and over different times in experimental ovens CSIRO Plant Industry is also developing roasting guidelines. This could lead to each batch of macadamias having personalised roasting instructions reducing rejects and maximising quality.

Roasting conditions are also important in achieving optimal flavour and together with Food Science Australia, CSIRO Plant Industry are identifying characteristics of macadamias favoured by consumers.

Harvest technology

Macadamias are harvested from the ground in Australia posing some quality problems because nuts mature and start to drop in April and continue to drop until November. This means that harvesting takes place over a long period of time and deterioration and damage to the nuts can take place whilst they are still on the tree or when they are on the ground waiting to be collected.

CSIRO Plant Industry has shown that the chemical Ethephon can be applied to late dropping macadamia varieties

causing the nuts to drop from the trees within two weeks. There appears to be no negative effects on the following year's yield, so the next step is to register the chemical so that it can be used more widely by the industry.

As part of this research CSIRO Plant Industry will also investigate the role of plant growth regulators such as the naturally occurring plant

hormone ABA, in nut drop. This may open up other methods for reducing the time period over which macadamia nuts drop.



CSIRO Plant Industry is developing better macadamia varieties and improved management and harvest techniques.



For further information contact:

CSIRO Enquiries
Bag 10 Clayton South VIC 3169

Phone: 1300 363 400 (National local call)
+61 3 95452176 (International phone)

Fax: +61 3 9545 2175

Email: enquiries@csiro.au

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