

Breeding and Selection of Blueberries®

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INTRODUCTION

I began farming blueberries at Moondarra, in Gippsland Victoria, after meeting with Dr. Ridley Bell from Horticulture Research Institute (HRI) Knoxfield in 1979. The business Moondarra Blueberries is centered on both fruit production and plant propagation. I run the business in partnership with my son Joel.

The commercial blueberry industry in Australia is based around three types of blueberries. The northern highbush (*Vaccinium corymbosum*) (NH) is a high-chill type and southern highbush (*V. darrowi*) (SH) and *V. asheri* (rabbiteye) (RE) are low-chill blueberries.

As a cultivated plant the blueberry is a newcomer. The first selections from the wild were made in the 1920s. One of those wild selections named 'Rubel' is still today listed in some blueberry nursery catalogs. The first release of named cultivars of blueberries to Australian growers was from the HRI at Knoxfield in 1979. These consisted of 15 selections grown from imported seed raised at Knoxfield as well as some popular U.S.A. cultivars imported as plants. There have been many other importations since then from both the U.S.A. and New Zealand, mostly southern highbush.

A number of years ago we became concerned about accessing new cultivars. Increasingly, large corporate grower groups are buying up new cultivars from the leading breeding programs around the world and controlling who has access to them. It also became clear to us that some cultivars, selected on soils and climate vastly different to those found at Moondarra, did not perform at our farm as expected.

On discussion with various overseas blueberry plant breeders it also became obvious that their selection criteria priority list differed from ours. I think being a commercial berry grower provides certain insight that may not be available to a non-grower working at a research institute.

Four years ago, Joel Deveson, his partner Suzy and I embarked on our own small breeding program. We set up a joint venture with Ridley Bell from Mountain Blue Orchards, NSW. Ridley has 15 or more years of breeding experience behind him both here in Australia and also in southern Spain, all of it with southern highbush. The initial focus with our program was with NH × NH and RE × RE crosses but now we are starting to mix both southern and northern highbush (NH × SH).

Our ultimate aim is to have early, mid, and late season cultivars with exceptional flavour; a pleasant, firm, smooth texture; and a large size.

Bush shape, vigour, drought and heat tolerance, and disease resistance are other characteristics we will take into account.

At Moondarra we currently have over 100 named cultivars covering the three blueberry types. We also have access to pollen from some of Ridley's superior selections, so the gene pool available for us to use is quiet large.

Crosses are planned 12 months in advance so parent plants can be planted into appropriate size pots. These are left outside till late winter and then placed in the cool room prior to bud burst.

During early spring branches of unopened flowers are cut and placed into a greenhouse. As flowers open the pollen is collected and kept refrigerated.

Once all the pollen is collected the parent plants are removed from the cool room and placed in an insect-proof greenhouse to initiate growth.

As flowers begin to open, emasculation is performed by removing the corolla and the ring of stamens with tweezers. Pollen is applied to the stigma using the blunt end of the tweezers to which the pollen has been added. The aim is to pollinate around 100 flowers so as to achieve sufficient viable seed numbers for up to 220 plants from any one cross.

During summer, ripe fruit is picked and refrigerated until the harvest on any one cross is complete. The seeds are removed by shredding the berries in a food blender with a little water for about 30 sec and then pouring off the pulp and skins. Sound seeds sink to the bottom while the skins, pulp, and abortive seeds tend to float.

The seeds can be direct sown onto trays of peat moss after separation or dried and stored in the fridge for sowing in early spring. Seedlings start to germinate after about a month but continue to emerge for some time.

The best 220 seedlings from those germinated in the tray are potted when the average size reaches a few centimeters. These are field planted into a seedling block when 18 months to 2 years old. The seedling block is laid out in double rows with plants 30 cm apart.

The following two summers, as ripening progresses, the rows are walked regularly and individual plants assessed against our criteria. Any promising plants have a ribbon attached. Cuttings are taken from marked plants so that a trial block of five plants per selection can be made for further assessment.

We expect the whole process to be at least a 10-year project, but with ready access to a large gene pool and young enthusiastic participants with a keen blueberry sense, the prospects of developing cultivars that suit our requirements and others, are promising and exciting.