

# Breeding Passion — A look into blueberry breeding operations at Mountain Blue in Tabulam, Northern NSW

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Australia is home to some of the world's best blueberry breeders. We spoke to renowned breeder and founder of Mountain Blue, Ridley Bell, and his team about the complexities, challenges, and future of blueberry breeding.

## How it all started

The Mountain Blue breeding program started in the early 2000's. Ridley Bell's involvement in blueberry breeding started much earlier than that though, spanning more than four decades (46 years to be precise) from when he imported seed from North America in 1975 for the first commercially-grown blueberry variety in Australia 'Brigitta'.

Ridley spent time in the United States in the 1980's where he visited breeding areas and developed relationships with other breeders. He started importing selections into Australia during this time and went on to make his own selections in the early 1990's.

Ridley worked full-time as a horticultural consultant in these early years, running breeding trials after work and on weekends. He soon saw the need for better genetics and took a leap of faith in 2001, offering his services (for free) to head up the breeding program at the Atlantic Blueberry Company in Spain in exchange for genetic material.

The Spanish company were struggling financially so it was a win-win situation in Ridley's eyes. It wasn't without its risks though, and Ridley is very thankful to his family who bailed him out financially on more than one occasion.



**I needed the genetic material, and the Spanish company needed a breeder. Neither of us had any money so it was a win-win situation for us both. It was a stressful time financially [with no income for 6 years] but a cross I made in Spain resulted in the creation of the well-known Eureka variety.**

## How does the breeding program work?

The Mountain Blue breeding program operates 365 days per year and employs 4-5 full-time staff breeding both Northern and Southern Highbush blueberry varieties.

The breeding process starts by selecting good parents with desirable attributes. These parents are crossed, and seedlings are planted-out for evaluation. Each year, between 7,000 and 9,000 seedlings are planted, and these are evaluated over 2-3 years. There are around 20,000-25,000 seedlings under evaluation in any given year.

Seedlings that show merit are 'selected' and go through further evaluation at trial sites in NSW, VIC, and QLD, to assess their agronomic, yield and quality traits under different commercial growing conditions. It can take several years of trials to gather enough data to determine if a selection (cultivar) is worth progressing through the breeding program and into varietal development and commercialisation.

When selections reach the commercialisation stage, they are grown at larger scale sites throughout Australia and the world to assess their performance under commercial pressures. Data is collected for 5-6 years from these sites and is used to create a 'recipe' for growing aimed at getting the best possible yield and quality out of the variety.

### Ridley and his team describe the highs and lows of blueberry breeding:

*"At any point along the way you can have heartbreak. We just recently had a very promising variety under development that we had to let go. It had large berries with the greatest crunch we have ever seen, but all the fruit split in a big rain event."*

**Ridley Bell**

*"You must have a passion for blueberries to be a breeder – you've got to eat thousands of them every week. It's very satisfying to do taste panels and see other people's pleasant surprise when they experience the size, crunch and flavour of our blueberries that they could never have imagined."*

**Tom Gunther**

### How long does it take to get a variety ready for release?

It takes between 7-10 years to create a commercial variety. We are currently in process of commercialising a variety that was selected 7 years ago from a cross that was made 10 years ago. We have released nine varieties over the last 10 years.

### What pays for the breeding program?

Now that the breeding program is up and running it pays for itself. Breeding is a continual cycle, there are always new varieties under development and ones that are already commercialised. Commercial varieties generate royalties that are fed back into the breeding program to help support its continuation. Mountain Blue is also a multifaceted business with three other income streams that support the breeding program: a nursery plant supply business, a commercial fruit-producing farm, and a marketing service.

### What's the main aim of your breeding program?

To provide customers with an excellent eating experience.

Fruit must have excellent flavour first and foremost, if a seedling doesn't produce good tasting fruit it won't make it through the selection process. Crunch or firmness is the second most important factor we breed for, no one wants to eat a soft blueberry. Consumers also prefer large berries, so berry size rounds off the top three parameters we select for.

There are many other traits we also consider when making selections including: machine harvestability/ease of picking, shelf life, yield, disease resistance, and performance in different climates and under different growing methods. We are also aiming to develop varieties that will allow us to supply blueberries to the consumer for 52 weeks of the year.

### What are the challenges?

Trying to meet different growing styles, climate variability and consumer preferences. We are breeding for the future so must be on top of market trends. What type of product will the consumer want in 5-10 years? Can fruit be too large? Can it be too crunchy? What type of systems will growers be using in 5-10 years?

Breeding is a long-term game, and you are breeding for an unknown future. We work closely with growers around the world to make sure we are keeping up with the everchanging industry. We need to be adaptable.

In practical terms, the time and space required to maintain a successful breeding program is another challenge. Research and development plots for our breeding program cover almost 10ha at our commercial farm in Tabulam, and we don't sell fruit out of the trial. "To get a good blueberry takes a lot of work through bad ones, so you need a lot of space." Ridley Bell



**Ridley Bell & Pollination team at work in the 10ha variety trial site in Tabulam, NSW.** Photo credit: Mountain Blue.



**Plants are carefully pollinated by hand to cross parent plants with desirable traits.** Photo credit: Mountain Blue.

## What's the future of blueberry breeding?

There are three viewpoints on this:

- From a consumer viewpoint, it's continually improving flavour, crunch, and size.
- From a grower viewpoint, the biggest focus at present is on harvestability and machine harvesting, this is in addition to producing hardy plants with high yields and fruit that stores well for future export markets.
- Climate change is the third viewpoint that must be considered, we need to be more adaptable in the decades ahead and breed for climatic extremes.

## How do growers access your varieties?

Growers can get in touch with the Mountain Blue team to discuss options for varieties in their region. Along with getting access to the genetics, growers are provided with agronomic support and marketing to help ensure the best possible outcome.

## Plant Breeders' Rights

Huge investments of time, resources and expertise go into breeding new varieties of any plant and there is a legal protection mechanism available to protect new varieties so that they cannot be stolen and used by others outside of licensing arrangements.

Plant breeders' rights (PBR), also known as plant variety rights (PVR), are rights granted to the breeder of a new variety of plant that give the breeder exclusive control over the propagating material (including seed, cuttings, divisions, tissue culture) and harvested material (cut flowers, fruit, foliage) of a new variety for a number of years.

PBR is a complex process, but the important take away is that any material over which PBR has been granted is fully protected by the laws of Australia and severe penalties can be applied to anyone who infringes that legal protection.

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