

# NEW NATIONAL PASSIONFRUIT BREEDING PROGRAM (PF19000)

BY DR CATHERINE NOCK, SCU

## THE NEXT PHASE

### PROJECT OVERVIEW

*The next phase of the National Passionfruit Breeding and Evaluation Program has been recently contracted to continue breeding research to deliver new varieties for Australian growers.*

*The program has been led by Dr Peter Bundock and a research team at Southern Cross University since 2016.*

*The new 5-year project is funded by Hort Innovation using the passionfruit research and development levy, and funds from the Australian Government, and supported by contributions from Southern Cross University.*

As most of you will know, the main scion varieties of passionfruit grown in Australia - Sweetheart and Misty Gem - have been propagated by tip cuttings for some years and a number of problems have been reported including reduced fruit size and yield compared to the original selections,

more frequent blind-tipping and also problems with finding suitable tips for grafting due to thinner tips.

The new project will continue and expand on the first phase of the breeding program building on the expertise and resources developed over the past four years.

The project will concentrate mainly on scion variety breeding and aims to produce, select and evaluate new high yielding scion varieties for Australian passionfruit growers. Some initial work aimed at producing a new Panama line will also be commenced.

As part of this new phase, the project will continue to engage with growers through field walks, presentations, industry news articles, and will seek input from a project reference group of growers to steer priorities towards grower needs.

### BROAD OBJECTIVES

– Field trialling program designed to select the best performing varieties for growers. Early-stage trial vines (1st and 2nd stage - see Breeding Cycle for selecting scion varieties) will be evaluated primarily at Alstonville, with advanced selections trialled,

where possible, across the three main growing regions of Northern New South Wales/South East Queensland, Wide Bay region and North Queensland.

- Performance data collected for advanced material for grower information.
- Production of partially inbred selections with the aim of producing a purple Panama.
- Maintain arboretum and expand the seed bank to preserve important germplasm.
- Establish a Breeding Management System for data acquisition, long-term storage and analysis.
- PhD student project with scholarship provided by Southern Cross University:
  - Determine which parent scion varieties produce the best progeny by estimating breeding values based on important traits. These best parents then used to produce larger numbers of progeny for the selection of a future variety.
  - Study of genetic variation for fruit shelf life.

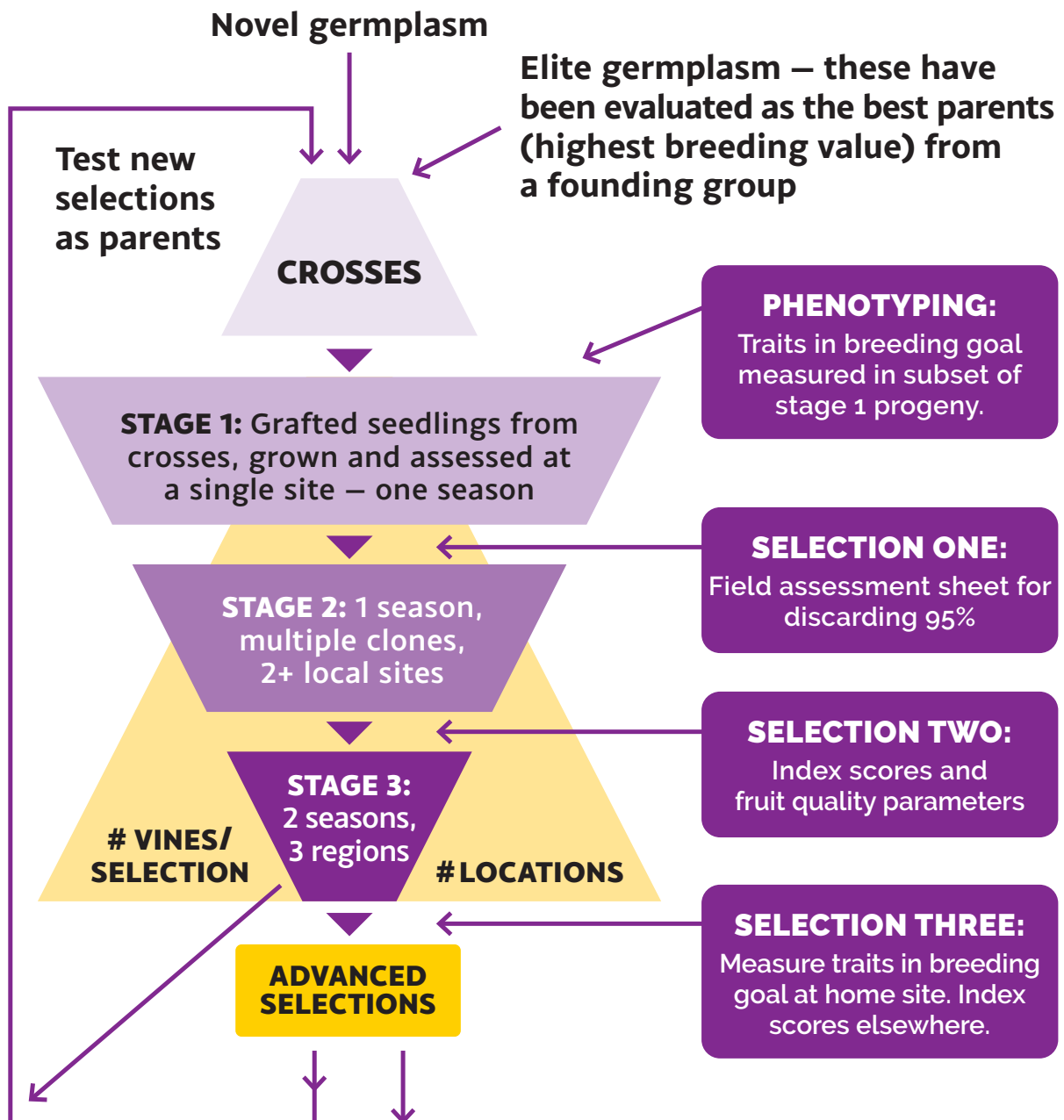


Figure 1. Dr Peter Bundock and Dr Catherine Nock at the Centre for Tropical Horticulture Alstonville trial site.



Figure 2. One of the promising 2nd stage selections from the breeding program

# BREEDING CYCLE FOR SELECTING SCION VARIETIES



**Traits in breeding goal:** e.g. estimated yield of first grade fruit, fruit disease impact, weight/fruit size, pulp pH, etc.

**Field assessment sheet:** Scored as Acceptable or Not; vine health, shell colour, fruit size, pulp fullness, flavour, shell thickness, disease free, blemish free, productivity.

**Index score:** All traits scored in the field – visual vine and in the fruit quality. Measured from 0–9.

**Fruit quality parameters:** Colour, weight, size, total acidity, pH, sweetness (BRIX)

## PROJECT TEAM

The ongoing research team includes Dr Peter Bundock, Associate Professor Tobias Kretschmar, Frances Elliott and Will Petrie. Management of the project will be transferred to Dr Cathy Nock in mid-2021 following an extended transition period to ensure the security of project data, background information, germplasm and technical expertise.

Cathy is a research fellow at Southern Cross University. She has lived in the Northern Rivers of NSW for over 25 years and her main research interest is subtropical horticulture. Cathy is a geneticist with expertise in pre-breeding and breeding

research, data and project management, and germplasm conservation.

She has successfully led Hort Innovation macadamia research projects and is a collaborator on the Australian macadamia breeding program.

Together, the Southern Cross University team has knowledge of the current passionfruit breeding methods and industry requirements along with a commitment to applying new methods to create new opportunities for producing passionfruit varieties into the future. Cathy is looking forward to meeting growers over the coming months and to working with the passionfruit industry.

## RECENT PROJECT UPDATE (NOVEMBER 2020)

Over the past month 300 first stage seedlings have been planted mostly at the Centre for Tropical Horticulture trial site at Alstonville.

These are from cross pollinations of select parents that were carried out by the team last summer.

The Alstonville trial site also contains replicates of promising 2nd stage selections and an arboretum with diverse germplasm.



Figure 3. Fruit from one of the promising 2nd stage selections from the breeding program

Figure 4. Alstonville trial site and arboretum (a) September 2020 (b) November 2020, planting new grafted 1st stage seedlings and 2nd stage selections.