

PROJECT UPDATE

NATIONAL PASSIONFRUIT BREEDING PROGRAM (PF15000)

BY PETER BUNDOCK, SOUTHERN CROSS PLANT SCIENCE, SCU

The National Passionfruit Breeding Programme is funded by Hort Innovation using the Passionfruit research and development levy and contributions from the Australian Government.

2019 CROSSING PROGRAM & 2017 VINE SELECTIONS

We are now well into the last half-year of the one-year extension to the breeding program which is due to finish in June this year. I think the last time I presented an update on the breeding program was at the PAI AGM back in October last year. I mentioned then that we had carried out a large number of crosses in the first part of 2019. Many of these crosses involved nine out of the twenty-nine selections made in 2017, which had been further refined in 2018 for the third stage trial last year.

So, although none of the 2017 selections appears to be of direct commercial quality, nine of them are forming the basis for further crossing and selection. Seed from eighteen crosses involving these vines crossed with Misty Gem and/or Sweetheart or each other were propagated at SCU in June - October last year. Additionally, five accessions inherited from the QDAFF seed bank were selected for propagation. Seedling vines from these twenty-three accessions were grafted onto Pandora rootstock and nearly 450 vines are now in first stage trial at four sites in northern NSW and SE Qld.

2019/2020 FIRST STAGE TRIAL VINES

At the Alstonville arboretum, there are 183 vines on trial, from 19 crosses (families). These vines have so far only been assessed for growth, but most have fruit developing and soon we will be able to test the flavour and acidity. The site is now full of vines with 329 in total, which includes reference vines of Misty Gem, Sweetheart and Pandora and selections past and present in the Arboretum section. A new fertigation system has just been installed there. Vines were mostly planted in October with a few in November and they are looking very healthy at the Alstonville site.

We will not be taking measurements on vines at other sites, just making selections of the best vines for 2nd stage trialling.



Vigorous vines at the Alstonville arboretum
Photo credit: Peter Bundock, SCU

2020 CROSSING PROGRAM

It has been crossing season and we have pretty much completed (26 February) our series of crosses for the 2020 planting season for 1st stage trial.

So far, there are 96 controlled pollinations, with success of 68%, so we have fruit developing or fallen for 65 pollinations. In combination with last year's crosses, these crosses form a matrix that should enable the estimation of breeding values for traits such as productivity, if we can count fruit fall effectively, and of course, only if the project is renewed.

Estimation of breeding values would enable us to identify the best parents for crossing from the 12 parents used in the program so far. New parents would be tested in future years and the worst performers dropped off the list.

This should enable the best crosses to be identified (so larger numbers of progeny for trialling can be produced from them), and it creates a rolling front of genetically improved breeding vines for use in crosses in future years. This would be much like an animal breeding program such as with sheep or dairy cattle, for example.



Passionfruit flower bud bagged for controlled pollination
Photo credit: Peter Bundock, SCU

RAPID GENERATION BREEDING – UPDATE

A scholarship for a MSc student to undertake a project on '**Establishing Protocols For Rapid Generation Advancement In Passionfruit**' was advertised by SCU in November 2019.

The scholarship is being funded 50/50 by SCU and PAI. Applicants, including a number from overseas, were shortlisted and interviews took place in late January 2020.

The preferred candidate, Madeline Ianna, has accepted the scholarship offer and started the project on 9 March.

The project will focus on establishing protocols for growing vines to fruiting stage in soil-free media in a polytunnel and/or glasshouse, manipulating growing conditions to induce flowering early in the life cycle, and possibly some work on tissue culture approaches to raising plantlets from the immature seed of passionfruit (embryo rescue).

ROOTSTOCK TRIAL

Although there was no undertaking to continue to monitor the rootstock trial after mid-2019, fruit counting at Bundaberg was undertaken in November 2019 to determine if there were any significant differences in performance evident between rootstocks.

Over 27,000 fruit were counted from around 300 vines. An initial analysis of this data indicates that the rootstocks grown from seed of the variety 'Lakelands' performed statistically significantly better than the current rootstock 'Pandora' in terms of yield of fruit on the vine. The yield increase is from 13-23 extra fruit on average per vine, depending on which Pandora isolate is compared. Five rootstocks had significantly higher 'yield' than the old standard rootstock 'Queensland DPI flavicarpa'.

The second-best performing rootstock at this one point in time was 'McGuffies Red'.

Rootstocks from crosses between different flavicarpa lines had an average performance with regard to fruit yield. Vines planted in October 2018 (17/10/2018) had significantly higher yields than vines planted in November 2018 (25/11/2018) having been in the ground for an additional 39 days.



Maddy Ianna is the MSc candidate & scholarship holder, who will be studying rapid generation breeding of passionfruit. Photo Credit: Maddy Ianna

At the time of going to press, Hort Innovation has started consultation with the Passionfruit SIAP and the Passionfruit Australia Management Committee about the next steps for levy investment in breeding.

It is the opinion of the Management Committee that the delivery of new commercially viable varieties remains the number one priority for our industry today, and that all available resources should be invested to achieve the new varietal outcomes – for all growing regions.

We want to hear from every grower that is interested in the future of varietal breeding in passionfruit as we would like you to be involved in the process of specifying the parameters for the next stage of the levy investment program.

Please email Amanda Roy on admin@passionfruitaustralia.org.au ASAP to be involved.

Given that the current program expires on June 30, we are very keen to move quickly so please get involved!

COVID-19 – RESOURCES TO ASSIST YOU THROUGH THIS CRISIS

Given the fluidity of the situation with COVID-19 spreading rapidly through our communities, particularly in the densely populated areas in our cities, it is not appropriate to try to provide resources directly through this magazine.

At the time of going to press, a range of federal and state support measures have been announced.

Learn more about the Federal Government Support at the Treasury site:

[treasury.gov.au/coronavirus](https://www.treasury.gov.au/coronavirus)

Access up-to-date information about the spread and the health measures:

www.australia.gov.au

Instead of providing details which may change, we have gathered together a series of links for you to access online to get the latest information as and when you need it.

QLD

The Queensland Government has created a one-stop-shop website for all information relating to the virus.

www.covid19.qld.gov.au

NSW

In NSW, there is a hub for information available at this website.

preview.nsw.gov.au/covid-19

WA

In Western Australia, a similar hub has been created and is being populated with information as it becomes available.

www.wa.gov.au/government/coronavirus-covid-19

Most importantly, stay safe & well.

passionfruitaustralia.org.au/covid-19