

Australian Strawberry Breeding Program Update

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BS17000: National Strawberry Varietal Improvement Program (2017-2022)

The Australian Strawberry Breeding Program (ASBP) has now completed our 2019 trials for subtropical and Mediterranean production regions. As such, it's a good time to let you know what we've been up to for these regions and what will be coming out of these programs in the near future. The 2019/20 temperate season is also now underway, and so we can provide an update on our trials for this region.

The ASBP is a national breeding program, targeting Australia's three major strawberry production climates: subtropical, Mediterranean and temperate. Our aim is to develop and release new strawberry varieties that are locally adapted to each region, with improved consumer traits, increased profitability for growers, and lower production costs.

There are four 'levels' of field trial that we run each year and for each targeted production region: seedling trials, early stage clonal trials, advanced stage clonal trials, and on-farm trials.

Every year we create a large number of genetically unique seedling plants via controlled cross-pollination. These seedlings are assessed in field trials for one season, and the most promising of them are then clonally propagated using runners, planted into randomised and replicated 'early stage' trials, and evaluated in detail. At the end of this season the best performers from these early stage trials are then assessed a second time in 'advanced stage' trials.

Following this, the best are once again selected and distributed to a small number of growers for 'on-farm' trialling to get their feedback. This grower input is used to help decide whether to commercialise any of

the selections as new varieties. All of these stages of trialling are run simultaneously each year, for each of the three production regions.

Following is a summary of our activities in 2019 for the Mediterranean and subtropical production regions.

Mediterranean breeding trials

The Mediterranean strawberry production region is centred around Perth, Western Australia. This year we completed trialling for the final stage of pre-commercialisation (Plant Breeder's Rights Part II) for three Mediterranean selections: 'Jubilee-ASBP', 'Rosalie-ASBP', and 'Fanfare-ASBP' (see Figure 1A, 1B and 1C on PAGE 38).

High health plants of these have been distributed to plant propagators around the country for bulking of numbers, and should be available for purchase in small numbers in 2020 or 2021.

Plant breeders' rights (PBR) 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.



Figure 1A. Jubilee



Figure 1B. Rosalie

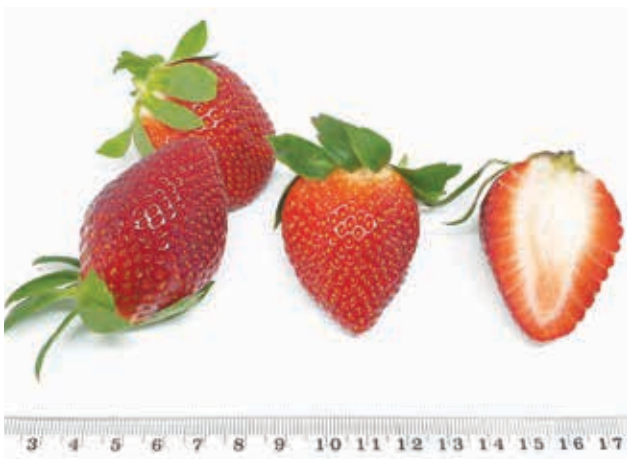


Figure 1C. Fanfare

Prior to this year's Mediterranean season we met with a small number of key WA industry representatives to get their input on the direction and target traits of the Mediterranean breeding program, and operation of the 2019 breeding trials. This was very valuable, and allowed us to optimise our efforts for the Mediterranean industry.

In 2019, a total of 763 Mediterranean seedlings were assessed, as well as seven early and three advanced stage selections (Figure 2A). These numbers are set to increase in 2020. Seven selections were additionally assessed in on-farm trials in the region to get industry input into plant performance and selections to advance.



Figure 2A.

At the end of the trial in mid-October, we selected 15 seedlings to be clonally replicated and assessed in the 2020 early stage trial, and two early stage selections to progress to advanced stage trialling and simultaneous on-farm trialling in 2020.

Subtropical breeding trials

The subtropical strawberry production region is predominantly centred in South East Queensland, up to Bundaberg to the north. In 2019 we completed trialling for the commercialisation of two subtropical selections: 'Meadowsong' and 'Venus-ASBP', and high health plants of both have been distributed to plant propagators (Figure 3A and 3B).



Figure 3A. Meadowsong



Figure 3B. Venus

For the subtropical region in 2019 we planted and assessed a total of 12,272 seedlings across two trial sites in Nambour and Bundaberg, Queensland (Figure 2B and 2C). We also evaluated 79 early stage selections and 22 advanced stage selections. An additional five selections were assessed in on-farm trials on grower's properties.



Figure 2B.



Figure 2C.

In November 2019 a Subtropical Reference Group meeting was held for the project, where fruit growers and plant propagators gave valuable input and feedback on the subtropical breeding program. With their assistance we've identified eight selections to be trialled on farms in 2020, prior to the potential selection of some of them for commercialisation. An additional 23 early stage selections were chosen by the program to progress to advanced stage trialling in 2020, and 172 seedlings to early stage trialling.

Temperate breeding trials

Temperate breeding trials for the 2019/2020 season were planted in April 2019. A total of 12,715 temperate seedlings are being assessed this season, along with 66 early stage selections and 29 advanced stage selections. These trials are located at Wandin, Victoria and Applethorpe in Queensland. Eleven advanced temperate selections are being trialled in on-farm trials in Victoria, South Australia, Tasmania, Western Australia, and Queensland.

Disease resistance trials

Screening for disease resistances of advanced selections from all production regions is continuing. These experiments are being used to determine the level of disease resistance in our best selections and varieties, as well as informing controlled cross-pollinations to increase resistance levels in our breeding population. In the last 12 months we have conducted routine screening experiments for the major crown wilt diseases Charcoal Rot, *Fusarium oxysporum* f. sp. *fragariae*, and *Colletotrichum gloeosporioides*. Genetic sources of resistance have been observed for all three diseases, and crosses are being performed to increase the incidence of resistance in our selections.

We have also undertaken our first screening experiment for Powdery Mildew, which included advanced selections from all three regions as well as two seedling families that shared a parent with high tolerance for Powdery Mildew. A high proportion of these seedlings also showed good tolerance and improved agronomic traits over their tolerant parent.

One of the guiding principles of the breeding work is to foster the exchange of ideas. We value your thoughts and appreciate your feedback for the project team so please get in touch.

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**Hort
Innovation**
Strategic levy investment

**STRAWBERRY
FUND**

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We thank the contributions by the Temperate and Subtropical Reference Groups and Mediterranean industry members who have help guide the program, the Industry Development Officers, and all other industry members who provide feedback, advice, and support.

We are also extremely grateful to all the fruit producers in all states who have trialled, collected data on, and given feedback on our on-farm selections. This has helped us make more informed and better commercial judgments.