

# Australian Strawberry Breeding Program Update

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A new variety, wrap-up of the subtropical season, and an update of Mediterranean and temperate seasons from project BS22000: Australian Strawberry Breeding Program

The Australian Strawberry Breeding Program (ASBP) strives to develop superior strawberry varieties tailored to the specific demands of Australia's varied climatic growing regions. With a focus on enhancing both grower profitability and consumer satisfaction, our trials and research reflect our commitment to delivering practical outcomes for industry. This article gives a summary of our recent achievements and ongoing initiatives.

## New variety

Following an overwhelmingly positive response from industry members, we are excited to introduce subtropical variety '**Stella-ASBP**' (breeding ID 2017-040) to the market (Figure 1). Data from our clonal trials and feedback from industry shows that *Stella* has large fruit, high yield, and generally produces fruit earlier in the season compared to *Red Rhapsody*. *Stella* also has a higher flavour rating than both *Red Rhapsody* and *Susie-ASBP*, and is a new favourite for a number of our breeding team. Similar to *Susie* it has full resistance to Red Leaf Disorder, and early trialling suggests that it may also perform well in the Mediterranean (Perth) region.

Additionally, small numbers of our soon-to-be-released novelty pink variety (SB 17-230-ASBP) are available to trial in small numbers this coming season. Talk to your plant propagators to check availability.

## Subtropical update

In the subtropical region, our 2023 breeding trials conducted at the Maroochy and Bundaberg Research Facilities in Queensland have yielded promising results (Figures 2 and 3). We have selected 149 seedlings, including 21 specialty lines, with consistent performance across the season to assess in replicated trials in 2024. We have also chosen 26 early-stage (stage 2) and 10 advanced (stage 3+) accessions for further evaluation during the 2024 retrials. Valuable feedback from growers conducting on-farm trials and from the industry field walk at the Maroochy Research Facility in July played a crucial role in our selection process.

Responding to feedback from industry, we conducted sap analysis for nitrate and potassium concentration in the subtropical clonal trials. This analysis, conducted fortnightly throughout the season, focused on key varieties such as *Red Rhapsody*, *Susie*, *Stella*, and select lines from the 2017 and 2019 cohorts. Additionally, we initiated monthly leaf nutrient testing for *Red Rhapsody*, *Susie*, and *Stella*. These analyses will help to establish a knowledge base for the nutrient requirements of advanced accessions and varieties. These efforts aim to provide growers with data-driven insights for effective crop management.

Stay tuned for a summary of these analyses in the next edition of the Australian Berry Journal.



**Figure 1. New variety 'Stella-ASBP'.** Photo credit: Jodi Neal



**Figure 2. Katie O'Connor assessing subtropical seedlings at Bundaberg, Qld, with coloured flags indicating good performance at different time points throughout the 2023 subtropical season.** Photo credit: Jodi Neal



**Figure 3. Industry members evaluating subtropical clonal accessions at the farm walk in Nambour, Qld, July 2023**

Photo credit: Katie O'Connor

### **Mediterranean update**

The Mediterranean seedling trial at the Maroochy Research Facility has resulted in the selection of 32 promising candidates for further development.

The number of Mediterranean seedlings assessed will be more than doubled in future seasons to over 4,000 each year, substantially increasing the likelihood of developing advantageous varieties for this region sooner.

The clonal trials hosted by a Mediterranean grower at Bullsbrook, WA, are still in progress (Figure 4). More plant and fruit traits are being assessed this year compared to previous years, which will inform selection decisions at the end of the season.

Two other growers in Western Australia are also hosting on-farm trials of two advanced accessions that are candidates for commercial release, pending discussions with industry stakeholders.

### **Temperate update**

Despite wet weather conditions extending the usual planting window, our temperate trials in Wandin North, Victoria, have progressed well.

We are assessing 11,752 seedlings from 50 families this season, plus 68 early-stage and 25 advanced-stage accessions in our replicated clonal trials (Figure 5).

After consultation with industry, our data collection period will be extended until later in the season going forward, to match commercial practice more closely.

We also have 11 advanced accessions being trialled in seven on-farm trials across five states. A number of temperate accessions are looking especially promising, and we're excited to see how they perform this season.



**Figure 4. 2023 Mediterranean clonal trial at a grower's property in Bullsbrook, WA.** Photo credit: Jodi Neal



**Figure 5. 2023-24 temperate clonal trial at Wandin, Vic., taken September 2023.** Photo credit: Jodi Neal

## Other breeding activities

Our routine powdery mildew screening has identified a number of tolerant accessions for all three production regions. These accessions are playing a pivotal role in current and future cross-pollinations, further enhancing fruit size, firmness, and mildew tolerance within the breeding populations. Additionally, annual screening for fusarium wilt tolerance has been completed for this season, and a screening experiment for charcoal rot tolerance has commenced.

Using genomic prediction models, we identified three subtropical seedling accessions from 2022 with predicted high performance, based on their genetic fingerprint alone. We integrated these accessions as parents in our subtropical cross-pollinations this winter and will use the same technology and innovation to identify elite Mediterranean and temperate accessions in the coming months. We are committed to continuous improvement and excellence in our breeding program and so are also currently re-assessing our statistical methods to enhance our confidence in selecting the best performers.

This year we also continued our involvement in the Hort Frontiers project *Genetics of Fruit Sensory Preferences* (Hort Innovation project AS19003). Fruit from ten varieties and accessions were assessed by a consumer preference panel and a trained sensory panel to provide feedback on Australian consumer preferences for strawberry. This has provided invaluable information to guide breeding efforts for improved and optimal strawberry flavour. Dilmini Hettiarachchi, a PhD student with the University of Queensland and co-supervised by ASBP project lead Jodi Neal, is additionally assessing this fruit for their volatile, sugar, and acid contents. As part of her PhD, Dilmini will identify genetic and near-infrared (NIR) tools to more easily screen breeding material for the presence of desirable volatiles (positively contributing to aroma and flavour) and sugars. Check out the Autumn 2024 issue of this journal for a full update on results from this project.

## Conclusion

The ASBP team remains committed to leading advancements in strawberry breeding and catering to the diverse needs of growers across different production regions. We extend our sincere gratitude to the industry for their continued support, invaluable feedback, and cooperation in our breeding efforts.

The ASBP is guided by the principle of fostering idea exchange. If you would like more information, please contact Jodi Neal (email: [jodi.neal@daf.qld.gov.au](mailto:jodi.neal@daf.qld.gov.au); phone: 07 5381 1352). Your thoughts and feedback are highly valued by the project team.

## Acknowledgements

The Australian Strawberry Breeding Program has been funded by Hort Innovation using the strawberry research and development levy, with co-contributions from the Queensland Government through its Department of Agriculture and Fisheries and funds from the Australian Government.

We thank the contributions by the Temperate, Subtropical and Mediterranean Reference Groups who have helped 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 accessions. This has helped us make more informed and better commercial judgments.

The Australian Strawberry Breeding Program team members include Jodi Neal (project lead), Michaela Antoine (Perth field assistant), Geoffrey Brinkley (Nambour lab assistant), Mitchell Gates (Nambour lab assistant), Apollo Gomez (pathologist), Joanna Gillespie (genetics and virus indexing), Dilmini Hettiarachchi (PhD student), Juan Jimenez (Nambour lab assistant), Dale McKenna (Nambour field technical officer and hydroponics), Lauren Stirling (Nambour field assistant), Alan Noon (Wandin field assistant), Katie O'Connor (breeding and genomics), Harrchun Panchalingam (laboratory technical assistant), Michelle Paynter (virus indexing, tissue culture, and pathology), Sandy Shaw (Wandin field assistant), Karen Spencer (Wandin operations manager), and Louella Woolcock (Nambour field and glasshouse operations manager).