Sugar Research Australia

Information Sheet
IS13029

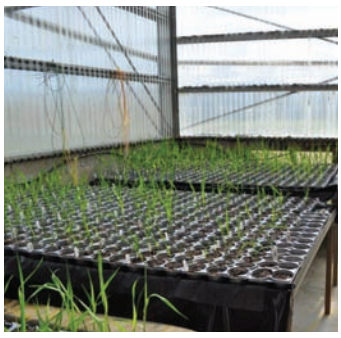
Herbert Plant Breeding Program

The SRA Plant Breeding Program in the Herbert region targets the needs of the local sugar industry through the optimised selection and release of more productive and disease-resistant varieties.

Left: *Herbert variety team*
(From left to right)
Plant Breeder: Felicity Atkin
Farm Manager: Jeff Smith
Variety Officer: Heidi Clements

22 new varieties have been released in the Herbert since 2000 from the SRA breeding program.

Female and male flowers are positioned in a 'lantern' to facilitate pollen transfer and prevent contamination.



Potential new varieties are screened for disease resistance by SRA Pathologists.

Parent selection and crossing in Meringa

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Early stage selection in Meringa

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Final stage selection in the Herbert

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New varieties are propagated and released for growers through local productivity services

Seedlings grown from true seed from crossings are planted to the field for assessment.

Measuring cane yield with commercial harvesters and weighing equipment. Sucrose content (CCS) is analysed by Near Infrared Spectroscopy (NIR).

New varieties which are approved for release are propagated for growers by Herbert Cane Productivity Services Limited (HCPSL).

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The SRA team is focused on providing an efficient and effective Plant Breeding Program to the Herbert sugar industry. Some of the improvements are as follows:

- Better statistical analysis methods to assess potential new varieties in trials which are compared to the current major commercial varieties.
- By using new trial designs, we have increased the number of potential new varieties we trial in the final stage by 50% (150-180); where they are trialled each year without an increase in resources.
- Final stage selections are assessed over 4 locations in the Herbert, and are also duplicated at 4 locations in the North. The performance of potential new varieties are tested under different soil types, management practices and micro-climates.
- The top performing potential new varieties from the first plant crop harvest results of the final stage trials each year are also repeated in a second set of trials to collect more productivity data before release.
- The SmutBuster program has doubled the number of early stage potential new varieties as a response to the smut outbreak.
- The time from initial crossing to release of a new variety to the industry has been reduced from 12-13 years to 10-11 years.
- Potential new varieties advancing through the selection program are screened for disease resistance to smut, Fiji leaf gall, leaf scald, mosaic, yellow spot, red rot at Woodford and for Pachymetra root rot in Tully by SRA pathologists. This means disease ratings are available early before variety release decisions are made.
- The SRA breeding program identifies and selects parents for crossing with traits that will enhance the clone performance for the Herbert challenges. These parents come from the vast SRA germplasm collection of old and current varieties as well as wild and foreign varieties.
- The SRA variety exchange program exchanges varieties with 17 countries around the world, including Brazil and the USA. These varieties are included in assessment trials in the Herbert region. They are also used for parents in the crossing programs, providing valuable traits.
- Wild species of cane, closely related to the domesticated cane cultivars, have been used in the production of hybrids to capture valuable traits such as vigour, ratooning ability and disease resistance.
- Inter Station Exchange (ISE) – as a method of exchanging elite clones between the other Plant Breeding Programs (North, Burdekin, Central and Southern). This facilitates earlier adoption of new varieties from other regions.
- Top performing varieties are assessed, for not only performance, but also suitability for the industry, with physical features such as lodging, arrowing, suckering, side shooting and bud prominence taken into consideration.