CENTRAL REGION VARIETY DEVELOPMENT PROGRAM

Sugar Research Australia

The SRA Variety Development Program in the Central region targets the needs of the Plane Creek, Mackay and Proserpine sugar industries.

14 new varieties have been released in the Central region since 2010 from the SRA breeding program.

PARENT SELECTION AND CROSSING
in Cairns at the Meringa Research Station

EARLY STAGE SELECTION
at Mackay Research Station

FINAL STAGE SELECTION
at Mackay, Plane Creek and Proserpine sites

NEW VARIETIES ARE PROPAGATED
and released to growers through local productivity services

The SRA team is focused on providing an efficient and effective Variety Development Program to the Central Queensland industry.

Here are some of the changes implemented recently:

- Better statistical analysis methods are used to analyse results from assessment trials which compare the performance of potential new varieties against current major commercial varieties.
- By using new trial designs, we have increased the number of potential new varieties in the final stage by 50%, without an increase in resources.

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

Seedlings are propagated from seed collected from the crossing and planted into the field.

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

New varieties which are approved for release are propagated for growers by Plane Creek, Proserpine and Mackay Productivity Services.

- The SRA breeding program identifies and selects parents for crossing with genetic traits that will improve breeding for the challenges of the Plane Creek, Mackay, and Proserpine cane-growing regions. These parents come from the large SRA germplasm collection of old and current varieties as well as wild and foreign varieties.
- 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 new sources of disease resistance.
- The SRA variety exchange program exchanges varieties with 17 countries around the world, including Brazil and the USA. These varieties are used for parents in the crossing program, providing valuable traits in the breeding pool, and are also selectively included in final assessment trials based on their merit.
- Elite clones from other regions (Northern, Herbert, Burdekin, Southern) are tested locally in final stage assessment trials. This facilitates earlier adoption in the Central region of new varieties from other regions.
- 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 and red rot at Woodford and for Pachymetra root rot at Tully by SRA pathologists. This means disease ratings are available before variety release decisions are made.
- Selection pressure for Pachymetra resistance has increased at all stages of selection, including parent selection and crossing, in response to the loss of Pachymetra resistant but smut susceptible varieties.
- Fast-tracking the selection program by using tissue culture on high value crosses to skip the first stage of selection and potentially save three years in the program.
- Using Marker Assisted Selection (MAS) to discard smut susceptible clones before going to the field in assessment trials.
- Final stage selections are assessed over four locations in the Central region. The performance of potential new varieties is tested under different soil types, management practices and micro-climates.
- The top performing potential new varieties from the plant crop harvest results of the final stage trials are also then planted in a second set of assessment trials to collect more productivity data before release.
- In collaboration with productivity service companies, the top performing clones are planted into 'observation' plots to gather agronomic information prior to release.
- Integration of the Southern Region and NSW early generation selection with the Central program. Clones provided from the Central program for later stage trials in Southern district and NSW, including some elite clones from the Herbert introgression program.
- The program is producing varieties with good commercial performance. SRA21$^{\Phi}$ and SRA22$^{\Phi}$ are examples of recent releases from the Central program.