

Pollinating canes at SRA Meringa. During pollination, it is important that the male plant remains taller than the female plant to ensure that he pollinates her.

Project details

Key Focus Area: 1

Optimally adapted varieties, plant breeding and release

Project name

Maximising the rate of parental improvement in the Australian sugarcane breeding program

Project number

2008/319

Principal provider

Sugar Research Australia

Project end date

March 2016

Choosing the perfect parents

While some people claim that you can tell how a woman will look in 20 years by looking at her mother, SRA researchers take a more rigorous approach to choosing breeding stock for their plant breeding program.

The SRA plant breeding program is designed to identify varieties that have genetic traits (for example disease resistance, CCS, TCH) that add extra value to the sugarcane industry.

Xianming Wei, SRA Principal Researcher, said that since 2008 his team have been researching ways of improving the way desirable genetic traits in parental varieties are identified and breeding stock is selected.

"We are always looking for ways to improve the way that we select parents for our breeding program. Obviously there is a lot of data and genetic information that needs to be considered when we select potential parental varieties," Xianming said.

"We need to challenge ourselves to make sure we are using the information in the best way."

"For example, say we are considering the potential value of a clone and have two or three pieces of information about different traits, we need to know how each piece of information should be weighted."

"Is one more important than the others? If we prioritised the information a certain way last year, is the ranking still the same this year when extra information becomes available?"

Xianming explained that they are also developing DNA marker technology for key cane traits and also establish trials to understand how sugarcane traits are genetically controlled so they can be more effectively assessed as parental clones.

"This will help us to improve our understanding of how parents pass their genetic information on to their progeny," he said.

"For many varieties that are already used as parents in the breeding pool we have a lot of data about the traits that each parent is likely to pass on, based on their progenies' performance. For example, we have collected data about the cane yield of the parents and the cane yield of the clones they have produced."

"For other varieties that have not already been used in the breeding pool there are more unknowns. We don't know how many of their traits they are likely to pass on to their progeny."

"We are keen to use the DNA marker technology to understand how we can better predict which traits will be passed down. This will mean we can more efficiently and effectively breed high performing varieties," he said.

Not surprisingly, this is a lengthy process that involves years of trials and a lot of data analysis.