Milling trials **assess soft canes**

When a new variety is approved for release for a region within the Australian sugarcane industry, a range of factors are considered to assess how it will perform for sugarcane growers and millers.

> *For more detail on recent changes to the variety approval process, see the story on page seven.*

One of the important characteristics that impacts how a variety is processed through the mill is its fibre characteristics – that is, where it sits on the spectrum between being a soft cane or a hard cane.

If a variety sits too far at either end of the spectrum, this causes issues for milling the cane. For example, some people in the industry may remember old soft (or low fibre) varieties such as Q87 and Q103 and the associated stories of lights dimming in factories as these varieties were milled. In recent years, new varieties with low fibre characteristics, SRA1$^{\Phi}$, SRA4$^{\Phi}$ and QC04-1411, were released or approved for release in several regions.

Due to concerns that these varieties are too soft in fibre to be milled, and that this would impact value chain profitability, a small research project took place in 2016 to investigate this further and compare these varieties against standard varieties.

The project was led by Dr Geoff Kent at QUT, funded by Sugar Research Australia (SRA), and SRA Bundaberg-based plant breeder Roy Parfitt has been a major collaborator.

Recent varieties

According to the trials, SRA1$^{\Phi}$ had a low fibre content of typically 10% and an impact resistance lower than the minimum criterion considered for normal canes.

The other two varieties, SRA4$^{\Phi}$ and QC04-1411 had relatively normal fibre content of about 14%. While their impact resistance was low, it was still within the normal range. Shear strength is the other fibre quality parameter with a defined normal range.

The shear strength of all three varieties was within the normal range, with SRA1$^{\Phi}$ having the lowest values. The final fibre quality parameter, short fibre content, does not have a defined normal range.

It is noted, however, that of the 35 results examined, the two highest values were for QC04-1411 and the next two highest values were for SRA1$^{\Phi}$ (Q240$^{\Phi}$ was the fifth highest and also had a shear strength lower than QC04-1411).

Milling issues

Dr Kent said that while the soft fibre varieties were able to be processed, there were some significant problems that were highlighted during his experiments.

This included mill feeding problems and stalling the elevator at one mill, and large quantities of froth overflowing the drains at another mill after about 15 minutes, which would have eventually led to the mill needing to stop operation. There were also further issues such as steam pressure reduction in another mill, due to increases in bagasse moisture content.

“Not all factory boilers can withstand significant increases in bagasse moisture content,” Dr Kent said.

Above: SRA1$^{\phi}$ in the field. **Opposite page:** Dr Geoff Kent, QUT, conducting trials at the Isis mill in October 2016.

"The experience at one mill processing SRA1$^{\phi}$ resulted in a rapid drop in steam pressure that only avoided a boiler shutdown because SRA1$^{\phi}$ was only processed for 15 minutes."

In light of the research, Dr Kent said that the yield and CCS of such varieties needs to be considered in relation to their practicality and costs with processing and capital upgrades.

Some mills have suggested that improvements that would be required to process such varieties would run into many millions of dollars, which they could not afford. Other regions at this stage are continuing with release of SRA1$^{\phi}$, albeit watching the research closely.

"We have also found since starting this project, that some of this information hadn't been making its way to SRA's plant breeding program, so we have also identified the opportunity to improve that communication," he said.

The current process

The fibre quality of cane is also considered in relation to a range of other traits including yield, CCS, disease resistance, and ability to ratoon.

In the past, BSES and the Sugar Research Institute developed standard tests that measured a range of characteristics in relation to fibre, and use of these tests has continued at SRA.

These particular new varieties were measured to be near the edge of the acceptable parameters, or just outside the parameters in the case of SRA1$^{\phi}$.

The decision to release the varieties continues to sit with the regional committees. SRA is no longer promoting SRA1$^{\phi}$, however the decision to release the variety remains with local regional variety committees.

Further research

A new project is proposed to begin on July 1 with the title *Reviewing and extending knowledge of fibre quality assessment and effects of cane varieties*, also led by Dr Kent with collaboration from Mr Parfitt. At the time of writing, it was under consideration by the SRA Research Funding Panel.

The project will extend the work of the 2016 research by reviewing historical fibre quality measurements (FQM) and understanding the variability within varieties, the impact of different mill arrangements, and consider how FQM could guide variety development. It will also look at how to best present FQM information for selection of new varieties.

This could enhance the feedback for plant breeders on the effect of varieties on mill operation and performance. It will also review the "safe range" FQM.

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