

Assessing the sugar content of a crop for managing the harvesting sequence



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Maximising whole-farm sugar yield is possible by selecting blocks to harvest with maximum Commercial Cane Sugar (CCS).

As the CCS of a block can vary due to a range of factors, including variety, age of the crop, arrowing, moisture, nutrient or temperature stress, it is important to understand which blocks contain the highest CCS levels.

This information can be obtained through some basic measurements and can help growers to develop a harvesting sequence plan.

Tools of the trade

A portable refractometer (or handheld brix meter) is a useful tool when planning the block harvesting sequence on your farm.

A refractometer measures brix in cane juice—a higher brix reading indicates higher sucrose content. The refractometer measurements taken from stalks of cane in the field can be used to estimate the relative sucrose content between blocks.

Refractometers, which are also used in home brewing, are readily available for around \$100–\$200.

The brix measured in the field is relative to but does not equal the mill-measured CCS due to the harvesting process, sampling error, fibre contents and environmental factors.

Juice-sampling equipment

A juice-sampling device, or dibbler, makes the measuring process easy. A handy engineer can make a device or dibbler, as shown on page 5. Pliers or a screwdriver can also be used to squeeze juice out of the stick into a reservoir, but this is slow and will destroy each stalk. Clean the tools between blocks to prevent the spread of ratoon stunting disease (RSD).

Assessing the average sucrose content of the block

To get a representative sample of the block, you will need to sample 10 to 20 sticks of cane from at least five locations spread across the block and at least 10 metres in from the edge or ends. It is important to sample this many sticks as the accuracy of the measurement improves when more sticks are sampled. Take the sample at the same height from the ground, such as waist height, on each stalk.

Take one brix reading from the collected juice sample at each of the locations and then average the five readings to give an overall brix for the block. If one of the five brix readings varies by greater than 10 per cent from the average, discard it from your calculation.

Sample each block and compare readings to assess the block with the best sugar content to harvest.

Assessing the maturity of the block

Because basal internodes of the stalk fill with sugar while the top of the stalk is still actively growing, the sugar content varies throughout the stalk. The lower internodes will have higher sucrose content than the upper stalk on an immature plant. As the stalk matures, more internodes reach their maximum CCS level.

You can use this characteristic to assess whether a sugarcane crop has reached its maximum CCS by sampling the stalks separately at top, middle and bottom. Use the same technique outlined above, but at each site collect CCS samples from the three positions along the stalk length.

A crop with more similar readings at the top and bottom of the stalk will be more mature, and only a minor increase in overall crop CCS will result from delaying the harvest.

A crop with a bigger difference between the brix reading at the top of the stalk compared to the bottom will be less mature. A higher overall crop CCS may result if harvest is delayed till the next round.

Maximising the sugar yield from each block by planning the harvester sequence will improve whole-farm productivity.

Sweet success

Michael Vassallo works with his parents, Colin and Georgina, and his brother Colin on their cane farms in Septimus in the Central region. Every season Michael takes regular refractometer readings of the blocks on their farms to compare the sugar content of the different varieties over time.

He charts these on his computer as a record from year to year and the results are used to help the team decide which blocks to harvest first and which blocks to leave till later in the season to improve the whole-farm sugar yields.

The chart below shows Michael's refractometer readings over time of five varieties. The results indicate a general increase in sugar content of all varieties. Harvesting Q200[®] early and Q208[®] later maximised the whole-farm sugar yield in this season.



Above: Cane Sap Extraction Tool (Dibbler). *Photo courtesy of Bruce Quinn, Isis Productivity Ltd.*



Top left: Dibbler. **Top right:** Refractometer.