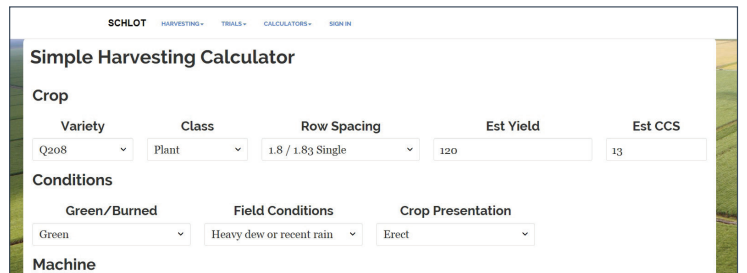




Sugar Research
Australia

SRA GUIDE TO MODERN HARVESTING FAN SPEED

The harvester operator is the single most powerful person in the entire sugarcane value chain. Even under optimum operating conditions, the combined value of the sugar lost through the choppers and the extractor is about equal to the cost of harvesting. The value of sugar lost at harvest as a result of short billets, high pour rates and high fan speeds can be much greater than the direct cost of harvest. Finding the right balance between harvesting losses and the direct cost of harvesting makes everyone more money. Tools such as SCHLOT, shown to the right, (<http://calcs.schlot.com.au/>) allow all sectors to make an informed decision between loss and the direct cost of harvesting.

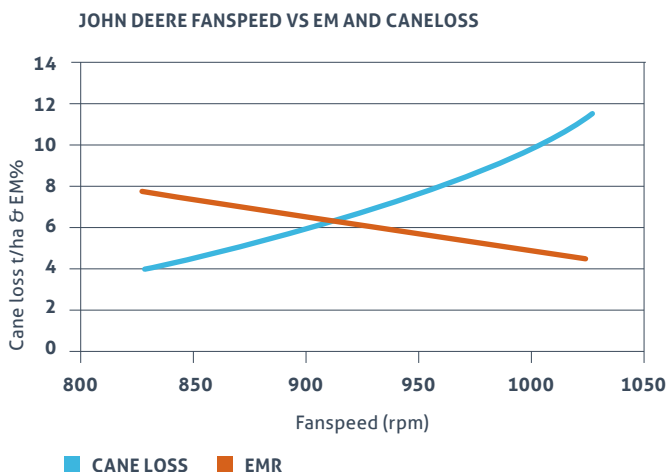


The extractor fan is intended to clean cane with minimal losses when operated correctly. Understanding the performance and limitations of the harvester, and more specifically the trash extraction system, is critical in understanding the consequence of different trash removal strategies. At current high pour rates, higher fan speeds are more effective at extracting cane than cleaning it. Numerous trials by SRA and others have repeatedly shown that in green cane, losses readily exceed 10-15 tonnes / hectare as fan speeds get above ~900 rpm.

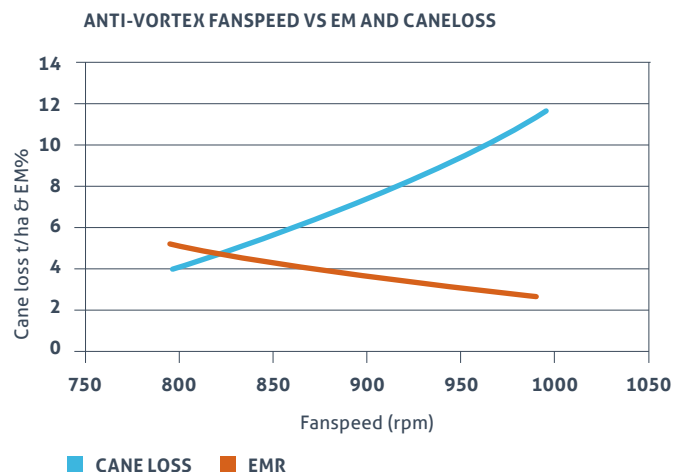
A large number of other factors affect cleaning efficiency and cane loss, some reducing it and some increasing it. These include manufacturer, fan type, blade configuration and fan speed.

Trials undertaken with different fan types show that increasing fan speed from 830 rpm to 1030 rpm tripled cane loss and only reduced EM levels by less than two percent as outlined in the graphs below.

7.5 t/ha increase in losses for 1.8% reduction in EM

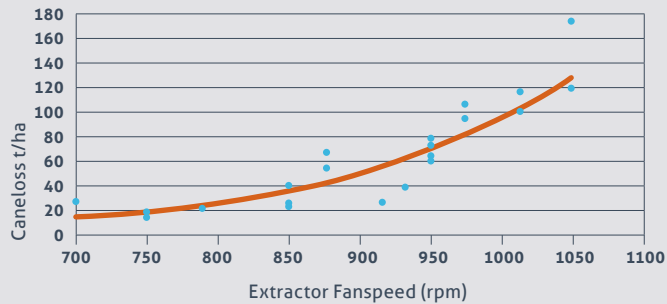


7.5 t/ha increase in losses for 1.85% reduction in EM

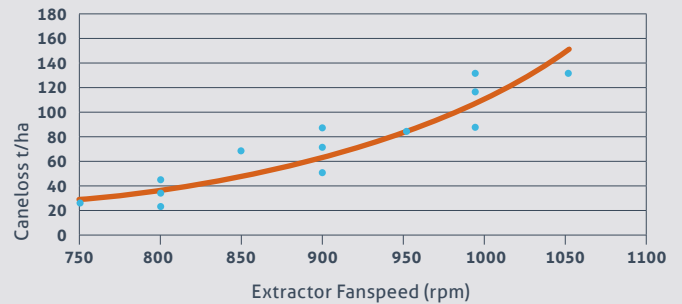


Trials using different fan hubs showed similar results as outlined in the four graphs below.

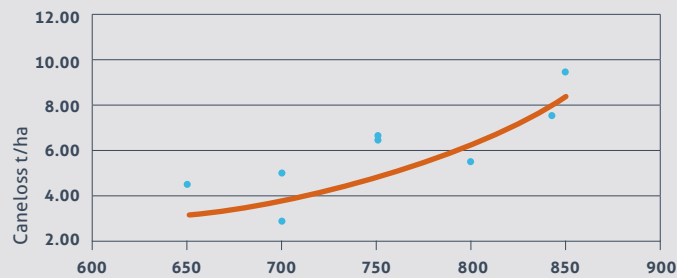
JOHN DEERE CANELOSS VS FANSPEED



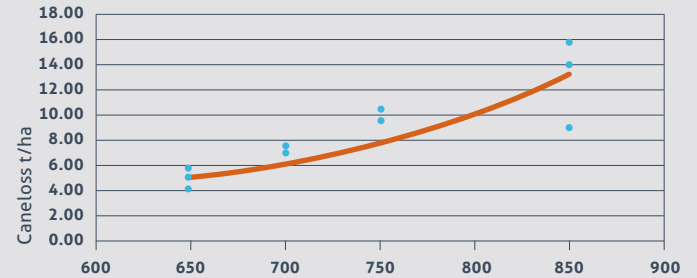
ANTI-VORTEX CANELOSS VS FANSPEED



H&F HUB CANELOSS VS FANSPEED



HOP001 PRATCO BLADES CANELOSS VS FANSPEED



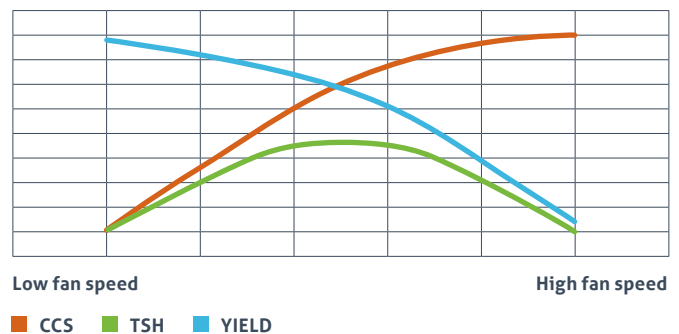
The reason for this is that the cleaning chamber is not designed to deal with the quantity of material related to high pour rates (greater than 90 tonne/cane/hour). At these high pour rates, because of the mass of cane that the system is trying to deal with, billets of cane get sucked out with the trash, especially when speeds are increased in an effort to remove more trash.

Installing different fan hubs and blades was seen as a solution to this problem because these have the capacity to 'pump' more air at lower speeds. However, as is evident from the data the impact on reducing cane loss while delivering a cleaner product has been minimal.

When it comes to cane cleaning, striking the right balance is critical and there is a point above which the losses outweigh the gains.

As fan speed increases, CCS increases and cane yield reduces as cane loss increases. There is a point at which sugar per hectare is maximised and that is what operators should be targeting. Above that point the cane loss starts to outweigh the increasing CCS as shown in the chart below.

Effect of Fanspeed on Yield, CCS and TSH



Summary

Newer fan designs "pump" more air at lower speeds with most data indicating that there has been relatively little gain with respect to the proportion of cane in trash extracted.

High trash extraction = high cane loss

At high pour rates there is a compromise between effective cane cleaning and cane loss.

For more information contact:

Phil Patane

E: ppatane@sugarresearch.com.au
T: (07) 4776 8202

Carol Norris

E: cnorris@sugarresearch.com.au
T: (07) 4963 6824

Garry Landers:

E: glanders@sugarresearch.com.au
T: (07) 3331 3332

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