



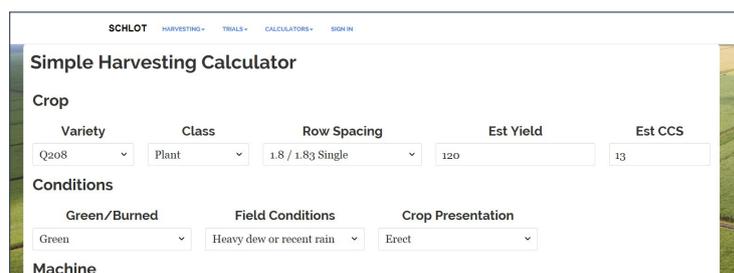
Sugar Research Australia

## SRA GUIDE TO MODERN HARVESTING

# FAN SPEED

Harvesting losses cannot be eliminated completely however, trials have shown that these can be reduced significantly if the harvester is set up and operated correctly. The harvesting operator has a crucial role in ensuring that the harvester is set up and operated in such a way that performance is optimised, cane quality is maximised and losses are minimised.

Even under optimum operating conditions, losses associated with the extractor can be significant and contribute to the overall harvesting losses the combined value of which can be equal to the cost of harvesting. 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.

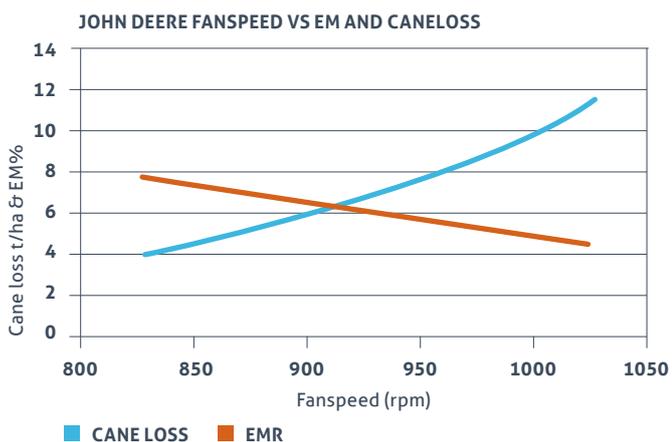


The extractor fan is intended to clean cane with minimal losses when operated correctly. Understanding the performance and limitations of the harvester, and more specifically the trash extraction system, is critical in understanding the consequence of different trash removal strategies. At current high 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.

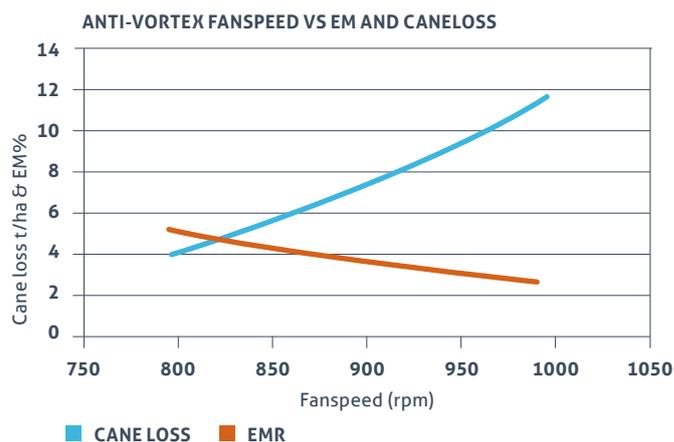
A large number of other factors affect cleaning efficiency and cane loss, some reducing it and some increasing it. These include manufacturer, fan type, blade configuration and fan speed.

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

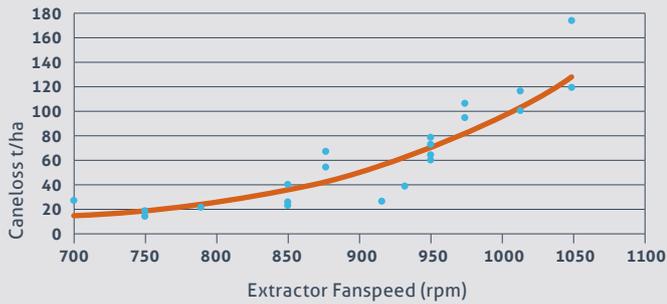


### 7.5 t/ha increase in losses for 1.85% reduction in EM

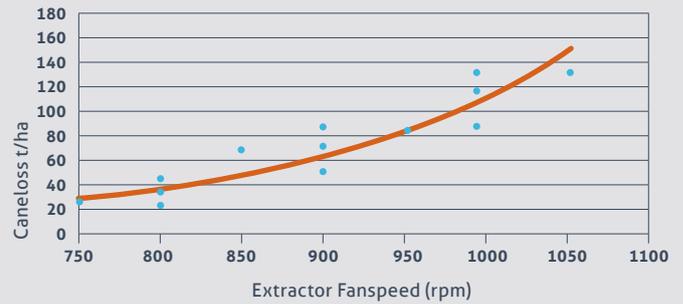


Trials using different fan hubs showed similar results as outlined in the four graphs below.

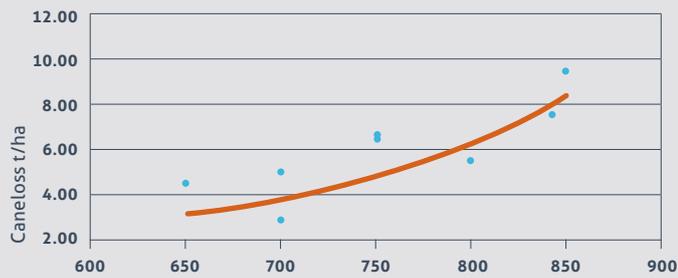
JOHN DEERE CANELOSS VS FANSPEED



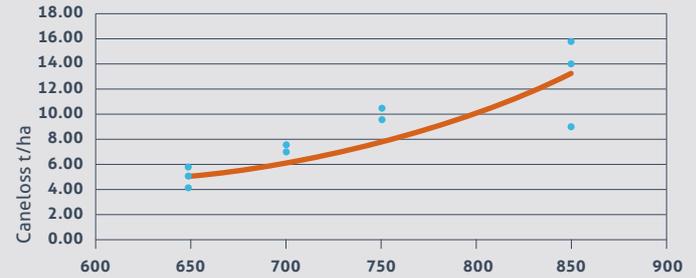
ANTI-VORTEX CANELOSS VS FANSPEED



H&amp;F HUB CANELOSS VS FANSPEED



HOP001 PRATCO BLADES CANELOSS VS FANSPEED



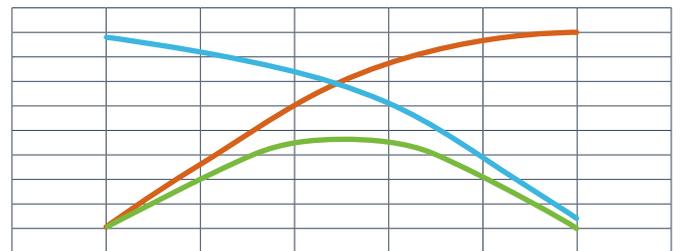
The reason for this is that the cleaning chamber is not designed to deal with the quantity of material related to high pour rates (greater than 90 tonne/cane/hour). At these high pour rates, because of the mass of cane that the system is trying to deal with, billets of cane get sucked out with the trash,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



Low fan speed High fan speed

■ CCS ■ TSH ■ YIELD

#### 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](mailto:ppatane@sugarresearch.com.au)  
T: (07) 4776 8202

**Carol Norris**

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

**Garry Landers:**

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

Copyright © 2018 • All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior permission of SRA. **Disclaimer** In this disclaimer a reference to 'we', 'us' or 'our' means SRA and our directors, officers, agents and employees. Although we do our best to present information that is correct and accurate, we make no warranties, guarantees or representations about the suitability, reliability, currency or accuracy of the information we present in this Information Sheet, for any purposes. Subject to any terms implied by law and which cannot be excluded, we accept no responsibility for any loss, damage, cost or expense incurred by you as a result of the use of, or reliance on, any materials and information appearing in this Information Sheet. You, the user, accept sole responsibility and risk associated with the use and results of the information appearing in this Information Sheet, and you agree that we will not be liable for any loss or damage whatsoever (including through negligence) arising out of, or in connection with the use of this Information Sheet. We recommend that you contact our staff before acting on any information provided in this Information Sheet.

**Warning** Our tests, inspections and recommendations should not be relied on without further, independent inquiries. They may not be accurate, complete or applicable for your particular needs for many reasons, including (for example) SRA being unaware of other matters relevant to individual crops, the analysis of unrepresentative samples or the influence of environmental, managerial or other factors on production.