PROCEEDINGS

of the

2018 CONFERENCE

of the

AUSTRALIAN SOCIETY

of

SUGAR CANE TECHNOLOGISTS

held at

MACKAY, QUEENSLAND

From 17th April 2018 to 20th April 2018

Edited by MC COX

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The views of the authors as set out in these Conference
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All papers published in these Conference Proceedings are peer-
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FORTIETH CONFERENCE
MACKAY, 2018

PROGRAM
The Official Opening, Annual General Meeting, and all Technical Sessions of the Conference will be held at the Mackay Entertainment and Convention Centre (MECC), Alfred Street, Mackay. The Industry Equipment Exhibition (IEE) and Poster Papers will also be located within the MECC.

WEDNESDAY, 18 APRIL 2018

Registration at the MECC, 17 Alfred Street from 07.30

MORNING SESSION – 09.00
Chair: Mr Danny van der Berg

WELCOME AND OFFICIAL OPENING
MR Craig Doyle
CEO Mackay Regional Council

09.15–09.30 President’s address: Mr Danny van der Berg
09.30–10.00 Keynote address: Mr Mark Furner MP, Minister for Agricultural Industry Development and Fisheries
10.00–10.30 Keynote address: Chris Greig–Overview of the energy industry and insight into the future
10.30–11.00 Official opening of the Industry Equipment Exhibition by Jason Costigan MP, Member for Whitsunday, followed by morning tea

GENERAL SESSION
Chair: Danny Van der Berg

Paper 11.00–11.30 Legal and trust issues in Australian agriculture, by L Wiseman, J Sanderson .......................................................... 1–9

Paper 11.30–12.00 From sugar mill to biorefinery: determining the global warming potential of upgrading a centenary factory, by JB Melendez ,T Gardner, Y Viera .................................................. 10–16

Paper 12.00–12.30 The weather experienced by sugarcane production systems in northern Queensland has changed over the past 80 years, by GD Bonnett ................................................................. 17–23

12.30–13.00 Lunch

AFTERNOON SESSION – 13.00

GENERAL SESSION
Chair: Jeff Snoad

Paper 13.00–13.30 Australian sugar industry training learning management system, by D Moller, B King ......................................................... 24–32

AGRICULTURE SESSION

Concurrent session
Chair: Terry Morgan

Paper 14.00–14.30 Effects of compost and mill mud/ash on soil carbon and the nematode community in a field trial on sugarcane at Harwood, New South Wales, by GR Stirling, AJ Young, RL Aitken, RN Beattie, A Munro ................................. 41–49
The impact of mill mud and compost amendments on the biology of sugarcane soils, by Graham R Stirling .............. 50–61
Deep placement of organic amendments in dense sodic subsoils: effects on sugarcane root growth, soil carbon levels and soil biological properties, by Graham R Stirling 62–70

Paper 14.30–15.00 i Effect of pesticides on microarthropods in sugarcane soils, by DE Walter, GR Stirling ........................................ 71–77
ii Plant-parasitic and free-living nematodes associated with sugarcane in north Queensland, by J Bull, GR Stirling, R Magarey ................................................................. 78–85

15.00–15.30 Afternoon tea

AGRICULTURE SESSION

Concurrent session
Chair: Troy Jensen

Paper 14.00–14.30 Sugarcane root systems: developing a toolkit of methods to understand what’s going on below ground, by JS Pierre, AL Rae, DJ Olsen, JM Perroux ................................. 127–137

Paper 14.30–15.00 A field experiment to evaluate the response of sugarcane varieties to waterlogging, by B Salter, G Park, E Kok ...... 138–150

15.00–15.30 Afternoon tea

MANUFACTURING SESSION

Concurrent session
Chair: Craig Wood

Paper 14.00–14.30 Laser cladding the flanks of mill roll grooves, by GA Kent, AKilpatrick, M Eiteneuer, RI Letizia, N Alam .................... 322–332


15.00–15.30 Afternoon tea

MANUFACTURING SESSION

Concurrent session
Chair: David Moller

Paper 14.00–14.30 A feasibility test for detection of atypical cane samples using near infrared spectroscopy, by J Sexton, Y Everingham, D Donald, S Staunton, R White ................................. 382–390

Paper 14.30–15.00 How digitalisation/automation addresses sugar production challenges, by Z Shan ................................. 391–401

15.00–15.30 Afternoon tea
AGRICULTURE SESSION

Concurrent session
Chair: Peter Larsen

Paper 15.30–16.00  i Intercropping sugarcane with sunflower and mixtures of plant species: effects on the soil biological community, by Graham R Stirling, Simon Mattsson 86–96

Paper 15.30–16.00  ii Effect of mill mud and gypsum amendments and their combination on physicochemical properties and hydraulic conductivity of marginal soils, by A Marchuk, S Marchuk, B Salter, JH Panitz, BL Schroeder 97–103

Paper 16.00–16.30  Profitability and environmental implications when growers transition to best management practices, by M Poggio, MA Renouf, C Connolly, M Thompson 104–116


Paper 16.30–17.00  ii Optimisation of farm management for reducing cane losses during mechanised sugarcane harvesting by using SCHLOT software model, by T Bahadori, S Norris 123–126

17.00  Happy hour with the IEE

AGRICULTURE SESSION

Concurrent session
Chair: Jason Eglington

Paper 15.30–16.00  How do current ratings of sugarcane varieties for resistance to smut relate to natural infection? by SA Bhuiyan, MC Cox, BJ Croft 151–159

Paper 16.00–16.30  The role of varieties and nematicides in controlling plant-parasitic nematodes in isis mill cane supply area, by NV Halpin, B Quinn, A Jakins, S Ginns, J Cobon 160–169

Paper 16.30–17.00  Review of progress in breeding with Erianthus arundinaceus in Hainan, China, by QN Wang, JY Wu, QW Li, C Fu, L Peng 170–178

17.00  Happy hour with the IEE

MANUFACTURING SESSION

Concurrent session
Chair: Peter Flanders

Paper 15.30–16.00  Investigation of underwater bridge inspection methods, by F Brandhorst, C Vanderneut 342–353

Papers 16.00–16.30  40 Tonne locomotive driveline upgrade review, by LG Santarossa, H Zelenka, S Vickers 354–369

Paper 16.30–17.00  BK49 improved sugar cane wagon coupling, by S Simson, A Lautenschlager, R Flanders 370–381

17.00  Happy hour with the IEE
MANUFACTURING SESSION

Concurrent session
Chair: Doug Sockhill

Paper 15.30–16.00 Proposed best operating practices to improve technical efficiency in Brazilian sugar and ethanol plants, by FV Carlucci, AP Salgado Jnr, SV Lemos, MA Souza Jnr, FA Antunes, ACM Duarte ................................. 402–413


17.00 Happy hour with the IEE

THURSDAY, 19 APRIL, 2018

MORNING SESSION—08.00

AGRICULTURE SESSION
Chair: Danielle Skocaj

Paper 08.00–08.30 ‘Six Easy Steps’ nutrient management program improving with maturity! by BL Schroeder, DM Skocaj, B Salter JH Panitz, G Park, DV Calcino, GZ Rodman, AW Wood ..... 179–193

Paper 08.30–09.00 Process for developing farm nutrient management plans in the wet tropics, by DM Skocaj, D Telford, AP Hurney, BL Schroeder ......................................................... 194–201

Paper 09.00–09.30 Interpretation of a simple nitrogen use efficiency index for informing nitrogen fertiliser management in the Burdekin, by Philip Moody, Julian Connellan ....................... 202–209

Paper 09.30–10.00 Crop size and sugarcane nitrogen fertiliser requirements: is there a link? by PJ Thorburn, JS Biggs, D Skocaj, BL Schroeder, J Sexton, YL Everingham ....................... 210–218

10.0–10.300 Morning tea

MANUFACTURING SESSION
Chair: Jeff Snoad

Paper 08.00–08.30 Advanced non-destructive testing techniques supporting asset integrity management strategies, by C Perrie ....................... 436–448

Paper 08.30–09.00 Application of machine learning algorithms in boiler plant root cause analysis: a case study on an industrial scale biomass unit co-firing sugar cane bagasse and furfural residue at excessive final steam temperatures, by R Laubcher, Q Engelbrecht ............................................ 449–459

Paper 09.00–09.30 i Driving an effective pressure equipment management system, by David Ross, Kate Suppel ....................... 460–465

Paper 09.00–09.30 ii Integrity management of steam piping systems, by Damien Charman, Kate Suppel ............................................. 466–473
Proceedings of the Australian Society of Sugar Cane Technologists

09.30–10.00 High pressure leak prevention—improved performance and reliability from anaerobic thread sealing compounds, by S Ayadurai ................................................................. 474–481

10.00–10.30 Morning tea

AGRICULTURE SESSION
Chair: Danielle Skocaj

Paper 10.30–11.00 Nitrogen mineralisation of legume residues, by S Reeves, W Wang, M Heenan, N Halpin, T Mcshane, A Rickert, A Royle ................................................................. 219–228

Paper 11.00–11.30 Harnessing microbial ‘slow-release’ to improve fertiliser profitability and sustainability, by P Pittaway, D Antille, S Marchuk, G Celotto, C Liddle ......................................... 229–236

Paper 11.30–12.00 Why benefits from controlled release fertilisers can be lower than expected on some soils, by K Verburg, JS Biggs, PJ Thorburn ................................................................. 237–249

Posters
Is climate forecasting compatible with the ‘Six Easy Steps’ nutrient management program? By BL Schroeder, DM Skocaj, PJ Thorburn, JS Biggs, J Sexton, YL Everingham . 250

A nitrogen roadmap—better alignment of N inputs to crop requirements, by MJ KealleY, MF Quirk, BJ Ashburner … 251

Simulating ‘how much N will that crop need?’ for Tully soils and climates using APSIM, by JS Biggs, DM Skocaj, AP Hurney, BL Schroeder, PJ Thorburn, R Barboux, YL Everingham ................................................................. 252

Producing APSIM soil parameters from soil survey data to underpin better nitrogen management, by R Barboux, JS Biggs, PJ Thorburn ................................................................. 253

Estimating the effect of nitrogen fertilisation on growth and yield of sugarcane using UAV lidar and multispectral imaging technologies, by I Shendryk, JJ Sofonia, D Skocaj, C Ticehurst, PJ Thorburn ................................................................. 254

Nitrogen and sugarcane: changing the conversation to risk of yield loss if fertiliser rates are reduced, by PJ Thorburn, L McMillan, J Biggs, Y Everingham, AJ Webster .......... 255

Legume crop rotation and residue management to improve nitrogen efficiency and sugarcane yield, by Weijin Wang, Neil Halpin, Steven Reeves, William Rehbein, Marijke Heenan ................................................................. 256

12.00–12.30 Sectional AGMs
12.30–17.00 Lunch box and field tours (Lunch box to be collected prior to boarding bus)
18.30–22.30 Conference dinner

MANUFACTURING SESSION
Chair: Raymond De Lai

Paper 10.30–11.00 Boiler simulation tool development, by AP Mann ............ 482–489

Paper 11.00–11.30 The use of simulation for design and implementation of a pan station control system, by S Crouther, D Ferraris, B Rich ... 490–498
Proceedings of the Australian Society of Sugar Cane Technologists

Paper 11.30–12.00 Predicting batch pan operation when using low pressure vapour, by R Broadfoot, J McFeaters ………………….. 499–511

12.00–12.30 Sectional AGMs

12.30–17.00 Lunch box and field tours (Lunch box to be collected prior to boarding bus)

18.30–22.30 Conference dinner

FRIDAY, 20 APRIL, 2018

MORNING SESSION–08.00

GENERAL SESSION
Chair: Rob Magarey

08.00–9.00 Wrap up of Sugar Tuesday and Futures forum and graduate program. Update to delegates provided by Rob Magarey, Doug Sockhill and Tracy Henderson. Delegates are invited to participate in this interactive session and provide feedback to facilitators on the Sugar Tuesday Initiative.

AGRICULTURE SESSION
Chair: Troy Jensen

Paper 09.00–09.30 Sugarcane streak mosaic—researching a relatively new disease in Indonesia, by RC Magarey, A Kristini, E Achadian, N Thompson, E Wilson, M Reynolds, N Sallam, R Goebel, L Putra ……………………………………………………… 257–266


10.00–10.30 Morning tea

MANUFACTURING SESSION
Chair: David Moller

Paper 09.00–09.30 Why the emerging strong interest in vertical continuous pans? by R Broadfoot, D Rackemann, D Moller ………………….. 512–525

Paper 09.00–10.00 Installation of VL1300 prototype low grade fugal, by K Selby, I Rose, G Vidler …………………………………………….. 526–533

10.00–10.30 Morning tea

AGRICULTURE SESSION
Chair: Terry Morgan

Paper 10.30–11.00 Efficacy and environmental runoff impact of alternative pre-emergent herbicides to diuron applied on trash blanketed ratoons, by E Fillols, S Lewis, A Davis …………………. 281–292

Paper 11.00–11.30 Comparison between bin tonnages and yield monitor predictions, by TA Jensen, AG Garmendia… …………………. 293–303
The bacterial biocontrol agent *Pasteuria penetrans* can help control root-knot nematode on sugarcane, by SA Bhuiyan, GR Stirling, K Garlick, JM Anderson, P Wickramasinghe, E Wong ................................................................. 304–307

Arbuscular mycorrhizal fungi and dark septate endophytes in the sugarcane crop cycle: rates and extent of development, by Anders Claassens, Catherine J Nock, Michael T Rose, Lukas Van Zwieten, Terry J Rose ........ 308–312

The effect of stool damage on sugarcane grown on permanent beds and conventionally tilled rows, by Glen Park, Bernard Schroeder, Muyiwa Olayemi ........................................ 313

Assessing the effectiveness of sugarcane fungicides to control pineapple sett rot disease in various concentrations of mill ash, by G Holzberger, N Matthews, L Di Bella ................. 314

A mysterious fungus affects sugarcane sett germination and growth—a preliminary investigation, by P Wickramasinghe, SA Bhuiyan .................................................. 315

Real-time provision of water quality information to support farmers optimising their crop management, by Y Zhang, P Fitch, AJ Webster, AM Davis, PJ Thorburn, SJ MacDonald 316

Spatial data hub: a valuable resource for the sugarcane industry, by R Crossley, A Law, M Anderson ............... 317–319


Modelling interactions between the harvester basecutters and cane stalk—understanding cane loss, by F Plaza, H Bakir, P Hobson ................................................................. 321

12.15–13.00 *Lunch*
13.00–14.00 *ASSCT AGM*
14.00–14.30 *Closing ceremony*

**MANUFACTURING SESSION**
Chair: Doug Sockhill

Energy efficiency improvements with vertical shell and tube juice heaters at Millaquin Mill, by D Dignon, NJ Sichter, GG Barazza ................................................................. 534–544

Implications of using a condensate cigar on factory operations, by R Broadfoot, D Rackemann .......................... 545–554

Effect of delivery nip pressure chute on milling performance, by MS Sundaram, DS Nikam, PR Ghundre, OP Thaval .... 555–560

Modern process technologies for the sugar industry, by S Pawar ................................................................. 561–564

Opportunities for energy innovation in Australian sugarcane, by JM Welsh, JW Powell ........................................ 565
Optimising the performance of continuous centrifugals by online monitoring of the sugar colour, by Tim Diringer, Bjarne Christian Nielsen ............................................. 566

12.15–13.00  Lunch
13.00–14.00  ASSCT AGM
14.00–14.30  Closing ceremony