CONTENTS

SASTA Awards 1962 - 2013  Pages 4-7
Congress 2014 Abstracts and speaker biographies  Pages 8-80
Exhibitor Floor plans and Exhibitor Directory  Pages 81-87
SASTA Officers 1926-2014  Page 88

OPENING SESSION - PLENARY SESSION ONE (Chair: Gavin Smith)
The South African development of traditional industries for economic growth and competitiveness  Unati Speirs (Guest Speaker)  Page 8
SA sugar industry: Strategy for a sustainable future  Trix Trikam (Guest Speaker)  Page 9

PLENARY SESSION TWO (Chair: Paul Schorn)
Investigation into the cause of turbidity at Malelane Mill 2013  Cronjé CPR and Sahadeo P  Page 13
How research can deliver value to the southern African sugarcane processing industry: the SMRI strategy  Davis SB and Dewar J  Page 14

PLENARY SESSION THREE (Chair: Kerry Redshaw)
The Umfolozi Flats: Opportunities and challenges in a niche sugarcane production area  Searle A  Page 15
Impact of recapitilisation and development funding in the South African sugar industry  Ellenson T and Madhanpall A  Page 17
Restitution in the sugar industry  Rankin DJ and Madhanpall A  Page 18
Genetically modified sugarcane – the who, why, what, when and how much  Snyman SJ (Guest speaker)  Page 19

POSTERS
Relationship between soil in cane and maintenance costs - a case study  Loubser RC  Page 20
The use of a double pipe evaporator pilot plant to test the feasibility of controlling evaporator scaling by using an antiscalant chemical (polymeric dispersant blend)  Ramaru R  Page 21
The z score as an alternative measure for the SMRI inter-laboratory testing programme  Walford SN and Pillay V  Page 22
Use of an upflow anaerobic sludge blanket reactor for anaerobic digestion of distillery effluent  Zizhou N  Page 23
Use of a microbicide to minimise microbiological contamination as part of a food safety programme  Sigwinta L and Taylor M  Page 24
Indices for energy intensity monitoring and benchmarking  Foxon KM, Davis SB and Stolz HNP  Page 25
Effect of mulches and chemical treatments on virus spread in NovaCane® plantlets  McFarlane SA, Martin LA, Wilkinson D, Koch AC, van Antwerpen T, Pillay N and Rutherford RS  Page 26
Results of a nematode survey conducted in the Midlands North growing region  Pillay U and Ramouthar PV  Page 27
NovaCane® - A boost for seedcane schemes  Snyman S, Redshaw KA and Stranack R  Page 28
Estimation of critical soil water values from soil texture data  van Antwerpen R and Kanamugire A  Page 29
Review of the SASRI geographic information systems service  Mthembu IB, Collings KA and Maher GW  Page 30
Soil monitoring and nutrient budgeting for the efficient use of fertilizer in sugarcane production in KwaZulu-Natal  Beckerling A, Fryer PJ and Hall C  Page 31
FACTORY SESSION 1 – Extraction (Chair: Craig Jensen)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The return of bagasse diffusers</td>
<td>Voigt I and Hulley SM</td>
<td>32</td>
</tr>
<tr>
<td>Direct clear juice - the production of clear juice in a sugarcane diffuser at Maidstone Factory</td>
<td>Jensen PS, Davis SB, Love DJ and Rassol A</td>
<td>33</td>
</tr>
<tr>
<td>Improved extraction at Felixton</td>
<td>Mbuyazi M and Mhlongo S</td>
<td>34</td>
</tr>
<tr>
<td>An alternative approach to setting a mill</td>
<td>Kent GA</td>
<td>35</td>
</tr>
</tbody>
</table>

FACTORY SESSION 2 – Boilers (Chair: Morne Bester)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFD combustion modelling and validation of a bagasse boiler</td>
<td>du Toit P and van der Merwe S</td>
<td>36</td>
</tr>
<tr>
<td>Bagasse fired boiler erosion modelling using Computational Fluid Dynamics (CFD)</td>
<td>Chabalala SV</td>
<td>37</td>
</tr>
<tr>
<td>Water circulation investigation to avoid tube failure in water tube boilers</td>
<td>Huang J</td>
<td>38</td>
</tr>
</tbody>
</table>

FACTORY SESSION 3 – Energy and Microbiology (Chair: Kitty Foxon)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal-hydraulic analysis of heat recovery through flue gas condensation in biomass fired boilers</td>
<td>Laubscher R</td>
<td>39</td>
</tr>
<tr>
<td>The operational challenges and optimising the energy consumption of the juice heaters during the 2012 season at Noodsberg Sugar Mill</td>
<td>Cooper CS</td>
<td>40</td>
</tr>
<tr>
<td>Steps taken to rehabilitate the effluent treatment plant at Pongola Sugar Mill</td>
<td>Ndlazi M and Singh W</td>
<td>41</td>
</tr>
<tr>
<td>Microbial diversity profiling in sugarcane processing: What, why and how?</td>
<td>Nel S</td>
<td>42</td>
</tr>
</tbody>
</table>

FACTORY SESSION 4 – Factory Operations and Commercial (Chair: Stanley Munsamy)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Productivity and technological advancements on Brazilian produced MAUSA BATCH centrifuges</td>
<td>Bennett S, Harinath V and Trovo G</td>
<td>43</td>
</tr>
<tr>
<td>Design, installation and operation of partial flash tanks in the evaporator station at Hippo Valley Sugar Mill</td>
<td>Dzirove E, David W, Mugadhi A and Sheahan W</td>
<td>44</td>
</tr>
</tbody>
</table>

FACTORY SESSION 5 – Refining and Commercial (Chair: Steve Davis)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine liquor colour: How does it affect energy, capacity and sugar losses?</td>
<td>Vawda AS, Sarir EM and Donado CA</td>
<td>45</td>
</tr>
<tr>
<td>Systematic study on the dissolution of individual sugar scale components with EDTA and application to real scales</td>
<td>Seetz J, Geenen AM, Chen H and LePage J</td>
<td>46</td>
</tr>
<tr>
<td>Fives Cail Batch and Continuous Centrifugals: Latest Developments</td>
<td>Hamilton D</td>
<td>47</td>
</tr>
</tbody>
</table>

AGRICULTURE SESSION A1 - Modelling Climate Change Impacts (Chair: Peter Thorburn)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Sessions A1 and A2</td>
<td>Thorburn P</td>
<td>48</td>
</tr>
<tr>
<td>Modelling the potential impacts of climate change on yield and water use of sugarcane and sugarbeet: preliminary results based on the AquaCrop model</td>
<td>Kunz R, Schulze R, Mabhaudhi T and Mokonoto O</td>
<td>49</td>
</tr>
<tr>
<td>A preliminary assessment of mid-century climate change impacts on sugarcane production in South Africa</td>
<td>Jones MR and Singels A</td>
<td>50</td>
</tr>
<tr>
<td>Climate change will impact the sugarcane industry in Australia</td>
<td>Sexton, JD, Everingham, YL, Inman-Bamber NG and Stokes C</td>
<td>51</td>
</tr>
</tbody>
</table>

AGRICULTURE SESSION A2 - Modelling Climate Change Impacts: Testing models (Chair: Abraham Singels)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptation of Cane-Gro sugarcane model to the two-dimensional soil-water option within DSSAT Cropping System Model ver 4.5.2.002</td>
<td>Morgan KT and Royce FS</td>
<td>52</td>
</tr>
<tr>
<td>Sugarcane model intercomparison: structural differences and uncertainties</td>
<td>Marin FR, Thorburn PJ, Nassif DSP, Costa LG and Santos MV</td>
<td>53</td>
</tr>
<tr>
<td>Evaluation of the APSIM-SUGAR model for simulating sugarcane yield at sites in seven countries: initial results</td>
<td>Thorburn P, Biggs J, Jones MR, Singels A, Marin F, Martine J-F, Chinorumba S, Viator R and Nunez O</td>
<td>54</td>
</tr>
<tr>
<td>Evaluation of the DSSAT-CANEGRO model for simulating climate change impacts at sites in seven countries</td>
<td>Jones MR, Singles A, Thorburn P, Marin FR, Martine J-F, Chinorumba S, Viator R and Nunez O</td>
<td>55</td>
</tr>
</tbody>
</table>

Panel Discussion

AGRICULTURE SESSION A3 - Soils and Water (Chair: Ruth Rhodes)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Towards the more efficient use of fertiliser potassium: prediction of ‘slowly-available’ potassium reserves in soils</td>
<td>Miles N and Farina MPW</td>
<td>56</td>
</tr>
<tr>
<td>Soil microbial biomass in sugarcane cropping systems of soybeans, sunn hemp, and velvet beans during fallowing for control of ratoon stunting disease</td>
<td>Zvoutete P, Nzima M, Nyati C, Mabveni A, Chinorumba S and Mupondi T</td>
<td>57</td>
</tr>
<tr>
<td>Title</td>
<td>Authors</td>
<td>Page</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Impact of CMS on soil acidity and aluminium toxicity in the sugarcane industry</td>
<td>Makoro P, van Antwerpen R, de Jager C and Miles N</td>
<td>57</td>
</tr>
<tr>
<td>Prediction of fertiliser phosphorus requirement factors for soils of the southern African sugar industry</td>
<td>Poswa LZ, Miles N, Manson A and Roberts V</td>
<td>58</td>
</tr>
<tr>
<td>Ammonia volatilisation losses from nitrogen fertilisers: Laboratory studies</td>
<td>Weigel A, Miles N, Nyandeni B, Naidoo G and Wettergreen T</td>
<td>59</td>
</tr>
<tr>
<td>Resource capture and conversion efficiency of two contrasting sugarcane genotypes under water stress</td>
<td>Ngxaliwe S, Eksteen AB, Singels A and Pammenter NW</td>
<td>60</td>
</tr>
<tr>
<td>AGRICULTURE SESSION A4 - Extension (Chair: Michelle Binedell)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Developing a strong Research - Extension - Grower linkage to ensure adoption of new sugarcane technology in South Africa</td>
<td>Maher GW</td>
<td>61</td>
</tr>
<tr>
<td>An Extension specialist’s yield and gross revenue database, used to guide recommendations and improve grower profitability</td>
<td>McElligott DM, van Antwerpen R and Ducasse G</td>
<td>62</td>
</tr>
<tr>
<td>An analysis of factors affecting the sustainable production of land reform sugarcane growers on the north coast of KwaZulu-Natal</td>
<td>Gina MC and Nothard BW</td>
<td>63</td>
</tr>
<tr>
<td>The ticketing system: Development of a management and monitoring tool for small-scale growers</td>
<td>Cronjé CPR and Mavimbela F</td>
<td>64</td>
</tr>
<tr>
<td>AGRICULTURE SESSION A5 - Varieties (Chair: Derek Watt)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance evaluation of eight Mauritian sugarcane varieties in Swaziland</td>
<td>Dlamini NE</td>
<td>65</td>
</tr>
<tr>
<td>Cultivar genetic gains for sugarcane yield, sucrose content and sugar yield in the Midlands region breeding programme</td>
<td>Zhou, MM</td>
<td>66</td>
</tr>
<tr>
<td>The influence of genotype by environment interaction on yield, quality and agronomic traits for the coastal short cycle breeding programme</td>
<td>Lichakane, M and Zhou MM</td>
<td>67</td>
</tr>
<tr>
<td>Potential gains from introgression breeding based on analysis of three breeding populations</td>
<td>Horsley TN and Zhou MM</td>
<td>68</td>
</tr>
<tr>
<td>AGRICULTURE SESSION B1 - Monitoring and Pest Control (Chair: Stuart Rutherford)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optimising sugarcane field layouts for pest control</td>
<td>Potgieter L, van Vuuren JH, Conlong DE and van Vuuren BJ</td>
<td>69</td>
</tr>
<tr>
<td>Abundance and diversity of nematode genera present in the South African sugar industry</td>
<td>Ramouthar, PV</td>
<td>70</td>
</tr>
<tr>
<td>A preliminary assessment of new insecticides for the control of the sugarcane borer <em>Eldana saccharina</em> Walker (Lepidoptera: Pyralidae)</td>
<td>Leslie GW and Moodley S</td>
<td>71</td>
</tr>
<tr>
<td>AGRICULTURE SESSION B 2 - Agricultural Engineering (Chair: Peter Lyne)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The development and application of an energy calculator for sugarcane production in South Africa</td>
<td>Boote DN, Smithers JC and Lyne PWL</td>
<td>72</td>
</tr>
<tr>
<td>The development and evaluation of a predictive mill-scale sugarcane quality model</td>
<td>Jenkins EPG and Bezuidenhout CN</td>
<td>73</td>
</tr>
<tr>
<td>The development of a strategic sugarcane vehicle dispatch optimisation tool</td>
<td>Jugurnauth M, Bezuidenhout CN and Ramasawmy H</td>
<td>74</td>
</tr>
<tr>
<td>Quantifying and modelling disruptions in the Eston sugarcane supply chain</td>
<td>Kadwa M, Bezuidenhout CN and Ortmann GF</td>
<td>75</td>
</tr>
<tr>
<td>Sugarcane trash recovery systems for cogeneration</td>
<td>Rees B, Smithers JC, Lyne PWL and van Antwerpen R</td>
<td>76</td>
</tr>
<tr>
<td>Attempts to detect the degree of deterioration in commercial sugarcane: lessons learnt</td>
<td>Sibomanana MS, Sobratee N, Workneh TS and Bezuidenhout CN</td>
<td>77</td>
</tr>
<tr>
<td>AGRICULTURE SESSION B3 - Agronomy (Chair: Sanesh Ramburan)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>An investigation into factors influencing flowering and pithing of sugarcane in Southern Africa</td>
<td>Eksteen A, Halse E, Simwinga E and Sutherland D</td>
<td>79</td>
</tr>
<tr>
<td>Investigation into the high sucrose yield in the 2005 season at Nakambala, Zambia</td>
<td>Munsamy SS</td>
<td>80</td>
</tr>
</tbody>
</table>
### SASTA AWARDS 1962-2013

#### SASTA GOLD MEDALISTS

<table>
<thead>
<tr>
<th>Year</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1968</td>
<td>AE RABE</td>
</tr>
<tr>
<td>1970</td>
<td>CGM PERK</td>
</tr>
<tr>
<td>1974</td>
<td>JL DU TOIT</td>
</tr>
<tr>
<td>1977</td>
<td>PCG BRETT</td>
</tr>
<tr>
<td>1981</td>
<td>JB ALEXANDER</td>
</tr>
<tr>
<td>1988</td>
<td>IA BELL</td>
</tr>
<tr>
<td>1990</td>
<td>GD THOMPSON</td>
</tr>
<tr>
<td>1998</td>
<td>SW UPFOLD</td>
</tr>
<tr>
<td>2000</td>
<td>PW REIN</td>
</tr>
<tr>
<td>2002</td>
<td>AB RAVNO</td>
</tr>
<tr>
<td>2005</td>
<td>E MEYER</td>
</tr>
<tr>
<td>2005</td>
<td>PG MOREL DU BOIL</td>
</tr>
<tr>
<td>2008</td>
<td>KM HURLY</td>
</tr>
<tr>
<td>2009</td>
<td>TC CLEASBY</td>
</tr>
<tr>
<td>2010</td>
<td>GRE LIONNET</td>
</tr>
<tr>
<td>2012</td>
<td>BS PURCHASE</td>
</tr>
</tbody>
</table>

#### TALBOT-CROSBIE AND KYNOCH/TRIOMF PRIZEWINNERS 1962-2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Prize/Award</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1962</td>
<td>Talbot-Crosbie</td>
<td>T COVAS</td>
</tr>
<tr>
<td>1963</td>
<td>Talbot-Crosbie</td>
<td>EJ BUCHANAN, K DOUWES-DEKKER and A VAN HENGEL</td>
</tr>
<tr>
<td>1964</td>
<td>Talbot-Crosbie</td>
<td>AE RABE</td>
</tr>
<tr>
<td>1965</td>
<td>Talbot-Crosbie</td>
<td>EJ BUCHANAN</td>
</tr>
<tr>
<td>1966</td>
<td>Talbot-Crosbie</td>
<td>Prize shared by: RC TURNER and RJ JENNINGS</td>
</tr>
<tr>
<td>1967</td>
<td>Talbot-Crosbie</td>
<td>A VAN HENGEL</td>
</tr>
<tr>
<td>1968</td>
<td>Talbot-Crosbie</td>
<td>J BRUIJN and RP JENNINGS</td>
</tr>
<tr>
<td>1969</td>
<td>Talbot-Crosbie</td>
<td>RCS ROBINSON and RP JENNINGS</td>
</tr>
<tr>
<td>1970</td>
<td>Talbot-Crosbie</td>
<td>IA SMITH</td>
</tr>
<tr>
<td>1971</td>
<td>Talbot-Crosbie</td>
<td>GG ASHE</td>
</tr>
<tr>
<td>1972</td>
<td>Talbot-Crosbie</td>
<td>JP MURRAY</td>
</tr>
<tr>
<td>1973</td>
<td>Talbot-Crosbie</td>
<td>B ST C MOOR</td>
</tr>
<tr>
<td>1974</td>
<td>Talbot-Crosbie</td>
<td>No Winner</td>
</tr>
<tr>
<td>1975</td>
<td>Talbot-Crosbie</td>
<td>EFA ROUILLARD</td>
</tr>
<tr>
<td>1976</td>
<td>Talbot-Crosbie</td>
<td>LMSA JULLIENNE</td>
</tr>
<tr>
<td>1977</td>
<td>Talbot-Crosbie</td>
<td>RP SCOTT</td>
</tr>
<tr>
<td>1978</td>
<td>Talbot-Crosbie</td>
<td>PG MOREL DU BOIL and K SCHAFFLER</td>
</tr>
<tr>
<td>1979</td>
<td>Talbot-Crosbie</td>
<td>MR KEDIAN</td>
</tr>
<tr>
<td>1980</td>
<td>Talbot-Crosbie</td>
<td>A KOEN</td>
</tr>
<tr>
<td>1981</td>
<td>Talbot-Crosbie</td>
<td>RG HOEKSTRA</td>
</tr>
<tr>
<td>1982</td>
<td>Talbot-Crosbie</td>
<td>LMSA JULLIENNE</td>
</tr>
<tr>
<td>1983</td>
<td>Talbot-Crosbie</td>
<td>BS PURCHASE</td>
</tr>
<tr>
<td>1984</td>
<td>Talbot-Crosbie</td>
<td>TMC BOEVEY and TJ MURRAY</td>
</tr>
<tr>
<td>1985</td>
<td>Talbot-Crosbie</td>
<td>GPN KRUGER</td>
</tr>
<tr>
<td>1986</td>
<td>Talbot-Crosbie</td>
<td>GRE LIONNET</td>
</tr>
<tr>
<td>1987</td>
<td>Talbot-Crosbie</td>
<td>PW REIN, MGS COX and G MONTOCCHIO</td>
</tr>
<tr>
<td>1988</td>
<td>Talbot-Crosbie</td>
<td>JPM DE ROBILLARD and CA IGGO</td>
</tr>
<tr>
<td>1989</td>
<td>Talbot-Crosbie</td>
<td>MJ REID</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PG MOREL DU BOIL, NB LEIBBRANDT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KM HARBORNE-RUTHERFORD, RA BAILEY and JB DA GRACA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PW REIN, MGS COX and TMC BOEVEY and JP FOURIE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GRE LIONNET</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JH MEYER, RA WOOD and RL HARDING</td>
</tr>
<tr>
<td>Year</td>
<td>Prize/Award</td>
<td>Author(s)</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td>-----------</td>
</tr>
<tr>
<td>1990</td>
<td>Talbot-Crosbie</td>
<td>CMJ DAY-LEWIS and KJ SCHAFFLER, NG INMAN BAMBER and BA STEAD</td>
</tr>
<tr>
<td>1991</td>
<td>Talbot-Crosbie</td>
<td>SJ MADAREE, PW REIN and CM WENMAN, RA BAILEY and SA TOUGH</td>
</tr>
<tr>
<td>1992</td>
<td>Talbot-Crosbie</td>
<td>Prize shared by: MGS COX and P SAHADEO; D MEADOWS and S WADLEY, SJ SNYMAN, KG BLACK, BI HUCKETT and MP WATT</td>
</tr>
<tr>
<td>1993</td>
<td>Talbot-Crosbie</td>
<td>M MOODLEY, NG INMAN-BAMBER, TL CULVERWELL and MG McGLINCHEY</td>
</tr>
<tr>
<td>1994</td>
<td>Talbot-Crosbie</td>
<td>VC STONE, BL SCHROEDER, JB ROBINSON, PET TURNER and M WALLACE</td>
</tr>
<tr>
<td>1995</td>
<td>Talbot-Crosbie</td>
<td>DC WALTHEW and LM TURNER, DB HELLMANN, GG PLATFORD and M WALLACE</td>
</tr>
<tr>
<td>1996</td>
<td>Talbot-Crosbie</td>
<td>DC WALTHEW and PW WHITELAY, R VAN ANTWERPE, MG McGLINCHEY, NG INMAN-BAMBER and ATP BENNIE</td>
</tr>
<tr>
<td>1997</td>
<td>Talbot-Crosbie</td>
<td>KJ SCHAFFLER and MTD DE GAYE, M KEEPING</td>
</tr>
<tr>
<td>1998</td>
<td>Talbot-Crosbie</td>
<td>Prize shared by: DM MEADOWS, GT SCHUMANN and S SOJi; SB DAVIES, M MOODLEY, I SINGH and MW ADENDORFF</td>
</tr>
<tr>
<td>1999</td>
<td>Talbot-Crosbie</td>
<td>None, MJ PARSONS</td>
</tr>
<tr>
<td>2000</td>
<td>Talbot-Crosbie</td>
<td>PG MOREL DU BOIL, EJ SCHMIDT, G NARCISO, P FROST and C GERS</td>
</tr>
<tr>
<td>2001</td>
<td>Talbot-Crosbie</td>
<td>N MAGASINIER, C VAN ALPHEN, M INKSON and B MISPLON</td>
</tr>
<tr>
<td>2002</td>
<td>Talbot-Crosbie</td>
<td>PB DEVNARAIN, DR ARNOLD and SB DAVIS</td>
</tr>
<tr>
<td>2003</td>
<td>Talbot-Crosbie</td>
<td>BM SCHOONEES, S GUYON, JL VOGEL, J OMARJEE, T VAN ANTWERPE, P CADET and J BALANDREAU</td>
</tr>
<tr>
<td>2004</td>
<td>Talbot-Crosbie</td>
<td>DJ LOVE, SD PEACOCK and GT SCHUMANN</td>
</tr>
<tr>
<td>2005</td>
<td>Talbot-Crosbie</td>
<td>L SMITH, Prize shared by: PWL LYNE, E MEYER and R HERBERT; M VAN DEN BERG and MT SMITH</td>
</tr>
<tr>
<td>2006</td>
<td>Talbot-Crosbie</td>
<td>L ECHEVERRI and PW REIN, OL KVEDARAS, MG KEEPING, F-R GOEBEL and M BYRNE</td>
</tr>
<tr>
<td>2007</td>
<td>Talbot-Crosbie</td>
<td>None, No Congress held</td>
</tr>
<tr>
<td>2008</td>
<td>Talbot-Crosbie</td>
<td>R SIMPSON and J OXLEY, SJ SNYMAN, CM MEYER, M BANASIJK, TL NICHOLSON, T VAN ANTWERPE, P NAIDOO and JD ERASMUS</td>
</tr>
<tr>
<td>2009</td>
<td>Talbot-Crosbie</td>
<td>BM MUIR, G EGGLESTON and B BARKER</td>
</tr>
<tr>
<td>2010</td>
<td>Talbot-Crosbie</td>
<td>V KOCHERGIN, C GAUDET and M ROBERT, S RAMBURAN, DM MELLIGOTT and O DE HAAS</td>
</tr>
<tr>
<td>2011</td>
<td>Talbot-Crosbie</td>
<td>Y NAIDOO and R SIMPSON, V HARRACA, J DU PISSANIE, RS RUTHERFORD and DE CONLONG</td>
</tr>
<tr>
<td>2012</td>
<td>Talbot-Crosbie</td>
<td>PS JENSEN, S RAMBURAN, T WETTERGREEN, SD BERRY and B SHONGWE</td>
</tr>
<tr>
<td>2013</td>
<td>Talbot-Crosbie</td>
<td>Prize shared by: S RAMBURAN; PV RAMOUTHAR, R RHODES, T WETTERGREEN, U PILLAY, MR JONES and R VAN ANTWERPE</td>
</tr>
<tr>
<td>Year</td>
<td>Prize/Award</td>
<td>Author(s)</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td>-----------</td>
</tr>
<tr>
<td>1977</td>
<td>Factory</td>
<td>B ST C MOOR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RT BISHOP</td>
</tr>
<tr>
<td>1978</td>
<td>Factory</td>
<td>RD ARCHIBALD and C MACK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OP LANDREY</td>
</tr>
<tr>
<td>1979</td>
<td>Factory</td>
<td>GC ASHE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No Winner</td>
</tr>
<tr>
<td>1980</td>
<td>Factory</td>
<td>DCM KEIR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AN MILLS and ER RINGELMAN</td>
</tr>
<tr>
<td>1981</td>
<td>Factory</td>
<td>S NORTH-COOMBES, K TAYLER and K KOSTER</td>
</tr>
<tr>
<td></td>
<td>Agricultural</td>
<td>JG HARDY</td>
</tr>
<tr>
<td>1982</td>
<td>Factory</td>
<td>P GLAUM and A LANDMAN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PC WISE</td>
</tr>
<tr>
<td>1983</td>
<td>Factory</td>
<td>RAH CHILVERS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JE LONSDALE</td>
</tr>
<tr>
<td>1984</td>
<td>Factory</td>
<td>DJ CARLIELL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PG BRAITHWAITE</td>
</tr>
<tr>
<td>1985</td>
<td>Factory</td>
<td>MA GETAZ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>J CHEDZY and JBR FINDLAY</td>
</tr>
<tr>
<td>1986</td>
<td>Factory</td>
<td>RAH CHILVERS and DJ LOVE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DJ NIXON, M WORKMAN and PJ GLENDINNING</td>
</tr>
<tr>
<td>1987</td>
<td>Factory</td>
<td>CPM SWEET, PW WHITE and GH GODWORTH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PC MANN</td>
</tr>
<tr>
<td>1988</td>
<td>Factory</td>
<td>RP SCOTT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DAG RALFE</td>
</tr>
<tr>
<td>1989</td>
<td>Factory</td>
<td>PM SCHORN, J BECKETT and WS GRAHAM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TL PEARSE</td>
</tr>
<tr>
<td>1990</td>
<td>Factory</td>
<td>DM VAN DEN BERG</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RN STATHAM</td>
</tr>
<tr>
<td>1991</td>
<td>Factory</td>
<td>B ST C MOOR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PJG GARDINER and J CAZALET</td>
</tr>
<tr>
<td>1992</td>
<td>Factory</td>
<td>RR SANDERS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CG SPALING</td>
</tr>
<tr>
<td>1993</td>
<td>Factory</td>
<td>DJ TAYFIELD and EW ANDERSON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OP LANDREY, GC EICHLER and J CHEDZY</td>
</tr>
<tr>
<td>1994</td>
<td>Factory</td>
<td>C CREBO, L BACHAN and V PILLAY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PC HENRY and W RHEBERGEN</td>
</tr>
<tr>
<td>1995</td>
<td>Factory</td>
<td>M MacNAUGHTON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D MCCRATH and VW SPAULL</td>
</tr>
<tr>
<td>1996</td>
<td>Factory</td>
<td>B MISPLON, H VERBANCK and P McINTYRE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PA DONOVAN</td>
</tr>
<tr>
<td>1997</td>
<td>Factory</td>
<td>Prize shared by M MOODLEY, DJ BEKKER, PJ PIENAAR and R PILLAY; M MOODLEY and PM SCHORN; I SINGH, NJ COETZEE and E BURMEISTER; I SINGH, R RILEY and D SEILLIER</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A PRINS, JJ BORNMANN and JH MEYER</td>
</tr>
<tr>
<td>1998</td>
<td>Factory</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JB CHADWICK</td>
</tr>
<tr>
<td>1999</td>
<td>Factory</td>
<td>T DALE and TD KNOETZE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HR ROSTRON, DWF BUTLER and MD ZWANE</td>
</tr>
<tr>
<td>2000</td>
<td>Factory</td>
<td>CRC JENSEN and G GOVENDE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N LECLER</td>
</tr>
<tr>
<td>2001</td>
<td>Factory</td>
<td>M DEBWE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M HUMM</td>
</tr>
<tr>
<td>2002</td>
<td>Factory</td>
<td>I SINGH, H JONES and S GAYAPERSAD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M ISYAGI and DMW WHITBREAD</td>
</tr>
<tr>
<td>2003</td>
<td>Factory</td>
<td>Prize shared by: LJ MELROSE, M MOODLEY, M PILLAY, PM SCHORN, G MITCHELL and R GELLING</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prize shared by: GW MAHER and L SCHULZ; C PFOTENHAUER</td>
</tr>
<tr>
<td>2004</td>
<td>Factory</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D ARMSTRONG</td>
</tr>
<tr>
<td>2005</td>
<td>Factory</td>
<td>None</td>
</tr>
<tr>
<td>2006</td>
<td>Factory</td>
<td>Prize shared by: M REIN, L SMITH, B STRACHAN and R WIRMINGHAUS; M NINELA and N RAJOO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prize shared by: MI LANGTON, JC SMITHERS, CN BEZUIDENHOUT and PWL LYNE; RR FORTMANN, PG BRENCHLEY and AK MATHEW</td>
</tr>
<tr>
<td>2007</td>
<td>Factory</td>
<td>None - No Congress held</td>
</tr>
<tr>
<td></td>
<td></td>
<td>None - No Congress held</td>
</tr>
<tr>
<td>2008</td>
<td>Factory</td>
<td>S RAMA and SS MUNSAMY</td>
</tr>
<tr>
<td>2009</td>
<td>Factory</td>
<td>PM SCHORN, L SMITH, SD PEACOCK, DJ LOVE and DJ MUZZELL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AT WYNNE, TJ MURRAY and AB GABRIEL</td>
</tr>
<tr>
<td>2010</td>
<td>Factory</td>
<td>DJ LOVE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JJ MURRAY</td>
</tr>
<tr>
<td>2011</td>
<td>Factory</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JJ DLAMINI</td>
</tr>
<tr>
<td>2012</td>
<td>Factory</td>
<td>R GENT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KE MATHIAS</td>
</tr>
<tr>
<td>2013</td>
<td>Factory</td>
<td>A RAGHUNANDAN, CRC JENSEN, T MTEMBU and FEA AHMED</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JJ MURRAY, HNP STOLZ and JL BOUWER</td>
</tr>
</tbody>
</table>
### SASTA POSTER AWARDS 2000-2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Prize/Award</th>
<th>Author(s)</th>
<th>Year</th>
<th>Prize/Award</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>Factory</td>
<td>None</td>
<td>2009</td>
<td>Factory</td>
<td>SN WALFORD, S EQLI and B MARTINCIGH</td>
</tr>
<tr>
<td></td>
<td>Agricultural</td>
<td>SA MCFARLANE and RA BAILEY</td>
<td></td>
<td>Agricultural</td>
<td>PL CAMPBELL, GW LESLIE, SA MCFARLANE,</td>
</tr>
<tr>
<td>2001</td>
<td>Factory</td>
<td>None</td>
<td>2010</td>
<td>Factory</td>
<td>SD BERRY, R RHODES, R VAN ANTWERPEN,</td>
</tr>
<tr>
<td></td>
<td>Agricultural</td>
<td>SA MCFARLANE</td>
<td></td>
<td>Agricultural</td>
<td>RS RUTHERFORD, T VAN ANTWERPEN,</td>
</tr>
<tr>
<td>2002</td>
<td>Factory</td>
<td>None</td>
<td>2011</td>
<td>Factory</td>
<td>DM McELLIGOTT and DE CONLONG</td>
</tr>
<tr>
<td></td>
<td>Agricultural</td>
<td>CN BEZUIDENHOUT and C GERS</td>
<td></td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>Factory</td>
<td>None</td>
<td>2012</td>
<td>Factory</td>
<td>CN BEZUIDENHOUT</td>
</tr>
<tr>
<td></td>
<td>Agricultural</td>
<td>A JUMMAN and NL LECLER</td>
<td></td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>Factory</td>
<td>Y NAIDOO and R SIMPSON</td>
<td>2013</td>
<td>Factory</td>
<td>WK LAWLOR</td>
</tr>
<tr>
<td></td>
<td>Agricultural</td>
<td>DJ NIXON</td>
<td></td>
<td>Agricultural</td>
<td>WA GILLESPIE, FJ MITCHELL, MJ WAY,</td>
</tr>
<tr>
<td>2005</td>
<td>Factory</td>
<td>None</td>
<td>2014</td>
<td>Factory</td>
<td>TM WEBSTER and JH WITTHOF</td>
</tr>
<tr>
<td></td>
<td>Agricultural</td>
<td>None</td>
<td></td>
<td>Agricultural</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>Factory</td>
<td>None</td>
<td>2015</td>
<td>Factory</td>
<td>H du CLOU and SN WALFORD</td>
</tr>
<tr>
<td></td>
<td>Agricultural</td>
<td>None</td>
<td></td>
<td>Agricultural</td>
<td>B BHENGU, T MASONDO, S HLELA,</td>
</tr>
<tr>
<td>2007</td>
<td>Factory</td>
<td>None - No Congress held</td>
<td>2016</td>
<td>Factory</td>
<td>V DLAMINI and S MNGOMEZULU</td>
</tr>
<tr>
<td></td>
<td>Agricultural</td>
<td>None</td>
<td></td>
<td>Agricultural</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>Factory</td>
<td>B BARKER and J WESLEY-SMITH</td>
<td></td>
<td>None</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Agricultural</td>
<td>SA MCFARLANE, T VAN ANTWERPEN,</td>
<td></td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

### JUBILEE AWARDS 2000-2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Prize/Award</th>
<th>Author</th>
<th>Year</th>
<th>Prize/Award</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>Factory</td>
<td>CRC JENSEN</td>
<td>2006</td>
<td>Factory</td>
<td>EJ SCHMIDT</td>
</tr>
<tr>
<td></td>
<td>Agricultural</td>
<td></td>
<td></td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>Factory</td>
<td>None</td>
<td>2009</td>
<td>Factory</td>
<td>V HARRACA</td>
</tr>
<tr>
<td></td>
<td>Agricultural</td>
<td>None</td>
<td></td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

### INNOVATION AWARDS 2000-2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Prize/Award</th>
<th>Author(s)</th>
<th>Year</th>
<th>Prize/Award</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>Factory</td>
<td>L HELFRICH</td>
<td>2004</td>
<td>Factory</td>
<td>WH REDINGER</td>
</tr>
<tr>
<td></td>
<td>Agricultural</td>
<td>D DINKLEMMANN</td>
<td></td>
<td>Agricultural</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>Factory</td>
<td>B GOVENDER</td>
<td>2005</td>
<td>Factory</td>
<td>C GARNETT</td>
</tr>
<tr>
<td></td>
<td>Agricultural</td>
<td>None</td>
<td></td>
<td>Agricultural</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>Factory</td>
<td>S CHINSAMY</td>
<td>2006</td>
<td>Factory</td>
<td>E ALBERTSE</td>
</tr>
<tr>
<td></td>
<td>Agricultural</td>
<td>NOODSBURG CANEGROWERS ASSOCIATION (Proposed by GW MAHER)</td>
<td></td>
<td>Agricultural</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>Factory</td>
<td>D DENNIS</td>
<td>2007</td>
<td>Factory</td>
<td>I HILLERMANN</td>
</tr>
<tr>
<td></td>
<td>Agricultural</td>
<td>None</td>
<td></td>
<td>Agricultural</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Agricultural</td>
<td>None</td>
<td></td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

### ROBIN RENTON MEMORIAL AWARD (PG8 PRIZE) 2003-2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Author(s)</th>
<th>Year</th>
<th>Author(s)</th>
<th>Year</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>LJ MELROSE</td>
<td>2007</td>
<td>None - No Congress held</td>
<td>2011</td>
<td>T NDHLALA</td>
</tr>
<tr>
<td>2004</td>
<td>None</td>
<td>2008</td>
<td>P SHARMA</td>
<td>2012</td>
<td>PS JENSEN</td>
</tr>
<tr>
<td>2005</td>
<td>None</td>
<td>2009</td>
<td>Z RAMBAKUS</td>
<td>2013</td>
<td>S SHAH</td>
</tr>
<tr>
<td>2006</td>
<td>S RAMA</td>
<td>2010</td>
<td>A JUMMAN</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### SASTA STUDENT THESIS AWARD 2004-2007

<table>
<thead>
<tr>
<th>Year</th>
<th>Author(s)</th>
<th>Year</th>
<th>Author(s)</th>
<th>Year</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>MH GRAHAM</td>
<td>2006</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>None</td>
<td>2007</td>
<td>None</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### SASTA STUDENT AWARD 2008-2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Author</th>
<th>Year</th>
<th>Author</th>
<th>Year</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>A HARRIS</td>
<td>2011</td>
<td>P MUDAVANHU</td>
<td>2015</td>
<td>RL ROSSLER</td>
</tr>
<tr>
<td>2009</td>
<td>G DITTRICH-SCHRODER</td>
<td>2012</td>
<td>SN RAHIMAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>H DU CLOU</td>
<td></td>
<td>TA GOBLE</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### AGRICULTURE SUCCESS STORY AWARD 2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Author</th>
<th>Year</th>
<th>Author</th>
<th>Year</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>None</td>
<td>2012</td>
<td>None</td>
<td>2013</td>
<td>None</td>
</tr>
</tbody>
</table>

### FACTORY OPERATIONAL PAPER AWARD 2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Author</th>
<th>Year</th>
<th>Author</th>
<th>Year</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>Q MASEKO</td>
<td>2012</td>
<td>S GARTNER</td>
<td>2013</td>
<td>B SKINNER</td>
</tr>
</tbody>
</table>
GUEST PRESENTATION

THE SOUTH AFRICAN DEVELOPMENT OF TRADITIONAL INDUSTRIES FOR ECONOMIC GROWTH AND COMPETITIVENESS

UNATI SPEIRS

Chief Director: Agroprocessing, Department of Trade & Industry

---

Biography: Unati Speirs

Born in East London, Unati Speirs has succeeded in balancing being a wife and mother with an extremely active career. Apart from her job as Chief Director of the Agro-Processing Business Unit at the Department of Trade and Industry, she is doing her final year towards a MSc Agric degree and is studying for a BCom Accounting degree through UNISA. She obtained her BSc Agric from the University of Fort Hare. She also has a law certificate from the University of Cape Town and a diploma in Project Management from Damelin College.

Unati began her career as a Project Coordinator at the Canon Collins Foundation Rural Development Project in South Africa, then moved on to teach at a Calloway High School in the USA. From America, she moved to a Post Office in The Netherlands. She returned to South Africa to take up the post of Regional Manager of the SA Institute of Chartered Accountants, where for six years she was in charge of the Eastern Cape. It was during this period that she pioneered the Thuthuka project, which helps black students who aspire to become Chartered Accountants.

While Unati was working as a Sector Manager at the East London Industrial Development Zone (IDZ), she was chosen by the United Nations to represent South Africa in an investment promotion initiate. As a UN delegate, Unati has travelled around the world promoting investment in South Africa, and has recently added the Business Women’s Association regional award (corporate category) to her list of achievements. Yet despite her heavy workload, Unati finds time to reach out to others, particularly rural women who are economically depressed.
GUEST PRESENTATION

SA SUGAR INDUSTRY: STRATEGY FOR A SUSTAINABLE FUTURE

TRIX TRIKAM

Executive Director, South African Sugar Association

Biography: Trix Trikam

Mukesh Kalidas (“Trix”) Trikam has held the position of Executive Director of the South African Sugar Association (SASA) for the past 15 years, having joined the sugar industry in 1981 as a B Com (Accounting and Business Economics) graduate. Trix’s first management position in SASA was that of Financial Planning Manager, a role which provided him with the opportunity of learning the complex operations of the sugar industry partnership. On the way to his appointment as Executive Director in December 1998, Trix held the positions of head of the Industry Affairs division and later Finance Director. In 2007, Trix was honoured as the Kwa-Zulu Natal Agriculturist of the Year. During this career with SASA, Trix has participated in executive education programmes at the University of Cape Town Graduate School of Business and at Ashridge University in the United Kingdom. His current role involves not only the leadership of SASA’s diverse divisions, ranging from agricultural research to international marketing, but sees Trix playing a key role in the development of industry strategy and in the securing of support from the industry’s external stakeholders for its strategic objectives. He also represents the industry in key regional and international trade forums and at international organisations.
SOUTH AFRICAN SUGARCANE PRODUCTION IN 2013/14: A RECORD BREAKING SEASON

SINGELS A1, LESLIE GW1, McFARLANE SA1, SCHOEMAN J1 and GABRIEL A2

1South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa
2South African Cane Growers’ Association, Flanders Drive, Mount Edgecombe, 4300, South Africa

abraham.singels@sugar.org.za

Abstract

The objective of this study was to analyse South African sugarcane production in the 2013/14 season and relate the key performance indicators of cane yield and cane quality to the main production factors. The information and lessons learnt from it can be used in future for more efficient production of high quality sugarcane in South Africa.

The industry produced 20.03 Mt of cane in the 2013/14 season, harvested from an estimated 263 465 ha. It was the third consecutive increase from the previous seasons after a steady decline since 2005, while the area under cane has increased from the previous season for the second consecutive season. The industry average cane yield is estimated at 76.0 t/ha, the highest yield achieved since 1987/88, when average age at harvest was substantially higher than at present.

The season was characterised by excellent growing conditions, especially in rainfed areas. Rainfall during the critical 2012/13 summer months was well distributed, keeping soil water status near optimal and enabling vigorous growth. The dry winter months promoted good cane quality, especially in late winter and spring. Excessive rainfall towards the end of milling season interfered with harvesting operations to some extent. Although this had a relatively small impact on seasonal average cane quality, some of crop scheduled for harvest in 2013 had to be carried over to 2014.

The good cane quality achieved in 2013/14 is ascribed to a combination of factors, namely, a large amount of mature cane carried over from 2012/13 in many areas, the increased and judicious use of chemical ripeners in irrigated and rainfed areas, and favourable climatic conditions.

Pests and diseases had relatively little impact on cane yield. Eldana damage declined steadily throughout the industry, and the sharp decline in 2013 on the South Coast of KwaZulu-Natal, in particular, was encouraging. Although problematic in some areas, overall, smut and mosaic disease levels were low. Brown and tawny rust were widespread in autumn and spring, and many growers applied a fungicide to infected fields to manage the disease. Of concern is the emergence of a new pest, yellow sugarcane aphid. This pest will be monitored carefully, and impacts on crop growth and yield and suitable control measures will be investigated.

The excellent growing conditions were offset by poor economic conditions. Sugarcane farming profitability has declined further to alarmingly low levels, due mainly to large production cost increases and a reduced product price. The latter was caused by massive amounts of imported sugar that reduced local market demand, necessitating increased sugar exports at low world prices.

Keywords: cane quality, cane yield, diseases, modelling, profitability, pests, production

Biography: Abraham Singels

Dr. Abraham Singels is a Principal Agronomist at the South African Sugarcane Research Institute (joined in 1997), a Fellow of the SA Society of Crop Production and holds honorary appointments at the Department of Plant Production at University of Pretoria and the School of Agriculture, Earth and Environmental Sciences at the University of KwaZulu-Natal. He obtained a Ph.D. in Agrometerology from the University of the Orange Free State, where he also worked as researcher and lecturer for 15 years. His interests are crop response to climate, crop modelling and crop decision support systems including for irrigation scheduling.
Abstract

Performance, throughput and other relevant aspects of the sugar industries in southern Africa for the 2013/14 milling season are presented and discussed. Data from sugar mills in South Africa, Malawi, Mozambique, Swaziland, Tanzania, Zambia and Zimbabwe are included.

The 2013/14 season in South Africa was better than the poor 2012/13 season in terms of tons of cane harvested, which increased to over 20 million tons. Cane quality also improved from the previous season. The Overall Time Efficiency improved as a result of a marked decrease in no-cane stops and a slight drop in Lost Time % Available. The Overall and Boiling House Recoveries also improved from 2012/13, but these were mainly as a result of improved cane quality. Although improvements to extraction and losses to molasses were made from the previous season, the Undetermined Loss increased. Despite the general improvements in the 2013/14 season, the sucrose recoveries achieved still differ substantially from ten year high values.

Regarding the Sugar Milling Research Institute NPC Affiliate Member mills in neighbouring countries, recoveries were generally better than in 2012/13.

Keywords: sugarcane, sugar factories, cane quality, crop size, performance, recovery

Biography: Gavin Smith

Gavin Smith is Industry Support Manager at the Sugar Milling Research Institute NPC in Durban. He received his Chemical Engineering degree from the University of Natal in Durban in 1983. His work history includes the nuclear energy field, before moving into the sugar industry in 1987. He has worked for Tongaat-Hulett Sugar and Illovo Sugar, including the downstream alcohol plant where he managed both the distillery and pharmaceutical plants. After a brief stint in project management, he moved to the SMRI where he now heads the Industry Support Division which is responsible for training, consulting, routine analytical services and the factory performance figures of the SMRI’s Member and Affiliate Member mills. Gavin has been a SASTA member since 1990, has been on the SASTA Council for 6 years and President for the past 4 years.
FIRST RECORD OF YELLOW SUGARCANE APHID, 
SIPHA FLAVA (HOMOPTERA: APHIDIDAE), IN THE
SOUTH AFRICAN SUGARCANE INDUSTRY

WAY MJ, CONLONG DE1, MARTIN LA, MCFARLANE SA,
STANACK R, KEEPING MG and RUTHERFORD RS1

1South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa
2School of Life Sciences, University of KwaZulu-Natal, P/Bag X01, Scottsville, 3209, South Africa
mike.way@sugar.org.za des.conlong@sugar.org.za lauren.martin@sugar.org.za
sharon.mcfarlane.org.za rowan.stranack@sugar.org.za
malcolm.keeping@sugar.org.za stuart.rutherford@sugar.org.za

Abstract
During 2013, the yellow sugarcane aphid, Sipha flava (Homoptera: Aphididae), was recorded in the South African sugarcane industry for the first time. Initially discovered at Mount Edgecombe in the KwaZulu-Natal Province of South Africa, it was subsequently detected across the entire sugarcane industry and more recently in Swaziland and Zimbabwe. Morphological and molecular taxonomic techniques were employed to confirm its identity. Native to North America, it currently has a wide geographical distribution across Central and South America, as well as the Caribbean and Hawaiian Islands. It was first reported on sugarcane in Africa in Morocco in 2006. In the Americas, sugarcane, sorghum (commercial and wild species), rice, maize, cereal crops, several species of lawn and pasture grasses, and Carex and Cyperus have been recorded as hosts. It has been collected from sugarcane, Sorgum bicolor, Tragus berteronianus, Echinochloa colona, Digitaria ciliaris, D. ternata and D. citratus in South Africa; however, additional hosts are expected as it becomes more established. Sipha flava (2 mm) are yellow with dusky coloured spots, short stiff hairs and reduced cornicles. All stages feed in dense colonies on the lower leaf surface along the mid-rib, causing yellowing and reddening. In South Africa natural enemies such as ladybird beetles, earwigs, hover flies, predaceous ants and spiders prey on S. flava. The effect on final sugarcane yield due to S. flava infestations in South Africa remains to be determined. Management tactics have yet to be developed and, should natural enemies and weather fail to keep populations in check, then resistant/tolerant varieties and insecticides could be considered.

Keywords: sugarcane aphid, biosecurity, IPM, tolerant varieties, natural enemies, biology

Biography: Mike Way

Mike Way is an entomologist at SASRI involved with researching various aspects of sugarcane pests. His main focus area is the ecology of arthropod communities to better understand their role in sugarcane crops and surrounds as a means towards the development of sustainable and environmentally favourable area-wide integrated pest management (AW-IPM) plans for the key sugar pests.
INVESTIGATION INTO THE CAUSE OF TURBIDITY AT MALELANE MILL 2013

CRONJÉ CPR¹ and SAHADEO P²

¹Tsb Pty (Ltd), Cane Supply, Malelane, 1320, South Africa
²Tsb Pty (Ltd), Malelane Mill, Malelane, 1320, South Africa
cronjep@tsb.co.za sahadeop@tsb.co.za

Abstract

The Malelane mill experienced major turbidity events during early spring 2005 and again in 2013. The 2005 events were investigated by a team of consultants, with the outcomes being inconclusive. With the 2013 event, a collaborative effort between the Tsb agriculture and factory teams led to the conclusion that the turbidity could be traced back to sources of cane supplied during the event.

The methodology included tracing every load of cane delivered to the mill over an extended period and then linking the load sources to subsequent turbidity events in the mill. The sequence and source of loads in the period prior to the events were analysed and it was found that deliveries from certain farms always occurred prior to turbidity events. By using a co-variance analyses derivative a strong correlation between specific deliveries and turbidity events, as well as severity of turbidity, was determined.

From these results a simple model was developed which was used for the balance of the season to develop a turbidity prediction system for the mill. The prediction system enabled the mill to pay attention to procedures during risk periods and thereby avoided further major disruptions in manufacturing.

The turbidity events were linked to deliveries from cane fields on very sandy soils. Where the deliveries from such farms were concentrated in time or as a series of extended sequential deliveries, turbidity events were triggered. The actual turbidity was linked to the formation of amorphous silica. Once the rainy season started the turbidity no longer occurred although some deliveries should have sparked events.

Keywords: sugarcane, sandy soils, amorphous silica, turbidity, mill delivery logistics

Biography: Pieter Cronjé

Dr Pieter Cronjé is Manager: Grower support for Tsb-Nkomazi. In this role he manages extension and research co-ordination for Tsb and is involved with many of the agronomic aspects of irrigated cane production. Pieter is an erstwhile employee of SASRI and holds a PhD from the University of the Witwatersrand. Pieter has presented at SASTA in the 1990’s and is a previous winner of the Kynoch Prize.
HOW RESEARCH CAN DELIVER VALUE TO THE SOUTHERN AFRICAN SUGARCANE PROCESSING INDUSTRY: THE SMRI STRATEGY

DAVIS SB and DEWAR J

Sugar Milling Research Institute NPC, University of KwaZulu-Natal, Howard College Campus, Durban, 4041, South Africa
sdavis@smri.org  jdewar@smri.org

Abstract

The Sugar Milling Research Institute NPC (SMRI) was established in 1949 to service the needs of the South African sugarcane processing industry. Since that time, the industry has encountered many significant economic challenges, as is currently the case. When economic times are tough, research expenditure is often the first to be cut, but the SMRI has enjoyed the continued support of the sugarcane processing industry throughout its history.

This presentation outlines how the SMRI, taking cognisance of the changes, challenges and opportunities in the sugarcane processing industry, has adapted its business and research strategies to address the needs and strategic objectives of its Members in the short, medium and long term to ensure their continuing support. These strategies take into account the need for short term interventions, consider the opportunities and challenges associated with the recent focus on bioenergy products (cogeneration and bioethanol), and assume that long term sustainability will require the adoption of an integrated biorefinery approach to sugarcane processing with diversification into higher value products.

It is understood that to deliver on this somewhat high risk and demanding strategy, and to enhance significantly the rate of innovation, diverse skills and resources beyond those previously available to the SMRI will be required. As a means of enabling this, the SMRI is engaging actively with government departments (especially the Department of Science and Technology) to attract substantial funding for focused sugarcane research, development and innovation aligned with both the industry’s needs and national development strategies. Coupled with this, the SMRI is actively exploring collaborative opportunities both nationally and internationally, especially where such collaboration can be supported by international funding.

Such initiatives are intended to multiply the funds available from the SMRI membership, principally the South African sugar milling companies, and speed up development of technologies and processes through partnership with technology providers and potential markets for bio-based products that can be derived from sugarcane. In this way, the processing industry can be developed into integrated sugarcane biorefineries for the long term sustainability of the entire industry.

Keywords: research, strategy, biorefinery, sugarcane processing

Biography: Steve Davis

Steve Davis is the Research and Development Manager at the Sugar Milling Research Institute NPC. A Professional Chemical Engineer, he studied for his BSc and MSc in Engineering at the University of Natal in Durban. His research interests include clarification processes, colour removal from sugar juices and syrups (raw house and refinery), separation technologies and tracer testing. He is managing the research and development group at the SMRI in providing research outcomes to assist the processing industry to move towards an integrated biorefinery model to enhance sustainability. This includes the development of a general sugarcane biorefinery techno-economic model to advise research strategy and to provide intelligence to the industry on potential products and processes that the local industry could consider. He has presented many SASTA papers, including the Annual Review of the Milling Season in Southern Africa for several years.
SHORT NON-REFEREED PAPER

THE UMFOLOZI FLATS: OPPORTUNITIES AND CHALLENGES IN A NICHE SUGARCANE PRODUCTION AREA

SEARLE A
South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa
alex.searle@sugar.org.za

Abstract
Sugarcane has been grown on the Umfolozi Flats since 1911, with the current agricultural production area being approximately 10 000 ha. The Umfolozi Flats are eminently suited to sugarcane production due to the deep fertile soils, high heat units and favourable annual rainfall. The location of the sugar mill in the midst of the production area, coupled with the utilisation of a narrow gauge railway, results in a highly efficient and effective transport system. Growers own 75% of Umfolozi Sugar Mill, which puts it in an enviable position to capitalise on other revenue streams derived from sugarcane as a raw material.

Both in terms of industry organisation and natural resources, the Umfolozi Flats differ from sugarcane farming areas in the rest of the South African sugar industry. Growing sugarcane on the deep alluvial soils at a few meters above sea level has presented a number of problems and opportunities which rarely occur in other parts of the industry. By way of example, the inherent fertility of the soils is a major contributory factor in the consistently high yields attained; however, historic flooding and the ever present water table over much of the area create agronomic challenges, not least when it comes to the effective management of irrigation and crop nutrition. In this paper, these and other factors relating to sugarcane production on the Umfolozi Flats are considered. Perceived barriers to further yield improvements and research needs are discussed.

Keywords: Umfolozi, water table, tramline, dryland cane, coastal, nutrition

Biography: Alex Searle
Alex Searle is an Extension Specialist at the South African Sugarcane Research Institute. Alex received an NDA Agricultural Management and Land & Environment in the United Kingdom. His work history includes Farm and contract management in Tanzania, Mozambique and South Africa. He started with SASRI in 2011 after a number of years with Farmers Agricare. He has a keen interest in knowledge dissemination, in particular, the use of technology to aid decision-making and environmentally sustainable farming.
REFEREED PAPER

GROWER-EXTENSIONIST-RESEARCHER PARTNERSHIPS: ON-FARM DEMONSTRATION TRIALS TO FACILITATE ADOPTION OF CHEMICAL RIPENING

VAN HEERDEN PDR, ADENDORFF MW, LAGERWALL G, BOTHA P,
CRONJE CPR, VAN DER MERWE J, NEL N, SMITH P, HÖLL E,
HYSLOP G, SMITH V, HARRIS A, HARRIS W, MHLONGO JB,
HARRIS DM, DHEOPURSAD P, MATTHEWS T and NAIDOO P

1South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa.
2Tsb Sugar RSA, Manager: Grower Affairs, Malelane, 1320
3Tsb Sugar RSA, Manager: Cane supply & Grower Affairs, Pongola, 3170
4Tsb Sugar RSA, Production Manager: Libuyile Farming Services, Komatipoort, 1340
5Noordgrens Estate, Komatipoort, 1340
6SM Naude Farming, Pongola, 3170
7Lilliefontein Farm, Baynesfield, 3770
8Vriendschap Farming, Melmoth, 3835
9Cane Testing Service, South African Sugar Association, 170 Flanders Drive, Mount Edgecombe, 4300, South Africa

Abstract

In the South African sugarcane industry chemical ripeners are used to increase cane quality in vigorously growing crops. Replicated research trials are conducted at several locations to develop variety-specific ripener recommendations. Since 2010, these trials have been supplemented by on-farm demonstration trials through the formation of grower-extensionist-researcher partnerships. The objectives of this paper are to elaborate on these partnerships and to showcase outcomes in terms of demonstrating on-farm economic benefit and grower adoption. Twelve demonstration trials were conducted on farms in Komatipoort, Pongola, Melmoth and Eston on irrigated annual and rainfed long cutting-cycle crops. Fields were identified through inspection to ensure that all logistical considerations were met and that the crops displayed in-field uniformity. Fields were demarcated into strips that acted as unsprayed controls or ripener treatments. Ripeners (Ethephon™, Fusilade Forte™ and Volley™) were administered by fixed-wing aircraft or helicopters at registered application rates. At harvest all cane deliveries from control and treatment strips were analysed by the Cane Testing Service at the respective sugar mills. These demonstration trials showed that ripeners increased relative value (RV) yields by 0.83-2.11 t/ha in annual cutting-cycle crops and by 0.51-2.15 t/ha in vigorously growing longer cutting-cycle crops, except for one trial at Melmoth where a negative response was observed in variety N16. Evidence supporting increased adoption of chemical ripening following communication of trial outcomes to growers in the Mpumalanga region is presented. In addition, areas requiring further research are revealed for purposes of establishing similar grower-extensionist-researcher partnerships in the future.

Keywords: adoption, cane quality, chemical ripening, demonstration trials, partnerships, sugarcane

Biography: Riekert van Heerden

Dr Riekert van Heerden is a senior scientist and manager of the Crop Performance and Management Research Programme at the South African Sugarcane Research Institute. He holds a Ph.D. in Plant Physiology from North-West University, South Africa. Dr van Heerden is a National Research Foundation (NRF)-rated scientist and has authored/co-authored 33 publications in accredited local and international journals. His main role at SASRI is to initiate and conduct research leading to best management practices for sugarcane cultivation with particular emphasis on the chemical ripening of irrigated and rainfed sugarcane. Research outcomes and advice on the use of ripeners are regularly shared with farmers at industry contact events and in the form of popular articles.
IMPACT OF RECAPITALISATION AND DEVELOPMENT FUNDING IN THE SOUTH AFRICAN SUGAR INDUSTRY

ELLENSON T and MADHANPALL A
South African Sugar Association, 170 Flanders Drive, Mount Edgecombe, 4300, South Africa
Thandeka.Ellenson@sasa.org.za  Anwar.Madhanpall@sasa.org.za

Abstract

Recapitalisation and Development funding, as a developmental tool, seeks to provide black emerging farmers with social and economic infrastructure and basic resources required to run successful agricultural businesses. In 2011, the government entered into a partnership agreement with the sugar industry to facilitate the implementation of the recapitalisation and development programme (RADP) funding. Government invested a total of R313 million to 177 sugarcane farming enterprises in KwaZulu-Natal and Mpumalanga provinces for planting, ratooning and machinery between 2011 and 2014. This funding was accompanied by strategic partnerships with accredited companies or well-resourced and experienced individuals as mentors. The industry contributed by investing in capacity building, and this was done through the allocation of R2.7 million for training on farming skills, governance and business management. Based on this investment of funds, it was important to measure the real impact of the RADP funding in the industry, and to establish whether the industry is meeting the desired outcomes. The industry has begun to see a return on investment (ROI) from RADP funding, which has also yielded permanent and seasonal job creation, the inclusion of black contractors in agricultural production processes, and increased tonnage delivery from some of the farms that were funded. This paper concludes that the sugar industry meets the desired outcomes of the policy for recapitalisation and development.

Keywords: development, funding, land reform, recapitalisation, sugarcane

Biography: Thandeka Ellenson

Thandeka is an Operational Support Manager at the South African Sugar Association within the land reform and rural development department. She provides support to new entrant and emerging growers under the land reform programme through management of recapitalisation and development funding invested by government to the industry, governance support, training coordination, supports the restitution, redistribution and rural development projects and manages the land reform database. She is passionate about working within the space of emerging businesses, and in this case, emerging farming entities. She holds a BCom (Hons) (Business Management) from University of KwaZulu-Natal and an MBA (Finance) from Anglia Ruskin University.
RESTITUTION IN THE SUGAR INDUSTRY

RANKIN D and MADHANPALL A

External Affairs, Land Reform Department, South African Sugar Association, Mount Edgecombe, 4300, South Africa
deiderrankin@mweb.co.za anwhar.madhanpall@sasa.org.za

Abstract

The land reform restitution programme is currently being implemented with claims registered and in various phases of the restitution process over sugarcane land. In addition, with the Restitution of Land Rights Amendment Bill (Government Gazette No. 36826 of 2013) currently in the consultation phase, there is a high likelihood of the restitution claims process being re-opened for an additional five years. This will enable claimants to lodge claims over land, and result in a larger area of cane land subject to land claims. This paper is premised on the need to ensure cane production tonnage and quality is sustained and does not decrease, within the context of the land reform restitution programme. In an attempt to ensure sustained cane production and quality a proactive approach from the sugar industry has been identified as being necessary. The proactive approach is characterised by the following strategies:

Development of post-settlement models and business processes jointly between the Regional Land Claims Commission (RLCC) and the sugar industry. These models and processes will be improvements to the identified previous weaknesses in processes and models which will ensure sugar industry objectives and government land reform objectives may be achieved.

Once developed, to implement the models and processes in a planned, coordinated manner through joint annual planning, followed by monitoring and evaluation underpinned by accountability.

This paper aims to significantly enhance the provision of structured and sustainable pre- and post-settlement support to the restitution programme. It is envisaged that the application of this paper in a manual and toolkit format will provide guidance to industry staff, government officials, restitution new grower entrants, existing growers/landowners, land reform practitioners, and all other stakeholders involved in the planning and implementation of a sustainable restitution programme in the sugar industry.

This paper is based on the belief that all stakeholders involved in this vitally important transformative endeavor, will shift their focus from an approach which focused primarily on the legal transfer of land as opposed to the long term sustainability of restitution beneficiaries’ capacities/capabilities to maintain commercial operations, and the formulation and implementation of appropriately coordinated and comprehensive support models.

The business processes and models presented aim to ensure that all sugarcane restitution projects are implemented as sustainable entities that will result in improved quality of life for beneficiaries, and long-term economic, social and environmental sustainability.

With these outcomes in mind this paper aims to ensure a sustainable programme for land restitution within the sugar industry.

Keywords: restitution in the sugar industry, business process, post-settlement models

Biography: Deidre Rankin

Deidre Rankin completed a Masters Degree (cum laude) with her thesis on Rural Development within the context of land reform. Since completing her studies she has worked in the then Department of Land Affairs – at monitoring and evaluating land reform nationally, as well as with implementation within the KZN provincial office. She currently is assisting SASA with regard to restitution in the sugar industry.
NON-REFEREED GUEST PRESENTATION

GENETICALLY MODIFIED SUGARCANE –
THE WHO, WHY, WHAT, WHEN AND HOW MUCH

SNYMAN SJ

1South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300,
South Africa Sandy.snyman@sugar.org.za

Biography: Sandy Snyman

Dr Sandy Snyman is a Senior Researcher in the Biotechnology facility at SASRI. She has been with SASRI for 27 years and during that time she has initiated and implemented several tissue culture protocols for application in different aspects of the business for example, NovaCane® as a means to produce seedcane that is disease-free and true-to-type as well as in vitro conservation of valuable germplasm. In addition, she has produced and field tested genetically modified sugarcane and is confident that one day the industry will benefit commercially from these novel genetic interventions. Sandy is a NRF-rated scientist, holds an Honorary position at the University of Kwa-Zulu Natal and is involved with post-graduate student training. She has a ministerial appointment to serve as a member of the Department of Agriculture, Forestry and Fisheries Advisory Committee (GMO Act 1997), which advises Government on issues relating to genetic modified organisms.
RELATIONSHIP BETWEEN SOIL IN CANE AND MAINTENANCE COSTS: A CASE STUDY

LOUBSER RC
Sugar Milling Research Institute NPC, c/o University of KwaZulu-Natal, Durban, 4041
rloubser@smri.org

Abstract

Certain cane handling equipment has the additional benefit of removing soil from sugarcane prior to shredding. Soil in cane is known to cause wear in the processing plant resulting in high maintenance costs, and so the removal of some of the soil may have an economic benefit. This poster describes work that was done to help generate guidelines for determining the economic viability of installing soil removal plants before the preparation unit at sugar factories. Data was gathered from South African factories to identify where the greatest expenditure for soil related wear was found in a sugar factory in the 2012/13 season. Soil related wear occurs wherever the cane fibre is handled. That is, it is encountered in preparation equipment, conveyors, extraction plant, drying mills and in the boilers. The most visible and easily measured costs are associated with the preparation process. It was not possible to discern significant effects of average annual ash per cent cane on maintenance expenditure between factories for that season, so a more targeted approach was chosen. The refurbishment of knives and hammers is carried out at short intervals and the expenditure is spaced throughout the season. It was proposed to relate the cost of maintaining the preparation equipment to the variation in the ash content of the cane through the season by totalling the costs of materials drawn from the store to recondition the knives and shredder hammers for each month, and linking it to the average ash content of the cane for that month. Only one South African mill was able to provide a consistent and meaningful list of expenditure on maintenance materials used for refurbishing the preparation equipment for the season so this mill was chosen for a case study. The cost was found to be well correlated with the average ash in cane reported for each month for that mill. It is suggested that the correlations found can go some way to estimating the potential savings that could be enjoyed by installing a sand removal system, although it is also noted that the costs have a strong dependence on the nature of the entrained soil and operations and practices within the factory.

Keywords: soil removal, ash, wear, preparation, cost, refurbishment

Biography: Richard Loubser

Dr Loubser is a member of the research team at the Sugar Milling Research Institute. He is primarily a mechanical engineer but puts his knowledge to use in a variety of research projects. He has presented papers and posters regularly since joining the sugar industry in 2000.
POSTER SUMMARY

THE USE OF A DOUBLE PIPE EVAPORATOR PILOT PLANT TO TEST THE FEASIBILITY OF CONTROLLING EVAPORATOR SCALING BY USING AN ANTISCALANT CHEMICAL (POLYMERIC DISPERSANT BLEND)

RAMARU R
Sugar Milling Research Institute NPC, c/o University of KwaZulu-Natal, Durban, 4041, South Africa
rramaru@smri.org

Abstract

Evaporator scaling is still a major bottleneck in the sugarcane processing industry. It leads to reduced evaporation rates, increased operation costs for cleaning and lost productivity due to downtime. A cost-effective solution to this problem would therefore be of significant economic benefit to the industry. Various scale prevention methods have been reported; these include softening (chemical removal of divalent inorganic components) and the use of antiscalants. An antiscalant trial was carried out to investigate the use of a polymeric dispersant blend from a supplier. The antiscalant was expected to control the deposition of calcium oxalate and inorganic deposits by preventing the aggregation of emerging precipitates and deposition of the precipitate on the tube wall. An antiscalant trial was conducted under controlled conditions using a double pipe evaporator pilot plant installed at Sezela Sugar Mill. The double pipe evaporator consisted of two tubes enclosed in a steam heated vessel. One tube was treated with an antiscalant and the other was not (i.e. a control stream). This allowed for comparative studies to be conducted. There was no substantial difference in the quantity of the scale deposited on the antiscalant tube compared to the control tube; however, the antiscalant reduced the calcium oxalate content in the scale deposits by 44%, but this was accompanied by an increase in the percentage of silicate scale. It was also observed that there was no significant difference in the heat transfer coefficients of the control and the antiscalant stream over a period of 186 hours.

Keywords: double pipe evaporator, antiscalant, evaporator scaling, heat transfer coefficients

Biography: Rendani Ramaru

Rendani Ramaru is currently working as a researcher at the SMRI. He obtained his Masters degree in chemical engineering at the University of Cape Town in 2009. He worked at CSIR Biosciences before he joined the SMRI in 2011.
THE Z SCORE AS AN ALTERNATIVE MEASURE FOR THE SMRI INTER-LABORATORY TESTING PROGRAMME

WALFORD SN and PILLAY V
Sugar Milling Research Institute NPC, c/o University of KwaZulu-Natal, Howard College Campus, Durban, 4041
swalford@smri.org, vpillay@smri.org

Abstract

The Sugar Milling Research Institute NPC (SMRI) organises an annual inter-laboratory proficiency testing scheme for the South African and Swaziland mills. The objective of the scheme, which runs throughout the season, is to develop and maintain the quality of the testing within the mill laboratories and highlight areas that may need attention to detail. Results from both Very High Pol (VHP) sugar and final molasses comparisons are used as the basis for awarding the prestigious ‘SMRI Inter-Laboratory Award’. The scores are currently based on a simple arithmetic basis and do not take into account any statistical factors. This poster reviews the use of the statistical z score as an alternative measure for the SMRI inter-laboratory testing programme. The z score indicates how far and in what direction, a reported value deviates from the overall distribution’s mean, expressed in units of the distribution’s standard deviation. The mathematics of the z score transformation are such that, if every item in a distribution is converted to its z score, the transformed scores will necessarily have a mean of zero and a standard deviation of one. The z score transformation is especially useful when seeking to compare the relative standings of results from distributions with different means and/or different standard deviations, as is the case when comparing results from multiple mill laboratories and instruments. The laboratory standings using the alternative testing scheme are compared to the current scheme results for the past year.

Keywords: proficiency testing scheme, z score, Inter-Laboratory Award

Biography: Stephen Walford

Stephen manages the Analytical Quality & Development group at the Sugar Milling Research Institute (SMRI). He is the nominated representative for the SMRI ISO17025 quality system and responsible for the management and on-going development of the system, including the necessary research and development of new and alternate analysis techniques. It is in this role that he is responsible for reviewing and updating the interlaboratory studies. Stephen has a research interest in analytical techniques and instrumentation, is the chairman of the South African National Committee for ICUMSA and has presented at both local and international conferences.

Biography: Venishree Pillay

Venishree is the Analytical Quality & SHE Supervisor, Sugar Milling Research Institute NPC, South Africa and is responsible for the day-to-day running and maintenance of the SMRI Quality System. This includes maintenance of the total Quality System on the SMRI SharePoint system, helping with continuous improvement of the system, internal auditing and organising and evaluating the mill interlaboratory schemes. It is in this role that she plays a crucial part in helping to develop possible alternative schemes as shown in this work.
USE OF AN UPFLOW ANAEROBIC SLUDGE BLANKET REACTOR FOR ANAEROBIC DIGESTION OF DISTILLERY EFFLUENT

ZIZHOU N
Sugar Milling Research Institute NPC, c/o University of KwaZulu-Natal, Durban, 4041, South Africa
nzizhou@smri.org

Abstract

A laboratory-scale upflow anaerobic sludge blanket (UASB) reactor was used to treat very high strength ethanol distillery vinasse both to reduce the chemical oxygen demand (COD) and to generate methane-rich biogas as a source of energy. The UASB reactor was seeded with granular sludge obtained from a brewery effluent plant. The reactor temperature was maintained at 36°C and vinasse was fed into the reactor undiluted or after diluting. Vinasse COD and total phenolics concentration were more than 100 000 mg/L and 8000 mg/L, respectively. The maximum COD and phenolics abatement rates were 67% and 49%, respectively, when the vinasse was diluted and appeared greater than 70% when vinasse was undiluted. Maximum biogas yield was between 0.3–0.5 L/g COD in both cases. These results were obtained for organic loading rates of 6 g COD/L.d for diluted vinasse and 4 g COD/L.d for undiluted vinasse. This study showed that the UASB could be used to reduce the COD and phenolic concentrations of high strength distillery vinasse and simultaneously produce biogas. The study highlighted the level of organic loading rates possible in a UASB system which can be used to design full-scale systems as well as the characteristics of the distillery effluent obtained from the ethanol distillation using South African molasses.

Keywords: anaerobic, biogas, chemical oxygen demand, effluent, phenolics, UASB, vinasse

Biography: Njodzi Zizhou

Njodzi joined the SMRI in 2011 as Senior Researcher after eight years working in Bioprocessing R&D, four years as a Researcher and four years in Business Development. Njodzi did his undergraduate and postgraduate studies in Chemical Engineering at the University of Cape Town gaining broad experience on interesting projects in yeast fermentation and algal biotechnology. His current research focus at the SMRI is in effluent treatment and biorefinery integration in the sugar industry.
POSTER SUMMARY

USE OF A MICROBICIDE TO MINIMISE MICROBIOLOGICAL CONTAMINATION AS PART OF A FOOD SAFETY PROGRAMME

SIGINTA L and TAYLOR M
Buckman Africa, 1 Buckman Boulevard, Hammarsdale, 3700
lsigwinta@buckman.com   mtaylor@buckman.com

Abstract

The South African industry in general and the sugar industry in particular, need to be internationally competitive. This means that it is essential for a sugar factory to be a low cost producer while consistently meeting the international standards demanded by customers. These standards ensure food safety and consistent food quality, and may also include benefits such as the reduction of waste and increased profits associated with good manufacturing practices for the supplier.

The work reported in this poster is based on the objective of using a microbicide programme to minimise microbiological contamination in the sugar process and to support a food safety programme. The work done and literature findings show the need for a sound microbiological treatment to control microbes that degrade sucrose and form dextrans. It was determined that under normal conditions a significant amount of microbes can be found at any point in the juice preparation process in sugar milling and in the refining of raw sugar when no sanitation aid is applied. These losses affect the overall performance and profitability of the sugar industry. The regular use of a broad spectrum biocide is important to improve sugar recovery at mill level. A Food and Drug Administration (FDA) approved biocide is recommended for use in mill juice and refinery syrup for microbial control. This poster is aimed at showing how possible microbiological problems can be prevented effectively to reduce sugar losses and final product contamination.

Mesophiles and thermophiles are responsible for the sucrose losses at medium (35-55°C) and high (55-105°C) temperatures. To reduce the impact of mesophiles and thermophiles in the breakdown of sucrose, microbicides are used. Thiocarbamate based chemicals are approved by the FDA for food industry sanitation. Thiocarbamate is active against microorganisms and the invertase enzyme. The results of not using a sanitation aid for a mill could be:

• loss in profit due to microbial inversion
• reduced mill efficiencies
• customer complaints of contaminated sugar.

Biocides can be used in sugar mills to reduce sucrose deterioration by reducing the invertase enzyme activity as well as inhibiting growth of *Leuconostoc mesenteroides* in sugarcane juice.

Keywords: microbicide, sanitation, food safety, food quality, food hygiene, sugar

Biography: Luyanda Sigwinta

*Luyanda has nine years of experience with Biocide treatment in Sugar mills, Pulp and paper mills and Process Cooling towers. He holds a Biotechnology Diploma, majoring in Microbiology from Durban University of Technology.*
Abstract

As an industry that is energy self-sufficient, sugarcane processing has an opportunity to create additional income through co-generation from burning bagasse. Bagasse may also be diverted towards creation of higher value products in downstream processing. In either scenario, efficient energy use in the factory will translate into additional profits through increased availability of bagasse for co-generation or downstream processing. Similarly, factories that currently burn coal to raise steam can realise savings by reducing energy use.

In current mill operation, there are a variety of indices used to monitor energy consumption, including GJ/ton sugar produced, GJ/ton cane crushed, HP steam % cane and exhaust steam % cane. However, there are no widely accepted benchmarks for good performance in terms of these indices, due to differences in factory configuration, and because of differences in opinion regarding achievable energy efficiency.

In the petroleum refining industry, the Solomon Energy Intensity Index (EII) for process units and for the refinery as a whole are calculated and compared to internationally established benchmarks. A local petroleum refinery has reported that routine monitoring of energy intensity has resulted in significant savings through identification of inefficient energy use, and through rational assessment of the sensitivity of energy intensity to changes in process operation.

This poster reviews current sugar industry energy indices, examining factors that impact on the value and sensitivity of the indices to changes in factory operation. The concept of developing a monitoring and benchmarking system similar to the Solomon approach is proposed.

Keywords: energy, bagasse, energy efficiency, energy intensity

Biography: Kitty Foxon

Kitty Foxon has a BSc Chemical Engineering from UND and a PhD from UKZN. She was a postgraduate student and researcher with the Pollution Research Group from 1998 and lecturer and senior lecturer at UKZN from 2006 to 2013. She joined the SMRI as Group Leader: Strategic Research in July 2013.
EFFECT OF MULCHES AND CHEMICAL TREATMENTS ON VIRUS SPREAD IN NOVACANE® PLANTLETS

MCFARLANE SA1, MARTIN LA1, WILKINSON D1, KOCH AC1, VAN ANTWERPEN T1, PILLAY N1 and RUTHERFORD RS1,2

1South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa
2School of Life Sciences, College of Agriculture, Engineering and Science, University of KwaZulu-Natal, Pietermaritzburg, South Africa

Abstract

The virus pathogens causing the sugarcane diseases, mosaic (Sugarcane mosaic virus - SCMV) and yellow leaf (Sugarcane yellow leaf virus - SCYLV), are vectored by aphids and are widespread in the South African sugar industry. Methods to reduce aphid numbers and subsequent SCMV and SCYLV spread in nurseries are required in order to provide healthy seedcane for the establishment of commercial fields. The efficacy of applying chemicals or mulches to reduce aphid numbers in NovaCane® plantlets was investigated. Treatments included reflective plastic sheeting and sugarcane trash used as mulches in the interrow, an insecticide (imidacloprid) and methyl jasmonate, a semiochemical that is reported to convey a signal that influences aphid activity. Cane growth, aphid numbers and SCMV and SCYLV incidence in these plots were compared to untreated control plots. The number of shoots was significantly higher in plots with the plastic mulch compared to the other treatments. Although aphid populations were generally low in the trial and the difference between treatments was not significant, numbers were lowest in the plastic and trash mulch treatments. Imidacloprid applied in the furrow had no effect on aphid numbers in this trial. Mosaic incidence was lowest in plots with the plastic mulch, but the treatments had little effect on SCYLV incidence. Plastic mulch is reported to reduce water loss and was observed to suppress weed growth in this trial, which would be of particular benefit when establishing nurseries with NovaCane® plantlets that are sensitive to water stress and herbicides in the early stages of growth. The practicalities of applying the plastic mulch are being investigated.

Keywords: tissue culture, NovaCane®, sugarcane viruses, virus management, aphids, mulch

Biography: Sharon McFarlane

Sharon McFarlane is a Plant Pathologist at SASRI. She joined the research institute in 1989 after completing her BSc Honours in Microbiology at the University of Natal, Pietermaritzburg. She later received an MSc from the School of Life and Environmental Sciences, University of Natal, Durban. Her key focus is disease management but she is also involved in research on microbe-insect interactions.
Poster Summary

Results of a Nematode Survey Conducted in the Midlands North Growing Region

Pillay U and Ramouthar PV
South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa
uvendri.pillay@sugar.org.za  prabashnie.ramouthar@sugar.org.za

Abstract

Losses in the South African sugarcane industry due to plant parasitic nematodes have been calculated at approximately 1.6 million tons of sugarcane per annum. However, at a local level, losses are dependent on the nematode genera present. In 2011, a survey was conducted in the KwaZulu-Natal Midlands North area to investigate the incidence and diversity of the nematode population present. Samples from 50 farms in the area were taken for nematode analysis. These samples were representative of different soil types and sugarcane varieties. The nematode genera found were divided into highly damaging nematodes (Meloidogyne and Xiphinema), moderately damaging nematodes (Pratylenchus and Paratrichodorus), less damaging nematodes (Helicotylenchus) and free living nematodes. Analysis of these samples showed that for the region, nematodes were present in all soil types irrespective of clay content. The overall composition for the area appears favourable with the highly damaging, yield limiting nematodes constituting a low 3% of the total population. However, these nematodes were found in more than 50% of the fields sampled. This is of concern because, although initially present in low numbers, due to their short reproductive cycles, numbers can escalate rapidly where conditions are favourable. The results from this investigation showed that highly damaging nematodes are present in the Midlands North area. Estimated yield losses are currently being investigated in ongoing nematode trials in the area. Future studies in other growing regions will help assess the nematode status in those areas and implications for nematode control.

Keywords: sugarcane, damage, nematodes, survey, diversity

Biography: Uvendri Pillay

Uvendri has a BSc degree in Biological Sciences from UKZN and since beginning as an intern, has worked on various projects within SASRI. In her current position in the Nematology department, Uvendri’s work is focussed on finding novel ways of controlling nematodes of sugarcane. This is her second SASTA presentation.
NOVACANE® – A BOOST FOR SEEDCANE SCHEMES

SNYMAN SJ1,2, REDSHAW KA1 and STRANACK R1

1South African Sugarcane Research Institute, Private Bag X02, Mount Edgecombe, 4300,
2University of KwaZulu-Natal, School of Life Sciences, Westville Campus, Private Bag X54001, Durban, 4000
sandy.snyman@sugar.org.za

Abstract

NovaCane® is a tissue culture process that involves the micropropagation of disease-free and true-to-type sugarcane germplasm. The technique involves apical meristem excision followed by in vitro shoot multiplication and rooting of plantlets. Acclimation to environmental conditions is achieved in seedling trays in a shade-house for two weeks before a 10 week growth period under ambient conditions. To establish plantlets during the subsequent field planting, irrigation is required. Currently, NovaCane® plants are produced by Dube Tradeport AgriLab and acclimation is sub-contracted to designated nurseries. In addition to AgriLab micropropagating selected local N cultivars for commercial growers, SASRI have entered into a Plant Material Cultivation agreement with them to bulk up pre-release varieties for the Plant Breeding Programme. Although NovaCane® plants are equally susceptible to pests and diseases as traditionally propagated germplasm, the advantage offered by the technology is that it enables the establishment of first stage seedcane nurseries with good quality, disease-free and true-to-type material. Although there have been several impediments to the wide-spread adoption of the technology in the sugar industry, these initial technical obstacles have been overcome, making it an attractive option for establishing sources of seedcane.

Keywords: sugarcane, seedcane, NovaCane®, tissue culture, acclimation

Biography: Sandy Snyman

Dr Sandy Snyman is a Senior Researcher in the Biotechnology facility at SASRI. She has been with SASRI for 27 years and during that time she has initiated and implemented several tissue culture protocols for application in different aspects of the business for example, NovaCane® as a means to produce seedcane that is disease-free and true-to-type as well as in vitro conservation of valuable germplasm. In addition, she has produced and field tested genetically modified sugarcane and is confident that one day the industry will benefit commercially from these novel genetic interventions. Sandy is a NRF-rated scientist, holds an Honorary position at the University of Kwa-Zulu Natal and is involved with post-graduate student training. She has a ministerial appointment to serve as a member of the Department of Agriculture, Forestry and Fisheries Advisory Committee (GMO Act 1997), which advises Government on issues relating to genetic modified organisms.
**POSTER SUMMARY**

**ESTIMATION OF CRITICAL SOIL WATER VALUES FROM SOIL TEXTURE DATA**

VAN ANTWERPEN R1,2 and KANAMUGIRE A1

1South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa
2Department of Soil, Crop and Climate Sciences, University of the Free State, PO Box 339, Bloemfontein, 9300, South Africa

rian.to.van.antwerpen@sugar.org.za   andre.kanamugire@sugar.org.za

**Abstract**

Growers and extension staff frequently request critical soil water values from soil samples submitted for urgent attention in order to plan irrigation scheduling or to determine plant available water. Normally at least four weeks are required to determine field water capacity (FC) and permanent wilting point (PWP) in the laboratory and to calculate plant available water capacity (AWC). The purpose of this paper is to report on the development of various pedo-transfer functions (PTFs, critical soil water values related to soil textural data) that can be used to estimate a range of critical soil water values. Soil textural data (clay and silt content) and critical soil water values (FC, PWP and sample density (SD)) were determined in the laboratory using standard methods. A total of 372 samples were analysed from various locations within and outside the sugar industry. The data set used for this work contained no samples with strong swell-shrink properties, as the number of samples in this category was too few to be representative and the data too variable. From the available data, stress point (SP), AWC and porosity at FC (pFC) were calculated. These parameters, including FC, PWP and SD, were all regressed to clay content and silt plus clay content. All relationships with clay content had coefficient of determination ($r^2$) values greater than 0.9 and silt plus clay relationships had $r^2$ values greater than 0.8. Novel functions from this work are soil textural relationships with SP, SD and pFC. Estimating critical soil water values using PTFs takes only three days compared to at least four weeks with the conventional laboratory method.

**Keywords:** pedo-transfer functions, sugarcane, critical soil water values, water retention

**Biography: Rianto van Antwerpen**

Rianto has been a soil scientist at SASRI since 1990. He has been involved in many projects over the years of which some are modelling of root growth, vertical mulching and ridging, soil compaction, green manuring and the development of a soil health analysis package for the sugar industry. He is currently a senior soil scientist and manager of the Systems Design and Optimisation programme at SASRI.
POSTER SUMMARY

REVIEW OF THE SASRI
GEOGRAPHIC INFORMATION SYSTEM SERVICE

MTHEMBU IB, COLLINGS KA and MAHER GW

South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa 4300
ingrid.mthembu@sugar.org.za

Abstract

A Geographic Information System (GIS) is a tool used to capture, manipulate, integrate, store, analyse and display data spatially. There are many benefits associated with collecting, analysing and storing data using this tool, an important one of which is assurance of the traceability of data, since a geographic position does not change whereas growers and field names and codes are prone to inconsistencies and inaccuracies. The sugar industry identified this benefit more than two decades ago, when investment commenced in GIS and associated mapping activities. Since then, the technology has advanced and the software has evolved. The sugar industry has over the years attempted to keep abreast of such developments and, in so doing, has created databases that are still in use today. The poster showcases the evolution of GIS technology at SASRI and the services provided to SASRI research and Extension.

Keywords: Geographic Information System, GIS, sugarcane, ArcGIS, Global Positioning System, GPS

Biography: Ingrid Mthembu

Ingrid B. Mthembu has been SASRI’s Geographic Information Systems (GIS) and Remote Sensing (RS) Specialist since 2007. She has a Masters in Science from University of KwaZulu Natal (UKZN) where she quantified forest biochemicals and measured leaf area index using hyperspectral imagery and GIS. Ingrid has a B Soc Scie in Environmental Management, majoring in GIS and RS, and a BSc in Plant Biotechnology from UKZN. Ingrid previously worked for CSIR as a junior research officer where she was investigating the use of hyperspectral imagery for forest management.
POSTER SUMMARY

SOIL MONITORING AND NUTRIENT BUDGETING
FOR THE EFFICIENT USE OF FERTILISER IN SUGARCANE PRODUCTION
IN KWAZULU-NATAL

BECKERLING A, FRYER PJ and HALL C
Profert, 41 Windy Ridge, Darnall, 4480, South Africa
andrewbeckerling@gmail.com  pj@profertkzn.co.za  chris@profert.co.za

Abstract

Soil sampling in the sugarcane industry has traditionally been done before the plant crop with a nutrition strategy being formulated for future ratoon crops from this single soil sample. Through the collection and analysis of historical data for a number of growers in Kwazulu-Natal, it has become clear that trying to manage nutrition efficiently and establishing trends will require more frequent sampling. The most cost effective approach would be to split a farm into a number of management units which could be sampled more frequently, allowing for closer monitoring and more efficient nutrient budgeting. Two fundamental shifts in the sugar industry, namely top-dressing of lime on ratoon fields and fertiliser recommendations based on yield, will also require more frequent sampling and monitoring of acid saturation and pH. This poster presents results from historical soil data from two farms, and proposes a new soil sampling strategy and nutrient budgeting system.

Keywords: soil sampling, fertiliser, efficiency, monitoring, sampling, nutrition

Biography: Andrew Beckerling

Andrew obtained his BSc Agric in Grassland Science at the University of Kwa-Zulu Natal and went on to obtain an MSc in Plant Ecology at the University of the North West. Andrew lectured at the University of Fort Hare for seven years and during that time did research in pasture and veld management and was one of the first to have post graduates at the University of Fort Hare majoring in Pasture Science. Over the last 20 years Andrew has been involved in the fertilizer industry doing consulting and research work on pastures for dairy production in the Eastern Cape. Andrew has recently been promoted to develop the agronomy section for a major fertilizer company and to develop new thinking and products in the key crops of South Africa. His present work involves developing iPad software for nutrient management on crops.

Biography: PJ Fryer

PJ grew up in Northern Zululand in the Umfolozi flats area where his father is still a sugar cane farmer. With a passion for wildlife and the outdoors he spent 3 years working as a field guide at one of South Africa’s premier private game reserves on the edge of Kruger National Park. Wanting to further his education he completed a BSc in Geography and Environmental Management at UKZN and spent 2 years working for an environmental consulting firm and then worked for a bird tour company that conducted birding tours around the world. Wanting to go back to his roots and get involved in agriculture he joined Profert in 2012 and has headed up the ProGro Programme in KZN, mostly working with sugar growers.
THE RETURN OF BAGASSE DIFFUSERS

VOIGT I and HULLEY SM
Bosch Projects, 1 Holwood Park, 5 Canegate Rd, La Lucia Ridge Office Park
voigti@boschprojects.co.za; hulleys@boschprojects.co.za

Abstract
The introduction of diffusers into the modern cane sugar industry occurred during the 1960s, and the first diffusers in South Africa were installed in 1968. These early diffusers were all bagasse diffusers, meaning that they processed bagasse that had been crushed in at least one mill. Ultimately, before the adoption of cane diffusion, a conventional bagasse diffuser installation was preceded by only one mill. Cane diffusion became the acceptable technology in the South African industry and in most other cane industries from the late 1970s. Almost 40 years later, bagasse diffusers are again being installed in both brownfields and greenfields projects.

This paper reviews the performance of early bagasse diffusers in South Africa and elsewhere. It also explains the reasons for cane diffusion becoming more acceptable and finally explores the reasons for the modern trend back to bagasse diffusion. It questions whether bagasse diffusion has a future in the southern African industry. Finally it considers modern case studies and discusses the design features of a modern bagasse diffuser.

Keywords: extraction, bagasse diffuser

Biography: Ivan Voigt
Ivan Voigt (BSc Eng (Mech), GCC, MBA) is the Director: Sugar Equipment at Bosch Projects Pty (Ltd). He has managed all aspects of Bosch Projects Sugar Equipment business, including marketing, engineering, technology development and projects. Noteworthy achievements include the commercialisation of the Bosch Projects Chainless Diffuser in Africa, South America and Asia, and the establishment of the Bosch Projects business in Brazil.

Biography: Sean Hulley
Sean Hulley (BSc Eng (Mech), PR Eng) is an Assistant Business Manager: Sugar Equipment at Bosch Projects Pty (Ltd). His responsibilities as an Assistant Business Manager have covered a variety of work, including sugar design work and project co-ordination in South Africa, Mozambique, Tanzania, Brazil and Thailand. Noteworthy achievements include the commercialisation of the Bosch Projects Continuous Vacuum Pan in Brazil.
DIRECT CLEAR JUICE – THE PRODUCTION OF CLEAR JUICE
IN A SUGARCANE DIFFUSER AT MAIDSTONE FACTORY

JENSEN PS¹, DAVIS SB¹, LOVE DJ² and RASSOL A³

¹Sugar Milling Research Institute NPC, c/o University of KwaZulu-Natal, Durban, 4041, South Africa
²Tongaat Hulett Sugar, Technology and Engineering Group,
Amanzimnyama, KwaZulu-Natal, South Africa
³Tongaat Hulett Sugar, Maidstone Mill, Tongaat, KwaZulu-Natal, South Africa
pjensen@smri.org  sdavis@smri.org  dave.love@tongaat.com
Althaf.rassol@tongaat.com

Abstract

The Sugar Milling Research Institute NPC (SMRI) performed pilot scale experiments in 2011 to assess the feasibility of producing clear juice (CJ) directly in a sugarcane diffuser. Based on the promising results of these trials, a conventional, counter-current diffuser at Maidstone factory was modified to allow it to be switched between normal mode and a mode that allowed it to produce clear juice directly (Direct Clear Juice or DCJ mode). The diffuser was run in DCJ mode for a number of days during the 2013 season. The quality of juice from the diffuser was assessed and compared with the quality of conventional CJ from a settling clarifier. This report highlights some of the changes made to the diffuser, the results of the trials, and operational considerations involved with the production of CJ directly from a diffuser.

Keywords: diffusion, clarification, clear juice, mud recycling

Biography: Paul Jensen

Paul began his career in the sugar industry as a process EIT at Maidstone factory. After completion of his EIT he spent a year at THS’s Technology and Engineering group before moving abroad for three years. In 2011, Paul returned to the South African sugar industry as part of the SMRI’s research team. Much of his work in the last few years has focused on how diffusers might be operated differently to improve the profitability of a sugar factory.
REFEREED PAPER

IMPROVED EXTRACTION AT FELIXTON

MBUYAZI M and MHLONGO S
Tongaat Hulett Sugar Felixton Mill, Mill Road, Felixton, 3875, South Africa
malesedi.mbuyazi@tongaat.com  siphiwe.mhlongo@tongaat.com

Abstract
Overall sucrose recovery is an aspect with which every sugar factory is concerned and extraction forms a major part of this factory performance figure. Felixton Mill has constantly achieved good extraction and has positioned itself well as the southern African sugar industry benchmark. This paper shows how performance parameters such as crush rate, diffuser operations and cane preparation contributed to improved extraction of 98.5% in the 2013 season. Although it is believed that good extraction requires high imbibition rates of up to 400% fibre, Felixton was able to achieve this with a lower imbibition rate of 333.54%. Factors such as diffuser stops and starts, diffuser start-up and liquidation are identified as important operational features. A good relationship between extraction and imbibition quantity in prepared cane and a residence time in the diffuser is shown. It can also be said with certainty that the preparation index in the range of 90-92 and imbibition quantities have a significant effect on extraction. It has been established that the bed, in a stable non-flooded condition and with consistent cane feed, yields optimum extraction performance. The benefit of paying attention to detail is highlighted as a key operational control measure.

Keywords: extraction, diffuser operations, imbibition, PI, consistent feed

Biography: Malesedi Mbuyazi

Malesedi has been a front end Process Engineer in Felixton for 3 years. After graduating in BTech: Chemical Engineering (DUT), she was employed as a panel operator in the WSM slipstream project. Her in-service training period spent at the SMRI exposed her to the sugar industry. It is because of her leadership and her good work ethics that she was promoted to Process Superintendent within a year after she joined Felixton. She again demonstrated a remarkable potential and a desire to learn that she was accepted into the EIT scheme in 2009. She was deployed to Darnall Mill for her training, where she successfully completed at the top of her group. Working in a male dominated industry, she describes herself as a level headed and diligent hardworker who pursues her goals and targets with a positive attitude. She has also undergone the MDP programme through UKZN, to enhance her leadership and management skills.
AN ALTERNATIVE APPROACH TO SETTING A MILL

KENT GA
Queensland University of Technology, GPO Box 2434, Brisbane, Queensland, 4001, Australia
g.kent@qut.edu.au

Abstract

The conventional approach to setting a milling unit is essentially based on the desire to achieve a particular bagasse moisture content or fibre fill in each nip of the mill. This approach relies on the selection of the speed at which the mill will operate for the selected fibre rate. There is rarely any checking that the selected speed or the selected fibre fill is achieved and the same set of assumptions is generally carried over to use again in the next year.

The conventional approach largely ignores the fact that the selection of mill settings actually determines the speed at which the mill will operate. Making an adjustment with the intent of changing the performance of the mill often also changes the speed of the mill as an unintended consequence.

This paper presents an alternative approach to mill setting. The approach discussed makes use of mill feeding theory to define the relationship between fibre rate, mill speed and mill settings and uses that theory to provide an alternative means of determining the settings in some nips of the mill. Mill feeding theory shows that, as the feed work opening reduces, roll speed increases. The theory also shows that there is an optimal underfeed opening and Donnelly chute exit opening that will minimise roll speed and that the current South African guidelines appear to be well away from those optimal values.

Keywords: sugar mill, sugar mill setting, speed, rate, compaction, feeding

Biography: Geoff Kent

Geoff Kent is a principal research fellow with Sugar Research & Innovation at Queensland University of Technology in Australia. He has worked for the Sugar Research Institute and QUT for 28 years, mainly in the cane transport and milling fields. He is responsible for SRI's research, consulting and training work in the cane supply, transport and milling fields. Geoff is a past Chairman of the Factory Engineering Section Committee of ISSCT and remains a committee member. He is also President and Publications Committee member of the Australian Society of Sugar Cane Technologists.
REFEREED PAPER

COMPUTATIONAL FLUID DYNAMIC COMBUSTION MODELLING OF A BAGASSE BOILER

DU TOIT P and VAN DER MERWE SW

John Thompson, Sacks Circle, Bellville South, 7530, South Africa
philipd@johnthompson.co.za

Abstract

As our demand for energy increases, so does the urgency for increased efficiency and versatility from boilers. Current demand is shifting towards higher pressure and temperature boilers for co-generation, consequently complicating current design procedures. Computational fluid dynamics (CFD) has been widely used to predict flow fields and heat transfer.

This paper presents the CFD modelling of a bagasse boiler to predict the final steam temperature and flame profile in the furnace. Site measurements of the flame temperature were taken with a suction pyrometer and a thermal camera to validate the CFD model. Good correlations were found for the flame temperature and the final steam temperature, demonstrating the capability of the software as an accurate and feasible design tool.

Keywords: computational fluid dynamics, validation, suction pyrometer, thermal camera, heat transfer

Biography: Philip du Toit

Philip du Toit, Pr Eng is a Senior Development Engineer in the Industrial Watertube Boiler Business Unit of John Thompson, a Division of ACTOM (Pty) Ltd. He joined John Thompson in 2001 after graduating with a BEng Mechanical from Stellenbosch University. During his career, he has been the technical team leader for John Thompson on projects in various industries of southern Africa involving boilers and cogeneration. Currently he is focusing on research and development while completing post graduate studies involving computational fluid dynamics. This is his second SASTA paper.
Abstract

In recent years, harvesting methods have had to be pushed to the limits in order to maximise agricultural yields. Thus sugarcane is cut closer to the ground, resulting in higher sand content in bagasse causing erosion in boilers, especially in the heat recovery equipment such as the economiser and air heater. This paper introduces the use of Computational Fluid Dynamics (CFD) in designing economic and robust solutions which can be used to minimise erosion and increase the lifespan of heat recovery equipment. The study will discuss in detail the use of hopper designs to remove the ash from the gas stream before it reaches the heat recovery equipment. Furthermore, the paper will discuss other aspects which will have an influence on erosion, such as angle of collision between tubes and ash particles, particle velocity and ash size distribution.

Keywords: computational fluid dynamics, CFD, water-tube boiler, erosion modelling, fly ash erosion, bagasse fired boiler

Biography: Vusi Chabalala

Vusi received his Bachelors in Mechanical Engineering degree at the University of Cape Town in 2008. From 2009 to 2011 he worked for the CSIR as a design engineer designing military equipment for South African Special Forces. In 2011 he joined John Thompson’s Industrial Watertube division as a design engineer.
Abstract

Industrial water tube boilers work on the principle of natural circulation. It is very important at the design stage to ensure that there is enough water present at all parts of the flow passages, otherwise pipe overheating will possibly occur which often leads to tube failure. This paper introduces the water circulation analysis employed in John Thompson, using traditional homogeneous models as well as modern software. The study provides some insight into the circulation characteristic and guidance for new designs, to ensure safe boiler operation. The calculation theory and principles are presented along with characteristic figures. A case study is given which may assist operating engineers and technicians to understand the boiler in more depth from a sensible perspective.

Keywords: boiler, water circulation, tube failure

Biography: Jianchang Huang

Jianchang Huang is a design engineer at John Thompson, a local boiler manufacturer based in Cape Town, South Africa. Jianchang Huang has a strong academic background, obtained his Ph.D in engineering from the University of the Witwatersrand in 2010, specializing in two-phase flow heat transfer and flow characteristics in heat transfer installations.
REFEREED PAPER

THERMAL-HYDRAULIC ANALYSIS OF HEAT RECOVERY THROUGH FLUE GAS CONDENSATION IN BIOMASS FIRED BOILERS

LAUBSCHER R
Sacks Circle, Bellville South, 7530, Cape Town, South Africa
RynoL@johnthompson.co.za

Abstract

Higher thermal efficiency (plant efficiency) is becoming an ever-increasing imperative in process and power generation industries. One of the many research fields which aim to increase this efficiency is heat recovery of waste heat streams. In biomass fired boiler systems the major contributor to loss in fuel efficiency is the wet gas loss or moisture in fuel loss. Moisture loss accounts for 18-25% of losses, depending on the fuel used in the boiler system and this in turn increases the amount of fuel required to achieve a certain energy output. The only way to regain some of the wet gas loss is by condensing the moisture out of the flue gas stream at the lowest temperature of the flue gas stream, which is usually downstream of the economiser or airheater. This paper thus sets out to explain the development of a thermal-hydraulic model which simulates a flue gas condensing device for a small biomass fired boiler. The paper is divided into the following sections: explanation of applicable gas mixture thermodynamics, film condensation of binary mixtures with inert gas presence, lumped system analysis of condensing economiser and thermal-hydraulic network modelling of the condensing economiser.

Keywords: heat transfer, thermodynamics, condensation, moisture loss, thermal-hydraulic modelling, flue gas condensation

Biography: Ryno Laubscher

Ryno Laubscher is a Mechanical Engineer at John Thompson’s Industrial Watertube division. He received his Bachelors in Mechanical Engineering degree at the University of Stellenbosch in 2009 and completed his Masters in Science Engineering degree at the end 2012 also at Stellenbosch University. His focus during his post-graduate studies was numerical heat transfer and thermofluids, where he applied these subject fields to next generation very high temperature nuclear reactor heat transfer research. He is set to start his PhD research this year in numerical modelling of combustion kinetics.
THE OPERATIONAL CHALLENGES AND OPTIMISING THE ENERGY CONSUMPTION OF THE JUICE HEATERS DURING THE 2012 SEASON AT NOODSBERG SUGAR MILL

COOPER CS
Noodsberg Sugar Mill, Private Bag X501, Dalton, 3236, South Africa
cocooper@illovo.co.za

Abstract
At Noodsberg sugar mill it was seen that the required mixed juice flow rates and outlet juice temperatures were not being achieved through the mixed juice heaters. This was the result of flow restrictions in the heaters and the challenge of extracting condensate at sub-atmospheric conditions. This was resolved by revising the cleaning regime and operating the heaters in a parallel juice flow configuration, together with modifying the condensate recovery system. When investigating these challenges, the vapour consumption across the heaters was calculated and optimal vapour configurations for the heaters were established which identified significant energy savings.

Keywords: mixed juice heaters, energy optimisation

Biography: Colin Cooper
Colin Cooper studied Mechatronic Engineering at Stellenbosch University before joining the Engineer in training program with Illovo Sugar in 2010 and was based at Noodsberg Sugar Mill. Upon completion of the program in 2013 he was appointed as the Boiler Engineer at Noodsberg Sugar Mill.
Steps taken to rehabilitate the effluent treatment plant at Pongola Sugar Mill

Ndlazi M, Singh RI and Ndlovu S
TSB Sugar, PO Box 23, Pongola, 3170, South Africa
ndlazim@tsb.co.za singhr@tsb.co.za ndlovus@tsb.co.za

Abstract

This paper deals with the remedial measures taken at the Pongola sugar mill to restore the performance of the Effluent Treatment Plant (ETP) with the objective of improving the quality of the final treated effluent. The Pongola ETP has been generously sized; however, over the years this capacity has been eroded due to high suspended solids ingress combined with elevated hydraulic loading. Incidents of water quality noncompliance with local regulations necessitated interventions to improve the quality of treated effluent. A programme of investigation to determine reasons for drop-off in performance followed by phased action plans to rehabilitate the Pongola ETP are detailed in the paper.

Keywords: sugar mill, effluent treatment, waste water quality, COD, environment and final effluent

Biography: Monica Ndlazi

Monica Ndlazi is currently employed as a Junior Assistant Production Manager at TSB Sugar Pongola Mill. She holds a Bachelor of Technology in Analytical Chemistry obtained in 2007 from the Durban University of Technology. Monica has 12 years of experience in the sugar manufacturing industry. Her working career started with Illovo Sugar at the Eston Mill as an in-service trainee in 2002. This was followed by working as a Laboratory Tester for the SASA Cane Testing Service at Felixton Mill. She then joined Tongaat-Hulett’s Felixton Mill in 2005 as a Laboratory Analyst followed by promotion to Laboratory Supervisor. In 2008 she was promoted to the position of Trainee Process Technologist. She joined TSB Sugar in 2009 as Laboratory Assistant Manager which was followed by an Engineer-in-Training position in 2011.
REFEREED PAPER

MICROBIAL DIVERSITY PROFILING IN SUGARCANE PROCESSING: WHAT, WHY AND HOW?

NEL S
Sugar Milling Research Institute NPC, c/o University of KwaZulu-Natal, Durban, 4041, South Africa
snel@smri.org

Abstract

Sugarcane and some locations in a sugarcane processing factory provide an attractive environment for the growth and reproduction of microorganisms, in particular gum-producing bacteria. The presence of microorganisms in a sugar factory is undesirable due to their actions; not only do they result in a direct loss of sugar, they can also lead to higher production costs due to the detrimental effects of gums produced by microorganisms in the sugar manufacturing process. It is vital to establish the identities and locations of gum-producing microbes in sugarcane processing to be able to develop a targeted approach to eliminate these organisms and their actions from the sugar manufacturing process. The aim of this paper is to enlighten the reader on the topic of microbial diversity profiling, with specific application to the sugarcane processing industry; in particular, explaining what this term means, why it is of importance and how this could be executed.

Keywords: gums, post-harvest cane deterioration, Leuconostoc, dextran

Biography – Sanet Nel

Sanet is a researcher at the SMRI where she finds all things small amusing. As such, much of her time is dedicated to research involving microbiology and molecular biology and she was instrumental in the establishment of a biotechnology laboratory at the SMRI last year. She is of the opinion that biotechnology is not only applicable to the agricultural side of the sugar industry, but has an important role to play in the milling side as well, as will be demonstrated by this paper.
COMMERCIAL PRESENTATION

PRODUCTIVITY AND TECHNOLOGICAL ADVANCEMENTS ON BRAZILIAN PRODUCED MAUSA BATCH CENTRIFUGES

BENNETT S, HARINATH V and TROVO G

SteveB@bncindustrial.co.za

Abstract

The Brazilian sugar industry is the largest in the world and produces the most sugar in close to 400 mills. MAUSA supplies 70% of Brazil’s sugar industry market requirements for batch centrifuges, and there are more than 1300 units sold.

MAUSA was established in Brazil in 1948 to manufacture accessories for Brazilian mills. In the 1960s they started to manufacture batch centrifugals under license from BMA. In the 1970s MAUSA started to produce centrifugals under rights and has since developed its own technology. MAUSA and Brazil offer the South African market a unique opportunity to increase its sugar productivity and competitiveness on the world stage in several ways:

A maximum interest rate of 0.4-1.6% (dependent on the LIBOR rate of interest) over five years on all MAUSA equipment through the Brazilian government (BNDES), which has already established credit partnerships with ABSA, Standard, First Rand and Nedbank in South Africa. There would be an added interest rate plus charges over and above this rate that would be negotiable with the local South African banks, depending on the risk in supplying a letter of credit to Brazil on behalf of the importer.

Technological advancements in all sugar industry equipment. This presentation will deal only with batch centrifuges – which includes the separation techniques of the masscuite before the batch machines start to separate the sugar crystals, and the patented design of the plough being incorporated into the spindle to prevent basket damage. An additional innovation is the use of an extended (full length) plough to increase the cycles per hour to 29 from standard models of 25 cycles/h. This effectively increases an eight month crushing season of 240 days by 23 040 cycles, and increases overall production by as much as 15%.

MAUSA’s commitment to invest in all essential spare parts for any machine purchased to be available in South Africa at all times via a consignment stock holding held by its official Africa agents.

To sponsor through its official South African agents, flights, accommodation and transport, along with hosting individuals to visit Brazil to inspect the MAUSA factory and the mills that use MAUSA equipment. This opportunity will be available based on indications by companies that they are seriously considering using MAUSA equipment.

Biography: Stephen G Bennett

Stephen holds an MBA (University of Wales). He has been involved in the sugar industry market since 1994 through a company called D&D Industrial, where he was a major shareholder and director. BNC Industrial was developed from D&D Industrial by his colleague S Balchund, after Stephen’s decision to leave South Africa in late 1999. Stephen returned to South Africa in early 2013 and has taken full responsibility as managing director of BNC Industrial, and is now a major shareholder. BNC Industrial will shortly be renamed API Solutions SA (Pty) Ltd.
REFEREED PAPER

DESIGN, INSTALLATION AND OPERATION OF PARTIAL FLASH TANKS IN THE EVAPORATOR STATION AT HIPPO VALLEY SUGAR MILL

DZIROVE E1, DAVID W2,3, MUGADHI A1 and SHEAHAN W2,4

1Tongaat Hulett Sugar, PO Box 1, Chiredzi, Zimbabwe
2previously at Tongaat Hulett Sugar, Private Bag 3, Glenashley, 4022, South Africa
3presently at Fluor Igoda Projects, Private Bag X24, Umhlanga Rocks, 4320, South Africa
4presently at Fives Fletcher, 33 Brunel Parkway, Pride Park, Derby, Derbyshire, DE24 8HR, UK

edzirove@hippo.co.zw  warren.david.email@gmail.com  amugadhi@hippo.co.zw  sheahanwarren@gmail.com

Abstract

Sucrose losses in a sugar factory as a result of entrainment into the vapour phase during evaporation or boiling can be a significant source of undetermined loss. This risk is higher in the final evaporator vessel, where sucrose can be entrained with the vapour into the condenser and is subsequently lost to the injection water. This is normally observed by a spouting or ‘fountain effect’ of the boiling syrup or liquid. The effect is created by a large pressure drop, or pressure differences between the final and preceding effects, which then causes significant flashing of the liquid entering the final effect vessel. The flashing effect has been a problem at Hippo Valley Estates sugar mill and has resulted in significant carry-over of syrup and losses to injection water. In order to reduce the flashing effect, partial flash tanks were designed and installed into each train of the evaporator station. This paper discusses the design, installation and operation of the flash tanks, and highlights the immediate benefits that the installation brought to the factory.

Keywords: evaporator, flash, entrainment, losses, Robert, spouting

Biography: Edmore Dzirove

Edmore is currently working as a Process Engineer at Hippo Valley Estates in Zimbabwe. He joined Hippo as an Engineer-in-Training in November 2004 after completion of his B.Eng. Chemical Engineering Degree studies at the National University of Science and Technology in Zimbabwe (NUST) the same year. He co-authored a SASTA paper in 2013. He also holds a Masters in Business Administration (MBA) degree from NUST.
FINE LIQUOR COLOUR: HOW DOES IT AFFECT ENERGY, CAPACITY AND SUGAR LOSSES?

VAWDA AS, SARIR EM and DONADO CA

CarboUA Ltd, 9635 Cresta Drive, Los Angeles, CA, 90035, USA
avawda@carboua.com sarire@carboua.com andresdonado@carboua.com

Abstract

In today’s competitive sugar refining environment, refiners are spending more time and attention to improve their conversion costs. This means energy, maintenance and chemical usage are constantly being measured and improved. As sugar refining consists of a series of separation processes, any inefficiency has a knock-on effect on operating costs.

Impurity removal by separation and crystallisation are the most important process operations in a refinery. This paper studies the main separation processes, namely clarification, decolourisation and crystallisation to demonstrate where poor separation contributes to excessive costs of processing. The results of various tests are analysed and conclusions are made for refiners to manage their chemical and fuel costs.

Keywords: Colour removal, ion exchange (IX), high performance adsorbents (HPA), granular activated carbon (GAC), powdered activated carbon (PAC)

Biography: Ahmed Vawda

Ahmed is a graduate of the Durban Institute of Technology where he qualified in chemical engineering and sugar technology. He is experienced in the sugar, chemical and water treatment industries in South Africa, Dubai, Egypt, Saudi Arabia and Canada, having worked previously for Illovo, Tongaat Hulett, A Khaleej Sugar, Booker Tate, Savola and more recently Carboua. Ahmed has presented 19 papers at the ISST, SASTA, PSSCT, PHILSUTECH, AVH and the SIT. He also served on the George and Eleanor Meade Award committee, was an executive committee member of the SIT from 2007 to 2012, and president of the SIT in 2010. He won the Meade and Spencer award for the best paper at the SIT in 2010.

Biography: Emmanuel M Sarir

Engineer Emmanuel M. Sarir is the Founder, CEO and President of CarboUA Limited and Carbo Solutions International. Emmanuel has a MSc Degree (1984) from Cranfield University. He gained expertise in Design and Development of High Performance Adsorbent Products after he met and studied (1994-98) with Dr. Robert Kunin. He has published and co-authored over 12 technical papers published at ISSCT, SIT, SASTA, AVH, STAI, PSSST, PHILSUTECH, Thai EXPO and Asian Sugar conferences.

Biography: Carlos Andres Donado

Engineer Carlos Andrés Donado is a Chemical Engineer graduated from “University of Valle” in Cali, Colombia. He has over 9 years of experience in sugar industry primarily with refining, mill, Sucre-alcohol and bottling industry.
COMMERCIAL PRESENTATION

SYSTEMATIC STUDY ON THE DISSOLUTION OF INDIVIDUAL SUGAR SCALE COMPONENTS WITH EDTA AND APPLICATION TO REAL SCALES

SEETZ J¹, GEENEN AM¹, CHEN H² and LEPAGE J³
¹Akzo Nobel Functional Chemicals BV, Amersfoort, The Netherlands
²Akzo Nobel Chemicals Co Ltd, Shanghai, PR China
³Akzo Nobel Functional Chemicals LLC, Chicago, Illinois, USA
jan.seetz@akzonobel.com  annemarie.geenen@akzonobel.com
henry.chem@akzonobel.com  jim.lepage@akzonobel.com

Abstract

Sugar scale is a complex mixture of various components that forms on evaporator heat exchangers and requires periodic removal to ensure efficient mill operation. Mechanical cleaning of these scales is increasingly being augmented or replaced with various chemical cleaning regimens of NaOH and acid treatments that allow easier mechanical removal of the remaining softer scale. However, more effective chemical treatments would allow less frequent, more thorough and faster mechanical cleaning, and could save significant labour, downtime and equipment damage.

For more than 60 years, chelating agents such as EDTA have been known to dissolve individual scale components such as calcium salts of carbonate, sulphate, oxalate and phosphate, which are components of many sugar scales. While EDTA has been in routine use in Australian sugar mills for over a decade, chelates are an often overlooked tool in scale management elsewhere in the world. The reasons for low acceptance of EDTA are not clear – but the authors believe the primary barriers are a general lack of understanding of this material and uncertainty as to the transferability and benefits of the technology in other parts of the world.

This presentation provides information on chelating agents and takes an in-depth look at their ability to dissolve individual pure scale components as a function of pH. Laboratory data is given on the dissolution of sugar scale, and results and recommendations from several mill trials around the world are presented.

Keywords: calcium scale, chelate, EDTA, oxalate, HAP, sulphate

Biography: Jan Seetz

Jan Seetz was born on November 19, 1953 in Haarlem, the Netherlands. He holds a MSc in Organic and Analytical Chemistry from the Free University of Amsterdam and, in 1983, obtained a PhD in Organometallic Chemistry, also from the Free University. Jan has been employed at Akzo Nobel Functional Chemicals BV in Amersfoort, the Netherlands, for more than 30 years, of which 25 years were spent in R&D working on developing new waterborne resins and improved coatings for aircrafts, and optimizing bulk chemical products and processes. For the past seven years Jan has been active in technical market development for the chelate business of Akzo Nobel, with emphasis on cleaning products and cleaning operations.
COMMERCIAL PRESENTATION

FIVES CAIL BATCH AND CONTINUOUS CENTRIFUGALS:
LATEST DEVELOPMENTS

HAMILTON D

Fives Fletcher, 33 Brunel Parkway, Pride Park, Derby, United Kingdom
don.hamilton@fivesgroup.com

Abstract

Fives Cail Group centrifugals process more than 25 million metric tons of sugar every year worldwide, offering a complete range covering all applications: beet, cane and refining. Today more than 4000 Fives Cail Group batch centrifugal installations are providing high performance service around the world. Fives Cail Group’s continuous development programme ensures regular improvement of its centrifugals, which are recognised for their solid construction and reliability.

Fives Cail has launched ZUKA®: its new range of batch centrifugals. This new generation offers outstanding innovations in the field of technologies: ZUKA® is the breakthrough in the centrifugal market. Today more than 1000 Fives Cail continuous centrifugals are providing high performance service around the world. Manufactured at the Group’s French production centre under rigorous quality control conditions, the machines comply with the most stringent international standards. The STG High Grade Continuous Centrifuge, following a successful development period, has established itself as a commercially and technically successful alternative for the production of high quality export raws and consumption sugars.

Turbofluid of South Africa, headed by Mark Jones, has recently been appointed the official agent for the Southern African Region covering South Africa, Malawi, Swaziland, Zambia, Mozambique and Zimbabwe. Fives Cail/Fives Fletcher now have the ideal partner to support their centrifugals and customers in Southern Africa, and look forward to providing the level of service and local support expected.

Keywords: centrifugal, batch, continuous, beet, cane, refinery

Biography: Don Hamilton

Don began his career in sugar with Booker Agriculture in 1979 and spent 10 years working in African sugar factories; six years in Kenya, two years in Madagascar and two years in the Sudan. He joined Fives Fletcher (formerly Fletcher Smith) in 1989 running regional sales offices in the Philippines and Indonesia. Don is now Regional Sales Director based in Derby, UK, responsible for English speaking Africa, USA and the Caribbean regions.
SHORT NON-REFEREED PAPER

MODELLING THE POTENTIAL IMPACTS OF CLIMATE CHANGE ON
YIELD AND WATER USE OF SUGARCANE AND SUGAR BEET:
PRELIMINARY RESULTS BASED ON THE AQUACROP MODEL

KUNZ R1, SCHULZE R1, MABHAUDHI T2 and MOKONOTO O1

1Centre for Water Resources Research, School of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal, P/Bag X01, Scottsville, South Africa
2Crop Science Discipline, School of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal, P/Bag X01, Scottsville, South Africa

kunzr@ukzn.ac.za    schulzer@ukzn.ac.za  mabhaudhi@ukzn.ac.za   208510256@stu.ukzn.ac.za

Abstract

The FAO AquaCrop model was used to estimate the attainable yield of sugarcane and sugar beet, in relation to their seasonal water use. The AquaCrop model has been re-calibrated for sugarcane using the AgMIP La Mercy dataset (1989-1991). Similarly, the model was also re-calibrated for sugar beet using field data collected during the 2013 growing season at the Ukulinga research farm in Pietermaritzburg.

Future climate projections were obtained from the Council for Scientific and Industrial Research and based on six atmosphere-ocean General Circulation Models (GCMs) for the ‘business-as-usual’ A2 emission scenario. The six climate projections were dynamically downscaled using the conformal-cubic atmospheric model of the Australian Commonwealth Scientific and Industrial Research Organisation.

The grid-based output from the six GCMs was further ‘spatially downscaled’ to the Quinary catchment level, where a Quinary is a topographically based sub-division of each Quaternary catchment (originally delimited by the Department of Water Affairs). Daily reference crop evaporation estimates (FAO Penman-Monteith approach) were derived from the GCM temperature output. Soils information required by AquaCrop was obtained from the Quinary sub-catchment database.

The AquaCrop model was run for each Quinary sub-catchment to determine the attainable yield and water use of both sugarcane and sugar beet, for each growing season over the period 1950-2099, with the exercise repeated for all six downscaled GCMs. The results allow for the calculation, at the national scale, of each feedstock’s water use efficiency. This knowledge may help guide decisions regarding which ethanol feedstock is better suited to South Africa’s water-stressed catchments.

Keywords: sugarcane, climate change, yield, water use

Biography: Richard Kunz

Richard Kunz has an MSc in Hydrology and is working on his PhD (part time) in the Centre for Water Resources Research at the University of KwaZulu-Natal, Pietermaritzburg. His main research involves estimating the water use and yield of potential feedstocks that are suitable for biofuel production. The impacts of climate change on water resources and agriculture is another research field of interest.
A PRELIMINARY ASSESSMENT OF MID-CENTURY CLIMATE CHANGE IMPACTS ON SUGARCANE PRODUCTION IN SOUTH AFRICA

JONES MR and SINGELS A

South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa
matthew.jones@sugar.org.za abraham.singels@sugar.org.za

Abstract

Previous studies mostly report positive impacts of climate change on sugarcane yields in South Africa (SA). Predictions vary considerably, however, and the limitations in methodologies and assumptions in these studies make it difficult to quantify impacts reliably at regional and industry scales.

The objective of this study was to provide a robust indication of climate change impacts on the SA sugar industry for the period 2040-2070 under a likely emissions scenario (571 ppm atmospheric CO$_2$), using methods based on the Agricultural Model Intercomparison and Improvement Project (AgMIP) protocol. Daily weather records for baseline (1980-2010) and future periods were prepared for 47 homogenous climate zones (HCZs) covering the SA sugarcane-growing regions. Future weather data were derived from five global climate models (GCMs). The DSSAT-Canegro model, modified with improved capability for simulating sugarcane growth under high temperatures and elevated CO$_2$, was used to simulate baseline and future cane and sucrose yields, using baseline crop management (but assuming no restrictions in irrigation supplies), at each HCZ.

GCM-averaged air temperature changes ranged from 0.66 to 1.02°C, while changes in annual rainfall ranged from -4 to +1%, depending on HCZ. Rainfall predictions were more uncertain than temperature predictions, with the standard deviation of predictions ranging from 1.11 to 5.24% for rainfall and from 1.08 to 3.80% for thermal time (a measure of effective temperature), depending on HCZ. GCM-averaged simulated cane yields per HCZ changed by between -3.0 and +15.5% (+7.1% on average) while sucrose yields changed by between -5.9 and +21.9% (+8.1% on average). Results indicate future increases in annual sugar production of between 127 000 and 202 000 t (average approx. 159 500 t) from the 2009-2013 average of 2 024 000 t, provided that field management quality (including current pest and disease severity levels), area under cane and irrigation supplies are maintained.

Keywords: temperature, rainfall, modelling, simulation, Canegro, greenhouse gas

Biography: Matthew Jones

Matthew Jones is a Systems Modeller at SASRI. His current research interests include modelling climate change impacts, ripener mechanisms, and gene-to-phenotype relationships in sugarcane.
CLIMATE CHANGE WILL IMPACT
THE SUGARCANE INDUSTRY IN AUSTRALIA

SEXTON JD¹, EVERINGHAM YL¹, INMAN-BAMBER NG² and STOKES C³

¹School of Engineering and Physical Sciences, James Cook University, Townsville, QLD, 4811, Australia
²Crop Science Consulting, Townsville, Australia
³Commonwealth Scientific and Industrial Research Organisation, Plant Industries, ATSIP Building, James Cook University, Townsville, QLD, 4811, Australia

justin.sexton@my.jcu.edu.au  yvette.everingham@jcu.edu.au
geoff.inmanbamber@gmail.com  chris.stokes@csiro.au

Abstract

Climate is a key driver of sugarcane production and its by-products. Given the significant contribution of sugarcane production to economic growth and development in Australia, it is critical to understand how this production system will be impacted by climate change. This project investigated the impact climate change will have on productivity and harvest practices. The project team assessed the change in projected climate across the Australian sugarcane industry on a grid as small as 5 x 5 km. This was pertinent to Australia’s sugar-cane-growing regions, as local topography can change rapidly. Projections for the period 2046 to 2065 considered a high (A2) and low (B1) illustrative emissions scenario and were compared to the baseline period of 1961 to 2000. Down-scaling from global circulation models of climate change showed that climatic variables within a given region are not uniform and are affected by local topography. Adaptation strategies may therefore need to vary within a region. Projections of yield varied between climate change scenarios. Harvest disruption projections should be considered closely with yield projections and rainfall projections either side of the harvest window. In the face of competing solutions and finite resources, the findings from this project can assist policy makers not only in Australia but around the world with developing robust adaptation strategies for a changing climate.

Keywords: sugarcane, harvesting, climate, GCM, productivity, sustainability

Biography: Justin Sexton

Justin Sexton is a student at James Cook University, Australia. He is currently doing a Masters by research in statistics. His area of research is in statistical calibration of a sugarcane model. Over the last 3 years his research has focused on climate change impact studies for the Australian Sugar Industry.
ADAPTATION OF CANEGRO SUGARCANE MODEL TO THE 2D SOIL-WATER OPTION WITHIN THE DSSAT CROPPING SYSTEM MODEL VER. 4.5.2.002

MORGAN KT¹ and ROYCE FS²

¹University of Florida, Soil and Water Science Department, Southwest Florida Research and Education Center, 2685 SR 29N, Immokalee, FL 34142, USA
²University of Florida, Agricultural and Biological Engineering Department, PO Box 110570, Gainesville, FL 33611, USA
Conserv@UFL.EDU froyce@ufl.edu

Abstract

A commonly used crop model for sugarcane production is the DSSAT-CaneGro, which is a modular software package that integrates principles from experts in various fields to provide a unified cropping system model. The DSSAT-CaneGro model has been used worldwide for addressing irrigation, making it a viable tool for improving efficiencies in crop production. However, despite previous applications of DSSAT to a wide range of cropping systems, the soil-water balance currently implemented in DSSAT simulates one-dimensional (1D), vertical flow on a daily time step approach. While such 1D modelling approaches adequately simulate water infiltration for rainfed, sprinkler or flood irrigation systems that apply water with high uniformity, such an approach may be insufficient for low volume irrigation systems (e.g. drip). Drip irrigation applies water non-uniformly with sharp soil-moisture gradients both radially and vertically from emitters and requires a two-dimensional (2D) approach. Further, a daily time step is inadequately coarse for capturing the temporal dynamics of the system under high frequency drip irrigation regimes, necessitating sub-daily time steps. The objective of this study was to compare outputs of the standard CaneGro model to those of a 2D version of DSSAT-CaneGro, as part of the calibration step described in Stage 1 of the Agricultural Model Intercomparison and improvement Project sugarcane model calibration and sensitivity analysis protocol. Comparisons of the DSSAT-CaneGro 1D and 2D models for three experiments are provided and indicate similar biomass, yield, water use and leaching between the two models.

Keywords: sugarcane, model, two-dimensional, drip irrigation, calibration, comparison

Biography: Kelly Morgan

Dr Morgan has been part of UF/IFAS for 23 years working on irrigation and nutrient programs for citrus, vegetables and sugarcane. His program assesses the impact of Best Management Practices (BMPs) on nitrogen and phosphorus movement and transformation within the crop root zone. Studies are conducted on nutrient application rates and timing, irrigation management, and use of controlled released fertilizers to increase nutrient use efficiency and minimize nutrient loss to the environment. Dr. Morgan has been the statewide management team chair of the Florida Automated Weather Network (FAWN) program for eight years and has led improvements in weather data and the development of integrated tools available to growers for irrigation scheduling and reduced water use during freeze protection. Dr. Morgan also led the development of a state-wide FDACS cost-share program to provide site-specific weather data through FAWN that will be used by growers to improve irrigation scheduling potentially conserving large quantities of water. Dr. Morgan recently assumed state-wide leadership of the Agricultural Best Management Practices program leading extension agents in development of field demonstrations and educational events.
SHORT NON-REFEREED PAPER

SUGARCANE MODEL INTERCOMPARISON:
STRUCTURAL DIFFERENCES AND UNCERTAINTIES

MARIN FR³, THORBURN P², NASSIF DSP¹, COSTA LG¹, SANTOS MV¹

¹University of São Paulo – ESALQ, PO Box 09, Piracicaba-SP, Brazil, 13418-900
²CSIRO EcoSciences Precinct, Dutton Park, QLD 4102, Australia

fabio.marin@usp.br    peter.thorburn@csiro.au
dspnassif@usp.br    costa.leandro@usp.br    murilodsv@usp.br

Abstract

Sugarcane is one of the world’s main carbohydrates sources. The authors analysed the APSIM-Sugar (AS) and DSSAT/CANE-GRO (DC) models to determine their structural differences, and how these differences affect their predictions of crop growth and production in Brazil. Both models initially underestimated leaf area index (LAI) and hence interception of solar radiation, although both accurately predicted crop growth and production after calibration. The AS model under-predicted yield at the hotter sites. Average predictions from both models of stalk yield and LAI resulted in closer predictions of the data than from the models individually.

Keywords: modelling, simulation, model calibration, uncertainty

Biography: Fabio Marin

Fabio Marin is Agronomist, Master in Agrometeorology and doctor in Agricultural Physics. He worked for 12 years in Embrapa and he is currently Professor at University of Sao Paulo – ESALQ, in the Biosystems Engineering Department, teaching and researching Agrometeorology and Crop Modeling, with special focus in Sugarcane crop.

Biography: Peter Thorburn

Dr Peter Thorburn is a Senior Principal Research Scientist and Research Group Leader with CSIRO Ecosystem Sciences in Brisbane. Peter’s present work focuses on the quantitative analysis of soil and plant interactions in agricultural production systems, aiming to determine management systems that can reduce detrimental environmental impacts while still continuing to produce significant economic and social outcomes. Much of Peter’s work involves development and application of simulation models, and he currently co-leads the crop modelling stream of the International Agricultural Model Intercomparison and Improvement Initiative. Peter’s research has led to significant developments in reducing losses of nitrogen to aquatic and marine environments, and the mitigation of greenhouse gas emissions caused by agricultural production. Peter’s contribution has been recognised internationally, including awards at the SASTA and ISSCT conferences.
SHORT NON-REFEREED PAPER

EVALUATION OF THE APSIM-SUGAR MODEL FOR SIMULATING SUGARCANE YIELD AT SITES IN SEVEN COUNTRIES: INITIAL RESULTS


CSIRO, GPO Box 2583, Brisbane, Australia
peter.thorburn@csiro.au  jody.biggs@csiro.au  matthew.jones@sugar.org.za
abraham.singels@sugar.org.za  fabio.marin@usp.br  jean-francois.martine@cirad.fr
262514@ecoweb.co.zw  ryanpviator@gmail.com  onunez@isc.com.ec

Abstract

Accurate crop simulation models are important tools for evaluating different crop management strategies and understanding potential impacts of climate change. This paper reports initial results from an international collaborative effort to improve sugarcane models, particularly for predicting impacts of projected climate change. Data from 35 experiments conducted in seven countries were simulated with the APSIM-Sugar model, firstly ‘blind’, using only climate, soil and management data, then again with the addition of available phenology data from the experiments. Surprisingly, the addition of the phenology data resulted in only small improvements in overall predictions of stalk dry mass, although the improvement was substantial (12-30 t/ha) at several sites. The generally small improvement suggests that either there is not a lot of vital information in phenology data for prediction of final stalk dry mass of a sugarcane crop, or the APSIM-Sugar model is not overly sensitive to these parameters. Further work is required to resolve these issues.

Keywords: AgMIP, climate change, impact assessment, model calibration, simulation

Biography: Peter Thorburn

Dr Peter Thorburn is a Senior Principal Research Scientist and Research Group Leader with CSIRO Ecosystem Sciences in Brisbane. Peter’s present work focuses on the quantitative analysis of soil and plant interactions in agricultural production systems, aiming to determine management systems that can reduce detrimental environmental impacts while still continuing to produce significant economic and social outcomes. Much of Peter’s work involves development and application of simulation models, and he currently co-leads the crop modelling stream of the International Agricultural Model Intercomparison and Improvement initiative. Peter’s research has led to significant developments in reducing losses of nitrogen to aquatic and marine environments, and the mitigation of greenhouse gas emissions caused by agricultural production. Peter’s contribution has been recognised internationally, including awards at the SASTA and ISSCT conferences.
SHORT NON-REFEREED PAPER

EVALUATION OF THE DSSAT-CANEGRO MODEL FOR SIMULATING CLIMATE CHANGE IMPACTS AT SITES IN SEVEN COUNTRIES

JONES MR, SINGELS A, THORBURN P, MARIN F, MARTINE J-F, CHINORUMBA S, VIATOR R and NUNEZ O

South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa
matthew.jones@sugar.org.za  abraham.singels@sugar.org.za  peter.thorburn@csiro.au
fabio.marin@usp.br  jean-francois.martine@cirad.fr  262514@ecoweb.co.zw
ryanpviator@gmail.com  onunez@isc.com.ec

Abstract

Realistic assessment of future climate change impacts on sugarcane production is essential for strategic planning. Accurate crop simulation models are important tools in this process. This paper reports on the suitability of the DSSAT-Canegro model for simulating sugarcane growth and yield for a wide range of environments across the globe under current and possible future climates. The protocols proposed by the Agricultural Model Intercomparison and Improvement Project (AgMIP) for the assessment of crop models for global climate change applications were followed. Experimental data from 35 treatments, in 10 experiments at sites in Australia, Brazil, Ecuador, Reunion, South Africa, the USA and Zimbabwe were used to calibrate the model in two stages: (1) ‘blind’ calibration, whereby only management, weather and soil data are provided, and (2) ‘phenology’ calibration with stage 1 data as well as crop development observations. The model was also subjected to sensitivity analysis, whereby 30 seasons of sugarcane growth were simulated at each site, using historical weather data perturbed by changes to daily air temperatures (-3, 0, +3, +6 and +9°C), rainfall (-25, -10, 0%, +10 and +25%) and atmospheric CO₂ concentration (+90, +190, +290 and +390 ppm).

Model performance in predicting stalk dry mass (SDM) was not as good as quoted in previous studies. Using leaf and tiller phenology data for model calibration did not improve model performance, highlighting the need for using leaf area index and biomass data for meaningful calibration. The study also highlighted the need for global model testing in diverse environments and production scenarios, rather than local testing, which may lead to model-fitting by unwarranted parameter adjustments.

The sensitivity analysis suggest that simulated responses in SDM to changes in temperature, rainfall and [CO₂] for the diverse production scenarios investigated in this study, are realistic and consistent with current knowledge and accepted theory in this regard.

Keywords: climate change, modelling, simulation, assessment, model calibration, sensitivity analysis

Biography: Matthew Jones

Matthew Jones is a Systems Modeller at SASRI. His current research interests include modelling climate change impacts, ripener mechanisms, and gene-to-phenotype relationships in sugarcane
SHORT NON-REFEREED PAPER

TOWARDS THE MORE EFFICIENT USE OF FERTILISER POTASSIUM: PREDICTION OF ‘SLOWLY-AVAILABLE’ POTASSIUM RESERVES IN SOILS

MILES N1,2 AND FARINA, MPW3

1South African Sugarcane Research Institute. P/Bag X02, Mount Edgecombe, 4300, South Africa
2School of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal, P/Bag X01, Scottsville, 3209, South Africa
3Consultant, Howick, South Africa
neil.miles@sugar.org.za

Abstract

Potassium (K) removals in harvested sugarcane generally range from 100 to 300 kg/ha. Since all K fertiliser is imported, the price is subject to the vicissitudes of the exchange rate. Current annual expenditure on this nutrient in the South African sugar industry is estimated to be in the region of half a billion rand. This investigation deals with the measurement of non-exchangeable (‘slowly-available’) K reserves in sugarcane soils from South Africa and neighbouring countries. Non-exchangeable K was determined in topsoil samples (n=340) using the boiling nitric acid procedure. Median nitric K was 1.19 cmol/kg, with the range being 0 to 17.89 cmol/kg. Values were highest in the northern irrigated areas of the South African industry, and in countries to the north, and lowest in the Midlands and coastal areas of South Africa. Data from Australian sugarcane trials as well as from a local sugarcane trial and long-term (25-year) maize trial suggest that for nitric K values above about 2.5 cmol/kg, no fertiliser K is required. Since the nitric acid extraction is laborious in terms of routine soil testing, the challenge is to develop reliable predictions of non-exchangeable K using either infra-red spectroscopy or multiple regression techniques based on routinely-measured soil parameters. The potentials of these approaches are considered in the paper.

Keywords: potassium, fertiliser, non-exchangeable K, boiling nitric acid extraction, topsoils

Biography: Neil Miles

Neil Miles is currently a senior scientist with the South African Sugarcane Research Institute (SASRI). Prior to his position with SASRI, he spent 28 years with the KZN Department of Agriculture, as a research scientist and research manager. His PhD, through the University of Natal, focused on the nutrition of intensive pastures. Dr Miles played a leading role in the development of the Cedara Fertilizer Advisory Service, which he also managed for some 20 years. At SASRI, Dr Miles manages the Fertiliser Advisory Service and conducts research relating to the optimization of soil health and the nutrient requirements of sugarcane. In 2011 he was appointed an Honorary Research Fellow at the University of KwaZulu-Natal.
Abstract

Most growers in Zimbabwe consider leaving sugarcane fields fallow for 90 days to control Ratoon Stunting Disease (RSD) to be wasteful and uneconomic. A long-term study was established in 2009 to determine the potential benefits of growing legumes during the 90 day RSD fallow period. Five sugarcane cropping systems (SCSs) tested were: (i) sugarcane monoculture (SM), (ii) 90 days of RSD fallow followed by sugarcane (90DFS), (iii) soybeans followed by sugarcane (SBS), (iv) sunn hemp green crop followed by sugarcane (SHGCS), and (v) velvet beans green crop followed by sugarcane (VBGCS). This report is on quantitative changes of soil microbial biomass among the five SCSs and on soil organic matter (SOM).

Soil cores were collected at 0-30 cm and 31-60 cm depths. Initial soil samples were collected before planting any crops. Thereafter, soils were sampled when legumes flowered and were ploughed under, and again 24 to 48 hours after the first irrigation following the harvest of sugarcane plant crops. Soil samples were analysed for colony forming units (CFUs) using the dilution and plating methods.

Legume crops improved soil microbial densities. SBS, SHGCS, and VBGCS increased CFUs in the top 0-30 cm soil after harvesting sugarcane plant crops by 6.7, 40.1 and 67.4% respectively, compared to crops following 90 day fallows. There were significantly more bacterial than fungal CFUs, and the CFUs were more abundant at 0-30 than at 31-60 cm soil depths. The increased CFUs at the harvest of sugarcane plant crops were not sustained in the subsequent ratoon crop.

Keywords: fallow, legume, microbial biomass, soil, sugarcane

Biography: Petros Zvoutete

Mr. Petros Zvoutete works as a Senior Plant Pathologist at the Zimbabwe Sugar Association Experiment Station (ZSAES). He received training in Crop Science and Plant Pathology from Zimbabwe and USA. Mr. Zvoutete researched on management of vegetable and cereal diseases and concurrently ran the Plant Disease Advisory and the Plant Quarantine Services under Plant Protection Research Institute, DR&SS for eight years before joining ZSAES in 1995. He has written six research papers published in international journals.

Biography: Simbarashe Chinorumba

Mr. Simbarashe Chinorumba is employed as an Agronomist at the Zimbabwe Sugar Association Experiment Station (ZSAES). Mr. Chinorumba received training in Agriculture specializing in Crop Science and in Agricultural Meteorology from the University of Zimbabwe. He was previously based at Chiredzi Research Stations, Department of Research and Specialist Services [DR&SS] for three years. While based at Chiredzi Research Stations, Mr. Chinorumba worked on management of rice and maize. He later worked for a Non Governmental Organisation [NGO] for about three years before joining Zimbabwe Sugar Association Experiment Station [ZSAES] in 2005. His current work is mainly on weed management, crop nutrition and crop modelling.
SHORT NON-REFEREED PAPER

IMPACT OF CMS ON SOIL ACIDITY AND ALUMINIUM TOXICITY IN THE SUGARCANE INDUSTRY

MAKORO P1,2, VAN ANTWERPEN R1,3, DE JAGER PC2 and MILES N1,4

1South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa
2Department of Plant Production and Soil Science, Faculty of Natural and Agricultural Sciences, University of Pretoria, P/Bag X20, Hatfield 0028, South Africa
3Department of Soil, Crops and Climate Sciences, University of the Free State, PO Box 339, Bloemfontein 9300, South Africa
4School of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal, P/Bag X01, Scottsville 3209, South Africa

makorop@gmail.com  rianto.vanantwerpen@sugar.org.za  Chris.DeJager@up.ac.za  neil.miles@sugar.org.za

Abstract

Acid soils are a common phenomenon in the South African eastern regions, and topsoil and subsoil acidity are a serious concern in most regions of KwaZulu-Natal. Low soil pH restricts plant growth and in most cases it mobilises toxic metals, particularly aluminum (Al), which restricts plant growth. Condensed Molasses Stillage (CMS) is used in the SA sugar industry as a K fertiliser. However, farmers are concerned that the low pH of CMS (4.5) will acidify soils even further. The objective of this work was to evaluate the effect of CMS on the chemical properties (pH, exchangeable acidity and exchangeable Al) of acid soils. A column experiment was laid out in a 2-way factorial design (three soils and five treatments) replicated five times. The treatments were control (no applications), inorganic fertiliser (5:1:5 (46)), CMS applied at 3 and 5 t/ha and CMS fortified with N and applied at 3 t/ha. Treatments were applied three times at an average interval of 11 weeks. The magnitude of pH, exchangeable acidity and exchangeable Al changes as affected by the amount, rate and frequency of the applied treatments were recorded. All the treatments mentioned above seemed to increase the pH of soils and maintained the higher pH for the duration of the trial (33 weeks). The reduction of exchangeable Al in acid soils by the selected treatments was in accordance with the increase in soil pH by the treatments. The addition of nutrients from CMS and inorganic fertiliser was also shown to improve the fertility of the soil, in particular the N, P and K status of the soils.

Keywords: CMS, pH, acidity, aluminium, fertility, sugarcane

Biography: Petrus Makoro

Petrus Makoro grew up in Limpopo province (Tzaneen area). He completed his BSc Agric (Soil Science and Plant Production) in 2009 from University of Limpopo (Turffloop campus). In 2010, he joined SASRI at Mount Edgcombe as Research Intern in Plant and Environmental Resource Centre (Crop nutrition & Soils) where he was involved in CMS projects. In 2011, he enrolled towards studying MSc Agric (Soil Science) at University of Pretoria. His thesis titled: The role of condensed molasses stillage in ameliorating soil acidity and aluminium toxicity in the sugarcane industry. In August 2012, Petrus joined EcoPlanetbamboo Southern Africa, when it was established in Grahamstown, Eastern Cape, where he worked as a Plantation Manager. Recently Petrus works for Syngenta South Africa as a Researcher for Product Development in the Crop protection section.

Biography: Rianto van Antwerpen

Rianto has been a soil scientist at SASRI since 1990. He has been involved in many projects over the years of which some are modelling of root growth, vertical mulching and ridging, soil compaction, green manuring and the development of a soil health analysis package for the sugar industry. He is currently a senior soil scientist and manager of the Systems Design and Optimisation programme at SASRI.
SHORT NON-REFEREED PAPER

PREDICTION OF FERTILISER PHOSPHORUS REQUIREMENT FACTORS FOR SOILS OF THE SOUTHERN AFRICAN SUGAR INDUSTRY

POSWA LZ 1,2, MILES N 1,2, MANSON AD 3 and ROBERTS V 4

1 South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa
2 School of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal, Pietermaritzburg, 3200, South Africa
3 KwaZulu-Natal Department of Agriculture and Environmental Affairs, Private Bag X9059, Pietermaritzburg, 3200, South Africa
neil.miles@sugar.org.za

Abstract

Establishing the phosphorus (P) requirements of sugarcane in southern Africa presents particular challenges for agronomists, since not only is P the most expensive of the macronutrients, but wide variations in soil properties imply variable availability of applied P for crop uptake. Of crucial importance in extending advice on P fertilisation is knowledge of the amount of P required under field conditions for unit increase in P soil test. In this study, laboratory incubations were used for quantifying the fertiliser P requirement factors (PRFs) of 40 topsoil samples taken from fields of the South African sugar industry. These soils varied widely in texture (7-47% clay), organic carbon (0.44-9.72%) and pH (3.79-6.65; measured in 0.01 M CaCl2). Soils from each site were treated with three levels of P and taken through wetting and drying cycles over a six-week period. Three P-test methods (Truog, Mehlich III and Resin) were included, and the reciprocals of isotherm slopes used to establish PRFs of the soils. PRF values for these three extractants ranged from 2.26-22.52, 1.89-27.17 and 4.39-39.68 kg P/ha per mg P/L, respectively, and were poorly related to clay content, but well related to ammonium oxalate extractable Fe and Al, organic carbon and volume weight (soil sample density). Mid-infrared spectroscopy (MIR) provided useful predictions of PRF values.

Keywords: P soil tests, fertiliser P requirement factors, phosphorus sorption, mid-infrared spectroscopy

Biography: Lwazi Poswa

Lwazi Poswa is an Assistant Research Officer at SASRI, focusing on the development of reliable leaf-nitrogen threshold values. He completed his BSc. Agric. degree at the University of Fort Hare and is currently finishing his MSc. degree on Phosphorus-Sorption at the University of KwaZulu-Natal. He is passionate about soils and crop nutrition.
AMMONIA VOLATILISATION LOSSES FROM NITROGEN FERTILISERS: LABORATORY STUDIES

WEIGEL A¹, MILES N², NYANDENI B¹, NAIDOO G¹
and WETTERGREEN T³

¹South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa
²School of Agricultural, Earth, and Environmental Sciences, University of KwaZulu-Natal, Pietermaritzburg, 3200, South Africa
³South African Table Grape Industry, Paarl, 7646, Cape Province, South Africa
Annett.Weigel@sugar.org.za

Abstract

Urea is the most widely used N fertiliser in the sugar industry, due largely to its high N concentration (46%) and lower price per unit of N compared to other fertilisers. The potential, however, for substantial amounts of N to be lost from field-applied urea by ammonia volatilisation remains a serious concern. Currently, several urea-based products claiming to have higher nitrogen use efficiency are actively marketed in the sugar industry. This study compared ammonia volatilisation losses from four fertilisers under controlled laboratory conditions. The fertilisers used were urea, limestone ammonium nitrate (LAN), a coated urea (Product A) and urea treated with a urease inhibitor (Product B). The soils which were included represented either properties favouring volatilisation losses (sandy, high pH) or properties not conducive to high losses (loam, low pH). Additional treatments included the influence of surface-applied lime and trash. Under all treatments, lowest N losses were from LAN (0.2 to 2.1% of N applied as fertiliser), and highest losses from urea (3.8 to 31.2% N loss, with liming and trashing significantly increasing losses). On the low pH loam soil, N losses from products A and B were significantly less than from urea. However, on a sandy, high pH soil (high volatilisation risk) losses from Product A were similar to those from urea, whereas Product B had lower losses than urea. Surface-applied lime and trash increased losses from all urea-based products. Consideration is given to the implications of these findings in terms of the selection of the most cost-effective N fertilisers for sugarcane on various soil types.

Keywords: N management, N fertilisers, N volatilisation, cost efficiency

Biography: Annett Weigel

Dr Annett Weigel is a German soil scientist. She completed her PhD in Halle, former East Germany in Germany about the effect of nutrition on the quality of brewing barley. After her graduation in 1992 she worked for the Environmental Research Centre Leipzig-Halle, dealing with Soil Organic Matter, its role in soil fertility and its interaction with the nitrogen cycle. Since 2007 she has been working at SASRI with focus on Carbon and Nitrogen dynamics of soils and improvement of Nitrogen use efficiency.
RESOURCE CAPTURE AND CONVERSION EFFICIENCY OF TWO CONTRASTING SUGARCANE GENOTYPES UNDER WATER STRESS

NGXALIWE S1, EKSTEEN AB, SINGELS A2,3 and PAMMENTER NW3

1South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa
2School of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal, P/Bag X01, Scottsville, 3209, South Africa
3School of Life Sciences, University of KwaZulu-Natal, P/Bag X54001, Durban, 4000, South Africa
sivuyile.ngxaliwe@sugar.org.za alana.ekesteen@sugar.org.za abraham.singels@sugar.org.za pammente@ukzn.ac.za

Abstract

There is growing interest in cultivating high-fibre sugarcane as a feedstock for biofuel production, possibly in marginal areas. However, there is a lack of quantitative information about their productivity, drought tolerance, resource (water and radiation) use and efficiency of conversion to biomass. This study compared crop development, growth and resource use of a high-fibre sugarcane hybrid (04G0073) and a traditional sucrose cultivar (N19) under well-watered and water stressed conditions. Setts were planted in four plots in a rainshelter facility at Mount Edgecombe in 2011. Water stress was imposed after four months by withholding irrigation from two plots. Green leaf area index (GLAI), radiation interception and soil water content were measured regularly. Dry aerial biomass and its components were measured at harvest. Evapotranspiration was derived from soil water content. Well-watered 04G0073 developed canopy cover more rapidly, enabling it to intercept 4% more radiation, and use 3% more water than N19. Well-watered 04G0073 also converted resources more efficiently than N19 to produce a 12% higher biomass yield. However, 04G0073 was found to be more sensitive to severe water stress than N19. GLAI, radiation interception and biomass at harvest were reduced by 66, 18 and 44% (compared to 55, 4 and 16% of N19), respectively. Radiation use efficiency and water use efficiency of 04G0073 were reduced by water stress and were lower than that of stressed N19. The information gathered in this study will be used to calibrate crop models for determining the feasibility of growing high-fibre cane for bio-fuel production in marginal areas.

Keywords: biomass, high fibre cane, water stress, water use efficiency, radiation use efficiency.

Biography: Sivuyile Ngxaliwe

Sivuyile has recently completed his MSc in Biological Science from the University of KwaZulu-Natal and will be presenting some of the results from his studies. Sivuyile has been at SASRI for 4 years, first as a research intern and currently holds the position of Assistant Research Officer in Agronomy. His research interests include effects of drought stress on sugarcane, response of sugarcane to chemical ripeners and medicinal plants.
DEVELOPING A STRONG RESEARCH-EXTENSION-GROWER LINKAGE TO ENSURE ADOPTION OF NEW SUGARCANE TECHNOLOGY IN SOUTH AFRICA

MAHER GW

South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa
geoff.maher@sugar.org.za

Abstract

Agricultural research and extension are conducted under a single umbrella at SASRI. The management of the research-extension-grower linkages can limit or enhance extension service effectiveness. Weak links between research and extension can limit the effectiveness of the extension service, leading to constraints in technology transfer. The linkage problems most commonly associated with these constraints are those affecting co-operation between research and extension and the feedback from growers through extension to research, and vice versa. Modern extension methods now acknowledge the grower’s own expertise as a major resource in the development of solutions to local issues. It is therefore essential to develop a strong research-extension-grower partnership to ensure the adoption of new technology at a local level. SASRI has encouraged the strengthening of the linkage between research and extension by developing a strategy which enables the participation of both the researcher and extension specialist in a number of key internal activities. These key activities include bi-annual staff meetings, participation of extension specialists in research project teams, provision of input by extension specialists in the determination of the composition of the overall research project portfolio, discussion groups, seminars and conferences, and extension requests for advice. The linkage between growers and the extension service has been strengthened by the introduction of local industry Research, Development and Extension committees, which define the objectives, needs and problems of the particular area and establish priorities to be included in the extension specialists’ annual programme of work. The objective of this paper is to provide an insight into the methods used by SASRI research and extension to create a successful strong research-extension-grower partnership.

Keywords: sugarcane, extension, research and development, adoption, technology

Biography: Geoffrey William Maher

Geoff was born in Rhodesia, of Irish decent. He attended Gwebi College of Agriculture in the late 70’s, and moved to South Africa in the early 80’s. He has been with SASRI since 1983. Geoff specialised in land use planning and environmental management, and is currently the Extension Manager at SASRI. He has produced several papers and publications related to land use planning and environmental management. Worked on the development of an environmental management system for sugarcane since 1998, which has culminated into todays SUSFARMS®. Geoff’s achievements are: Under 20 rugby player of the year 1977, Cecil Renaud award 2003, Grandfather. His hobbies are: Triumph Motorcycles and Motorcycling and Wildlife & Birding.
AN EXTENSION SPECIALIST’S YIELD AND GROSS REVENUE DATABASE, USED TO GUIDE RECOMMENDATIONS AND IMPROVE GROWER PROFITABILITY

MCHELLIGOTT DM\(^1\), VAN ANTWERPEN R\(^{1,2}\), DUCASSE G\(^3\)

\(^1\)South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa
\(^2\)University of the Free State, PO Box 339, Bloemfontein, 9300, South Africa
\(^3\)South African Cane Growers’ Association, PO Box 88, Mount Edgecombe, 4300, South Africa
dmmcelligott@illovo.co.za

Abstract

For a number of years growers in all sectors of the sugar industry (rainfed and irrigated) have been of the opinion that yields are either plateauing or on the decline, resulting in sugarcane cultivation being less profitable. The South African Cane Growers’ Association (SACGA) has on many occasions demonstrated the margins between production costs and the financial returns that growers receive, and since 2002 the margins of profit have been extremely tight. The profitability of growers is determined by certain uncontrollable economic factors, e.g. the price of recoverable value (RV), interest rates and the cost of essential inputs such as fertiliser, herbicides and labour. However, the effectiveness of managing these inputs and resources in achieving attainable yields is a major factor that influences the viability of sugarcane farming. Since 1997, Extension Specialists at Sezela and Umzimkulu have embarked on a project demonstrating the usefulness of a well maintained grower database to establish why certain growers can still farm profitably and others not.

When comparing individual grower’s yields, cane quality and revenue on a homogenous ward basis, there are growers that continue to maintain high yields and revenues. Grower ward comparisons have been part of an Extension Specialist’s ‘tool kit’ for technology transfer in two mill regions since 1997, being the Annual Yield Comparison projects carried out at Sezela and Umzimkulu. The database contains over 10 years of individual grower and ward data, and the specialist interpretation of this information is the key to identifying and promoting the critical best management practices (BMPs) that make sugarcane farming profitable.

Keywords: yield plateau, profitability, economic factors, homogenous ward, adoption, better management practices (BMPs).

Biography: Dirk Michael McElligott

Dirk McElligott is the Group Agronomist for Illovo Sugar LTD. He started in the sugar industry in 1988 as a student in training with the Farm Planning department at SASEX (now SASRI). Other work experiences have included contract work between the Water Research Commission and SASRI and an agronomist with Kynoch Fertilizer. Before joining Illovo Sugar, Dirk spent 15 years with SASRI as the Extension Specialist based at Sezela where he spent the final four years as the Regional Extension Manager for the southern region of the South African Sugar Industry. Dirk has a Bachelor of Agricultural Management Degree from the University of Natal, a National Diploma in Agricultural Resources Utilization (Pretoria Technikon) and a Diploma in Marketing Management from the Institute of Marketing Management.
AN ANALYSIS OF FACTORS AFFECTING THE SUSTAINABLE PRODUCTION OF LAND REFORM SUGARCANE GROWERS ON THE NORTH COAST OF KWAZULU-NATAL

GINA MC and NOTHARD BW

South African Cane Growers’ Association, PO Box 888, Mount Edgecombe, 4300, South Africa
mgina@canegrowers.co.za bnothard@canegrowers.co.za

Abstract

The South African Sugar industry has seen 21% of the area under sugarcane being transferred from white commercial growers to previously disadvantaged growers. Their success remains critical to the long-term sustainability of the entire industry as redistribution continues under land reform policies. This study analysed factors that have influence on the sustainability of land reform growers in the north coast region of Kwazulu-Natal, South Africa. A sample of 50 growers was used in the study, which included both Land Redistribution for Agricultural Development (LRAD) recipients and Medium Scale Farmers (MSF) as defined by the industry. The average change in Relative Recoverable Value (RRV) tons per hectare was used as a proxy for sustainability. The main factors considered under this study include grower age, years of farm ownership, short term loans per hectare, production grants received per hectare, levels of outsourced or contracted operations and the extent to which growers are involved in the direct management of the farm (grower living on or off the farm). An Ordinary Least Squares (OLS) regression analysis was used to identify factors that are the key contributors to a land reform grower’s ability to increase tons RV per hectare over time. Three of the six variables proved statistically significant, namely, the age of the grower, the level of contractor utilisation and the grant per hectare received.

Keywords: land reform, sugarcane, sustainability, north coast

Biography: Mzwandile Gina

Mzwandile Gina is the Regional Economic Advisor for CANEGROWERS’ Tugela Region and is based in Gingindlovu. He has a five year BSc. Agriculture (Economics and Management) obtained from the University of Swaziland in 2007. He started working for Crookes Brothers Limited in 2009 until he joined SASRI in January 2010 then joined CANEGROWERS’ in July 2010. Mzwandile joined SASTA in 2010 and this is his fifth congress.
SHORT NON-REFEREED PAPER

THE TICKETING SYSTEM: DEVELOPMENT OF A MANAGEMENT AND MONITORING TOOL FOR SMALL-SCALE GROWERS

CRONJÉ CPR and MAVIMBELA F

Tsb (Pty) Ltd, Cane Supply, Malelane, 1320, South Africa
Tsgro, Malelane, 1320, South Africa
cronjep@tsb.co.za mavimbelaf@tsb.co.za

Abstract

Attention to detail and lack of timeliness of post-harvest and ratooning operations have been identified as major constraints to small-scale grower sugarcane production management. To find management solutions to address the issue, a system was devised to monitor and manage post-harvest activities. The system makes use of the fact that post-harvest and ratooning activities follow a specific recipe and timing. By monitoring and scoring these activities, a management tool was developed. By using the results obtained with the tool, problems could be identified and corrective actions taken. The Extension Officer could then take actions include advising, training and/or replacing field management, to address the management problems.

The system makes use of a traffic light scoring system which is well known to growers. The green ticket implies good performance, while yellow indicates problems and red indicates a failed or grossly overdue action. The Extension Officer monitors post-harvest and ratooning activities weekly, and then tickets activities on a scoreboard placed in the project office. The project committee accompanies the Extension Officer from time to time to verify the issuing of tickets.

The publicly displayed scoring system leads to self-regulating activities and also some competition between growers to achieve ‘all greens’. Added benefits include a way to ensure that Extension Officers pay attention to their growers on a regular basis, and scoring enables the replacement of chronic poor performers with better growers through the community project management structures. The system has been operational for two seasons, with good results and improvement in individual fields being recorded.

Keywords: sugarcane, small-scale grower, ratoon management, scoring system, monitoring system, ticketing system, extension

Biography: Shapo Florence Mavimbela

Shapo Mavimbela is Manager: Development Services for TsGro. TsGro is a support venture between Small Scale Sugar Growers and TSB Sugar. She has worked in the sugar production extension environment since 2001 with TSB and more recently since 2013 with the formation of TsGro. Shapo started her career in extension by joining the Department of Agriculture in 1991 in extension support services. Ms Mavimbela holds the following qualifications: Diploma in Agricultural Extension, B-Tech in extension and rural development, Masters in sustainable agriculture
PERFORMANCE EVALUATION OF EIGHT MAURITIAN SUGARCANE VARIETIES IN SWAZILAND

DLAMINI NE

Swaziland Sugar Association, PO Box 367, Simunye L301, Swaziland
njabulod@ssa.co.sz

Abstract

In 2001, the Swaziland Sugar Association Technical Services (SSATS) imported eight sugarcane varieties (R570, M1176/77, M1186/86, M1246/84, M1400/86, M1551/80, M695/69 and M96/82) from the Mauritius Sugar Industry Research Institute (MSIRI). The objective was to select high sucrose yielding, pest and disease resistant and sustainable varieties to be grown in Swaziland conditions (harvest season x soil type) on a 12-month harvesting cycle. During the period 2004-2005, four replicated field trials were established, two on Z-set soils (poor drainage) and two on R-set soils (good drainage) harvested either early (May) or late (November) season, and irrigated by surface drip. For comparison, these varieties were planted alongside standard cultivars NC0376 (under all conditions) and N23, N25 and N40 (under specific conditions). Data collected over seven continuous crops included stalk heights and population, smut infection, leaf analysis, Eldana saccharina Walker (eldana) damage, cane and sucrose yields, sucrose and fibre contents. Variety M1176/77 yielded up to 13.4% more tons of sucrose per ha (tsh) than NC0376 under all conditions. In late x R-set, varieties M1400/86 (18.4 tsh) and M1551/80 (17.9 tsh) yielded 15% and 11% more sucrose than NC0376 (16.0 tsh) with no statistical differences (p=0.05) in other environments. In early x R-set, varieties M1176/77, M1400/86 and M1551/80 produced 1.7, 0.8 and 0.6 tsh more than N23 (16.5 tsh). In late x Z-set, variety M96/82 produced 107% the sucrose yield of NC0376 (17.5 tsh) and 94% of N25 (19.9 tsh). Although N25 and N40 yielded slightly better sucrose at their recommended harvest seasons and soils than these four varieties, the differences were not statistically significant (p=0.05). Smut infection was less than that of NC0376 (5.45%) for varieties M1551/80 (4.64%), M1176/77 (1.88%), M96/82 (0.7%) and M1400/86 (0.43%). Eldana damage ranged from 0.47% (NC0376) to 1.02% (M1551/80) and such damage was not statistically different (p=0.05) between varieties.

Keywords: sugarcane, varieties, sucrose, season, smut, Eldana saccharina

Biography: Njabulo Dlamini

Njabulo Dlamini currently works for the Swaziland Sugar Association (SSA) as a Crops Agronomist. He has also worked for the Royal Swaziland Sugar Association (RSSC), Tongaat Hulett (Xinavane) and Omnia Fertilizer. His research interests include crop performance evaluation, chemical ripening and crop nutrition.
CULTIVAR GENETIC GAINS FOR SUGARCANE YIELD, SUCROSE CONTENT AND SUGAR YIELD IN THE MIDLANDS REGION BREEDING PROGRAMMES

ZHOU MM

South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa
University of the Free State, PO Box 339, Bloemfontein, 9300, South Africa
Marvellous.Zhou@sugar.org.za

Abstract

Analysis of genetic gains provides a measure of performance of plant breeding programmes. Previous studies have shown low gains among several sugarcane breeding programmes. The objectives of this study were to determine the trends in genetic gains for cane yield, sucrose content and sugar yield of cultivars grown in the humic and sandy soils of the Midlands region, and to determine cultivar characteristics for the soil types. Data derived from the final stage of variety testing were analysed using the mixed procedure of SAS to estimate cultivar least square means. Trends in yield and quality over time were tested using simple linear regression. There were consistent and significant cane and sugar yield increases with year of release, indicating significant genetic gains have been achieved. Recently released cultivars produced significantly higher cane and sugar yield than older cultivars, indicating adoption of new cultivars would significantly increase profitability. There were limited gains in sucrose content, indicating the need to enhance breeding for sucrose content. Principal component analysis indicated the negative association between cane yield and sucrose content, the main variables that grouped the cultivars. Generally, cultivars producing low sucrose content (for example N31) were unsuitable for humic soils, whereas cultivars producing low cane yield (for example N37) were unsuitable for sandy soils. Breeding cultivars producing high sucrose content for the humic soils and high cane yield for the sandy soils will increase genetic gains for sugar yield. Increasing area planted to new cultivars is expected to increase sugar yield by 7-20%.

Keywords: Cultivars, genetic gains, humic and sandy soils, principal component analysis

Biography: Marvellous Zhou

Professor Marvellous Zhou is a Senior Plant Breeder and Plant Breeding Project Manager at SASRI and Associate Professor in the Department of Plant Breeding, University of the Free State. Before joining SASRI, he was a Plant Breeder at the Zimbabwe Sugar Association Experiment Station and later PhD Research Fellow in the Sugarcane Genetics Laboratory at Louisiana State University. He graduated from the University of Zimbabwe with a BSc Agriculture Honours, MSc Agriculture from the University of Natal, Masters in Applied Statistics and PhD (Plant Breeding and Genetics) from Louisiana State University. He has published extensively in peer reviewed journals, refereed conference proceedings and presented at several conferences including CSSA, SASTA, ISSCT, ASSCT, ASA, SAPBA, SAGS, and EUCARPIA. His research interest includes optimising plant breeding programmes, Plant Breeding methodology, Quantitative genetics and Applied statistics.
SHORT NON-REFEREED PAPER

THE INFLUENCE OF GENOTYPE BY ENVIRONMENT INTERATION ON YIELD, QUALITY AND AGRONOMIC TRAITS FOR THE COASTAL SHORT CYCLE BREEDING PROGRAMME

LICHAKANE M and ZHOU MM
South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa
Lichakane@sugar.org.za  Marvellous.Zhou@sugar.org.za

Abstract

Breeding programme decisions commonly rely on knowledge of the underlying genetic structure of the population and an understanding of genotype by environment (GE) interaction. GE is known to confound selection decisions by altering the genotype performance across locations. The Coastal Short Cycle (CSC) average potential represents environments where sugarcane is harvested at 12 months to reduce Eldana saccharina Walker (Lepidoptera: Pyralidae) (eldana) damage. The objective of this study was to evaluate the influence of GE trends on yield, quality and agronomic traits for the CSC programme. Yield, quality and agronomic data were collected from plant, first and second ratoon crops of the on-station (UV) and off-station (U1V) variety trials at Gingindlovu research station. Data were analysed using the mixed procedure of SAS. The genotype effect produced the highest F-values (4.14 to 15.14); these were highly significant (P<0.001) for all trial series and traits, indicating high genotype variability. Genotype by location effect was not significant (p>0.05) for fibre, purity and length, indicating that these traits were stable across locations. Significant (p<0.01) GE effects were however, observed for all the other traits, indicating that genotypes perform differently in different locations and site specific evaluation is required. There were significant (p<0.01) genotype x crop interaction effects for all traits except purity, indicating the importance of ratooning ability. A non-significant (p>0.05) location by genotype by crop interaction was observed for length and diameter, indicating the stability of these traits. It can be concluded that GE interaction has a significant influence on the performance of genotypes.

Keywords: genotype-environment interaction, yield components, quality, ratooning

Biography: Moipei Lichakane

Miss Moipei Lichakane is a Plant Breeder at the South African Sugarcane Research Institute. Before joining SASRI in 2011 she worked as a Researcher in maize for the Agricultural Research Council and Monsanto. She graduated from the University of Free State with MSc Agric (Plant Breeding).
**Abstract**

One of the objectives of South African sugarcane breeders is to balance the ratio of sucrose to fibre in the stalk, since high fibre content causes losses through increased juice extraction costs and loss of sucrose in processing. There are, however, very complex physiological processes controlling this ratio. In addition, these traits are negatively correlated. This poses a challenge for introgression breeding, since most of the wild species of sugarcane contain high fibre levels. The aim of the present study was to determine trends in sucrose and fibre across three generations of progeny resulting from introgression crosses with *Saccharum spontaneum* at the South African Sugarcane Research Institute. Data were collected from single stalk trials established from seedlings planted across three regional breeding programmes, (a) irrigated, (b) coastal short cycle high potential and (c) coastal hinterland breeding programmes. Genotypes included *Saccharum* spp. commercial hybrids (commercial crosses), F₁ genotypes (commercial genotype × *S. spontaneum* crosses) and BC, genotypes (commercial genotype × F₁ crosses). At harvest age (12 to 18 months, depending on the site), one stalk was sampled randomly from each of the first 20 seedlings in each family plot and analysed in the sucrose laboratory using standard procedures to estimate the quality variables. Results showed that progress with introgression was variable. For the irrigated and coastal short cycle high potential breeding programmes, on average, progeny resulting from commercial crosses had the highest ERC and lowest fibre content, while F₁ progeny had the highest fibre content and lowest ERC, as expected. ERC improved in BC, progeny, with a corresponding decrease in fibre content. However, crosses from the coastal hinterland breeding programme displayed a different trend. BC, genotypes had the lowest ERC, as well as the lowest fibre content compared to the other crosses, suggesting that the commercial-type parental genotypes used in the BC, crosses in the coastal hinterland breeding programme may have been sub-optimal. Future crosses should target high sucrose parents.

**Keywords:** Introgression, *Saccharum spontaneum*, regional breeding programmes, backcrossing

**Biography: Tasmien Horsley**

Dr Tasmien Horsley (BSc Hons (Biological Science), MSc (Plant Biotechnology) and PhD (Forestry)) was a Plant Breeder at SASRI. Prior to that, she was a Principal Researcher at Sappi Forests for 12 years, where she specialised in Seed Technology and Tree Reproductive Biology.

---


The tragic car accident near Mtubatuba on the 25 July 2014 that took Tasmien away from her family, friends and her colleagues at SASRI is deeply etched in our minds. Such events defy comprehension, and in this particular case, Tasmien’s passing has created a void in many people’s lives. Her beloved two-year old son, Tristan, will barely remember her warmth and strength and will never benefit from her insights, guidance and love. For her extended family at SASRI, the passion and drive with which Tasmien tackled her work will always be remembered.

Tasmien was part of our team of Plant Breeders and the leader of the new Introgression Project at SASRI which aims to increase the genetic diversity of the South African breeding germplasm, thereby enhancing our ability to breed new varieties with good resistance to pests and diseases and also to improve biomass and fibre levels that would be desirable in a biofuel crop. The potential value and impact of this work is immense and was also recognised nationally when Tasmien applied for and was awarded a research grant for three years by the Thuthuka programme of the National Research Foundation. This competitive and sought after award is made to young scientists with a talent for developing not only their own scientific career but also for advancing that of other young scientists through postgraduate study. Hence the grant was made to provide postgraduate student bursaries for the development of a team of young scientists and for co-funding research expenses in addition to supporting Tasmien’s visits to international breeding programmes to facilitate the exchange of technology and sugarcane breeding material.

In her recent international visits to both the USA and also Australia where Tasmien met several of the world’s leading sugarcane introgression breeders, she developed a valuable network for SASRI and created lasting impressions. Her passing has elicited considerable international recognition of her loss but it is undoubtedly that her clarity of thinking and drive associated with her research thrust will benefit SASRI long into the future. We will not forget.

_Obituary by Dr CM BAKER, SASRI_
OPTIMISING SUGARCANE FIELD LAYOUTS FOR PEST CONTROL

POTGIETER L1, VAN VUUREN JH2, CONLONG DE3,4 and VAN VUUREN BJ2

1Department of Logistics, Stellenbosch University, Private Bag X1, Matieland, 7602, South Africa
2Department of Industrial Engineering, Stellenbosch University, Private Bag X1, Matieland, 7602, South Africa
3South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa
4Department of Conservation Ecology and Entomology, Stellenbosch University, Private Bag X1, Matieland, 7602, South Africa

lpotgieter@sun.ac.za  vuuren@sun.ac.za  Des.Conlong@sugar.org.za

Abstract

The contribution of a heterogeneous agricultural landscape (in terms of field layouts of diversified crop ages) towards pest suppression is considered in this study. In order to investigate the population dynamics of the pest species *Eldana saccharina* Walker (Lepidoptera: Pyralidae) in differently configured sugarcane habitats, mathematical simulation models of Eldana population growth and dispersal in temporally variable and spatially heterogeneous environments are formulated. Infestation levels in a number of different mosaic configurations of differently aged agricultural crops across a spatial domain, where the harvesting of these fields occurs at different times, are compared to establish which field layout structures perform best in terms of average infestation over time. It has been found that more diversified field configurations (in terms of crop age) yield lower average infestation levels.

Keywords: *Eldana saccharina*, population dynamics, pest control, sugarcane field configurations

Biography: Linke Potgieter

Linke has been a fulltime Operations Research lecturer at Stellenbosch University in the Department of Logistics since September 2012. She completed her HonsBSc (Mathematics) at Stellenbosch University in 2009, after which she completed her Masters and PhD in 2013, with the title “A mathematical model for the control of *Eldana saccharina* Walker using the sterile insect technique”.

Short Non-Refereed Paper
ABUNDANCE AND DIVERSITY OF NEMATODE GENERA PRESENT IN THE SOUTH AFRICAN SUGAR INDUSTRY

RAMOUTHAR PV

South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa
prabashnie.ramouthar@sugar.org.za

Abstract

The roots of sugarcane plants in South Africa can be attacked by as many as 23 different genera of soil dwelling plant parasitic nematodes. Some genera are more damaging than others and damage to the plant is dependent on the composition of the nematode community present. Identifying the different genera that inhabit the soils is therefore very important, as it has implications for control. Based on data collected in 2012, this paper examines the different nematode genera present in the South African sugar industry. Fifteen different nematode genera were observed in the soil samples analysed, whilst four nematode genera were found in the roots. *Pratylenchus* was the most frequently encountered genus in sugarcane soil and roots. *Meloidogyne*, responsible for up to 30% yield loss in sugarcane, occurred in just 24% of the soil samples analysed but, when found, its levels were yield limiting. The results from this study provided valuable insight into the nematode genera currently present in the SA sugar industry. Future studies of this nature will help monitor trends in the industry.

Keywords: nematode diversity, *Meloidogyne*, abundance, yield loss

Biography: Prabashnie Ramouthar

Prabashnie Ramouthar started at the South African Sugarcane Research Institute in 2009 and is currently employed as the Nematologist. She completed her MSc cum laude in 2009 with studies on brown rust of sugarcane, but is now a converted nematologist. She has authored three full papers at SASTA and has been either author or co-author on four short communications and one poster. This is her third SASTA presentation.
A PRELIMINARY ASSESSMENT OF NEW INSECTICIDES FOR THE CONTROL OF THE SUGARCANE BORER

ELDANA SACCHARINA WALKER (LEPIDOPTERA: PYRALIDAE)

LESLIE GW and MOODLEY S

South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa

graeme.leslie@sugar.org.za   suran.moodley@sugar.org.za

Abstract

Since 2003 the synthetic pyrethroid, alpha-cypermethrin, has been successfully used as part of an integrated pest management (IPM) strategy against the sugarcane borer Eldana saccharina Walker (eldana). To obviate reliance on one insecticide, three others were assessed for their efficacy against this pest in a replicated field trial; indoxacarb, chlorantraniliprole and triflumuron.

Treatments were applied monthly for four months, commencing in October, to carry-over sugarcane. The standard treatment, alpha-cypermethrin, was included and applied at eight two-weekly applications (the registered practice) as well as five x one-monthly applications, both commencing in August.

Results showed that, compared to the untreated control, all treatments significantly reduced eldana damage (expressed as the percentage of internodes bored). Damage estimates in the final survey before harvest showed chlorantraniliprole to be the most effective insecticide, with the percentage of internodes bored in the treated and untreated plots being 3.5 and 18.4% respectively. Levels of damage in the indoxacarb, triflumuron and standard alpha-cypermethrin treatments were 5.8, 9.3 and 7.0% respectively. The least effective treatment was the five monthly applications of alpha-cypermethrin (estimated damage 10.5%).

Estimates of treatment effect on tons sucrose/ha. showed that all treatments significantly increased yield. The most effective treatment was again chlorantraniliprole (8.4 tons sucrose/ha compared to the control, 4.9 tons sucrose/ha).

Yield estimates in the indoxacarb, triflumuron and standard alpha-cypermethrin treatments were 7.1, 7.6 and 7.1 tons sucrose/ha respectively. The least effective treatment was the five monthly applications of alpha-cypermethrin (6.9 tons sucrose/ha).

These results show that the insecticides tested, and the revised approach using alpha-cypermethrin, are effective in suppressing eldana damage and improving crop yield and offer potential alternative strategies for eldana control.

Keywords: Eldana saccharina Walker, control, insecticides, new approaches, sugarcane

Biography: Graeme Leslie

Graeme Leslie is a Principal Scientist at SASRI. Over the past 39 years he has been involved in all aspects of Integrated Pest Management strategies against Eldana, whitegrubs, thrips and more recent pests such as grasshoppers and the yellow sugarcane aphid. Current research focus is the economic use of insecticides and the development of new chemistries for effective pest control in the sugarcane industry. He has authored or co-authored over 49 research papers as well as posters and Conference abstracts for national and international research meetings.
SHORT NON-REFEREED PAPER

THE DEVELOPMENT AND APPLICATION OF AN ENERGY CALCULATOR FOR SUGARCANE PRODUCTION IN SOUTH AFRICA

BOOTE DN¹, SMITHERS JC² and LYNE PWL¹,²

¹South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa
²Bioresources Engineering, School of Engineering, University of KwaZulu-Natal, Private Bag X01, Scottsville, 3209, South Africa
darran.boote@sugar.org.za

Abstract

The rising cost of energy and an increasing awareness of the negative environmental effects of Greenhouse Gas (GHG) emissions have led to a global effort to reduce fossil fuel Energy Use (EU). In this regard, the South African sugar industry is currently exploring measures to reduce EU and increase EU efficiencies of on-farm operations. To remain commercially and environmentally sustainable, measures need to be taken to reduce EU and increase EU efficiencies of on-farm operations. The purpose of this paper is to report on the development of an energy calculator for sugarcane production in South Africa. Case studies were used to test the functionality of the calculator. Results show that, in irrigated sugarcane production, the harvest and transport process, together with irrigation, account for between 70 and 80% of the total on-farm EU. For one of the case studies, an estimated 17% saving in the total on-farm EU was identified, and can be achieved if appropriate technology is adopted in irrigation practices. It is envisaged that the energy calculator will help farmers minimise on-farm EU and subsequently reduce input costs. It will also provide a valuable tool for researchers to benchmark and profile EU in sugarcane production in South Africa. Research focused on the sustainable production of sugar, from the agricultural to milling phase, is of high priority at present. The quantification of on-farm EU in sugarcane production will form a critical component of such research.

Keywords: sugarcane, fossil fuel, energy use, energy calculator, diesel, electricity

Biography: Darran Boote

Darran Boote is currently employed by the South African Sugarcane Research Institute (SASRI). He forms part of the agricultural engineering department in the systems design and optimisation research programme. Darran is a BSc Engineering (Ag) graduate from the University of KwaZulu-Natal (UKZN). He attained an MScEng (Ag) from UKZN the title of which is: “The development and assessment of a direct energy calculator for use in sugarcane production”. His research work at SASRI focuses on energy use in mechanisation and irrigation operations.
SHORT, NON-REFEREED, PAPER

THE DEVELOPMENT AND EVALUATION OF A PREDICTIVE MILL-SCALE SUGARCANE QUALITY MODEL

JENKINS EPG and BEZUIDENHOUT CN
School of Engineering, University of KwaZulu-Natal, P/Bag X01, Scottsville, 3209, South Africa
209507571@stu.ukzn.ac.za  bezuidenhoutc@ukzn.ac.za

Abstract

Sugarcane quality has important implications for mill operations and mill supply area profitability. Accurate predictions of quality enable better management of mill operations and maintenance, harvest schedules, payments to growers and even the marketing of sugar.

Sugarcane quality is predominantly controlled by preceding weather conditions across the mill area. In this study a simple and robust model to predict cane quality, based on rainfall and temperature, was developed. The model, named the SQ-model, predicts the components of the RV equation. The SQ-model estimated daily brix, pol and fibre contents with an acceptable degree of accuracy after 98 coefficients were mathematically calibrated. For calibration the SQ-model uses readily available quality and climatic data collected by the sugar industry. Independent verifications at Sezela and Umfolozi yielded $R^2$ values between 0.52 and 0.74.

Keywords: sugarcane quality, modelling, fibre, pol, brix

Biography: Edwin Jenkins

Edwin Jenkins matriculated from Port Shepstone High School in 2008 and completed his Bachelor of Science in Agricultural Engineering in 2012. He is currently pursuing his Master of Science in Engineering at the University of KwaZulu-Natal. His field of study is modelling the sugarcane supply chain with a specific focus on predicting sugarcane quality.
THE DEVELOPMENT OF A STRATEGIC SUGARCANE VEHICLE DISPATCH OPTIMISATION TOOL

JUGURNAUTH M1, BEZUIDENHOUT CNE2 and RAMASAWMY H1

1 Mechanical and Production Engineering Department, Faculty of Engineering, University of Mauritius, Reduit, Mauritius
2 School of Engineering, University of KwaZulu-Natal, P/Bag X01, Scottsville, 3209, South Africa
mowshmi,jugurnauth1@umail.uom.ac.mu haree@uom.ac.mu bezuidenhoutc@ukzn.ac.za

Abstract

In Mauritius, mill centralisation is at the heart of a sugar reform drive. Transport is a major component of the total cost of sugarcane operations. The aim of this research was to develop a transport costing model within a mathematical combinatorial solver that would create an optimal transport dispatch profile for different vehicle types within a sugar milling area. This research was motivated by a merger between two sugar milling areas. A cost equation was developed that considered cycle times, payloads and vehicle cost for different vehicles while operating in different areas. This equation was solved using the MS Excel GRG nonlinear Solver while attempting to minimise costs and concurrently ensuring that all the cane was dispatched to the mill. The dispatching plan included a mix of four different types of vehicles and both mechanical and manual harvesting were taken into consideration. The impact of different queuing times at the mill was further investigated and confirms a non-linear solution space.

Keywords: transport, optimisation, logistics, dispatch model, vehicle utilisation

Biography: Carel Bezuidenhout

Carel Bezuidenhout is an associate professor in engineering at the University of KwaZulu-Natal. Over the past 12 years he has filled a SASRI Research Fellowship position, which is funded by the sugar industry. He has been a member of SASTA since 1998 and contributed to a number of SASTA papers over this period. Carel is also a member of SASTA council.
QUANTIFYING AND MODELLING DISRUPTIONS IN THE ESTON SUGARCANE SUPPLY CHAIN

KADWA M1, BEZUIDENHOUT CN1 and ORTMANN GF2

1School of Engineering, University of KwaZulu-Natal, P/Bag X01, Scottsville, 3209, South Africa
2School of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal, P/Bag X01, Scottsville, 3209, South Africa

mmkadwa@hotmail.com  bezuidenhoutc@ukzn.ac.za  ortmann@ukzn.ac.za

Abstract

The Eston Mill, which was established in 1994, is the youngest in the KwaZulu-Natal sugar belt. As with other sugar mills, daily crush fluctuations occur because of various types of disruptions. This research involved two core objectives. First, to develop, validate and verify a model to predict and quantify the factors that influence daily crush rate fluctuations at Eston. Secondly, to estimate the trends and impacts of cutter absenteeism over a number of years. Local weather station and milling data for nine seasons were collated. Four seasons were utilised for the model development and validation, while the other five seasons were used for verification purposes. Fibre was assumed to be the limiting factor for maximum daily mill crushing capacity and was used to predict the achievable daily crush rate, before the consideration of mill disruptions. The model involved the calibration of parameters for mill maintenance and operational stops and rainfall events. The model captures approximately 64% of the variation observed in daily crush rates. Subsequent to model development, additional cane supply disruptions caused by cutter absenteeism were further investigated. Cutter absenteeism was previously estimated to cost the Eston milling area approximately R1.3 million per annum (Kadwa et al., 2012). A gradual increase in absenteeism is observed over the period 2007 to 2010, with a decline since.

Keywords: supply chain fluctuations, mill breakdowns, crushing inconsistencies, weekday inconsistencies, cutter absenteeism.

Biography: Muhammad Kadwa

Muhammad Kadwa is currently employed as an Agricultural Economist by the KZN Department of Agriculture. In addition, he is currently completing a Doctoral degree in Bioresources Systems Engineering, which was converted from a Master’s Degree. The research focuses on the modelling and quantification of complex agricultural value chains, using various statistical software applications. He also excelled at a four-year Bachelor of Science Degree in Agriculture, with majors in Agricultural Economics and Economics.
SUGARCANE TRASH RECOVERY SYSTEMS FOR COGENERATION

REES B1, SMITHERS JC1,4, LYNE PW1,2 and VAN ANTWERPEN R2,3

1Bioresources Engineering, School of Engineering, University of KwaZulu-Natal, South Africa
2South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa
3Department of Soil, Crops and Climate Sciences, University of the Free State, PO Box 339, Bloemfontein, 9300, South Africa
4National Centre for Engineering in Agriculture, University of Southern Queensland, Australia

209515793@stu.ukzn.ac.za  smithers@ukzn.ac.za  lynep@ukzn.ac.za  rianto.vanantwerpen@sugar.org.za

Abstract

The use of biomass, particularly sugarcane trash, as a sustainable and environmentally friendly source of renewable energy is gaining widespread attention. For sugarcane trash to be used as a viable energy source, it needs to be recovered from the field and transported to the mill economically. A costing model has been adopted and further developed with the objective of estimating the cost of trash collection and transport. The model was created in such way as to incorporate a number of different trash recovery routes which could be used. During the initial parts of this study, a number of different trash recovery routes which are applicable in South African conditions were identified. These routes include different methods of harvesting, trash separation infield or at the mill, method of trash collection, trash processing, and transportation of the trash. Processing to increase the bulk density of the trash prior to transport has been considered in this study as the low bulk density of the trash has been identified as a critical issue in other studies. By processing the trash, the energy density and bulk density of the trash are increased, which in turn improves the bulk density of the load and transport efficiency. Three trash densification processes were considered, these being torrefaction, pelleting and a combination of torrefaction and pelleting. Problems encountered when modelling these processes included estimating the capital cost requirements, as well as the maintenance and operating costs involved for each processing plant.

Keywords: sugarcane, trash, cogeneration, modelling, processing, cost, energy

Biography: Bryan Rees

Bryan is from Pietermaritzburg and graduated from the University of KwaZulu-Natal in 2012 with a BSc Eng (Agricultural). He is busy completing his MSc Eng, and aims to be completed by June 2014.
SHORT NON-REFEREED PAPER

ATTEMPTS TO DETECT THE DEGREE OF DETERIORATION IN COMMERCIAL SUGARCANE: LESSONS LEARNT

SIBOMANA MS, SOBRATEE N, WORKNEH TS and BEZUIDENHOUT CN

University of KwaZulu-Natal, Private Bag X01, Scottsville, Pietermaritzburg, 3209, South Africa
sylversi@yahoo.co.uk   Sobratee@ukzn.ac.za   Seyoum@ukzn.ac.za   Bezuidenhoutc@ukzn.ac.za

Abstract

Delays between harvesting and milling continue to be a notable indicator of cane supply chain inefficiency in South Africa. An empirical investigation of cane deterioration in this context was conducted. Two cane storage trials of nine days each were performed using varieties N12 and N31 stored under ambient conditions. Parameters monitored were respiration, D-lactate production, total bacterial counts and Pol % Fibre. Parameters were measured at the bottom, middle and top sections of the stalks to evaluate the effect of stalk section on parameter changes. The stalk sections significantly affected the parameters, with the top and bottom sections showing greater bacterial proliferation, respiration rates and D-lactate production than the middle section in Trial 1 (P<0.001). A significant difference in activity was observed between trials, with Trial 2 showing less activity and less variation in stalk section and between varieties. In Trial 1, a significant declining trend was noted for Pol % Fibre in the top section (P<0.05). The effect of greater respiration in the cut ends in Trial 1 was noted in significantly reduced Pol % Fibre in these cut ends during the storage time. Environmental conditions were found to be the major factor influencing quality during the storage period. The top (less mature) section of the cane stalks showed more changes after harvest and might be more susceptible to deterioration. Burnt cane showed a reduced influence of stalk section in changes observed. This information adds to existing knowledge and may prove valuable to growers, for example in deciding whether to harvest immature stalks or ripen to enhance maturity, and in deciding on harvest techniques such as burning or delivering green cane.

Keywords: sugarcane quality, sugarcane supply chain, post-harvest deterioration, harvest to crush delay

Biography: Milindi Sibomana

Milindi Sylver Sibomana is a PhD student in Bioresource Systems at the University of KwaZulu-Natal, focusing on research into the postharvest quality management of sugarcane. He holds a BSc (Microbiology and Genetics – summa cum laude) and a BSc Hons. degree in Microbiology. Milindi has also undergone training in supply chain and operations management, as well as postharvest technology in South Africa and Israel.
SHORT NON-REFEREED PAPER

POTENTIAL ECONOMIC IMPACT OF A LONG FALLOW AND CHANGING PLOUGH-OUT DATES IN THE KWAZULU-NATAL MIDLANDS

RHODES R1, JONES MR1, EDMONDS A2, GILLITT CG3 and WILKINSON D1

1South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa
2Donovale Farming cc, Postnet Suite 174, P/Bag X9118, Pietermaritzburg, 3200, South Africa
3South African Cane Growers’ Association, PO Box 888, Mount Edgecombe, 4300, South Africa

ruth.rhodes@sugar.org.za matthew.jones@sugar.org.za ant@edelnet.co.za
Chris.gillitt@adfsc.ae david.wilkinson@sugar.org.za

Abstract

The replant strategy followed by sugarcane growers in the KwaZulu-Natal Midlands requires consideration of two key factors. (1) When in the milling season to harvest the final crop of the fields designated for replanting. Harvesting replant fields late in the season will allow for a greater proportion of the ratooned fields to be harvested during the early season, resulting in reduced stool damage in fields being ratooned (fewer ratoon fields being harvested during wet summer months; fields being harvested during these months will be replant fields, hence no concern about stool damage); and yield benefits associated with more fields being ratooned during winter months, typically providing higher yields. (2) Length and type of fallow. Soil health and yield advantages have been illustrated for longer as opposed to shorter fallows, and planting green manure fallows at more agronomically favourable times of the year is likely to result in better, and more beneficial, green manure stands. Each set of choices has cost and income implications. Using a Midlands cane farm as a case study, an economic study was undertaken to quantify the possible gains or losses associated with changing from a short fallow system, with replant fields harvested at the start of the season, to a long fallow system with replant fields harvested at the end of the season. Results indicate that, under the yield and costing scenarios used, the long fallow system economically outperformed the short fallow system, or at worst, broke even. Growers are advised, however, to perform similar assessments in advance using on-farm yield records (economic outcomes may vary from farm to farm) and to implement the system shift gradually, to avoid a longer period of restricted cash flow.

Keywords: economics, long fallow, plough-out, replant, short fallow, sugarcane cycle

Biography: Ruth Rhodes

Ruth Rhodes is a soil scientist at SASRI, focusing on green manuring and crop nutrition. Ruth completed her BSc. Agric. degree at the University of Natal (Pietermaritzburg) and her MSc. in Conservation Biology at UCT. She is passionate about sustainable farming systems.
AN INVESTIGATION INTO FACTORS INFLUENCING FLOWERING AND PITHING OF SUGARCANE IN SOUTHERN AFRICA

EKSTEEN AB1, HALSE E2, SIMWINGA E3 and SUTHERLAND D4

1South African Sugarcane Research Institute, P/Bag X02, Mount Edgecombe, 4300, South Africa
2Illovo Sugar Limited, PO Box 46, Dwangwa Estate, Malawi
3Zambia Sugar, PO Box 670240, Nakambala Sugar Estate, Mazabuka, Zambia
4Illovo Sugar Limited, PO Box 194, Mount Edgecombe, 4300, South Africa

alanekaesteen@sugar.org.za Ehalse@illovo.co.za
ESimwinga@zamsugar.zm DSutherland@illovo.co.za

Abstract

Flowering in sugarcane is a physiological process that can affect cane yield and quality. Pithing is a phenomenon in sugarcane stalks whereby dry cavities are formed within the internodes, which can affect sucrose extraction during processing. The aim of this study was to investigate the effect of selected climatic factors on the extent of sugarcane flowering and pithing, and the effect of these phenomena on cane yield and quality in southern Africa. Weather, the extent of flowering, pithing, cane yield and quality data for selected cultivars from Dwangwa Estate (Malawi) and Nakambala Estate (Zambia), were analysed over five (2008-2012) and three seasons (2008-2010), respectively. Flowering was more profuse in 2008 and 2009 at Dwangwa and 2010 at Nakambala, and the extent of flowering was significantly influenced by cultivar choice (p<0.001). Pithing was observed to range from 5.88-19.46% and 9.00-19.41 % at Nakambala and Dwangwa, respectively. The extent of flowering was well correlated with pithing (R²=0.69; p<0.01). Flowering and pithing also appeared to be significantly influenced by daily minimum temperature (Tmin) during the flower initiation stage at Nakambala only (p<0.001) and daily maximum temperature (Tmax) during the flower initiation stage at both Nakambala and Dwangwa. Flowering in sugarcane ensures a very high chance of pithing in cultivars with a high propensity for flowering. No relationship was found between flowering and sugarcane yield, and pithing and sugarcane yield, which indicates that post-flowering harvest management was well scheduled. Further investigation into the management factors that affect pithing is required.

Keywords: flowering, pithing, rainfall, sugarcane yield effects, temperature

Biography: Alana Eksteen

Dr Alana Eksteen has been employed as a Crop Scientist (Plant Physiology) at SASRI since 2011. She received her PhD from UKZN in 2012 and currently manages and participates in a diverse range of projects at SASRI. Her research focus areas are physiological responses of sugarcane to drought, flowering, and ripening. She is a member of the South African Society of Crop Production and was co-opted to the SASTA Council Organising Committee in 2013.
INVESTIGATION INTO THE HIGH SUCROSE YIELD IN THE 2005 SEASON AT NAKAMBALA, ZAMBIA

MUNSAMY SS
Illovo Sugar Ltd, 1 Montgomery Drive, Mount Edgecombe, 4300, South Africa
smunsamy@illovo.co.za

Abstract
Nakambala is an irrigated estate situated in the southern province of Zambia. The highest recorded yield on the estate was 18.2 tons sucrose per hectare per annum (TSHA) in 2005, resulting primarily from increased biomass yield (12% increase in tons cane per hectare per annum compared to the five year average over 2000-2004. The 2005 climate data was interrogated and employees were interviewed to find clues to the high yield.

The climate data showed that the high yield was produced under drought conditions in the presence of adequate water for irrigation. The rainfall was 55% of the long term mean (LTM), with average relative humidity at 58%. The high cane and sucrose yields were driven by high average daily sunshine hours of 9.4 hours (107% of LTM), high average maximum temperature of 30.3°C (104% of LTM) and average temperature range of 14.3°C (107% of LTM). Total radiation was 8668 MJ/m²/annum, representing 104% of the LTM. The data indicates that a combination of high temperatures, wide diurnal temperature fluctuations, high incident solar radiation and a high number of sunshine days may lead to good yields at Nakambala, provided that sufficient water is available for irrigation in the dry periods.

According to global climate data, 2005 was the warmest year since 1890, and 2002, 2003 and 2004 featured in the top five warmest years globally. On the estate 2005 was the warmest year, followed by 2002. The estate yields showed good alignment with the DSSAT-Canegro model which predicts increasing yields with increasing temperatures.

The 2005 season findings can be used as an early crop yield indicator on Nakambala estate. Hot and dry conditions in the period November to March could indicate a good cane yield in the season starting in April, provided water is available for irrigation. The findings and comments in the paper are specific to Nakambala estate.

Keywords: Nakambala yield, drought conditions, warmest year

Biography: Stanley Munsamy

Stanley Munsamy was the Operations Director of Zambia Sugar Plc (a subsidiary of the Illovo Group) from April 2009 to January 2013 based at Nakambala in the Southern Province of the Republic of Zambia. The operations included 17 000 hectares of irrigated cane and a large sugar manufacturing plant. He held a number of senior positions in the Illovo Group before moving to Zambia. He studied sugar technology and sugar cane husbandry at M L Sultan Technikon now part of Durban University of Technology. Stanley was past President of SASTA and a SASTA Council member for many years. He authored and co-authored a large number of SASTA papers. He is currently Group Head of Sugar Technology in the Illovo Group.
<table>
<thead>
<tr>
<th>BOOTH NUMBER</th>
<th>EXHIBITOR</th>
<th>PAGE NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Osisoft</td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>SAMCO Pumps KZN</td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>South African Sugar Technologists’ Association (SASTA)</td>
<td>86</td>
</tr>
<tr>
<td>05</td>
<td>POSTER BOARDS (Sponsored by Dube Tradeport)</td>
<td>86</td>
</tr>
<tr>
<td>06</td>
<td>POSTER BOARDS (Sponsored by Dube Tradeport)</td>
<td>86</td>
</tr>
<tr>
<td>07</td>
<td>Dube Tradeport</td>
<td></td>
</tr>
<tr>
<td>08 &amp; 09</td>
<td>Triveni Turbine Ltd.</td>
<td>87</td>
</tr>
<tr>
<td>10 &amp; 11</td>
<td>DRESSER-RAND</td>
<td>84</td>
</tr>
<tr>
<td>15</td>
<td>Bruker South Africa</td>
<td>83</td>
</tr>
<tr>
<td>16</td>
<td>Thomas Broadbent</td>
<td>87</td>
</tr>
<tr>
<td>17</td>
<td>SAW Africa</td>
<td>86</td>
</tr>
<tr>
<td>18</td>
<td>ITECA SOC Adei</td>
<td>85</td>
</tr>
<tr>
<td>19</td>
<td>Sugar Milling Research Institute</td>
<td>87</td>
</tr>
<tr>
<td>20</td>
<td>Clarke Energy</td>
<td>84</td>
</tr>
<tr>
<td>22</td>
<td>SB Reshellers</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>SQR Software</td>
<td>86</td>
</tr>
<tr>
<td>25</td>
<td>Topcon Precision Agriculture</td>
<td>87</td>
</tr>
<tr>
<td>26</td>
<td>Process Valve Corp.</td>
<td>86</td>
</tr>
<tr>
<td>27</td>
<td>NETAFIM S.A.</td>
<td>85</td>
</tr>
<tr>
<td>29</td>
<td>Anton Paar SA (Pty) Ltd.</td>
<td>83</td>
</tr>
<tr>
<td>30</td>
<td>Monitoring &amp; Control Laboratories</td>
<td>85</td>
</tr>
<tr>
<td>31</td>
<td>Dawn Star Trading</td>
<td>84</td>
</tr>
<tr>
<td>32</td>
<td>API Solutions SA</td>
<td>83</td>
</tr>
<tr>
<td>33</td>
<td>S3 Technologies/Sugarcane Specialists</td>
<td>87</td>
</tr>
<tr>
<td>34</td>
<td>GEA Nilenca</td>
<td>84</td>
</tr>
<tr>
<td>36</td>
<td>South African Sugar Association (SASA)</td>
<td>86</td>
</tr>
<tr>
<td>37</td>
<td>John King Chains SA</td>
<td>85</td>
</tr>
<tr>
<td>38</td>
<td>MECOSA (Pty) Ltd.</td>
<td>85</td>
</tr>
<tr>
<td>39</td>
<td>Praj Industries Limited</td>
<td>85</td>
</tr>
<tr>
<td>41</td>
<td>Adapt IT (Pty) Ltd.</td>
<td>83</td>
</tr>
<tr>
<td>42</td>
<td>WEIR Minerals Africa (Pty) Ltd / WEIR Power &amp; Industrial</td>
<td>87</td>
</tr>
<tr>
<td>43</td>
<td>Crown Engineering</td>
<td>84</td>
</tr>
<tr>
<td>44</td>
<td>Turbine Generator Services/NG Allen/Allen Gears</td>
<td>87/83</td>
</tr>
<tr>
<td>45</td>
<td>PGBI Engineers</td>
<td>85</td>
</tr>
<tr>
<td>46</td>
<td>Buckman Laboratories</td>
<td>83</td>
</tr>
<tr>
<td>47</td>
<td>Actom John Thompson</td>
<td>83</td>
</tr>
<tr>
<td>48</td>
<td>ZEST WEG Group</td>
<td>87</td>
</tr>
<tr>
<td>50</td>
<td>SIVEST SA (PTY) LTD.</td>
<td>86</td>
</tr>
<tr>
<td>52</td>
<td>Carbo Solutions International</td>
<td>84</td>
</tr>
<tr>
<td>54</td>
<td>SternEnzym GmbH &amp; Co. KG</td>
<td>86</td>
</tr>
<tr>
<td>55</td>
<td>ImproChem</td>
<td>85</td>
</tr>
<tr>
<td>56</td>
<td>ELGIN Engineering</td>
<td>84</td>
</tr>
<tr>
<td>58 &amp; 60</td>
<td>BMG – Bearing Man Group</td>
<td>83</td>
</tr>
<tr>
<td>59</td>
<td>Bonfiglioli</td>
<td>83</td>
</tr>
<tr>
<td>Outdoor - 12</td>
<td>Bell Equipment Co.SA (Pty) Ltd</td>
<td>83</td>
</tr>
<tr>
<td>Outdoor - 19b</td>
<td>Turbofluid / Fives Cail</td>
<td>87/84</td>
</tr>
</tbody>
</table>
ACTOM JOHN THOMPSON
Booth Number : 47
Representative : Fabio Maffeis
Email : fabiom@johnthompson.co.za
Telephone : 031 408 9700
Website : www.johnthompson.co.za

We are a Boiler and Environmental Solutions Company serving the Power Generation and Industrial markets, both locally and internationally, with innovation and enthusiastic response.

ADAPT IT
Booth Number : 41
Representative : Lucian Naidoo
Email : enquiries@adaptit.co.za
Telephone : 031 514 7300
Website : www.adaptit.co.za

Adapt IT has 420+ employees operating out of business divisions in Durban, Johannesburg, Pretoria and Cape Town; and provides specialised IT solutions and services to the Education, Mining and Manufacturing, Energy And Financial Services sector. Our products and services span the complete IT life cycle, from consulting through to support.

ANTON-PAAR
Booth Number : 29
Representative : Manju Naicker
Email : manju.naicker@anton-paar.com
Telephone : 082 901 7810
Website : www.anton-paar.com

Anton Paar develops, produces and distributes highly accurate laboratory instruments and process measuring systems, and provides custom tailored automation and robot solutions. It is the world leader in the measurement of density, concentration and CO₂ and in the field of rheometry and optical analysis.

ALLEN GEARS
Booth Number : 44
Representative : Mr. Steve Blood
Email : steve.blood@allengears.com
Telephone : +44 (0) 7202 4243 321
Website : www.allengears.com

Allen Gears Design and manufacture high performance Epicyclic and Parallel Shaft gearboxes for Industrial and Marine applications.

API SOLUTIONS SA (PTY) LTD.
Booth Number : 32
Representative : Steve Bennett
Email : info@apisolutions.co.za
Telephone : 031 902 6244
Website : www.apisolutions.co.za

API Solutions is a company focused to supply the mills with centrifugal spares, descaling equipment, consumables, refurbishments and more. We are also the agents for the Brazilian manufacturing company MAUSA which produces centrifuges, masscuitte and vacuum pumps, sugar drying equipment, overhead cranes and specialist mill projects.

BELL EQUIPMENT
Booth Number : OD-12 (Outdoor Stand)
Representative : Raj Singh
Email : sales@bell.co.za
Telephone : 011 928 9700
Website : www.bellequipment.com

Born and bred in the heart of South Africa’s sugar industry, Bell Equipment is a leading global manufacturer, distributor and exporter of an extensive range of material handling machines. Providing lowest cost per ton solutions with exceptional product, unparalleled service and support are the key elements of Bell’s success.

BMG – BEARING MAN GROUP
Booth Number : 58 & 60
Representative : Chris Johns
Email : chrisj@bmgworld.net
Telephone : 031 516 6200
Website : www.bmgworld.net

BMG – Bearing Man Group – plays a key role in Africa’s Sugar Industry with an extensive range of engineering components and technical services available from a network of over 120 branches. BMG’s value enhancing services ensure the highest level of plant reliability and provide measurable production efficiencies, which means competitive advantage and profit maximization.

BONFIGLIOLI SOUTH AFRICA
Booth Number : 59
Representative : Kevin Coull
Email : olivia.brain@bonfiglioli.com
Telephone : 031 701 4150
Website : www.bonfiglioli.com

Bonfiglioli SA is supplier of quality and reliable power transmission equipment, offering technical support and after sales service into the Sugar Industry for more than 16 years. Heavy duty planetary and bevel / helical gearboxes built to meet the arduous conditions experienced in the sugar manufacturing process.

BRUKER SOUTH AFRICA
Booth Number : 15
Representative : Neil Oosthuizen
Email : neil.oosthuizen@bruker.com
Telephone : 011 463 6640
Website : www.bruker.com

Bruker South Africa is the leading supplier of spectroscopic solutions to the sugar and related industry. FT-IR is used for the analysis of soil and soil related parameters, to assist with fertilizer advisory to the farmer. FT-NIR is provided to the sugar mills for the analysis of shredded sugarcane, mixed juice and related factory products. FT-NIR is also used for the non-destructive analysis of raw and refined sugar. Local service and application supported is also provided.

BUCKMAN
Booth Number : 46
Representative : Stephan Steenkamp
Email : marketingsa@buckman.com
Telephone : 031 736 8800
Website : buckman.com
Buckman is a privately held, global specialty chemical company serving customers in more than 90 countries. We work proactively and collaboratively with our worldwide sugar and ethanol customers to deliver innovative specialty chemical solutions and exceptional service to provide a measurable return on investment (ROI) and return on environment (ROE).

**CARBO SOLUTIONS**

- **Booth Number**: 52
- **Representative**: Ahmed Vawda
- **Email**: info@carboua.com
- **Telephone**: +131 092 77125
- **Website**: www.carboua.com

CarboUA manufacture high performance process aids for sugar milling and refining industries. Our products and services can assist our customers in the following areas:
1. Improve Capacity
2. Reduce energy consumption
3. Solve quality problems
4. Lower conversion costs
5. Reduce sugar loss

We also have a process engineering consultancy division.

**CLARKE ENERGY SOUTH AFRICA (Pty) Ltd.**

- **Booth Number**: 20
- **Representative**: Ray Lombard
- **Email**: ray.lombard@clarke-energy.com
- **Telephone**: 031 763 3222
- **Website**: www.clarke-energy.com

Clarke Energy specializes in sales, engineering, installation and maintenance of power plants using GE Power and Water’s Jenbacher gas engines. Clarke Energy has 900 staff in Algeria, Australia, Bangladesh, France, India, Ireland, New Zealand, Nigeria, Tunisia, South Africa including Botswana and Mozambique maintaining low-carbon and renewable energy applications.

**CROWN ENGINEERING**

- **Booth Number**: 43
- **Representative**: Johan Meyer
- **Email**: J_Meyer@crown-eng.com.au
- **Telephone**: +61 7 3375 6300 / +61 410 477 544
- **Website**: www.crown-eng.com.au

Crown Engineering is an ISO accredited company with 96 years experience with a world class quality reputation in the design and manufacture of gears and various engineered products used in the Sugar, Power Generation and Mining Industries. We specialize in general Machining, Gear manufacturing, Fabrication and Gearbox Assemblies.

**DAWN STAR TRADING (PTY) LTD**

- **Booth Number**: 31
- **Representative**: Daniel Munisamy
- **Email**: daniel@dawnst.co.za / admin@dawnst.co.za
- **Telephone**: 031 464 6944
- **Website**: www.dawnst.co.za

Our main focus at Dawn Star Trading is on harnessing cutting edge technologies, and making them available to the rest of Africa. We specialize in the supply of additives, lubricants, hydraulics and pneumatic components, lubrication equipment and total wear solutions within the steel, chemical, sugar, marine, cement and mining industries.

**DRESSER-RAND**

- **Booth Number**: 10 & 11
- **Representative**: Marthinus Erasmus
- **Email**: merasmus@dresser-rand.com
- **Telephone**: 031 584 8181/2
- **Website**: www.dresser-rand.com

Dresser-Rand is a world leader in designing, manufacturing, installing, commissioning and servicing of steam turbines, from 1kW to 100MW. The company has considerable experience in the sugar industry and has been designing and manufacturing steam turbines for more than 100 years. Dresser-Rand also provides parts, upgrades, revamps and completely new engineered internals for all markets of turbines, through its industry leading Applied Technology.

**ELGIN ENGINEERING**

- **Booth Number**: 56
- **Representative**: Mervin Reddy
- **Email**: mervin@elgin.co.za
- **Telephone**: 031 274 0000
- **Website**: www.elgin.co.za

Since 1949, Elgin Engineering’s team have been the go to guys for local sugar producers, manufacturing new machinery and ensuring that existing equipment is maintained in working order. Elgin supplies more than 350 sugar rolls per year to the global sugar industry and has a workshop specially dedicated to the manufacture and maintenance of all types of sugar industry plant and equipment. We are able to undertake fabrications and casting of any size using our own large scale foundry and workshop facilities.

**FIVES FLETCHER**

- **Booth Number**: OD-19B (Outdoor Stand)
- **Representative**: Don Hamilton
- **Email**: fivesfletcher@fivesgroup.com
- **Telephone**: +44 1332 636000
- **Website**: www.fivesgroup.com

Fives Fletcher and Fives Cail design and supply process equipment and complete plants for cane raw, beet and refined sugar industries throughout the world. We focus on high energy efficiency equipment covering all stages of the sugar process; wherever possible we manufacture locally to keep costs down.

**GEA NILENCA**

- **Booth Number**: 34
- **Representative**: Liezl Bothma
- **Email**: liesl.bothma@gea.com
- **Telephone**: 083 844 3042
- **Website**: www.gea-hx.com

More efficient and better product quality with GEA’s Plate Technology, shorter residence times in our evaporators, high heat transfer rates and patented FreeFlow Technology, the complete sugar manufacturing process are more profitable from energy, product quality and business management aspects.
ImproChem
Booth Number : 55
Representative : Ebbie Venter
Email : Ebbie.Venter@improchem.co.za
Telephone : 011 971 0400/082 885 1920
Website : www.improchem.co.za
ImproChem provides innovative Water; Energy and Air Quality management solutions to industry.
In order to help our Customers solve some of their toughest water, energy and air quality management challenges, ImproChem utilises a combination of:
• World-class Chemical Technology
• Mechanical Equipment & Custom-engineered Systems
• Knowledge & Experience
• Monitoring & Control
• Support from Technology Partners
We work with our Customers to develop integrated solutions for continuous improvement in equipment integrity, process efficiency and product quality, whilst minimising water usage and waste generation.

ITECA SOCADEI
Booth Number : 18
Representative : Claire Rua
Email : Claire.rua@iteca.fr
Telephone : +33 442 977700
Website : www.iteca.fr
ITECA has long been developing specific sensors for sugar industry worldwide.
It’s Color and Vision Department has created equipments based on Color Analysis and Image Processing Techniques that help optimizing the crystallization process, allowing customers to fully control their production at a lower cost.

John King Chains SA
Booth Number : 37
Representative : Frikkie Ras
Email : frikkie@jkc.co.za
Telephone : 011 894 3570
Website : www.jkc.com
John King Chains SA is part of an international leading chain manufacturer and distributor. We strive to offer the best quality products and also a guaranteed 24 hour service on breakdown. Our products range from: transmission chains, British and metric conveyor chains, forged chains, agricultural chains, heavy drive chains, round link and combination chains, leaf chains and cast link chains, sprockets, taper locks and accessories.

Mecosa (Pty) Ltd.
Booth Number : 38
Representative : Leon Christodoulou
Email : measure@mecosa.co.za
Telephone : 011 257 6100
Website : www.mecosa.co.za
Mecosa (Pty) Ltd. is a leading supplier of Process Measurement Instrumentation in Southern Africa. In the sugar industry Mecosa (Pty) Ltd. Specializes in Brix concentration, density, moisture, flow, level, pressure, pH and conductivity measurement. Mecosa (Pty) Ltd. Has been serving the industry for more than 30 years and continues to grow from strength to strength.

Monitoring & Control Laboratories
Booth Number : 30
Representative : Germaine Maistry and Richard Hattersley
Email : sales@moncon.co.za
Telephone : JHB 011 608 4664 / DBN 031 914 2912 / CT 0860 109 259
Website : www.moncon.co.za
MCL is one of Southern Africa’s leading suppliers of superior laboratory and scientific equipment. In operation since 1992, MCL is a key supplier to the sugar industry. MCL is the exclusive agent for the leading brand Atago, renown for its bench-top and handheld refractometers and polarimeters designed for the sugar industry.

Netafim
Booth Number : 27
Representative : Gary Frances
Email : sales@netafim.net
Telephone : +27 21 987 0477
Website : www.netafim.co.za
HELPING THE WORLD GROW MORE WITH LESS.
As the world’s population continues to rise and natural resources come under pressure, more efficiency makes more sense than ever. At Netafim, we help our customers produce more yields and better crops with less resources.

NG Allen
Booth Number : 44
Representative : Ed Cliffe
Email : Ed.Cliffe@weirgroup.com
Telephone : +44 7795 527
Website : www.weirallensteamturbines.com
NG Allen Design and manufacture steam turbines, from 0.5MW to 65 MW for Power Generation and Mechanical Drive applications.

PGBI Group
Booth Number : 45
Representative : Des Jenkinson
Email : lcarlstein@pgbi.co.za
Telephone : 031 202 3098
Website : www.pgbi.co.za
The PGBI Group has been, and is currently active in the sugar industries of many countries ranging from Indonesia and Jamaica to China with a focus on Africa. Internationally PGBI has conducted bankable feasibility studies for governments in sugar and ethanol production and the co-generation of electricity bagasse.

Praj Industries Ltd.
Booth Number : 39
Representative : Ramesh Bhosale
Email : RameshBhosale@praj.net
Telephone : +91 20 7182000
Website : www.praj.net
Praj is a Process Engineering and Technology Company offering innovative end-to-end solutions for bio-fuel, ethanol, brewery, water and wastewater treatment plants and critical process equipment.
§ systems. Praj also offers bio nutrients to enhance the yield of ethanol in sugar and starch based distilleries. Praj has presence in more than 60 countries across 5 continents and has more than 600 references.

**PROCESS VALVE CORP. cc**

**Booth Number :** 26  
**Representative :** Bruce Titmuss  
**Email :** bruce@processvalve.co.za  
**Telephone :** 082 444 9371  
**Website :** www.processvalve.co.za

Process Valve Corp. cc is an industrial valve stockiest distributor formed in 1987, specializing in mechanical and instrumentation Control Valves for “high end” applications. Steam, chemical, extreme pressure, temperature and difficult process conditions are our field of specialty. Offering four stocking branches nationally with fully trained staff and repair facility in Durban.

**SAMCO PUMPS**

**Booth Number :** 2  
**Email :** richard@samcopumps.com  
**Telephone :** 031 700 5858  
**Website :** www.samcopumps.com

One of KwaZulu-Natal’s biggest pump and supply companies. Committed to meeting all our customers’ needs – 24 hours a day. We offer a turnkey solution to the pump industry, from supply, system design, service contacts and mechanical re-pairs for all industrial, process and general applications covering common or exotic material builds. Samco offers in house machining, seal refurbishing, motor repairs and fabrication facilities, which includes a pump test facility. If it Can Be Pumped We Can Do It For you Cost Effectively & Efficiently.

**SAW AFRICA**

**Booth Number :** 17  
**Representative :** Lorrian Bekker  
**Email :** lorrian@sawafrica.co.za  
**Telephone :** 031 502 2959

SAW Africa is the Authorized Value Provider for ABB process performance motors and we import and stock a full range of IE2 high efficiency motors in SA. Our main focus is to supply and provide support for ABB Process Performance Motors to industry, mining and the OEM’s in the country.

**SiVEST**

**Booth Number :** 50  
**Representative :** Mina Lovisa  
**Email :** info@svest.co.za  
**Telephone :** 031 5811 500  
**Website :** www.sivest.co.za

SiVEST is a leading provider of engineering, project management and construction services to the sugar and related sectors, including ethanol and power, in the factory and agricultural areas. SiVEST has extensive experience in working throughout Africa.

**SOUTH AFRICAN SUGAR ASSOCIATION (SASA)**

**Booth Number :** 36  
**Representative :** Jennifer Crawford  
**Email :** Jennifer.Crawford@sasa.org.za  
**Telephone :** 031 508 7031  
**Website :** www.sasa.org.za

The South African Sugar Association provides a range of specialist services that enhance the profitability, global competitiveness and sustainability of the South African sugar industry. This R12 billion industry is one of the world’s leading cost-competitive producers of high quality sugar.

**SOUTH AFRICAN SUGAR TECHNOLOGISTS ASSOCIATION (SASTA)**

**Booth Number :** 23  
**Representative :** Danile Macdonald  
**Email :** sasta@sugar.org.za  
**Telephone :** +27 (0)31-5087543  
**Website :** www.sasta.co.za

SASTA, founded in 1926, is an association of people interested in the technical aspects of the SA sugar industry. SASTA operates under the aegis of the South African Sugar Association, but is governed under its own constitution by a Council, elected by its members. SASTA organises the annual SASTA Congress, 2014 being the 87th! Workshops, visits to factories, farms and sites of interest are periodically arranged around topical issues. SASTA publishes the annual Congress Proceedings and the official methods SASTA Laboratory Manual.

**SQR SOFTWARE**

**Booth Number :** 24  
**Representative :** Linda De Beer  
**Email :** info@sqrsoftware.com  
**Telephone :** 033 347 5491  
**Website :** www.sqrsoftware.co.za

CanePro is an agricultural Management System designed for either large commercial sugar estates or for farmers. CanePro is used in many African countries and also in Central America. CanePro provides a complete solution for managing fields, harvesting plans, irrigation scheduling, employees, vehicles and materials.

**STERNENZYM GmbH & CO KG**

**Booth Number :** 54  
**Representative :** Laurent Guerindon  
**Email :** info@sternenzym.de  
**Telephone :** +49 4102 202 002  
**Website :** www.sternenzym.de

SternEnzym GmbH & Co Kg is a member of the independent, owner-managed Stern-Wywiol Gruppe in Hamburg. Established in 1988, Stern Enzym specializes in designing enzymes and enzyme complexes, in particular for the food industry. The main applications are bread and pastry goods, sugar, and dairy, fish and meat products.
SUGAR MILLING RESEARCH INSTITUTE NPC

Booth Number : 19
Representative : Reza Essop
Email : ressop@smri.org
Telephone : 031 273 1358 / 031 273 1300
Website : www.smri.org

The Sugar Milling research institute is the central scientific organization involved in research work and technical services for the Southern Sugar industry.

THOMAS BROADBENT + SONS LIMITED

Booth Number : 16
Representative : Sean Doyle
Email : sdoyle@broadbent.co.uk
Telephone : +44 7966 478637
Website : www.broadbent.co.uk

Thomas Broadbent design, manufacture and supply a full range of batch, continuous and decanter centrifuges together with ancillary equipment such as mixer tanks, for the sugar cane, beet and refinery industries worldwide.

TOPCON PRECISION AGRICULTURE

Booth Number : 25
Representative : Christo Helm
Email : chelm@topconpa.com
Telephone : 083 233 5497
Website : www.topconpa.com

Topcon Precision Agriculture develops and manufactures leading-edge satellite positioning, guidance systems, electronic controls, mapping, monitoring and landleveling solutions for agriculture to meet the ever changing demands facing agricultural industries worldwide. Topcon Precision Agriculture prides itself on providing exemplary customer service.

TRIVENI TURBINE LTD.

Booth Number : 8 & 9
Representative : Santosh MG & Sagar Mali
Email : mktg@triveniturbines.com
Telephone : +91 8022 164 100
Website : www.triveniturbines.com

Triveni Turbine Limited supplies engineered-to-order steam turbines upto 30 MW and has a joint venture with GE Oil and Gas for supplying steam turbines above 30 up to 100 MW. It also provides unparalleled after-sales service. It has supplied steam turbines in over 40 countries across the globe.

WEIR POWER & INDUSTRIAL

Booth Number : 42
Representative : Sanjay Ramsingh
Email : powerindustrial@weirgroup.com
Telephone : 011 929 2929
Website : www.weirpowerindustrial.com

WEIR POWER & INDUSTRIAL designs and manufactures engineered products and provides aftermarket support for flow control and rotating equipment across the power generation and sugar industries. With an industry-renowned portfolio of product brands, WEIR has an established reputation synonymous with excellence in design, engineering, performance and reliability.

ZEST WEG GROUP

Booth Number : 48
Representative : Taylor Milan
Email : info@zest.co.za
Telephone : 011 723 6000
Website : www.zest.co.za

The Zest WEG Group, a subsidiary of leading Brazilian motor and controls manufacturer WEG, started out as a South African company and maintains a strong commitment to contributing to the development of the African region. As a leading supply of low, medium and high voltage electric motors, vibrator Motors, variable speeds drives, softstarters, transformers MCC’s, containerised substations, diesel generator sets, switchgear and co-generation and energy solutions as well as electrical and instrumentation engineering and project management services in Africa, Zest WEG Group operates a strategically situated network of branches and distributors across the continent.
OFFICERS 2013-2014

President: GT SMITH                  Patron: B LINDA               Vice-President: KA REDSHAW
Congress Chair: DL SWEBY                 Treasurer: AJ VAN DER NEST

OFFICERS 2013-2014

Former Presidents

1931-32 GC DYMOND  1953-54 GC DYMOND  1975-76 JB ALEXANDER  1997-98 GB O'REILLY
1933-34 BED PEARCE  1955-56 JB GRANT  1977-78 GD THOMPSON  1999-00 TJ MURRAY
1935-36 GC WILSON  1957-58 JPN BENTLEY  1979-80 GD THOMPSON  2001-02 TJ MURRAY
1937-38 J Rault  1959-60 JPN BENTLEY  1981-82 GW SHUKER  2003-04 MS GREENFIELD
1941-42 FW Hayes  1963-64 JR GUNN  1985-86 AB RAVNO  2007-08 PM SCHORN
1942-43 A MCMARTIN  1964-65 JR GUNN  1986-87 AB RAVNO  2008-09 PM SCHORN
1943-44 G Booth  1965-66 JR GUNN  1987-88 PK MOBERLY  2009-10 PM SCHORN
1945-46 GS MOBERLY  1967-68 LF CHIAZZARI  1989-90 PK MOBERLY  2011-12 GT SMITH
1946-47 W BUCHANAN  1968-69 TG CLEASBY  1990-91 PW REIN  2012-13 GT SMITH

Former Vice-Presidents

1927-28 HH DODDS  1949-50 JL DU TOIT  1971-72 JB ALEXANDER  1994-95 GB O'REILLY
1928-29 GS MOBERLY  1950-51 OWM PEARCE  1972-73 M MATIC  1995-96 GB O'REILLY
1932-33 AC WATSON  1954-55 K DOUWES-DEKKER  1976-77 GW SHUKER  1999-00 BS PURCHASE
1933-34 GC DYMOND  1955-56 GC DYMOND  1977-78 GW SHUKER  2000-01 BS PURCHASE
1935-36 E CAMDEN-SMITH  1957-58 WG GALBRATH  1979-80 GW SHUKER  2002-03 KM HURLY
1937-38 P MURRAY  1959-60 JL DU TOIT  1981-82 AB RAVNO  2004-05 SS MUNSAMY
1941-42 A MCMARTIN  1963-64 JR GUNN  1985-86 PK MOBERLY  2008-09 DL SWEBY
1943-44 FB MACBETH  1965-66 LF CHIAZZARI  1987-88 PW REIN  2010-11 BM MUIR
1945-46 W BUCHANAN  1967-68 LG CLEASBY  1989-90 GW SHUKER  2012-13 KA REDSHAW
1946-47 GC DYMOND  1968-69 JB ALEXANDER  1990-91 PH HEWITT

Council of the Association 2012-13

CN BEZUIDENHOUT  P CRONJE  SD PEACOCK
K McFARLANE  SS MUNSAMY  KA REDSHAW (Vice-President)
S RAMGAREEB  GT SMITH (President)  D SUTHERLAND
PM SCHORN  A VAN DER NEST (Treasurer)
DL SWEBY (Congress Chair)  W LAWLOR