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SASTA AWARDS 1962-2014

SASTA GOLD MEDALISTS

1968	AE RABE	2002	K SCHAFFLER
1970	CGM PERK	2002	AB RAVNO
1974	JL DU TOIT	2005	E MEYER
1977	PCG BRETT	2005	JH MEYER
1981	JB ALEXANDER	2005	PG MOREL DU BOIL
1988	IA BELL	2008	KM HURLY
1990	GD THOMPSON	2009	TG CLEASBY
1998	SW UPFOLD	2010	GRE LIONNET
2000	PW REIN	2012	BS PURCHASE

TALBOT-CROSBIE AND KYNOCH/TRIOMF PRIZEWINNERS 1962-2014

Year	Prize/Award	Author(s)	Year	Prize/Award	Author(s)
1962	Talbot-Crosbie Kynoch	T COVAS JR ANDERSON	1976	Talbot-Crosbie Triomf	LMSA JULLIENNE JR PILCHER and G VAN DER MERWE
1963	Talbot-Crosbie Kynoch	EJ BUCHANAN, K DOUWES- DEKKER and A VAN HENGEL GS BARLETT	1977	Talbot-Crosbie Triomf	RP SCOTT J BURROWS
1964	Talbot-Crosbie Kynoch	AE RABE RT BISHOP	1978	Talbot-Crosbie Triomf	PG MOREL DU BOIL and K SCHAFFLER DB HELLMANN
1965	Talbot-Crosbie Kynoch	EJ BUCHANAN JM GOSNELL and GD THOMPSON	1979	Talbot-Crosbie Triomf	MR KEDIAN PR ATKINSON
1966	Talbot-Crosbie Kynoch	Prize shared by: RC TURNER and RJ JENNINGS AJM CARNEGIE	1980	Talbot-Crosbie Triomf	A KOEN NG INMAN-BAMBER
1967	Talbot-Crosbie Kynoch	A VAN HENGEL J GLOVER	1981	Talbot-Crosbie Triomf	RG HOEKSTRA KE CACKETT and JJ RAMPF
1968	Talbot-Crosbie Kynoch	J BRUIJN and RP JENNINGS G ROTH	1982	Talbot-Crosbie Triomf	LMSA JULLIENNE E MEYER and B WORLOCK
1969	Talbot-Crosbie Kynoch	RCS ROBINSON and RP JENNINGS PK MOBERLY	1983	Talbot-Crosbie Triomf	BS PURCHASE TMC BOEVEY and TJ MURRAY
1970	Talbot-Crosbie Kynoch	IA SMITH ME SUMNER	1984	Talbot-Crosbie Kynoch	GPN KRUGER PET TURNER
1971	Talbot-Crosbie Kynoch	GG ASHE JM GOSNELL and AC LONG	1985	Talbot-Crosbie Kynoch	PG MOREL DU BOIL NB LEIBBRANDT
1972	Talbot-Crosbie Triomf	JP MURRAY FE RICHARDSON	1986	Talbot-Crosbie Kynoch	GRE LIONNET KM HARBORNE-RUTHERFORD, RA BAILEY and JB DA GRACA
1973	Talbot-Crosbie Triomf	B ST C MOOR H ROSTRON	1987	Talbot-Crosbie Kynoch	PW REIN, MGS COX and G MONTOCCHIO TMC BOEVEY and JP FOURIE
1974	Talbot-Crosbie Triomf	No Winner JPM DE ROBILLARD and GA IGGO	1988	Talbot-Crosbie Kynoch	MJ REID BRF GEORGE
1975	Talbot-Crosbie Triomf	EFA ROUILLARD PGC BRETT, RL HARDING and RH PAXTON			



Year	Prize/Award	Author(s)	Year	Prize/Award	Author(s)
1989	Talbot-Crosbie Kynoch	GRE LIONNET JH MEYER, RA WOOD and RL HARDING	2001	Talbot-Crosbie Kynoch	N MAGASINER, C VAN ALPHEN, M INKSON and B MISPLON Prize shared by: FC BOTHA and J ROHWER; MK BUTTERFIELD, A D'HONT and N BERDING
1990	Talbot-Crosbie Kynoch	CMJ DAY-LEWIS and KJ SCHAFFLER NG INMAN BAMBER and BA STEAD	2002	Talbot-Crosbie Kynoch	PB DEVNARAIN, DR ARNOLD and SB DAVIS Prize shared by: E MEYER and N GOVENDER; PJ THORBURN, R VAN ANTWERPEN, JH MEYER and CN BEZUIDENHOUT
1991	Talbot-Crosbie Kynoch	SJ MADAREE, PW REIN and CM WENMAN RA BAILEY and SA TOUGH	2003	Talbot-Crosbie Kynoch	BM SCHOONEES S GUYON, JL VOGEL, J OMARJEE, T VAN ANTWERPEN, P CADET and J BALANDREAU
1992	Talbot-Crosbie Kynoch	Prize shared by: MGS COX and P SAHADEO; D MEADOWS and S WADLEY SJ SNYMAN, KG BLACK BI HUCKETT and MP WATT	2004	Talbot-Crosbie Kynoch	DJ LOVE, SD PEACOCK and GT SCHUMANN PJ THORBURN, HL HORAN, IM BIGGS and SE PARK
1993	Talbot-Crosbie Kynoch	M MOODLEY NG INMAN-BAMBER, TL CULVERWELL and MG McGLINCHEY	2005	Talbot-Crosbie Kynoch	L SMITH Prize shared by: PWL LYNE, E MEYER and R HERBERT; M VAN DEN BERG and MT SMITH
1994	Talbot-Crosbie Kynoch	VC STONE BL SCHROEDER, JB ROBINSON PET TURNER and M WALLACE	2006	Talbot-Crosbie Kynoch	L ECHEVERRI and PW REIN OL KVEDARAS, MG KEEPING, F-R GOEBEL and MJ BYRNE
1995	Talbot-Crosbie Kynoch	DC WALTREW and LM TURNER DB HELLMANN, GG PLATFORD and M WALLACE	2007	Talbot-Crosbie Kynoch	No Congress held No Congress held
1996	Talbot-Crosbie Kynoch	DC WALTREW and PW WHITELAW R VAN ANTWERPEN, MG McGLINCHEY, NG INMAN- BAMBER and ATP BENNIE	2008	Talbot-Crosbie Kynoch	R SIMPSON and J OXLEY SJ SNYMAN, GM MEYER, M BANASIAK, TL NICHOLSON, T VAN ANTWERPEN, P NAIDOO and JD ERASMUS
1997	Talbot-Crosbie Kynoch	KJ SCHAFFLER and MTD DE GAYE M KEEPING	2009	Talbot-Crosbie Kynoch	BM MUIR, G EGGLESTON and B BARKER A SINGELS, MA SMIT, M BUTTERFIELD, PDR VAN HEERDEN and M VAN DEN BERG
1998	Talbot-Crosbie Kynoch	Prize shared by: DM MEADOWS, GT SCHUMANN and S SOJI; SB DAVIS, M MOODLEY, I SINGH and MW ADENDORFF Prize shared by: CPR CRONJE, RA BAILEY and K McFARLANE; E MEYER	2010	Talbot-Crosbie Kynoch	V KOCHERGIN, C GAUDET and M ROBERT S RAMBURAN, DM M ^c ELLIGOTT and O DE HAAS
1999	Talbot-Crosbie Kynoch	None MJ PARSONS	2011	Talbot-Crosbie Kynoch	Y NAIDOO and R SIMPSON V HARRACA, J DU PISSANIE, RS RUTHERFORD and DE CONLONG
2000	Talbot-Crosbie Kynoch	PG MOREL DU BOIL EJ SCHMIDT, G NARCISO, P FROST and C GERS			



Year	Prize/Award	Author(s)	Year	Prize/Award	Author(s)
2012	Talbot-Crosbie Kynoch	PS JENSEN S RAMBURAN, T WETTERGREEN, SD BERRY and B SHONGWE	2014	Talbot-Crosbie Kynoch	PS JENSEN, SB DAVIS, DJ LOVE and A RASSOL PDR VAN HEERDEN, MW ADENDORFF, G LAGERWALL, P BOTHA, CPR CRONJE J VAN DER MERWE, N NEL, P SMITH, E HÖLL, G HYSLOP, V SMITH, A HARRIS, W HARRIS, JB MHLONGO, DM HARRIS, J DHEOPURSAID, T MATTHEWS and P NAIDOO
2013	Talbot-Crosbie Kynoch	PS JENSEN Prize shared by: S RAMBURAN; PV RAMOUTHAR, R RHODES, T WETTERGREEN, U PILLAY, MR JONES and R VAN ANTWERPEN			

ANNUAL CECIL RENAUD AWARDS 1977-2014

Year	Prize/Award	Author(s)	Year	Prize/Award	Author(s)
1977	Factory Agricultural	B ST C MOOR RT BISHOP	1990	Factory Agricultural	DM VAN DEN BERG RN STATHAM
1978	Factory Agricultural	RD ARCHIBALD and C MACK OP LANDREY	1991	Factory Agricultural	B ST C MOOR PJB GARDINER and J CAZALET
1979	Factory Agricultural	GG ASHE No Winner	1992	Factory Agricultural	RR SANDERS CG SPALING
1980	Factory Agricultural	DCM KEIR AN MILLS and ER RINGELMAN	1993	Factory Agricultural	DJ TAYFIELD and EW ANDERSON OP LANDREY, GG EICHLER and J CHEDZEY
1981	Factory Agricultural	S NORTH-COOMBES, K TAYLER and K KOSTER JG HARDY	1994	Factory Agricultural	C CREBO, L BACHAN and V PIL- LAY PC HENRY and W RHEBERGEN
1982	Factory Agricultural	P GLAUM and A LANDMAN PC WISE	1995	Factory Agricultural	M MacNAUGHTON D McARTHUR and VW SPAULL
1983	Factory Agricultural	RAH CHILVERS JE LONSDALE	1996	Factory Agricultural	B MISPLON, H VERBANCK and P McINTYRE PA DONOVAN
1984	Factory Agricultural	DJ CARLIELL PG BRAITHWAITE	1997	Factory Agricultural	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 A PRINS, JJ BORNMANN and JH MEYER
1985	Factory Agricultural	MA GETAZ J CHEDZY and JBR FINDLAY	1998	Factory Agricultural	None JB CHADWICK
1986	Factory Agricultural	RAH CHILVERS and DJ LOVE DJ NIXON, M WORKMAN and PJ GLENDINNING	1999	Factory Agricultural	T DALE and TD KNOETZE HR ROSTRON, DWF BUTLER and MD ZWANE
1987	Factory Agricultural	GF MANN CPM SWEET, PW WHITE and GH GODWORTH	2000	Factory Agricultural	CRC JENSEN and G GOVENDER N LECLER
1988	Factory Agricultural	RP SCOTT DAG RALFE			
1989	Factory Agricultural	PM SCHORN, J BECKETT and WS GRAHAM TL PEARSE			



Year	Prize/Award	Author(s)	Year	Prize/Award	Author(s)
2001	Factory Agricultural	M DEBWE M HUMM	2007	Factory Agricultural	None - No Congress held None - No Congress held
2002	Factory Agricultural	I SINGH, H JONES and S GAYAPERSAD M ISYAGI and DMW WHITBREAD	2008	Factory Agricultural	S RAMA and SS MUNSAMY JJ MURRAY
2003	Factory Agricultural	Prize shared by: LJ MELROSE; M MOODLEY, M PILLAY, PM SCHORN, G MITCHELL and R GELLING Prize shared by: CW MAHER and L SCHULZ; C PFOTENHAUER	2009	Factory Agricultural	PM SCHORN, L SMITH, SD PEACOCK, DJ LOVE and DJ MUZZELL AT WYNNE, TJ MURRAY and AB GABRIEL
2004	Factory Agricultural	None D ARMSTRONG	2010	Factory Agricultural	DJ LOVE JJ MURRAY
2005	Factory Agricultural	None None	2011	Factory Agricultural	None J DLAMINI
2006	Factory Agricultural	Prize shared by : M REIN, L SMITH, B STRACHAN and R WIRMINGHAUS; M NINELA and N RAJOO Prize shared by: MI LANGTON, JC SMITHERS, CN BEZUIDENHOUT and PWL LYNE; RR FORTMANN, PG BRENCHLEY and AK MATHEW	2012	Factory Agricultural	R GENT KE MATHIAS
			2013	Factory Agricultural	A RAGHUNANDAN, CRC JENSEN, T MTEMBU and FEA AHMED JJ MURRAY, HNP STOLZ and JL BOUWER
			2014	Factory Agricultural	Prize shared by: M NDLAZI, RI SINGH and S NDLOVU; M MBUYAZI and S MHLONGO CPR CRONJE and P SAHADEO

SASTA POSTER AWARDS 2000-2014

Year	Prize/Award	Author(s)	Year	Prize/Award	Author(s)
2000	Factory Agricultural	None SA McFARLANE and RA BAILEY	2007	Factory Agricultural	None - No Congress held None - No Congress held
2001	Factory Agricultural	None SA McFARLANE	2008	Factory Agricultural	B BARKER and J WESLEY-SMITH SA McFARLANE, T VAN ANTWERPEN, P GOVENDER and GF BUCHANAN
2002	Factory Agricultural	None CN BEZUIDENHOUT and C GERS	2009	Factory Agricultural	SN WALFORD, S EGLI and B MARTINCIGH PL CAMPBELL, GW LESLIE, SA McFARLANE, SD BERRY, R RHODES, R VAN ANTWERPEN, RS RUTHERFORD, T VAN ANTWERPEN, DM McELLAGOTT and DE CONLONG
2003	Factory Agricultural	None None			
2004	Factory Agricultural	Y NAIDOO and R SIMPSON DJ NIXON			
2005	Factory Agricultural	None MT SMITH, A SINGELS and J NEEN	2010	Factory Agricultural	None A JUMMAN and NL LECLER
2006	Factory Agricultural	None M JONES and M VAN DEN BERG	2011	Factory Agricultural	None CN BEZUIDENHOUT



Year	Prize/Award	Author(s)	Year	Prize/Award	Author(s)
2012	Factory Agricultural	WK LAWLOR WA GILLESPIE, FJ MITCHELL, MJ WAY, TM WEBSTER and JH WITTHOFT	2014	Factory Agricultural	RC LOUBSER SA McFARLANE, LA MARTIN, D WILKINSON, AC KOCH, T VAN ANTWERPEN, N PILLAY and RS RUTHERFORD
2013	Factory Agricultural	H du CLOU and SN WALFORD B BHENGU, T MASONDO, S HLELA, V DLAMINI and S MNOGOMEZULU			

JUBILEE AWARDS 2000-2014

Year	Prize/Award	Author	Year	Prize/Award	Author
2000	Factory Agricultural	CRC JENSEN EJ SCHMIDT	2009	Factory Agricultural	None None
2003	Factory Agricultural	None None	2011	Factory Agricultural	Y NAIDOO V HARRACA
2006	Factory Agricultural	None None	2014	Factory Agricultural	None None

INNOVATION AWARDS 2000-2013

Year	Prize/Award	Author(s)	Year	Prize/Award	Author(s)
2000	Factory Agriculture	L HELFRICH D DINKLEMANN	2007	Factory Agricultural	None I HILLERMANN
2001	Factory Agricultural	B GOVENDER None	2008	Factory Agricultural	None A SINGELS
2002	Factory Agricultural	S CHINSAMY NOODSBERG CANEGROWERS' ASSOCIATION (Proposed by GW MAHER)	2009	Factory Agricultural	None None
2003	Factory Agricultural	D DENNIS None	2010	Factory Agricultural	None None
2004	Factory Agricultural	None WH REDINGER	2011	Factory Agricultural	None None
2005	Factory Agricultural	None C GARNETT	2012	Factory Agricultural	None None
2006	Factory Agricultural	None E ALBERTSE	2013	Factory Agricultural	None None

ROBIN RENTON MEMORIAL AWARD (PGBI PRIZE) 2003-2014

Year	Author(s)	Year	Author(s)
2003	LJ MELROSE	2009	Z RAMBAKUS
2004	None	2010	A JUMMAN
2005	None	2011	T NDHLALA
2006	S RAMA	2012	PS JENSEN
2007	None - No Congress held	2013	S SHAH
2008	P SHARMA	2014	DN BOOTE



SASTA STUDENT THESIS AWARD 2004-2007

Year		Thesis Author	Year	Thesis Author
2004	Agricultural	MH GRAHAM	2006	None
2005		None	2007	None

SASTA STUDENT AWARD 2008-2014

Year		Author	Year	Author
2008	Agricultural	A HARRIS	2012	Factory Agricultural
2009	Agricultural	G DITTRICH-SCHRODER		SN RAHIMAN TA GOBLE
2010	Factory	H DU CLOU	2013	Agricultural
2011	Agricultural	P MUDAVANHU	2014	Agricultural
				RL ROSSLER MS SIBOMANA

AGRICULTURE SUCCESS STORY AWARD 2010-2013

Year		Author	Year	Author
2010		D SUTHERLAND	2012	None
2011		None	2013	None

FACTORY OPERATIONAL PAPER AWARD 2011-2013

Year		Author	Year	Author
2011		Q MASEKO	2013	B SKINNER
2012		S GARTNER		



SUGAR AND HEALTH: AN OVERVIEW OF SCIENTIFIC EVIDENCE

MARJANNE SENEKAL

Head: Human Nutrition, Dept of Human Biology, Faculty of Health Sciences, University of Cape Town



Biography: Marjanne Senekal

Marjanne Senekal (RD (SA), PhD) is currently Associate Professor and Head of the Division of Human Nutrition, Department of Human Biology, Faculty of Health Sciences, University of Cape Town. Over the past 35 years she has been actively involved in teaching dietetics; research supervision; publication of research papers, research reports, a dietary assessment and education manual, a weight management manual and a chapter in a textbook. She has presented numerous papers at national and international conferences. She was the director of the International Society of Nutrigenetics and Nutrigenomics for a period of five years. Her main research interests involve obesity and weight management; related problems in and interventions targeted at various age and gender groups; dietary methodology and development and validation of nutrition screening questionnaires. Marjanne is a registered dietitian and was an elected member of the Professional Board for Dietetics (1999-2003). She is currently on the National Task Team for the development of the South African strategy for the prevention of obesity.



REVIEW OF SOUTH AFRICAN SUGARCANE PRODUCTION IN THE 2014/2015 SEASON FROM AN AGRICULTURAL PERSPECTIVE

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Abstract

The objective of this study was to analyse South African sugarcane production in the 2014/15 season and relate the key performance indicators of cane yield and cane quality to the main production factors. The information and lessons learnt from this can be used in the future for more efficient production of high quality sugarcane in South Africa.

The 2014/15 season was characterised by challenging climatic conditions in rainfed areas. Very low rainfall limited cane yields, while widespread frost limited production in the high lying areas. On the other hand, near perfect harvesting conditions resulted in excellent cane quality for most mill supply areas. Yields of irrigated cane declined slightly in some cases, while cane quality was good. Pest and disease impacts were relatively low in 2014. The low rainfed productivity translated to low grower profitability, despite an improved product price, and the long term sustainability of growers in some rainfed areas is under threat.

The season was a reminder that rainfed sugarcane production in South Africa is often subjected to drought. Every effort is required to maximise rainfall use efficiency by implementing agronomic practices to improve soil water availability to the crop. Correcting subsoil acidity and increasing soil organic matter has been shown to improve the crop's ability to withstand dry conditions, while the use of a residue blanket where appropriate has been shown to reduce wasteful evaporation and runoff of water.

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 Agrometeorology 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. He has co-authored 100 peer-reviewed papers in scientific journals and conference proceedings.



NINETIETH ANNUAL REVIEW OF THE MILLING SEASON IN SOUTHERN AFRICA (2014/15)

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Abstract

Performance, throughput and other relevant aspects of the sugar industries in southern Africa for the 2014/15 milling season are presented and discussed. Data from sugar mills in South Africa, Malawi, Mozambique, Swaziland, Tanzania, Zambia and Zimbabwe are included.

The 2014/15 season in South Africa was affected by industrial action which stopped production at most of the mills for two to three weeks. The season was not as good as the 2013/14 season in terms of tons cane harvested, which again dropped below 20 million tons. Cane quality improved from the previous season in terms of Recoverable Value % cane but the mixed juice purity was lower. The Overall Time Efficiency improved as a result of a marked decrease in no-cane stops and despite a slight increase in Lost Time % Available. The extraction and Boiling House Recoveries decreased from 2013/14. Losses to molasses and Undetermined Losses both increased.

Regarding the Sugar Milling Research Institute NPC (SMRI) Affiliate Member mills in neighbouring countries, recoveries were generally worse than in 2013/14.

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

Biography: Gavin Smith

Gavin Smith has been SASTA President from 2010 to 2015. He is the 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.



IMPROVING SUGARCANE PRODUCTION IN FROST-PRONE ENVIRONMENTS OF SOUTH AFRICA

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Abstract

The widespread frost experienced in 2014 highlighted the severity of this major production constraint for inland areas. The objectives of this study were to (i) summarise recent variety performance and post-frost deterioration from a series of trials, (ii) identify the best management practices and (iii) highlight future research thrusts to improve production in frost prone areas. Varieties traditionally grown in the midlands (controls) were tested against varieties from the coastal and irrigated programmes and new midlands releases (tests) in a series of four trials in frost pockets from 2007 to 2014. Trials were harvested annually, approximately one month after frost events for three to seven crops. As a group, test varieties outperformed controls by 0.2 to 1.4 tons estimated recoverable crystal (ERC)/ha. The test varieties N36, N41 and N48 performed consistently well across all trials and crops, and should be recommended for frost pockets. On average, N36 and N39 showed the fastest rates of deterioration of 0.25 and 0.27 tons ERC/ha/week, and should therefore be prioritised for harvesting following frosts events. The mid-May to mid-June harvesting period was ideal to maximise ERC yields in frost pockets, irrespective of frost onset and severity. Irrigation, combined with ripener application led to yield improvements of 6.2 tons ERC/ha, and should be considered as management options for frost pockets. Variety N36 was shown to maintain higher temperatures at the growing point underneath the canopy compared with other varieties when temperatures dropped below freezing. Future work on frost effects should include dedicated screening of varieties in artificial environments to complement field trials, and the development of a frost damage rating scale.



Keywords: frost, yield loss, canopy temperature, varietal damage scale

Biography: Sanesh Ramburan

Sanesh Ramburan is currently employed as a Crop Scientist (Variety Evaluation) at SASRI. His research focuses on variety characterisation under different environmental conditions and management practices. He manages projects at SASRI dealing with variety interactions with agronomic factors, including the effects of abiotic stresses. He is lead author of more than 20 peer-reviewed publications and numerous popular publications. He is the vice-president of the South African Society of Crop Production and is also an NRF rated scientist. He holds an MSc Agric. from UKZN and a PhD in plant breeding from the University of the Free State.

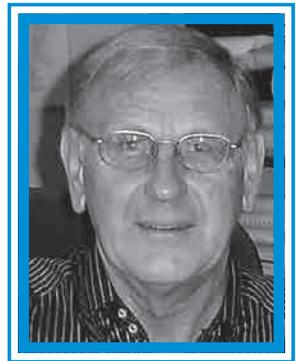
LOCAL AND ACCUMULATED DOWNSTREAM IMPACTS OF DRYLAND SUGARCANE ON STREAMFLOWS IN THREE SOUTH AFRICAN CATCHMENTS: CAN A CASE BE MADE FOR SUGARCANE TO BECOME A 'STREAM FLOW REDUCTION ACTIVITY'?

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Abstract

Stream Flow Reduction Activities (SFRAs), i.e. targeted land uses utilising more water than the natural vegetation they replace, and the payment of a compensatory levy for those land uses, has been a contentious issue in the South African agricultural sector since the promulgation of SFRAs in the National Water Act of 1998. Sugarcane has on numerous occasions been identified as a potential SFRA. In a detailed study carried out in the Mgeni, Mvoti and Mhlatuze catchments of KwaZulu-Natal, impacts of dryland sugarcane and production forestry on unit runoff, as well as impacts of actual areas under sugarcane and forestry, on accumulated streamflows were assessed at a resolution of the 90 Quinary sub-catchments making up the three catchments. Simulations with the daily time-step, process-based ACRU hydrological model of changes in *in loco* as well as of accumulated downstream streamflows indicates that impacts of sugarcane are relatively small, with sugarcane utilising in places more and elsewhere less water than the natural vegetation it replaces. While in certain local inland areas reductions of up to 3.5% were simulated for individual Quinaries, by the time accumulated streamflows reached the estuaries of the three catchments the totalled streamflow reductions were modelled to be only 0.54% for the Mgeni, 0.35% for the Mvoti and 0.17% for the Mhlatuze catchment – considerably lower than corresponding impacts of upstream forestry. These findings, and the more detailed results on unit runoff reductions by sugarcane versus those by forestry presented in the paper, need to be borne in mind if sugarcane were to be considered a SFRA.



Keywords: sugarcane, KwaZulu-Natal, unit runoff reduction, accumulated streamflow reduction, SFRA

Biography: Roland Schulze

Roland Schulze, PhD (University of Natal), is a certified Professional Hydrologist with the American Institute of Hydrology, a Fellow of the Royal Society of South Africa as well as of the University of KwaZulu-Natal and a Member of the Academy of Science of South Africa. Retired as Professor of Hydrology at UKZ-N, he is now Professor Emeritus and a Senior Research Associate. While he started off as a hydrological simulation model developer (ACRU agrohydrological modelling system; SCS-SA design hydrology model), his main focus at present is on climate change related issues in the water and agricultural sectors (vulnerability, impact, adaptation studies; strategies and policy), on hydro-climatic mapping and on integrated water resource management. In the climate change field he leads several multi-institutional research projects with national and international funding. In the 1980s he initiated South Africa's first degree course in hydrology. He has over 580 scientific publications to his credit, including more than 130 in peer reviewed journals. Over 90 students have been supervised by him at MSc and PhD level. In his wide lecturing experience he was a Guest Professor at Delft (Netherlands) for 17 years and he spent sabbatical leaves in the USA (twice), the UK (twice), the Netherlands and Germany. He has served on the Minister's National Water Advisory Committee. He is married, has 2 children and 6 grandchildren.



LIGHT AT THE END: A SEASON OF COMPOSITE MJ NIRS ANALYSIS

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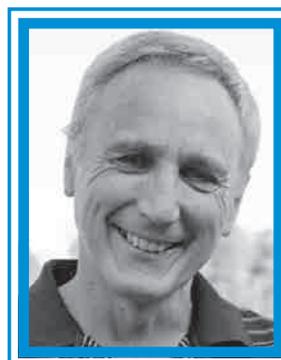
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Abstract

Near Infrared Spectroscopy (NIRS) has held the promise of being used as an alternative method for composite Mixed Juice (MJ) analysis at the Sugar Milling Research Institute NPC (SMRI) for a protracted length of time. The lengthy adoption uptake has been the result of technology issues and in part due to the importance of ensuring that the technology provides results equivalent to the conventional methods as a consequence of their use in the cane payment system. SMRI identified and resolved the technology issues and has developed robust prediction equations for the analysis of brix, pol and sucrose in weekly composite MJ samples. These equations were used for parallel testing of the NIRS analysis method against conventional methods at SMRI for all South African tandems throughout the 2014-2015 season. This paper briefly describes the technology issues and how they were overcome, compares the results obtained from the parallel testing and investigates what effect replacing conventional results with NIRS results would have had on the calculation of the mill-based Recoverable Value.



Keywords: NIRS, MJ, calibrations, predictions, RV

Biography: Stephen Walford

Stephen manages the Analytical Quality & Development group at the Sugar Milling Research Institute NPC (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 the development of appropriate NIR methods for use in the mill laboratories. He is excited about the potential of NIR as a technique to help in both current applications and future research for the sustainable development of the local sugar industry. Stephen has a research interest in analytical techniques and instrumentation, is the chairman of the South African National Committee for ICUMSA and presented at both local and international conferences. Outside of work, he has interests in woodwork and music

CONVERSION OF A COAL FIRED BOILER TO BAGASSE FIRED USING COMPUTATIONAL FLUID DYNAMICS

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Abstract

The availability of good quality coals are found to be decreasing while its demand is increasing. The deterioration of coal quality has an adverse effect on combustion in boilers and their efficiency. Coupled with an abundant supply of a biomass such as bagasse, there is an ever increasing demand to convert traditional coal fired boilers to dual fuel boilers.

This paper investigates the conversion process of a traditional three pass mainbank, coal fired boiler to a bagasse fired boiler with the aid of computational fluid dynamics (CFD). Since the original design of the furnace was for coal firing only, concerns of inadequate residence time as well as bagasse related erosion problems were raised. Various design alterations were evaluated using CFD combustion - and erosion modelling.

A creative and cost effective heated secondary air system was proposed to achieve the required evaporation rate without increasing the furnace volume. Erosion modelling suggested alterations to the main bank, air heater and ducting to reduce the increased erosion associated with bagasse firing.

Keywords: coal conversion, boiler, bagasse, erosion, CFD

Biography: Schalk van der Merwe

Schalk is a research and development engineer at John Thompson's Industrial Watertube division. He received his Bachelors in Mechanical engineering degree at the University of Stellenbosch in 2006 and completed his Masters in Science Engineering degree in 2009 at the University of Stellenbosch. His focus during his post-graduate studies was on Hydrogen fuel cells and CFD modelling thereof.

He joined John Thompson in 2013, and is currently working on CFD combustion modelling and the validation of the models. Current interests are the development and improvements of high temperature in-situ measurement techniques related to boilers. These include suction pyrometers, optical pyrometers and thermal cameras.



GAS SIDE VISUAL BOILER INSPECTION AND ITS INFLUENCE ON BOILER PERFORMANCE AND RELIABILITY

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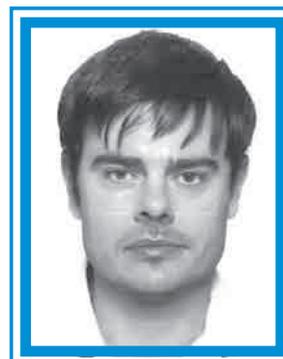
Abstract

This paper presents the typical problems identified during a visual boiler inspection, followed by a discussion of the causes as well as the influence on boiler performance and reliability. All major boiler components will be discussed along with the typical problems associated with each one. Examples from industry will be discussed: stoker problems, overheating of superheaters, erosion of multipass main banks, and so forth.

Keywords: boiler inspection, boiler performance, overheating, erosion, corrosion

Biography: Christof Kotze

Christof Kotze, Pr Eng is a Design Engineer& Commissioning Manager in the Industrial Water-tube Boiler Business Unit of John Thompson, a Division of ACTOM (Pty) Ltd. He joined John Thompson in 2008 after graduating with a BEng Mechatronic from Stellenbosch University. During his career, he has been part of the design and commissioning team of a number of projects, mostly in the sugar industry.



IMPROVING BOILER COMBUSTION USING COMPUTATIONAL FLUID DYNAMICS MODELLING

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Abstract

There are numerous well documented phenomena that plague boiler combustion, and specifically stable boiler combustion. Some of the key parameters identified that influence stable boiler combustion are fuel moistures, critical air temperatures, overall air distribution and fuel spreading.

This paper concerns itself with the latter mentioned phenomena, namely air distribution throughout the boiler and fuel spreading. The effects of poor fuel spreading and exacerbated combustion air distribution are investigated with the aid of Computational Fluid Dynamics (CFD). A well-documented boiler with combustion problems is modelled with CFD. The model boundary conditions are measured in situ with the anemometer and optical pyrometer.



An optimised fuel spreader is proposed to spread the fuel uniformly on the grate, which decreases drying/devolatilising time. Alterations to the air distribution are found to have drastic effects on the combustion stability by inducing adequate mixing at an optimal level.

Keywords: bagasse combustion, spreader, secondary air, stability, CFD

Biography: Schalk van der Merwe

Schalk is a research and development engineer at John Thompson's Industrial Watertube division. He received his Bachelors in Mechanical engineering degree at the University of Stellenbosch in 2006 and completed his Masters in Science Engineering degree in 2009 at the University of Stellenbosch. His focus during his post-graduate studies was on Hydrogen fuel cells and CFD modelling thereof.

He joined John Thompson in 2013, and is currently working on CFD combustion modelling and the validation of the models. Current interests are the development and improvements of high temperature in-situ measurement techniques related to boilers. These include suction pyrometers, optical pyrometers and thermal cameras.



ADVANCED MODELLING OF HOMOGENOUS VOLATILE COMBUSTION THROUGH THE USE OF REDUCED CHEMICAL MECHANISMS

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Abstract

The ability to harness the thermal energy from combustion is essential to existence on this planet. According to the International Energy Agency's 2013 Key World Energy Statistics report, 91.9% of the world energy is supplied by combustion processes. There is a broad range of applications of combustion; one of these is the combustion of coal and biomass such as sugarcane bagasse in watertube boilers. The current state-of-the-art in combustion modelling uses computational fluid dynamics, mixing based combustion models or chemical kinetics along with global and quasi-global chemical mechanisms to capture the complex processes. This approach is useful for designing stationary combustion processes, but is not ideally suited to capture time-dependant processes (quenching and ignition) and pollutant formation (SO_x, NO_x and unburned hydrocarbons). Combustion of solid fuels such as coal and biomass can be divided into the following sections: heating, evaporation, devolatilisation, volatile combustion and char oxidation. Combustion models are applied to solve the homogenous combustion of the volatile gases.



Current modelling techniques of combustion are comprised of two-step combustion models of the hydrocarbons, whereas the advance models use a chemical mechanism built up of multiple steps. The use of chemical mechanisms enables the engineer to model the NO_x precursors (HCN, NH₃) and subsequent NO_x reactions. These reactions can be used to optimise the combustion and secondary air system for NO_x reduction and ensure less unburned hydrocarbon escapes the furnace (CH₄, C₃H₈). According to literature, 94% of the volatile gases released during devolatilisation is H₂, CH₄, CO₂ and CO (note this value is for a moisture free sample). Thus in this paper the combustion of these gases will be investigated.

This paper focuses on the use of different combustion models to predict gas mixture temperatures and species mass fractions, and then compares the current modelling approaches with an advanced approach. The results are then validated with experimental data.

Keywords: combustion, numerical modelling, chemical mechanisms, kinetics, emissions, CFD

Biography: Ryno Laubscher

Mnr. Ryno Laubscher is a Mechanical Engineer at John Thompson's Industrial Watertube division for the last two years. 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 currently pursuing his PhD where his field of focus is in numerical modelling of combustion kinetics.

PRELIMINARY RESULTS FROM RESEARCH WITH NEW HERBICIDES FOR SELECTED PROBLEM WEEDS

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Abstract

Recent herbicide research at SASRI has focused on replicated small plot trials in the field. This poster reports preliminary results from these trials investigating chemical control options for four major weed species in sugarcane: *Cynodon dactylon* (cynodon), *Rottboellia cochinchinensis* (rottboellia), *Parthenium hysterophorus* (famine weed) and *Cyperus rotundus* (rotundus). The most effective treatment tested against three of the target species was glyphosate in combination with one other chemical with a new mode of action. This combination (Code SASA127H) aimed at increasing residual activity, resulting in prolonged weed control. When compared with industry standards, Code SASA127H provided (a) prolonged cynodon control for 20 weeks, (b) equivalent control of famine weed at 12 weeks after treatment and (c) equivalent control of rottboellia at nine weeks after treatment, but with an apparent increased suppression of subsequent rotundus emergence. For rotundus control, a non-glyphosate coded product provided effective control at eight weeks after application. Although providing effective control, Code SASA127H will damage the crop. This can be minimised by directed or shielded application. For famine weed, healthy grass prevents establishment in degraded land, and could be protected by treating famine weed when grass is seasonally dormant. Results showed that Code SASA127H at eight weeks after application suppressed existing grass cover by 83% after spring rains, but by only 48% when applied before spring rains. However, grass recovered by 12 weeks after application and was not significantly different from the control, either before or after spring rains. At this time, famine weed seedling numbers were similar when sprayed with Code SASA127H before or after rains (1 seedling/15 m² compared with approximately 40 for the control), suggesting that recovering grass in this trial had no suppressive effect on famine weed.



Keywords: rottboellia, parthenium, cynodon, cyperus, chemical control

Biography: Peta Campbell

Peta is the Weed Specialist at the SA sugarcane Research Institute, and current research focuses on developing chemical control recommendations for problematic weeds; Integrated Weed Management of creeping grass weeds; and technology transfer for weed control principles to assist emerging farmers.



POSTER SUMMARY

MICROSATELLITE MARKERS TO ANALYSE GENETIC DIVERSITY OF POPULATIONS OF *BEAUVERIA HOPLOCHELI*, A FUNGUS USED AS A BIOINSECTICIDE TO CONTROL THE WHITE GRUB, *HOPLOCHELUS MARGINALIS*, IN SUGARCANE FIELDS IN REUNION ISLAND

COSTET L, ANDIGADOU S, TERVILLE M, TELISMART H,
NIBOUCHE S, AND ROBENE-SOUSTRADE I.

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Abstract

Hoplochelus marginalis Fairmaire (Coleoptera: Melolonthidae) endemic from Madagascar was introduced in the seventies into Réunion Island where this white grub rapidly became a serious pest of sugarcane. Several strains of an entomopathogenic fungus belonging to the genus *Beauveria* (Ascomycota: Hypocreales) were isolated from *H. marginalis* in Madagascar and introduced into Reunion. We have recently demonstrated that these strains corresponded to a new species, *Beauveria hoplocheli*. A commercial product (Betel®) based on this fungus has been used for three decades in Réunion for the biological control of *H. marginalis*. To assess the sustainability of the biological control, tools are needed to monitor the evolution of the bioinsecticide in the field soils. Microsatellites are useful tools to evaluate the genetic diversity of populations and to follow their evolution. However, only microsatellites developed for *B. bassiana* and *B. brongniartii* are available. The aim of this work was to develop, specifically for *B. hoplocheli*, microsatellite markers that will enable the study the genetic diversity of populations present in the soils of Reunion Island. DNAs of 12 strains were pooled to achieve a DNA microsatellites enriched bank. The bank allowed the identification of 359 sequences containing microsatellites for which it was possible to design PCR primer pairs flanking the microsatellite sequence. Over the 100 pairs of primers tested on five strains, 24 produced a single polymorphic amplicon. After evaluation on 13 strains, 22 pairs of primers that could be multiplexed in three PCR reactions were validated.



Keywords: entomopathogen, fungi, SSR, cockchafer, biocontrol, *Saccharum* spp

Biography: Laurent Costet

Dr. Laurent Costet is the research plant pathologist in sugarcane at CIRAD in the research unit UMR PVBMT (Plant communities and biological invaders in tropical environment) in Reunion Island.

USING A K-NEAREST NEIGHBOUR TECHNIQUE TO GENERATE REALISTICALLY CORRELATED MULTI-SITE RAINFALL AND TEMPERATURE DATA

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Abstract

This research was conducted in order to feed into a larger logistics and management project, which requires realistically correlated weather data for the surrounding areas providing sugarcane to a mill.

The stochastic weather simulator, ClimGen, was used to generate weather data for the most influential 'master' climatic zone. Each day of generated data (a combination of maximum temperature, minimum temperature and rainfall) was then matched, using the lowest root mean square error (RMSE), with historic data for that same zone. The date containing the matching historic data was found, and the weather data for that date was collected from the historic data of the neighbouring 'slave' zones. This ensured that the weather data used for all zones was based on historically recorded correlations.



This K-nearest neighbour technique was tested using a boot-strapping method, with Sezela as the master zone, and Il-lovo as the slave zone. Historical data for these sites was available from 1983 through to 2012. The test was conducted through the entirety of the historical data, with the RMSE statistic being used to compare the historical and simulated data. The 29-year average and standard deviation RMSE for the master zone was 0.15 and 0.3 respectively, and for the slave zone were 4.14 and 4.46, respectively. Thus it can be concluded that this technique can be used to provide an adequately realistic correlation of weather data between neighbouring climatic zones.

Keywords: nearest neighbour, multi-site, rainfall, temperature, climate, modelling

Biography: Gareth Lagerwall, Edwin Jenkins and Carel Bezuidenhout

Dr Lagerwall is a former student and now lecturer at UKZN in the discipline of Bioresources Engineering. He obtained his PhD from the University of Florida, USA in 2011. He now lectures mechanisation, and has an interest in precision agriculture.

Mr Jenkins is a recent MSc graduate in the discipline of Bioresources Engineering at UKZN. His work focussed on further developing the LOMZI model used in sugarcane supply chain modelling.

Prof Bezuidenhout is a former Professor at UKZN in the discipline of Bioresources Engineering, where he worked closely with SASRI. He is now applying his skills to the forestry industry in New Zealand.



POSTER SUMMARY

PLANTING VARIETY MIXTURES: IS THIS BENEFICIAL FOR PEST AND DISEASE CONTROL?

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Abstract

Millions of Rands are lost annually in the sugarcane industry due to pest and disease damage. Sugarcane varieties differ in their ability to tolerate these pressures and are rated accordingly. Planting varieties with different tolerance ratings as mixtures in the field to increase yield and improve pest and disease control is successful in other crops such as wheat and rice. The aim of this study was to evaluate the effect of planting mixed sugarcane varieties on nematode numbers, rust infection, *Eldana saccharina* Walker (Lepidoptera: Pyralidae) (eldana) damage and crop yield. Three varieties were planted in each trial, on their own and in combination. Nematode numbers were monitored over six crops at Umdloti and three crops at Sheffield. Rust infection at Eston was monitored over three crops and eldana damage at Gingindlovu over four crops. Each trial was harvested annually, except Eston (2-year cycle) and yield (biomass and sucrose) were recorded. The variety mixtures at Umdloti and Sheffield had no significant effect on nematode numbers or crop yield. At Eston, mixtures showed a significant increase in yield in the first ratoon crop as compared with susceptible N29 planted on its own. The mixture, however, did not yield more than N12 (resistant variety) planted on its own. No significant differences in eldana numbers were found at Gingindlovu when comparing the mixed plantings with N27. The mixtures tested in this study did not significantly reduce pest/disease pressure or increase yield compared with the varieties planted on their own. There is thus no obvious benefit to planting mixed varieties over the current resistant varieties.



Keywords: sugarcane, nematodes, eldana, rust, varieties

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 third SASTA presentation.

NEMATICIDE SCREENING IN THE SOUTH AFRICAN SUGAR INDUSTRY

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Abstract

The withdrawal of Temik from the world market in 2011 left many South African sugarcane growers without their preferred chemical nematicide. The South African Sugarcane Research Institute has been proactively involved in plans to replace Temik. The aim of this project was to screen a wide range of nematicides in order to identify new products suitable for the sugar industry. The first screening stage was conducted using pot trials. Fifteen candidate products were tested, including chemical and biological products, liquids and granules, and registered and unregistered products. Results from the pot trials informed future decisions on product testing in the field. In 2012, one plant crop trial and two ratoon field trials were treated using four chemical products identified in the pot trials. Based on nematode control and yield results from these field trials, two products were identified as potential nematicides to replace Temik. Registration trials were completed in 2014 for one product and a field trial contributing to registration of the second product was planted in November 2014. Four biological products shown to be effective in the initial pot trials were advanced to field trial assessment. The trial was planted in September 2014 and is being sampled periodically for nematodes. The large scale nematicide screening that began in 2012 has yielded many positive results thus far. To ensure that a wide variety of products are always available in the sugar industry, new nematicides will continue to be screened as and when they become available.



Keywords: nematicide screening, nematodes, Temik, biological products

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 five short communications and three posters. This is her fourth SASTA presentation.



A WEB-BASED REAL-TIME WEATHER DATA TOOL FOR THE SOUTH AFRICAN SUGAR INDUSTRY

SITHOLE P AND PARASKEVOPOULOS A

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Abstract

Weather information is vital for planning and performing agricultural operations. Often the unavailability of timely meteorological information impedes the integration of weather data into decision support tools for agronomic planning. The South African Sugarcane Research Institute (SASRI) records and processes meteorological data from various sites across the South African sugar industry. The information and related products are available to stakeholders on the SASRI weather website, <http://portal.sasa.org.za/weatherweb/>. However, high data transfer costs limit data uploads on the website to once a day and only for daily summaries. This makes the latest available data at least one day behind and hence impractical to use for immediate decisions. The objectives of this work were to introduce a cost effective and efficient automatic weather station (AWS) data transfer system and to design and implement a web-based near real-time data display tool. The Global System for Mobile communication (airtime-based) was replaced by the General Packet Radio Service (internet-based) at 18 strategic AWSs to facilitate near continuous low cost data transfer and display on a website using a Real-Time Monitor and Control software. Weather variables such as rainfall and temperature recorded at each AWS are displayed and updated every five minutes. Additional derived weather-based variables include evapotranspiration and a fire danger index. Graphical presentations of all the variables can be viewed, while current and recent data can be downloaded. Users were asked to provide feedback on the tool, and their comments were used to improve the web facility. The tool is useful for real-time decision making for irrigation, spraying and harvesting operations and will be extended to more AWSs.



Keywords: real-time, weather data, AWS, sugarcane, decision making, planning

Biography: Phil Sithole

Phil is an Agrometeorologist with the South African Sugarcane Research Institute (SASRI). He holds a Masters of Science Degree in Agricultural Meteorology from the University of Zimbabwe. He joined SASRI in 2007 after working briefly with the Zimbabwe Sugar Association Experiment Station. One of his key duties at SASRI is to estimate and relate sugarcane yields at zone, mill or industry level as influenced by climatic factors over the growth cycle. He also oversees SASRI's network of weather stations and the processing of weather data into key decision support products.

BIOTECHNOLOGY ADVANCES IN SUGARCANE AGRICULTURE

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Abstract

Biotechnology can be broadly defined as ‘the use of living things to make or change products and processes’. Over the past 20 years, the South African Sugarcane Research Institute has advanced sugarcane agriculture by developing and capitalising on these modern techniques. For example, conventional breeding efforts have been strengthened by marker assisted breeding where screening populations for the presence of certain DNA markers, e.g. Bru1 for brown rust resistance, can indicate whether the desired characteristic is present in progeny and parents. In addition, significant research progress has been made using genetic modification (GM) technology and proof of concept in the field has been demonstrated for traits such as herbicide tolerance and *Eldana saccharina* Walker (Lepidoptera: Pyralidae) stalk borer resistance. Similarly, pathogen detection and identification has been greatly enhanced with diagnostic molecular techniques such as tissue blots for Sugarcane Yellow Leaf Virus and reverse transcription polymerase chain reaction for Sugarcane Mosaic Virus. The use of tissue culture has facilitated the micropropagation of disease-free and true-to-type seedcane via NovaCane®, and valuable germplasm can be conserved by storage at 18°C in small containers in a laboratory growth cabinet. Cultivar identity can be verified using DNA fingerprinting, and strides are being made to sequence the sugarcane genome to gain further knowledge on how to maximise yields in this important and diverse crop.



Keywords: biotechnology, fingerprinting, pathogen detection, tissue culture, breeding, marker assisted selection, genome sequencing

Biography: Sandy Snyman

Dr Sandy Snyman is a Senior Researcher in the Biotechnology facility at SASRI. She has been with SASRI for 28 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.



DEVELOPMENT OF AN IMPROVED MOLECULAR TEST FOR THE DIAGNOSIS OF SUGARCANE MOSAIC VIRUS IN SUGARCANE

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Abstract

Sugarcane Mosaic Virus (SCMV) is the causal agent of mosaic disease in sugarcane, and has been reported as the cause of significant yield losses worldwide. Common symptoms of SCMV infection include contrasting shades of green patterned on leaf blades, often recognised as islands of normal green on a background of paler green or yellowish chlorotic areas. However, visible symptoms are not always presented and therefore sensitive diagnostic tests are needed for the detection of the virus. Reverse transcriptase polymerase chain reaction (RT-PCR) is currently used for SCMV detection in the South African Sugarcane Research Institute (SASRI) quarantine glasshouse and in research projects. While reliable in SCMV detection, the RT-PCR method is labourious and expensive. Consequently, a faster and more cost-effective alternative diagnostic test was required for phytosanitary applications at SASRI. A new diagnostic tool, namely quantitative reverse transcriptase polymerase chain reaction (qRT-PCR) was introduced and optimised for use in the quarantine facility. Specific qPCR primers were designed from conserved regions of different strains of SCMV. The primers amplified a 115 base pair (bp) fragment and were effective for the detection of SCMV-infected sugarcane leaves. The constant introduction of new technology will improve the SASRI quarantine processes and status in respect of higher sample throughput, and greater confidence in the phytosanitary germplasm that is exported as well as imported into the South African sugarcane industry.



Keywords: Sugarcane Mosaic Virus, SCMV, quarantine diagnostic test, RT-PCR, qRT-PCR

Biography: Tania van Antwerpen

Tania van Antwerpen is a plant pathologist and has been working at SASRI for 25 years. She obtained her Master's degree (cum laude) in Plant biotechnology from the University of Stellenbosch in 1999. She is currently in charge of sugarcane quarantine in South Africa and is also doing research on new molecular diagnostic tests for diagnosis of novel and existing plant pathogens. Tania is also involved in soil microbiological research at SASRI.

IMPORTED SUGARCANE VARIETIES: LIFE AFTER QUARANTINE

VAN ANTWERPEN T, ZHOU M AND RUTHERFORD RS

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Abstract

The earliest known sugarcane grown in southern Africa was found in the 17th century along the coast of northern KwaZulu-Natal. This cane was believed to have entered Mozambique from Indonesia. According to Zhou (2013) the first sugar in South Africa was produced in 1852 and was derived from varieties of noble cane (*Saccharum officinarum*). In the early years South Africa was dependent on imported sugarcane varieties but because of disease susceptibility the South African Sugarcane Research Institute (SASRI) started to breed new varieties suited specifically for South African growing conditions. Although almost 60 South African sugarcane varieties have since been bred at SASRI, exchange of sugarcane varieties with many different countries, including Australia, the United States of America, Colombia, Brazil, Barbados and Zimbabwe is ongoing, mainly to increase the genetic pool of parents for breeding purposes. Imported varieties are also evaluated as potential commercial varieties. Imported varieties are kept in the SASRI quarantine glasshouse for a period of two years before being released to a post-quarantine area for another two years. During this period the clones undergo a series of stringent tests for exotic diseases and pests. After a total of four years since the import date, clones are released to the plant breeding programme. This poster shows the percentage of imported varieties that are eventually released from quarantine and how many were utilised as parents in the breeding programme or as commercial varieties over the past 20 years. The poster also describes new strategies for use in future imported sugarcane varieties.



Keywords: sugarcane, breeding programme, quarantine, imported varieties

Biography: Tania van Antwerpen

Tania van Antwerpen is a plant pathologist and has been working at SASRI for 25 years. She obtained her Master's degree (cum laude) in Plant biotechnology from the University of Stellenbosch in 1999. She is currently in charge of sugarcane quarantine in South Africa and is also doing research on new molecular diagnostic tests for diagnosis of novel and existing plant pathogens. Tania is also involved in soil microbiological research at SASRI.



HOW IMAGE PROCESSING TECHNIQUES CAN IMPROVE SUGAR PAN YIELD

DUC N AND BOUCHE C

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Abstract

The crystallisation process is a very important step in determining overall sugar quality. A close monitoring of the boiling and the centrifuging processes using advanced image processing techniques can significantly contribute to improving pan yield. At the pan level, an on-line pan High Definition Video microscope delivers real time statistical information (MA, CV, number of fines from 4 µm minimum) to allow the operator an accurate characterisation of the pan operation and to establish the best possible sequences to produce stable massecuite with highest yield. At the centrifugals outputs, an on-line colorimeter also equipped with a high resolution digital camera analyses the beet or cane sugar colour and automatically detects sugar nonconformities. The measured dry or wet sugar colour is used to optimise the centrifugal washing time, and the out of specification automatic detection avoids contaminating the silo or the dryer.



Benefits that can be achieved by using this equipment:

- reduction in energy consumption by reducing the steam and electricity usage.
- improvement of the massecuite quality and reduction in strike time by optimising the boiling operation.
- increase in centrifugal station throughput by reducing the amount of remelted sugar and increasing both quality and quantity of the massecuite.
- increase in overall pan floor extraction with an enhancement of food safety.
- improvement in operator training and feedback.

These benefits already mark a big step forward in improving the sugar pan yield and lay the foundations for even more significant advances in the future, when full customised automation will be achieved.

Keywords: crystallisation, colour measurement, on-line monitoring, pan HD video microscope, process optimization

Biography: Norbert Duc

Born in 1971, Norbert earned degrees in Electronical engineering and Industrial computer science and then International trade, management and administration from University of Grenoble and Montpellier Business school. He worked as an Area sales manager in Europe since 1996 with standard and automation systems, new high tech solutions mainly in medical, aeronautic, military and automotive industries. He recently joined a great team at ITECA Color & Vision Department.

HAZE DEXTRAN IN RAW SUGAR VERSUS DEXTRAN IN MOLASSES?

DU CLOU H

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Abstract

In the South African sugar industry, one of the sugar quality parameters that is measured is haze dextran. As such, the Sugar Milling Research Institute NPC (SMRI) measures haze dextran levels in raw and refined sugar on a weekly basis throughout the milling season. Literature reports that stale cane causes high dextran levels in sugar. Certain mills, therefore, have control limits in place to manage their stale cane. Typically, the levels of haze dextran in sugar increase near the end of a season. Towards the end of the 2012/13 season (South African Sugar Association (SASA) week 34, onwards), three mills were flagged as having dextran levels in their raw sugars in excess of their control limits. As part of the Polysaccharide Characterisation research project, the SMRI set out to determine whether these high levels of haze dextran measured in the raw sugars were indicative of the amount of gums or dextran present in the processing streams. Final molasses samples for these three mills were analysed from week 28 onwards. Analyses included determination of the gum quantity in the final molasses and the structural analysis of the isolated gums by gas chromatography mass spectroscopy (GCMS). This poster presents the non-parametric statistical analyses of the results and concludes that haze dextran concentrations in raw sugars cannot be used to predict the total gums and/or dextran levels present in the final molasses.



Keywords: haze dextran, raw sugar, gums, structure, GCMS, final molasses

Biography: Heidi du Clou

Heidi du Clou has been with the Sugar Milling Research Institute NPC (SMRI) since 2009. Heidi is one of the Research Officer's and is involved in both Research and Method Development. She holds an MSc in Chemistry, and is currently completing her PhD on a part-time basis with the University of KwaZulu-Natal. Heidi's main research area involves the characterisation of polysaccharides in the sugar industry.



QUANTIFYING PAN BOILING BEHAVIOUR

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Abstract

In South Africa, pan boiling is often reported to demonstrate poor behaviour towards the end of the season. The definition of poor pan boiling behaviour is somewhat nebulous, with massecuites simply referred to as being 'hard to boil'. Factors used to describe this behaviour include slow boiling, slow crystal growth and low evaporation rates. In general, pan boiling is influenced by the quality of the massecuites. Massecuite viscosity impacts on the crystallisation process and is influenced by several elements including the brix, temperature, available crystal surface area and the nature and concentration of impurities. Gums are polysaccharides which make up a large percentage of the organic impurities present in massecuites. Based on the premise that gums increase massecuite viscosity, the Sugar Milling Research Institute NPC (SMRI) has undertaken to characterise these and develop new approaches to massecuite viscosity modification. A measure of pan boiling behaviour is required to relate massecuite physicochemical properties, such as viscosity, to the quantity and nature of polysaccharide impurities. Data were collected from various C-pan boilings of a South African sugar mill over the 2014/2015 sugar milling season. Factors examined from the data include the overall change in mass of crystals, linear crystal growth rate, heat transfer coefficient, average supersaturation coefficient, agitator current as an indicator of viscosity, average evaporation rate, average feed rate, exhaustion and crystal content per boiling. This poster explores these factors as measures for quantifying the boiling characteristics of the massecuites.



Keywords: pan boiling, massecuite, viscosity, gums, polysaccharides, crystallisation

Biography: Heidi du Clou

Heidi du Clou has been with the Sugar Milling Research Institute NPC (SMRI) since 2009. Heidi is one of the Research Officer's and is involved in both Research and Method Development. She holds an MSc in Chemistry, and is currently completing her PhD on a part-time basis with the University of KwaZulu-Natal. Heidi's main research area involves the characterisation of polysaccharides in the sugar industry.

APPLICATION OF FATIGUE THEORY TO PREDICT THE LIFE OF SUGAR MILL ROLL SHAFTS

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Abstract

Ongoing failures within the South African sugar industry prompted an investigation into the fatigue life of mill roll shafts. Ferrous material has an 'endurance limit' which is the alternating stress above which the shaft will fail by fatigue in a predictable number of cycles. Below this stress limit the material will have infinite life. For various carbon steels this has been determined empirically using the RR Moor Test Rig which subjects a specimen to pure bending only. When a material is subject to a constant stress (mean stress) the endurance limit is reduced. In a sugar mill roll, the drive torque subjects the material to a constant (mean stress), and the forces on the roll while it rotates results in an alternating stress. This poster shows the calculation to determine the reduction in endurance limit for a mill top roll subject to a mean and alternating load. Based on the assumptions made, the calculation shows that the particular mill roll selected does not have an infinite life but will fail by fatigue.



Since fatigue always originates at a material defect or stress raiser this has important implications on the maintenance, handling and operation of mill rolls in general. The message of the poster is that, although mill rolls appear to be big and strong, they may be operating close to their fatigue capability and therefore should be treated with the utmost care. The poster builds on previous work in this field.

Keywords: mill roll failure, mill roll fatigue, mill roll shear force and bending moment diagrams, endurance limit, fatigue strength

Biography: Warren Lawlor

Warren Lawlor is Senior Manager: Projects at TSB Sugar and provides both project development and project implementation support to the group. He holds a Degree in Mechanical Engineering from the University of Natal and is a registered Chartered Engineer. Warren has been a member of SASTA since 1996 and has also served on the SASTA Council in recent years.



PRACTICAL USE OF NIRS FOR FACTORY PROCESS CONTROL (2015)

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Abstract

All of the South African sugar mill laboratories have access to Near Infrared Spectroscopy (NIRS) instruments with process stream calibrations supplied by the Sugar Milling Research Institute NPC (SMRI). The calibrations include sucrose, fructose, glucose, pol and brix predictions for mixed juice, clear juice, syrup and all the various grades of molasses and massecuites. Further to this, dry solids can be predicted on C-molasses, and conductivity ash on mixed juice and C-molasses.

The rapid and reliable predictions by NIRS can be used by factories to improve recoveries and reporting of factory performance figures. This poster elucidates some approaches on how to achieve this.

Included in the poster are details of:

- Inversion loss determinations. Factory tests across an evaporator station are reported on, as well as the method developed for these tests.
- Sucrose-based factory performance parameters on intermediate streams e.g. exhaustions and crystal contents. These are calculated from gravity purities and as such are affected by changes in the pol/sucrose ratio; a move to reporting on sucrose-based apparent purities eliminates the effect of the pol/sucrose ratio changes.
- The use of NIRS to predict the C-molasses Target Purity Difference (TPD). These analyses have traditionally been performed at the SMRI, which is not ideal for factory control purposes as the information provided would be at least a week old. The almost immediately available NIRS predicted TPD results can now be used to revise massecuite and seed purities timeously. The NIRS TPD analyses can also be performed on a shift-basis as a check on each centrifugal to assess where sucrose may be lost. At present 'purity rise' across the centrifugals aims to do this but, at best, only one centrifugal is tested per shift due to lack of personnel and the limited number of Nutsch filters.

Keywords: NIRS, laboratory, UDL, TPD, inversion, sucrose

Biography: Shaun Madho

Shaun Madho is the Group Leader of Adaptive Research at the Sugar Milling Research Institute (SMRI). His chief duty is to employ best practices and innovative technologies to reduce the costs associated with sugar production. He was previously employed as a Process Engineer with Illovo Sugar Ltd at the Gledhow, Eston and Noodsberg mills and is a UKZN chemical engineering graduate who is currently completing his Master's degree.



COLOUR MEASUREMENT OF REFINERY STREAMS USING IMAGE ANALYSIS

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Abstract

The measurement of colour is essential in sugar refineries as an indicator of quality control and performance. In South Africa the colour analysis of intermediate streams is typically performed by the laboratory every four hours. Crystalline sugar may therefore already have been produced from problematic liquor before the colour measurement is performed and the result relayed to the relevant staff for the appropriate action to be taken. Ideally, the colour of intermediate streams should be determined online and linked to a digital control system that has an alarm for out-of-specification colour; a swift response could then ensue. To the best knowledge of the authors, only crystalline refined sugar colour is determined online in South Africa and thus the local refineries could benefit from an inexpensive online colour measurement technique for intermediate streams.



Image J[®] is free image analysis software that is available in the public domain. It is capable of measuring the colour information from an image in the form of red, green and blue (RGB) pixel values. This poster reports on work done at the Sugar Milling Research Institute (SMRI) using Image J[®] to correlate the RGB pixel values from images of different colour technical solutions (200-2000 ICUMSA units) to the laboratory determined colour of the solutions; the correlation could be used for the development of an online colour measurement system.

Keywords: colour, refinery, quality, online, image analysis, Image J[®]

Biography: Sayed Rahiman

Sayed Rahiman is a research assistant employed at the Sugar Milling Research Institute. He received his B-Tech degree in chemical engineering from the Durban University of Technology in 2013, and he intends to complete his M-Tech studies in the near future. Sayed is currently involved in the continuous seed production project at the SMRI which is now at its pilot stage.



POTENTIAL NEW PESTS IN THE NEIGHBOURHOOD: DIVERSITY AND ABUNDANCE OF SUGARCANE STEM BORERS IN THE PONDOLAND REGION OF THE EASTERN CAPE PROVINCE OF SOUTH AFRICA

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Abstract

Stem borers constitute an important constraint in sugarcane production. However, stem borer research in South Africa is concentrated on commercial farms because of their economic significance. Studies on the diversity and abundance of stem borers in small-scale sugarcane farms of South Africa are still lacking. The current study was conducted to determine the diversity and abundance of sugarcane stem borers in small-scale farms of the Pondoland region in the Eastern Cape Province of South Africa with the aim of studying the effect of cropping systems on stem borer diversity and abundance. Five species belonging to three genera of cereal stem borers were recorded with two species, *Sesamia calamistis* and *Eldana saccharina*, known to be pests of sugarcane in South Africa, while two others, *Busseola fusca* and *Chilo partellus* were recorded for the first time from South African sugarcane and one, *Conicofrontia sesamoides*, has never been reported from cultivated crops anywhere in the world. Pest populations differed in abundance and species composition among locations included in the study. The implication of these findings to commercial sugarcane production in South Africa is discussed.



Keywords: cropping systems, new records, Pondoland, small-scale farmers, stem borers, sugarcane

Biography: Yoseph Assefa

Yoseph Assefa is an Entomologist with a Ph.D. in molecular entomology, M.Sc. in crop protection and B.Sc. in crop production. He has research experience in pest management, insect ecology, insect biocontrol and insect molecular biology. He taught entomology courses at universities in three African countries for 12 years and he is currently serving University of Fort Hare in South Africa as an associate professor of Entomology.

THE DESIGN OF AN AGENT-BASED MODEL FOR SIMULATING THE POPULATION DYNAMICS OF *ELDANA SACCHARINA* (LEPIDOPTERA: PYRALIDAE)

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Abstract

Eldana saccharina Walker (Lepidoptera: Pyralidae) is a stalk borer pest which continues to plague the sugar industry in South Africa. The pest feeds on the internal tissue of sugarcane stalks, causing losses in sucrose and cane yields. Various control methods have been proposed in an attempt to suppress the pest and decrease its detrimental impact on the industry. These control methods are, however, often difficult and costly to test, implement and develop further in an iterative manner. In an attempt to better understand the behaviour and population dynamics of *E. saccharina*, it is proposed that an agent-based simulation model be developed, which accurately simulates the stalk borer's biology, feeding habits, mating behaviour, dispersal patterns and other characteristics. In particular, the complex mating behaviour of *E. saccharina* requires careful consideration and structural implementation in the model, as it plays a primary role in the continued prevalence of the pest. Once a carefully calibrated simulation model, which incorporates the natural variation of an ecological system, has been designed, certain control strategies can be further developed and tested using the model prior to in-field implementation. This approach aims to minimise cost and assist in the ongoing development of an integrated pest management (IPM) system. The modelling framework for a novel, agent-based model of *E. saccharina* is presented in this paper, as well as details of modelling approaches adopted to incorporate some of the biological attributes of the pest.



Keywords: *Eldana saccharina* Walker, sugarcane pest infestation, agent-based simulation, modelling approach, population dynamics, integrated pest management

Biography: Brian van Vuuren

Brian van Vuuren is a post-graduate student at Stellenbosch University and is part of the Stellenbosch Unit for Operations Research and Engineering (SUNORE) group in the Industrial Engineering faculty. Brian works in simulation modelling and, more specifically, agent-based modelling under the supervision of Dr. Linke Potgieter, as well as Prof. Jan van Vuuren. Outside of the office, Brian enjoys playing music, squash and watching movies.



TAWNY RUST: AN UPDATE ON THE NEW SPECIES OF RUST INFECTING SUGARCANE IN SOUTHERN AFRICA

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Abstract

A new species of rust, originally referred to as African sugarcane rust, but recently renamed tawny rust, was first reported in Swaziland in 2008. This rust has since spread to most cane growing areas in South Africa, and more recently to sugarcane fields in Mozambique and Zimbabwe. It has been observed on a number of South African sugarcane varieties grown under varying environmental conditions. Infected sugarcane leaves display typical rust symptoms, with brown lesions developing parallel to the leaf midrib and profuse bright orange urediniospores released from the uredinia. Molecular phylogenetic analyses together with morphological examination confirmed that this rust is a new, previously undescribed species. A full taxonomic description has been developed and the name proposed for this newly discovered disease of sugarcane is tawny rust, caused by *Puccinia fulva* sp. nov. This short paper serves as an update and brief overview of the tawny rust research currently under way at the South African Sugarcane Research Institute (SASRI), which includes: (a) a thorough investigation into the phylogenetic placement of this species within a broader context of the Pucciniales and the overall Basidiomycota based on a portion of the rDNA (including 5.8S, ITS2 and 28S nuclear large subunit (nLSU) genes), (b) the development of a molecular diagnostic tool for rapid identification of the pathogen using polymerase chain reaction, (c) laboratory and field-based studies to determine the optimum environmental conditions for spore germination and rust development and (d) fungicide trials to determine the effect of this disease on sugarcane yield and future management strategies.



Keywords: African sugarcane rust, tawny rust, *Puccinia fulva* sp. nov., Pucciniales, diagnostic PCR, yield

Biography: Lauren Martin

Lauren Martin is a Microbiologist at SASRI. She joined the research institute in 2006 as a Masters student and in 2008 she was employed in her current position as Assistant research officer in Pathology. She is involved in a broad range of projects and activities ranging from investigations into tawny rust, molecular phylogenetics of the rust fungi, development of an alternative method for RSD detection, and biosecurity efforts involving molecular identification of potential insect pests and pathogens.

A NEW NEMATICIDE/THRIPICIDE FOR THE SOUTH AFRICAN SUGAR INDUSTRY

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Abstract

Nematodes cost the industry a significant amount of money each year due to cane yield loss. The most economical and effective method of managing this pest is chemical control. However, the most widely used product, Temik, has been withdrawn. There are also many negative perceptions surrounding some of the nematicides currently available. The South African Sugarcane Research Institute has been screening new products for use in the industry. During this process, a promising new product containing a combination of abamectin (nematicide) and thiomethoxam (insecticide) was identified. This study was aimed at evaluating the efficacy of this product against nematodes and thrips. Three plant crop and three ratoon trials were conducted between 2012 and 2014. Nematodes, thrips and yield were monitored. The product significantly reduced plant parasitic nematode numbers in the roots in both the plant crop and ratoon. Thrips numbers in the spindle were also significantly reduced. The use of the product increased cane yield (tc/ha) in five of the six trials. An average cane yield increase of 35% in the plant crop and 10% in the ratoon was noted. The product offers a single effective solution for the control of both thrips and nematodes and will soon be registered for use in the South African sugarcane industry.



Keywords: nematicide, nematodes, thrips, abamectin, thiomethoxam, yield

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 five short communications and three posters. This is her fourth SASTA presentation.



RIDE THROUGH TECHNOLOGY

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Abstract

The rigid grid and spare capacity that was available in sugar mills are now a thing of the past. Many sugar mills are, or shortly will be, connected to a national grid and co-generating to derive a secondary income stream. The dips (brownouts) and disconnections (blackouts) with varying durations tend to 'blackout' the factory with the resultant losses and stresses that go with the restart. The ability to 'ride through' on critical equipment such as boiler fans, boiler feed water and fuel feeders becomes essential to any protection and control philosophy and needs to be part of any sustained plan of operation for a sugar cane mill.

Keywords: variable speed drive, VSD, soft-starter, UMC, ride through, energy recovery



Biography: Barrie Skinner

Barrie was born in Zambia, raised in Rhodesia, left Zimbabwe, and qualified in South Africa. He qualified as an electrician and electrical technician with the City and Guilds of London institute and a South African S4. Barrie obtained his GCC for Electrical Engineering, Factories in 1989. He has worked in the motor industry, National Railways, worked with cranes, FMCG Industry, Paper and Pulp, contracting and the sugar industry where he has spent the past 11 years with Illovo Sugar. He started in Eston Sugar mill and has been involved with projects like the Nakambala and Ubombo upgrades. He is presently working in the Illovo Sugar, Group Manufacturing Performance-Engineering.

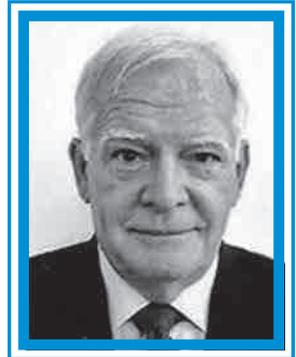
THE ECONOMIC JUSTIFICATION OF INVESTING IN ENERGY EFFICIENCY

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Abstract

In some parts of the world, sugar factories have migrated from the 'historical' model to the very latest model of high pressures and extremely low process steam usage. The historical model is characterised by low to medium boiler outlet steam pressure and high process steam usage, designed to consume all bagasse so as not to cause an environmental problem of disposal of surplus bagasse, without requiring the use of coal. The migration is expensive but is justified by the returns. The enablement of substantial cogen and other processes (because the energy situation has been optimised) represent a lifeline for an industry under pressure. In South Africa the migration has not taken place and there are still many 'historical' factories. The various sugar companies have probably done their economic evaluations, but none have presented a paper at SASTA on such matters. This presentation aims at spreading the concepts to a wider audience.



Biography: St John Tremayne Field

John Field holds a Diploma in Sugar Technology from Natal Technical College and a B Sc Mech Eng from University of Natal. He went through the ranks in Tongaat-Hulett Sugar to Engineering Manager at the new Felixton Mill in 1984. He then crossed the floor to CG Smith Sugar as Factory Manager at Sezela. This was followed by General Manager at Illovo Sugar, Umfolozi Mill, General Manager at Companhia de Sena, Marromeu, Mozambique, Mechanical Engineering Department Manager at United Sugar Company, Jeddah. John was seconded to USC at Ayn Sokhna, Egypt, for 6 months. He was Project Director at Techserve for a short period. After spending a few years at Tsb Sugar Pongola Mill as Project Manager and Acting Engineering Manager he has joined Carbo Solutions International as Senior Technical Director.



ROADMAP FOR SMALL-SCALE GROWER SUSTAINABILITY

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Abstract

Small-scale sugarcane growers (SSGs) form the majority of cane growers in South Africa. Their contribution to the sustainability and long-term growth of the South African sugarcane industry is invaluable and impacts on the long term viability of the whole industry. The South African sugar industry has a proud history of supporting small-scale growers indicating that the present decline in this sector may not be due to a lack of industry support, but rather to a combination of other factors. SSGs are faced with challenges such as the lack of capital or credit; low and declining productivity of crop land; lack of management capacity and regulatory systems; lack of farmer capacity (technical, business, institutional); high costs of inputs and transportation and inadequate irrigation infrastructure (International Sugar Organisation Investigation, 2008).



South African SSG development and capacity strengthening requires clear direction for action. Such guidelines need to holistically tackle the developmental and agronomic challenges facing these growers and present a roadmap for growth within the context of the sustainable livelihoods framework. This paper presents such a roadmap for SSG development and identifies important stakeholders, their roles and responsibilities and proposed initiatives and interventions. The paper also discusses the advantage of considering new approaches for the long term sustainability of the South African small-scale grower livelihood.

Keywords: smallholder, small-scale grower, sustainability, sugarcane, livelihoods

Biography: Richard Nicholson

Richard Nicholson is the Economic Research Manager at the South African Canegrowers Association. He completed all his studies at the University of Pretoria attaining a BSc Agricultural Economics in 2009 followed by a BInst Agrar (Hons) Extension in 2010. He also completed an MSc Agricultural Economics degree in 2014. While completing his Masters, Richard gained a range of experience working in the private sector as an Investment Analyst for an African agricultural investment fund. Followed by a business development post at NOSA Agricultural Services developing training and education tools for small-holder farmers, farm managers and agribusinesses in Africa.

THE IMPACT OF IMPROVING IRRIGATION SCHEDULING FOR SMALLHOLDER GROWERS IN SWAZILAND

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Abstract

Smallholder sugarcane growers are essential in Swaziland for poverty alleviation and rural economic development. Total area under sugarcane in Swaziland is about 59 000 ha, with about 12 000 ha managed by a substantial number of smallholder growers (unpublished data). Swaziland Sugar Association Technical Services conducted a study in 1998, which showed that smallholder growers did not follow any form of irrigation scheduling at all (unpublished data). Irrigation scheduling is essential to meet crop water requirements and can help to reduce the cost of electricity use. This necessitated the initiation of an irrigation scheduling research project in 2011/12 funded by the European Union. At its inception, 63 growers from three sugarcane growing areas in Swaziland volunteered to participate. The pin-peg board irrigation scheduling method was used in the project because the smallholder growers could easily understand it. The pin-peg board method required growers to move a pin on a board on a daily basis depending on the day's evapotranspiration (ET). This method was combined with the profit and loss book, irrigation software programme (Canesched) and the cellular phone short message system technology to convey daily ET figures to growers, as well as receiving feedback from the growers. In addition, growers received training to enhance understanding and implementation of the project. Despite challenges, results showed that more than 80% of the smallholder growers participating in the project implemented the irrigation scheduling methods recommended. The growers received benefits such as improved yields and record keeping; and the project was rolled out to 67 new smallholder growers.



Keywords: Irrigation, smallholder-growers, scheduling, sugarcane, evapotranspiration

Biography: Patrick Mkhalihi

Patrick Mkhalihi works for the Swaziland Sugar Association (SSA) as an Irrigation Officer. Before joining SSA in 1999 he worked for the Swaziland government as a teacher and the Royal Swaziland Sugar Corporation as a Graduate Trainee in sugarcane agriculture. He holds a Diploma in Agriculture and a Bachelor of Science in Agriculture from the University of Swaziland. He co-authored one poster paper at ISSCT in 2007 with the title "Evaluation of pump delivery rates in the Swaziland sugar industry". His research interest is in irrigation scheduling.

1. Swaziland Sugar Association Integrated Annual Report 2013/14. 27 pp.
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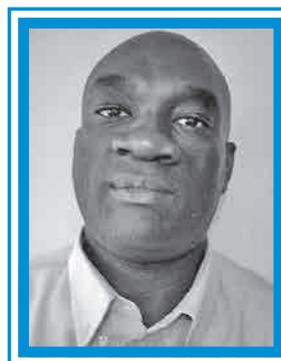
ONE-TENTH HECTARE SEEDCANE DEVELOPMENT

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Abstract

Rapidly declining small-scale grower (SSG) sugarcane production in the Umbumbulu tribal region highlighted the necessity to find an economic and practical solution to restore higher production. Challenges faced by growers included issues of access to finance for replant and ratoon management. A one-tenth hectare seedcane model was considered ahead of one hectare plots. The concept was to plant one tenth of a co-operator's farm and thereafter plant out the rest of the field with the yield from this small plot. This was a practical way of providing affordable seedcane, and it encouraged replant. The advantage over the larger (1 ha) seedcane plots was that, as growers already had the seedcane on their fields, there was no need to lay out large capital investment for seedcane and transport costs. The 1 ha plot had the disadvantage that the seedcane was all planted on one co-operator's field, and therefore fire, disease or drought could wipe out the entire crop. Yields achieved in the 1 ha plots could benefit approximately 5-6 growers, whereas in the one-tenth project, approximately 10 growers benefited. The project was funded by the South African Sugar Association Grower Development Account to plant 156 one-tenth plots over a three year period (2009/10 to 2011/12). One hundred and eighty one-tenth plots have already been established and have been planted out by the majority of the beneficiaries. The 180 one-tenth plots planted out to one hectare plots could provide seedcane for approximately 900 ha, which will boost replanting and production in the region and improve revenue for the local community. The concept has been widely adopted by growers.



Keywords: seedcane, economics, replant, production, plots, small-scale growers, SSGs

Biography: Patrick Bhengu

Patrick Bhengu, aged 44 years, is employed by the South African Canegrowers' Association in the Midlands region (Eston and Noodsberg Small Scale Growers areas). Patrick holds a B.Tech in Agricultural Management, a Senior Certificate in Sugarcane Agriculture, and a Certificate in Community Development. He has worked for SACGA for 9 years as a Grower Support Officer.

VALUE CHAIN ANALYSIS: CRITICAL SUCCESS FACTORS FOR COMPETITIVENESS IN UGANDA'S COMMERCIAL SUGARCANE INDUSTRY

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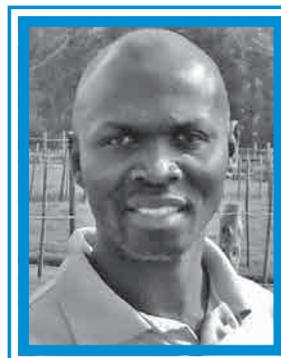
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Abstract

Pursuing an agricultural productivity agenda is no longer a choice but a must for growth in sub-Saharan Africa. This research contributes to the current debate on why some countries advance in the global marketplace, and others fail to do so. This paper unpacked this question from the macro level and examined it at the meso and micro levels of Uganda's commercial sugarcane industry. The focus of the paper was to provide an assessment of the critical success factors for the Ugandan commercial sugarcane industry competitiveness.

The research shows that entrepreneurial traits, productivity indicators and financial indicators are critical success factors for competitiveness. Although the critical success factors reveal a fit between performance categories based on quantitative data, qualitative evidence offers contrary and interesting results. The high performing enterprises mainly attributed their competitiveness to the internal environmental factors under an entrepreneur's control. These entrepreneurial traits, such as personal involvement, passion and timely application of agronomical practices, can be developed and nurtured as a business culture that results in competencies and capabilities for high sugarcane productivity. On the other hand, both the medium and low performing enterprises attributed their competitiveness to the external environmental factors that are outside the entrepreneur's control. Interestingly, cane pricing was a contentious issue between producers and buyers. This suggested an information asymmetry on the cost production structure that could lead to a market failure and thus the necessity to review the cane payment system.



Keywords: critical success factors, entrepreneurial traits, productivity, financial, competitiveness, Uganda's commercial sugarcane industry

Biography: Michael Mugabira

Michael Mugabira is a PhD Student at the Graduate School of Business at the University of Cape Town. His area of study is Global Value Chains covering Commercial Sugar and Forestry Industry Competitiveness in Uganda vis a vis South Africa. He has expansive practical, theoretical and scholarly experiences spanning over 15 years in both the Public and Private Sector. Michael has done extensive consultancy studies for global value chains for fisheries and policy for the Investment Climate & Business Environment (ICBE) with funding from the International Development Research Centre in Canada. He has also done consultancy studies for value chain addition on aquaculture for the Millennium Science Initiative Project sponsored by the World Bank, and studies on the investment climate for global value chains with support from DFID under Uganda Investment Authority (UIA). Michael worked with UIA till early 2013. Currently, he is the founder Director and C.E.O for Eden Forestry Company Limited, investing in Commercial Sugarcane Production, Commercial Forestry Plantations, and Horticulture. The company also does Agricultural Engineering and Contracting Services based on turnkey projects.



FALLING-FILM EVAPORATORS: FROM HEATING SYSTEM CONCEPTS TO OPERATING RESULTS IN MODERN CANE SUGAR MILLS

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Abstract

Energy economy in the beet sugar industry was continuously improved and refined over decades to reduce the steam consumption as far as possible, whereas the cane sugar industry for a long time attached only minor importance to this subject. However, this attitude is no longer relevant. More and more cane sugar factories are narrowly monitoring their energy consumption figures in an effort to reduce their steam consumption to a minimum by investing in equipment and also process optimisation. The new global tendency to install cogeneration plants is the main reason for the cane sugar factories to monitor not only the daily number of bags of sugar produced, but also the bagasse quantity that is saved daily. The bagasse saved serves as an energy source after the campaign to produce electric power. Any additionally produced electricity is then fed into the local grid. Modern cane sugar factories achieve steam consumption values of 30% on cane (without refinery) and 40% on cane (with refinery) and can thus store 50/30% of the bagasse produced.



This paper will present the concepts as well as the operating results from cane sugar factories in India and Pakistan, where processing performance and steam consumption could be clearly optimised by the installation of falling-film evaporators and modification of the heating system.

Keywords: steam consumption, heating system concept, falling-film evaporator, scaling, cleaning, non-condensables

Biography: Fahmi Brahim

Dr. Fahmi Brahim was born in Gafsa, Tunisia in 1972, and graduated in Mechanical Engineering / Process Engineering (Dr.-Ing.). Dr Brahim worked in the Institute of Chemical and Thermal Process Engineering at the Technical University of Braunschweig in Germany in teaching and research, before joining BMA in February 2005. Dr Brahim is specialized in evaporators and evaporation stations and is a senior specialist in heat economy for beet and cane sugar factories and also for sugar refineries.

DETERMINATION OF OPTIMUM SURFACE DISTRIBUTION IN A QUINTUPLE-EFFECT EVAPORATOR SUBJECTED TO FOULING IN THE FINAL EFFECT

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Abstract

The performance of a quintuple-effect evaporator is affected by the distribution of the heating surface area of the five vessels where the total surface area of the evaporator is fixed. Previous studies have been concerned with the optimisation of heating surface distribution with the assumption that no fouling occurs. In fact, in practice the evaporator is subjected to fouling due to the increasing concentration of juice across the vessels, and the evaporator must be regularly taken off duty so that cleaning can be carried out. The present study assumes a model for fouling in the last vessel. The evaporator is assumed to operate with vapor bleeding from the first vessel and condensate flash recovery. The system of equations governing the operation of the evaporator is non-linear. Iterative solutions are then obtained for different surface distributions. The heating surface area of the first vessel must be fixed for the pressure of bled vapor to be satisfactory. It is shown that using equal surfaces for the other vessels results in less total evaporation compared with using a larger surface for the last vessel.



Keywords: multi-effect, evaporation, optimisation, scaling, mathematical model

Biography: Somchart Chantasiriwan

Dr. Somchart Chantasiriwan graduated with a Ph.D. from the University of California, Santa Barbara. He is a professor in mechanical engineering at Thammasat University, Thailand. He has taught courses in power plant engineering, heat transfer, fluid mechanics, and numerical methods. He is also a technical consultant to the Buriram Sugar Public Company Limited (<http://www.buriramsugar.com>), which operates a sugar factory and bagasse power plants in Thailand.



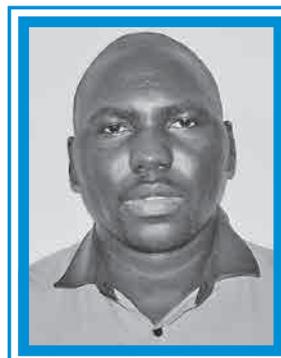
INVESTIGATION OF FEASIBILITY OF MECHANICALLY REMOVING EVAPORATOR SCALE DEPOSITS WHILE EVAPORATORS ARE IN OPERATION

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Abstract

Evaporator scaling is still a major bottleneck in the sugarcane processing industry. It leads to reduced evaporation rates, increased operation costs due to cleaning and lost productivity due to downtime. Over the past years various evaporator scale prevention methods have been investigated by various authors. These include juice softening, the use of antiscalant chemical addition and the use of modified tube surfaces (e.g. polished tubes and non-stick coated tubes). At present, no intervention of this kind is being used in South African sugar factories. In 2014, the Sugar Milling Research Institute NPC (SMRI) investigated the use of scrubbing objects inserted into evaporator tubes for *in situ* prevention of scale formation. The scrubbing object diameter was chosen to be smaller than the tube diameter such that the object continuously oscillated up and down due to the bubbling nature of juice in the tubes. A number of objects with different densities and shapes were constructed and inserted into second effect factory evaporator tubes. The study aimed at quantifying the efficacy of these objects in minimising scale formation during evaporator operation. The scrubbing objects did not significantly reduce the amount of scale deposited in evaporator tubes. This paper looks at the trial procedure and results, and suggests reasons why the tube cleaning objects were not as effective as was originally hoped.



Keywords: evaporator scaling, continuous mechanical cleaning, scrubbing objects

Biography: Rendani Ramaru

Rendani Ramaru is currently working as a researcher at the Sugar Milling Research Institute NPC (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. He has presented two posters at previous SASTA conferences. This is his first full paper presentation.

PLATE HEAT EXCHANGERS AND AFTER SALES SERVICE FOR STEADY PERFORMANCE DURING MILLING SEASON

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Abstract

While the sugar industry in South Africa relies heavily on shell and tube heat exchangers for heating applications, it is more and more common to utilise plate heat exchanger technology for the same applications. Plate heat exchangers are the superior heat exchanger type for most heat transfer tasks within a sugar mill. Due to its design and construction the plate heat exchanger provides higher turbulences and better heat transfer efficiency, enabling closer temperature approaches and thus higher heat recovery. Further advantages of plate technology are gentle juice treatment, easy installation, easy adaptation to new operational duty and minimum maintenance. There is still some reluctance to use plate technology because of experiencing poor support from the manufacturer of the plate heat exchangers in the past.



Support can be given in many ways, starting with the sales process that ranges from firm knowledge of the customer's needs to a get-to-know with the new technology that goes far beyond referring to the user manual. Another aspect of support is being present at the start-up of the heat exchanger in the sugar mill and being able to support the challenges of the new technology (e.g. cleaning process). Addressing spare part inquiries is hassle free, even on short notice. This all can be expected and will be given from GEA Ecoflex GmbH and GEA Nilenca (Pty) Ltd as we present 'know how' and support for plate heat exchanger technology for southern African sugar mills.

Keywords: plate heat exchanger, after sales, cane mill, energy saving, service, support

Biography: Christian Hessler

Christian was born in Spremberg, East Germany. He completed his diploma in Industrial Engineering at the University of Applied Sciences in Merseburg and commenced his career as a Project Engineer at APRO Ingenieurbüro. He worked in the Sugar Department for more than five years, gaining experience in the sugar manufacturing process as well as being involved in energy efficiency studies and plant and equipment performance optimisation. Christian joined GEA Ecoflex GmbH at the beginning of 2014 as an Application Engineer specialising in sugar applications. Christian is responsible for the design of the plate heat exchangers and rising film plate evaporators worldwide.



EXPERIENCES WITH A DOUBLE DISC OPENER WHOLE STICK SUGARCANE PLANTER IN SOUTH AFRICA

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Abstract

Minimum tillage planters are a strategic mechanisation component of a conservation farming system where soil health benefits through practices such as reduced tillage and controlled traffic are promoted. Conservation farming systems may also result in reduced on-farm input costs. These types of planters can plant directly into fallow fields following the previous cane crop, or through break crop residues, or into conventionally prepared seedbeds.

The objective of this paper is to present results of the performance of an imported minimum tillage whole stick sugarcane planter. Suitability for local conditions as well as the performance and operating characteristics of the planter are presented. The studies were conducted over two commercial planting operations totalling approximately 35 and 40 hectares under an irrigated and dryland environment, respectively. Time and motion studies for both operations are compared and findings relating to productivities and efficiencies are presented. Mechanical planting operations and traditional manual planting operations are contrasted. The introduction of suitable planters into the industry may assist in reducing input costs where minimum tillage operations are adopted. A substantial reduction in seedcane required for planting was noted through the use of the planter. Vehicle operating hours are also expected to be reduced substantially when implementing minimum tillage planting. Planting speeds of 2.0-3.3 km/h and overall productivity were measured to range between 1.2 and 2.6 hectares per day. Factors affecting productivity are discussed. Between seven and sixteen laborers per hectare (including the tractor driver and operators) were required for the mechanical planting operations, depending on the management and productivity of the planter. This could be reduced to about three laborers per hectare if the removal of seedcane leaves was not required.

Keywords: mechanical performance, mechanisation, minimum tillage, planters, sugarcane

Biography: Peter Tweddle

Peter Tweddle is an Agricultural Engineer at SASRI specializing in research relating to Mechanization and Transport within the Sugarcane Industry. He has a BSc Engineering degree in Bioresources Engineering which he obtained from the University of Natal. Peter is registered as a Professional Engineer with the Engineering Council of South Africa (ECSA). Peter has recently completed his MSc Engineering degree through the University of KwaZulu-Natal.



ANATOMY OF THE SUSFARMS® IRRIGATION MODULE

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Abstract

The SUSFARMS® irrigation module is a succinct but comprehensive package of measures, reference material and recommendations in the context of irrigation better management practices. The module is logically structured to guide end users systematically from the irrigation planning and design phase, through to correct irrigation operation, monitoring, scheduling, maintenance and evaluation. The intention of this paper is to present the anatomy of the irrigation module in order to give end users a view of how the tool can be used to track irrigation performance and to easily identify areas where tangible benefits can be gained by implementing improvements. The framework of the module provides a clear and holistic list of key measures with an easy spreadsheet based scoring system for gauging performance of irrigation on the farm. For example, the energy use efficiency measure will purposefully point the end user to examine sizing and matching of motor and pump combinations, appropriate selection of ESKOM tariff structure and timing of pump operation relative to peak and off-peak hours. Over and above measures of performance, relevant reference material and recommendations are also available. An example is the useful schedule of preventative maintenance activities/tasks for each irrigation system. In the case of water quality, or soil salinity and sodicity, important flag-raising threshold values are presented in user friendly tables and charts. Increased usage of the tool is anticipated to stimulate greater planning and operational thinking and ultimately improved irrigation in the South African sugar industry.



Keywords: Irrigation Better Management Practices (BMPs), irrigation performance assessment, irrigation benchmarking, technology transfer, SUSFARMS®

Biography: Ashiel Jumman

Ashiel Jumman is employed by SASRI as a Researcher: Agricultural Engineer. He is currently registered for a part time PhD at the University of Kwa-Zulu Natal (UKZN). The goal of the PhD project is to develop recommendations for improving the adoption of irrigation better management practices using a system dynamics modelling approach. Ashiel obtained his MSc. Engineering degree from UKZN in 2009. The title of Ashiel's MSc. Dissertation was "A framework to improve irrigation design and operating strategies in the SA sugarcane industry". In the last seven years, Ashiel has authored and co-authored more than 10 papers at the SASTA (2008, 2009, 2010 & 2012), SANCID (2008, 2010), SABI (2009 & 2011) and SAIAE (2014) conferences. Ashiel was also awarded the prestigious Robin Renton Memorial award for the best technical paper by a young engineer at SASTA. In the same year, Ashiel also received the best Agricultural poster award. Ashiel is a very passionate and energetic young man who thoroughly enjoys working in the research field.



A SYNERGETIC SYSTEM TO PRODUCE SUGARCANE USING SURFACE IRRIGATION

LECLER NL^{1,2}

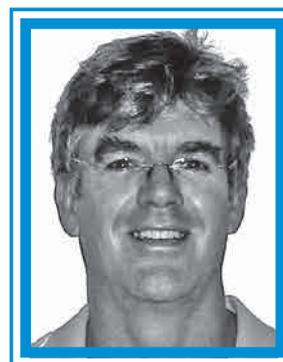
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Abstract

In 2008, a novel irrigation system, named 'automated short furrow'(ASF) was developed and implemented in a 0.6 ha trial at the University of KwaZulu-Natal's Ukulinga research farm. ASF was shown to have potential to be a relatively low cost, efficient and easy to manage irrigation system. Further development and testing was required before it could be easily adopted by commercial growers. The purpose of the project described in this paper was to further develop, refine and test ASF and associated sugarcane farming systems for implementation in a commercial environment. In the current project, a unique and synergetic production system for sugarcane was developed using surface irrigation similar to ASF. The new system, as described in this paper, permitted efficient use of mechanical equipment and precise low energy surface irrigation, even on relatively shallow soils. The system was demonstrated at the Zimbabwe Sugar Association Experiment Station. At the demonstration site, water use productivity (WUP) was 2.72 tons of estimated recoverable crystal (ERC) per megalitre (ML) of irrigation water applied. This WUP was exceptionally high relative to even the better performing plant-cane fields in the surrounding area. In an industry and country where water supplies are limited, the WUP value obtained at the demonstration site showed a potential to permit a substantial reduction in water withdrawals or a major expansion of the irrigated area using existing water supplies.



Keywords: irrigation efficiency, surface irrigation, sugarcane, farming systems, energy, economics

Biography: Neil Lecler

Neil Lecler is a Principal Agricultural Engineer at the Zimbabwe Sugar Association Experiment Station (ZSAES), a Fellow of the South African Institute of Agricultural Engineers (SAIAE) and an Honorary Associate Professor at the University of KwaZulu-Natal, where he earned his PhD. He was born, grew up and went to school in Rhodesia and then Zimbabwe but has worked mainly in South Africa; at Agricor in the former Bophuthatswana, at the University of Natal (now University of KwaZulu-Natal) and at the South African Sugarcane Research Institute. He was also at the Zimbabwe Sugar Association Experiment Station between 1998 and 2002. Most of his professional life and research effort have been dedicated to developing and synthesising systems, models and information to support more effective use of resources, especially water. Neil has registered a patent, supervised or co-supervised nine successful Master's students, authored or co-authored more than fifty publications and undertaken a number of local and international consultancies. He is a very keen golfer and he also enjoys the odd game of cricket, tennis and squash and a little bass and fly fishing. Neil is happily married to Denise and they have two children.

ESTIMATING CROP PRODUCTION LOSSES FOR VARIOUS INFIELD SUGARCANE EXTRACTION SYSTEMS

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Abstract

Infield traffic is understood to negatively impact crop yields. For high biomass crops such as sugarcane, the amount of infield traffic when removing the crop from the field is substantial compared to other crops. In the South African sugar industry there are a range of systems that are used to harvest and remove the cane crop, each with varying amounts of infield traffic. Surveys were conducted to determine the extent of traffic that occurred infield and the position of the traffic with respect to the crop row and inter-row areas. Yield losses differentiating between row and inter-row traffic were synthesised from local and international literature. These yield losses were used to estimate field based crop production losses for a range of systems that are typically found in the South African sugar industry. The estimated yield losses ranged from approximately 1-9%, depending on the loading system and the associated intensity and extent of traffic through the field. The results from this study provide an indication of the impact that infield traffic is having on yields and crop sustainability for different systems, and the benefits that may be available through the adoption of better infield traffic practices and systems. This study provides the basis for the economic benefit of better infield traffic practices to be quantified, and in certain cases may provide sufficient incentive for the changing of infield traffic equipment and systems.



Keywords: compaction, harvesting systems, extraction systems, infield traffic, sugarcane, stool damage, yield losses

Biography: Peter Tweddle

Peter Tweddle is an Agricultural Engineer at SASRI specializing in research relating to Mechanization and Transport within the Sugarcane Industry. He has a BSc Engineering degree in Bioresources Engineering which he obtained from the University of Natal. Peter is registered as a Professional Engineer with the Engineering Council of South Africa (ECSA). Peter has recently completed his MSc Engineering degree through the University of KwaZulu-Natal.



APPLICATION OF THE LOMZI MODEL AT SIX MILLS IN THE SOUTH AFRICAN SUGAR INDUSTRY

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Abstract

Rainfall, air temperature and cane quality are key factors that influence the tons of sugarcane crushed and sugar produced in any specific mill area. An accurate prediction of these factors leads to important decision making in the operations of a sugar mill, such as determining the length of the milling season and profitability of the entire milling area. To a large extent, tons of sugarcane crushed at the mill, cane quality and sugar produced are controlled by the preceding rainfall and air temperature experienced across a mill supply area. To predict the sugar produced and tons crushed at a mill scale, based on daily rainfall and air temperature data, a length of milling season model (LOMZI) was developed. The model has a cane quantity and a cane quality component based on relationships with the weather. The LOMZI model estimates daily tons of sugarcane crushed, brix, pol and fibre contents with an acceptable degree of accuracy after 126 coefficients were mathematically calibrated against real production and weather data for each mill. The model was calibrated for Umzimkulu, Sezela, Eston, Noodsberg, UCL and Umfolozi. As part of the verification, R^2 values ranged from 0.16 to 0.69 for cane crush quantity, 0.55 to 0.80 for brix, 0.58 to 0.77 for fibre and 0.56 to 0.81 for cane quality. This short paper describes the development, calibration and application of the LOMZI Model. The model was executed using stochastic weather data and the results are discussed. Areas for further research and improvement to the model are suggested.

Keywords: tons crushed, sugar produced, cane quality, rainfall, air temperature, stochastic modelling, prediction, fibre, pol, brix, LOMZI



Biography: Farai Ngoro

Farai Munemero Ngoro matriculated from Sandringham High School in Norton, Zimbabwe, in 2002 and completed his BCom Supply Chain Management Honours in 2010. Farai is currently pursuing his MSc in Bioresources Systems at UKZN. Farai has worked for various institutions in Zimbabwe and South Africa, namely Kingdom Bank, PG Bison (PMB) and Momentum Life. His field of study is modelling the sugarcane supply chain with a specific focus on the length of the milling season.

Biography: Precious Dzapatsva

Precious Dzapatsva matriculated from Loreto High School, Midlands Zimbabwe, in 2008 and completed her Bachelor's Degree in Computational Physics in 2012 and Honours Degree in Physics in 2013 at UKZN. Precious is currently pursuing her MSc in Bioresources Systems at the University of KwaZulu-Natal. Her field of study is modelling the sugarcane supply chain with a specific focus on the length of the milling season.

JOHNSON SCREENS IN CONTINUOUS CENTRIFUGE OPERATION

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Abstract

Johnson Screens/Filteg Solutions have in the past given presentations on the advantages of a wedge wire screen over foils in continuous sugar centrifuges. The information presented was based on data from sugar mills in various parts of the world, and we are now able to show the advantages of a wedge wire screen in a southern African sugar mill.

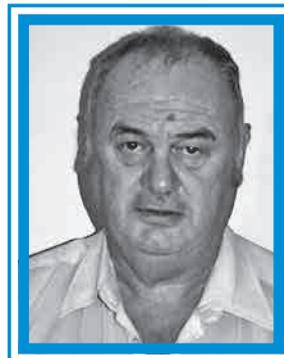
The use of wedge wire screens was found to have many advantages over the foils normally fitted to continuous sugar centrifuges. The unique design ensures a high mechanical strength that is less susceptible to damage during start-up, and is many times more abrasion resistant than thin perforated sheets. The precise slot opening and continuous long screen slots with a larger percentage of open area allows for increased capacity and produces less crystal degradation. The purity of the molasses produced was also improved.

With reduced maintenance, the Johnson Screens sugar centrifuge screen was found to be cost effective over the test period, with improved molasses purity being a valuable bonus.

Keywords: centrifuge, molasses purity, wedge wire, foil screens

Biography: John Turner

John's initial background was in the chemical industry, active in both commissioning and process investigation before heading into process equipment sales. This experience has led to an understanding of the problems on the factory side of the sugar industry especially in mist elimination and the application of wedge wire screens.



INNOVATIVE HYBRID TURBINE TECHNOLOGY

GOPI PU

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Abstract

For many years, industrial steam turbines have employed either an impulse or reaction blade path. A new hybrid version which combines impulse and reaction technology optimises the efficiency of the turbines. In the hybrid design, a reaction blade path is used in high pressure stages, which provides an efficiency advantage due to aspect ratio. Impulse blading with variable reaction is used in intermediate pressure (IP) and low pressure (LP) stages as these sections provide robustness in the wet steam zone. The combination of impulse and reaction technology allows higher efficiency of steam energy recovery with greater operational flexibility. The customised steam path in these advanced turbines is designed to handle high volumes of inlet flow as well as extraction flow due to specially designed internal control valves. The turbine technology centres on optimising the hybrid blade path, which offers a better trade-off between cost and efficiency for customers. The hybrid technology includes the advantages of both reaction and impulse technologies, while circumventing their disadvantages.



Keywords: turbine, rotor, blade path, technology, impulse, reaction

Biography: Pramodchandra U Gopi

Mr Gopi is the Chief Technology Officer at Triveni Turbines Ltd, the market leader in industrial steam turbines in India. The company provides steam turbine based power solutions in more than 50 countries worldwide. Mr Gopi graduated in Mechanical Engineering from NIT, Suratkal, in 1988 and also has a Masters in Business Administration, with Finance as his specialisation. Mr Gopi has worked with Elliott compressors in the oil and gas industry and Alstom power systems in advanced combined cycle systems. He has extensive experience in machinery design of steam and gas turbines and compressors in combined cycle power plants, with specialisation in turbine island portions. At Triveni, in association with US-based design houses, he has led market oriented turbine product programmes which involved in-depth work in mechanical design, thermal design, rotor dynamics, structural analysis, heat transfer, aero/CFD areas and transient analysis. Mr Gopi carries end-to-end product development cycle experience, from market concept to field maturity stage, CAPEX/OPEX optimisation. He has dealt with the technology side of steam turbine collaborations and joint ventures with various OEMs such as Skoda and GE, and has a keen interest in green technologies

MICROWAVE TECHNOLOGY: UBIQUITOUS MEASUREMENT INSTRUMENT FOR DENSITY, TOTAL SOLIDS AND CONCENTRATION, ESPECIALLY FOR BRIX IN A SUGAR FACTORY

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Abstract

Microwave concentration measurement is one of the most modern technologies used in industry for process measurement and control. Measurement systems have been successfully employed for brix control on batch and continuous pans in the sugar making process. Recent developments allow the technology to be applied to virtually all measurement points requiring process variable determination and control of concentration, density or total solids in sugar plants. Over the past few months new applications, especially the concentration measurements in large pipelines and measurements in tanks, remelters and mixers, have shown that microwave technology offers unique and new solutions to the sugar producing industry. This presentation discusses experiences with microwave concentration measurement on large pipelines, in mixers, remelters and vessels. Particular focus is on the concentration measurement of magma, molasses and milk of lime, with discussion of the technical aspects, considerations and advantages of the employment of microwave technology.



Keywords: microwaves, brix, concentration, density, pan control, molasses, remelter and milk of lime

Biography: Dudley James

Dudley was born in Benoni, Gauteng and went to school mainly in Gauteng, completing his schooling in Glencoe, Northern Natal. Thereafter he served an apprenticeship at Benoni Engineering as a Fitter and Turner. While doing his apprenticeship he studied for and achieved his National Certificate for Technicians. He then served a very short time in the drawing office at Sultzer Bros, He joined Festo South Africa in 1977 and remained with them until moving to White River in 1979, where he started his own business and became the agent for Festo. In 1993, Brenley Engineering Sales cc was formed to deal specifically with Festo Sales. In 2004, proMtec approached Dudley to sell their product in southern Africa. Brenley has continued with Festo and has become one of the biggest distributors of Festo in southern Africa. The microwave section has grown from strength to strength, and with a staff of five, Brenley now also manufactures a range of probes locally. The development of the 'all in one' probe has changed the outlook of continuous pan instrumentation.



AUTOMATION OF SUGAR PLANTS IN BRAZIL AND PERU

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Abstract

A complete explanation is presented on the automation needs in sugar plants in both Brazil and Peru, in particular highlighting the specific technologies applied in the vast environments of both tropical and desert climates. These plants are used to illustrate and showcase the statistics in process control, in a single centralised process control room, and optimising decisions in both agriculture and factory procedures.

Keywords: automation, WEG, ZEST WEG Group, sugar plant, Peru, Brazil, climate, process control



Biography: Marcos Mesquita

Mesquita was born in São Paulo, Brazil. Thereafter he moved to Ribeirão Preto city, and started work at Santa Adélia Sugar Plant as an Engineer. While working at Santa Adélia he was invited to work at Johnson and Johnson, where he was able to experience an international career, traveling to Latin American. He learned a lot about the Latin American culture and language in the process control field. In September 1985 he moved to São Paulo and continued to work as a manager of Argentinian and Uruguayan subsidiaries in the Ecolab UNILEVER Group. He returned to Ribeirão Preto, to work at SMAR as the Manager of a technical assistance for eight years; where he has capable of doing a range of instrumental Plants. Different types of process, including: oil platforms, brewery plants and sugar plants in various sizes all over Brazil. He worked as a Specialist in the area of instrumentation and centralized process control. In July 2007 he accepted the challenge to do a sugar plant outside of Brazil, in the Peru Desert, as a WEG Project and Automation Department member. It was successfully implemented and they are currently in the sixth expansion on this plant. He is currently the Project Manager for sugar and ethanol plants inside the WEG Automation Division, part of ZEST WEG Group. Marcos is the author of five complete projects of automation of sugar plants in Brazil and two complete projects in Peru.

INFLUENCE OF LOCATIONS AND SEASONS AND THEIR IMPLICATIONS ON BREEDING FOR SUGARCANE YIELD AND SUCROSE CONTENT IN THE IRRIGATED REGION OF SOUTH AFRICA

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Abstract

Breeding programmes conduct multi-environment trials to evaluate the adaptability and performance of genotypes across variable agro-ecological regions. Genotype by environment interaction (GxE) causes the genetic values to vary across environments. When GxE is large, then greater genetic gains can be achieved through developing specific genotypes for each environment. The objectives of this study were to investigate location and seasonal effects on genotype performance for cane yield and sucrose content and their implication on breeding varieties for the irrigated regions of South Africa. Data were collected from a series of variety trials planted in 2009 and 2010 at Mpumalanga and Pongola locations in the early and late seasons. Randomised complete block designs with three replications were used for the variety trial at each site. Data for cane yield and sucrose content were collected in the plant, first, second and third ratoon crops. Data were analysed using the mixed procedure of Statistical Analysis System. Seasonal effects were larger than location effects, while genotype x season was larger than genotype x location, indicating the importance of seasons when breeding for irrigated regions. Seasonal effects were larger for sucrose content than cane yield. Genotype by ratooning effects was non-significant, indicating that ratooning ability was less important in irrigated regions. High cane yield and low sucrose in early season and low cane yield and high sucrose in late season indicated the uniqueness of the early and late seasons. Establishing early and late season breeding programmes in the irrigated region would enhance genetic gains for yield and quality in each season.



Keywords: locations, seasons, breeding, irrigation, cane yield, sucrose content

Biography: Marvellous Zhou

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. He is NRF rated C1 level scientist. 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, book chapters 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.



INFLUENCE OF GENOTYPE BY ENVIRONMENT INTERACTION ON *ELDANA SACCHARINA* BORER DAMAGE IN THE COASTAL LONG CYCLE BREEDING PROGRAMMES IN SOUTH AFRICA

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Abstract

Eldana saccharina Walker (Lepidoptera: Pyralidae) (eldana) is an endemic pest in coastal sugarcane growing areas of South Africa where it causes significant yield losses. The larvae are the most destructive stage, causing extensive tissue damage by boring and tunnelling in the stalks. The objective of this study was to evaluate the influence of genotype by environment interaction (GE) trends on eldana borer damage and implications for resistance breeding. Data were collected from plant, first and second ratoon crops of trial series planted at five locations in 2005, 2006 and 2007. Twenty stalks per plot were randomly sampled, the number of damaged stalks recorded and converted into percentage bored stalks. Data were analysed using the Statistical Analysis System. The highly significant ($p < 0.001$) location effects indicated differences in levels of damage among trials. Gingindlovu trials, with high levels of damage would be the ideal location for eldana screening trials. Genotype effects produced highly significant ($p < 0.001$) F-values (4.11 to 6.68), indicating differences for damage and ability to identify genotypes showing low levels of damage. Location by genotype (GL) effects were highly significant ($p < 0.001$) indicating damage between genotypes was significantly influenced by location. There was a non-significant ($p > 0.05$) genotype by crop (GC) interaction, indicating that there were no seasonal effects on the performance of genotypes against eldana damage. Location by genotype by crop interaction (GLC) was non-significant ($p > 0.05$), indicating that genotypes were not influenced by location and there were no crop effects. This study will help identify suitable locations for effective eldana screening.



Keywords: genotype-environment interaction, percentage stalks bored, seasonal effects, location effects

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).

OPTIMUM HARVEST AGE IN RAINFED REGIONS: INTERACTIONS BETWEEN VARIETY, AGE AND *ELDANA SACCHARINA* (LEPIDOPTERA: PYRALIDAE) DAMAGE

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Abstract

The release of earlier maturing varieties, the desire to increase harvest age, and the impacts of *Eldana saccharina* (eldana) on aged cane have created uncertainty around the optimal harvest age in rainfed regions. The objectives of this study were to (i) revisit the optimal harvest age of cane in rainfed regions, (ii) illustrate the effects of variety choice on optimal harvest age and (iii) explore interactions between eldana damage, harvest age and variety choice. Using a data mining approach, variety trial data from 2000 to 2013 were categorised by region, harvest age, variety and variety eldana resistance category (resistant vs susceptible). Recoverable value (RV) yields and percentage internodes damaged (%ID) were plotted against harvest age to investigate effects of region, variety, eldana resistance and their interactions. On average, the optimal harvest ages along the coast and inland regions were 15 and 22 months, respectively. Newer varieties such as N31 and N41 showed faster growth rates than N12 and their optimal harvest ages should be reduced accordingly. The optimal harvest age of a specific variety varied by region, illustrating that a generic optimal harvest age for a particular variety cannot be recommended. As a group, eldana resistant varieties outperformed susceptible varieties when aged over 13 months along the coast. The %ID was 4.1% compared with 3.1% per month of growth for susceptible vs resistant variety groups along the coast, respectively. The data mining approach was valuable in extracting key trends and best management practices relating to variety choice, harvest age and eldana control.



Keywords: eldana, harvest age, sugarcane, variety

Biography: Sanesh Ramburan

Sanesh Ramburan is currently employed as a Crop Scientist (Variety Evaluation) at SASRI. His research focuses on variety characterisation under different environmental conditions and management practices. He manages projects at SASRI dealing with variety interactions with agronomic factors, including the effects of abiotic stresses. He is lead author of more than 20 peer-reviewed publications and numerous popular publications. He is the vice-president of the South African Society of Crop Production and is also an NRF rated scientist. He holds an MSc Agric. from UKZN and a PhD in plant breeding from the University of the Free State.



MODELLING JUICE FLOW IN A SHREDDED CANE BED

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Abstract

A diffuser is essentially a porous bed of shredded sugarcane through which juice flows. Theory based on the equations attributed to Darcy for saturated flow and Richards for unsaturated flow predicts that the velocity of the flow through the bed depends on the distribution of the permeability in the bed. At steady state, a pressure profile is established within the bed so that the friction pressure loss exactly matches the gravitational pressure head. If the permeability in the bed is uniform then the theory predicts that the static pressure in the bed will be constant throughout the bed and will be equal to atmospheric pressure. A rectangular glass model diffuser in which the lateral dispersion of the juice could be observed with a static cane bed was used to map the pressure distribution and flow through a bed. The results from pressure and flow distribution measurements were compared to theoretically derived results. The steady state pressure distribution that was measured verified the theoretical prediction that the static pressure would essentially be equal to atmospheric pressure. These results can form the basis for more complex models to predict the flow distribution within a full scale diffuser.



Keywords: diffuser, flow, extraction, pressure, permeability, flooding

Biography: Richard Loubser

Dr Richard Loubser completed his MSc and started his career in freight damage protection in the transport industry. He joined the Sugar Milling Research Institute in 2000. He has worked in various areas of mechanical engineering and fluid dynamics within the SMRI. He is now a Chief Research Officer in the Process Engineering division. He has been involved in both original research and providing engineering support to the research initiatives of the SMRI. He has authored and co-authored several papers since he joined SASTA in 2000.

DIRECT CLEAR JUICE (DCJ): 2014 FACTORY TRIAL RESULTS INCLUDING BAGACILLO REMOVAL REQUIREMENTS FOR THE CONTINUOUS PRODUCTION OF GOOD QUALITY DCJ

JENSEN P¹, RAMARU R¹ AND SULIMAN M²

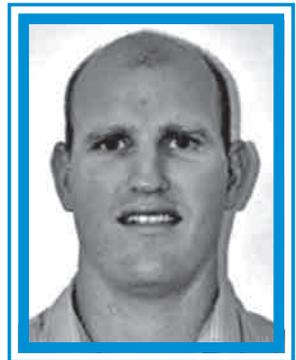
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Abstract

The term 'Direct Clear Juice' (DCJ) refers to the production of clear juice (CJ) within a modified sugarcane diffuser, thus negating the need for further juice purification in a settling clarifier. In 2013, trials at Maidstone factory showed that DCJ of similar pH and turbidity to CJ could be continuously produced in a diffuser operating at 60% of its designed throughput (mainly due to limited cane supply) without any reduction in extraction. In 2014 the throughput was increased to 77% of the diffuser's design, and once again DCJ of similar pH and turbidity to CJ was produced without any drop in extraction. Higher throughputs were not possible due to constraints with cane preparation and bagasse dewatering equipment. The original plan for 2014 was to bypass the clarifier to determine the effect of DCJ on sugar quality rather than on juice quality alone. Close monitoring of the juice bagacillo (small bagasse fibres) content revealed that more fibre was passing through holes in the diffuser screen than was measured in 2013, and contaminating the otherwise clear DCJ. There was concern that Maidstone's syrup clarifier would be unable to reduce the fibre to acceptable levels. It thus became evident that a reliable means of either preventing these fibres from entering the juice, or subsequently removing them, would be required before the clarifiers could be bypassed. Juice screening, which although not practised at Maidstone, is practised at most other conventional diffuser factories, has been identified as the most suitable technology for removing the fibre particles from DCJ.



Biography: Paul Jensen

Paul joined the SMRI's research team in 2011, after working abroad for 3 years. His work in the last few years has focused on diffuser operation, ion exclusion chromatography, and the continual search to discover and develop innovative solutions which can increase the profitability of the South African industry.



RIPENING WITH ETHEPHON: GROWTH, PHYSIOLOGICAL AND CANE QUALITY RESPONSES OF SELECTED SUGARCANE VARIETIES

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Abstract

Ethephon (2-chloroethyl phosphonic acid) is an effective chemical ripener which alters carbon partitioning within the cane stalk towards the storage of sucrose. Sucrose storage is favoured because the sink demand for sucrose for sugarcane growth is reduced when there is a reduction in stalk and leaf growth. The physiological and growth responses between different sugarcane varieties that are involved in attaining an increase in sucrose content are currently unknown. The aim of this study was to compare the Ethephon response in terms of growth, physiology and cane quality of three sugarcane varieties. The three sugarcane varieties were grown for one season, of approximately 12 months, at the South African Sugarcane Research Institute (SASRI), Mount Edgecombe. Growth measurements (stalk height and population, leaf length and width, and green leaf area) were performed once a month and physiological measurements (CO_2 assimilation rate (A_n), stomatal conductance (g_s) and transpiration (E)) were measured once before and after Ethephon application (at 1.5 L/ha) with a LiCor 6400 photosynthesis system. Sugarcane quality parameters (e.g. sucrose content, non-sucrose content and RV%) were determined at harvest. Ethephon suppressed leaf growth (in terms of leaf length) in all three varieties, which caused a reduction in green leaf area. All three varieties showed a similar reduction in A_n in response to Ethephon application. Sucrose content ranged from 9.04% (N51) to 10.92% (N42) in the control treatments, and although Ethephon increased the sucrose content of N47 and N51 by 10 and 17%, respectively, it did not have a significant effect on sucrose content of N42. Non-sucrose content (%) of N51 was significantly higher in both treatments compared with N42 and N47, and the sucrose benefit on recoverable value (RV%) from ripening of N51 was eroded by the high non-sucrose value. Application of Ethephon significantly increased RV% of N47 only. The data derived from the current study will be used to refine the sugarcane crop model to explain changes in structural plant processes such as stalk and leaf elongation rate and photosynthesis.



Keywords: chemical ripening, Ethephon, photosynthesis, sugarcane, variety, yield effects

Biography: Alana Eksteen

Dr Alana Eksteen has been a Crop Scientist in Agronomy at SASRI since 2011. She has previously presented at SASTA on drought stress, flowering and pithing and has co-authored short communications on bio-ethanol production from sugarcane and crop physiology. She was elected on to the SASTA council in 2014 and also serves on the SASTA Congress Organising Committee.

DEVELOPMENT OF A WHOLE-STALK JUICE PURITY CALCULATOR TO SIMPLIFY CHEMICAL RIPENER DECISION-MAKING: PRELIMINARY FINDINGS

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Abstract

Chemical ripeners are used widely in South Africa to increase recoverable value (RV) yields. However, efficacy becomes poor above certain chemical-specific whole-stalk juice purity (JP) thresholds. Unfortunately, JP determination is cumbersome and cannot be performed by sugarcane growers. This study aimed at developing a simple calculator that would estimate JP from total sugar content (brix%), which can easily be measured in the field with affordable hand-held refractometers. Brix% was measured with hand-held refractometers in a large number (>1000) of stalk samples submitted to the South African Sugarcane Research Institute's cane quality testing laboratories situated in Mount Edgecombe and Pongola. From each of these samples, consisting of 12-16 stalks, three representative stalks were selected for brix% measurements. Each stalk was divided into three equal sections (bottom, middle and top) and pliers were used to squeeze juice from the centre point of each section for Brix% measurement. The entire sample of 12-16 stalks was then tested by the laboratory for whole-stalk JP. Data were analysed by averaging the three brix% values recorded along the length of the three stalks. This method proved to be the most reliable when correlated with laboratory determined JP. Results revealed a significant ($p < 0.01$) positive correlation ($R^2 = 0.61$) between average brix% and laboratory determined JP, regardless of variety, cutting cycle or whether the crops were irrigated or rainfed. The data collected will be used to determine the nature of the JP calculator, in terms of variety and cutting cycle specificity, before release to growers and extension specialists.



Keywords: brix%, chemical ripeners, juice purity, juice purity calculator, refractometer

Biography: Tracy Mfeka

Tracy studied at Cedara College of Agriculture and obtained a Diploma in Agriculture. She is currently employed as a research intern at the South African Sugarcane Research Institute. She is also registered at the University of South Africa for a Baccalaureus Technologiae (BTech) in Agricultural Management.



EARLY SEASON RESPONSE OF COASTAL RAINFED SUGARCANE VARIETIES TO CHEMICAL RIPENERS

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Abstract

Chemical ripener research often focuses on the response of sugarcane varieties to ripeners under high potential irrigated conditions. However, good responses can also be achieved under favourable coastal growing conditions. This study quantified the effects of Ethephon (Eth), Fusilade Forte (FF) and the combination treatment (Eth+FF) on recoverable value (RV%) and RV yield of three coastal rainfed varieties (N42, N47 and N51). A field trial was established along the coast (Mount Edgecombe, KwaZulu-Natal, South Africa) as a complete randomised design with each variety x treatment combination replicated five times. Ripeners were applied at standard spray-to-harvest intervals and at rates of 1.5 L/ha (Eth) and 0.2 L/ha (FF). Cane quality and yield were determined at harvest in each treatment plot. Post-harvest measurements, including stalk population and stalk height, were also conducted to test for any residual ripener effects. Statistically significant increases in RV% were observed in seven out of nine variety x ripener treatment combinations. Only variety N47 showed significant increases in RV% in response to Eth. The FF treatment significantly increased cane quality in the three varieties by between 1.1 and 1.3 RV% units. Varieties N42 and N51 responded well to the Eth+FF treatment with increases of up to 2.0 RV% units. There were no significant reductions in cane yield in any of the treatments, thus leading to large increases in RV yield. The residual action of some of the ripener treatments caused a temporary increase in growth of the succeeding ratoon crop at a young age, which disappeared towards harvest.



Keywords: cane quality, chemical ripeners, coastal varieties, Ethephon, Fusilade Forte

Biography: Sivuyile Ngxaliwe

Sivuyile has an MSc in Biological Science from the University of KwaZulu-Natal. 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 stress physiology, response of sugarcane to chemical ripeners and medicinal plants.

PHOSPHORUS MANAGEMENT IN THE SUGAR INDUSTRY: USING SOIL TESTS TO MINIMISE ENVIRONMENTAL IMPACTS

MILES N^{1,2} AND VAN ANTWERPEN R^{1,3}

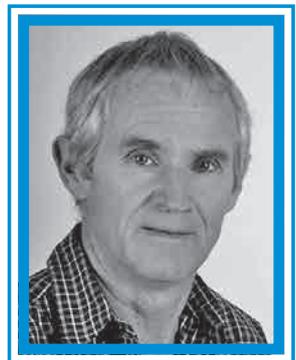
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Abstract

Phosphorus (P) is the most limiting nutrient in terms of the eutrophication of most stream and dam waters. Where soil P levels are not excessive, P applied to agricultural land is rapidly immobilized through chemical reactions with soil components, and the potential for pollution is low. With increasing saturation of soils with P, however, extractable (soil test) and soluble P levels increase sharply, with a concomitant increase in the risk of diffusive P loss in overland water flow. Data presented in this paper show that soil test P levels in many fields of the sugar industry are well in excess of established threshold levels for optimum growth, with excess P often being associated with the long-term use of poultry manure. Relationships developed between soluble P (i.e. the P potentially removable in percolating or runoff waters) on the one hand, and P extracted with the Truog and resin tests on the other, reflect an exponential increase in P solubility with rising P test levels beyond the zone of immediate crop growth requirements for this nutrient. A model using resin P / oxalate Al was found to provide an improved prediction of soluble P levels. Of concern is that soil samples taken to a depth of 20 cm for routine soil fertility evaluations in most cases grossly underestimate the P environmental hazard, since P levels are highest at the immediate soil surface (top 2-5 cm soil layer). Based on the findings presented here, suggestions for the more responsible management of P are proposed.



Keywords: phosphorus, environmental pollution, soil testing, soil sampling

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. He is an Honorary Research Fellow with the University of KwaZulu-Natal.



MEASURING APPARENT ELECTRICAL CONDUCTIVITY: A COMPARISON BETWEEN TWO EM38-MK2® INSTRUMENTS

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Abstract

Electromagnetic induction (EMI) is widely used to improve the understanding of spatial soil variability. EMI sensors measure apparent electrical conductivity (EC_a), which is used as a surrogate measure of selected soil properties, e.g. salinity, water and clay content and cation exchange capacity, through deterministic or stochastic calibration exercises. The objective of this study was to compare EC_a measured with two EM38-MK2® instruments. The broader aim was to identify the extent to which measurements obtained with a new instrument would mirror those obtained with an instrument which needed replacing. Two identical EM38 instruments were used to survey a site near Bloemfontein (Paradys) and another in the KZN midlands (Glenside). Each site was divided into grids which were used to determine positions where all scanning data were collected. EC_a data were obtained by operating the instruments in both their shallow (0.5 m) and deep (1.0 m) settings for both vertical and horizontal dipole orientations. Comparison between the instruments for the shallowest depth (measured in the horizontal position and 0.5 m setting) was weakly correlated at Paradys with an r^2 of 0.45, but obtained an r^2 of 0.99 at Glenside. It was nevertheless concluded that both instruments expose similar 'fingerprinting' characteristics from the sites surveyed. Results obtained for the greatest depth (measured in the vertical position and 1.0 m setting) were also weakly correlated at Paradys with an r^2 of 0.44, but obtained an r^2 of 0.88 at Glenside. It is concluded that both instruments revealed the same fingerprint for both depths at each site and can therefore be used to substitute each other in surveys. However, the observed shift in the data between the two instruments imply that data from the replacement instrument should only after careful consideration be pooled with that of the original instrument.



Keywords: apparent electrical conductivity, clay content, EM38-MK2®

Biography: Rianto van Antwerpen

Dr Rianto van Antwerpen is a soil physicist by trade and in his career he has worked on projects which covered soil tillage, root growth, soil health, irrigation scheduling, the use of residue from various sources and soil management. Rianto is a Senior Soil Scientist and Programme Manager at SASRI, and holds an honorary appointment at the Department of Soil, Crops and Climate Sciences at University of the Free State. He also serves on councils of the Soil Science Society of South Africa (President), the International Society of Sugarcane Technologists (Agricultural Commission, Agronomy section) and the South African Sugarcane Industries' Agronomists Association (Convener).

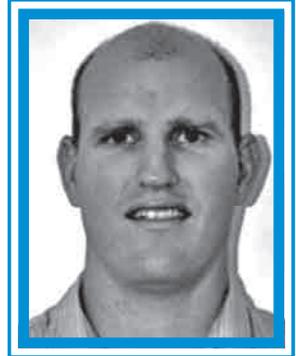
ION EXCLUSION DESUGARISATION OF REFINERY JET 4 USING A SIMULATED MOVING BED PILOT PLANT

JENSEN P AND BALKISSOON S

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Abstract

Ion exclusion is a chromatographic process which separates components from an impure feedstock on the basis of molecular size and charge. The idea of using ion exclusion to increase the recovery of sucrose from refinery Jet 4 (also known as return syrup, the run-off from the last white sugar boiling) has been considered for at least 20 years, but there are still no known installations using the technology for this application. The SMRI recently installed a simulated moving bed (SMB) ion exclusion pilot plant and used it to investigate the feasibility of desugarising refinery Jet 4. The results obtained are compared with those from a previous author who used a batch ion exclusion column to recover sucrose from Jet 4. Although not optimised in the current study, a sucrose recovery of 96% was achieved. The SMB was able to reduce the ash, colour and oligosaccharide components of Jet 4 by up to 93, 72 and 65%, respectively. Other methods of treating Jet 4 were also examined to understand under which conditions one technology is more suitable than another.



Keywords: ion exclusion, chromatography, desugarisation, simulated moving bed

Biography: Paul Jensen

Paul joined the SMRI's research team in 2011, after working abroad for 3 years. His work in the last few years has focused on diffuser operation, ion exclusion chromatography, and the continual search to discover and develop innovative solutions which can increase the profitability of the South African industry.



MULTI-BAG FILTER USED AS SENTRY FILTER AT THE MALELANE SUGAR REFINERY

MDAKANE A AND NDHLALA T

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Abstract

The decolourisation process used at Malelane sugar refinery is carbonatation and colour precipitation followed by light sulphitation. This combination is adequate for the production of refined sugar to EEC2 specification. Intermittent incidences of high turbidity and insoluble solids levels were experienced, the origin of which were attributed to breakthroughs of suspended matter from the final set of filters. Adding a polish filtration step was considered as a suitable solution; however, due to the cost of a full scale polish plant, it was decided to first determine the nature and quantity of suspended contaminants present in the filtered liquor. Pilot plant testing using a bag filter revealed the presence of filter aid, rust particles and unfiltered sludge. The capacity performance tests of the pilot filter bag supported the view that a multi-bag station acting as a sentry filter would be a cost effective alternative to a full scale polish filter plant. The multi-bag sentry filter results show that it is effective in capturing incidences of breakthrough. The main benefit has been the elimination of high turbidity and insoluble solids levels in refined sugar.



Keywords: sugar refinery, decolourisation, turbidity, insoluble solids, cost effective, filtration

Biography: Amanda Mdakane

Amanda Z. Mdakane is an Engineer in Training at TSB Malelane. She obtained her BEng in Chemical Engineering at Stellenbosch University.

FROM 0 TO 5 NOSA STARS: HULREF JOURNEY TOWARDS SAFETY

MOODLEY M AND COCKBURN G

Tongaat Hulett Sugar Refinery, PO Box 1501, Durban, 4000, South Africa
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Abstract

The Tongaat-Hulett Sugar central Refinery in Durban has been in operation for over a century. For many decades, the culture that developed at the Refinery was an operational one and the main focus in terms of performance was on the technical aspect. Due to the changing environment both internally and externally, it became necessary for the management to change the culture from one that focused mainly on production to one that incorporates safety, health, environment and quality (SHEQ). In this paper the journey that was undertaken to shift the focus to safer production practices will be discussed.



The Refinery is a fairly complex entity:

- It is over 100 years old.
- It has an approximate complement of 1300 people, of which 704 are permanent staff, the remainder consisting of fixed term and ad hoc contractors.
- It operates for 47 weeks per year.
- A large number of vehicles enter the Refinery premises on a daily basis (average 535 inclusive of Transnet rail wagons).
- It is 5.26 hectares (52 600 m²) in size and borders the uMhlatuzana river on the south.

The approach used in changing the culture at the Refinery to one of 'SAFE PRODUCTION' involved systems thinking. In any complex process involving change, human nature is given to resistance. In the paper, steps taken to deal with this resistance will be discussed. Data will also be presented on the effectiveness of a safe production culture.

Keywords: refining, safety, NOSA, safe production, safe culture

Biography: Mano Moodley

Mano Moodley is currently the Factory Manager at Hulref. He has 29 years of sugar experience (SMRI, TSB, TEG and now at the refinery). He has authored and co-authored a large number of both SASTA and SIT (Sugar Industry Technologist) papers.



IMPROVED SUGAR QUALITY USING BULAB® 5031 FOR RAW HOUSE PROCESSING

GODDARD SM AND SIGWINTA L

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Abstract

A South African sugar factory was experiencing poor sugar quality due to a carry-over of fine bagacillo particles in the final sugar and high raw house sugar colours. In addition, the pol values were as low as 98% in the final sugar, which was well below the target specification of 99.37%. The result was that the sugar was being rejected and had to be reprocessed. A full-scale factory trial was then conducted with Bulab®5031 at an average of 6 grams per ton on crush rate to the mixed juice tank. During the trial the sugar quality improved significantly with the elimination of the black specks caused by the bagacillo carry-over and a significant improvement in the raw sugar colour. The pol value also improved, with the sugar meeting specification. A second full-scale factory trial with Bulab®5031 was run at another sugar factory that was experiencing black specks in the sugar due to bagacillo carry-over, and again a significant improvement in colour and elimination of bagacillo carry-over was realised.

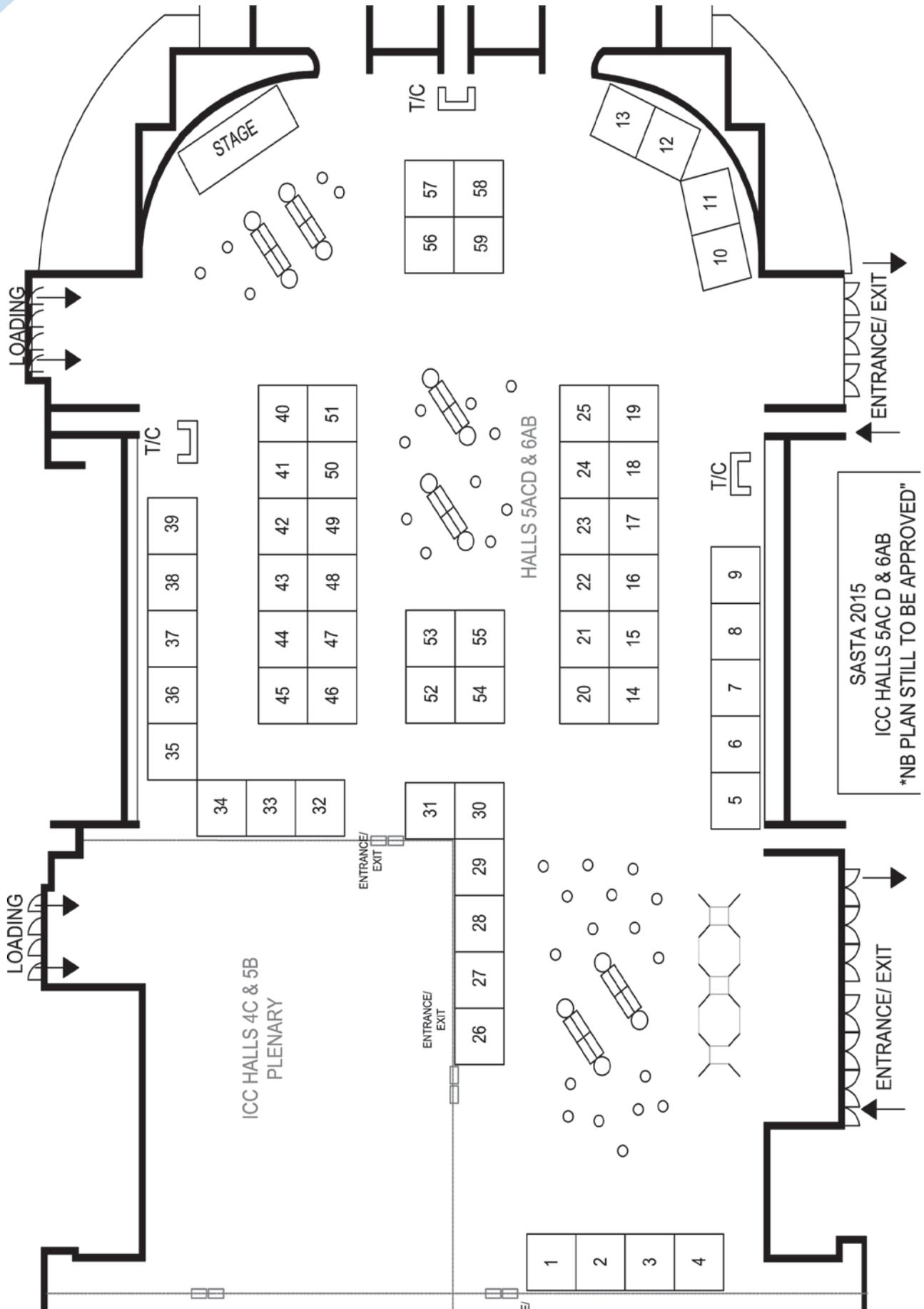


Keywords: quality, colour, bagacillo, carryover

Biography: Shannon Goddard

Shannon Goddard currently holds the position of Project Chemist and is part of the Technology Division of Buckman Africa based in Hammarsdale KwaZulu-Natal. Shannon obtained her Master of Science degree at the University of Natal. She has been with Buckman for 18 years and her key focus areas include providing technical support to the Buckman technical sales team and their customer base across Sub Saharan Africa. Technical and technological support includes sustainable and innovative solutions for various water and direct process related applications for the various markets Buckman serves, with particular interest in the Sub Saharan African Sugar and Ethanol Industry.

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4	Joseph Grieveson Foundry	
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7	Lasec	
8	Processvalve Corp cc	
9	SPEC-CAST Engineering & Wear Parts	
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21	Brevini Power Transmission – PIV Gearboxes	
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24	PGBI Group	
25	Brenley Engineering	
26	John Thompson	

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Website	: http://www.adaptit.co.za/

Adapt IT has approximately 550 employees operating from business divisions in Durban, Johannesburg, Pretoria and Cape Town, led by a core team of executives. Adapt IT has customers in 18 countries in Africa, Asia, Australasia, Europe and North America, and its services and solutions span the complete IT life cycle, from consulting and application design, through to delivery and support.

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Email	: engineering@sucrotech.co.za

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Email	: chrisj@bmgworld.net
Website	: www.bmgworld.net

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Website	: www.bonfiglioli.com

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 Website : www.bruker.com

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BUCKMAN

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 Website : www.clarke-energy.com

Clarke Energy specialises in sales, engineering, installation and maintenance of power plants using GE Power & Water's Jenbacher gas engines. Clarke Energy has 1000 staff in Algeria, Australia, Bangladesh, Cameroon, France, India, Ireland, New Zealand, Nigeria, Tanzania, Tunisia, South Africa (including Botswana and Mozambique), the United Kingdom maintaining low-carbon and renewable energy applications.

CROWN ENGINEERING

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 Email : Johan@Crown-eng.com.au
 Website : http://www.crown-eng.com.au

Crown Engineering is an ISO accredited company with 97 years' experience in the design and manufacture of gears and various engineered products used in the Sugar and Mining Industries. We specialise in general Machining, Gear manufacturing, Fabrication, Heat treatment, Induction Hardening and Gearbox assemblies with a world class quality reputation.

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 Website : www.dresser-rand.com

Dresser-Rand is a world leader in designing, manufacturing, installing, commissioning and servicing of steam turbines from 1K W 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 makes of turbines, through its industry leading applied technology.

DUBE AGRILAB

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 Website : www.dubetradeport.co.za

Dube AgriLab's micro-propagation facility supplies disease free, true-to-type young plant for the agricultural and horticultural industries. Located in Durban adjacent to King Shaka International Airport the AgriLab services both national and international markets and has the ability to develop protocols internally for a variety of plant cultivars. It has the capacity to produce more than 3 million plantlets a year.

ELGIN ENGINEERING

Stand Number : 3
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 Website : www.elgin.co.za

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EWC was established in 2014 to combine a collective of 40 years of project, operation and detail design experience in a single entity to give a Turnkey solution. Design, consulting and engineering services range from the Packaging, Fuel, Wood, Pulp, Mining, Agriculture, Animal Feed and Sugar industries. EWC is hands-on Project, Integration and Contract Management consultants with a strong focus from concept, design to commissioning approach. The key area for EWC is in the Project Planning and Conceptual engineering that will ensure that the projects are correctly structured, engineered and managed. An important aspect of EWC is their ability to conduct integrated design and management thereof, combining multi engineering discipline in a Turnkey approach.

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1 Pinelands Business Park
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ImproChem's core focus is on partnering with their Customers to maximise water utilisation efficiency. ImproChem offer a wide range of Water, Energy and Air Management solutions; including the latest technology around their chemical offering, and a full range of equipment solutions to specifically the Sugar Industry in South Africa and over the African continent. These offerings assist their customer to drive down their operational cost and at the same time reduced impact on the environment.

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MAINTENANCE ENGINEERING SERVICES CC

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 Website : www.mescc.co.za

Maintenance Engineering Services CC was established in 1996, with its core activity being the design, supply and maintenance of the equipment used by SASA Cane Testing Service as well as sampling equipment of other factory products. This comprises the equipment used to sample and analyse consignments of cane delivered to the cane factory, for payment to the cane suppliers.

MECOSA (PTY) LTD

Stand Number : 6
 Representative : Henning Springer
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Stand Number : 20
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NETAFIM

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OSIsoft provides an open infrastructure to connect sensor-based data, operations and people to enable real-time intelligence. Our flagship product, the PI System, enables your business to capture and leverage sensor-based data across the enterprise to improve efficiency, sustainability, quality and safety. A leading solution provider to the sugar industry in Africa. Our regional Head Office in Kloof, KwaZulu Natal, South Africa, provides sales, technical support and training across sub-Saharan Africa.



PGBI GROUP

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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 from bagasse. PGBI actively seeks out and develops new sugar, bio-ethanol and bio-mass power generation opportunities across the African continent, and we have also designed and implemented numerous mill expansions, ethanol projects and co-generation projects for our Africa based sugar clients.

PRAJ INDUSTRIES LIMITED

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 Telephone : +27 (0)760 242 903
 Email : grant@processvalve.co.za
 Website : www.processvalve.co.za

Process Valve Corp. cc is an industrial valve stockist distributor formed in 1987, specialising 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.

REGGIANA RIDUTTORI SRL

Stand Number : 58
 Representative : Mr. Peter Kristensen _ Sales Manager
 Telephone : +39 0522259211
 Email : info@reggianariduttori.com
 Website : www.reggianariduttori.com

With over 40 years of experience, Reggiana Riduttori is one of the world's leading companies in the design and manufacture of gear-boxes for power transmission applications. Our products are 100% manufactured in Italy and offer the most innovative solution for the sugar cane industry.

RMIG

Stand Number : 1&2
 Representative : Steffen Moller & Steve Bennett
 (Local agent API Solutions)
 Telephone : +27 (0) 31 569 2396 & +45 44 20 88 11
 Email : steveb@apisolutions.co.za
 & stmo@rmig.com
 Website : www.rmig.com & www.apisolutions.co.za

RMIG are one of the largest perforating companies in the world. One of its specialised sugar product lines is the manufacture of screens for BATCH centrifuges and mud filter screens. The local agent in South Africa is API Solutions SA (Pty) Ltd.

SASTA

Stand Number : 19
 Representative : Danile Macdonald
 Telephone : +27 (0) 31 508 7543
 Email : Sasta@sugar.org.za
 Website : www.sasta.co.za www.sastacongress.org.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, 2015 being the 88th ! 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.

Benefits of SASTA membership:

- opportunity for the sharing of scientific and technical knowledge at SASTA Congress
- member rates for SASTA Congresses and other SASTA events
- member prices for SASTA publications (Lab Manual and current Annual Congress Proceedings)
- access to participation at SASTA Congress trade exhibitions
- email notifications and newsletters regarding Congress, Field Days, Workshops, AGM etc.

S. B. RESHELLERS PVT. LTD

Stand Number : 27
 Representative : Mr. Mohsin Shaikh
 Telephone : +91 231 2658 297, 2656 197
 Email : mmshaikh@sbreshellers.com;
 helpdesk@sbreshellers.com
 Website : www.sbreshellers.com

S. B. Reshellers is a world leader in Sugar Mill Rollers and Mill spares. We cater to all major Sugar Factories and Original Equipment Manufacturers of sugar mills in India and International market. Today SBR caters to almost 20 countries across 6 continents. Together with F.P. Engineers, SBR intends to support the Southern African Sugar Millers for complete Milling solutions.



SGM MARKETING CC

Stand Number : 22 & 23
 Representative : Simon Marsh
 Email : Simon@sgmmarketing.co.za

SGM is based in Durban, South Africa. We have recently concluded a co-operation agreement with Su Group, world leaders in Centrifuge development, design, manufacture & sale. This is an exciting development for both our companies. We continue to be fully equipped to supply, service and repair all Enerpac, Brevini and Skataskalo products as well as various engineered parts and pumps. Over the last 25 years, we have built strong business relationships with our OEMs, thereby ensuring streamlined processes and very competitive prices.

SIVEST

Stand Number : 29
 Representative : Mr. Didier Regnaud
 Telephone : +27 (0) 31 581 1500
 Email : didierr@sivest.co.za
 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

Stand Number : 37
 Representative : Evesh Maharaj
 Telephone : +27 (0)31 5087700
 Email : Evesh.maharaj@sasa.org.za
 Website : www.sasa.org.za

The South African Sugar Association will be showcasing the services that we have on offer to the industry.

SPEC-CAST ENGINEERING & WEAR PARTS

Stand Number : 9
 Representative : KERRIE SLATER
 Telephone : +27 (0) 82 853 8170
 Email : kerrie@spec-cast.co.za
 Website : www.speccastwearparts.co.za

Spec-Cast Group of companies are leading manufacturers & distributors of wear parts & custom designed castings & forgings for the Mining, Power, Sugar, Earthmoving & Agricultural industries. SWP in association with Qadbros Engineering bring to the Sugar Industry a dynamic, world recognised, cost effective range of Preparation & Milling equipment for Sugar Factories within the African continent.

STERNENZYM GMBH & CO. KG

Stand Number : 15
 Representative : Mr. Lennart Fluegge
 (lfluegge@sternenzym.de)
 Telephone : +49 (0) 4102 202 002
 Email : info@sternenzym.de
 Website : www.sternenzym.de

SternEnzym GmbH & Co KG is a member of the independent, owner-managed Stern-Wywiol Gruppe in Hamburg. Established in 1988, SternEnzym 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.

THOMAS BROADBENT & SONS LTD

Stand Number : 1 & 2
 Representative : Mark Taylor and Ron Harper (UK)
 Steve Bennett (South Africa)
 Telephone : + 27 31 569 2396 & +44 (0)1484 477200
 Email : rharper@broadbent.co.uk (SPARES)
 sugar@broadbent.co.uk (NEW) & steveb@apisolutions.co.za (SOUTH AFRICA)
 Website : www.broadbent.co.uk &
 www.apisolutions.co.za

Thomas Broadbent design, manufacture and supply a full range of batch, continuous and decanter centrifugals together with ancillary equipment such as mixer tanks, for the sugar cane, beet and refinery industries worldwide. We would be happy to discuss your centrifugal requirements together with our local agents API Solutions SA (Pty) Ltd, visit us at stand 2 1 & 2 at the exhibition.

TOPCON PRECISION AGRICULTURE

Stand Number : 11
 Representative : CHRISTO HELM
 Telephone : +27 (0) 832335497
 Email : chelm@topcon.com
 Website : http://ag.topconpositioning.com

Topcon produces a range of controllers for steering and guidance, spraying, seeding, planting, fertilizing, spreading, and incorporating auto-section and variable rate control. Topcon's advanced products are designed to increase efficiency, improve yields, reduce input costs, conserve water, protect the environment, and enhance your farm management system. Topcon have specific applications for the sugarcane production. Topcon has more than 25 years in agriculture.

TRIVENI TURBINE LTD

Stand Numbers : 40,41,50 & 51
 Representative : SAGAR MALI and SANTHOSH MG
 Telephone : +91 80 22164000 (EXT 4111)
 Email : santhosh.mg@triveniturbines.com
 & sagar.mali@triveniturbines.com
 Website : www.triveniturbines.com

Triveni Turbine Limited supplies engineered-to-order steam turbines up to 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 services. With its steam turbines running in over 50 countries and across 18 different industries, it has an installed base of above 11,000 MWe.



TSE ENGINEERING PTY (LTD)

Stand Numbers	: 16
Representative	: Wayne Brits
Telephone	: +27 (0) 832948172
Email	: wayne@turbosystems.co.za
Website	: www.turbosystems.co.za

TURBINE GENERATOR SERVICES

Stand Numbers	: 48
Representative	:
Telephone	: +27 (0) 31 705 3800
Email	:
Website	: www.tgs.co.za

Turbine Generator Services offers a wide range of specialist services to satisfy our customer's power generation needs, from routine maintenance to major overhauls and completed co-generation upgrades. These services are enhanced by our principals, NG Allen, Allen Gears and Dawson Technology. Dawson Technology design and manufacture digital governors and co-generation control systems.

TURBOFLUID

Stand Number	: 30 & 31
Representative	: SHAUN AYLIFFE
Telephone	: +27 (0) 83 659 9240
Email	: shaun.a@turbofluid.co.za
Website	: www.turbofluid.co.za

TURBOFLUID is a multi-disciplinary engineering supply company. Established in 1997, the company provides services throughout South Africa and internationally. Turbofluid supply, repair, maintain, service and commission all types of pumps, steam turbines and rotating equipment. Turbofluid is a preferred vendor for all the major sugar suppliers both nationally and internationally.

The mission of Turbofluid is to achieve the highest potential for excellence and customer satisfaction in the supply, repair, installation / commissioning of pumps, steam turbines, rotating and ancillary equipment to a broad cross section of industry, including sugar and agriculture.

VALVE SPECIALISTS CC

Stand Number	: 45
Representative	: DAYALAN.B.NAIR
Telephone	: 0315696325/6 – 0824682981
Email	: dayalan@valvespec.co.za
Website	: www.valvespecialists.co.za

As one of the largest suppliers of industrial valves in South Africa, Valve Specialists has conveniently located branches in Durban and Johannesburg, offering stocking facilities and prompt delivery services. Our range of valve products range from manual, pneumatic and electric operated, and automated control valves in a variety of materials, pressure and temperature classes. Since commencing

operations in 1990, the company has shown tremendous growth, and currently supplies to all major industries in the country. These include mining, sugar, pulp and paper, petrochemical, food processing, water and effluent, power generation, transport and general manufacturing. Valve Specialists places a premium on quality both on products and service and is proud to have been awarded approval of ISO 9001:2008 certification for the last ten years.

VRL ENGINEERING AND PROJECTS PVT LTD

Stand Number	: 38
Representative	: T VENKATA RAMANA
Telephone	: +919448993901
Email	: venkataramana@vrlautomation.com
Website	: www.vrlautomation.com

- Total Boiling House Equipment on Turnkey Basis
- Upgrading Cane Preparation / Modernization of Mills
- Steam Economy System
- Total Electrical Solutions including Design, Manufacture and Supply & Commissioning of PCC, MCC, Soft Starters, APFC, AC VFD, DC Drives With PLC Control Panels
- Total Automation Solutions Including Design, Manufacture and Supply & Commissioning of DCS, PLC-SCADA and Standalone Controller Based Automation Systems.

ZEST WEG GROUP

Stand Number	: 55
Representative	: Taylor Milan
Telephone	: +27 (0)11 723 6000
Email	: info@zest.co.za
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 supplier of low, medium and high voltage electric motors, vibrator Motors, variable speeds drives, soft starters, 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 2014-2015

Council of the Association 2014 – 2015

CM BAKER	Patron: R LUTGE	KM HURLY
WK LAWLOR	A EKSTEEN	K McFARLANE
SD PEACOCK	S MADHO	KA REDSHAW (Vice-President)
PM SCHORN	S RAMGAREEB (Congress Chair)	D SUTHERLAND
DL SWEBY	GT SMITH (President)	A VAN DER NEST (Treasurer)

Former Presidents

1926-27	M MCMASTER	1956-57	JB GRANT	1986-87	AB RAVNO
1927-28	M MCMASTER	1957-58	JPN BENTLEY	1987-88	PK MOBERLY
1928-29	HH DODDS	1958-59	JPN BENTLEY	1988-89	PK MOBERLY
1929-30	HH DODDS	1959-60	JPN BENTLEY	1989-90	PK MOBERLY
1930-31	GS MOBERLY	1960-61	JL DU TOIT	1990-91	PW REIN
1931-32	GC DYMOND	1961-62	JL DU TOIT	1991-92	PW REIN
1932-33	GC DYMOND	1962-63	JL DU TOIT	1992-93	PW REIN
1933-34	BED PEARCE	1963-64	JR GUNN	1993-94	PW REIN
1934-35	E CAMDEN-SMITH	1964-65	JR GUNN	1994-95	PH HEWITT
1935-36	GC WILSON	1965-66	JR GUNN	1995-96	PH HEWITT
1936-37	GC WILSON	1966-67	LF CHIAZZARI	1996-97	GB O'REILLY
1937-38	J RAULT	1967-68	LF CHIAZZARI	1997-98	GB O'REILLY
1938-39	P MURRAY	1968-69	TG CLEASBY	1998-99	TJ MURRAY
1939-40	P MURRAY	1969-70	TG CLEASBY	1999-00	TJ MURRAY
1940-41	EP HEDLEY	1970-71	TG CLEASBY	2000-01	TJ MURRAY
1941-42	FW HAYES	1971-72	TG CLEASBY	2001-02	TJ MURRAY
1942-43	A MCMARTIN	1972-73	J WILSON	2002-03	MS GREENFIELD
1943-44	G BOOTH	1973-74	J WILSON	2003-04	MS GREENFIELD
1944-45	GS MOBERLY	1974-75	J WILSON	2004-05	KM HURLY
1945-46	GS MOBERLY	1975-76	JB ALEXANDER	2005-06	SS MUNSAMY
1946-47	W BUCHANAN	1976-77	JB ALEXANDER	2006-07	PM SCHORN
1947-48	W BUCHANAN	1977-78	GD THOMPSON	2007-08	PM SCHORN
1948-49	JL DU TOIT	1978-79	GD THOMPSON	2008-09	PM SCHORN
1949-50	HH DODDS	1979-80	GD THOMPSON	2009-10	PM SCHORN
1950-51	A MCMARTIN	1980-81	GD THOMPSON	2010-11	GT SMITH
1951-52	GC DYMOND	1981-82	GW SHUKER	2011-12	GT SMITH
1952-53	GC DYMOND	1982-83	GW SHUKER	2012-13	GT SMITH
1953-54	GC DYMOND	1983-84	AB RAVNO	2013-14	GT SMITH
1954-55	GC DYMOND	1984-85	AB RAVNO		
1955-56	JB GRANT	1985-86	AB RAVNO		



Former Vice-Presidents

1926-27	LE ROUILLARD	1955-56	GC DYMOND	1985-86	PK MOBERLY
1927-28	HH DODDS		WG GALBRATH	1986-87	PK MOBERLY
1928-29	GS MOBERLY	1956-57	WG GALBRATH	1987-88	PW REIN
1929-30	GS MOBERLY	1957-58	JL DU TOIT	1988-89	PW REIN
1930-31	GC DYMOND	1958-59	JL DU TOIT	1989-90	PW REIN
1931-32	AC WATSON	1959-60	JL DU TOIT	1990-91	GW SHUKER
1932-33	AC WATSON	1960-61	J DICK	1991-92	PH HEWITT
1933-34	GC DYMOND	1961-62	JPN BENTLEY	1992-93	PH HEWITT
	E CAMDEN-SMITH	1962-63	JPN BENTLEY	1993-94	PH HEWITT
1934-35	BED PEARCE	1963-64	LF CHIAZZARI	1994-95	GB O'REILLY
1935-36	E CAMDEN-SMITH	1964-65	LF CHIAZZARI	1995-96	GB O'REILLY
1936-37	J RAULT	1965-66	LF CHIAZZARI	1996-97	TJ MURRAY
1937-38	P MURRAY	1966-67	TG CLEASBY	1997-98	TJ MURRAY
1938-39	EP HENDLEY	1967-68	TG CLEASBY	1998-99	BS PURCHASE
1939-40	EP HENDLEY	1968-69	JB ALEXANDER	1999-00	BS PURCHASE
1940-41	FW HAYES	1969-70	JB ALEXANDER	2000-01	BS PURCHASE
1941-42	A MCMARTIN	1970-71	JB ALEXANDER	2001-02	MS GREENFIELD
1942-43	G BOOTH	1971-72	JB ALEXANDER	2002-03	KM HURLY
1943-44	FB MACBETH	1972-73	M MATIC	2003-04	KM HURLY
1944-45	G BOOTH	1973-74	M MATIC	2004-05	SS MUNSAMY
1945-46	W BUCHANAN	1974-75	M MATIC	2005-06	RA BAILEY
1946-47	GC DYMOND	1975-76	GW SHUKER	2006-07	DL SWEBY
1947-48	GC DYMOND	1976-77	GW SHUKER	2007-08	DL SWEBY
1948-49	GC DYMOND	1977-78	GW SHUKER	2008-09	DL SWEBY
1949-50	JL DU TOIT	1978-79	GW SHUKER	2009-10	DL SWEBY
1950-51	OWM PEARCE	1979-80	GW SHUKER	2010-11	BM MUIR
1951-52	OWM PEARCE	1980-81	GW SHUKER		KA REDSHAW
1952-53	K DOUWES-DEKKER	1981-82	AB RAVNO	2011-12	KA REDSHAW
1953-54	JB GRANT	1982-83	AB RAVNO	2012-13	KA REDSHAW
1954-55	K DOUWES-DEKKER	1983-84	PK MOBERLY	2013-14	KA REDSHAW
		1984-85	PK MOBERLY		

Former Congress Organising Committee Chairs

2013-14	DL SWEBY
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