



Welcome to the ISSCT Bulletin for January 2022, in which we collect latest ISSCT updates, along with news, research, and past and upcoming events related to sugar cane technology.

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News from ISSCT

Cane Sugar Engineering – Copyright Infringement

The book “Cane Sugar Engineering” published by the German publisher Verlag Dr. Albert Bartens KG has been very successful and well-accepted by the sugar industry. It was translated into Spanish and Portuguese, and when the first edition was sold out, a second revised and updated edition was published. However sales of the second and the translated editions have been very low, due to the fact that illegal copies of these books have been circulating on the internet. In spite of efforts by Bartens to stop this, the copies continue to circulate.

Each book contains the following statement: “No part of this book may be reproduced in any form – by photoprint, microfilm, or any other means – transmitted or translated into a machine language without written permission from the publishers.”

Wikipedia defines copyright infringement as follows: “Copyright infringement (at times referred to as piracy) is the use of works protected by copyright without permission for a usage where such permission is required, thereby infringing certain exclusive rights granted to the copyright holder, such as the right to reproduce, distribute, display or perform the protected work, or to make derivative works....Public distribution – by uploading or otherwise offering to share copyright-protected content – remains illegal in most, if not all countries.”

Bartens have been sugar industry publishers for four generations, publishing the journal Zuckerindustrie/Sugar Industry, ICUMSA Methods and numerous books relating to sugar. They have added considerable value to the world-wide sugar industry over many years, and have always provided high quality publications. It is now a deplorable situation, and sad to see this behaviour from some fellow technologists. This means that Bartens find themselves making a financial loss in continuing to provide value to the industry. It is the publishers who outlay considerable capital in printing a large number of expensive books. As the author, my loss in royalties is very small by comparison.

An electronic copy of the book may be purchased from the publisher, if that is the preferred option. Users of the illegal copies need to realise that the use of these illegal copies is stealing, and should desist from their use. A user must be able to recognize piracy as a moral issue.

Dr Peter Rein

Chair ISSCT Council and Executive Committee 1999–2001

ISSCT Honorary Life Member

Sugar Cane News

Allbirds and adidas release their first low-carbon performance running shoe

	Yahoo News	December 14, 2021	https://malaysia.news.yahoo.com/allbirds-adidas-release-first-low-112842656.html?guccounter=1&guce_referrer=aHR0cHM6Ly9uZXdzLmdvb2dsZS5jb20v&guce_referrer_sig=AQAAAJFuUyTxao5eZLabRsMttGKVUTeya53N64nWWwxl4LuVff_19amPnzfCmPmgPK6nAxGfH5ULsIDIDTmjhPgP0FJgc35Sv2R8bWdJTYQRsapGqUffGtwRHmmlLRPMsntmwLIX-UmlkmQRcIqUjAHVNZy01xxCmsR_-o3z2WQGrchO
<p><i>Eight months after presenting their low carbon footprint sneaker concept, Allbirds and adidas are now offering it for sale. The highly anticipated shoe, with a carbon footprint of no more than 2.94 kg of CO2 equivalent, will go on sale, initially as a limited edition, on December 15.</i></p> <p><i>Featuring a midsole made from Allbirds' organic sugarcane technology, the performance shoe was built using the tangram principle -- meaning that each component was designed to fit together like a tangram puzzle. The goal is to reduce waste, and by extension, carbon emissions.</i></p>			

Mackay canegrowers impacted by mill stoppages and wet weather [Australia]

	North Queensland Register	December 14, 2021	https://www.northqueenslandregister.com.au/story/7550076/sugar-cane-crush-soured-by-stoppages/
<p><i>Equipment failures have marred what has been an otherwise excellent sugarcane growing season along Queensland's east coast.</i></p> <p><i>Growers are reporting the best crop in five years in the Mackay district, plus excellent sugar prices, but poor factory performance at all three Mackay Sugar mills - Farleigh, Marian and Racecourse, but predominantly Marian - has resulted in a frustrating outcome there, resulting in hundreds of thousands of tonnes of cane still to harvest.</i></p>			

Brazilian scientists erase genes and create sugarcane that produces more sugar and biomass [Brazil]

	Tridge.com	December 22, 2021	https://www.tridge.com/news/scientists-erase-genes-and-create-sugarcane-that-p?utm_medium=email&utm_source=interaction&utm_campaign=market_updates_digest_2021-12-23&utm_content=large_media_cta
<p><i>Brazilian scientists announced this week a new creation in the world: two varieties of manipulated and non-transgenic sugarcane, the so-called DNA-Free. To obtain the plants, some specific genes were silenced and not transplanted from one variety to another, causing their DNA to change. Therefore, they are not considered transgenic.</i></p>			

According to the researchers, who work at Embrapa Agroenergia (DF), one of the sugarcanes has greater digestibility of its cell wall and the other, a greater concentration of sucrose in its tissues. This would solve three challenges for the sector: increase the production of first and second generation ethanol (which is made from bagasse), expand sugar production and generate more bioproducts.

Tereos to double sugarcane seedlings with automation [Brazil]

	Future Farming	December 13, 2021	https://www.futurefarming.com/crop-solutions/tereos-to-double-sugarcane-seedlings-with-automation/
	<p>Tereos aims to double pre-sprouted sugarcane seedlings production by its automated biofactory located in Guaíra, in the interior of São Paulo, Brazil. The goal is to produce 50 thousand seedlings daily and up to 12 million during the entire harvest next year.</p> <p>Inaugurated in April 2020, the facility has produced 7.5 million seedlings so far. Structured to ensure quality MPB's (pre-sprouted seedlings) for the seven Tereos units, located in the northwest region of the state of São Paulo, the increase in production will bring benefits on several fronts for the company.</p> <p>Upon completion of the initiative, important steps of this process will be carried out in an automated manner, such as substrate preparation, yolk extraction, thermal and chemical treatment and temperature and humidity control in the pre-germination phase.</p>		

Ferrari to use bioethanol in its F-1 cars next season [Brazil]

	Biofuels International	November 15, 2021	https://biofuels-news.com/news/ferrari-to-use-bioethanol-in-its-f-1-cars-next-season/
	<p>Brazilian energy company Raizen and Shell have clinched a deal with Ferrari to supply biofuel to its Formula One team next year. The team will begin using 10% second generation ethanol blend in its fuel from next season. The International Automobile Federation (FIA) wants all racing cars to use only sustainable fuels by 2025. The second-generation ethanol to be used by Ferrari is made of sugarcane bagasse.</p>		

Reunion Island plans to go green [Réunion/France]

	DW.com	January 10, 2022	https://www.dw.com/en/reunion-island-plans-to-go-green/a-60359013
	<p>At first glance, Reunion Island seems like a paradise – with palm trees, lush green landscapes and a fresh sea breeze. But the French overseas territory in the Indian Ocean is less idyllic than it seems. Almost two-thirds of its electricity are produced through fossil energy sources.</p> <p>The local government now aims to switch to 100% renewable energy production by the end of 2028. Some media had inaccurately reported a target date of 2023, but it is still an ambitious goal. Mainland France is aiming for a renewable share of just 32% by 2030.</p> <p>But not everybody agrees with Reunion's methods of achieving this goal.</p>		

Praj launches solution to preserve cane juice for 12 months [India]

	The Indian Express	December 10, 2021	https://indianexpress.com/article/cities/pune/praj-launches-solution-to-preserve-cane-juice-for-12-months-7665003/
	<p>City-based Praj Industries has announced the launch of its patented technology, which would allow preservation of sugarcane juice for 12 months. During a press conference in Pune, Pramod Chaudhari, executive chairman of Praj Industries, said this technology will help sugar mills to produce ethanol round the year.</p> <p>Chaudhari said Biosyrup, a patented bio-chemical, is used to treat juice in a specially designed mechanism. For an average mill with 1,000 tonnes cane per day (TCD) capacity, the total investment for the technology will be nearly Rs 4-5 crore.</p>		

How farmers and agripreneurs are making the most of technology that is at their disposal [India]

	The Free Press Journal	December 19, 2021	https://freepressjournal.in/weekend/kisan-diwas-2021-how-farmers-and-agripreneurs-are-making-the-most-of-technology-that-is-at-their-disposal
	<p>Retracing actor extraordinaire Manoj Bajpayee's brand endorsements in 2021 makes one marvel at the ingenuity of his choices. He endorsed products and services that matter to an ordinary person, be it home, finance, farm, food, and rightly so. "I was born and brought up in a village, and I have always flaunted being a farmer's son with immense pride. It is the core of my being, my work and how I choose to do what I do," he says. A proud farmer's son, he endorsed Krish-e App by Mahindra because the product reflects his identity, and he could relate to it.</p> <p>"More so, because I find technology a great enabler, and Krish-e has leveraged it to its advantage to help farmers reduce costs, increase productivity, and ultimately farmers' income," says the actor, who won the National Award for his searing performance in Devashish Makhija's Bhonsle this year. With his endorsement, Bajpayee set the tone for the changing narrative in the agriculture sector that's gravitating towards tech and seeing the active participation of young agripreneurs.</p>		

Uttar Pradesh emerging a leader in ethanol production and blending: ACS Sugar & Cane Sanjay R. Bhoosreddy [India]

	ET Auto.com	January 1, 2022	https://auto.economicstimes.indiatimes.com/news/industry/uttar-pradesh-emerging-a-leader-in-ethanol-production-and-blending-acs-sugar-cane-sanjay-r-bhoosreddy/88638844
	<p>Having 75 distilleries with production capacity of 249.49 crore liters per annum, Uttar Pradesh has become the largest producer of ethanol in the country, with 10 percent blending — the highest among all states. The state government is further establishing 17 new distillery units which are expected to be commissioned in the next two years, said Sanjay R. Bhoosreddy.</p>		

Sugar stakeholders urged to work with Gov't to secure viable future for industry

[Jamaica]

	Jamaica Observer	November 27, 2022	https://www.jamaicaobserver.com/latestnews/Sugar_stakeholders_urged_to_work_with_Gov%26%238217;t_to_secure_viable_future_for_industry
	<p>Agriculture Minister Audley Shaw is calling on stakeholders in the sugar industry to work with the Government to identify solutions to current weaknesses and impediments to promote a thriving sector that can meet market demands.</p> <p><i>"Together we must find the right parameters for a sustainable Jamaican sugar industry – cane farmers, investors, manufacturers, extension workers, haulage contractors, scientists, and technologists and, of course, Government," he said.</i></p> <p>The Minister was addressing the 84th Annual Conference of the Jamaica Association of Sugar Technologists (JAST), which was held virtually on Thursday.</p>		

Left in the lurch, Nepali sugarcane farmers struggle to stay in business [Nepal/India]

	The Kathmandu Post	December 17, 2021	https://kathmandupost.com/money/2021/12/17/unsupported-nepali-sugarcane-farmers-struggle-to-stay-in-business
	<p>A World Trade Organisation panel on Tuesday declared that India violated international trade rules when it offered excessive subsidies to the production and export of sugar and sugarcane.</p> <p>The panel said India violated the WTO agriculture agreement when it provided excessive non-exempt product-specific subsidies to sugarcane producers between 2014 and 2019.</p> <p>The WTO said India must remove its illegal subsidies within 120 days of the adoption of the report.</p>		

Sugarcane harvester in use for first time in Nepal [Nepal]

	The Himalayan	January 8, 2022	https://thehimalayantimes.com/nepal/sugarcane-harvester-in-use-for-first-time-in-nepal
	<p>A cane harvester has been brought into operation to cut and load sugarcanes in Rautahat for the first time in Nepal. Baba Baijunath Sugar Chemicals Mills located at Rautahat's Katahariya Municipality had brought the cane harvester from India's Pune.</p> <p>Nepali Congress Province 2 President Krishna Prasad Yadav inaugurated the cane harvester machine in the sugarcane field on the banks of the Bagmati River amid a programme today. President Yadav said the use of harvester machine would rid farmers of dull works of cutting and ferrying sugarcanes to the mills.</p>		

Sugarcane unavailability: GM says Mardan mills facing closure [Pakistan]

	The News International	December 14, 2021	https://www.thenews.com.pk/print/916636-sugarcane-unavailability-gm-says-
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		mardan-mills-facing-closure
<p>The general manager of the Premier Sugar Mills Mardan on Monday said the mills were facing closure due to the unavailability of the sugarcane.</p> <p>Speaking at a press conference, Jamil Khanzada said that thousands of workers would lose jobs if the mills closed down. Premier Sugar Mills Mardan General Manager Saleem Karmani and Senior Manager Masood Akhtar were also present.</p> <p>Jamil Khanzada said thousands of illegal gur-making (jaggery) units were functioning in Mardan due to the negligence of the district administration. He added that the sugar mills provided Rs285 per 40 kilogram against Rs225 per 40 kg of the government rate. Jamil Khanzada added that despite the sugarcane-harvesting season, the mills had been closed for two months due to the unavailability of sugarcane.</p>		

Nigeria looks to ramp up sugar production with \$73m fund [Nigeria]

	Business A.M.	December 22, 2021	https://www.businessamlive.com/nigeria-looks-to-ramp-up-sugar-production-with-73m-fund/
<p>The Nigerian federal government has formally commissioned a \$73 million infrastructure intervention project aimed at fostering the development and productivity of Nigeria's sugar sub-sector.</p>			
	<p>The sugar infrastructure programme named 'Presidential Intervention on Irrigation Infrastructure to Accelerate Sugar Backward Integration Programme Projects', is expected to support the development of irrigation facilities on 10,000 hectares of sugar plantations located at six Backward Integration Programme (BIP) sites across the country's sugarcane production strongholds including, Numan in Adamawa State; Sunti in Niger State; Lafiagi in Kwara State; and Toto/Tunga in Nasarawa State.</p>		

Ministerial body proposes major reforms in sugar sector [Pakistan]

	Dawn	December 16, 2021	https://www.dawn.com/news/1664041/ministerial-body-proposes-major-reforms-in-sugar-sector https://www.dawn.com/news/1664041/ministerial-body-proposes-major-reforms-in-sugar-sector
	<p>A ministerial panel on Wednesday called for major reform in the sugar sector, suggesting a shift in sugarcane pricing on the basis of sucrose content without any government role, freedom to import sugar but controlled export in case of surplus and imposition of heavy penalties for delayed sugarcane crushing and cartelisation by mills.</p> <p>The Sugar Sector Reform Committee (SSRC), led by Energy Minister Hammad Azhar, was constituted by the federal cabinet in June 2020 following massive price hike in November 2019 and subsequent investigations by the Federal Investigation Agency (FIA).</p>		

Fakhar stresses use of modern technology in agri sector [Pakistan]

	The News International	December 16, 2021	https://www.thenews.com.pk/print/919328-
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		fakhar-stresses-use-of-modern-technology-in-agri-sector
<p>Federal Minister for National Food Security and Research Syed Fakhar Imam has said that there is a need to adopt modern techniques and technology in the agriculture sector in order to strengthen the country's economy and improve the financial conditions of farmers.</p> <p>He said this during his online address to the participants of the inaugural ceremony of the 4th international symposium on Advances in Molecular Biology of Plants and Health Sciences organised by Punjab University Centre of Excellence in Molecular Biology (CEMB) at Sheikh Riazuddin Auditorium here on Thursday.</p>		

Sugar cane quota extension could lead to decline of UK sugar beet – NFU [UK]

	AgriLand	December 22, 2021	https://www.agriland.co.uk/farming-news/sugar-cane-quota-extension-could-lead-to-decline-of-uk-sugar-beet/
	<p>NFU Sugar has criticised the government's decision to extend its 260,000t tariff-free quota for raw cane sugar imports for another three years, which will continue to allow imports of sugar produced in ways that would be illegal in the UK.</p> <p>Michael Sly, chair of NFU Sugar, warned that this extension, coupled with the complete liberalisation of sugar in the UK-Australia trade deal, could lead to the permanent decline of the UK sugar beet industry.</p>		

Latest Research

Modification of cellulose from sugarcane (*Saccharum officinarum*) bagasse pulp by cold plasma: Dissolution, structure and surface chemistry analysis

Cellulose is a most abundant natural biopolymer, however, the strong hydrogen bonding system makes cellulose hard to dissolve, limiting its further applications. In this study, an innovative cold plasma (CP) technology was used to modify cellulose from sugarcane (*Saccharum officinarum*) bagasse pulp. Dissolution, structure, and surface chemistry of cellulose before and after CP treatment were investigated. Results showed that the dissolution rate of cellulose after different CP treatment time (3–12 min) and operating voltage (40–70 kV) was significantly improved. Roughness, even holes (CP treatment 9 min with 50 kV) and breakage (CP treatment 9 min with 70 kV) were observed on the surface. The crystallinity index decreased from 62.31% (control) to 60.88% (CP treatment 3 min with 50 kV). The hydrogen bonding force was weakened and the peak intensity of Cdouble bondO and Csingle bondO stretching vibration groups were enhanced. Therefore, CP-modified cellulose may be applied more in future, such as biological films for food future packaging.

Journal to be published: 16 April 2022, article available online now

> [Link](#)

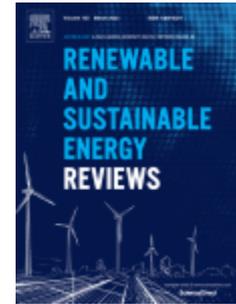


Advancing anaerobic digestion of sugarcane vinasse: Current development, struggles and future trends on production and end-uses of biogas in Brazil

Anaerobic digestion (AD) is a multipurpose technology. One of the AD outcomes is biogas that can be used to supply a local thermal demand, electricity generation or upgraded to fuel vehicle. Brazil has the largest potential for producing biogas, due to its extensive agroindustrial production plus the fact that the country has a population of over 210 million inhabitants. The Brazilian Association of Biogas and Biomethane (ABiogás) reports a potential biogas production of 41.4 billion m³ per year in the sugar-energy sector. However, less than 2% of this is achieved, indicating that the biogas is still chemically, economically, and politically invisible. The current technologies for the production, purification and end-use of biogas/biomethane were reviewed and presented in the context of sugarcane biorefineries. One of the major findings has indicated a thermal efficiency of 85% and a national grid surplus of 74–121 kWh.ton⁻¹ sugarcane when steam boilers connected to electricity generators are used. Alternatively, a quarter of the vinasse generated by a medium-size sugarcane mill (600 m³ d⁻¹) would be enough to supply the diesel consumption of on agricultural operations. The motivation of this review came from the fact that normally renewable energy does not reach its potential due to the lack of references on technological, regulatory and management in their productive arrangements: essential aspects to make them feasible. Therefore, it is expected to strengthen the panorama of research in the biogas system to properly fit with the current expansion and diversification of the Brazilian energy matrix.

Journal to be published: April 2022, article available online now

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Sustainable planning and decision-making model for sugarcane mills considering environmental issues

Many companies and organizations are pursuing “carbon footprint” projects to estimate their own contribution due to growing concerns about global climate change and carbon emissions. Measures such as carbon taxes are the most powerful means of dealing with the threats of climate change. In recent years, researchers have shown a particular interest in modelling supply chain networks under this scheme. Disorganized disposal of by-products from sugarcane mills is the inspiration of this research. In order to connect the problem with the real world, the proposed sustainable sugarcane supply chain network considers carbon taxes on the emission from industries and during transportation of goods. The presented mixed-integer linear programming modelling is a location-allocation problem and, due to the inherent complexity, it is considered a Non-Polynomial hard (NP-hard) problem. To deal with the model, three superior metaheuristics Genetic Algorithm (GA), Simulated Annealing (SA), Social Engineering Optimizer (SEO) and hybrid methods based on these metaheuristics, namely, Genetic-Simulated Annealing (GASA) and Genetic-Social Engineering Optimizer (GASEO), are employed. The control parameters of the algorithms are tuned using the Taguchi approach. Subsequently, one-way ANOVA is used to elucidate the performance of the proposed algorithms, which compliments the performance of the proposed GASEO.

Journal to be published: 1 February 2022, article available online now

> [Link](#)



Facile extraction and characterization of cellulose nanocrystals from agricultural waste sugarcane straw

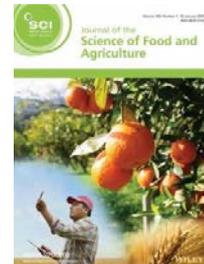
Sugarcane straw is an available but largely ignored lignocellulosic biomass to obtain cellulose nanocrystals (CNCs) with highly crystalline, tunable surface chemistries and a wide-ranging adaptability. Herein, we utilized sugarcane straw to obtain pure cellulose via purification processes, followed by subsequent preparation of CNCs via sulfuric acid hydrolysis. The properties of the purified fibers and obtained CNCs were assessed by their composition, morphology, chemical structure, crystallinity and thermal stability.

After the purification process, alkali-treated fibers (ATFs) contained $886.33 \pm 1.25 \text{ g kg}^{-1}$ cellulose, and its morphological analysis revealed a smooth and slender fibrous structure. The CNCs obtained by treatment with 64 wt% sulfuric acid at 45°C for 60 min were isolated in a yield of 21.8%, with a diameter and length of 6 to 10 nm and 160 to 200 nm, respectively. Moreover, crystallinity index of these CNCs reached 62.66%, and thermal stability underwent a two-step degradation. Short-term ultrasonication after hydrolysis was employed to enhance isolation of the CNC particles and improve the anionic charge with higher value -38.00 mV .

Overall, isolation and characterization results indicated the potential for CNCs preparation using sugarcane straw, in addition to offering a fundamental understanding of this material and indicating potential applications. © 2021 Society of Chemical Industry.

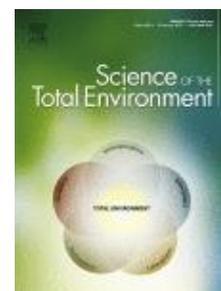
Journal to be published: 15 January 2022, article published June 2021

> [Link](#)



Ten years of monitoring dissolved inorganic nitrogen in runoff from sugarcane informs development of a modelling algorithm to prioritise organic and inorganic nutrient management

Reducing nitrogen (N) losses from cropping systems to aquatic ecosystems is a global priority. In Australia, N losses from sugarcane production in catchments adjacent to the Great Barrier Reef (GBR) are threatening the health of this World Heritage-listed coral reef ecosystem. N losses from sugarcane can be reduced by improving fertiliser management. However, little is known about the contribution of organic sources of N, such as mill mud. We used more than 10 years of data from two of the main Australian sugarcane regions, a high (Wet Tropics) and moderate (Mackay Whitsundays) rainfall area, to calibrate and validate a model to predict dissolved inorganic nitrogen (DIN) losses in runoff from both inorganic and organic fertilisers. DIN losses in runoff were well simulated (RMSE = 0.37 and 2.0 kg N ha⁻¹ for the Wet Tropics and Mackay Whitsunday regions, respectively). Long-term simulations of rate and fertiliser deductions to account for N from organic sources showed that adopting best management practices for organic fertiliser (applying $\leq 50 \text{ wet t ha}^{-1}$ mill mud) can significantly reduce DIN in runoff losses compared with applications of $150 \text{ wet t ha}^{-1}$. Simulations of typical farmer practices in relation to fallow management (bare fallow vs. legume fallow) and organic fertiliser placement (buried in a fallow but surface applied to a green cane trash blanket in ratoons)



showed that inorganic fertiliser rates need to be adjusted to account for N inputs from both mill mud and legume crops. Rates of application of organic N had a larger impact on DIN runoff losses than placement or timing of application. This work presents a DIN in runoff modelling algorithm that can be coupled with nitrogen models readily available in agricultural models to assess the impact of nutrient management on the quality of water leaving agricultural systems.

Published 10 January 2022

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A comprehensive molecular cytogenetic analysis of the genome architecture in modern sugarcane cultivars

Modern sugarcane cultivars are derived from the hybridization of *Saccharum officinarum* ($2n = 80$) and *S. spontaneum* ($2n = 40-128$), leading to a variety of complex genomes with highly polyploid and varied chromosome structures. These complex genomes have hindered deciphering the genome structure and marker-assisted selection in sugarcane breeding. Ten cultivars were analyzed by fluorescence in situ hybridization adopting chromosome painting and *S. spontaneum*-specific probes. The results showed six types of chromosomes in the studied cultivars, including *S. spontaneum* or *S. officinarum* chromosomes, interspecific recombinations from homoeologous or nonhomoeologous chromosomes, and translocations of *S. spontaneum* or *S. officinarum* chromosomes. The results showed unexpectedly high proportions of interspecific recombinations in these cultivars (11.9–40.9%), which renew our knowledge that less than 13% of chromosomes result from interspecific exchanges. Also, the results showed a high frequency of translocations (an average of 2.15 translocations per chromosome) between *S. officinarum* chromosomes. The diverse types of chromosomes in cultivars imply that hybrid gametes of *S. spontaneum* and *S. officinarum* may form unusual chromosome pairs, including homoeologous or nonhomoeologous chromosomes either between or within *S. spontaneum* and *S. officinarum*. Moreover, we consistently observed 11 or 12 copies for the four studied chromosomes, i.e., chromosomes 1, 2, 7, and 8, suggesting steady transmission during the breeding program. By comparison, we found a relatively fewer copies of *S. spontaneum* chromosome 1 than those of *S. spontaneum* chromosomes 2, 7, and 8. These results provide deep insights into the structure of cultivars and may facilitate chromosome-assisted selection in sugarcane breeding.

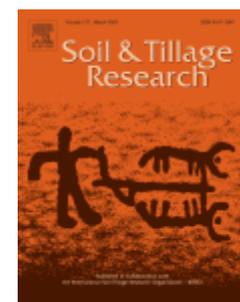
Published: 6 January 2022

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Investigating the relationships between soil and sugarcane attributes under different row spacing configurations and crop cycles using the state-space approach

The adoption of different row spacing configurations has been advocated as a possible solution to mitigate the problems related to soil compaction in sugarcane areas due to the frequent use of heavy agricultural machines. This study aimed to (i) identify factors that influence the relationships of biometric attributes of sugarcane and attributes of an Oxisol soil under different scenarios in Southern Brazil and (ii) describe the distribution of the biometric attributes of sugarcane through state-space analysis under all the evaluated scenarios. Sugarcane was planted using conventional planting systems. The total experimental area of 200 m × 20 m consisted of three row spacing configurations:



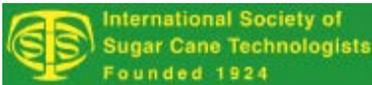
(i) single-row spacing; (ii) double-row spacing; and (iii) triple-row spacing. In each row spacing configuration, a transect was established, and fifty soil sampling points were distributed at equal distances. At each point and transect, disturbed and undisturbed soil samples were collected in the 0.00–0.10 m soil layer to determine soil bulk density, total porosity, macro- and – microporosity, soil penetration resistance and water content at field capacity in three sugarcane crop cycles. At the end of each crop cycle and each transect, stalk height, number of stalks per square meter, stalk mass and tons of stalks per hectare were determined at each sampling point. All the data sets were analyzed using descriptive statistics and ANOVA. In addition, using the Tukey test, the mean values of each attribute were compared to assess the effects of each row spacing configuration and sugarcane crop cycle on all the soil and crop attributes. Spatial relationships of the biometric attributes of sugarcane and co-regionalized soil attributes under each row spacing and crop cycle were evaluated using the auto- and cross-correlation functions and the state-space approach. There were no statistically significant differences between the crop and soil attributes measured under the single- and double-row spacing configurations. In addition, it is expected that with the advance in the age of the sugarcane crop, a superiority of the performance of the double-row spacing, compared with the single-row spacing, will be observed, due to the possibility of monitoring the traffic control under the double-row spacing configuration. On the other hand, the adoption of the triple-row spacing configuration caused negative effects on all the crop and soil attributes, compared with the other two row spacing configurations. Future studies of sugarcane crop and soil attributes should be developed to validate the state-space approach in other environmental conditions.

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Events

	<p>7th IAPSIT International Sugar Conference & Sugarcon-2022 <i>"Sustainability of the Sugar and Integrated Industries: Issues & Initiatives"</i> Indian Institute of Sugarcane Research 16–19 February 2022 Lucknow, India & virtual platform (for international delegates)</p> <p>> Link</p>
	<p>The Dubai Sugar Conference Dubai Sugar Conference 13–16 March 2022 InterContinental Dubai Festival City</p> <p>> Link</p>
	<p>2022 S.I.T. Orlando Conference Sugar Industry Technologists 17–19 April 2022 Orlando, Florida, USA</p> <p>> Link</p>

	<p>2022 Australian Society of Sugar Cane Technologists Conference <i>Australian Society of Sugar Cane Technologists</i> 19–22 April 2022 Mackay MECC, Queensland, Australia</p> <p style="text-align: right;">> Link</p>
	<p>ASSCT Annual Florida & Louisiana Joint meeting <i>American Society of Sugar Cane Technologists</i> 14–16 June 2022 Hyatt Regency Coconut Point Bonita Springs FL USA</p> <p style="text-align: right;">> Link</p>
	<p>XVI International Congress on Sugar and Cane Derivatives: Diversification 2022 <i>AZCUBA Sugar Group, the Cuban Association of Sugar Technicians and the Cuban Institute of Research on Sugarcane Derivatives</i> 20–24 June 2022 Cuba</p> <p style="text-align: right;">> Link</p>
	<p>American Sugar Alliance Symposium, Seattle, WA <i>American Sugar Alliance</i> 29 July – 3 August 2022 Seattle, WA, USA</p> <p style="text-align: right;">> Link</p>
	<p>28ª Feira Internacional da Bioenergia <i>Fenasucro & Agrocana</i> 16–19 August 2022 Centro de Eventos Zanini, Sertãozinho, Brazil</p> <p style="text-align: right;">> Link</p>
	<p>ISSCT XXXI Congress <i>International Society of Sugar Cane Technologists / The Sugar Technologists' Association of India (STAI)</i> February 2023</p> <ul style="list-style-type: none"> • Congress: 20–23 February • Pre-congress tour: 17–18 February • Post-congress tour 24–28 February

	Hyderabad International Convention Centre (HICC), India > Link
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