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Bulletin

Welcome to the ISSCT Bulletin for June 2026, 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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ISSCT News

Heat stress and the future of the sugarcane sector

by

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Introduction

Sugarcane, cultivated on around 27 million hectares worldwide, supplies more than 80% of global sugar production. It is also the primary feedstock for the emerging bioeconomy, including the production of biofuels and a wide range of biobased products. For much of its modern history, the sugarcane industry has viewed climate change through a familiar lens: drought, floods, and shifting rainfall patterns. These are tangible risks, and in many regions already material. Yet a more fundamental challenge is now emerging, one that strikes at the core of the crop's productivity: the physiological limits of photosynthesis itself.

Photosynthesis machinery at stake

Recent work published in the journal Science has sharpened this concern. Crops can acclimate to elevated temperatures, but photosynthetic efficiency declines sharply once certain thermal thresholds are exceeded. Irreversible damage to photosystem II and associated biochemical processes usually begins when leaf temperatures exceed about 40–45°C (Bernacchi *et al*, 2025). At that point, the machinery for converting sunlight into biomass becomes unstable. This constrains carbon assimilation and, ultimately, yield.

Perhaps the most alarming finding is that gradual exposure to elevated temperatures lets plants develop protective mechanisms. But these defences are not activated by the sudden, acute temperature spikes that now characterize modern heat waves. In other words, the crop cannot adapt fast enough to the kind of extreme heat events that climate change is making routine.

For sugarcane, a crop often regarded as inherently heat-tolerant, this finding should prompt careful reassessment. The question is no longer simply whether sugarcane can survive in hotter climates. The more pressing question is whether it can remain economically productive as extreme heat events become more frequent and prolonged.

Sugarcane's C4 photosynthetic pathway confers a clear advantage under high light and high temperature. It allows for higher radiation-use efficiency and reduced photorespiration compared to C3 crops. However, this advantage is not absolute. For sugarcane, physiological evidence is disturbing. Studies show that growth becomes stunted above 36°C, and photosynthetic rates decline measurably once temperatures exceed 38°C. At 40°C, a threshold once rare but increasingly common across major growing regions, chlorophyll concentrations fall sharply. The efficiency of Photosystem II, the leaf's light-harvesting engine, degrades. The plant begins to shut down the very process on which sugar synthesis depends. Furthermore, at high temperatures, maintenance respiration accelerates oxidative stress and impairs enzymatic function.

Closer examination of the underlying molecular mechanisms suggests that the carbon-fixing enzyme Rubisco normally drives the photosynthetic cycle. But as temperatures climb, Rubisco loses specificity for CO_2 over O_2. The result is a wasteful process called photorespiration, which consumes energy and releases carbon dioxide instead of fixing it. Heat simultaneously damages the thylakoid membranes in chloroplasts. These membranes convert light into chemical energy. Damage generates reactive oxygen species, causing oxidative damage to proteins and membrane lipids. Field observations consistently show that severe heat stress leads to reduced stalk elongation, increased fibre content, and diminished recoverable sugar.

When drought compounds heat stress, the combined effect on photosynthesis is particularly destructive. Stomatal closure triggered by water deficit starves the leaf of CO_2. This magnifies the photodamage caused by high temperatures (Sato et al., 2024). This interaction is critical for sugarcane, which is grown mainly in climates where heat and drought increasingly co-occur.

The globalization of climate risk

The geographic reach of this threat is vast. Brazil, the world's largest sugarcane producer, is already facing the consequences. Climate models across nine of

Brazil's agroclimatic zones show that, under the most extreme warming scenario (SSP5–8.5, a very high greenhouse gas pathway), yield variability increases substantially. Rainfall could decline by up to 71% in the northeast by the century's end. A dual blow of heat and drought may arrive together (Leite et al., 2026). India, the second-largest producer, also faces sobering projections. Using the CANEGRO-Sugarcane crop model, Jaiswal et al. (2023) found that rising minimum temperatures will speed stalk growth in some tropical states. Yet sucrose content will decline across most regions, and harvest returns fall even when raw biomass increases. This distinction matters: the industry sells sucrose, not biomass, so stalk growth does not guarantee profitability.

As Yale Climate Connections has documented in its coverage of climate impacts on agriculture, crops have optimal temperature thresholds beyond which steep yield declines become inevitable, with yield reductions for corn, wheat, rice, and soybeans projected to be between 3 and 7% per degree Celsius of warming (Masters, 2022). The broader pattern is unambiguous: climate change is increasing the frequency and intensity of concurrent heat and drought events, and the world's major cropping systems, including sugarcane, are not well adapted to handle them simultaneously. A 2025 study cited by Yale Climate Connections found that for every 1°C increase in global mean surface temperature, food production losses equivalent to 4.4% of recommended nutrient intake occur globally (Masters, 2025).

Beyond heat: the cost of climate volatility

There is a second crisis unfolding beyond physiology: the collapse of seasonal predictability that generations of farmers have relied upon. Volatility has distinct economic consequences. Mills must maintain crushing capacity regardless of fluctuations. Growers commit capital months ahead of harvest, often with little visibility on climate conditions. Input suppliers, insurers, and lenders also face higher risk as production becomes less predictable.

Yale Climate Connections has reported that sugarcane farmers in India's Maharashtra state are planting according to their traditional calendars, only to watch their crops fail. First, they faced floods. Then heat. Then pest outbreaks linked to warmer winters (Masters, 2025). Climate models now find not just higher average temperatures, but more erratic rainfall. They show longer dry spells

interrupted by intense deluges, disrupting the cool, dry ripening periods essential for sucrose accumulation.

This matters enormously for the industry's economics. Sugarcane yield is one thing; sucrose content is another. The modelling work of Flack-Prain et al. (2021) confirms that sugarcane yield's sensitivity to temperature varies greatly by site and moisture regime. The connection between warming and productivity is neither linear nor uniformly positive.

Redrawing the industry map

The most consequential, and most neglected, dimension of heat stress on sugarcane is not how it affects the crop this season. It is how it will redraw the map of viable production over the coming decades. At the 2007 ISSCT congress in Durban, researchers warned that the long-term trajectory of climate change would fundamentally redraw sugarcane's suitability map (ISSCT, 2007). That warning now nearly two decades old, has yet to be absorbed into mainstream industry planning with the urgency it deserves.

The emerging picture from climate-suitability modelling is one of creeping exclusion in the tropics and possible expansion at the margins. In Brazil, the agricultural frontier for sugarcane is already shifting southward as the northeast becomes thermally and hydrologically marginal (Leite et al., 2026). In India, the simulation studies consistently projects that the sugar producing states Maharashtra, Karnataka, Tamil Nadu will experience the sharpest yield and sucrose losses (Jaiswal et al., 2023). Small island producers, namely Mauritius, Fiji, Barbados, and parts of the Caribbean, sit somewhat apart from this picture. Their maritime climates are buffered by the ocean's thermal inertia, and sea surface temperatures are projected to rise more gradually than land temperatures in continental interiors, so the acute photosynthetic shutdown threshold is unlikely to be the primary threat. But sugarcane growth and sucrose accumulation are sensitive to mean temperature increases well below that threshold, and island producers face their own compounding pressures: rising sea levels and saline intrusion into low-lying cane lands, more intense cyclones, and shifting rainfall patterns. For these industries, the redrawing of the suitability map is less a question of crossing a dramatic thermal ceiling than of a slower erosion of viability, and with nowhere to relocate within national borders, that erosion has nowhere to go but down.

This is where the economic stakes of heat stress become truly confronting. A modern sugarcane processing mill represents a capital investment of hundreds of millions of dollars and is designed with an operational lifespan of 40 to 50 years. Decisions being made this decade about mill construction or refurbishment in Brazil, Thailand, India, and East Africa will still be operating in the 2060s and 2070s, precisely when the most severe thermal unsuitability is projected to arrive. The Oxford University Smith School has documented the concept of "stranded assets" in agriculture: productive assets that suffer unanticipated write-offs or are converted to liabilities as environmental conditions shift beneath them (Caldecott et al., 2013). Sugar mills, immovable, enormously capital-intensive, and entirely dependent on a viable agricultural catchment within economical transport distance, are among the most exposed agricultural fixed assets on earth.

The relocation of a mill is not merely a matter of dismantling machinery and rebuilding it elsewhere. The entire socioeconomic infrastructure of a sugar-producing region, the networks of cane farmers bound by long-term supply contracts, the roads and rail lines built to move cane to the factory gate, the rural employment base, the local tax revenues, in some cases, the identity of entire towns, is anchored to a mill's location. When the climate renders that location thermally unviable, the mill is not the only stranded asset. It is an anchor that holds a community fast to a sinking geography.

The innovation gap

The sugarcane industry can perhaps mitigate the challenge. Breeding programs in Brazil, Australia, India, and across the Caribbean are screening germplasm for thermotolerant traits, and biotechnologists are exploring genetic pathways, including the manipulation of heat-shock protein expression and Rubisco stability, that could extend the crop's functional temperature range. Bernacchi *et al* (2025) identify several promising strategies in their review: modifying the surface energy balance of crop canopies to reduce leaf temperatures, optimising canopy architecture, improving the enzymatic heat tolerance of Rubisco, and re-engineering key metabolic pathways to remove biochemical bottlenecks. Long (2025) reinforces the urgency of these efforts, noting that without prolonged and costly intervention, many crops and regions will face potentially catastrophic yield declines under continued warming.

But the pace of this scientific work is badly mismatched to the pace of both warming and infrastructure investment. Developing, trialling, and deploying a new sugarcane variety commercially takes 12 to 15 years. The genetic bottleneck in commercial sugarcane varieties, most of which descend from a remarkably narrow lineage, further constrains adaptive breeding. And against this slow biological clock, mills are being built today on 50-year assumptions about the climatic stability of their surrounding landscapes that the science no longer supports.

Concluding comment

The very conditions that made sugarcane the world's dominant sugar crop are now converging toward a threshold beyond which the plant's own biochemistry begins to fail. The 40° to 45°C ceiling identified by Bernacchi et al (2025) is not an abstraction. It is an alarm.

The ISSCT sounded a version of that alarm in Durban in 2007. The science has since grown more precise, more urgent, and more geographically specific.

For decades, sugarcane systems have been designed to maximise output under relatively stable conditions. The emerging climate reality suggests a different objective: maintaining acceptable and predictable performance amid increasing uncertainty.

This raises a final, and perhaps uncomfortable, question.

Can an industry built around maximising productivity adapt quickly enough to a future in which managing volatility becomes more important than maximising yield?

References

Bernacchi, C.J., Long, S.P. and Ort, D.R. (2025) Safeguarding crop photosynthesis in a rapidly warming world, *Science*, 388(6752), pp. 1153–1160. https://doi.org/10.1126/science.adv5413

Caldecott, B., Howarth, N. and McSharry, P. (2013) *Stranded Assets in Agriculture: Protecting Value from Environment-Related Risks*. Oxford: Smith School of Enterprise and the Environment, University of Oxford.

https://www.smithschool.ox.ac.uk/sites/default/files/2022-04/Stranded-Assets-Agriculture-Report-Final.pdf (Accessed: 13 June 2026).

Flack-Prain, S., Shi, L., Zhu, P., da Rocha, H.R., Cabral, O., Hu, S. and Williams, M. (2021) The impact of climate change and climate extremes on sugarcane production, *GCB Bioenergy*, 13(3), pp. 408–424. https://doi.org/10.1111/gcbb.12797

Schulze, R. (2007) C*limate change and the sugar industry in South Africa: Adapting for best management practices* Proc. int. Soc. Sug. Cane Technol. 26: 527-530

Jaiswal, R., Mall, R.K., Patel, S., Singh, N., Mendiratta, N. and Gupta, A. (2023) Indian sugarcane under warming climate: A simulation study, *European Journal of Agronomy*, 144, p. 126760. https://doi.org/10.1016/j.eja.2023.126760

Leite, E.A., Figueiredo Moura da Silva, E.H., Fattori Júnior, I.M. and Marin, F.R. (2026) 'Assessing climate change impacts on sugarcane yield, crop water productivity, and nitrous oxide emissions across Brazil's bioenergy using the CSM-SAMUCA-sugarcane model', *Agricultural Systems*, 231, article 104494. https://doi.org/10.1016/j.agsy.2025.104494

Long, S.P. (2025) Needs and opportunities to future-proof crops and the use of crop systems to mitigate atmospheric change*, Philosophical Transactions of the Royal Society B: Biological Sciences*, 380(1927), p. 20240229. https://doi.org/10.1098/rstb.2024.0229

Masters, J. (2022) 'Food supply and security concerns mount as impacts stress agriculture', *Yale Climate Connections*, 16 September. Available at: https://yaleclimateconnections.org/2022/09/food-supply-and-security-concerns-mount-as-impacts-stress-agriculture/ (Accessed: 13 June 2026).

Masters, J. (2025) 'Ag's challenging future in a changing climate', *Yale Climate Connections*, updated July 2025. Available at: https://yaleclimateconnections.org/2022/09/ags-challenging-future-in-a-changing-climate/ (Accessed: 13 June 2026).

Sato, H., Mizoi, J., Shinozaki, K. and Yamaguchi-Shinozaki, K. (2024) Complex plant responses to drought and heat stress under climate change', *The Plant Journal*, 117(6), pp. 1873–1892. https://doi.org/10.1111/tpj.16612

Summary of the Papers and Posters in Agricultural Engineering Section presented at the XXXII ISSCT Congress in Cali, Colombia, August 2025

by

***Carmina del Valle Fandos, EEAOC, Argentina, Member of the ISSCT* Agricultural Engineering Section**

The activities of the Agricultural Engineering Section at the XXXII ISSCT Congress began with the presentation of four commemorative reports marking the centenary of the society. Each paper analysed a quarter-century of research in agricultural engineering and its impacts throughout the history of the ISSCT congresses. The presentations were delivered by Somwang Leekar, who presented the 1924–1938 period on behalf of Fandos *et al*. and the 1950–1974 period on behalf of Bernard Schroeder; and by Carmina Fandos, who presented the 1975–1999 period on behalf of Troy Jensen and the 2000–2023 period on behalf of Pierre Todoroff.

The technical programme then continued with 20 oral sessions and 12 poster sessions, structured around four key themes: efficient water management, optimization of mechanization systems and reduction of harvesting losses, incorporation of artificial intelligence (AI) and digital agriculture, and sustainable soil fertility management.

Water Management and Smart Irrigation

Several oral and poster sessions focused on optimizing water use and resources through advanced technologies.

In the oral sessions, Kenta Watanabe explained that smart irrigation combined with subsurface drip irrigation (SSDI) increased sugarcane yield by up to 23% during an extreme drought, outperforming traditional management. This system was also more water-efficient and demonstrated that farmers often overapply water.

Elkin Geovanni Sanchez Roncancio (on behalf of A. Avilez *et al.*) also detailed that irrigating at 100% of crop water requirements optimizes profitability and water

efficiency, allowing a 25% reduction in the total volume of water applied compared with common over-irrigation practices.

Pedro Francisco Sanguino Ortiz stated that the use of a mechanical bed former can reduce water use by up to 27% in furrow irrigation by improving the soil's hydraulic efficiency.

In the poster sessions, Julián Eduardo Antía Castaño (on behalf of Angel *et al.*) presented the "GOTAS" project in the Cauca River Valley, which deploys a LoRaWAN-based IoT network with more than 500 digital rain gauges covering 95% of the cultivated area. This system transmits real-time data to the cloud to optimize water management and irrigation decision-making, while also reducing operational costs by 20% to 45%.

Alejandro Durán (on behalf of Carvajal *et al.*) reported that Hacienda Génova (Colombia) transitioned from gravity irrigation to subsurface drip irrigation. Results included an 8% increase in yield, a 60% reduction in water consumption, and a 33% decrease in labour requirements. Pilot tests with underground systems showed water-saving potential of up to 75%.

Mechanization and Harvest Quality

In the oral sessions, Chris Norris, in a double session, revealed that actual losses—especially the "invisible" losses expelled through the extractor—can exceed 30%, a figure much higher than conventional estimates. Faced with this issue, he emphasized the need to establish international standards for mass measurement and to perform precise technical adjustments to machinery. In this regard, controlling the power of the extractor or secondary fan is essential to balance raw material cleaning with sucrose retention.

Samuel Galeano proposed a systematic monitoring method to reduce losses caused by cane pieces left on the ground, improperly cut cane, and ratoon damage.

José Giraldodo detailed that the configuration of harvester blades directly impacts billet quality. Reducing the number of blades from 8 to 4, producing long billets of 27.4 cm, decreased cane ejection by 45.4% and increased sucrose concentration, although it also increased extraneous matter and reduced wagon loading capacity.

María Alejandra Gómez indicated that the delay between cutting and milling has a differential impact depending on the condition of the material. Sucrose loss progresses at a rate of 1.33% per hour in billets with mechanical damage or mutilation, whereas in healthy billets degradation decreases to 0.85% per hour.

Luis Eduardo González Buritica presented a guideline aimed at harmonizing field design with mechanized harvesting, since older designs cause inefficiencies and damage. The guideline proposes calculating plot geometry according to soil conditions and machinery measurements.

In the poster sessions, Marco Giron indicated that La Estrella Mill (Panama) optimized furrow shape through the calibration of post-harvest implements (subsoilers and cultivators). The objective was to standardize furrows to 60 cm wide and 15 cm high. This resulted in an 85% reduction in harvester damage and reduced the amount of cane lost in the field by 65%.

María Camila Cardozo Guzmán (on behalf of Penagos *et al.*) showed that a 2024 study quantified total sucrose loss from field to mill at 2.466%. The CC85-92 variety was identified as the most prone to losses due to its high level of extraneous matter. The analysis highlights that cane variety and waiting time in mill yards are critical factors in sugar degradation.

Henry Bladimir Tarapues explained that they evaluated improvements in harvester cutting components. Discs with a 30° angle improved base-cut quality by up to 13% compared with flat discs. Likewise, the use of 6-edge blades (instead of 4-edge blades) reduced wear and increased the cutting quality index by 20%, extending component lifespan.

Digital Agriculture and Artificial Intelligence

In the oral sessions, Somwang Leekar presented a meta-analysis of scientific literature revealing that 42% of Artificial Intelligence applications in the sector focus on early crop yield estimation. In terms of data acquisition platforms, Unmanned Aerial Vehicles (UAVs/Drones) dominate with a 74% operational preference due to their high spatial resolution, followed by satellite imagery with 26%.

Samuel Daniel Lup Haruta presented a digital model integrating Synthetic Aperture Radar (SAR) data and multispectral optical sensors to diagnose

sugarcane maturity indices at a regional scale, optimizing the planning and application of chemical ripeners.

Julián David Montes presented a study in which, through impurity analysis, they implemented a K-Nearest Neighbors (KNN)-based algorithm coupled with turbidity sensors. The system classifies the presence of mineral impurities in the cane flow in real time with 75% accuracy.

Jaime Hernán Caicedo Angel presented the consolidation of a large-scale multisector RTK network with 10 reference base stations providing coverage to 80% of the 240,000 cultivated hectares in the Cauca River Valley. This network provides automatic planters and harvesters with centimeter-level accuracy of 2.5 cm, drastically reducing ratoon trampling and optimizing furrow layout.

Luis Eduardo González Buritica presented a study in which physical scales and impact sensors on conveyor belts were replaced by cameras analysed through deep learning networks. Eliminating mechanical components vulnerable to wear resulted in a 19% increase in weighing system availability, a 34% reduction in maintenance costs, and a 90% decrease in operational downtime.

Other sessions analysed the use of Synthetic Aperture Radar (SAR) technology for soil moisture estimation. In Diego Fernando Angrino Chiran's study, SAR data was combined with machine learning models, while Alejandro Mestre Quereda further integrated optical satellite imagery into the analysis. Both studies concluded that these technologies enhance decision making in irrigation management, harvest scheduling, and heavy machinery logistics.

Alberto Arroyo Avilez evaluated the effectiveness of the SAFER model using Sentinel-2 satellite imagery to estimate actual evapotranspiration (ETa) in sugarcane crops. By comparing results with the traditional Penman-Monteith method, it was determined that the SAFER model provides a more accurate view of water demand by reflecting actual field water availability conditions, unlike potential calculations that assume unlimited water supply.

Joel Morales described an agricultural management model integrating budget planning with climate forecasts based on the El Niño phenomenon (ENSO). Through the use of digital tools such as chlorophyll meters, moisture sensors, and NDVI satellite monitoring, operational decisions were optimized. This strategy

increased cane yield per hectare by 14.4% and sugar yield by 10.5%, while drastically reducing production costs per tonne by 18.8%.

Arvind Chudasama analysed barriers to implementing digital agriculture, highlighting challenges such as poor rural connectivity, data complexity, and cybersecurity risks. From a socioeconomic perspective, he emphasized the high costs that exclude small producers, the lack of technical training, and the possible loss of farmers' empirical knowledge. He concluded that public policies facilitating technological access and specialized training are necessary.

In the poster sessions, Sebastian Anderson Guerrero showed that Cenicaña and Risaralda Mill (Colombia) developed a method using drone-based LiDAR technology (DJI Matrice 300 RTK) to identify furrow deformations. The system divides rows into 5-meter sections and classifies as deformation any point located 20 cm below the average height.

Alexander Mauricio Caballero Rodríguez detailed the implementation of LiDAR drones to replace traditional tractor-based surveying methods. Through a Python-developed tool, point clouds are processed automatically. This innovation reduced surveying time from 30 minutes to 3 minutes per hectare, eliminated fossil fuel use, and increased irrigation efficiency through improved land levelling.

Ita and Carlos Clynes detailed a study evaluating the use of a portable near-infrared spectrometer (MicroNIR) to analyse cane quality directly in the field. The tool enables non-destructive measurement of Brix, Pol, and moisture with an R^2 greater than 87%. This facilitates determining the exact harvest timing to achieve maximum economic and operational efficiency.

Ana María Guerrero detailed that Pichichi Mill (Colombia) implemented the NAX Artificial Intelligence platform to optimize harvesting. By using clustering algorithms and route optimization, a 15% increase in operational efficiency was achieved.

Soil, Fertility, and Sustainability

In the oral sessions, Carmina Fandos explained that remote sensing and GIS were used to update the zoning of the sugarcane area of Tucumán (Argentina) according to production levels and relate it to soil organic matter (SOM) and pH maps. Low-production areas are mostly concentrated in the center of the province, generally coinciding with low SOM values and, in some cases, alkaline

pH. In contrast, the highest production areas, mainly in the northeast and south of the province, present high SOM values and non-limiting pH levels.

Oscar Javier Munar Vivas presented a geostatistical methodology developed jointly by Cenicaña and the National University of Colombia to map Soil Organic Carbon (SOC) reserves at a depth of 0–20 cm. It is based on the use of organic matter data obtained from laboratory analyses and soil bulk density calculated through a pedotransfer function algorithm.

During the poster sessions, Marco Giron presented a study conducted in Panama where precision agriculture was applied on 150 hectares to reverse declining yields. Electrical conductivity (ECa) maps, NDVI indices, and drone flights were used to adjust irrigation, fertilization, and replanting. As a result, production increased by 10% in the first and second ratoon crops without increasing operational costs.

José Luis Duran presented the development of a rotational mechanical device called “controller” for weed control without herbicides. This tool reduced labour requirements by half and lowered costs per hectare from USD 427 to USD 283.

Pedro Francisco Sanguino Ortiz presented research on the use of chisel subsoiling to combat compaction caused by heavy machinery in Colombia. The treatment that removed residues only from the cane row for subsoiling (T4) was the most effective, reducing penetration resistance and increasing plant growth by 36 cm compared with the control.

Conclusions

The presentations demonstrated that the future of the sugarcane industry lies in precision agriculture that integrates sustainability with high operational efficiency. On one hand, water optimization through smart irrigation systems and IoT networks is achieving water savings and a significant reduction in operational costs associated with traditional over-irrigation. On the other hand, research shows that minimizing critical sucrose losses requires both geometric redesign of fields and meticulous technical calibration of harvester components. Furthermore, the consolidation of digital agriculture—driven by artificial intelligence, LiDAR drones, RTK networks, and soil fertility maps—makes it possible to automate and diagnose crops in real time. This shifts the global challenge of

overcoming economic and rural connectivity barriers to achieve widespread adoption.

Highlights and Synopsis, ISSCT Pathology Section Webinar

by

***Chair ISSCT Pathology Section*, Dr. Shamsul Bhuiyan, Sugar Research Australia**

Screenshot of webinar

Highlights

The webinar highlighted the increasing emergence of complex and evolving disease threats in global sugarcane production systems. Across different regions, presenters documented how previously minor or unrecognized pathogens are now causing significant economic losses, often in association with other organisms or environmental stressors.

In India, *Fusarium sacchari* has shifted from a minor pathogen to a major cause of Fusarium wilt, with yield losses reaching up to 90%, particularly in ratoon crops. Disease severity increases when combined with red rot or during stress conditions, indicating changing host–pathogen interactions and the urgent need for resistant varieties. Similarly, Australia is reporting rising incidences of poor germination, stunting, and crop death linked to *Fusarium* spp., with evidence

suggesting a potential disease complex influenced by varietal susceptibility and environmental conditions.

Emerging disease syndromes were also highlighted. In Jamaica, a previously unrecognized condition characterized by leaf yellowing, shortened internodes, and stalk death is suspected to be a new disease with an unknown causal agent, emphasizing the importance of rapid diagnostics and surveillance. In Brazil, sugarcane wilt syndrome was identified as a complex disease involving *Colletotrichum falcatum* as the primary pathogen and *Pleocyta sacchari* as a secondary contributor, demonstrating how multi-pathogen interactions complicate diagnosis and management.

Collectively, these studies underscore a global trend toward more complex, emerging disease systems, requiring integrated management, molecular diagnostics, and proactive industry preparedness.

Synopsis

On Tuesday 2nd June 2026, the ISSCT Pathology Section hosted a webinar on '***Emerging Diseases of Sugarcane***', bringing together leading global experts to examine emerging diseases of sugarcane with a strong focus on how climate variability and changing production systems are reshaping disease dynamics worldwide.

The webinar featured four presentations from Dr Rassappa Viswanathan (former Director of ICAR-Sugarcane Research Institute, India), Dr Philippe Rott (CIRAD, Montpellier, France), Dr Mariana Cicarelli Cia (CTC, Brazil), and Dr Shamsul Bhuiyan (SRA, Australia).

Across all regions, a key message emerged from the presentations and subsequent panel discussions: diseases previously regarded as minor or unknown are now becoming major production constraints, posing a serious risk to global sugarcane industries.

The topics discussed were:

1. Fusarium Wilt and its Link with Pokkah Boeng - Dr R. Viswanathan described how *Fusarium sacchari* has evolved from a minor to a major pathogen in Indian sugarcane systems. Fusarium wilt can cause up to 90% yield losses, particularly in the ratoon crop. It intensifies when combined with red rot infection or during stress conditions. A traditionally localized pathogen is now becoming a major

issue, indicating a shift in pathogen behaviour and host-pathogen interactions. Current research efforts focus on understanding the epidemiology of this emerging disease and developing integrated management strategies. Particular emphasis at this stage is being placed on developing resistant varieties to mitigate future impacts.

2. Leaf Yellowing and Internode Stunt – A New Disease? Dr Philippe Rott reported on the occurrence of a potential new sugarcane disease in Jamaica during October to November 2023, that was associated with significant production losses. Symptoms included yellow-orange leaf discoloration, reduced internode length, side-shoot proliferation, reduced stalk diameter, and stalk death and mummification. Based on the current observations, it appears to be a new disease of sugarcane, with an unknown causal agent. This case highlights the emergence of new disease syndromes with potentially severe economic consequences. Investigations are ongoing, including molecular diagnosis to identify the likely biotic causal agent(s).

3. Sugarcane Wilt Syndrome in Brazil – Dr. Mariana Cia described a new disease phenomenon, involving stalk mortality and internal rot, that has been observed in commercial crops in Brazil. The disease, identified as sugarcane wilt syndrome, was found to be primarily associated with *Colletotrichum falcatum*, while *Pleocyta sacchari* was identified as a secondary associated organism. The integration of classical pathology and molecular diagnostics was instrumental in identifying the causal agents. A key message from this talk was the increasing occurrence of disease complexes involving primary pathogens and opportunistic organisms, which are making disease diagnosis and management more challenging.

4. Fusarium Wilt in Australia – An Emerging Risk? – Dr. Shamsul Bhuiyan presented recent findings from the Australian sugar cane industry, where increasing incidences of germination failure, stunting, and plant death have been observed. A strong association with *Fusarium* spp. (especially *F. sacchari)* has been observed. Disease incidence and severity appeared to vary among varieties and were influenced by prevailing environmental conditions. Additional fungi were also identified, suggesting a complex disease system. Ongoing research aims to identify causal agent(s), assess industry risk, and develop management strategies. Preliminary findings indicate a potential emerging disease complex,

highlighting the need for continued investigation and proactive industry preparedness.

Panel Discussion

The presentations were followed by a panel, during which several themes were identified:

a) Climate Change: Changing climate conditions including rising temperatures, erratic rainfall, prolonged drought, and wet cycles are reshaping disease dynamics in sugarcane. These conditions increase pathogen survival, enhance disease expression, and expand pathogen geographic ranges.

b) Emergence of Previously Minor Diseases: Pathogens once considered secondary are now major threats. Examples include *Fusarium sacchari* and various soilborne disease complexes. This trend indicates shifts in the host-pathogen-environment relationship.

c) Increasing Importance of Disease Complexes: Multiple pathogens acting together (e.g., primary/minor or opportunistic organisms) could complicate diagnosis. It requires an integrated approach that combines molecular, field epidemiology, and agronomic observations to better understand the underlying causes.

d) Rising Threat of Soilborne Diseases: Soilborne pathogens such as *Fusarium* wilt and red rot are becoming more widespread and more impactful, leading to major consequences such as poor crop establishment, reduced yield, and reduced ratoon ability.

A key consensus emerged that sugar cane disease scenarios are changing globally due to climate pressures. Participants expressed strong concern about the rapid emergence and escalation of new disease threats and the need for global collaboration. The panel recommended greater efforts to collect and integrate data worldwide and link the datasets with climate data for predictive analysis. Suggestions were made to compile global datasets ahead of the ISSCT Pathology Workshop (Réunion, 2027) and to improve preparedness through shared surveillance, knowledge sharing, and collaborative research.

The webinar clearly showed that emerging sugarcane diseases are no longer isolated events but part of a global trend driven by environmental change and evolving pathogen dynamics. A coordinated international effort—combining

research, surveillance, and industry engagement—is essential to safeguard the future of sugarcane production.

Programme of Webinars and Workshops

Webinars by Zoom from 11 am to 1 pm GMT https://www.issct.org/activities/webinars/			
Commission/Section	**Theme**	**Date**	**Announcement (Click to access)**
Biology Commission			
Molecular Biology Section	Molecular and Biotechnology Approaches Shaping the Future of Sugarcane	25-Jun-26	Announcement
Germplasm & Breeding Section	Selection strategies for accelerated and precision breeding	07-Jul-26	Announcement
Entomology Section	Research advances in the management of major sugar cane insect pests	09-Jul-26	Announcement
Co-products Commission	From Sugarcane Byproducts to Breakthroughs: Integrated Fuels, Bioproducts, and Carbon Accounting	28-Jul-26	Announcement

Workshops https://www.issct.org/activities/workshops/		
Commission/Section, Theme and Venue	**Date**	**Announcement (Click to access)**
Agricultural Commission		
Agricultural Engineering & Agronomy	12-15 April 2027	Announcement
Embracing technological advancements and AI to enhance productivity and sustainability		Workshop website
L'Auberge Casino & Hotel Baton Rouge, LA, USA		
Biology Commission		
Germplasm & Breeding/Molecular Biology	9-13 November 2026	Announcement
Developing Climate Resilient Sugarcane		Workshop website
Accra Beach Hotel , Hastings, Christ Church, Barbados, Barbados		
Pathology & Entomology	15-19 March 2027	Announcement
Pushing the frontiers of agroecological management strategies of sugarcane pests and diseases in the context of climate change		Workshop website
Le Récif Hotel, Saint-Gilles-les-Bains, Réunion		
Factory Commission		
Engineering & Processing	19 and 20 April 2027	In preparation
Cairns, Australia		
Co-products Commission		
Reinventing the sugar industry for next-generation value	6-10 June 2027	In preparation
Khon Kaen, Thailand		
Management Commission		
Guatemala	January/February 2028 (During XXXIII Congress)	

XXXIII Congress, Guatemala, January/February 2028

The first Newsletter may be accessed through the following link:

https://designrr.page/?id=489090&token=51652552&type=FP&h=5110

The Newsletter No. 2 is under preparation and will be sent out in mid-August 2026.

The South African Sugar Technologists' Association (SASTA) Turns 100!

Celebrating a century of scientific exchange

1926-2026

by

Sandy Synman

In 2026, the South African Sugar Technologists' Association (SASTA; www.sasta.co.za) celebrates a century of advancing science and innovation in the local sugar industry. For the past 100 years, SASTA has been at the heart of the sugar industry, bringing together industry professionals through world-class congresses and related events, sharing knowledge, building networks, and enhancing progress from field to factory.

SASTA President, Dr Muhammad Kadwa, looks forward to a milestone year of celebration, collaboration, and continued excellence. 'As we honour a century of achievement and reflect on our roots, we also look forward with purpose. Our current industry challenges have perhaps never been as widely shared or as well understood as they are today, and the fundamental principles of research and development remain key to sustainability and investment. As the year progresses, it is evident that many of the themes affecting both agriculture and factory operations have remained relevant throughout our history. The 98th SASTA Congress, scheduled to take place from 18 - 20 August 2026 at the International Convention Centre in Durban, will include an exciting pre-Congress tour and international keynote speakers. This event will

serve as the flagship of our centenary year, highlighting collaboration and continued excellence within the association. As SASTA looks toward the next century, we aim to continue being the central hub for professionals driving our vital industry. The centennial year not only honours our legacy of innovation but also sets the stage for a vibrant future in advancing sugarcane agriculture and sugar processing in South Africa.'

Introducing a new logo

To mark SASTA's centenary, a new logomark was launched. More than a visual update, the new logomark represents SASTA's continued evolution and its readiness to lead the industry into its next century.

The Annual Congress

Attendance at the SASTA Congress has grown steadily over the past 25 years and, while there have been ups and downs, a record number of 667 delegates attended in 2024. An annual congress has consistently been held every year, with the exception of 2007, due to SASTA's involvement in the ISSCT, and 2020 due to the COVID-19 pandemic. Although the SASTA Congress is a local event aimed primarily at role players in the South African sugar industry, it has attracted a growing number of international delegates. Over the last few years, there has been representation from at least 20 countries at SASTA Congresses.

Factory Section Highlights

The significant progress and technological developments have related to a few key areas over the years. Looking back to the first ten years of Congresses, some of the paper titles could be replicated and used today. Some notable ones are:

- Humidity in relation to packing and storage of sugar (1923)
- Deterioration of cut cane (1923)
- The use of bagasse as a raw material for manufactured goods (1926)
- Certain by-products from the sugar industry: Their production and use in SA (1927)
- Boiler efficiency and heat balance in a cane sugar factory (1928)
- Disposal of waste waters (1928)
- On the effect of fibre percentage on extraction (1929)
- Enquiry on the presence & control of sulphur dioxide in Natal raw sugars for export (1931)

- The by-products of the sugar industry - a neglected source of revenue (1931)
- Experiments on the testing of bagasse (1932)

The Factory Annual Review will be presented for the 100th time in 2026. The most published factory authors include the presenters of this Review. The most prolific authors are Steve Davis (65), Raoul Lionnet (58) and Stephen Walford (39).

The topics that have seen the most interest as far as presentations are concerned, with over 50 each, are:

- Extraction – milling & diffusion
- Measurement and control
- Pan floor
- Boilers
- Evaporation
- By-products
- Sugar refining
- Clarification

Agricultural Section Highlights

As with the Factory Section, it is fascinating to see that some of the key issues presented in the first few congresses in the early 1920s are still highly topical and relevant today. For example, soil health and nutrient management, sugarcane pests and diseases, irrigation, mechanisation, and varieties are still at the forefront of discussions. The top three most prolific authors are Jan Meyer (SASRI Soil Scientist 1967-2006), Dr Des Conlong (SASRI Entomologist 1981-2018) and Professor Stuart Rutherford (SASRI Principal Scientist: Integrated Pest and Disease Management 1983-2025). Significant research and technology developments reported on at SASTA Congresses for the benefit of all industry stakeholders, have included the topics seen in the word cloud.

Field and factory visits

For the past 100 years, factory and field visits have played a central role in SASTA's enduring commitment to promoting the exchange of scientific knowledge related to sugarcane agriculture and milling. At their heart, SASTA visits are about learning from people - those who are applying their knowledge with skill, innovation, and integrity. Factory and field visits complement the annual SASTA congress – where knowledge is shared in a scientifically rigorous way - by stepping beyond the science, and into the practical arena of farms and factories.

Into the future

As SASTA celebrates a century of advancing science in support of the sugar industry, its future remains firmly rooted in innovation, collaboration, and knowledge sharing. Building on its rich history, SASTA will continue to serve as a vital platform connecting researchers, industry professionals, and emerging scientists to address the challenges and opportunities facing the sector. Through shared wisdom, decades of experience and a solid source of invaluable information on all sugarcane technology matters, SASTA will strive to embrace future challenges and serve as a forward-thinking platform for the benefit of the sugar industry in the next century.

In the years ahead, the Association will play an important role in promoting sustainable production, embracing new technologies, and fostering the next generation of scientific leaders who will assist in guiding the industry forward. By strengthening collaboration between researchers, industry stakeholders, and growers, SASTA will strive to remain a cornerstone of innovation, resilience, and sustainability for the sugar sector well into the future.

Sugar Cane News

Genetic architecture of sugarcane traits in a polyploid genomics framework

nature	**Nature / Bioengineer.org**	**May 28, 2026**	**https://www.nature.com/articles/s41586-026-10576-7**
	A major study published in Nature has assembled a fully phased genome of POJ2878 - the century-old 'King of Sugarcane' foundational cultivar - resolving all 118 chromosomes. Analysing 981 Saccharum accessions, the research found that over 95% of modern cultivars share extensive genetic segments with POJ2878. The team identified breeder-favoured haplotypes, including a SUS2 haplotype linked to enhanced sucrose content, providing molecular tools to accelerate variety improvement programs globally.		

VSI delegation visits Australia to study advanced sugarcane research [Australia]

ChiniMandi	**ChiniMandi**	**April 27, 2026**	**https://www.chinimandi.com/vsi-delegation-visits-australia-to-study-advanced-sugarcane-research/**
	A high-level delegation from the Vasantdada Sugar Institute has begun a 13-day study tour of Australia from April 26, aimed at exploring new technologies and research methods in sugarcane cultivation. *During the visit, the team will engage with Sugar Research Australia, a leading global institution in sugarcane research. The delegation includes senior members such as Balasaheb Thorat and Rajesh Tope, along with scientists specialising in crop production, breeding, and biotechnology, Loksatta reported.*		

Brazil approves new GM sugarcane variety to curb borer damage and improve field yields [Brazil]

ChiniMandi	**ChiniMandi**	**May 8, 2026**	**https://www.chinimandi.com/brazil-approves-new-gm-sugarcane-variety-to-curb-borer-damage-and-improve-field-yields/**
	Brazil's biosafety commission CTNBio has approved a new genetically modified (GM) sugarcane variety designed to help farmers combat the destructive cane borer insect and improve weed management, Reuters reported. The variety, named VerdPRO2, was developed by the Cane Technology Centre (CTC).		

	According to CTC, VerdPRO2 is a next-generation GM cane that is expected to increase overall field yield by helping the plant gain weight and raise its sugar content. Beyond productivity benefits, the variety also addresses one of the most persistent threats to Brazilian cane cultivation.

Brazil is converting sugarcane waste into more resistant, durable, and eco-friendly asphalt, with a technology that promises to revolutionize roads, reduce the carbon footprint of infrastructure, and repurpose millions of tons of bagasse. [Brazil]

	CPG	**May 3, 2026**	**https://en.clickpetroleoegas.com.br/brazil-is-converting-sugarcane-waste-into-more-resistant-durable-and-eco-friendly-asphalt-with-a-technology-that-promises-to-revolutionize-r-asaf04/#goog_rewarded**
	*Brazilian researchers evaluate the use of sugarcane bagasse ash in asphalt mixtures, combining waste reuse, pavement engineering, and technical performance in an experimental section in Paraná. A residue generated in sugar and ethanol mills has begun to be studied in Brazil as an alternative to improve the performance of **a**sphalt mixtures.*		

Brazil tests ethanol-powered electricity generation in global first for sugarcane fuel [Brazil]

	BioEnergyTimes	**June 3 2026**	**https://bioenergytimes.com/brazil-tests-ethanol-powered-electricity-generation-in-global-first-for-sugarcane-fuel/**
	Brazil has moved a step closer to expanding the role of ethanol beyond transportation, with the launch of what is being described as the world's first engine designed to run almost entirely on ethanol for large-scale electricity generation. *The development marks a key milestone at the Suape II Power Plant, where Suape Energia and Finnish technology company Wärtsilä have completed the installation phase of the Ethanol Project and are preparing to begin real-world operational testing, Interesting Engineering reported.*		

Sugar industry seeks Centre of Excellence for advanced sugarcane breeding [India]

Business Standard	**Business Standard**	**June 3 2026**	**https://www.business-standard.com/industry/agriculture/sugar-industry-seeks-icar-centre-of-excellence-for-advanced-cane-breeding-126060301102_1.html**
	Two of the biggest sugar industry bodies, the Indian Sugar and Bio-Energy Manufacturers Association (Isma) and the National Federation of Cooperative Sugar Factories (NFCSF) have jointly urged the Centre to establish a dedicated Centre of Excellence (CoE) for advanced sugarcane research at the Icar-Sugarcane Breeding Institute (SBI) in Coimbatore. They have sought an estimated outlay of ~87.94 crore for such a centre over the next five years, starting from financial year 2027 (FY27).		

CSIR-IICT scientists develop method to turn sugarcane waste into green biofuel [India]

ChiniMandi	**ChiniMandi**	**April 21, 2026**	**https://www.chinimandi.com/csir-iict-scientists-develop-method-to-turn-sugarcane-waste-into-green-biofuel/**
	Scientists at the CSIR-Indian Institute of Chemical Technology have developed a new method to convert sugarcane waste into high-quality biofuel, offering a potential boost to clean energy efforts and better use of agricultural residue in India. *The research team, led by Alka Kumari along with Chandana and T. Satish, worked under the guidance of institute director D. Srinivas Reddy. They demonstrated an advanced process to convert sugarcane bagasse into biofuel using catalytic hydrothermal liquefaction, The Hindu reported.*		

Can sugar cane waste replace plastic? The Kenyan firm pushing sustainable packaging [Kenya]

rfi	**RFI**	**June 18, 2026**	**https://www.rfi.fr/en/africa/20260518-can-sugar-cane-waste-replace-plastic-kenya-s-push-for-sustainable-packaging**
	In the sugar-growing regions of western Kenya, harvest season leaves behind more than just refined sugar. After extracting the juice from sugar cane, large amounts of fibrous residue – known as bagasse – lie piled next to processing plants. This residue is often treated as industrial waste – burned, discarded or used in low-value applications. *However, one manufacturer in Nairobi believes this waste could help address one of the world's fastest-growing environmental issues: single-use food packaging.*		

Establishing climate-responsive pest and disease management strategies in Tanzanian sugarcane plantations [Tanzania]

ScienceDirect	**Science Direct**	**June 2026**	**https://www.sciencedirect.com/science/article/pii/S2666188826002182**
	Sugarcane productivity in Tanzania is increasingly affected by insect pest and disease infestations linked to climatic variability. This study, conducted in 2022–2024, examined seasonal patterns of pest and disease occurrence in Kilombero and Kagera sugarcane plantations and assessed crop-specific susceptibility to guide climate-responsive management strategies.		

Sugarcane-derived bio-oil eyed as huge waste-saver [Thailand]

Bangkok Post	**Bangkok Post**	**May 23, 2026**	**https://www.bangkokpost.com/thailand/general/3259574/sugarcanederived-biooil-eyed-as-huge-wastesaver**
	Khon Kaen University is developing bio-oil from sugarcane leaves to cut agricultural waste and support clean energy production, with the prototype technology capable of producing up to 1,000 litres daily. *The research project, led by the university's Academic Service Office, uses pyrolysis technology to convert sugarcane leaves and tops into liquid biofuel under high heat without oxygen. The process also produces biochar, a high-value soil improvement material.* *Assoc Prof Chuchat Kamollert, director of the office, stated that the project was developed in cooperation with the Office of the Cane and Sugar Board to help reduce farmers' costs while addressing environmental concerns caused by agricultural waste burning.*		

Harabas: New DOST-PCAARRD program targets fall armyworm in sugarcane [Philippines]

DailyGuardian	**DailyGuardian**	**April 14, 2026**	**http://dailyguardian.com.ph/blog/harabas-new-dost-pcaarrd-program-targets-fall-armyworm-in-sugarcane**
	In a bid to combat the devastating impact of the widely invasive fall armyworm (Spodoptera frugiperda) or FAW on sugarcane in the Negros Region, a program led by the National Crop Protection Center of the University of the Philippines Los Baños (NCPC-UPLB) and funded by the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development of the Department of Science and Technology (DOST-PCAARRD) was launched to develop sustainable strategies against the pest.		

	Locally known as 'harabas,' FAW infestation has affected nearly 1,000 hectares and 4,000 farmers, resulting in an estimated losses of P50.2 million. Aside from FAW, other lepidopteran pests are also causing significant leaf damage to sugarcane.

South Africa: Climate smart sugarcane farming gets boost [South Africa]

	ChiniMandi	**May 8, 2026**	**https://www.chinimandi.com/south-africa-climate-smart-sugarcane-farming-gets-boost/**
	South Africa's sugarcane sector is advancing a suite of climate-smart farming interventions aimed at improving resilience to variable rainfall and rising temperatures in KwaZulu-Natal and other growing regions. Initiatives include precision irrigation, improved trash management practices, and varietal trials targeting heat and drought tolerance. The push comes as the South African Sugarcane Research Institute (SASRI) prepares its 2026–2031 strategy, and as industry stakeholders seek to reduce vulnerability to the weather extremes that have suppressed yields in recent seasons.		

U.S. Sugar puts the country's largest autonomous tractor fleet to work in the cane fields [USA]

	Florida Politics	**May 11, 2026**	**https://floridapolitics.com/archives/795795-u-s-sugar-puts-the-countrys-largest-autonomous-tractor-fleet-to-work-in-the-cane-fields/**
	*The Clewiston-based grower **U.S. Sugar** is rolling out the largest commercial deployment of autonomous tractors in the American sugar industry, putting a fleet of unmanned John Deere machines to work.* *The fleet includes four John Deere 8R Series tractors and one 9R Series tractor, all retrofitted to operate up to 24 hours a day, seven days a week. The autonomy comes courtesy of Utah-based Autonomous Solutions, Inc. whose Vehicle Automation Kit slots into the tractors' existing drive-by-wire systems.*		

Zim targets 450,000 tonnes in sugar output [Zimbabwe]

	NewsDay	**May 22, 2026**	**https://www.newsday.co.zw/local-news/article/200055743/zim-targets-450000-tonnes-in-sugar-output**
	As Zimbabwe's 2026 crushing season intensifies, Tongaat Hulett's Hippo Valley and Triangle mills have introduced the Cane Logistics and Orchestration Platform (CLOP) — a digital scheduling and site-control system that links harvesting schedules directly to real-time mill capacity. The platform has reduced truck waiting times significantly, enabling more loads per day. The mills are targeting 450,000 tonnes of sugar output, an increase that is expected to boost export earnings and rural employment in the Lowveld region.		

Latest Research

Sugarcane Breeding in the Genomic Era: Integrative Strategies and Emerging Technologies

Sugarcane (Saccharum spp.) is a globally important crop for sugar and bioenergy production. However, genetic improvement through conventional breeding is constrained by long breeding cycles, low genetic gain, and considerable operational complexity arising from its highly allopolyploid and aneuploid genome. With the increasing global demand for sustainable food and renewable energy, sugarcane breeding programs must accelerate the development of high-yielding, stress-tolerant cultivars through the integration of advanced biotechnological tools with traditional breeding approaches. Recent advances in genetic engineering, genomic selection (GS), and high-throughput omics technologies, including genomics, transcriptomics, proteomics, metabolomics, and phenomics, have substantially enhanced the efficiency of trait improvement related to growth, development, yield, and stress resilience. The integration of multi-omics data enables the dissection of regulatory networks linking genotype to phenotype, improves predictive accuracy, and provides deeper insights into the molecular mechanisms underlying complex traits. These integrative approaches support more informed selection decisions and accelerate genetic gain in sugarcane breeding programs. This review synthesizes recent technological developments and their practical applications in sugarcane improvement. It highlights the strategic implementation of transgenic and genome-editing technologies, genomic selection, and multi-omics integration to enhance yield potential and resistance to biotic and abiotic stresses, thereby contributing to sustainable sugarcane production and global food and bioenergy security.

Published January 17, 2026

> **Link**

Research on Sustainable Sugarcane Development Based on Deep Learning Models

Based on panel data from 16 regions across the world's five leading sugarcane-producing countries (China, Brazil, India, Thailand, and Australia) spanning 1980–2023, this study constructs four scenario models. Scenario simulations reveal that the comprehensive policy scenario (CPS), through the synergistic effects of policy incentives and technological upgrading, could reduce global nitrogen losses from sugarcane cultivation by 413.109kg/ha, yield per unit area increased by 22,098.289 kg/ha by 2030. This study provides the first systematic demonstration of the cost-effectiveness advantages of the "Policy-Technology-Economy" synergy framework in agricultural sustainable development, offering theoretical support and practical pathways for the green transformation of the global sugarcane industry.

Published June 5, 2025

> Link

Sugarcane trash-derived porous biocarbon as a scaffold for controlled-release fertilizers (PhD thesis)

The global human population is projected to approach 9 billion by 2035, placing unprecedented pressure on agriculture to increase productivity and maintain food security. Meeting this demand will require intensification of crop production, however, nutrient use inefficiencies and the environmental impacts associated with conventional fertilizer practices increasingly constrain our ability to achieve this sustainably. Unchecked intensive cultivation further depletes soils in organic carbon and other essential nutrients, degrades soil structure, and reduces soil fertility, which in turn drives greater reliance on high fertilizer inputs to maintain yields. These challenges highlight the need for improved fertilizer systems that retain nutrients and better align their supply with crop demand while minimizing nutrient losses to the environment through agricultural run-off, leaching, and volatilization.

Urea is the most extensively applied nitrogen fertilizer, but its rapid dissolution commonly leads to inefficient utilisation by crops and exposes surplus nitrogen to volatilization, leaching and run off pathways. Slow release fertilizers aim to synchronise nutrient supply with plant demand to improve nitrogen use efficiency. Biomass derived biocarbon is emerging as an attractive carrier because it is rich in recalcitrant aromatic carbon and can also act as a soil carbon amendment. However, biocarbon typically has modest surface area and poorly developed porosity, which limits nutrient loading and controlled release. There is also a general notion that all biocarbons are not the same in terms of their properties. Choosing the right biomass, with a balanced proportion of biopolymers, and the desired pyrolysis conditions is critical to producing biocarbon with ideal physico-chemical properties.

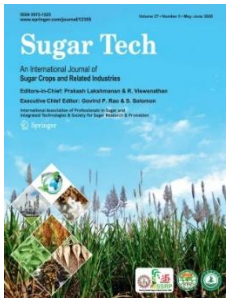
Sugarcane trash is produced in large quantities globally. Utilizing it to produce biocarbons is an attractive proposition for addressing landfilling issues and creating functional materials for the agriculture sector. However, as mentioned earlier, biocarbon is usually non-porous, and thus its transformation into porous counterparts

via processes such as chemical activation can further enhance its properties. This increases the appeal of porous biocarbons for various applications, particularly for the agricultural sector as scaffolds for slow-release nutrient delivery, such as nitrogen and silica. This idea forms the central theme of this PhD thesis, which will focus on developing sustainable porous biocarbon scaffolds from sugarcane trash as platforms for the slow, controlled release of nitrogen and silicon.

Published: June 5, 2026

> Link

Diagnosing Quality Management Maturity in Sugar Mill Evaporation Systems: An Integrated Approach



Quality management in continuous process industries requires systemic approaches capable of integrating strategy, operational control, information governance, and organizational learning. In sugar mills, the evaporation sector plays a critical role in thermal efficiency, operational stability, and product quality, yet managerial maturity in this area remains insufficiently structured in the literature. This study proposes and applies an integrated diagnostic framework to assess the maturity of quality management in the evaporation sector of a large sugarcane processing plant. The framework was structured into nine interdependent subsystems and operationalized through a 96-question instrument. Question weights were determined using the Improved Analytic Hierarchy Process, and inter-rater reliability was assessed through the Intraclass Correlation Coefficient. The results indicated good agreement among experts in the weighting stage and statistically adequate reliability. The evaluated sector presented intermediate maturity, with strengths in strategic alignment and quality planning, and limitations in information governance, analytical use of indicators, documentation standardization, and structured human resource development. The findings suggest that improving the integration between data analysis, decision-making, and continuous learning is more critical than increasing isolated control mechanisms. The proposed framework contributes a structured and replicable tool for diagnosing managerial maturity in continuous process environments and supports prioritization of improvement actions aligned with operational performance and long-term sustainability.

Published June 1, 2026

> Link

Systematic literature review using deep learning in plant genomic prediction

Genomic prediction (GP) is a critical approach in plant breeding used to forecast agronomic traits based on genetic marker data. In recent years, machine learning and deep learning methods have been increasingly applied in genomic prediction to address the limitations of traditional methods such as genomic best linear unbiased

prediction (GBLUP). This systematic literature review aims to evaluate research trends over the past decade (2015–2025) regarding the application of deep learning in genomic prediction for crops, encompassing publication trends, publication sources, dataset types, key research topics, methods/algorithms used, implementation schemes, and commonly used evaluation metrics. The study follows the PRISMA protocol, with literature searches conducted on the primary databases Scopus and SpringerLink. From thousands of identified articles, 43 studies meeting the inclusion criteria were selected. The data revealed a significant increase in publications since 2018, peaking in 2024. The majority of articles were published in open-access journals, with notable contributions in Frontiers in Plant Science, Scientific Reports, and G3. The research covers various crop types, including wheat, maize, rice, soybean, sugarcane, and others, with diverse deep learning schemes such as convolutional neural networks (CNN), Ensemble Stacking, and Multi-Task Learning, often compared to conventional methods. The synthesis indicates that deep learning frequently enhances the accuracy of genomic prediction, particularly for complex multi-environment or multi-trait data. However, in some cases, classical linear/Bayesian models remain competitive. The application of deep learning in plant genomic prediction is rapidly advancing and demonstrates significant potential for improving crop selection performance.

Published June 1, 2026

> **Link**

A Survey of Computer Assisted Approaches for Sugarcane Stress Detection and their Management

Agriculture is one of the sources of income for any country. Sugarcane is a tropical plant under agricultural domain, which grows in the field on an annual basis. Its management from germination to maturity stage is required to be focused while it fights with numerous infectious agents. This study is taken care to focus on the computer-based technologies, their intervention in the growth of the crop, their management, and related to identification of the diseases or stress symptoms available on the leaf's surface of sugarcane. There are various sugarcane diseases such as red rot, smut, wilt, grassy shoot, ratoon stunting, yellow leaf, and sugarcane rust etc. This review discussed about computer-based technologies like machine learning models (Support Vector Machine), deep learning models (AlexNet, GoogLeNet, InceptionV3 etc), domain specific models (Reverse Transcriptase- Polymerase Chain Reaction (RT-PCR)), and so on. The assertion is made after research, literature analysis, and discovery that every model has distinctive constraints that must be addressed. Each model in their study is showing their best (in terms of accuracy, precision, and recall), but its real time interventions is not up to mark. This paper also highlighted that how abiotic factors is important while in the growth of sugarcane.

Published May 26, 2026

> **Link**

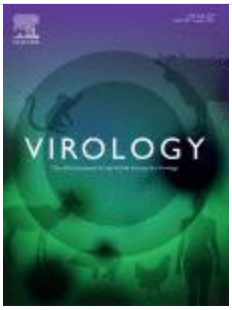
Deep Learning-Based Detection of Micronutrient Deficiencies and Disease Prediction in Sugarcane Crops

The shortage of necessary micronutrients in plants and the development of diseases result in economic losses that lead to diminished sugar industry production volumes nationwide and internationally. Plants receive better protection from destruction, and practitioners achieve maximum precision farming system efficiency through the early implementation of modern technology-based plant health assessments. The proposed system combines pre-trained Convolutional Neural Networks (CNNs) with a Vision Transformer (ViT) to develop an advanced detection technique to identify sugarcane agricultural diseases during their early nutrient deficiency stages. Researchers benefit from the non-local means (NLM) noise reduction filter because it protects essential image attributes during cleaning operations so data remains accurate. Combining DenseNet-201, Inception-V3 VGG16, and ViT leads to self-attention analysis for developing highly advanced deep feature extraction methods that obtain precise insights about crop health from image data. The Starfish Optimization Algorithm (SOA) is an optimization tool that provides exact model performance at high speed when creating models. The research evaluation procedure involves a detailed assessment of ViT using comparison tests with DenseNet-201 Inception V1 and VGG16 to determine their applications in agriculture. An automated disease-diagnosis system based on Python provides accurate detection and reliable operational capabilities to enable scalable assessments of sugarcane nutrient deficiencies to secure food supplies sustainably.

Published April 27, 2026

> Link

Sugarcane viral diseases: Epidemiology, detection, and advanced breeding methods for resistance



Sugarcane viruses threaten yield and sucrose content, imposing substantial global economic losses. This review provides current knowledge on the major sugarcane pathogens, with a focus on virus biology, transmission, and virus-host interactions, and uses this foundation to frame practical control strategies. We first describe the epidemiology and economic impact of sugarcane viral diseases to establish the urgency of robust surveillance and management. Building on these insights, we then evaluate detection and surveillance technologies, ranging from traditional immunoassays and nucleic acid hybridization to molecular diagnostics, isothermal amplification, and CRISPR-based approaches, and discuss how high-throughput sequencing accelerates virus discovery. Next, we assess management strategies that include virus-free planting material, vector control, sanitation, and modern breeding technologies, like RNA interference (RNAi), CRISPR/Cas genome editing, marker-assisted selection (MAS), and genome wide association studies (GWAS) within genomic selection (GS) frameworks. We also consider supplementary strategies such as plant-derived antivirals and environmental management, and discuss how they complement core approaches. Crucially, we identify key knowledge gaps in sugarcane virus-host interactions and resistance breeding, and propose data-driven, multi-omics and AI-assisted approaches to precision breeding and integrated disease management. The

review concludes with a practical roadmap for advancing sugarcane virus control and promoting sustainable production. **To be published: August 2026** > **Link**	

Events

	American Society of Sugar Cane Technologists (ASSCT) – Annual Joint Meeting *American Society of Sugar Cane Technologists (ASSCT)* **17-19 June 2026** **Sheraton New Orleans** **New Orleans, USA** > **Link**
	**Molecular Biology Webinar: *Molecular and Biotechnology Approaches Shaping the Future of Sugarcane*** *ISSCT* **25 June 2026, 11 AM – 1 PM GMT** **Online** > **Link**

ISSCT Germplasm & Breeding Section Webinar: *Selection strategies for accelerated and precision breeding*

ISSCT

7 July 2026, 11 AM–1 PM GMT

Online

> **Link**

SugarEx Vietnam 2026

Fireworks Trade Media Co

8–9 July 2026

Ho Chi Minh City, Vietnam

> **Link**

ISSCT Entomology Section Webinar

The International Society of Sugar Cane Technologists (ISSCT) is pleased to invite you to the webinar on sugar cane Entomology which will take place on

Thursday 9 July 2026 from 11 am to 1 pm GMT

Theme: Research advances in the management of major sugar cane insect pests

Chaired by Nalini Behary Paray (Chair of the Entomology Section) with presentations as follows:

Presenter	Presentation Title
Dr C Camargo Gil	Current Advances in management strategies of *Diatraea* spp.
Dr F R Goebel & Q Mace	Management of sugar cane white grubs
Dr L Malinga & N Behary Paray	Research progress in the application of the Sterile Insect Technique (SIT) for sugar cane borers
Dr B Wilson	Management of sugar cane borers in Louisiana: recent findings

The presentations will focus on the research progress in the management of the major sugar cane pests across diverse environments.

Format of the Webinar

- Duration of each presentation will be 15 minutes
- 5 minutes for Q & A after each presentation
- 20-minute panel discussion involving all speakers at the end of the final presentation
- Total duration of the session will be approximately 2 hours.

The facilitators/organizers are:

- Mrs Nalini Behary Paray, MSIRI, Mauritius
- Dr. Lawrence Malinga, SASRI, South Africa
- Dr C Camargo Gil, CENICANA, Colombia
- Dr Hannah Penn, USDA, USA

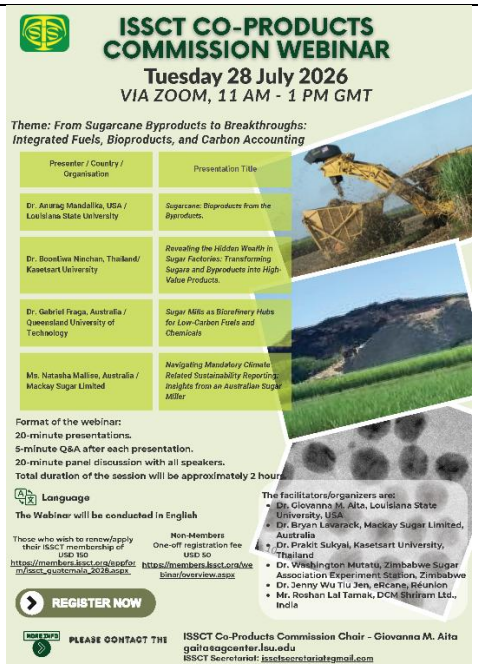
ISSCT Entomology Section Webinar: *Research advances in the management of major sugar cane insect pests*

ISSCT

9 July 2026, 11 AM–1 PM GMT

Online

> **Link**



ISSCT Co-products Commission Webinar: ***From Sugarcane Byproducts to Breakthroughs: Integrated Fuels, Bioproducts, and Carbon Accounting***

ISSCT

28 July 2026, 11 AM-1 PM GMT

Online

> **Link**

13th Latin America Congress

ATALAC - Association of Sugar Technicians of Latin America and the Caribbean & STAB – Society of Sugar and Alcohol Technicians of Brazil

10-14 August 2026

Ribeirão Preto, SP, Brazil

> **Link**

Fenasucro & Agrocana 2026

American Society of Sugar Cane Technologists (ASSCT)

11-14 August 2026

Sertãozinho – SP, Brazil

> **Link**

SASTA	**SASTA Congress** *South African Sugar Technologists' Association* **18-20 August 2026** **Durban, South Africa** > **Link**
Thailand SUGAR Conference 2026	**Thailand Sugar Conference 2026** *Office of The Cane and Sugar Board / Thailand Society of Sugar Cane Technologists / Thai Sugar Millers Corporation Limited (TSMC), with Fireworks Media (Thailand) Co. Ltd* **10-11 September 2026** **Khonkaen International Convention & Exhibition Center, Thailand** > **Link**
	**Agrotech** *Tecnicaña* **5-6 October 2026** **Cali, Colombia** > **Newsletter** > **Website**

Germplasm & Breeding/Molecular Biology Workshop - *Developing Climate Resilient Sugarcane*

ISSCT Biology Commission

9-13 November 2026

Barbados

> **Link**

35th International Sugar Organization Seminar

ISO

1-2 December 2026

Church House, Westminster, UK

> **Link**

Pathology & Entomology Workshop - Pushing the frontiers of agroecological management strategies of sugarcane pests and diseases

ISSCT Biology Commission

15-19 March 2027

Réunion Island

> **Link**

Agricultural Engineering & Agronomy Workshop

ISSCT Agricultural Commission

12-15 April 2027

L'Auberge Casino & Hotel Baton Rouge
LA, USA

> **Link**

International Society of Sugar Cane Technologists Founded 1924	**Engineering & Processing Workshop** *ISSCT Factory Commission* **17-23 April 2027** **Australia** > **Link (more information to be included when available)**
International Society of Sugar Cane Technologists Founded 1924	**Co-Products Workshop** *ISSCT Co-Products Commission* **6-10 June 2027** **Khon Kaen, Thailand** > **Link** (more information to be included when available)
International Society of Sugar Cane Technologists Founded 1924	**Management Workshop** *ISSCT Management Commission* **January/February 2028 (during Congress)** **Guatemala** > **Link** (more information to be included when available)
International Society of Sugar Cane Technologists Founded 1924	**XXXIII ISSCT Congress 2028** *ISSCT & Asociación de Técnicos de Azucareros de Guatemala (ATAGUA)* **January/February 2028** **Comité Permanente de Exposiciones, COPEREX, 8a calle 2-33 zona 9, Ciudad de Guatemala, Guatemala City** > **Link**