Your Guide for the XXIX
ISSCT CONGRESS
Chiang Mai, Thailand

plus
THAILAND SUGAR IN THE FUTURE!
Western States
where innovation happens everyday™

Western States Machine Company
24/7/365

Centrifuges that withstand the test of time . . . Western States' undeniable durability and superior service keeps your machine running smoothly yesterday, today and tomorrow!
AUSTOFT 8000 SERIES.
THE BEST JUST GOT BETTER.

For over 50 years, customers have demanded the best from Austoft® cane harvesters. The new 8000 series better the best with 40% more chopper horsepower than the 7000 series and the industry exclusive factory-installed harvesting datalogger for easier fleet management, plus an all new cab. Add these innovations to the standard automatic basecutter height control and industry-leading cleaning system and you’ll see how the best just got better. For more information, see your nearest Case IH dealer today or go to www.caseih.com.

CASE IH. FOR THOSE WHO DEMAND MORE™.
This edition of Sugar Journal features the XXIX International Society of Sugar Cane Technologists (ISSCT) Congress, which is held in Chiang Mai, Thailand. The last time this meeting was in Thailand was 1992, so it will be exciting to visit this beautiful country again.

The ISSCT is a member association of scientists, technologists, managers, institutions and companies/corporations concerned with the technical advancement of the cane sugar industry and its co-products. The ISSCT has been in existence for 89 years during which it has organized 28 Congresses, usually at 3-year intervals. The last Congress was held in Sao Paulo, Brazil, June 2013.

Workshops are also held in-between congresses for discussions among specialists on key issues affecting the industry.

The association’s mission is to be committed to the economic and sustainable advancement of the sugar cane industries of the world and associated communities, through promoting innovative research, development and the adoption of technology, and by sharing the knowledge among its members for their professional development.

This is by far, the largest international sugarcane congress attended by scientists and industry people. For suppliers to the industry, there will be an EXPO available to rent space and meet with potential clients or to shake hands and visit with their customers.

Along with our report on the congress, we have included two articles on the sugar industry there. Susan Buchanan talks about Thailand changing sugar industry policies that have been in place for many years. Thailand Sugar in the Future! a Thai insider's view and was written by several sugar industry personnel.

Raul Castillo, writes in this month’s Cane Planter column about climate change and how it affected the sugar industry in Ecuador.

The December issue will feature our annual New Products and Technology report. If you would like to subscribe, visit SugarJournal.com and be sure to also subscribe to our E-newsletter, Sugar & Energy Notes. Stay Tuned!

Publisher’s Corner

3803 Cleveland Ave.
New Orleans, LA 70119 USA
504.482.3914
www.SugarJournal.com

Editorial Staff
Editor
Romney Kriedt-Richard
romney@sugarjournal.com

Executive Editor
Charley Richard, Ph.D.
charley@sugarjournal.com

Editor, Brazil and Latin America
Guilherme Rossi Machado Jr.
rossi@sugarjournal.com

Contributing Editors, Latin America
Juliusz Lewinski, Ph.D. Luis Rivas

Contributing Editor, Africa
Peter Lyne

Technical Editor
Steve Clarke, Ph.D.

Business Staff
Publisher
Romney Kriedt-Richard
romney@sugarjournal.com

Production Manager
Laura Sanders
laura@sugarjournal.com

Circulation Manager
Debbie Helmstetter
debbie@sugarjournal.com

Accounting
Carol Helmstetter
carol@sugarjournal.com

Advertising Representative
Scott Walker
scott@sugarjournal.com

Advertising Representative-Latin America
Adriano Cupello
adriano@sugarjournal.com
<table>
<thead>
<tr>
<th>Column</th>
<th>Page</th>
<th>Title</th>
<th>Authors/Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugar Around the World</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>People and Places</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cane Planter</td>
<td>32</td>
<td></td>
<td>Climate Change Affected The 2015 Harvest Season In Ecuador, Raul O. Castillo, Ph. D.</td>
</tr>
<tr>
<td>Plantador de Cana: Centro De Investigación De La Caña De Azúcar Del Ecuador, Raul O. Castillo, Ph. D.</td>
<td>32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What's Cookin'</td>
<td>36</td>
<td></td>
<td>Shrimp-Stuffed Portobello Mushrooms</td>
</tr>
<tr>
<td>Features</td>
<td>8</td>
<td>Thailand Sugar in the Future!</td>
<td>Klanarong Srithoth, Wirat Vanichsriratana, Jackapon Sunthornvarabhas</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>Thailand Considers Altering Its Decades-Old Sugar Policies</td>
<td>Susan Buchanan</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>International Society of Sugar Cane Technologists</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>Officers of the Issct and Congress</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>Welcome from Mr. Kitti Choonhawong, Congress Chairman</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>Papers and Authors</td>
<td></td>
</tr>
<tr>
<td>Departments</td>
<td>4</td>
<td>Publisher's Corner</td>
<td></td>
</tr>
<tr>
<td></td>
<td>29</td>
<td>SugarSites</td>
<td></td>
</tr>
<tr>
<td></td>
<td>38</td>
<td>Advertiser's Index</td>
<td></td>
</tr>
<tr>
<td></td>
<td>38</td>
<td>Coming Meetings</td>
<td></td>
</tr>
<tr>
<td>Cover</td>
<td></td>
<td></td>
<td>Large scale plantation, Courtesy from Mitr Phol Group</td>
</tr>
</tbody>
</table>
Next Generation Sugar Solutions
Increase Savings & Efficiency with our innovative Products & Services

Cromgard Stainless Steels
Specialty Low Cost & Durable Stainless Steel for:
- Conveyors - Tanks - Feed Tables - Scrubbers
- Ducting - Condensers - Pipes / Tubes

LLT Clarifiers
Best in Class Clarifiers for:
- Mixed Juice - Filtrate Juices

Services
Process Engineering & Consulting from our team of Engineers in:
- Mechanical - Chemical
- Agricultural

New Products
State-of-the-art products:
- Cane Knives Tips - Harvester Blades

Quality Under Pressure Since 1989

5th ESST/VDZ Conference Announced

The ESST/VDZ Conference will be taking place May 21–24 in Dresden, Germany. The European Society for Sugar Technology (ESST) was founded in Berlin in 2007. The ESST took on the responsibilities of the CITS (Commission Internationale Technique de Sucrerie), but works on a wider basis. Although CITS membership was restricted to sugar companies, now sugar technologists associations and suppliers to the sugar industry are able to join ESST.

Comstock retiring as Research Leader

Dr. Jack C. Comstock will be stepping down from the position of Research Leader of the USDA-ARS Sugarcane Field Station in Canal Point, FL effective October 1. He will remain in ARS as a Research Scientist.

Comstock joined ARS in 1989 as Research Plant Pathologist in Canal Point coming to ARS from the Experiment Station in Hawaii where he had been a Sugarcane Pathologist for 15 years. In 2005, Comstock assumed the role of Research Leader where he made tremendous accomplishments and great impacts as the Research Plant Pathologist and Research Leader at the Sugarcane Field Station.

Comstock is recognized nationally and internationally as a leader in sugarcane pathology and sugarcane cultivar development. He has been a cooperator on the release of 60 cultivars that have made great impact on sugar production in Florida, Texas, and many other countries, particularly in Central America. Two sugarcane varieties that were released under his leadership are unique because they were jointly tested, released and registered with scientists in CENGLICA-NA (CP 88-1165) and in Pakistan (CP-3481).

Comstock has authored/co-authored 19 book chapters on sugarcane diseases, over 100 peer reviewed papers, and numerous other articles related to sugarcane diseases and pathology. He has identified and recognized several new diseases (sugarcane yellow leaf, dry top rot, sugarcane mosaic outbreak, leaf scald outbreak and orange rust) in Florida and brown rust in Hawaii.

US Sugar Producers Team Up

America’s sugar producers may be fierce competitors in the marketplace, but they regularly join forces on important issues. They’ve teamed up for another worthy cause: Helping people in need with the recent floods in Louisiana.

The good work began when American Crystal Sugar Company, which is headquartered in Moorhead, MN, made a much needed donation.

"American Crystal recognizes their kinship with Louisiana’s sugarcane industry and wanted to help our state in its recovery from the August 2016 flood," explained Jim Simon, head of the Louisiana-based American Sugar Cane League.

"Their genuine concern is indicative of just how tightly knit America’s sugar farmers are," he continued.

But the sugar industry wasn’t done. Next, the American Sugar Cane League, Domino Sugar, Imperial Sugar, and Louisiana Sugar Refining teamed up to donate 12,000 pounds of sugar. During this catastrophe, four feet of water flooded one of the food bank’s warehouse, destroying 570,000 pounds of purchased and donated food. 

---

**Self lubricating Hitemp 150**

**Best for hanger bearings**

- High temperature tolerance
- Low friction qualities
- High abrasion resistance
- Unaffected by alkalis
- Longer life than bronze
- Reduced maintenance

Call +1 866 635 7596
Mail vesconite@vesconite.com

FREE DESIGN MANUAL

---

**subscribe to**

SugarJournal

The Leading Resource for the Global Sugar Industry

www.SugarJournal.com

---

**AFFORDABLE POWER SOLUTIONS**

- Gas and Steam Turbines & Generators
- Transformers, Dry type, Pad mounts, Substations- 500KVA - 425MVA
- Low/medium/high voltage switchgear
- Parts for old & obsolete breakers
- Same day/next day air shipments for emergency breakdowns

If you’re looking for a specific or unique piece of equipment, whether transmission or distribution, buy, sell or lease give us a call - we’ve been getting the power back on for 100 years.

2200 NORTHWOOD AVE, EASTON, PA 18045 USA
(610) 515-8775 • Fax-(610) 258-1230
www.belyeapower.com • sales@belyeapower.com

---

**people & places**
Production and Plantation of the Thai’s Sugarcane

The Thai’s sugarcane plantation area is significantly increased by approximately 70% during the last decade. Current total sugarcane plantation area in 2016 is 1.762 million hectare, compared with 1.042 million hectare in 2007\(^1\). An increase in this number is due to a change in zoning policy. The strategy aims to optimize the plantation area which has had poor management or has been improperly utilized. This idea was then initiated and as a result, rice fields in the North-eastern area were re-plant ed with sugarcane. In addition to adjusting the relationship between crop and land characteristic, the policy indicated that crops within the designated zone must be under contract farming to ensure the stability of production. In the contract, the company usually provides material; seed and fertilizer, and financial support; loan and aid to perform any activity for growing and harvesting sugarcane. Knowledge and technology for growing crop in the area that has low water level is also provided. All these supports were granted to the grower to ensure sustainability of the sugarcane that is going to the factory for further production. Table 1 presents sugarcane yearly production for the last ten years\(^2\).

It is known that crop production directly relates to the plantation area, unlike the productivity. Due to the long drought, sugarcane production dropped to 94 million tons comparing with previous yearly production at 106 million tons in previous year.

In 2016, the North-eastern region of the plantation area covered 0.758 million hectares or 43% of the total sugarcane plantation area. Central, Northern, and Eastern region covers 27%, 23% and 7% of total sugarcane plantation area, respectively. Increases for each region were investigated. While the Central region has higher plantation area than the Northern region, its increase in plantation area appears opposite. A higher increase in Northern region is likely due to the influence of the zoning policy in combination of change to the factory in the vicinity.

External factors such as drought and shortage of labor can also significantly influence the amount of sugarcane production. While this issue is uncontrollable, it can be prevented by good management. Other contributing factors that can influence the economics of sugarcane is the good practice and management of the crop from all parties that are associated to the production.
Bonsucro is a name of an international industrial platform that was initiated to promote a measurable standard in association to environmental and social impact of sugarcane production\(^3\). The strategy was carefully developed to ensure an improvement of practice, product performance, and development. Bonsucro is also a name of a private and non-profit organization that was initiated to ensure that sugarcane and its derived production, processing and milling are sustainable, and reducing undesirable environmental and social impacts.

Currently in 2016, there are total 478 members from 40 countries with different kinds of roles and duties ranging from grower, trader, industrial sector, and end-user\(^4\). There are currently three members from Thailand on the list of official website and one of the factory from Mitr Phol Groups successfully acquired Bonsucro certificate in 2015. To obtain a certificate from Bonsucro, there is much criteria that covers a wide range of aspects – for example, soil and fertilizer management, management of chemicals and wastes, production administration and management, work and labor’s right, and condition of works and employment – have to be met. In the moment, more areas and more companies are on the list of becoming member of Bonsucro standard.

### Competitiveness of sugarcane in Thailand

There are many factors that favor the production of sugarcane in Thailand. An increase of plantations in each region, government action on zoning policy, fully and advances fifty-four factories across Thailand. Introduction of mechanization in the production “modern farming,” these are the existing features that influence the readiness and competitiveness of the sugarcane processing industry.

In addition to the existing factors, there are elements and actions that were developed and organized in the past few years to accommodate the change and provide true reflection and need of the industry. A new sugar act will change the definition and acknowledge the importance of the juice. This change will significantly impact the recognition and management to reflect the actual situation associate the market and industry specifically, the utilization of juice to create other by-products. To create competitiveness, introduction of research and new technology will ensure a long-term leading position and ability to compete in the world stage. There is much research and development focusing the utilization of the waste and by-product from the sugarcane processing and the improvement of the sugar process\(^5\). Recent studies reveal many possibilities of the compounds from the process that have never been discovered. The discovery of the compound was brought to light due to the development of technology from multidisciplinary. These components can bring new kind of product to the commercialization stage. Corresponding to the increase in plantation area, current number of

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>94.047</td>
<td>105.959</td>
<td>103.666</td>
<td>100.002</td>
<td>97.979</td>
<td>95.359</td>
<td>68.485</td>
<td>66.463</td>
<td>73.308</td>
<td>63.798</td>
</tr>
</tbody>
</table>

\(^1\)Mitr Phol Group  \(^2\)Department of Biotechnology, Kasetsart University, Bangkok 10900, Thailand  
\(^3\)National Center for Genetic Engineering and Biotechnology, Bangkok 10900, Thailand  
Corresponding author: aapkrs@ku.ac.th and klanarongs@mitrphol.com

![FIGURE 2. Mitr Phol Group’s Bonsucro certificate, Courtesy from Mitr Phol Group](image-url)
factory will increase to 61 in the next few years. With an average milling capacity of sugarcane of 20,000 tons per day and 120 milling days, it is expected that Thailand is capable of milling 146 million ton of sugarcane in the near future (2020).

With so many components, the crop, government policy, and intention to incorporate research and development, will guarantee Thailand’s competitiveness in sugarcane industry.

Acknowledgements Figures were provided by Mitr Phol Group.

Simple, standardized line of heavy duty purpose built Sugar Cane Equipment for long service hours anywhere in the world.
THAILAND CONSIDERS ALTERING ITS DECADES-OLD SUGAR POLICIES

By Susan Buchanan

Hurt by drought, Thailand produced between 9.6 million and 9.7 million metric tons of sugar in 2015/16, below the four previous seasons, according to Office of the Cane and Sugar Board. Harvesting began in November of last year and ended in April. Output is slated to decline again in 2016/17 to between 9.3 million and 9.4 million tons after dryness early in the growing season. Smaller crops in Thailand and India have contributed to a widening global sugar deficit, sending world raw prices to four-and-a-half-year highs in late September.

This year, the Thai industry has contended with Brazilian complaints to the World Trade Organization last spring that the Asian nation supports growers and mills in violation of trade agreements. Thailand has expanded its share of the world market at the expense of the South American producer, Brazil claims.

In early October, the Thai industry had 54 sugar mills. Its major producers, Mitrphol and Thai Roong Ruang groups, are two of the world’s biggest exporters. Under the government’s Cane and Sugar Strategy for 2015-2026 to support the sector, the cane board from this January to early October approved 22 new sugar plants and 17 mill expansions. Thai millers have five years to complete construction before their licenses expire. Over the next decade, Thailand’s cane production is forecast to grow. Beyond churning out sugar and ethanol, the industry is expected to support output of bio-plastics and other high-value items.

Molasses, a byproduct of sugar production, and cassava are feedstocks for Thailand’s ethanol industry. Lower crude oil prices since mid-2014, however, have cramped growth in the nation’s ethanol output.

Thailand, the world’s second-largest exporter after Brazil, is expected to ship 7.1 million metric tons of sugar in 2016. Indonesia, Myanmar, China and Japan are its biggest customers. Thai exports have expanded since 2010.

PROPOSED OVERHAUL IN QUOTAS

The OCSB allocates the amount of sugar sold in Thailand, using three quotas. Quota A sets aside sugar for domestic consumption, Quota B covers raws for state-run exports and Quota C sets the quantity of sugar to be exported by private millers. In July 2016, the OCSB decided to expand the amount of sugar sold domestically under Quota A. The board was concerned that increased domestic demand had caused stocks to shrink. The Quota A allocation was raised from 2.5 million metric tons to 2.6 million.

Then in September, the OCSB said plans had been drawn up to revoke the quotas that have prevailed for over three decades. A profit-sharing scheme between planters and millers would be altered. A buffer stock of sugar for domestic consumption would be maintained, however, to prevent shortages. The plan was to be submitted to the nation’s cabinet. Any policy changes would require legislative attention and could take several years to be implemented.

“Market chatter is that these proposed changes are a strategic play in Thailand’s defense against Brazil’s accusations that Thailand is subsidizing its producers,” Kelvin Chow, senior commodities analyst at Rabobank Singapore, said in early October. “But there’s been no official word from the Thai government that the proposed overhaul is related to, or in response to, Brazil’s challenge at the World Trade Organization. It would be prudent to wait for an official statement from Thailand to know whether the government is reacting to Brazil’s complaints.”

In an April 4 request to the WTO for consultations with Thailand, Brazil said that the Asian nation imposes a system that guarantees high prices for sugar produced for internal consumption, and cross-subsidizes sugar produced beyond that quota for export. Thailand provides payments to growers, along with subsidies to turn cane into sugar and subsidies to convert
land from rice to cane, Brazilian officials said.

According to Brazil, Thailand’s domestic support and export subsidies violate its obligations under the Agreement on Agriculture and the Subsidies and Countervailing Measures Agreement.

Within Thailand, the nation’s Cane and Sugar Act of 1984 is credited with having stabilized the domestic industry during decades of world price fluctuations. Quotas have been used to guarantee sugar for internal needs and a fair distribution of income between cane planters and millers at 70% and 30%, respectively. Domestic prices have been capped to ensure that supplies meet needs at home and income is adequate for growers.

POLICY CHANGES COULD AFFECT EXPORTS

Would the abolition of quotas impact Thai exports? “If the OCSB’s proposals are approved by the parliament, abolishing quotas—such as A, which sets aside stocks for domestic consumption—will affect exports,” Chow said. “When the need to set sugar aside for internal use is removed, market forces would determine whether Thailand has exportable surpluses or deficits. If sugar supplies are greater than demand domestically, then more sugar will be exported into the global market.” Thailand’s internal consumption in the past five years has averaged 2.5 million metric tons, raw value, annually, he noted.

Brazilian officials tend to be well prepared when they enter any WTO negotiations. In 2003, Brazil, Thailand and Australia filed a complaint against EU sugar subsidies, and they won their case at the WTO.
OFFICERS OF THE ISSCT AND CONGRESS

XXIX CONGRESS ORGANIZING COMMITTEE

Honorary President of Congress
Dr Kasem Sooksathan

Congress Chairman
Mr Kitt Choonhawong

Congress Vice-Chairmen
Dr Klanorong Siroth
Dr Wiwat Suasa-ard

Congress Secretary-Treasurer
Dr Sopon Uraichuen

ISSCT EXECUTIVE COMMITTEE*

Chair
Timothy Murray, South Africa

Vice-Chair
Philippe Rott, USA

Chair, Technical Program Committee
Robert Gilbert, USA

Members
William Burnquist, Brazil
Raul Castillo, Ecuador
Nicolás Gil Zapata, Colombia
Vinay Kumar Gupta, India

General Secretary
Jean-Claude Autrey, Mauritius

Editor
Peter Allsopp, Australia

*The Executive Committee appoints standing and sometimes ad hoc sub-committees to study and report on specific issues such as finance, constitution, eligibility and strategic initiatives.

ISSCT COUNCILLORS

Juan Carlos Mirande, Argentina
Matthew Kealley, Australia
P. Seshagiri Rao, Barbados
Paulo E A Uchôa, Brazil
Litao Yang, China
Guillermo Rebolledo Mejía, Colombia
Carlos E. Saenz Acosta, Costa Rica
Eduardo Lamadrid Martinez, Cuba
Oscar Núñez, Ecuador
Benoit Coquelet, France
Jürgen Bruhns, Germany
Luis Molina, Guatemala
Sanjay Awasthi, India
Nur Iswanto, Indonesia

Naser Rezaei Shooshtary, Iran
Thierry Merven, Mauritius
Manuel Enriquez Poy, Mexico
Latif Demola Busari, Nigeria
Muhammad Pervez Akhtar, Pakistan
Ramon Alvarez Picornell, Philippines
Gavin Smith, South Africa
Kitti Choonhawong, Thailand
Mike Getaz, United Kingdom
Leslie Baucum, USA
Miguel Ramon, Venezuela
ISSCT TECHNICAL PROGRAMME COMMITTEE*

Chair
Robert Gilbert
USA

Agricultural Commissioner
Bernard Schroeder
Australia

Biology Commissioner
Asha Dookun-Saumtally
Mauritius

Factory Commissioner
Roderick Steindl
Australia

Co-Products Commissioner
Suleiman José Hassuani
Brazil

Management Commissioner
Carolyn Baker
South Africa

Editor
Peter Allsopp
Australia

*At Congress, the Technical Program Committee forms an enlarged Technical Panel that includes Chairs of Sections and COC Collaborators and meets as often as needed to monitor the organisation.

ISSCT STANDING COMMITTEES

COMPLIANCE COMMITTEE

Chair
Timothy Murray
Two Councillors to be appointed at the first meeting of the Executive Council at the XXIX Congress

FINANCE COMMITTEE

Chair
Freddie Martin

Members
Vinay Kumar
Raul Castillo

CONSTITUTION AND RESOLUTIONS COMMITTEE

Chair
Raúl Reissner

Members
Freddie Martin
Nicolás Gil Zapata

Subscribe to SugarJournal.com

The LEADING RESOURCE for the GLOBAL SUGAR INDUSTRY
In the capacity of the Congress Chairman, I am honored and delighted to welcome you to the XXIX International Society of Sugar Cane Technologists (ISSCT) Congress 2016 which is being hosted by Thailand Society of Sugarcane Technologists (TSSCT) in the amazing Kingdom of Thailand.

Thailand is ranked among the world’s top sugar exporters; second only to Brazil. The high volume of sugar production of the country is because of the relationship and cooperation between the small growers and the millers as well as the country’s geographical location and climate. This is also a reason why Thailand was selected to host this year’s congress which will be held under the theme of Sufficient and Sustainable Agri-Sugar Cane from Small Farmers to Global Exporters. The congress would allow Thailand to demonstrate how the country would promote sustainability within the industry while responding to the world’s growing demand for sugar and its by-products.

Sugarcane being one of the country’s zero-waste economic plants; as it could be turned into ethanol, biochemical and fertilizer provokes a long-term plan to sustainably increase the overall output of the sugarcane and sugar. Consequently, Thailand is likely to have more miller plants in the upcoming years to respond to the increasing demand of sugar in both domestic and international market. However, Thailand’s sugar industry would need more than just a higher number of processing plants and an increase in the output of sugar and sugarcane to eventually be in the right position in the global stage. We would need to also take research and development into account in order to enhance and develop the whole industry and the congress would be a key milestone of such progress.

The congress program will start off with a pre-congress tour in Khon Kaen, which is in the Northeastern part of Thailand, where you can choose to have either a factory visit or an agricultural tour during December 2-4, 2016. The main congress, on the other hand, will be held at Chiang Mai International Exhibition and Convention Centre (CMECC) in Chiang Mai during December 5-8, 2016. We have also made certain congress-day excursion options available for you to enjoy and explore the charming city of Chiang Mai which is well-known for its cultural and natural beauty. The program will be followed by a post-congress tour which will take you from Chiang Mai to Bangkok in 3 days, during December 9-11, 2016, with a combination of cultural and technical activities along the route.

The congress will also provide the delegates with an opportunity for exchanging and sharing knowledge and technology as well as be a space for a open dialogue or even a business discussion among all delegates from different sectors in the industry.

I believe all the activities provided and the congress, itself, would make your visit to Thailand a worthwhile journey and a memorable experience. I do wish all of the participants would be able to make use of the congress to learn from one another; especially those from different sectors ranging from farmers, processing factories to the consumers, themselves, and to take a closer look at the latest eco-friendly technology available in the industry for further development in the production system.

Mr. Kitti Choonhawong
Chairman of the Congress
papers included are those submitted by the time of publication

**PLENARY PAPERS**

Balieiro, de Witte, Wecrathaworn - Using production-cost analysis to understand the competitiveness of sugarcane production: a comparison among Thailand, Vietnam, South Africa and Brazil

Botha - Sugarcane R,D&E: over managed and underperforming?

Chudasama - Dynamics of the global sugar industry: an overview

Dubreucq, Rungiang, Siroth, Fulcrand - Plant phenolics in the sugarcane biorefinery

Gravois, Zhou, Hoffmann, Piperidis, Badaloo - Breeding new sugarcane varieties with enhanced ratooning ability

Monthienvichienchai - Mitr Phol Group’s increasing international experience

van Antwerpen, Ng Cheong, Miles, Gilbert - Strategies for cane production in marginal environments and under more environmental scrutiny

**AGRICULTURAL ENGINEERING PAPERS**

Erazo; Muñoz, Arévalo - Evaluating a fixed-rate fertilization system in sugarcane

Jensen, Gobbett, Bramley, Garmendia - A methodology to assess the accuracy and reliability of yield-monitor data

Khawprateep, Jensen, Schroeder, Eberhard - Influence of yield and other cane characteristics on cane loss and product quality

Lecler - Projects and strategies to introduce a synergetic controlled-traffic farming system to Zimbabwe

Merry - Exploring the economic limits of pumping for sugarcane irrigation

Norris, Basson, Tempel - Assessment of the yield and sugar recovery from green-cane chopper-harvesting and burned-cane hand-cutting for a South African operation

Norris, Norris - Modelling the sugarcane value chain: an interactive decision-support tool

Thungsotanon, Usaborisut, Kuson, Kulketwong, Abdullakasim - Measuring the impact of tractor trailers on soil compaction for typical sugarcane-haulage operations in Thailand

Usaborisut, Oonkong, Srisukajorn, Sukcharoenvipharat, Nunnoy - Performance and efficiency tests of an auto-trip subsoiler with different shank shapes

Whiting, Giddy, Norris - A cane-loss measuring system for machine-harvested sugarcane

**AGRICULTURAL ENGINEERING POSTERS**

Bastidas-Obando, Jarmain, Bastiaansen, Voogt - Measuring the effect of water stress for yield in irrigated sugarcane with a satellite-based system

Choedkiatphon, Usaborisut, Niyamapa, Bamrungwang - Preliminary performance test of cane–residue incorporator using a powered disc tiller

Erazo, García, Herrera - Design and implementation of a real-time kinematic network for the sugarcane industry in Colombia

Erazo, Ospina, Camacho - Effect of traffic-control strategies for harvesting sugarcane

Ng Cheong, Teeluck - Development of an irrigation-scheduling software for sugarcane

Nuñez, Palomeque - Sugarcane performance under different row configurations designed to accommodate in-field traffic

Sanches, Magalhães, Franco - Using electromagnetic induction and kriging techniques to develop soil maps with few samples

Shinde - Performance of a mechanical sugarcane planter developed for Indian conditions

Rahmawan, Wibisono, Rosiawan, Desyosop - Modification of ripener applicators for use by small-scale growers
Agravay, Martine, Poser, Marnotte, Goebel - ECOFI: a new generic database to analyse complex agroecological experimentation

Castro, Franco, Sanches, Kolln, Magalhães - The best time to apply N-fertilizer in sugarcane ratoons in the Centre South of Brazil

González, Ferrer, Jiménez, Casanova - Improving the efficiency of the estimation of agricultural and factory yields in Cuba

Juntahum, Boonlue - Efficiency of arbuscular mycorrhiza fungal inoculation with rock phosphate on soil-available phosphorus, and drought stress, growth and yield of sugarcane under field conditions

Kamiya, Yatabe, Ando, Ponragdee, Ito, Terajima, Sugimoto - Features of sugarcane yield components of the low-yielding area in northeast Thailand

Karmollachaab, Bakhshandeh, Moradi Telavat, Moradi, Shomeili - Sugarcane yield and ripening response to chemical ripeners

Li, Yang, Tan, Wang, Yang, Song - Exploitation and application of improved farming-systems technologies in sugarcane production in China

Mkhaliiph, Dlamini - Increasing sugarcane yields and decreasing inputs for smallholder growers through improvements in irrigation scheduling in Swaziland

Muñoz, Villegas, Moreno, Posada - Use of cowpea (Vigna unguiculata) as a green manure and its effect on nitrogen (N) requirement and productivity of sugarcane

Ramos, Alves Vidal, Ramos, Rossetto, de Lima Nechet - Carbon dioxide enrichment effects on the decomposition of sugarcane residues

Ramburan, Tweddle, van Heerden, Ramouthar, Miles - A tool for converting conventional sugarcane trial results into economic terms

Roa, Cadavid, Muñoz, Chica, Angel - Isolation and preliminary biochemical characterization of nitrogen-fixing bacteria belonging to three genera obtained from sugarcane in Colombia

Sandhu, Singh, McCray - Use of apparent soil electrical conductivity to improve sugarcane nutrient management in Florida

Seechan, Chimnarong, Veerachat, Jiraphattharasiri, Rethinum, Pliansinchari - Historical ENSO-related impacts on sugarcane yields in northeastern Thailand

Singh, Vivek, Jain, Pastore - Climate-smart agriculture: catalyzing behavior change in sugarcane farmers for water-use efficiency

Takaragawa, Watanabe, Thanankorn, Nakabaru, Kawamitsu - Crop diversity in sugarcane: effect of mixed cultivars on the growth and yield of sugarcane

Thongponkaew, Chittamart, Tawornpruek, Pinjai - Screening of phosphate-solubilizing bacteria from sugarcane rhizospheric soil and their abilities to improve growth and yield of sugarcane

Zeng, Qi, Chen, Wu, Li - Differential responses among sugarcane clones to low-nutrient stress

Astanto, Supriyadi, Darma, Andriadhi - Cost of weed control - delayed harvesting after ripening and during the dry season on a tropical sugarcane plantation in Indonesia

Chapanya, Nootas, Ngasan, Muangmontri, Ngamonsai, Rachdawong, Pliansinchari - NIR technique for rapid determination of soil chemical properties in northeastern Thailand

Chopart - Two high-fibre sugarcane varieties adapted for energy use in Guadeloupe

Darunsontaya, Jindaluang, Ketroth, Kheoruenromne, Sudhiphrakarn - Chemical profiles of sugarcane-growing soils under a moist tropical savanna climate in Thailand

Haryani, Irfansah, Abdurrachim, Kusuma - Growth and yield of sugarcane with drip irrigation in an Ultisol in Indonesia

Khandagave - Crop geometry compared with intercropping in sugarcane: an option to increase the income of farmers

Luanmanee, Paisancharoen, Kongtien - Optimum soil and nutrient management for increasing sugarcane productivity on sandy soils in northeast Thailand

Mansuy, Marion, Labrunie - Cover crops associated with sugarcane to control weeds

Niamsanit, Milintawisamai, Krumkhutot, Jaisil - Assessment of Enterobacter oryzae 3LSO1 and Stenotrophomonas maltophilia 5LSO2 for promoting sugarcane growth in the field
Nootas, Ngasan, Pliansinchai, Rittiron, Surareungchai, Cheunkar - Portable near-infrared (NIR) spectrophotometers for the measurement of sucrose content in cane in the field

Okada, Ueno, Taira, Watanabe, Kawamitsu - Effects of low temperature and frost damage in winter on sugarcane yield and quality in Japan

Paillat, Davrieux, Thuriès, Moussard, Azami, Marion - Sugarcane foliar diagnosis with near-infrared spectroscopy: determination of nitrogen and carbon contents

Palomeque, Núñez - Evaluation of two rotation management strategies on sugarcane production

Pinna-Cabrejos, Valdivia-Salazar, Valdivia-Vega - Nitrogen fertilization and harvesting age effect on sugarcane thresholds for soil salinity

Rossetto, da Silva, Vitti, Piemonte, Dias, Cantarella - Concentrated vinasse applied to ratoon sugarcane: yield and soil fertility

Shinde - Sugarcane nutrition through drip irrigation

Sitepu, Suryadarma, Gunito - Selection of a new effective post-emergence mix of herbicides as an alternative to a standard mixture used in Indonesia

Solomon, Jain, Chaab, Hamdi, Vanden Berghe - Improvement of the sucrose content of early harvested sugarcane using stabilised orthosilicic acid

Suwanno, Thaymuang, Phankamolsil, Buddhiprakarn - Effect on zinc management on yield and quality of sugarcane

Tauvoli, Naidu - Routine soil analysis for determining lime requirement: lime buffering capacity as an alternative method

Veerachitt, Rethinum, Pliansinchai - Monitoring sugarcane growth using high resolution imagery from a UAV

Watanabe, Takaragawa, Nakabaru, Taira, Ueno, Kawamitsu - Effects of different kinds of K+ and Cl− salts on sugarcane growth, quality and ion composition

Watanarojanaporn, Chatwawong, Tipart, Rachadawong, Pliansinchai - Isolation of plant-growth-promoting bacteria and their effect on sugarcane plantlet growth

BREEDING PAPERS

Afghan, Shahzad, Afzal, Iqbal, Shahzad, Wijesuriya - Sugarcane improvement in Pakistan through traditional and modern breeding technologies

Basnayake, Lakshmanan, Jackson, Chapman, Natarajan - Canopy temperature: a predictor of sugarcane yield for irrigated and rainfed conditions

Gazaffi, Cursi, Chapola; Santos, Fernandes, Carneiro, Barbosa, Hoffmann - RB varieties: a major contribution to the sugarcane industry in Brazil

Jackson - What is the optimal selection intensity of seedlings (stage 1) in sugarcane breeding programs?

Koonjah, Badaloo, Mangar, Beekharry, Dookun-Saumtally - A new and reliable criterion for the identification of early ripening, high-sucrose parent varieties

Rajeswari, Bharathi, Rao - Use of ‘Big Mill’ tests in evaluating and promoting new varieties: case example of a Parry India variety

Rao, Rajeswari, Varatharaj, Lourdusamy - Farmer Acceptance Selection – a participatory approach to selection and technology transfer for new sugarcane varieties

Santchurn, Badaloo, Zhou, Labuschagne - Genotype-by-environment interaction, adaptability and stability of biomass sugarcane varieties in Mauritius

Wei, Jackson - Addressing slow rates of long-term genetic gain in sugarcane

Yang, Jackson, Chen, Wei, Wu, Fan - Economic weightings of traits for variety selection in China and the impact of increased mechanisation on selection of varieties

BREEDING POSTERS

Guinet-Brial, Bousquet, Darroussat, Fernandez, Daugros - Visacane, an overview of the distribution of disease-free sugarcane varieties for the last 10 years

Hattori, Tarumoto, Sakaigaichi, Tanaka, Hayano, Irei - Morphological and physical studies on varietal differences in resistance to wind-caused cane-top breakage in the active growth stage

Continued on page 22
The John Deere Cane Harvester Family

Leading the world in quality, productivity, and fuel efficiency for small, medium, and large operations
**Continued from page 19**

Heliyanto, Djumali, Sugiyarta - Status of the development of high-yielding sugarcane varieties for rainfed areas in Indonesia

Huang, He, Li, Pan, He, Luo, Qin - Evaluating sugarcane varieties in Guangxi, China

Kuangpatee, Songsri, Jaisil, Jongrungklang - Physiological traits and their contributions to growth in sugarcane clones under drought conditions in northeastern Thailand

Rae, Pierre, Olsen, Perroux - Approaches to analysis of root-system traits in sugarcane

Rajeswari, Raghuraman, Bharathi, Rao - Screening of parental clones for red rust resistance in India

Rodriguez, Puchades, Abiche, Rill, García - SASEL: software for data management generated in the Cuban sugarcane breeding program

Roussel - Evaluation of sugarcane using the direct hydraulic press method

Singh, Gawander, Prasad - Variation among families and expansion of genetic resources in the Fiji sugarcane breeding program

Singh, Singh, Sharma - Variation in sugar content between early and mid-late maturing sugarcane varieties across the crushing period in sub-tropical India

Songsri, Jonglangklang - Participatory selection of elite sugarcane clones in the Northeast of Thailand

Suhanto, Fathir, Zulhindra, Gunito - Performance of potential cultivars at different planting times in Central Lampung, Indonesia

Tahchai, Napa, Jetsada, Prasert, Adul, Sarawut, Tanapon - Evaluation of interspecific hybrids between sugarcane cultivars and Saccharum spontaneum for tolerance to water stress

Thong-Chane, Sinama, Boisbineuf, Barau - Are elite sugarcane varieties also good parents in their zone of adaptation?

Tonsomros, Pliansinchai, He - Adaptability of Thai sugarcane varieties in China

Vidal Guerra, Pérez Oramas, Cabrera Miranda, Chinaa Martin, Campo Zabala, Gómez - Status and handling of genetic resources of sugarcane in Cuba

Wang, Tang, Tan, Li, Huang, He - GT44 – a productive variety for Guangxi province, China

**ENTOMOLOGY PAPERS**

Amirieh, Mohammadi, Pakrou - Nitrogen and silicon impacts on the intensity of stem borer damage in sugarcane in Iran

Atencio, Goebel, Pérez Milián, Rodríguez, Fernández - Yield loss in sugarcane due to Diatraea tabernella Dyar (Lepidoptera: Crambidae) in Panama

Hanboonsong, Wangkeeree, Kobori - Integrated management of the vectors of sugarcane white leaf disease in Thailand: an update

Jatmika, Saeojo - Aulacaspis tegalensis (Zehntner) (Hemiptera: Diaspididae) infestations and management in Indonesia

Maneerat, Uraichuen, Suasa-ard - Economic impact of Cotesia flavipes (Cameron) (Hymenoptera: Braconidae) for controlling sugarcane moth borers in Thailand

Martin, Goebel - DECIPESTS, a decision-support system for pest management in sugarcane

Mouret, Martin, Roux, Goebel - Multi-scale evaluation of the impacts of using Beauveria sp. (Ascomycota: Hypocreales) to control the white grub Hoplochelus marginalis (Fairmaire) (Coleoptera: Scarabaeidae) in sugarcane – a retrospective review in Réunion

Prasad, Sallam, Rounds, Gawander - Population dynamics and damage levels of Rhabdoscelus obscurus (Coleoptera: Curculionidae) in Fiji

Salvatore, Isas, del Pilar Pérez, Sosa, Alonso, Romero, Willink, Gastaminza - Incidence of Diatraea saccharalis attack on irrigated and nitrogen-fertilized sugarcane in Tucumán, Argentina

Soti, Tran, Goebel - Potential of remote-sensing images to study the effect of natural vegetation on the spatial distribution of greyback canegrub, Dermolepida albohirtum, in Australia

Vega, Rojas, Regal - Geostatistical tools for the assessment of the incidence of Diatraea saccharalis in sugarcane in Cuba
**ENTOMOLOGY POSTERS**

Jarnkoon, Tintarasaranaratchaseema, Pliansinchai, Rana, Moonrinta, Neelsawat, Dailey - Diagnosing sugarcane insect pests and diseases using mobile applications

Naidu, Prakash, Padayachi - Management of an isopteran pest, Coptotermes gestroi, in the Fiji sugar industry

Nikpay, Goebel - Major sugarcane pests and their management in Iran

Pan, Huang, Wei, Shang, Lin, Xin - Distribution and natural parasitism rate of egg parasitoids of sugarcane borers in China

Pan, Huang, Xin, Wei, Shang, Lin - Occurrence of Habrobracon hebetor (Braconidae) in the rearing room of Corcyra cephalonica used for Trichogramma production in China

Qin, Wei, Song, Luo, Liu, Deng - Efficacy of the ladybird beetle Cryptolaemus montrozieri Mulsant for control of Saccharicoccus sacchari (Cockerell)

Rao, Sankar - Successful use of the biocontrol agents Trichogramma chilonis and Tetrastichus howardi in sugarcane in India

Rodríguez, Fuentes, Loddo, Rodríguez, Álvarez, Jiménez - Impact of the biological control program in sugarcane pest management in Cuba

Salvatore, Isas, Del Pilar Pérez, Romero, Zossi, Sorol, Willink, Gastaminza - Sugarcane deterioration caused by Diatraea saccharalis (Crambidae) in Tucumán, Argentina

Shang, Huang, Wei, Pan, Lin, Qin - Damage by and occurrence of Exolontha castanea Chang (Coleoptera: Melolonthidae) in sugarcane in Guangxi, China

Tintarasaranaratchaseema, Jarnkoon, Kodsopa, Swangmaneecharern, Pliansinchai - Metarhizium anisopliae for controlling termites in sugarcane

Wangkeeree, Hanboonsong - Bacterial symbionts in a leafhopper vector of sugarcane white leaf and their potential use as biocontrol agents

Wei, Huang, Pan, Shang, Wang, Qin - Infestations by Scirpophaga excerptalis (Walker) (Lepidoptera: Pyralidae) in sugarcane in Guangxi, China

**PATHOLOGY PAPERS**

Ángel, Victoria, Cadavid, Ángel - The race is on: review, advances and challenges for integrated and sustainable management of sugarcane brown rust and orange rust in Colombia

Bhuiyan, Croft, Stirling, Jackson, Piperidis, Aitken - Resistance of Saccharum spontaneum and its backcross progenies to root-knot and root-lesion nematodes

Braithwaite, Ngo, Croft, Magarey, Young - Progress in understanding and managing chlorotic streak of sugarcane

Chen, Liu, Wu, Zeng - Pathogenicity test of Sporisorium scitamineum, causal agent of sugarcane smut, from Guangxi province, China

Hoarau, Roques, Efife, Adjano-Lubin, Debbakas, Daugrois - Narrow-sense heritability estimates of resistance of sugarcane to Sugarcane yellow leaf virus

Hoy, Baisakh, Avellaneda, Kimbeng, Hale - Detection, breeding and selection of durable resistance to brown rust in sugarcane

Joomun, Dookun-Saumtally - Importance of using highly specific and sensitive diagnostics for Sugarcane yellow leaf virus in quarantine

Mollov, Malapi-Wight - Next Generation Sequencing: a useful tool for detection of sugarcane viruses in quarantine programs

Puchades, La O Hechavarría, Carvajal, Montalván, Rodríguez, Rodríguez, Rodríguez - Multi-environment trials for evaluating resistance to Sugarcane mosaic virus

Putra, Damayanti - Effect of nitrogen and potassium fertilizers, and soil water content on incidence and severity of Sugarcane streak mosaic virus (SCSMV) infecting sugarcane

Rott, Kaye, Naranjo, Shine, Sood, Comstok, Raid - Controlling sugarcane diseases in Florida: a challenge in constant evolution

Sood, Glynn, Yang, Wang, McCorkle, Rott, Comstock - Inheritance of resistance to orange rust in sugarcane

Thompson, Wilson, Magarey, Putra, Hidayat - Development of diagnostic tests for Sugarcane streak mosaic virus
Viswanathan, Sathyabhama, Malathi, Sundar - Transcriptome analysis of host-pathogen interaction between sugarcane and Colletotrichum falcatum by suppression subtractive hybridization and illumina sequencing

PATHOLOGY POSTERS

Aday Diaz, La O Hechavarría, Puchades Izaguirre, Zárdón Navarro, Bertani, Mesa Lopez, Rodríguez Lema - Genotyping of Sugarcane yellow leaf virus in commercial cultivars and the Cuban germplasm collection

Bao, Sun, Li, Duan, Chen, Zhang - Identification and characterization of Fusarium oxysporum gx3 causing sugarcane pokkah boeng in China

Brindha, Viswanathan - Ab initio prediction of microRNA like structures in sugarcane viruses and their cellular targets

Klinkong, Patarapuwadol, Reanwarakorn - Development of loop-mediated isothermal amplification (LAMP) assays for rapid detection of sugarcane white leaf phytoplasma

Lin, Wang, Zhou, Li, Shang, Wei, Pan, Huang - Fusarium species associated with sugarcane pokkah boeng in China

Molina, Ovalle, Peiró, López, Gisbert - Xanthomonas albilineans and Sugarcane yellow leaf virus (SCYLV) in Guatemala: assessment of methodologies for sanitation of infected sugarcane material

Pérez, Pérez, La O, Pellón - Sugarcane leaf scald: symptom expression in relation to sucrose content and pathogen population density in the juice of infected stalks

Prabakaran, Bharathi, Ganapathi, Rao - Production of virus-free seed cane through tissue culture for a three-tier nursery system in India

Prasanth, Viswanathan, Malathi, Sundar, Tiwari - Identification of candidate secretory effector proteins (CSEPS) genes from Colletotrichum falcatum and their role in host-pathogen interaction by comparative modelling
On-line image analysis
dedicated to the sugar industry

**Crystobserver®**
Pan HD Video Microscope
'Monitor Crystallization in Real-time
'Follow crystal growth in the pan
'Improve crystallization process
'Measure crystal sizes from 4 µm
'Keep video records of the process
'Trigger out-of-specification alarms
'Provide statistical data to the process

**Colobserver®**
On-line Colour Analyzer
'Track Sugar Production in Real-time
'Manage your sugar color and quality
'Record video sequences on events
'Detect out-of-specification sugar
'Increase productivity and profitability
'Maximize your ROI reducing remelted sugar

---

We assist you in exceeding your challenges for quality, performance, value and reliability since 1993

---

Rodríguez, Loddo, Alfonso, Rodríguez, Jiménez, Fernández, Gandrailla - *Nematodes of sugarcane in Cuba*

Rodríguez, Puchades, Piñón, Acevedo - *Studies on sugarcane mosaic in Cuba*

Tiwari, Kumar, Madhupriya, Rao, Sharma - *Detection of 'Candidatus Phytoplasma oryzae' in non-symptomatic sugarcane cultivars in eastern Uttar Pradesh, India*

Wu, Alabi, Damaj, Sun, Mirkov, Fu, Chen, Gao - *Prevalence and RT/RNase H genealogy of Sugarcane bacilliform virus isolates from China*

**MOLECULAR BIOLOGY PAPERS**

Aitken, Farmer, Berkman, Muller, Wei, Demano, Jackson, Magwire, Dietrich, Kota - *Generation of a 345K sugarcane SNP chip*

Botha, Marquardt, Scalia, Wathen-Dunn - *Yellow Canopy Syndrome (YCS) is associated with disruption of sucrose metabolism in the leaf*

Lembke, Lee, Andrade, Margarido, Nishiyama, Ferreira, Pandya, Weissmann, Schatz, Davidson, Heckerman, Van Sluys, Souza - *Exploring gene expression of the sugarcane genome in all its multiple copies: genome sequence and analysis of an energy crop*

Lin, Wang, Bao, Guo, Powell, Xu, Chen, Zhang - *Deciphering the transcriptomic response of Fusarium verticillioides in relation to nitrogen availability and the development of sugarcane pokkah boeng disease*

Parmessur, Dookun-Saumtally - *QTL mapping for resistance to yellow spot disease in sugarcane clone M134/75*

Riascos, Salazar, Loaiza, Lopez, Espitia, Franco, Victoria - *Advances in the utilization of Next Generation Sequencing data in the Colombian sugarcane breeding program*

Song, Chen, Tan, Yang, Li - *Molecular cloning of smut-related genes in sugarcane using suppression subtractive hybridization*
MOLECULAR BIOLOGY POSTERS

Emam, Sadat, Khodarahmoom, Noori - Evaluation of resistance to glyphosate in sugarcane cultivar CP48-103 by somaclonal variation via tissue culture

He, Liu, Liu, Fan, Yu, Weng - Photoautotrophic rooting of sugarcane microshoots

La O Hechavarría, Puchades Izaguirre, Zardon Navarro, Perez, Casas, Mesa - Detection of resistance-related genes in sugarcane cultivars inoculated with sugarcane mosaic virus

Liao, Yang, Wang, Huang, Yang, Li - Factors influencing and cell structure changes related to sugarcane stem tip browning in in vitro culture

Luo, Huang, Zhou, Liu, Lin, Lei, Gao, Duan, Yang, Zhang, Zhang, Li - GISH analysis of a hybrid between Erianthus arundinaceus and Saccharum spontaneum

Punpee, O’Connell, Robinson, Schmidt, Lakshmanan - Conditional up-regulation of cytokinin increases growth and development of sugarcane during water deficits

Singh, Singh, Nigam, Sharma - Development, characterization and validation of sugar gene-based SSR markers in sugarcane

Wang, Yu, Huang, Chen, Deng - Physical localization of 5S rDNA on the chromosomes of Saccharum spontaneum of different ploidy

Yang, Zhou, Chen - DNA methylation in different sugarcane varieties

FACTORY ENGINEERING PAPERS

Cobo, Lucuara, Ospina, Montes - Strategies for increasing availability and milling performance at Colombian mills

Davy, Kent - A classification scheme for wear and corrosion

du Toit, van der Merwe - Applications of CFD (computational fluid dynamics) modelling on boilers in the sugar industry

Geyer, Lehnberger - Today’s production requirements – how material selection and innovative design contribute to their fulfilment

Goel, Awasthi, Srivastava - Improved design of a falling-film tubular evaporator with a maintenance-friendly novel juice distributor

Joshi, Mushrif, Chavan, Goyal - Technologies for exporting electricity of 100 kWh/t of clean cane while producing white sugar: a success story

Kharbanda, Goel, Kalsi - Six-roll sugarcane mill: mathematical model, finite element analysis and its validation by strain-gauge measurement

Lewinski, Grassmann, Fredriksson, Kallin - Trouble shooting of mill operation by analysing the torque distribution between the rollers

Loe, Phosale - Enhancing milling efficiency and throughput through control philosophy – San Diego experience

Loubser, Foxon, Hocking, Gibson, Mitchell - The process energy value chain

Sundaram, Nikam Ghadge - The role of the JPMA mill coupling in energy conservation

van Belzen - Improving engineering project management by using multiple business science models

FACTORY PROCESSING PAPERS

Awasthi, Marwaha, Srivastava - An innovative process for producing plantation-white sugar of ultra-low SO2 content

Brahim, Lehnberger, Mallikarjun, Nasim, Shah - Further reduction of steam demand at modern cane sugar mills
Cobo, Pereddo, Gomez, Gil - Water management in the sugar factory: balances and quality in different streams
Cobo, Rodriguez, Ospina, Gomez, Gil - Evaporation performance: present and future in Colombian sugarcane mills
Dani, Sapkal - Guidelines for water conservation and wastewater discharges from sugar mills in India
Gauche, Belotti, Pelletan - How can numerical models help decision makers and improve existing cane sugar factories?
Jensen, Davis - Direct clear juice: a summary of experiences gained in the production of clear juice in a sugarcane diffuser
Joshi, Bhave, Giramkar - Two-stage decanter operation for treatment of muddy juice
Kesarwani, Moharana - A cost-effective and more efficient continuous ion-exchange system for raw sugar melt decolorisation
Kochergin, Alvarez - Ion-exchange softening of clarified juice - results of pilot trials
Lehnberger, Laue, Mallikarjun, Mahesh - Improved crystallisation in cane sugar mills with updated strategies and equipment
Love, Rahiman, Madho - Continuous production of seed crystals using sound-induced nucleation
Mohan, Bajpai, Singh - Sugarcane juice clarification by distillery fermenter gases
Mohan, Yadav - Recycling of pan and last-effect vapours by compressing with a mechanical vapour recompressor and use in the first effect of the evaporator set
Moor - Modern sugar factory equipment for good recoveries, energy efficiency and low costs
Narendranath - Ejector sulphitation of juice and syrup at a cane sugar factory
Ngasan, Thiravetyan, Suksabye, Lecchart, Simaratanamongkol, Pliansinchai - Decolorization of filtered liquor using bagasse fly ash at the pilot scale
Rackemann, Broadfoot - Evaluation of sucrose loss in evaporators for different processing configurations
Radmehr, Mazuchi - Web-based application for analyzing the operation and optimising processing in sugar mills
Rein, Getaz, Raghunandan, Du Pleissis, Saleh, D’Leon - Performance of lamella clarifiers for juice and syrup clarification
Sanaullah, Khan, Mogalle - Managing sugar-mill liquid effluent to zero discharge - a case study of Mehran Sugar Mills Limited
Schuermann, Timmers, Avram, Morgenroth - Sugar storage in silos
Srivastava, Babu, Chandrasekar, Rao - Process conversion to produce refined sugar in India
Tascon, Latorre, Rodriguez, Gil - Overview of crystallization in vacuum pans in the Colombian sugar industry
Thaval, Broadfoot, Kent, Rackemann - Determining optimum tube dimensions for Robert evaporators

FACTORY PROCESSING POSTERS

Agarwal, Yadav - Near-zero effluent discharge from an ion-exchange regeneration process by using a brine-recovery system and fly-ash filter bed
Bryan, Wilson - Dextran determination in cane juice using the DASA system: the Jamaican experience
Chen, Katryan, McManus, LePage, Kincaid - Evaporators descaled with EDTA – a season’s experience
Grossmann, Retzmann - Scales in evaporators of cane sugar factories – economic aspects of their removal and prevention
Mazuchi, Beheshti, Pakdel - Effect of bagacillo on the colour of clarified juice
Mueangmontri, Chapanya, Nootas, Ngasan, Pliansinchai - Evaluation of a near-infrared spectrophotometer for determining molasses quality
Namonsai, Nootas, Ngasan, Sontong, Pliansinchai - Optimization of temperature and pH for improvement of efficiency in the carbonation process
Ninchan, Vanichsriratana, Siroth - Comparison of the kinetic behavior of dextranase and pullulanase applied to massecuite A and C
Reichling, Raineri, Richard - Case study: operation of the first Solex sugar cooler with raw sugar and with amorphous sugar
Saothong, Sriroth, Ninchan, Khotavivattana, Vanichsriratana - Applications of dextranase in Thai sugar factories

Saska, Zossi, Sastre, Ruiz - Rapid methods for starch analysis in cane juice

Saska, Zossi, Sastre, Torres, Ruiz - Modifications of the Robert's method for total soluble polysaccharides in refined and raw cane sugars

Singh, Chandra, Gupta, Kumar - Application and potential of a pulsed magnetic field in controlling scale formation in cane-sugar processing

Subodh, Ajay, Anil - Fibre separation from raw juice using a rotary juice screen

Taira, Ueno, Watanabe, Kawamitsu, Yoshimoto - Non-destructive measurement system for process control using combined spectroscopic data

Bernhardt - Development of a prototype cane-trash burner

Chandgude, Patil - Intensification of power generation in sugar mills through modernization

Ito, Mizu, Yatabe, Ikeda - Deodorizing effects of sugarcane extracts: deodorizing activity and active ingredients

Kumar, Paroha, Mohan - Feasibility of ethanol production in India through alternative feedstocks

Lavarack - Review of the development of the co-products industry in Australia

Leal, Leite - Ethanol as a major coproduct

Loha, Pruksathorn - Research system for the production of high-value chemical compounds from biomass (molasses) feedstock

Masson, Lejars, Fusillier, Auzoux, Poser - Assessing economic and environmental benefits of dedicated energy cane using a simulation tool: ReefCane®

For over 30 years Veco has been producing high-quality electroformed screens for continuous centrifuges. This experience was used to develop a sugar screen with superior characteristics: VecoFlux. Featuring all the benefits of our standard screens, such as conical holes to reduce blinding and clogging, the thicker VecoFlux screen has a much higher open area for more throughput and is available with smaller slots for capturing even the tiniest sugar crystals.

www.vecoprecision.com

A member of SPGPrints Group
Milintawisamai, Saelee, Lautup, Pisetpongsa, Pookun, Panyasit - *High-ethanol-producing yeast Saccharomyces cerevisiae KKU 6M4.1 for efficient industrial ethanol production*

Mohan, Srivastava - *Graphene oxide from bagasse: synthesis and utilization in carbocatalysis*

Nolasco Junior, Atala, Ambrosio, Yamakawa, Rossell - *Implementation of VHG (Very High Gravity) ethanol fermentation in continuous multistage with cell recovery, reactivation and recycling*


O’Hara, Rackemann, Moller, Zhang, Plaza, Kitai, Ohara, Yasuhara - *Pilot-scale demonstration and economics of the inversion process for sugar and ethanol production*

Phaengthai, Sompugdee, Rachdawong, Pliansinchai - *Effect of inorganic salts in molasses on ethanol production using Saccharomyces cerevisiae*

Phankamla, Slakkam, Chantarasutti, Kammeng, Leelavatcharamas - *An alternative protein source ingredient for Japanese quail feed from molasses fermentation by thermostolerant Candida sp. Sbc 06*

Somyanonthanakun, Nakarungsee, Junpirom, Yingsamphancharoen, Thongmee - *Development of activated carbon from bagasse for adsorbing heavy metals*

Strünkmann, Morgenroth - *Challenges in vinasse concentration for miscellaneous downstream applications*

Subramanian, Singla - *Development of an efficient slop-fired boiler*

Sundaram, Kulkarni, Rizwan - *Diversion of different sugarcane-based feedstocks for ethanol production*
To-on, Uttra, Saengsathien - Mechanical properties of lightweight concrete blocks containing bagasse ash

Umrit, Ganeshan, Mulleegadoo, Dookun-Saumtally - Development of a cost-effective technology for the production of the bioplastic poly-(3-hydroxyalkanoate) from sugarcane harvest residues

Yamakawa, Atala, Ambrosio, Nolasco Junior, Rossell - Assessment of VHG (Very High Gravity) ethanol fermentation in continuous multistage with cell recovery, reactivation and recycling using a blend of juice and molasses from sugarcane as raw material

COPRODUCTS POSTERS

Chitprasert, Juttuporn, Rodprapakorn - Ultrasonic-assisted extraction of antioxidants and antimicrobials from sugarcane bagasse

Furuta, Mutsuura, Ito, Yatabe - Antioxidant effects and taste-improving effects of a sugarcane extract

Gaur - Alternative treatment technologies for distillery effluent to achieve zero discharge

Moopram, Subsamran, Mahakhan, Buaeri, Vichitphan, Vichitphan, Sawangkaew - Value addition from the conversion of sugarcane tops and leaf waste to bioethanol

Nootas, Suwannasarn, Mueangmontri, Pliansinchai - Development of a model to estimate fermentable sugar losses during the storage of molasses

Rodprapakorn, Chitprasert, Khaibuddee, Khopprasert - Optimization of xylanase production from Thermobifida fusca Pa 1-1 using delignified sugarcane bagasse

Sankar, Prakash - Incineration technology for vinasse/spent wash/stillage

Suwanapetch, Vanichsriratana - Experimental design for erythritol production

MANAGEMENT PAPERS

Adendorff, van Heerden, Jumman - Establishing extension services through a research, technology development, extension and grower continuum – a case study

Athipanyakul - Sugarcane production efficiency of small-scale farmers in Thailand

Autrey, Lionnet - The ACP Sugar Research Programme: a review of achievements and prospects

Gheewala, Silalertruksa, Pongpat, Prasara-A, Prapaspongsa, Jakrawatana - Sustainability assessment of sugarcane biorefineries to enhance the competitiveness of the Thai sugar industry

Kealley, Quirk - Smartcane BMP – understanding drivers and building momentum for best management practice uptake in the Queensland sugarcane industry

Leite, Leal. Langa - Sugarcane outgrower schemes in Mozambique: findings from the field

Mugabira, Chivaka - Productive, unproductive and/or predatory entrepreneurship: a value-chain analysis of institutional reforms in Uganda’s sugarcane industry with key insights from South Africa and Kenya

Nicholson, King - Reality and sustainability: dryland land-reform grower challenges in a changing sugar industry

O’Shea, Clement - Sugar Research Australia – an evolution in the delivery of RD&E activities to the Australian sugar industry

Payandi Pillay, Dookun-Saumtally, Saumtally - A demand-driven R&D plan for the sustainability of the Mauritian sugarcane industry

Prakash, Loze, Shamugha, Lata - Recovery plan for Fiji’s sugar sector following Tropical Cyclone Winston

Rao, Bongane, Nair - Overview and experiences of different cane-management models in different countries

Viart, Seixas, Slavinski - Evaluation of the Bonsucro calculator as a sustainability performance benchmarking tool in the sugarcane sector

Vivek, Singh, Jain, Pastore - Farm process outsourcing: promoting mechanization among sugarcane farmers through custom-hire services by agri-technology service providers

Watt, Binedell, Stranack, Baker - Promoting sustainability of sugarcane research, development and innovation in the South African sugar industry

Yadav, Ohri - Improved performance in sugarcane production and factories of the Co-operative Sector through better management strategies: appraisal of sugar factories located in Uttar Pradesh, India
**MANAGEMENT POSTERS**

Aguilar-Rivera, Herrera-Solano, Enriquez-Poy, Gomez-Juarez - Sustainable management of inputs and by-products to improve the competitiveness of sugarcane farms in Veracruz, Mexico

Bryan, Wilson - Ensuring reliability of test results through a quality assurance programme

He - Approaches to solve the plight of the Guangxi cane-sugar industry in the context of economic transition and international trade

Jumman, Gilbert, Van Heerden, Sandhu - Designing and packaging innovations for easier adoption: what to consider in the research design phase

Pérez Martínez - Development of a web-based application for quality supervision of products marketed by Tecnoazúcar

Ramos Pousa, Delgado Arrieta, Almazán - Technology transfer in the sugarcane industry - the ICIDCA experience

Raskar, Nikam - Profitability of Indian sugar co-operatives - a case study of Mahrashtra State

Rethinam, Khodphuvieng, Praphatharo, Pliansinchai - Leveraging digital trends for information-intensive farm management – a decade of growth for Mitr Phol Sugar, Thailand

Vanichsriratana, Khotavivattana, Sriroth - Modification of the sugarcane purchasing system: the Thai experience

**WORKSHOP REPORTS**

Autrey, Leal, Hassuani - Review of the ISSCT Co-Products Workshop

D’Hont, Jackson, Thong-Chane, Barau, Hoarau - Pushing the frontiers of sugarcane improvement: a summary of the joint ISSCT 11th Germplasm and Breeding and 8th Molecular Biology workshops

Lecler, Norris, Norris - Sugarcane – unlocking its potential as an ‘electricity crop’

Saumtally, Goebel, Sallam, Salvatore, Uraichuen, Way, Garces, Grisham, Thompson, Viswanathan - Enhancing innovative pest and disease management strategies in the sugarcane agro-system – a report on the combined ISSCT XI Pathology and IX Entomology workshops

---

**Serving Sugar for 40 Years**

**A & F TEXAS**

- Chains
- Conveyors
- Sprockets
- Bearings
- Gears
- Filters and Filter Parts
- Copper and Stainless Tubing
- Moly Lubricants
- Alfa Laval Evaporators and Juice Heaters
- Mill Hydraulics

[www.aftexas.com](http://www.aftexas.com)

andy@aftexas.com

Phone: 281.449.9332
Fax: 281.449.1742

---

**STEAM TURBINE GENERATOR IMMEDIATE SHIPMENT**

1500KW Murray

- 400 psig • 650°F • 10# B.P. • 360/240/4160V
- 3000KW Allis Chalmers
  - 360 psig • 720°F • 40# B.P. • Exh 4160V
  - 3536KW Westinghouse
    - 300-350 psig • 570°F • 20-75# B.P. • Exh 4160V
    - 9375KW GE
      - 450 psig • 672°F • 50-70# A.E. B.P. • 4160V
      - 22MW GE
        - 850 psig • 900°F • 1.5 HG • Abs 13.8KV
      - 22MW Shin Nippon
        - 850 psig • 865°F • Ext 230/78 • 13.8KV

---

**TURBINES**

1314HP Terry

- 300 psig • 515°F • 150# B.P. • 3800 RPM

1500HP Worthington

- 300 psig • 540°F • 35# B.P. • 3600 RPM

1500HP Worthington

- 350 psig • 650°F • 60# B.P. • 5000 RPM

220HP Murray

- 545 psig • 610°F • 13-40# Exh. • 3600 RPM

2800HP Murray

- 395 psig • 700°F • 20-45# B.P. • 4670 (3000) RPM

9495HP Dresser Rand

- 400 psig • 720°F • 2.5” HG ABS 8000 RPM

Contact Us For More Information

CALL: + 847 541 5600
FAX: + 847 541 1279

[www.wabashpower.com](http://www.wabashpower.com) • info@wabashpower.com

---

www.aftexas.com • Andy@aftexas.com

Phone: 281.449.9332
Fax: 281.449.1742

---

wabash POWER EQUIPMENT CO.

444 Carpenter Avenue, Wheeling, IL 60090
FIGURE 1. Comparison of average temperatures (°C) from 2012 - 2015 registered at three meteorological stations of San Carlos, La Troncal and Valdez mills.

FIGURE 2. Averages of maximum, mid and minimum temperatures from January to December 2015 registered in three meteorological stations of San Carlos, Valdez and La Troncal mills.

FIGURE 3. Total monthly rainfall (mm) during 2015 registered at three meteorological stations of San Carlos, La Troncal and Valdez mills.

FIGURA 1. Comparación de los promedios de temperaturas (°C) entre 20012 – 2015 registradas en tres estaciones meteorológicas de los ingenios San Carlos, La Troncal y Valdez.

FIGURA 2. Promedios de temperatura mínima, media y máxima durante enero a diciembre de 2015 registradas en tres estaciones meteorológicas de los ingenios San Carlos, Valdez y La Troncal.

FIGURA 3. Total de lluvias mensual (mm) durante 2015 registradas en tres estaciones meteorológicas de los ingenios San Carlos, La Troncal y Valdez.
CLIMATE CHANGE AFFECTED THE 2015 HARVEST SEASON IN ECUADOR

Raul O. Castillo, Ph. D., Center of Investigation of the Sugarcane of Ecuador – CNCAE, rcastillo@cincae.org

Ecuador is located on the west coast of the South American continent and crossed by the equator (the country gets its name from the Spanish word for “equator”). It has a length of 714 km (444 mi) N-S and a width of 658 km (409 mi) E-W, latitude of 00°50’ N to 04°28’ S; longitude of 80°20’ to 75°30’ W. Ecuador borders Colombia on the North, Peru on the East and South, and the Pacific Ocean on the West. The total boundary length of 4,247 km (2,639 mi), of which 2,237 km (1,398 mi) is coastline. The Galápagos Islands, with an area totaling 8,010 km2 (3,093 mi2), are approximately 1,130 km (700 mi) off the coast on the equator at 89° to 92° W. In the Ecuadorian continental land, there is great variety of climates, largely determined by altitude. It is mild year-round in the mountain valleys, cold mild in the highlands and permanent snow with small glacial at the Andean picks, with a humid subtropical climate in coastal areas and rainforest in lowlands and the Amazon basin. The Pacific coastal area has a tropical climate with a severe rainy season from January to May between 1370 and 2000 mm of precipitation per year, and dry season from June to December. The climate in the Andean highlands is temperate and relatively dry, and the Amazon basin on the eastern side of the mountains shares the climate of other rainforest zones. Because of its location at the equator line, Ecuador experiences little variation in daylight hours during the course of a year. Both sunrise and sunset occur each day at about 06h00 and 18h00 hours, respectively.

Sugar production develops between approximately 03° S y 00°30’ N of the equator line and longitude 78° 30’ W. Most of the production happens in the lower area of the Guayas River, near Guayaquil, in the provinces of Guayas, Los Ríos and Cañar, where only 2.25 hours average per day of net radiation (sun-
shine) has been registered during the year. The mills have a six months harvesting period, between June to December, collecting canes of 12 to 13 months. Other small areas of production are located in the inter-andean valleys of Imbabura and Loja provinces at higher elevation of about 800 – 1200 m altitude with about 800 TM of milling per day.

The El Niño event forecasted for late 2015 with heavy rains was not present at the Ecuadorian low land. However, a climate change patterns with temperature and rainfall showed differences compared to those observed in previous years. Minimum temperatures remained as low as 22°C with and maximum of 32°C, with average temperature of 27°C (Figure 2). These high temperature conditions during the whole year and especially in May-June allowed to the sugarcane plant continue growing with no sugar accumulation. It is well known that sugar accumulation starts when the acid invertase is less active compared to the neutral invertase at low temperature in a wide temperature range. At high temperature, the acid invertase increases activity with cell wall accumulation. In addition, rainfall continued up to early August (Figure 3), and the high temperature conditions mentioned above and the low sunshine or net radiation of 2.25 hours average per day, allowed a continued growing period for the sugarcane plant with low sugar accumulation. The plant mainly produced organic matter (leaves, young stalks and tops) with high stem water content resulting in high tonnage per hectare (TCH). These factors did not allow sugar accumulation and ripening to start harvesting, including the difficulties to access to the fields. In normal conditions, rains will stop in May to allow the farmers harvest from late June to December.

The two conditions described above forced to the mills accelerate the milling process, with low sugar recovery of the crushed cane. Despite this, it was not possible to grind all the cane produced, leaving about 19,000 ha from 72,000 ha of sugarcane planted (about 1,800,000 TM) to be harvested in 2016. Therefore, sugar mills will have a 4–5 month period to harvest the remaining cane before the one year canes are collected of all planted varieties, including those released by the Sugarcane Research Center of Ecuador - CINCAE.

**VARIETY COMPOSITION**

There have been important changes in variety composition percentages at sugar mill fields. In 1997, a single Australian variety named Ragnar occupied 92% of the variety composition for sugar production. Later on, in 2006, the Colombian variety CC85-92 reached 40%. In 2015, the new Ecuadorian variety released by CINCAE named ECU-01 was 30%; together with the newer released varieties: EC-02, EC-03, EC-05, and EC-06 occupy 43% of the mill’s cultivated area with 15,860 ha (Figures 4 and 5). The remaining is a mixture of introduced varieties. Therefore, variety adoption of those released by CINCAE in Ecuador has been a success, a rapid integration to the commercial production is observed in few years. However, it is important to point out that cane growers are still planting foreign varieties. There is a need to promote the benefits and use of local varieties among growers.
todo el año. Los ingenios cosechan la caña entre junio a diciembre; es decir, un periodo de seis meses, con cañas de 12 a 13 meses de edad. Otras pequeñas áreas de producción se encuentran en los valles interandinos de las provincias de Imbabura y Loja a un altitud entre 800-1200 msnm. El promedio de molienda de estos ingenios es aproximadamente 800 TM de caña/día.

El fenómeno del Niño pronosticado para finales 2015 que preveía altas precipitaciones no se presentó en la costa ecuatoriana. Sin embargo, si se observó un cambio de los patrones climáticos donde se registraron temperaturas y precipitaciones diferentes en comparación con los observados en años anteriores. La temperatura mínima no bajó de los 22° C y la máxima fue de 33° C, con temperatura promedio de 27° C en 2016 (Figura 2). Estas condiciones de alta temperatura durante todo el año, y especialmente durante mayo y junio hicieron que continúe el crecimiento de la caña de azúcar con muy baja acumulación de azúcar. Es conocido que la acumulación de azúcar comienza cuando la invertasa ácida es menos activa comparada con la invertasa neutral a temperaturas bajas y con buen rango u oscilación de temperaturas mínimas y máximas. Por tanto, estas condiciones más la baja luminosidad de apenas 2.25 horas promedio diario durante el año de radiación neta en la zona, no permitieron que la caña de azúcar incremente su contenido azucarero para iniciar la zafra, incluyendo la dificultad de acceso a los campos de cultivo (canteros o suertes). En el 2015, las lluvias continuaron hasta principios de agosto (Figure 3), acompañadas de las altas temperaturas mencionadas anteriormente. Esto ayudó a un crecimiento continuo de la planta de caña de azúcar, con acumulación de materia verde (chupones, hojas y cogollos) y alto contenido de agua en los tallos, sin permitir la acumulación de azúcar y su consiguiente maduración; es decir, altos tonelajes de caña por hectárea (TCH).

Las condiciones descritas obligaron a las fábricas de los ingenios a acelerar el proceso de molienda con baja recuperación de azúcar de la caña molida. A pesar de ello, no fue posible moler toda la caña de campo, dejando alrededor de 19,000 ha de 72,000 ha de caña sembrada (cerca de 1,800,000 TM) como caña rezagada para moler en la zafra de 2016. Es decir, los ingenios azucareros de Ecuador deberán moler por un periodo de 4 – 5 meses solamente caña rezagada de cañicultores y caña propia de ingenios de todas las variedades cultivadas, incluyendo las entregadas por el Centro de Investigación de la Caña de Azúcar del Ecuador – CINCAE.

**COMPOSICIÓN VARIETAL**

En la industria ecuatoriana se han observado cambios importantes de la composición varietal. En el año 1997, las estadísticas de producción muestran que la variedad Ragnar de origen australiano ocupaba el 92% de la superficie cultivada de caña para producción de azúcar. Más adelante, en el año 2006, la variedad colombiana CC85-92 llegaba al 40%. En el 2015, la variedad ECU-01, entregada por el CINCAE en agosto de 2007, llega al 30%; la que junto con las otras variedades de reciente entrega: EC-2, EC-03, EC-04, EC-05 y EC-06, llegan al 43% del área cultivada en campos de ingenios, con un total de 15,860 ha (Figuras 4 y 5). Por tanto, la adopción de variedades obtenidas por CINCAE ha sido positiva, ya que en pocos años se han integrado rápidamente a la producción comercial. Sin embargo, es importante señalar que a nivel de cañicultores todavía no han ingresado como se esperaría, donde se debe hacer un trabajo de promoción sobre las bondades de las mismas.
SHRIMP-STUFFED PORTOBELLO MUSHROOMS

Rich, meaty Portobello's are delicious all by themselves, but a seafood stuffing takes them to another level—with a definite Louisiana touch. Of course, you can vary the seafood (using crab, crawfish, scallops, or whatever you like) as well as the type of mushroom, cheese, and herbs. It’s your party; choose your favorites and enjoy!

INGREDIENTS

- 4 medium Portobello mushrooms (about 1 pound)
- 2 tablespoons butter or margarine
- 1 medium onion, finely chopped (about 1/2 cup)
- 4 cloves garlic, minced
- 8 ounces peeled, deveined, and cooked shrimp, chopped
- 1/2 cup bread crumbs
- 1 egg, slightly beaten
- 1 tablespoon fresh lemon juice
- 1 tablespoon fresh basil, finely chopped
- 1 ounce Parmigiano-Reggiano cheese, grated
- 4 to 8 whole peeled, deveined, and cooked shrimp, (21–25 count) (optional)
- fresh parsley or basil sprigs (optional)

TO MAKE

Preheat oven to 425°F. Wipe mushrooms with a clean, damp cloth or paper towel. Remove mushroom stems and chop them coarsely; set aside.

In a large skillet, melt butter or margarine over medium heat. Cook onion, garlic, and chopped mushroom stems in hot butter for 6 to 8 minutes or until tender. Stir in chopped shrimp, bread crumbs, egg, lemon juice, and cook 1 to 2 minutes, until shrimp turn opaque.

Place Portobello caps, stem sides up, on a baking sheet. Divide shrimp mixture among Portobello caps. Sprinkle with cheese. Bake, uncovered, about 15 minutes or until mushrooms are tender. To serve, garnish with additional whole shrimp and herbs, if desired.
XXIX ISSCT CONGRESS 2016 
5-8 December 2016 in Chiang Mai, Thailand

Sufficient and sustainable agri-sugar cane: from small farmers to global exporters

REGISTER NOW & GET BETTER DEAL!
Don’t miss out our intriguing topics in plenary sessions!

Plenary sessions will be held on each day of the Congress.

- The topic at the Opening Ceremony:
  - sustainability in sugar cane production
- The topic on subsequent days:
  - Producing sugar cane under changing environmental conditions;
  - Changing economic conditions;
  - Changing policy and management regimes

The speakers will elaborate on the following issues:

- Effect of global warming on sugarcane;
- Production cost analysis across Thailand, Vietnam, South Africa and Brazil;
- Sugar cane research, development and extension, over-managed and under-performing;
- On dynamics of the global sugar industry

www.29issctthailand.com  Facebook.com/issct2016  +66(0) 2229 3341
COMING MEETINGS

2016 MEETINGS & CONFERENCES


DECEMBER 5 - 8 | XXIX International Society of Sugar Cane Technologists’ (ISSCT) Congress, Chiang Mai, Thailand, 29issctthailand.com

2017 MEETINGS & CONFERENCES

JANUARY 29-31 | American Sugarbeet Growers Association’s Annual Meeting, Hilton Miami Downtown, Miami, FL, USA, AmericanSugarbeet.org

FEBRUARY 6-8 | ASSCT, Louisiana Division Meeting, Double Tree by Hilton Hotel, Lafayette, LA USA, ASSCT.org

FEBRUARY 27- MARCH 2 | ASSBT 39th Biennial Meeting, Greenville, SC USA, Bsdf-assbt.org

MAY 7-10 | 75th Sugar Industry Technologist Conference, Tainan, Taiwan, Sucrose.com

MAY 21-24 | 5th European Society for Sugar Technology (ESST/VDZ) Conference, Dresden, Germany, Esst-Sugar.org

JUNE 14-16 | ASSCT, Joint Division Meeting, Crowne Hotel, New Orleans, LA USA, ASSCT.org

AUGUST 4 - 9 | 34th International Sweetener Symposium, Omni San Diego Hotel, San Diego, CA USA, Sugaralliance.org

AUGUST 22 - 25 | Fenasucro & Agroncana, Centro Eventos, Zanini, Sertaozinho - SP, Brazil, Fenasucro.com.br

COMING IN DECEMBER, 2016

New Products & Technology issue features new products that are advancing technology in the global sugar industry. Advertisers will receive a free product release and photo. Also Ethanol & Energy Production Worldwide. This issue explores the rapid growth of global energy and ethanol production.

CONSULTANTS

Luis E. Rivas
Mechanical Engineer
Email: Irivase@aol.com
Phone: 225-274-0770
Fax: 225-272-6269
Cell: 225-939-8741
Bi-lingual English/Spanish

Guilherme Rossi Machado Jr
Agronomy and Breeding
rossi@merconet.com.br
Telefax: 55 19 3422 8541
Piracicaba - Brazil
Tri-lingual: Portuguese/English/Spanish

ADVERTISERS

A & F Texas ........................................31
Belyea Company, Inc.........................7
BMA..................................................CIII
Bosch Rextroth...............................CIV
Broadbent, Inc..................10
Case IH...........................................3
Crompion International...............6
Game Equipment............................11
Graver Technonologies..............24
ISSCT.............................................37
ITECA............................................25
John Deere Thibodaux, Inc.......20-21
Metro Boiler Tube, Inc.................6
Prodek..........................................10
Valmet..........................................13
Veco BV........................................28
Vesconite......................................7
Wabash Power Equipment Co.......31
Welding Alloys...............................13
Western States............................CII
Sugar production is a process that requires plenty of energy, and most process steps use steam as their energy source. Relying on more than 160 years of experience and our process engineering expertise, we can help customers achieve both a sustainable energy balance and a high level of efficiency. BMA supplies more than products that can be perfectly integrated into the energy system of existing process steps. In fact, we design and optimize entire factories across the globe, with the primary goal of saving energy to enhance efficiency.

In cane sugar factories, BMA technology has greatly helped to cut steam consumption to as little as 28% per ton of cane. Slashing the energy consumption of a production plant doesn’t always cost an arm and a leg – and this may well apply in your case. Let’s find out together!
The unstoppable drive to keep things moving

Your move?
We’re in.

The fiber in sugar cane varies, but your milling output can always be high. Hydraulic drives from Bosch Rexroth – with their low speed, high torque and excellent control – let you boost your existing power or drive each roll independently for maximum performance.

Come visit us at ISSCT 2016, booth K13.