

## DEBRIEFING ON XXIIIV ISSCT CONGRESS EXPERIENCE AND OPPORTUNITIES

by

*Dr. Shahid Afghan*

*Director Research Shakarganj Sugar Research Institute, Jhang Pakistan*

[shahid.afghan@shakarganj.com.pk](mailto:shahid.afghan@shakarganj.com.pk)

### **ABSTRACT**

International Society of Sugarcane Technologists (ISSCT) 28<sup>th</sup> Congress was organized on 24 to 28 June 2013 at Sao Paulo Brazil with pre and post congress visits to cane fields and sugar factories. Two research papers were presented on the event from Pakistan. Total presentations were 327 from 42 countries of sugar world, covering research work on agriculture, biology, factory and co-products. In Brazil, climatic and soil conditions are ideal for sugarcane crop with rainfall 2,000 mm per annum, temperature range 05 to 35 Celsius. About 70,000 growers were growing sugarcane crop on 23.66 million acres, supplying 588 million tons of cane to 435 sugar factories. Average cane yield was 760 mounds per acre with average recoverable sugar 12 percent. Brazilian sugar industry started commercial production of 6 Bios for its sustainability viz. bio-ethanol, bio-electricity, bio-sugar, bio-diesel, bio-foam and bio-water. Crushing-season duration was expanded from 6 to 9 months. Some factories efforts were in progress to extend the duration with sweet sorghum for 11 months. 92 % harvesting and plantings were mechanized with 6 hours average cut to crush intervals. Cropped areal survey was done with GPS based tagging for varietal survey, identification, yield estimates and prediction of biotic and abiotic factors. Amongst the top 10 varieties area under one variety was not more than 27 percent even if it was excellent in all aspect, this was done to avoid any unexpected epidemic. Linear regression models were used to breed the crop as sugarcane and energycane. Plant improvement was in progress using molecular, basic and commercial breeding. A new technique “microscopy” as most efficient and reliable tool was used for screening of varieties against Smut and Rust diseases. Opportunities for the institutes working on improvement of sugarcane crop in Pakistan comprised biological material transfer agreements, development of crop photo-system efficiency, microscopic screening for diseases, use of linear regression model for biometry of the crop, GPS based crop logging, development of DNA marker for cluster analysis of varieties to group for sucrose contents, training of scientist and collection of 20 clones form ISSCT germplasm bank, annually. Sound policies, environmental care, social responsibility, technological development, trade barriers elimination and partnership are key for the successful development of Brazilian Sugar Industry.

## Events and Papers

Pre-Congress:	June 20-21, 2013
Congress:	June 24-27, 2013
Countries:	65
Delegates/Members:	850/1486
Papers Submitted:	600
Accepted:	
Full Length papers:	184
Poster papers:	137
Plenary papers & Reports:	12
Post-Congress:	June 29-30, 2013

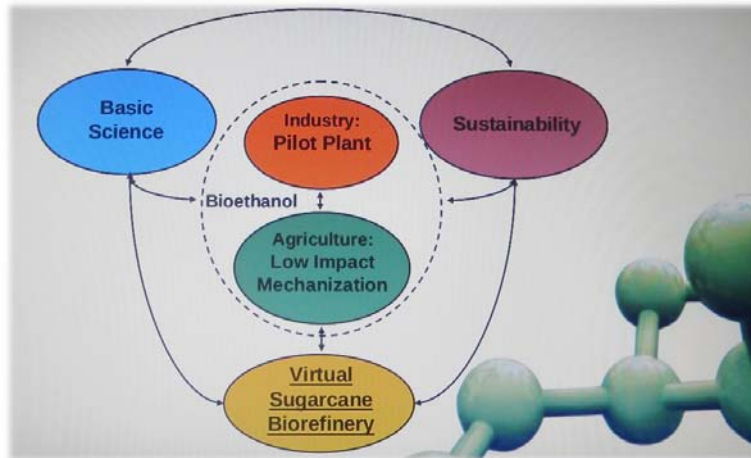
## ISSCT Congress – 2013

Section	Papers	Posters
Agriculture	47	28
Biology	63	60
Factory	36	26
Co-products	29	18
Management	9	5
TOTAL	184	137

## Statistics of Brazilian Sugar Industry

Number of Sugar Mills	= 435
Number of Cane Growers	= 70,000
Average number of growers per mill	= 161
Cultivated area (million hectares)	= 9.62
Cane Yield (tons per hectare)	= 72.0
Sugar Recovery (% cane)	= 12.0

## Research Programme



## Selection Pressure in Cane Seedling at Different Cane Breeding Stations

Country	Cane area ('000'ha.)	Crosses (number)	Seedlings per annum
Australia	391	1,500	85,000
Brazil	9,616	1,477	400,000
India	4,400	2,500	300,000
Indonesia	495	2,000	1,200,000
Mauritius	61	2,600	100,000
South Africa	314	1,300	180,000
USA	350	1,700	300,000
Sri Lanka	14	1,000	100,000
Pakistan	1,031	-	50,000

## The 20 Most Grown Varieties Brazil

Varieties	%	Position
RB867515	27.27	1
SP81-3250	10.60	2
RB966928	9.49	3
RB855453	6.11	4
RB855156	5.12	5
RB92579	5.10	6
CTC-15	3.02	7
SP83-2847	2.89	8
CTC-9	2.33	9
RB83-5054	2.11	10
SP80-1842	2.03	11
RB85-5536	1.80	12

### The 20 Most Grown Varieties in Brazil

Varieties	%	Position
CTC-4	1.52	13
CTC-17	1.30	14
CTC-2	1.15	15
RB93-5744	1.07	16
SP80-3280	1.05	17
SP80-1116	0.98	18
RB83-5486	0.90	19
RB93-7570	0.85	20
Others	13.31	

### Planting Technique



### Opportunities

- ✓ Breeding for stress tolerance
- ✓ Linear Regression Model
- ✓ Exchange of germplasm
- ✓ Training of scientist
- ✓ DNA marker/genetic mapping
- ✓ Disease and molecular tools
- ✓ Quarantine prediction
- ✓ ISSCT germplasm bank


## Opportunities

21.22

**Physiological traits**

Photosystem II efficiency

- FluorPen FP 100
- (model Z990) ( $F_v/F_m'$ )



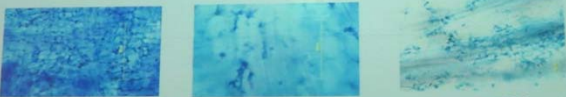
XVIII ISSCT  
16-17 June 2013

The slide features the Conicoma logo in the top left and a small circular icon in the bottom right. A red arrow points from the text to the image of the FluorPen FP 100 device.

18.17

**Segregation of internal resistance**

- 74 individuals from QN80-3425 x CP74-2005 were screened using the injection method
- 49 individuals from Q208 x CP74-2005 were also screened using this method
- Scored on a scale of 1-5



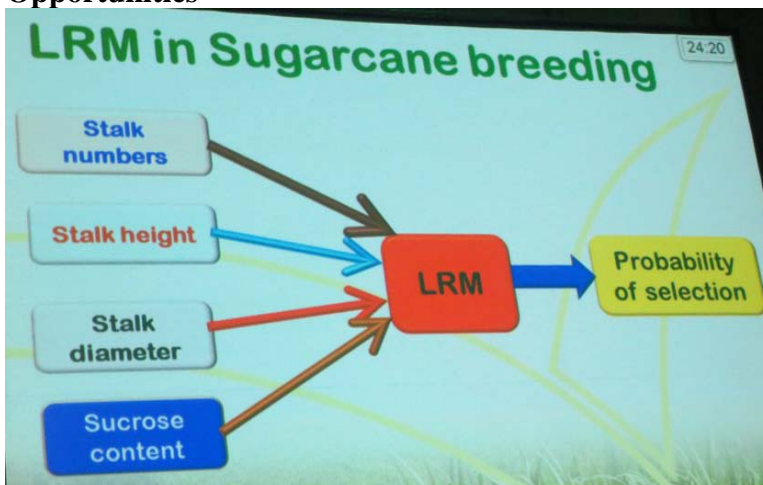
KQ07-5056 Highly resistant

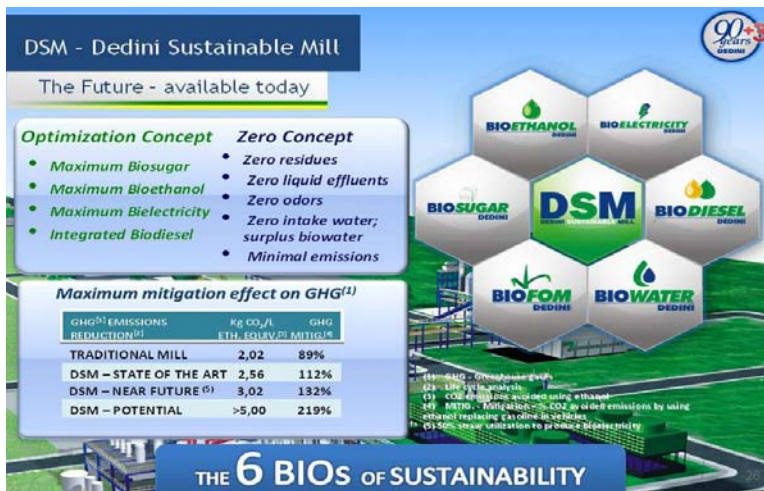
KQ07-4912 intermediate

KQ07-4903 Highly susceptible

The slide includes the Conicoma logo in the bottom right corner. Three micrographs show varying degrees of internal resistance, with the most resistant sample (KQ07-5056) showing a dense, blue-stained cellular structure, the intermediate sample (KQ07-4912) showing a less dense structure, and the highly susceptible sample (KQ07-4903) showing a very sparse, light blue-stained structure.

## Opportunities





## Agricultural Functional Structure

Cultivation process

Harvest process

Development process

## Cultivation Process

*Soil analysis*

*Chemical fertilizing (cover)*

*Stillage dilution with Waste water*

*Fertigation (vinasse)*

*Soil adjustment (Calcarium and gypsum)*

## Development process

Contracts administration (partnership and farmers)

Agricultural control and production planning

New technologies (agriculture)

Autopilot /Image diagnosis

New systems of planting (varieties yard)

## Varietal Trials



## Areal Survey of Sugarcane Plantations

Cropped area surveyed

Price of Package (Hardware + software) = 35,000 USD

= 500 ha per

### Benefits:

- ✓ GPS based Tagging of total area
- ✓ Identification of crop and varieties
- ✓ Yield estimates,
- ✓ Prediction of diseases

## **DELTA SUCROENERGIA**

Ribeirao Preto, Brazil

(June 21, 2013)

- Mechanized Planting / Harvesting
- Crop rotation and tillage
- Biological Control of Sugarcane pests
- Reuse of organic waste (water, vinase, residue of production) on culture
- Practice environmental education

**Application Of Vinase (dilution 6 to 2.5 brix) Using Rain Gun @ 8 Cubic Meter Per Hactare + 60 KG N Per Hectare With Out P and K**



**Mechanized Application Of Potassium And Gypsum**

Organic matter = 25 %

Potassium= 2 %

Other minerals = 3 %

Moisture contents = 70 %

**One Crop Cycle:**

Year-1

Application @ 14 t/ha

Year-2

Vinasse 2.5 brix @8 cubic meter /ha

Year-3

NK @ 100-200 /ha





## **Plantlets Plantation of Sugarcane as Seed of New Varieties**



## **Application of Stillage on planted Sugarcane Nursery Seed**





**Dr. Jack C. Comstock, ARS-USDA, Canal Point, USA**



**Dr. Phillip Jackson and Dr. Mac Hogarth, CSIRO/BSES, Australia**