

SugarMech  
2017

# NATIONAL SYMPOSIUM ON SUGARCANE MECHANISATION: CHALLENGES AND OPPORTUNITIES

MARCH 17-18, 2017

## COMPENDIUM OF RESEARCH-PAPERS



held at

**Bannari Amman Institute of Technology**  
Sathyamangalam, Tamil Nadu, India

Financial support by  
Indian Council of Agricultural Reserach, New Delhi



COORGANIZERS



## 2. RESEARCH ABSTRACTS

### A. SUCARCANE MECHANIZATION

*SugarMech 2017/Oral/SM/1*

#### **Problems on mechanization in sugarcane cultivation in india**

N.Sridhar<sup>1</sup>, A .Surendrakumar<sup>2</sup>C.Selvakumar<sup>3</sup>

<sup>1</sup>Research scholar, Agricultural Engineering College and Research Institute, Kumulur, Tiruchirapalli- 621 712, <sup>2</sup> Professor , Agricultural Machinery Research Centre, Tamil Nadu Agricultural University, Coimbatore- 641 003, <sup>3</sup>District Manager-Erode, Netafim Irrigation India Pvt Ltd; Emai.Id:sriphd88@gmail.com

Sugarcane is an important commercial crop worldwide. In India sugarcane is cultivated in 52.84 lakh hectare with annual production of 3565.61 lakh tonne in the year 2015-2016. The average yield of sugarcane is about 70.86 tonne per ha, which is lower than the average productivity of Australia, Indonesia, Colombia etc. The major producing states are Uttar Pradesh, Maharashtra, Tamilnadu, Karnataka, and Gujarat. The energy consumption in production of sugarcane is highest as compared to many other crops such as paddy, wheat, potato, maize, sorghum etc. sugarcane is labour intensive requiring more

than 360 man-hour per hectare for different operations. In India, agricultural implements and machinery for few operations in sugarcane cultivation has been developed. However the adoption of these implements and machinery has not been up to the desired level. Thus there is a considerable mechanization gap, especially in the area of sugarcane planting, intercultural, pesticide, herbicide and other nutrient application , irrigation , and harvesting. Therefore it is necessary that concentrated efforts be made for adoption, development and popularization of sugarcane machinery for various operations.

*SugarMech 2017/Oral/SM/2*

#### **Need for efficient healthy nursery programme to sustain sugarcane cultivation through mechanized cane cultivation**

R. Viswanathan and D. Neelamathi

Principal Scientists, ICARSugarcane Breeding Institute, Coimbatore – 641007; e-mail: rasaviswanathan@yahoo.co.in

Sugarcane production is affected by different diseases caused by fungal, bacterial, viral and phytoplasmal pathogens in the country. Major fungal diseases such as red rot and smut are managed through deploying disease resistant varieties. Due to vegetative propagation the viral pathogens along with other non-fungal pathogens causing RSD and GSD gradually increase in their load in the canes over the generations. Such a high population of different pathogens leading to

'varietal degeneration', i.e. loss in vigour of sugarcane varieties. Due to this, longevity of many elite sugarcane varieties was reduced in the past. Since most of the pathogens are transmitted through seed in sugarcane, greater emphasis are given to seed health to manage the diseases. Hence disease-free nursery programmes form the basis of healthy crop in the field. Otherwise, the disease severity aggravates in the ratoons, scope of multi-ratooning and

mechanization depends on the use of healthy planting material. In the past, impact of these diseases was ignored in the past due to lack of precise diagnostic techniques and clarity in symptoms caused by different viral diseases in sugarcane. Ever since yellow leaf disease (YLD) became a serious threat to sugarcane cultivation, ICAR-SBI has given more emphasis on healthy seed programme to address varietal degeneration by elimination of systemic virus infections through tissue culture combined with molecular diagnosis. At ICAR-SBI sensitive diagnostic techniques such as RT-PCR and PCR techniques were developed for the specific detection of the RNA viruses and phytoplasmas infecting sugarcane, respectively. These techniques have been applied to detect the pathogens in the tissue culture derived *in vitro* clones. Although the pathogen titre is expected to be very low, these techniques are highly sensitive to detect such a low titre in young plantlets. When tissue culture derived seedlings are utilized for commercial planting without diagnosis for the designated pathogens, the process also facilitates spread of the diseases far and wide and this will have a catastrophic effect in the field on crop health. Hence production of disease-free seedlings through tissue culture should be

indexed for the designated viruses and phytoplasmas. Such virus-free seedlings are to be used as breeder seed in the three-tier seed nursery programme as they cannot be directly planted for commercial cultivation. Canes from this nursery can be used to raise single bud settlings in prostrays under shade-net and such healthy settlings are used for planting in the field either for commercial cultivation or subsequent multiplication. Large scale adoption of such nurseries in Erode and Namakkal Districts in Tamil Nadu resulted in significant jump in cane yield as compared to the conventional planting. Critical monitoring of YLD-free fields revealed that the disease-free fields always maintained a vigorous crop stand and the farmers realized an average increase of 37.5-50 tonne/ha in cane yield in the region. In addition, rapid multiplication of healthy planting materials is achieved through settlings in the nurseries. Ultimately this approach would increase land productivity, increase farmer's income and sustain sugarcane productivity. Our interventions in producing virus-free seedlings have opened new vistas towards effective management of diseases and supply of healthy planting materials in sugarcane.

*SugarMech 2017/Oral/SM/3*

### **Sett treatment device – an effective way to deliver agro-inputs for planting materials of sugarcane**

P Malathi<sup>1</sup>, R Viswanathan<sup>1</sup>, Ravindra Naik<sup>2</sup>, C Naveen Prasanth<sup>1</sup>, A Ramesh Sundar<sup>1</sup> and SJK Annamalai<sup>2</sup>

<sup>1</sup>Crop Protection Division, ICAR Sugarcane Breeding Institute; <sup>2</sup>ICAR Central Institute of Agricultural Engineering Regional Centre, Coimbatore; e-mail: malathi@yahoo.com

Sugarcane diseases pose major challenge for crop production in all the sugarcane growing countries. Vegetative propagation facilitates transfer of dreaded pathogens through seed canes or other planting materials. Besides, major fungal pathogens causing diseases such as red rot and wilt survive in soil and infect germinating shoots. Our earlier experiments revealed that the effective diffusion of fungicides inside the setts, require prolonged duration (overnight). Since it is cumbersome to handle huge volume of seed canes for fungicide treatment, ICAR-

SBI has developed a technology (The Patent Office Journal 21/06/2013) to deliver fungicides or beneficial microbes effectively and rapidly in the setts. Based on that technology, the Institute has fabricated a sett treatment device in collaboration with ICAR-CIAE to treat setts with fungicides and other agro inputs for disease management and healthy nursery programme. The principle involved in the device is vacuum infiltration by creating a negative pressure followed by absorption of the chemicals inside the setts. This method of sett