

Bud chip technology for quick replacement of old Sugarcane varieties in West Bengal

Goutam Mahata*

Sugarcane Research Station, Bethuadahari, Nadia, West Bengal 741 126

Sugarcane (Saccharum spp. hybrid complex), having religious value is being cultivated in West Bengal for a long time. Traditional varieties are cultivated (3-budded setts) using conventional methods mainly due to unavailability of quality seed cane of newly released varieties and transportation cost of huge seed materials, required for planting (6 t/ha). Sugarcane Research Station, Bethuadahari, Nadia is the only source of quality seed cane of newly released varieties in West Bengal. The performance of the only one operational sugar mill, Khaitan (India) Ltd. at Plassey, Nadia in West Bengal have very poor recovery record as compared to national average. The main problem for implementation of sustainable development of sugarcane based cropping system in West Bengal is transportation of quality seed cane to different districts. Quality seed cane lifted from the research station from different districts was 454.5 quintal and 174.0 quintal during 2016–17 and 2017–18 respectively, clearly indicate the declining trend of seed cane supply. In this context, sugarcane bud chip technology plays an important role on quality seed production and fast replacement of old varieties. This is a low cost technology with high seed multiplication ratio, 6–8 weeks' time saving and is reliable by eliminating about 80–90% seed cane to manageable bud chips making transport and handling easy.

Keywords: Climate change, Hilly region, Springshed, Springwater

SUGARCANE (*Saccharum* spp. hybrid complex) provides raw materials to sugar and sugarcane based industries. Bagasses, Molasses and Press mud, which are the main by-products in sugar industry, serve as raw material for various purpose, essentially for production of alcohol, power/paper and bio-manures respectively. It is cultivated in West Bengal in around 17 thousand ha area with an average yield of 76.1 t/ha and total production of 12.94 lakh tonnes during 2017–18. It is grown in almost all districts of West Bengal mainly Murshidabad, Nadia, Birbhum, North 24 Parganas, Paschim Medinipur and Malda except hill areas. Traditional varieties are being cultivated (3-budded setts) in this state mainly due to unavailability of quality seed cane of superior varieties at different locations and transportation cost of huge seed materials, required for

planting (6 t/ha). The performance of the only one operational sugar mill, Khaitan (India) Ltd. at Plassey, Nadia in West Bengal have consistently poor cane crushing and recovery record as compared to national average, for last few years resulting in less production of sugar and thus their paying capacity to the farmers is also poor and uncertain (Table 1).

The efficiency of sugar and

sugarcane based industries is mainly depended upon the availability of improved sugarcane varieties with better juice quality and tolerance to biotic and abiotic stresses. So, replacing the existing old traditional varieties and promoting promising newly released varieties to different districts is an urgent need. Five promising sugarcane varieties, viz. CoLk 94184, CoSe 01421, Co 0232, CoB 99161 and

Table 1. Performance of sugar industry (Khaitan India Ltd.) in West Bengal

Performance	2017–18	2016–17	2015–16	2014–15
Crushing Cap. (MT)	1800	1800	1800	1800
Crushed (Lakh MT)	0.69	0.66	0.75	0.59
Sugar (Lakh Qtl.)	0.36	0.48	0.50	0.49
Recovery (%)	5.21	7.18	6.63	8.36
National Average Recovery (%)	9.30	10.48	10.62	10.37
Molasses (MT)	3800	3700	5200	3200

(Source-Sugar India, Year Book 2018)

CoSe 95422 of early maturing group (300 days) were taken for the study. They were planted in conventional method i.e 3-budded sett planting and using bud chip in bud chip technology method in seed production programme at research farm of Sugarcane Research Station, Bethuadahari, Nadia, West Bengal during 2018–19. For conventional method, the spacing was 90 cm row to row and 12 buds per meter within the row. In bud chip technology method, the spacing was 90 cm × 45 cm. The standard methodologies for preparing bud chips and raising seedling nursery for quality seed cane production were followed.

Preparation of bud chips for quality seed cane production

Healthy canes of 6–8 month of age, free from insects and diseases, were selected. In case of aged cane, bud chips from bottom 1 m portion were avoided. While, in other cases bud chips were taken manually using chipping machine/bud cutter. The chips were dried in shade for 2–4 h. A solution consisting of malathion 50 EC 0.1% (2 ml per litre of water) and carbendazim 0.1% (1 g per litre of water) was prepared. The dried bud chips were dipped in pesticide solution for 10 min. After removing from solution, they were again dried in shade for 2 h. If they were meant for transport, the bud chips could be kept in perforated polybags before packing in corrugated paper boxes.

Table 2. Comparative study on bud chip technology and conventional method of sugarcane cultivation at Sugarcane Research Station, Bethuadahari, Nadia

Parameter	Conventional method	Bud chip technology	Advantages of bud chip technology over conventional
Seed cane requirement	60–80 ha	7.5–10 ha (25000 bud chip/ha)	Nearly 80–90% (by weight) of the planting material can be reduced
Bud germination	30–35%	Around 90%	Assured crop stand in the field
Seed multiplication ratio	1:10	1:100	Faster multiplication of new released varieties is possible in bud chip technique
Cane yield	650–750 ha	750–1000	Higher cane yield
Chances of varietal admixture during transport	High	Nil	Controlled
Sett transmitted diseases and pests	Maximum	Very less	Minimum
Transportation cost of seed material	Very high	Very low	Low cost technology

Raising seedling nursery

A homogenous mixture with equal quantity of soil, sand and vermicompost was prepared and filled in seedling trays (portrays). The bud chips were dipped in 0.1% carbendazim solution for 10 min and were planted with bud facing upward in seedling trays. While planting, the bud chips were covered with soil mixture lightly and the seedling trays were covered with polythene sheet for 5–7 days to make the buds germinate faster. Regular watering with rose cane was done and 1% urea solution was sprayed on 15th and 25th day

after planting. After 6 weeks, the seedlings were transferred together with the mass of medium to the field and were transplanted in small pits with required spacing.

Findings of the seed production programme

Seed Production Programme has played an important role in fast replacement of old varieties by high yielding newly released varieties. The various advantages of quality seed cane production through bud chip technology method over conventional are presented in Table 2.

Low seed cane requirement and high cane yield is found in bud chip technology method as compared to conventional method of planting. Seed multiplication ratio, the most important parameter for rapid seed cane replacement of newly released varieties, is ten times higher in bud chip technology over conventional method. The main hindrance for successful implementation of sustainable development of sugarcane based cropping system in West Bengal, the only operative scheme exclusively for sugarcane in this state, is lifting quality seed cane from sugarcane research station, Bethuadahari, Nadia to different growing districts.



Conventional method of planting

SUMMARY



Bud chip technology method

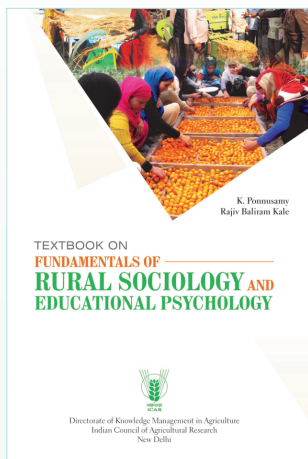
Rapid seed cane multiplication and large quantity of planting material poses a great problem in transport, storage and involves high cost. In this context, quality seed cane production of sugarcane through Bud chip technology for replacement of old varieties is one of the most important option in West Bengal. Sugarcane bud chip technology is relatively cheaper, less labour intensive, saves 6–8 weeks and is reliable method for seed cane

multiplication in West Bengal as compared to conventional planting through 3-budded setts. Bulks of seed cane are reduced to manageable bud chips that make transport and handling easier and cheaper. The cane after taking bud chips can be well utilized for preparing juice or jaggery (gur). Replacement of old varieties of sugarcane cultivated in different district of West Bengal can easily be achieved by using this technology and can save the

government money allotted for carrying cost of seed material for implementation of different components of the sustainable development of sugarcane based cropping system in West Bengal.

*Corresponding author's e-mail:
goutamab.srs@gmail.com

Textbook on Fundamentals of Rural Sociology and Educational Psychology



India being a land of villages, rural sociology and educational psychology is an essential theme for agricultural students and professionals. Rural sociology deals with rural society and the relations of people who live in villages. Rural sociology presents a scientific picture of rural life.

Extension workers work with farmers very closely in their settings for which their understanding of rural background and farmers' psychology is very essential. Extension professionals should have necessary knowledge of the precise approaches and methods of dealing with farmers. Rural sociology can help professionals in organizing the rural structure in a constructive manner.

This textbook consists of fundamental facts of rural sociology. The book has twenty two chapters covering both rural sociology and educational psychology out of which twelve chapters consist of rural sociology and ten chapters deal with educational psychology. In this text book, emphasis has been given on various aspects of educational psychology also. It provides all the relevant information in the field of rural sociology with special emphasis on Indian culture, merits and demerits of Indian rural societies, the stressful conditions under which farmers live and work. The book will be a good basis of information reference for agriculture students, psychology students besides extension practitioners, research scientists, KVKs and agricultural colleges.

TECHNICAL SPECIFICATIONS

No. of pages : i-viii + 252 • Price : ₹ 450 • ISBN No. : 978-81-7164-181-9

For obtaining copies, please contact:

Business Unit

Directorate of Knowledge Management in Agriculture
Krishi Anusandhan Bhavan-I, Pusa, New Delhi 110 012
Tel : 011-25843657, Fax 91-11-25841282; e-mail : bmicar@gmail.com