

Research Note

Impact of Improved Sugarcane Production Technologies on Pest Incidence

S. Saravanakumar

ABSTRACT

Sugarcane is an important commercial crop cultivated over 23000 ha in Erode District of Tamil Nadu. Attempts were made to improve the productivity and reduce the pest incidence in sugarcane by adopting improved production technology called *Sustainable Sugarcane Initiatives* (SSI) practices. The experiments were conducted during *kharif* 2017 in 5 farmers' field of Poonthurai block of Erode district. The incidence of early shoot borer and red rot incidence was nil under SSI whereas incidence was noticed in the normal planting system. The cane yield was higher in SSI system with 127.5 t/ha and 108.75 t/ha in the normal planting system. 17.24 per cent yield increase was noticed over conventional system. The cost benefit ratio between the SSI and normal planting system was 2.05 and 1.73, respectively. Considering the above facts, SSI shows the reduction in pest incidence and yield advantages over conventional system of sugarcane cultivation.

Keywords: B:C ratio, Pest incidence, Sustainable sugarcane initiatives, Yield

INTRODUCTION

Sugarcane is an important cash crop in India both sociologically and economically occupying about 4 per cent of the total cropped area. Sugarcane is the central source of sugar or sucrose in India. Nearly 340 Lakh tons of canes are produced in the country shares the 22.6 per cent of the world sugar production. In Tamil Nadu, sugarcane occupies 3,46,000 ha and records annual production of 38576000 tons (Nair, 2008). The production potential of the sugarcane is declining year by year due to its susceptibility to pests and diseases. Though Tamil Nadu ranks first in productivity, this is much lower than the production potential of the crop (Waclawovsky *et al.*, 2012). To meet the need of growing and the increasing demand of sugar and sweeteners for internal consumption, the production and productivity of the crop needs to be increased. Since the land is limited, development and adoption of suitable technologies is the need of the hour for managing pests and diseases and increases the yield of sugarcane.

SSI method has shown promise in addressing the water scarcity problem, high input use efficiency and reduction in environmental degradation. Similar to paddy SSI method of cultivation are more resistant to pests and diseases (Gani, 2004). However, SSI has the advantages of low setts requirement, high tillering ability, water conservation, high yielding etc. The insect pest and disease occurrence is crucial which play a major role in yield of sugarcane. The productivity of the crop could be increased by adopting the improved production technologies, management practices and suitable varieties (Ranawat *et al.*, 2011). Hence, the trail was undertaken with a view to compare the pest and disease occurrence and yield of sugarcane through SSI and conventional method of sugarcane cultivation.

METHODOLOGY

The field experiments were laid out in five farmers' field during *kharif* 2017 in Poonthurai village of Erode district. The variety Co-0212 was sown under two methods

of cultivation viz., conventional planting and sustainable sugarcane initiatives with an area of 20 cents each. The selected progressive farmers were trained on all scientific sugarcane cultivation aspects before starting of the experiments. The farmers were provided with good quality seedlings (sugarcane buds treated with recommended chemicals with the support of vaccum treatment chamber) for transplanting. The details of technologies adopted for each system of cultivations are presented in Table 1.

Incidence of early shoot borer and red rot disease was calculated by counting the number of plants infected and total number of plants in the plot by using the formula.

$$\text{Percent Incidence} = \frac{\text{Pest Disease} \times \text{Number of plants infected in a row}}{\text{Total number of plants in a row}} \times 100$$

The fields were regularly monitored and periodically observed by the scientists of KVK. At the time of harvest yield data were collected from both the SSI and conventional method of cultivation. The cost of cultivation and profit details of both the systems were collected from the farmers for working out the benefit cost ratio. The data's were statistically analyzed by using ANOVAs.

RESULTS AND DISCUSSION

The study reveals that the adoption of SSI method of cultivation reduces the early shoot borer incidence than

the conventional method of cultivation. Table 2 indicates that the early shoot borer incidence was lower (0.45%) than the conventional method, similarly the red rot incidence was not noticed in the SSI method of cultivation, since the planting materials are thoroughly treated with recommended dose of chemicals. The results are in line with Viswanathan *et al.* (2014) in sugarcane and Ravi *et al.* (2007) in paddy cultivation. Yield parameter like individual cane weight of 1.511 kg was recorded in SSI method of cultivation which was superior to the conventional method of planting (1.125 kg per cane). Table further indicates that the SSI method of cultivation recorded 127.50 ton cane yield/ha which is significantly higher the conventional method of cultivation (108.75 ton/ha). The results are in line with Kalita *et al.* (2019) and Singh *et al.* (2019)

It was found that the average cost of cultivation under SSI method of cultivation was Rs. 146000.00 / ha (Table 3) and Rs. 147500.00 /ha in conventional method of cultivation. The cost reduction in the SSI method of cultivation was mainly due to reduced planting materials as well as the reduction in pest and disease infestation. The SSI method recorded the higher mean gross return of Rs. 299625.00/ha and the net return of Rs. 153625.00/ha with the high benefit cost ratio of 2.05. These findings are in line with the findings of Hiremath and Nagaraju

Table 1: Details of technologies adopted under different system of sugarcane cultivation

Technology	Conventional system	SSI system
Planting materials used	Setts	Seedlings
Quantity of planting materials used	3 tons	5000 numbers
Age of planting	On the day of sett cutting	25 days old
Spacing	3 feet row spacing	5 x 2 feet
Organic fertilizers	FYM 12.5 ton/ha	FYM 12.5 ton/ha
Chemical Fertilizers	As per recommendations	As per recommendations

Table 2: Yield, pest and disease incidence in conventional and SSI method of sugarcane cultivation

Method of planting	Pest / Disease Incidence		Yield parameters (ton/ha)	
	Early shoot borer	Red rot	Individual cane weight	Cane yield
Conventional method	3	6.2	1.125	108.75
SSI	0.45	0	1.511	127.5
SEm±	1.725	3.1	1.318	13.26

Table 3: Economic parameters by conventional and SSI method of sugarcane cultivation

Method of planting	Gross cost (Rs/ha)	Gross Return (Rs/ha)	Net Return (Rs/ha)	Benefit cost ratio
Conventional method	147500	255562.5	108062.5	1.73
SSI	146000	299625	153625	2.05
SEm±	1060.66	31156.89	32217.55	0.226

(2009) and Sreelakshmi *et al.* (2012). These results are clearly indicated that the adoption of SSI method of sugarcane cultivation enhanced the sugarcane production and reduced the pest and disease occurrences.

CONCLUSION

There was a 17.24 percent yield increase in the SSI method of cultivation over conventional method. This improved production technology helped the farmers with reduced pest and disease infestation percent. Thus it can be concluded that the SSI method of sugarcane cultivation along with integrated crop management practices enhances the productivity of sugarcane.

Paper received on : April 10, 2020

Accepted on : April 22, 2020

REFERENCES

- Gani, A. (2004). *Opportunities for rice self sufficiency in Indonesia with the system of rice intensification*. In: Abstract on world rice research conference, Tokyo, Japan, November 4–7.
- Hiremath, S.M. and Nagarjau, M.V. (2009). Evaluation of frontline demonstration trials on onion in Haveri district of Karnataka, *Karnataka Journal of Agriculture Science*, **22**(5), 1092-1093.
- Jayachandran, M., Ravichandran, V.K., Manickam, G., Pannerselvam, R. and Durai, R. (2004). Si 96125 – mid late maturing sugarcane clone with higher yield and quality, *SISSTA Sugar Journal*, **29**, 49–51.
- Kumar, K.S., Chhonkar, D.S. and Kanwat, M. (2019). Assessment of cluster front line demonstrations on rapeseed (*Brassica campestris* L.) in Tirap District of Arunachal Pradesh, *Indian Journal of Extension Education*, **55**(3), 17-22.
- Nair, N.V. (2008). Sugarcane Breeding Institute, Coimbatore: A perspective, *Sugar Technology*, **10**(4), 285–292.
- Ranawat, Y., Ram, H., Sisodiya and Punjabi, N.K. (2011). Adoption of improved maize cultivation practices by trained and untrained farmers of KVK, Udaipur, *Rajasthan Journal of Extension Education*, **19**, 144-147.
- Ravi, G., Rajendran, R., Raju, N., Chozhan, K. and Muralidharan, V. (2007). Insect pest scenario in irrigated rice under SRI method of cultivation, In: *Second National Symposium on System of Rice Intensification (SRI) in India- Progress and Prospects*, Gujja B, Goud VV, Mahendra Kumar R, Rao PP, Prasad CS and Shib S (Eds.), 3-5 October, 2007, Agartala, India. pp. 94-95.
- Singh, K.K., Singh, R.P.N. and Mishra, D. (2019). Evaluation of front line demonstration of oilseeds in Raebareli District, *Indian Journal of Extension Education*, **55**(3): 49–52.
- Sreelakshmi, C.H., Sameer Kumar C.V. and Shivani (2012). Productivity enhancement of pigeon pea (*Cajanus cajan* L.) through improved production technology, *Madras Agricultural Journal*, **99**(4-6), 185-189.
- Viswanathan, R., Chinnaraja, C., Malathi, P., Gomathi, R., Rakkiyappan, P., Neelamathi D. and Ravichandran, V. (2014). Impact of sugarcane yellow leaf virus infection on physiological and growth parameters of sugarcane under tropical climatic conditions in India, *Acta Physiologiae Plantarum*, **36**, 1805–1822.
- Waclawovsky, A.J., Sato, P.M., Lembke, C.G., Moore, P.H. and Souza, G.M. (2010). Sugarcane for bioenergy production: as assessment of yield regulation of sucrose content, *Plant Biotechnology Journal*, **8**, 263-276.