



Research Article

PRIMING OF CANE NODE FOR ACCELERATING GERMINATION IN SUGARCANE

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Received: July 05, 2016; Revised: August 26, 2016; Accepted: August 27, 2016; Published: October 30, 2016

Abstract- An experiment was carried out during year 2012-13 to 2014-15 at Central Sugarcane Research Station, Padegaon (M.S.) to find out suitable cane node priming technique and its effect on acceleration of germination and growth and yield of sugarcane. The total six treatments were involved with randomized block design in *suru* (spring) season. The results revealed that the conventional 3 bud setts planting recorded significantly higher germination (73.17%). However, it was at par with the priming cane node with cattle dung plus cattle urine and water in 1:2:5 ratio (72.67%), treating cane node in hot water in 50°C and urea solution (3%) for 2 hours (69.96%). The priming cane node with cattle dung plus cattle urine and water in 1:2:5 ratio recorded significantly the highest cane and CCS yield (135.43 and 17.82 t ha⁻¹). However, cane yield was found at par with treating cane node in hot water in 50°C and urea solution (3%) for 2 hours (131.63 t ha⁻¹) and CCS yield was found at par with treating cane node in hot water in 50°C and urea solution (3%) for 2 hours (17.28 t ha⁻¹), treating cane node in hot water in 50°C for 2 hours (16.46 t ha⁻¹) and conventional 3 bud setts planting (16.33 t ha⁻¹). The lowest cane and CCS yield was observed in unprimed cane node. trend was observed among the different growth parameters. The priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio recorded significantly the highest brix (22.44), sucrose (20.54 %) and CCS (14.38 %) than the rest of the treatment. While CCS per cent was found at par with treatment treating cane node in hot water in 50°C and urea solution (3%) for 2 hours.

Keywords- Priming cane node, Hot water treatment, Cattle dung, Cattle urine, Urea solution and Sugarcane.

Citation: Ghodke S.K., et al., (2016) Priming of Cane Node for Accelerating Germination in Sugarcane. International Journal of Agriculture Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 8, Issue 52, pp.-2441-2442.

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Introduction

Sugarcane is the most important cash crop and it has an important position in the economy of India. It provides the employment opportunities to people, either skilled or semi skilled workers, mostly from rural areas. Sugarcane is normally propagated vegetatively with two eye budded setts from top one-third of the stalk are commonly used. Failure of germination of individual buds and damage to the setts causes gaps and affect the yield of sugarcane. Instead of directly use of two eye budded setts for plantation. These setts are treated with different setts treatment viz. hot water treatment at 50 °C, 3% urea solution, cattle dung and urine treatment, incubation of setts in cattle dung+ urine+ water for 15 minutes for acceleration of germination such treatments have been found better in sugarcane for crop stand and yield [1]. The hot water treatment of setts at 52 °C for 10 to 20 minutes before planting has significantly improved germination and growth. The increase in germination has been ascribed to the establishment of an appropriate hormonal balance for germination within the bud region [2-4]. Planting methods, nutrient management, plant protection, weed management, are the important factor of production. Germination for optimum plant stand is essential requirement for getting higher yield; very meager information is available on different germination aspects of sugarcane. Therefore, this experiment was conducted with the object to find out suitable cane node priming technique for sugarcane setts and to assess the effect of cane node priming on acceleration of germination, growth and yield of sugarcane.

Materials and Methods

Field experiment was conducted during 2012-13 to 2014-15 at Central Sugarcane Research Station, Padegaon, Tal: Phaltan, Dist: Satara, Maharashtra, India. The experiment was laid out in randomized block design with four replication and six

treatments viz., Un-primed cane node, Treating cane node in hot water in 50°C for 2 hours, Treating cane node in hot water in 50°C and urea solution (3%) for 2 hours, Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio, Conventional 3 bud setts planting, Primed and sprouted cane node (Incubated for four days after priming). The sugarcane variety CoM 0265 was planted as per the treatments with 100cm row spacing in gross and net plot size 10.0m X 6.00m and 8.00m X 4.00m, respectively. The two eye budded setts were planted at 15-20 cm distance. The crop was fertilized with the recommended fertilizer dose 250 kg N ha⁻¹, 115 kg P₂O₅ ha⁻¹ and 115 kgK ha⁻¹. The nitrogen was applied in 4 splits at planting (10%), tillering (40%), grand growth stage (10 %) and earthing up (40 %). Phosphorus and Potassium were applied in 2 splits at planting (50 %) and at earthing up (50 %). The soil of the experimental site was medium black. All the recommended plant protection measures were undertaken during the course of investigation. Data were recorded at harvest for yield and quality characters. The juice analysis was done by sampling five canes from each plot at harvest.

Results and Discussion

Growth and yield attributes:

The data regarding growth and yield attributes are presented in [Table-2]. The perusal of data revealed that the conventional 3 bud setts planting recorded significantly higher germination (73.17%) However, it was at par with priming cane node with cattle dung plus cattle urine and water in 1:2:5 ratio (72.67%) and treating cane node in hot water in 50°C and urea solution (3%) for 2 hours (69.96%).

The priming cane node with cattle dung plus cattle urine and water in 1:2:5 ratio recorded significantly higher tillering ratio (1.74). It was found at par with the

treatment treating cane node in hot water in 50°C and urea solution (3%) for 2 hours. The number millable canes (109000/ha) are recorded significantly higher in the priming cane node with cattle dung plus cattle urine and water in 1:2:5 ratio and found at par with the rest of the treatments except un-primed cane node and primed and sprouted cane node (Incubated for four days after priming). The millable height (306 cm), cane girth (11.2 cm) and the weight per cane (1.24 kg)

recorded numerically highest in the priming cane node with cattle dung plus cattle urine and water in 1:2:5 ratio. Among the setts treatments, cattle urine resulted good germination reported [5]. Significantly, better shoot lengths from setts treated with cow dung slurry observed [6]. Also germination of sugarcane setts were enhanced by heat treatment which is reported [7].

Table-1 Pooled mean cane and CCS yields as affected by various treatments

Treatment	Cane yield (t ha ⁻¹)				CCS yield (t ha ⁻¹)			
	2012-13	2013-14	2014-15	Pooled mean	2012-13	2013-14	2014-15	Pooled mean
T ₁ : Un-primed cane node.	115.26	116.96	117.76	116.66	15.71	13.68	16.84	15.44
T ₂ : Treating cane node in hot water in 50°C for 2 hours.	127.36	128.86	129.24	128.49	17.26	13.62	18.51	16.46
T ₃ : Treating cane node in hot water in 50°C urea solution (3%) for 2 hours	129.97	131.77	133.16	131.63	18.44	14.24	19.15	17.28
T ₄ : Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio	132.78	134.68	138.84	135.43	18.94	14.33	20.18	17.82
T ₅ : Conventional 3 bud setts planting.	122.78	124.48	126.08	124.45	17.35	14.18	17.45	16.33
T ₆ : Primed and sprouted cane node (Incubated for four days after priming)	118.00	119.80	121.17	119.66	16.28	13.84	16.62	15.58
SE+	4.06	3.88	3.03	2.05	0.58	0.10	0.44	0.72
C.D at 5%	12.23	10.86	9.14	6.15	1.73	0.28	1.32	2.13

Cane and CCS yield:

The data on cane and CCS yields presented in [Table-1] revealed that priming cane node with cattle dung plus cattle urine and water in 1:2:5 ratio recorded significantly the highest cane and CCS yield (135.43 and 17.82 t ha⁻¹). However, cane yield was found at par with treating cane node in hot water in 50°C and urea solution (3%) for 2 hours (131.63 t ha⁻¹) and CCS yield was found at par with treating cane node in hot water in 50°C and urea solution (3%) for 2 hours (17.28 t

ha⁻¹), treating cane node in hot water in 50°C for 2 hours (16.46 t ha⁻¹) and conventional 3 bud setts planting (16.33 t ha⁻¹). The lowest cane and CCS yield was observed in unprimed cane node. Enhanced germination might have improved the optimum plant stand and enhanced growth parameters were observed. They might have contributed in increase in yield attributes and yield of sugarcane [7] also reported similar findings.

Table-2 Pooled mean growth and juice quality as affected by various treatments

Treatments	Germ. (%)	Tillering ratio	Height (cm)	Girth (cm)	No. of internodes	Millable canes (000 ha)	Av. cane wt. (kg)	Brix (°C)	Sucrose (%)	Purity (%)	CCS (%)
T ₁ : Un-primed cane node.	66.23	1.47	274	9.01	23	101	1.16	20.48	19.31	92.00	13.87
T ₂ : Treating cane node in hot water in 50°C for 2 hours.	67.88	1.61	288	9.9	26	106	1.21	20.57	19.44	93.17	13.84
T ₃ : Treating cane node in hot water in 50°C urea solution (3%) for 2 hours	69.96	1.65	296	10.5	28	108	1.23	21.33	20.19	93.35	14.57
T ₄ : Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio	72.67	1.74	306	11.2	29	109	1.24	22.44	20.54	93.27	14.38
T ₅ : Conventional 3 bud setts planting.	73.10	1.41	270	9.9	24	104	1.20	20.30	19.53	95.33	14.05
T ₆ : Primed and sprouted cane node (Incubated for four days after priming)	68.24	1.36	267	9.6	22	102	1.18	20.21	19.35	93.86	13.79
SE+	1.73	0.03	2.65	0.15	0.81	1.76	0.02	0.14	0.12	0.70	0.11
C.D at 5%	5.24	0.10	NS	NS	2.41	5.22	NS	0.42	0.36	NS	0.32

Quality parameters:

The data regarding juice quality parameters are presented in [Table-2] revealed that priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio recorded significantly the highest brix (22.44), sucrose (20.54 %) and CCS (14.38 %). than the rest of the treatment. While CCS per cent was found at par with treating cane node in hot water in 50°C and urea solution (3%) for 2 hours.

Conclusion

The priming cane node with cattle dung plus cattle urine and water in 1:2:5 ratio recorded significantly the highest cane and CCS yield (135.43 and 17.82 t ha⁻¹) and the cane yield was at par with treating cane node in hot water in 50°C and urea solution (3%) for 2 hours (131.63 t ha⁻¹), CCS yield was found at par with treating cane node in hot water in 50°C and urea solution (3%) for 2 hours, treating cane node in hot water in 50°C for 2 hours and Conventional 3 bud setts planting. The lowest cane and CCS yield was observed in unprimed cane node.

Conflict of Interest: None declared

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