

Influence of Bag and Sett Size on Germination and Vigour of Sugarcane Settlings

M. A. S. Miah, M.A.Matin and A.B.M. M. Rahman

Sugarcane Research & Training Institute

Ishurdi, Pabna, Bangladesh.

Transplanting of single-bud sugarcane settlings received considerable research attention at the IISR (Indian Institute of Sugarcane Research, Lucknow, India) in the mid 1970's (Kumar *et al* 1978). Experiments on spaced transplanting (STP) was also initiated in Bangladesh during 1976-77 crop season following the visit of the then Director, SRTI to IISR. The results of the earlier works are reported elsewhere (Rahman, 1976; Rahman and Rahman, 1979; Srivastava *et al* 1981). For transplanted sugarcane, settlings are initially raised either in soil-bed, or in polythene bag containing planting medium, usually a mixture of soil and organic manure. In the case of polythene bag practice, informations are extremely lacking as to the minimum/optimum size of the polythene bag and seed piece (sett) that must be maintained but not at the cost of the seedling vigour. The size of the polythene bag is important because of the fact that the cost of settling production is directly dependent on the bag size apart from the question of compatibility of sett size with bag size. An experiment was, therefore, conducted to find out the suitable bag size and compatible sett size for raising sugarcane settlings.

The experiment was conducted at SRTI during the crop year 1986-87 with the variety Isd-16. Three bag sizes viz., 20 x 15, 12.5x10 and 11.3x8.8 cm, and three sett sizes viz., 11.3, 6.3 and 3.8 cm were used. Possible eight treatment combinations were as follows : 20x15/11.3, 20x15/6.3, 20x15/3.8, 12.5x10/11.3, 12.5x10/ 6.3, 12.5x10/3.8, 11.3x8.8/6.3 and 11.3x8.8/3.8.

One single-budded sett was planted in each polythene bag which represented a particular treatment and each treatment was replicated 15 times. Soil medium was prepared using top soil and cowdung at a ratio of 7: 3 which is called growth medium in the present investigation. Several holes were made at the bottom of each polythene bag to drain out excess water. Apparently healthy setts were carefully selected and treated with Aretan-6. In each bag 1 g Furadan 3G was applied and mixed up with growth medium thoroughly. Irrigation and necessary care were taken as and when required. Data on germination, shoot and root weight were recorded as per schedules.

Results on the speed of germination have been presented in the Tables 1. and 2. The Table 1 shows that the speed/rapidity of germination is dependent on the size of the setts and germination started in the setts size 6.3 cm within 5 d of planting. Highest, germination was recorded in this sett size upto 11 d of planting. Table 2 shows that bag size has no influence on the speed as well as on percent germination. Sett size 6.3 cm was found the best.

Table 1. Effect of sett size on germination at different dates after planting.

Growth parameter Treatment combination (Bag size/Sett size)	Germination % (Days after planting)					
	5	7	9	11	22	45
20×15/11.3	—	6.67	13.33	26.67	73.33	86.67
12.5×10/11.3	—	—	6.67	20.00	60.00	86.67
Mean	—	3.34	10.00	23.34	66.67	86.67
20×15×6.3	6.67	20.00	20.00	46.67	86.67	93.33
12.5×10/6.3	6.67	13.33	33.33	46.67	86.67	93.33
11.3×8/6.3	—	13.33	20.00	60.00	86.67	93.33
Mean	4.45	15.55	24.44	51.11	86.67	93.33
20×15/3.8	—	6.67	33.33	63.33	100.00	100.00
12.5×10/3.8	—	6.67	13.33	33.33	86.67	100.00
11.3×8.8/3.8	—	—	13.33	46.67	80.00	80.00
Mean	—	4.45	19.99	44.44	88.89	93.33

Results on shoot and root weights have been presented in the Tables 3 and 4. It is seen from the Table 3 that bag size has positive effect on shoot and root weight. Shoot and root weight gradually increased as the bag size was increased. Table 4 shows that sett size has also positive influence on shoot weight increase. However, sett size did not affect root dry weight. Perhaps because of the fact that number of root depends on the number of active primordia on the nodes.

It can be summarized from the results that bag size does not influence germination while sett size enhance rapid germination, and 6.3 cm sett size was recorded the best. In this case, however, higher biomass was obtained as the size of bag was increased proportionately and the larger bags provided more nutrients for

vegetative growth. However, it is speculated that the smaller and tougher settlings have better establishment potentiality than the larger settlings. Lowest biomass was obtained in the 11.3x8.8 cm bag size which was the smallest size of the bags used.

Table 2. Effect of bag size on germination at different dates after planting.

Growth parameter Treatment combination (Bag size/Sett size)	Germination % (Days after planting)					
	5	7	9	11	22	45
20x15/11.3	—	6.67	13.33	26.67	73.33	86.67
20x15/6.3	6.67	20.00	20.00	46.67	86.67	93.33
20x15/3.8	—	6.67	33.33	53.33	100.00	100.00
Mean	2.22	11.11	22.22	42.22	86.67	93.33
12.5x10/11.3	—	—	6.67	20.00	60.00	86.67
12.5x10/6.3	6.67	13.33	33.33	46.67	86.67	93.33
12.5x10/3.8	—	6.67	13.33	33.33	86.67	100.00
Mean	2.22	6.67	17.44	33.33	77.78	93.33
11.3x8.8/6.3	—	13.33	20.00	60.00	86.67	93.33
11.3x8.8/3.8	—	—	13.33	46.67	80.0	80.00
Mean	—	6.67	16.67	53.34	83.34	86.67

Table 3. Effect of bag size on settling vigour and performance.

Growth Parameters Treatment combinations (Bag size/Sett size)	Shoot and Root weight of 45 d old settling		
	Shoot fresh wt. (g plant ⁻¹)	Shoot dry wt. (g plant ⁻¹)	Root dry wt. (g plant ⁻¹)
20 x 15/11.3	8.06	1.71	0.98
20 x 15/6.3	6.89	1.39	0.81
20 x 15/3.8	5.37	1.08	1.08
Mean	6.77	1.39	0.96
12.5 x 10/11.3	4.70	0.93	0.43
12.5 x 10/6.3	4.62	0.97	0.40
12.5 x 10/3.8	2.45	0.50	0.31
Mean	3.92	0.80	0.38
11.3 x 8.8/6.3	3.66	0.87	0.38
11.3 x 8.8/3.8	1.94	0.47	0.27
Mean	2.80	0.67	0.32

Table 4. Effect of sett size on settling vigour and performance.

Growth Parameters Treatment combinations (Bag size/Sett size)	Shoot and Root weight of 45 d old settling		
	Shoot fresh wt. (g plant ⁻¹)	Shoot dry wt. (g plant ⁻¹)	Root dry wt. (g plant ⁻¹)
20 × 15/11.3	8.06	1.71	0.98
12.5 × 10/11.3	4.70	0.93	0.43
Mean	6.38	1.32	0.73
20 × 15/6.3	6.89	1.39	0.81
12.5 × 10/6.3	4.62	0.97	0.40
11.3 × 8.8/6.3	3.66	0.87	0.38
Mean	5.06	1.08	0.53
20 × 15/3.8	5.37	1.08	1.08
12.5 × 10/3.8	2.45	0.50	0.31
11.3 × 8.8/3.8	1.94	0.47	0.27
Mean^{2r}	3.25	0.68	0.55

Besides, smaller bags have other advantages that the cost of seedlings production and transport would be less. Considering the above facts it can be concluded that bag size 11.3x8.8 cm would be economic, and 6.3 cm sett size would also be compatible for this bag size to raise seedlings for transplanting sugarcane. Therefore, we recommend and suggest to use 6.3 cm long sett in the 11.3x8.8 cm bags for economic, and efficient seedling production for spaced transplanting technique of sugarcane cultivation.

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