

Development of a Hand Bud Chip Cutter

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For planting of sugarcane in Bangladesh it needs about 6 to 6.5 t/ha of seedcane in conventional method where two eyed or three eyed seeds are used as planting material. In spaced transplanting (STP) method developed at Bangladesh Sugarcane Research Institute (BSRI), Ishurdi, pabna, pregerminated single bud polybag or two bud soil bed settlings of 45-60 d old are transplanted in the main field. The amount of seed cane in this method is reduced to 1.5-2.0 t/ha (Anon., 1989). To reduce the seed cane further, Physiologists of BSRI tested the possibilities of utilizing bud chip as planting material. For collecting bud chips from sugarcane stalks, a small hand operated bud chip cutting machine was used and settlings were raised in the polibags like single bud polybag settlings. It has been reported that bud chip settlings are equally good as polybag settlings (Imam *et al.* 1988 & Anon., 1989). But the efficacy of the bud chip cutting machine developed primarily was very poor and deseved improvement. Thereafter, a pedal operated sugarcane bud chip cutting machine was designed and fabricated in the Agricultural Engineering workshop of BSRI. It has been reported that by this machine an average of 1045 bud chips were cut per hour with an average bud damage of 9.9%. It has been also reported that the approximate weight of bud chips required for one hectare, cut by this machine, was 116 kg and the fabrication cost of the machine was only Tk. 2610.00 (Eusufzai *et al.* 1993).

Although performance of the pedal operated bud chip cutting machine is better it is fixed and it needs the sugarcane stalks to be collected from the field to the machine for cutting bud chips. After preparation of bud chips, the remaining parts of sugarcane should be used for sugar or 'gur' manufacturing immediately as there is no scope to keep the cane unused for longer period like normally harvested cane. Therefore, an attempt was made to develop a hand bud chip cutter which can be used to remove bud chip from the standing cane in the field so that the budless sugarcane stalks can be kept erect in the field for some days before final harvesting.

The Figure 1 shows the hand bud chip cutter, developed in the Agricultural Engineering workshop of Bangladesh Sugarcane Research Institute (BSRI), Ishurdi, Pabna together with its various dimensions. Six labourers were selected from BSRI farm to test the performance of the cutter. Each of the labourers was allowed to remove bud chips from the standing sugarcane stalks for one hour and the process was repeated thrice. The cutting rate and germination percentage of the cut bud chips are shown in The Tables 1 and 2 respectively. The variety Isd 16 of 9 months old was used for determining

the cutting rate and the varieties Isd 16, Isd 20, Isd 21 and Isd 25 were used for determining the germination percent of the bud chips.

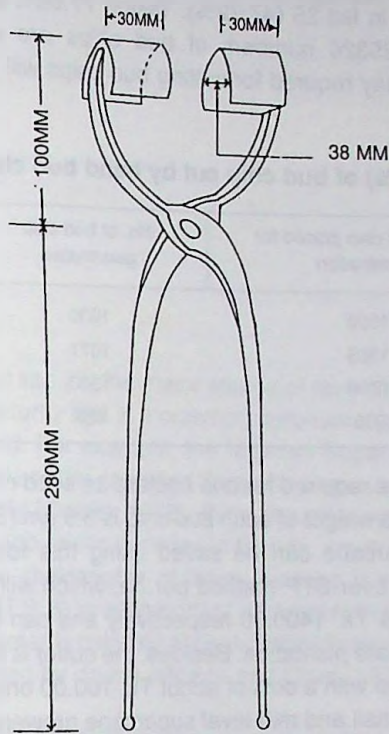


Figure 1. Hand bud chip cutter.

Table 1. Cutting rate of bud chip from standing cane (Isd 16) by a hand bud chip cutter.

Labour No.	No. of bud chip cut/hr		% of bud chip damage		No. of bud chip cut/day	
	Individual	Average	Individual	Average	Individual	Average
1	302		3.00		2416	
2	467		4.28		3736	
3	360	460	4.52	3.89	2880	3677
4	565		3.13		4520	
5	477		4.82		3816	
6	588		3.57		4704	

Average cutting rate of bud chips was found 460 buds/labour-hr and 3677 buds/labour-day with an average bud damage of 3.89% (Table 1). The variety Isd 16 showed the highest germination (79.23%) followed by Isd 20 (78.46%) and Isd 21 (77.06%); and the lowest in Isd 25 (47.22%). Taking 77.06% as reference germination it can be calculated that 25320 numbers of bud chips are required for one hectare. Therefore, the total man-day required for cutting bud chips will be 7 man-days/ha.

Table 2. Germination (%) of bud chip cut by hand bud chip cutter.

Variety	No. of bud chip placed for germination	No. of bud chip germinated	percentage of germination
Isd 16	1300	1030	79.23
Isd 20	1365	1071	78.46
Isd 21	1700	1310	77.06
Isd 25	900	425	47.22

The weight of bud chips required for one hectare as seed material is $(25320 \times 3.9 =) 99$ kg, considering the average weight of each bud chip is 3.9 gm (Eusufzai *et al.* 1993). Thus, the seed material of sugarcane can be saved using this tool is about 5900 kg over conventional and 1400 kg over STP method per ha, which will consequently reduce the seed cost by Tk. 5900.00 & Tk. 1400.00 respectively and can be a great economic help for the small growers to initiate plantation. Besides, the cutter is light and can be fabricated in the local black-smith shop with a cost of about Tk. 100.00 only. The tool, therefore, can be recommended for the small and mid-level sugarcane growers to expedite the adoption of bud chip technology for the greater benefit of the grower as well as the country.

REFERENCES

- Anonymous, 1989. Comparative performance of different STP techniques under irrigated condition. SRTI Annual Report, 1989. pp. 23-24.
- Anonymous, 1989. Effect of different treatment on the germination percentage of single bud setts and bud chips. SRTI Annual Report, 1989. pp. 52-53.
- Imam, S.A.; Hossain, A.H.M.D.; Matin, M.A. and Ali, M. 1988. Effect of row and interplant spacing on the productivity of transplanted sugarcane. *Bangladesh J. Sugarcane*, 10 : 5-8.
- Eusufzai, S.U.K.; Hossain, S.M.I. and Hossain, M.A. 1993. Design and fabrication of sugarcane bud chip cutting machine. *Bangladesh J. Sugarcane*, 12-15 : 115-117.