

## EFFECT OF DIFFERENT PLANTING METHODS AND SEEDLING AGE ON GROWTH AND YIELD OF TROPICAL SUGARBEET

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### ABSTRACT

An experiment was conducted at Bangladesh Sugarcrop Research Institute Rahmotpur sub-station, Barishal to study the effect of different planting methods and seedling age on growth and yield of tropical sugarbeet. The experiment under seven treatment viz. T<sub>1</sub> = Direct seed sowing in ridge method, T<sub>2</sub> = Poly bag seedling age of 14 days, T<sub>3</sub> = Soil bed seedling age of 14 days, T<sub>4</sub> = Poly bag seedling age of 21 days, T<sub>5</sub> = Soil bed seedling age of 21 days, T<sub>6</sub> = Poly bag seedling age of 28 days and T<sub>7</sub> = Soil bed seedling age of 28 days. Experiment was conducted during August 2018 to February 2019 in a Randomized Complete Block Design with three replications. It was observed that the plant height of sugarbeet increased rapidly as T<sub>4</sub> treatment (52.56 cm). Number of leaves grow highest in T<sub>5</sub> treatment (10.66). Circumference (cm) was highest in T<sub>3</sub> treatment (15.2 cm). The highest Individual beet weight of sugar beet (789.67 g) observed under treatment T<sub>4</sub>. The highest yield of sugar beet (70.67 t ha<sup>-1</sup>) observed under treatment T<sub>4</sub>. The lowest yield of sugarbeet (45.13 t ha<sup>-1</sup>) observed under treatment T<sub>7</sub>. Percentage of Brix was highest in T<sub>1</sub> treatment. It may be concluded that T<sub>4</sub>= Poly bag seedling age of 21 days was better yield of sugarbeet.

**Key words:** Sugarbeet, planting method, seedling age.

### Introduction

Sugarbeet (*Beta vulgaris* L.) is a winter season Sugarcrop. Sugar yielding crop Sugarbeet production in world second place. Beet produced sugar is called beet sugar. Some research in Sugarbeet Bangladesh Agricultural University who is initial stage. North Africa, West Asia and South Europe were origin of Sugarbeet. 17-20°C temperature need for germination in sugarbeet (Alam *et al.*, 2001). Some line innovated by BAU was K.Fizapolly, M. Resistapolly, Ramuskapolly, M. Marvipolly, ECI-2, M. Magnapolly and OPH. Fertile Sandy silt soil is better for Sugarbeet cultivation. Slightly acidic, slightly alkali and slightly saline can tolerate Sugarbeet crop. It requires about 150-165 days for maturing. Sugarbeet is a promising crop in our country to mitigate sugar deficit. Yield as well as quality of any crop depends upon the suitable planting method of that crop. For successful cultivation of sugar beet development of suitable planting method is necessary. On the other hand, due to late shower in our country land preparation cannot be possible in the months of September to 1<sup>st</sup> week of October (BSRI 2017). But sugarbeet can be planted following some techniques in those months in medium high land of southern region of Bangladesh. So, from this experiment suitable planting methods and seedling age of sugarbeet will be identified.

### Materials and Methods

An experiment was conducted at Bangladesh Sugarcrop Research Institute Rahmotpur sub-station, Barishal to study the effect of different planting methods and seedling age on growth and yield of tropical sugarbeet. The Sugar Beet seeds were collected from Bangladesh Sugarcrop Research Institute, Ishurdi, Pabna. BSRI Sugar Beet-1 was selected for the study. Seven treatments were used in the experiment viz. T<sub>1</sub>: Direct seed sowing in ridge method, T<sub>2</sub>: Poly bag seedling age of 14 days, T<sub>3</sub>: Soil bed seedling age of 14 days, T<sub>4</sub>: Poly

bag seedling age of 21 days, T<sub>5</sub>: Soil bed seedling age of 21 days, T<sub>6</sub>: Poly bag seedling age of 28 days and T<sub>7</sub>: Soil bed seedling age of 28 days. The experiment was laid out in RCB design following 3 replications. The unit plot size was 4 m × 4 m. Seed rate was 3.5-4.00 kg ha<sup>-1</sup>. 1, 00,000-1, 20,000 plants or roots used in per hectare land. Fertilizers used accordingly the guidelines of Rahman *et al.*, (2016) as follows:

Name of fertilizer	Amount (kg ha <sup>-1</sup> )	Name of fertilizer	Amount (kg ha <sup>-1</sup> )
Urea	250	Zinc Sulphate	10
TSP	120	Boric acid	20
MOP	225	Cowdung	10,000
Gypsum	100	Khoil	450

Data collected on Plant height (cm), number of leaves, circumference, yield of sugar beet (t ha<sup>-1</sup>), unit beet weight (gm) and brix (%) etc. at harvest (160-165 days after sowing, when the crops became matured). The collected data were compiled and tabulated in proper form and were subjected to statistical analysis. The analysis of variance was done following the computer package MSTAT-C software. The mean differences among the treatments were tested with Duncan's Multiple Range Test (Gomez and Gomez, 1984) and the ranking was indicated by letters.

### Results and Discussion

The present study was carried out at Bangladesh Sugarcrop Research Institute Rahmotpur sub-station, Barishal to study the effect of different planting methods and seedling age on growth and yield of tropical sugarbeet. The result obtained from the experimental data in respect of above aspects was elaborated. The data presented in two parts, i) Growth contributing characters ii) Yield and yield contributing characters.

#### Growth contributing characters

**Plant height:** The plant height varied with the different seedling method in Sugar beet. The highest plant height (52.56 cm) was found in the Poly bag seedling age of 21 days which was near statistically similar of Soil bed seedling age of 14 days (51.13 cm). The lowest plant height (49.3 cm) was recorded for Poly bag seedling age of 28 days in Sugar beet (Table 1).

**Number of leaf:** The highest Number of leaf (10.667 cm) was found in the Soil bed seedling age of 21 days which was near statistically similar of other treatments.

Table 1: Growth contributing characters of tropical sugar beet

Treatment	Plant height (cm)	No. of leaf	Circumference (cm)	Comment
T <sub>1</sub>	51.57ab	10.333a	13.33b	Plant height (cm), no. of leaf and circumference (cm) was highest in T <sub>4</sub> , T <sub>5</sub> and T <sub>3</sub>
T <sub>2</sub>	50.1bc	10.333a	14.13ab	
T <sub>3</sub>	51.13ab	10.333a	<b>15.2a</b>	
T <sub>4</sub>	<b>52.56a</b>	10.000a	14.1ab	
T <sub>5</sub>	50.56bc	<b>10.667a</b>	14.83ab	
T <sub>6</sub>	49.3c	10.000a	14.3ab	
T <sub>7</sub>	49.33c	10.333a	14.8ab	
LSD(0.05)	1.62	NS	1.77	

T<sub>1</sub>= Direct seed sowing in ridge method, T<sub>2</sub>= Poly bag seedling age of 14 days, T<sub>3</sub>= Soil bed seedling age of 14 days, T<sub>4</sub>= Poly bag seedling age of 21 days, T<sub>5</sub>= Soil bed seedling age of 21 days, T<sub>6</sub>= Poly bag seedling age of 28 days and T<sub>7</sub>=Soil bed seedling age of 28 days.

**Circumference (cm):** The circumference (cm) increased with the different seedling method in Sugar beet. The highest circumference (cm) 15.02 cm was found in the Soil bed seedling age of 14 days. The second circumference (cm) T<sub>2</sub> (14.13), T<sub>4</sub>(14.1),T<sub>6</sub> (14.3) and T<sub>7</sub> (14.8) was which was statistically similar. Similar results obtained by BSRI (2015).

*Yield and yield contributing characters*

**Individual beet weight (g):** The Individual beet weight changed with the different seedling method in Sugar beet. The highest Individual beet weight (789.67 g) was found in the Poly bag seedling age of 21 days which was near statistically similar of Soil bed seedling age of 14 days (51.13 cm). The lowest plant height (49.3 cm) was recorded for Poly bag seedling age of 28 days in Sugar beet (Table 2).

Table 2: Yield contributing characters of tropical sugar beet

Treatment	Individual beet weight (g)	Yield (t ha <sup>-1</sup> )	Brix%	Comment
T <sub>1</sub>	765.67 ab	65.50ab	<b>14.50a</b>	Individual beet weight (g) and yield (t ha <sup>-1</sup> ) was highest in T <sub>4</sub> but brix% was highest in T <sub>1</sub>
T <sub>2</sub>	666.33 bc	57.83ab	14.25ab	
T <sub>3</sub>	630.67 c	51.2ab	13.80ab	
T <sub>4</sub>	<b>789.67a</b>	<b>70.67a</b>	13.70bc	
T <sub>5</sub>	580.33 cd	54.53ab	13.63bc	
T <sub>6</sub>	525.00 de	46.93b	13.23c	
T <sub>7</sub>	473.33 e	45.13b	13.36bc	
LSD(0.05)	2.17	22.3	1.38	

T<sub>1</sub>= Direct seed sowing in ridge method, T<sub>2</sub>= Poly bag seedling age of 14 days, T<sub>3</sub>= Soil bed seedling age of 14 days, T<sub>4</sub>= Poly bag seedling age of 21 days, T<sub>5</sub>= Soil bed seedling age of 21 days, T<sub>6</sub>= Poly bag seedling age of 28 days and T<sub>7</sub>=Soil bed seedling age of 28 days.

**Yield (tha<sup>-1</sup>):** The yield differed with the different seedling method in Sugar beet. The highest yield (70.67 ton) was found in the Poly bag seedling age of 21 days which was near statistically similar of T<sub>1</sub>= Direct seed sowing in ridge method (65.50 ton), T<sub>2</sub>= Poly bag seedling age of 14 days (57.83 ton), T<sub>5</sub>= Soil bed seedling age of 21 days (5453 ton) T<sub>3</sub>= Soil bed seedling age of 14 days (51.2 ton). Average yield of sugarbeet was 60-70 ton/ha India but in Barishal (Agro ecological Zone 12) soil is not prepare for highest yield of sugarbeet (Fig. 1). Sugarbeet grow well in temperate region but can cultivated in tropical and sub-tropical region as experimental basis (BSRI, 2017)



Fig. 1: Yield of Sugarbeet

**Brix %:** The brix (%) varied with the different seedling method in Sugarbeet. The highest brix (%) (14.50) was found in T<sub>1</sub>= Direct seed sowing in ridge method of 14 day. The brix (%) lowest (13.23) was recorded in T<sub>6</sub>= Poly bag seedling age of 28 days. Average brix (%) is 13.00-15.00 for Sugarbeet in the world (BSRI 2016).

### **Conclusion**

Poly bag seedling age of 21 days was better performance in yield at harvest. Soil bed seedling age of 28 days was lowest result of sugarbeet cultivation. From the above aspect of the present study may be suggested, such the same observation may be practiced at different growing areas of Bangladesh.

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