ISSN : 1812-5379 (Print)
ISSN : 1812-5417 (Online)
http://ansijournals.com/ja

# JOURNAL OF AGRONOMY

ANSInet
Asian Network for Scientific Information
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

Journal of Agronomy 3 (1): 11-17, 2004
ISSN 1680-8207


# Effect of Different Types of Settling of Different Varieties on the Yield and Yield Contributing Characters of Sugarcane

[1]M.S. Rahman, [2]Kuasha Mahmud, [2]M.S. Hossain and [1]M. Eunus
[1]Department of Agronomy, Bangladesh Agricultural University, Mymensingh, Bangladesh
[2]Bangladesh Sugarcane Research Institute, Ishurdi, Pabna, Bangladesh

**Abstract:** An experiment was carried out at Modhupur agro-ecological zone during the period from October 1995 to December 1996 in order to study the effect of different types of settling of different varieties on the yield and yield contributing characters of sugarcane. The yield and yield contributing characters were influenced by the variety and the different types of settling. Results revealed that the variety Isd 16 exhibited the best performance in terms of number of millable cane, weights, heights and finally cane yield. The local variety Misrimala produced higher number of tillers and lower number of millable cane than Isd 16 but yet it produced significantly higher cane girths and weights. The modern varieties Isd 16 and Isd 18 produced higher numbers of millable canes than Misrimala. The polythene bag settling appeared superior to two eyed soil bed settling following by one eyed soil bed settling. The variety Isd 16 produced the highest yield (144.5 t $ha^{-1}$) with polythene bag settling. In contrast, one eyed soil bed settling yielded the lowest (112.6 t $ha^{-1}$) with Isd 21.

**Key words:** settlings, varieties, sugarcane

## INTRODUCTION

Sugarcane (*Saccharum officinarum* L.) is a tropical plant and hence its cultivation is concentrated around the world in between $30^0$ north and south of the latitude. It is a $C_4$, long duration, clonally propagated plant and is one of the most effective quantum converters of solar energy. It is not only a most important food-cum-cash crop but it has also the ability to generate industrialization in rural areas[1]. As a raw material for sweetening agent, the importance of sugarcane is established as a key of renewable energy. It may be described as the most expensive energy giving food per unit area of land. Moreover, sugarcane has diverse uses; its by-products can generate over US$ 7000.00 per ton of raw cane from its bagasses and molasses. At present about 100 million tons of sugar are produced in the world of which two third is derived from sugarcane. The annual production of sugar and gur in Bangladesh is about 200000 and 500000 tons, respectively, which is derived from sugarcane only. The present area of sugarcane is about 180000 ha with average yield of 45-50 ton $ha^{-1}$. Bangladesh is not self-sufficient in sugar and gur production. It is the principal crop in some pockets of the eastern zone and in all parts of the north-western zone of Bangladesh. A target for sugar and gur production has been fixed at 300,000 and 600,000 tons, respectively by the government of Bangladesh at the end of 2000. It is obvious that more land will not be available for cane production. The area under sugarcane production will remain more or less static. Alternatively, the simple solution lies in increasing the $ha^{-1}$ yield. In Bangladesh, there are broadly two zones where sugarcane is being cultivated and processed. These are mills zone and non mills zone. The modern industrial area are known as mills zone and the traditional area are known as non mills zone or gur zone. The gur zone is the most neglected and the yield of sugarcane is much less than of the mills zone. This is due to neglect of the gur industry, even through almost two third the country's total energy is produced in this zone. However, to achieve the national target for sugar and gur production in the mill zone, a new sugarcane transplanting technique is being practiced to improve cane, gur and sugar yield. The available suitable sugarcane varieties have been tested using different technique with good results obtained[2]. Targeted sugar and gur production in mill zone is near full achievement. On the other hand through the target for gur production is fixed, sufficient attention has not been given to the non mill zone. Both research and extension in the non mill zone is inadequate. It is observed that the number of millable canes per unit area has a strong direct effect on cane yield followed by cane thickness and weight[3]. This important finding highlights one of the basic reasons for lower cane yield in Bangladesh. It is estimated that a good sugarcane

**Corresponding Author:** Kuasha Mahmud, Scientific Officer, On-Farm Research Division, Bangladesh Sugarcane Research Institute, Ishurdi-6620, Pabna, Bangladesh

crop should have at least 100-125 thousand millable cane $ha^{-1}$ at harvest, but at present only 50-60 thousand millable cane $ha^{-1}$ are produced in the mills zone. The yields of sugar cane could be increased considerably if optimum number of millable cane per area could be ensured with the existing cane varieties. This is only possible if uniform plant populations per unit area are maintained. The spaced transplanting (STP) technique has overcome the problems and ensures potential millable cane per unit area. Scientists are of the opinion that there is considerable scope for efficient exploitation of the yield potential of exiting varieties beyond their apparent limits by changing the planting techniques ensuring adequate space water, nutrients and sunshine[4]. Transplanting plant material in the seedling stage is a common agricultural practice in tropical and eastern countries. Transplanting which implies the proper spacing of plants has become an acceptable practice in many agricultural enterprises. Today many high value crops are transplanted; best examples are rice, tea, tomato, cabbage/cauliflower, papaya and tobacco. Usually vegetative propagated crops such as potato and sugarcane are not transplanted. In England, potatoes are now being transplanted[5]. Transplanted crops generally give higher yields, require less seed material and facilitate intercultural operations. Sreepur and Valuka area of Gazipur and Mymensingh district of Bangladesh include over 5000 ha of land under sugarcane cultivation. Though remarkable quantities of gur are produced to meet the need of the country. There is no extension and support service activities for the improvement of gur industry is these areas. The planting technique of these areas is quite different from of rest of the country. Sugarcane growers of these areas have practiced the STP technique for a long time. The growers due to their long history of experience have evolved and adapted a transplanting technique suitable to their socio-economic and climatic condition. Farmers raise two or four eyed soil bed settling in the nursery from top cutting in the month of March or April. The settlings are then transplanted in the main field at the on set of monsoon in the later part of April or early May. The row and plant spacing is apparently 45 and 30 cm, respectively. The crop is generally harvested for gur in the month of February to April of the next year. The sugarcane growers of this area selected two primitive varieties imported during the late 1960 imported from abroad. The local names of these varieties are Fatataty and Misrimala. The later one is more favourable and suitable for gur production. Misrimala can produce good quality gur but is highly susceptible to white leaf and grassy shoot diseases. A recent survey indicates that the Misrimala it covered over 95% cultivated areas in this zone. On the other hand, the traditional spaced transplanting technique of sugarcane planting of these areas mentioned above are not suitable to fit local environment. Usually in practice, the growers of these areas transplanted two to four eyed settlings in furrows opened by bullocks or buffaloes drawn plough with very closer row and plant spacings. Inter-plant competition results in poor yield. The yield limit is 40 t $ha^{-1}$, which is very unusual using STP technique. Moreover, there is a high risk of seedling mortality of sufficient rainfall is not available immediately after transplanting. On the basis of these observation and to meet the urgent need of the situation, the present study was under taken in the farmers field to select suitable sugarcane variety/varieties for the Modhupur agro-ecological zone of Bangladesh and to find out suitable types of settling for spaced transplanting technique of sugarcane.

## MATERIALS AND METHODS

An experiment was conducted at Sreepur Farmers' filed under the district of Gazipur of Modhupur agro-ecological zone during the cropping season through September 1995 to December 1996. The land is flat, well drained and above flood level. The soil of the experiment field was silty loam with pH 5.3 (Table 7). The experiment used four varieties: Isd 16, Isd 18, Isd 21 and Misrimala and three types of settling namely one eyed polythene bag, one eyed soil bed and two eyed soil bed. The experiment was laid out in a split-plot design assigning varieties in the main plot and sugarcane settlings in the sub-plots with three replications. The climate of the location is characterized by its heavy precipitation during April to October. The monthly average temperature, humidity, total rainfall and sunshine hours at the experimental station during the study period were collected from the weather yard of cotton seed Multiplication farm, Sreepur, Gazipur (Table 8). The varieties were harvested separately during the last week of September 1995. The canes were cut into pieces of one and two eyed setts separately for different treatments. The canes were cut for one eyed polythene bag technique just above 1.5 cm from the node (consisting one viable eye bud) and below 3.0 cm from the node; for one eyed soil bed technique, just 2.5 cm above and below the node (consisting one viable eye bud); and for two eyed soil bed technique, 2.0 cm from the two internodes (consisting two viable eye buds). In case of bag settlings 12.0×15.50 cm polythene bags were selected and four holes were made on the bottom of the bags to avoid water logging. Soil and cowdong were mixed and polythene bags were filled with it. One eyed setts prepared for one eyed polythene bag

technique were placed in side the bags in a vertical position covering them with thin layer of soil. The bags were then placed in 1.5×10.0 m nursery beds. For soil bed settlings 10.0×1.5 m nursery beds were made. The composition of the soil and cowdung mixture was 3 : 1. The beds were 12.0 cm up from ground level. One eyed and two eyed setts prepared for $S_2$ and $S_3$ techniques were placed such a way that the eye buds lay by the side of individual setts for the individual variety and technique separately. A little soil was spread over the setts. After that, the beds were covered with a thin layer of rice straw. As per requirement of the soils and settling, sufficient water was supplied to the nursery beds through the whole period before transplantation of the settling to the main field. The land was prepared using country plough. After four ploughing the trenches were made using spades with a row distance of 100.0 cm and a depth of 12.0 cm. Recommended doses of NPKS fertilizers (urea : 375 kg; TSP : 280 kg; MP : 280 kg and Gypsum : 188 kg $ha^{-1}$ were used in the experiment. Whole doses of TSP and Gypsum and 1/3 of Urea and 1/3 of MP were applied as basal doses in the trenches before planting of settling. Rest of the Urea and MP fertilizer were top-dressed in two equal splits at 150 and 180 days after transplanting of settling. The settling of the four varieties were transplanted at spacings of 100 × 45 cm in the main field and covered with thick loose soil on November, 1995. Just after plantation life irrigation was given for proper establishment of the settlings. The mulching of the top soil was done with a hand weeder 15 days after transplantation of the settlings. The experiment plots were weeded out four times. Since there were infestation of insect pests, plant protection measures were needed to be taken for the crop. Earthing up and tying of sugarcane were done after 140 days of transplanting. From the growing period to harvest, the harvesting data on different parameters were collected separately in the following manner. Individual plots were inspected 25 days after transplanting and settlings were counted and recorded. Mortality percentage were then calculated out. Tillers from 10 randomly selected clumps were counted at 30 days intervals beginning after 60 days transplantation until 180 days transplantation. The sugarcane were harvested in the December. At the time of harvest data on millable cane stalk weight; girth; height; number of internode; brix percent and number of millable cane stalks were taken for individual varieties. After cutting the cane with a sharp knife just above ground level, the cane stalks were detrashed. All cane stalks of two middle rows in each plots were weighed by; a balance in kilo grams for different treatments separately. The diameter of cane stalks were measured. Average of bottom; middle and top of 20 individual canes girth were taken using a steel centimeter tape for each plot. At harvest period 20 cane stalks were selected randomly and the length of individual cane was measured from the bottom to the top using a meter tape. After detrashing the leaves, 20 cane stalks were selected randomly and the number of internodes of individual cane were counted. Immediately after harvesting the percentage brix were taken using a hand refractometer. Average of bottom; middle and top of a cane stalk were calculated from 20 individual canes for all treatments. After harvesting,the total number of millable cane stalks were counted from all treatments separately. All millable cane stalks were harvested from two middle rows of each unit plot and weighed. Cane yield was calculated and converted to t $ha^{-1}$. The collected data on mortality(%), number of tillers, number of cane, weight of individual cane, cane girth, cane height, number of cane internodes, cane yield and cane brix(%) were statistically analyzed and the mean differences were adjusted by Duncan's multiple range test (DMRT).

## RESULTS AND DISCUSSION

The characters studied in the experiment were mortality(%), number of tiller, number of millable cane, height, girth, number of internode, brix(%) and yield. Settling mortality(%) after transplanting was significant at 0.05 level for the variety under study (Table 1). Among the four varieties, mortality percentage was the highest in Misrimala, which was statistically similar to that of Isd 16. The lowest mortality was observed in variety Isd 21 which was again similar with those of Isd 16 and Isd 18. Millable cane production of different varieties of sugarcane differed significantly at 0.01 level (Table 1). The varieties Isd 16, Isd 18 and Isd 21 produced similar significantly from that of Misrimala. The variety Misrimala produced the lowest number of cane $ha^{-1}$. The variety Misrimala produced the highest weight of cane stalks and differed significantly from the rest (Table 1). Again variety 21 produced the lowest weight of cane stalk which was statistically similar to Isd 18 variety. No significant differences were found in height in relation to variety (Table 1). The variety Misrimala produced the highest girth (9.36 cm) and differed significantly from rest of the varieties. The Isd 18 variety produced second higher girth and which was similar to the variety and differed significantly from the variety Isd 16 (Table 1). The variety Misrimala produced the highest number of internodes and differed significantly from the remaining varieties. The variety Isd 18 produced the second highest number of internodes which was statistically similar to Isd 16 and Isd 21 varieties (Table 1). Significant variances were observed

Table 1: Varietal performances pertaining to yield and yield contributing characters of sugarcane

| Variety | Mortality (%) | Number of millable cane ($\times 10^3$ ha$^{-1}$) | Weight of individual cane (kg) | Cane height (m) | Cane girth (cm) | Cane internodes (No.) | Cane brix (%) | Cane yield (t ha$^{-1}$) |
|---|---|---|---|---|---|---|---|---|
| Isd 16 | 2.17ab | 103.10a | 1.30b | 3.00 | 7.50c | 29.00b | 21.61a | 134.30a |
| Isd 18 | 2.12b | 103.70a | 1.27c | 3.00 | 8.23b | 29.11b | 21.69a | 132.10ab |
| Isd 21 | 1.86b | 104.30a | 1.25c | 0.03 | 7.82b | 28.33b | 20.94b | 131.30b |
| Misrimala | 2.62a | 87.87b | 1.43a | 2.99 | 9.36a | 30.22a | 16.50c | 125.80c |
| Level of significance | 0.05 | 0.01 | 0.01 | NS | 0.01 | 0.05 | 0.01 | 0.01 |

In column, values having common letter(s) do not differ significantly. NS = non significant

Table 2: Varietal performances on tiller production at different stages of growth

| | Number of tillers ($\times 10^3$ ha$^{-1}$) | | | | |
|---|---|---|---|---|---|
| Variety | 60 DAT | 90 DAT | 120 DAT | 150 DAT | 180 DAT |
| Isd 16 | 37.93 | 75.69c | 103.50c | 124.40bc | 153.20c |
| Isd 18 | 38.51 | 80.76a | 109.00b | 125.70b | 156.30b |
| Isd 21 | 38.56 | 77.32b | 108.00b | 122.20c | 154.50c |
| Misrimala | 38.41 | 80.57a | 129.00a | 145.50a | 178.90a |
| Level of significance | NS | 0.01 | 0.01 | 0.01 | 0.01 |

In column, values having common letter(s) do not differ significantly. NS = non significant DAT = Days after transplanting

Table 3: Effect of different type of settlings on yield and yield components of sugarcane

| Types of settling | Mortality (%) | Number of millable cane ($\times 10^3$ ha$^{-1}$) | Weight of individual cane (kg) | Cane height (m) | Cane girth (cm) | Cane internodes (No.) | Cane brix (%) | Cane yield (t ha$^{-1}$) |
|---|---|---|---|---|---|---|---|---|
| One eyed polythene bag settling | 1.17c | 107.10a | 1.32a | 3.03a | 8.45a | 29.67a | 21.27a | 141.00a |
| One eyed soil bed settling | 3.37a | 88.28c | 1.29b | 2.95b | 7.89b | 28.67b | 20.67b | 114.30c |
| Two eyed soil bed settling | 2.04b | 103.80b | 1.32a | 3.03a | 8.33a | 29.17ab | 20.88ab | 137.30b |
| Level of significance | 0.01 | 1.01 | 0.01 | 0.05 | 0.01 | 0.01 | 0.01 | 0.01 |

In column, values having common letter(s) do not differ significantly.

Table 4: Effect of types of settling on tiller production at different stages of growth

| | Number of tillers ($\times 10^3$ ha$^{-1}$) | | | | |
|---|---|---|---|---|---|
| Variety | 60 DAT | 90 DAT | 120 DAT | 150 DAT | 180 DAT |
| One eyed polythene bag settling | 56.68a | 103.50a | 143.40a | 173.50a | 187.40a |
| One eyed soil bed settling | 22.35c | 55.12c | 87.13c | 90.49c | 120.70c |
| Two eyed soil bed settling | 36.03b | 77.13b | 107.00b | 124.30b | 174.00b |
| Level of significance | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |

In column, values having common letter(s) do not differ significantly. DAT = Days after transplanting

Table 5: Interaction effect of variety and types of settlings on yield and yield contributing characters of sugarcane

| V×S | Mortality (%) | Number of millable cane ($\times 10^3$ ha$^{-1}$) | Weight of individual cane (kg) | Cane height (m) | Cane girth (cm) | Cane internodes (No.) | Cane brix (%) | Cane yield (t ha$^{-1}$) |
|---|---|---|---|---|---|---|---|---|
| $V_1S_1$ | 0.90a | 111.20ab | 1.30c | 3.01 | 8.16c | 29.66 | 22.16 | 144.90a |
| $V_1S_2$ | 3.63h | 91.00de | 1.29cd | 2.96 | 6.63d | 28.66 | 21.16 | 118.00f |
| $V_1S_3$ | 1.96d | 107.20c | 1.30c | 3.03 | 7.70c | 28.66 | 21.50 | 140.00c |
| $V_2S_1$ | 1.21b | 112.10a | 1.27de | 3.00 | 8.30c | 30.00 | 21.90 | 143.10ab |
| $V_2S_2$ | 3.18g | 89.83e | 1.26ef | 2.93 | 8.13c | 28.33 | 21.50 | 113.80g |
| $V_2S_3$ | 1.96d | 109.10bc | 1.22de | 3.06 | 8.26c | 29.00 | 21.66 | 139.30c |
| $V_3S_1$ | 0.90a | 113.00a | 1.25ef | 3.08 | 7.86c | 29.00 | 21.33 | 141.80bc |
| $V_3S_2$ | 3.03g | 90.33de | 1.24f | 2.96 | 7.83c | 28.00 | 20.83 | 112.60g |
| $V_3S_3$ | 1.66c | 109.6b | 1.27de | 3.06 | 7.76c | 28.00 | 20.66 | 139.60c |
| $V_4S_1$ | 1.66c | 92.30d | 1.45a | 3.05 | 9.50ab | 30.00 | 19.66 | 134.40d |
| $V_4S_2$ | 3.63h | 81.97f | 1.37b | 2.96 | 8.96b | 29.66 | 19.16 | 112.80g |
| $V_4S_3$ | 2.57e | 89.33e | 1.45a | 2.96 | 9.60a | 31.00 | 19.66 | 130.10e |
| Level of significance | 0.05 | 0.01 | 0.01 | NS | 0.01 | - | - | 0.01 |

In column, values having common letter(s) do not differ significantly. NS = non significant

$V_1$ = Isd 16 $V_2$ = Isd 18 $V_3$ = Isd 21 $V_4$ = Misrimala

$S_1$ = One eyed polythene bag settling $S_2$ = One eyed soil bed settling $S_3$ = Two eyed soil bed settling

among varieties in respect of brix(%). The highest brix(%) was found in variety Isd 18 which was identical to variety Isd 16 (Table 1). The lowest brix(%) was found in variety Misrimala. Variety Isd 21 was intermediate in respect of brix(%). The highest cane yield was obtained in variety Isd 16[6]. The variety Isd 18 gave similar cane yield to that of Isd 16. The lowest cane yield obtained in local variety Misrimala. Variety Isd 21 gave similar cane yield to that of

Table 6: Interaction effect of variety and types of settling on tiller production at different stages of growth

| Interaction | Number of tillers ($\times 10^3$ ha$^{-1}$) | | | | |
|---|---|---|---|---|---|
| V × S | 60 DAT | 90 DAT | 120 DAT | 150 DAT | 180 DAT |
| $V_1S_1$ | 56.73a | 106.40a | 142.10b | 175.80b | 177.43b |
| $V_1S_2$ | 23.17d | 53.37j | 78.20h | 83.77b | 112.55g |
| $V_1S_3$ | 33.90c | 67.33g | 90.17f | 113.60f | 169.63c |
| $V_2S_1$ | 57.00a | 106.50a | 138.80c | 172.50b | 177.03b |
| $V_2S_2$ | 21.83d | 56.17i | 81.93g | 86.87h | 121.16f |
| $V_2S_3$ | 36.70b | 79.57e | 106.30e | 117.70ef | 170.80c |
| $V_3S_1$ | 55.90a | 101.40b | 137.80c | 163.40c | 177.36b |
| $V_3S_2$ | 22.80a | 53.93j | 79.90gh | 83.73h | 120.80f |
| $V_3S_3$ | 37.00b | 76.63f | 106.40c | 119.40e | 165.30d |
| $V_4S_1$ | 57.10a | 99.70c | 155.00a | 182.30a | 217.86a |
| $V_4S_2$ | 21.60d | 57.00h | 108.50e | 107.60g | 118.46e |
| $V_4S_3$ | 36.53b | 85.00d | 125.00d | 146.70d | 190.30a |
| Level of significance | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |

In column, values having common letter(s) do not differ significantly. DAT = Days after transplanting

$V_1$ = Isd 16 $V_3$ = Isd 21 $V_2$ = Isd 18 $V_4$ = Misrimala

$S_1$ = One eyed polythene bag settling $S_2$ = One eyed soil bed settling $S_3$ = Two eyed soil bed settling

Table 7: The physical and chemical characteristics of soil of the experimental field (0-30 cm depth) before setting the experiment

| Soil characteristics | Analytical data |
|---|---|
| **Physical:** | |
| % of sand | 25.2 |
| % of silt | 54.2 |
| % of clay | 20.6 |
| Textural class | Silty loam |
| **Chemical:** | |
| Total nitrogen (%) | 0.086 |
| Organic matter (%) | 0.93 |
| Available phosphorus (ppm) | 12.00 |
| Available sulphur (ppm) | 3.15 |
| Exchangable potassium (me 100 g soil$^{-1}$) | 0.17 |
| pH | 5.3 |

variety Isd 18 (Table 1). Differences in tiller production among varieties became prominent from 90 DAT onwards[7,8]. Local variety Misrimala produced the highest number of tillers ha$^{-1}$ where as Isd 16 produced the lowest number of tiller ha$^{-1}$ beginning 90 DAT upto 180 DAT. variety Isd 16 was intermediate in respect of producing tillers ha$^{-1}$. variety Isd 21 showed similar behavour in respect of production of tiller upto 120 DAT after that this variety exhibited a decline in the production of tiller ha$^{-1}$ (Table 2). Different types of settling differed significantly (0.01). One eyed soil bed settling showed a highest mortality and differed significantly from one eyed polythene bag settling and one eyed soil bed settling. Two eyed soil bed settling showed second highest mortality. Lower mortality was found in one eyed polythene bag settling among the three types of settling studied (Table 3). Significant differences were observed with in three types of settling. Among these one-eyed polythene bag settling produced highest number of millable cane stalk[9] which was differed significantly from the rest. Again lowest number of cane stalk was produced by one-eyed soil bed settling (Table 3). Settling had also significant effect one eyed polythene bag settling and two eyed soil bed settling produced the highest and almost same weight of millable cane. and the lowest weight of millable cane was obtained from one eyed soil bed settling (Table 3). One eyed polythene bag settling and two eyed soil bed settling produced maximum height and differed significantly from one eyed soil bed settling (Table 3). Settling had significant effect on girth. One eyed polythene bag settling produced highest girth which was statistically identical with two eyed soil bed settling and differed from one eyed soil bed settling (Table 3). Maximum number of internodes was produced by one eyed polythene bag settling which was significantly identical with two eyed soil bed settling (Table 3). Lowest number of internodes was produced by one eyed soil bed settling. Settlings had also significant effect of brix(%). Maximum brix(%) was obtained from one eyed polythene bag settling which was statistically similar to two eyed soil bed settling and significantly with one eyed soil bed settling. Again one eyed soil bed settling produced the lowest brix (%) (Table 3). Types of settling significant affected the cane yield (Table 3). The highest yield was obtained when one eyed polythene bag settling were transplanted in the field followed in order by transplanting of two eyed soil bed settling and one eyed soil bed settling[10]. The improvement of yield component such as number of millable cane stalk ha$^{-1}$, weight of individual cane ha$^{-1}$, height of cane, cane girth and number of cane internodes were mainly responsible for the improvement of yield in the plots transplanted with one eyed polythene bag settling. The yield components where relatively depressed when transplanting was done with one eyed soil bed settling and ultimately resulted in the lowest cane yield. Transplanting of one eyed polythene bag settling thus appeared as the promising type of settling in sugarcane production which provide higher yield. Singh

Table 8: Monthly average temperature, humidity, total rainfall and sunshine during the period of experimentation (July 1995-december 1996)

| Month/Year | Temperature (°C) Maximum | Minimum | Average | Average rainfall (mm) | Average humidity (%) | Average sunshine (h) |
|---|---|---|---|---|---|---|
| July 1995 | 33.29 | 26.20 | 29.74 | 8.56 | 84.12 | 5.73 |
| August 1995 | 31.32 | 24.85 | 28.08 | 7.41 | 85.87 | 5.78 |
| September1995 | 36.28 | 29.62 | 32.95 | 4.05 | 87.95 | 4.63 |
| October 1995 | 31.15 | 26.12 | 28.63 | 5.12 | 85.88 | 6.12 |
| November 1995 | 30.20 | 22.32 | 26.26 | 0.86 | 84.12 | 7.73 |
| December 1995 | 29.25 | 14.65 | 21.95 | Nil | 79.15 | 8.10 |
| January 1996 | 24.65 | 11.12 | 17.88 | Nil | 78.34 | 7.98 |
| February1996 | 29.92 | 14.93 | 22.42 | Nil | 71.22 | 8.64 |
| March 1996 | 33.22 | 18.72 | 25.97 | 8.75 | 71.10 | 7.58 |
| April 1996 | 35.78 | 22.54 | 29.16 | 64.12 | 73.55 | 7.66 |
| May 1996 | 35.95 | 25.36 | 30.65 | 72.15 | 83.65 | 8.32 |
| June 1996 | 34.32 | 20.76 | 27.54 | 174.52 | 87.93 | 4.33 |
| July 1996 | 31.64 | 26.51 | 29.07 | 421.66 | 86.84 | 3.12 |
| August 1996 | 32.72 | 26.27 | 29.49 | 635.33 | 86.10 | 4.33 |
| September 1996 | 33.12 | 27.12 | 30.12 | 141.47 | 81.12 | 3.22 |
| October 1996 | 32.15 | 25.64 | 28.89 | 5.34 | 78.53 | 6.89 |
| November 1996 | 29.55 | 18.91 | 24.23 | 5.85 | 77.67 | 6.73 |
| December 1996 | 26.86 | 14.48 | 20.67 | 10.88 | 72.83 | 7.57 |

and Kumar[11] found that highest yield was obtained in one eyed polythene bag settling in transplanting method. This finding is in agreement with the results of Hossain[12], Vastova[13], Tang and Chen[14]. It was observed that one eyed polythene bag settling was easily established in the main field as the roots of the settlings were not so much disturb during transplanting. On the other hand roots were disturb in one eyed and two eyed soil bed settlings during uprooting and they spent more time to get established in the main field. Probably these were responsible for reduction on yield components and yield. Settlings had also significant effect on tillers production. One eyed polythene bag settling produced the highest number of tillers at each succeeding stage[15]. Again one eyed soil bed settling produced the lowest number of tillers at each dates (Table 4). Variety X Settling interaction mortality was significant (p =0.05). Treatment Isd 16 x one eyed soil bed settling and Misrimala x one eyed soil bed settling showed highest mortality and different significantly from rest of the combinations. Treatment Isd 18 x one eyed soil bed settling produced the second highest mortality. Lower mortality were found in treatments Isd 16 x one eyed polythene bag settling and Isd 21 x one eyed polythene bag settling (Table 5). Highest number of millable cane stalk was obtained from Isd 21 x one eyed polythene bag settling which is statistically similar to Isd 18 x one eyed polythene bag settling. Other combinations have prodced comparatively lower number of millable cane and Misrimala x one eyed soil bed settling produced the lowest (Table 5). Among the twelve treatments Misrimala x one eyed polythene bag settling and Misrimala x two eyed soil bed settling produced the highest weight of millable cane stalk and significantly differed from rest of the combinations. Treatment Isd 18 x two-eyed soil bed settling produced the lowest weight of cane (Table 5). Variety and settling interaction was not significant on cane height. Isd 18 x one eyed soil bed settling produced the lowest height and Isd 21 x one eyed polythene bag settling produced the highest height (Table 5). Misrimala x two eyed soil bed settling produced the highest girth which was differed significantly from the rest (Table 5). The lowest girth was obtained from Isd 16 x one-eyed soil bed settling. No significant effects were found on internode and brix(%) from variety x settlings interaction. Sugarcane yield was significantly affected by the interaction between variety and types of settling (Table 5). The highest cane yield was obtained in variety Isd 16 transplanted with one eyed polythene bag settling and the lowest cane yield was obtained in Isd 21 transplanted with one eyed soil bed settling behaved in the similar manner as that of variety Isd 21 transplanted with one eyed soil bed settling. Variety Isd 18 transplanted with one eyed polythene bag settling was at per with variety Isd 16 transplanted with same type of settling. Therefore transplanting of Isd 16 and Isd 18 with one eyed polythene bag settling appeared as the promising practice in sugarcane production. Interaction of variety and settling had significant effect at 0.01 level for the production of tiller. There was a considerable variation on each date of sampling for the character. As 60 DAT Misrimala coupled with one eyed polythene bag settling produced the highest number of tillers which was found to be statistically similar with that of Isd 21 x one eyed polythene bag settling, Isd 18 x one eyed polythene bag settling as well as Isd 16 x one eyed polythene bag settling (Table 6). The second highest number of tillers produced due to coupled with Misrimala x two eyed soil bed settling, Isd 21 x two eyed soil bed

settling and Isd 18 x two eyed soil bed settling and they differed significantly from Misrimala x one eyed soil bed settling, Isd 18 x one eyed soil bed settling, Isd 16 x one eyed soil bed settling and Isd 16 x two eyed soil bed settling. It may be mentioned that the production of tillers found to be increased with period of growth after transplanting. At 120, 150 and 180 DAT the maximum number of tillers were obtained from Misrimala coupling with one eyed polythene bag settling. However, at 180 DAT the highest number of tillers were produced due to Misrimala x one eyed polythene bag settling, Misriala x two eyed soil bed settling and they differed significantly from Isd 21 x one eyed polythene bag settling, Isd 18 x one eyed polythene bag settling and Isd 16 x one eyed polythene bag for the character and the lowest number tillers were resulted due to coupling effect of Misrimala x one eyed soil bed settling, Isd 18 x one eyed soil bed settling and Isd 16 x one eyed soil bed settling.

## REFERENCES


1. Lactch, W.M., 1979. Basic Concept in Botany. Little Brown and company, Bosstoon, pp: 138-39.
2. SRTI., 1987. Potentiality of cane production and sugarcane industries. Sugarcane Research and Training Institute, Ishurdi, Pabna, pp: 1-4.
3. Khairwal, P.R. and K.P. Babu, 1975. Planting technique of sugarcane cultivation. Indian Farming, 63: 25-30.
4. Imam, S.A., A.H.M.D. Hossain, M.H. Rahman and M.N. Islam, 1982. A comparative syudy of variety performance in eight ecological zones. Bangladesh J. Sugarcane, 4: 7-13.
5. Nickel, L. G., 1967. Agriculture aspects of transplanting and spacing. Hawaiian Sugarcane Planters Association (HSPA). J. series paper No. 202.
6. Chowdhury, S.N.A., M.K. Ali, M.A. Kader, M.O. Gani and M.A. Rashid, 1999. Yield performance of sugarcane varieties in different technology-based demonstration plots. Bangladesh J. Sugarcane, 21: 85-88.
7. Aiyer, A.K.Y.N., 1958. Field crops in India. The Bangalore printing and publishing co. Ltd. Bangalore City, pp: 232.
8. Barber, C.A., 1952. Quoted from Botany of sugarcane by C. V. Dillewijn. The chronica Botanica co., waltham, Mass. USA, pp: 79.
9. Agnihotri, V.P., 1983. Diseases of sugarcane. Oxford & OBH publication co. New Delhi, pp: 1-341.
10. Rashid, M.A., M.B. Ahmed, S. Rahman and D.H. Scarisbrick, 1999. Effect of different sources of settlings on yield and yield parameters of some selected sugarcane varieties. Bangladesh J. Sugarcane, 21: 105-113.
11. Singh, P.P. and K. Kumar, 1979. Investigations into the vertical and horizontal plantings of sugarcane under north Indian conditions. Proceeding ISSCT. 12th Congress, 2: 855-59.
12. Hossain, A.H.M.D., 1989. Comparative performance of different planting/transplanting techniques of sugarcane under farmers condition. Proceedings of the 14th Annual Bangladesh Science Conference. Bangladesh Association for the Advancement of Science. Dhaka, Bangladesh, pp: 48-49.
13. Vastova, S.R., 1981. Tillering studies of sugarcane. Indian J. Sugarcane Res. and Dev., 8: 245.
14. Tang, K.H. and W.T. Chen, 1974. Studies on the transplanting of sugarcane in Taiwan. Proc. ISSCT. 15th congress, 2: 756-60.
15. SRTI., 1982. Annual Report, Sugarcane Research and Training Institute, Ishurdi, Pabna, pp: 23.