

## **Studies on the performance of two promising strains of sugarcane in the advanced yield trial**

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### **ABSTRACT**

A replicated field trial was conducted with two selected strains of sugarcane and four commercial varieties to compare their performance regarding yield and yield contributing characters. One of the selected clones namely I-112/67 was found to display its superiority over the other clones regarding almost all characters studied. The strain I-156/66 was second in respect of the parameters studied.

### **INTRODUCTION**

The decreasing vigour and yield of cane varieties after they have been in commercial cultivation for some years has been common observation. It is an obscure and puzzling problem of the highest importance to growers and processors on the one hand and to the scientist on the other. A number of factors lead to inability for continuing higher yield. At present due to acute shortage of high yielding sugarcane varieties with high sugar content the sugar industries in Bangladesh is facing a serious problem. To replace the existing commercial varieties continuous efforts need to be made to develop new varieties with high yield and other desired characters. Keeping such a view in mind a large number of crosses are to be performed every year and the hybrids are studied over 8 to 9 years for different desirable characters in a specified manner. Under the varietal development programme two strains namely I-112/67 and I-156/66 have been finally selected for comparing with four existing commercial varieties with regard to cane and sugar yield and other attributes.

### **MATERIALS AND METHODS**

The trial was conducted at the Sugarcane Research Institute farm, Ishurdi, Pabna during the cropping year 1978-79. Two selected strains (I-112/67 and I-156/66) and four commercial varieties (Co.1158, Co.1148, Isd-2/54 and L.jaba-C) were included in the trial and the experiment was set up in a randomized complete block design with four replications. The plot size was 9.14m x 9.14m maintaining 1.37 meters row to row distance. Normal cultural practices were followed from time to

time to provide right conditions for optimum growth and development of plants. Data on the following parameters were recorded :

1. Germination count at 75 days after transplanting
2. Number of tillers per clump at 150 days after planting
3. Stalk height (m)
4. Stalk diameter (cm)
5. Single stalk weight (kg)
6. Cane yield (kg/plot)
7. Brix reading (%) and
8. Recoverable sugar content (%)

Cane and sugar yield in ton per acre were also recorded. Data on germination, number of tiller per clump and cane yield were collected on the whole plot basis. Stalk height, stalk diameter and single stalk weight were noted from 10 randomly selected plants taken from the middle rows. Brix and recoverable sugar content were recorded from chemical analysis, done twice in a month started from October 1979 to February 1980.

The data on all the parameters were statistically analysed to compare the different clones/varieties under observations.

## RESULTS AND DISCUSSION

Analysis of variance for all characters revealed significant differences. Such significant differences of all characters among some varieties/strains were also reported by Mian and Awal (1979). Table 2 presents cane and sugar yield per acre and Table-3 shows the increase in sugar of two selected strains over the commercial varieties.

Maximum germination (48.75%) was observed in Co. 1158, a commercial variety, followed by I-156/66 (47.29%). The lowest germination was noted in L. Jaba-C (36.25%), a variety selected from local collection.

The mean number of tillers per clump varied from 5.16 in Co. 1148, to 3.47 in Isd-2/54, a variety developed by the Sugarcane Research Institute (Anon: 1979). However, I-112/67 and I-156/66 were found to produce 5.01 and 4.72 number of tillers per clump, respectively. The number of tillers per plant of these two strains and Co. 1148, the highest number of tiller producer, was observed to be statistically identical (Table -1).

In respect of stalk height I-112/67 attained maximum height (2.78 meters) which was found to be statistically insignificant with I-156/66, Co. 1158. and Co. 1148. The minimum plant height (2.28m) was noted in the variety Isd. 2/54 which was found to differ a little from L.Jaba-C (Table-1). The maximum stalk diameter (2.31 cm) was noted in I-112/67 and Co. 1148 and the minimum (2.10 cm) was recorded in I-156/66. The varieties Isd. 2/54 and L.Jaba-C were found to display same stalk diameter of 2.16 cm (Table-1). Both of the attributes like height and diameter contributed towards cane yield through individual stalk weight (Singh and Sangwan, 1980).

Table 1. Mean values of different characters of sugarcane under trial.

| Varieties /strains. | Percentage germination * | Number tiller-/clump ** | Stalk height (m) ** | Stalk diameter (cm) ** | Single stalk weight (kg) ** | Cane yield/plot (kg)** | Brix (%) ** | Recoverable sugar (%) ** |
|---------------------|--------------------------|-------------------------|---------------------|------------------------|-----------------------------|------------------------|-------------|--------------------------|
| I-156/66            | 47.29ab†                 | 4.72ab                  | 2.72a               | 2.10b                  | 0.79bc                      | 721.10ab               | 16.44b      | 8.74ab                   |
| I sd.2/54           | 44.27ab                  | 3.47c                   | 2.28b               | 2.16b                  | 0.60c                       | 427.49c                | 16.12b      | 8.53bc                   |
| I-112/67            | 40.28bc                  | 5.01ab                  | 2.78a               | 2.31a                  | 0.98a                       | 743.24a                | 17.74a      | 9.49a                    |
| Co.1158             | 48.75a                   | 3.80c                   | 2.62a               | 2.28a                  | 0.83b                       | 664.35ab               | 15.07c      | 7.80c                    |
| Co.1148             | 42.81ab                  | 5.16a                   | 2.58a               | 2.31a                  | 0.78c                       | 501.25c                | 14.04d      | 6.45d                    |
| L.Jaba-C            | 36.25c                   | 4.46b                   | 2.34b               | 2.16b                  | 0.69d                       | 590.83b                | 17.00ab     | 9.23ab                   |

†Figures followed by the same letters are statistically identical.

\*\* Significant at 1% level.

\* Significant at 5% level.

Single stalk weight plays a vital role in deciding the yield potential of a variety. The stalk weight being directly related with cane yield provides a good measure for selection. The good combination of maximum stalk height and diameter in I-112/67 resulted in maximum stalk weight (0.98 kg) which differs significantly from all other varieties/strain. The minimum weight (0.60 kg) was recorded in I sd.2/54 which significantly differs from all other varieties/strains.

As shown in Table-1, the highest stalk yield of 743.24 kg. per plot was recorded in I-112/67 compared to the lowest of 427.49 kg. in I sd.2/54. The highest yield producer was found to differ with Co. 1158 and I-156/66, the yield of which were 664.35kg and 721.10 kg per plot, respectively.

Brix of I-112/67 was found to be 17.74% which differs significantly from all other varieties/strain except L.Jaba-C (17.00%) as shown in Table 1. The highest amount of recoverable sugar (9.49%) was also recorded in I-112/67 followed by L. Jaba-C and I-156/66 producing 9.23% and 8.74% sugar, respectively. But differences among them were statistically insignificant. The lowest recoverable sugar of 6.45% was recorded in Co.1148.

As regards the production of cane and sugar per acre, I-112/67 yielded 35.89 tons cane and 3.40 tons sugar per acre (Table 2). The strain I-156/66 was found to produce 34.89 tons cane and 3.05 tons sugar per acre. It was further observed that the varieties I sd. 2/54 and Co. 1148 gave poor yield of cane and sugar.

As reported in Table-3, the strain I-112/67 produced 93.42, 36.11, 118.16 and 29.33 percent more sugar than I sd. 2/54, Co. 1158, Co. 1148 and L.Jaba-C, respectively. Similarly I-156/66 produced 72.85, 21.63, 94.96 and 15.58 percent more sugar than I sd.2/54, Co.1158, Co. 1148 and L.Jaba-C, respectively.

**Table 2. Cane and sugar yield (ton/acre)**

| Varieties/strains. | TCA   | TSA  |
|--------------------|-------|------|
| I-156/66           | 34.89 | 3.05 |
| Isd.2/54           | 20.68 | 1.77 |
| I-112/67           | 35.89 | 3.40 |
| Co.1158            | 32.15 | 2.50 |
| Co.1148            | 24.25 | 1.57 |
| L.jaba-C           | 28.59 | 2.63 |

**Table 3. Percent of more sugar produced by the selected strains over the commercial ones.**

| Selected strains<br>Commercial<br>varieties. | I-112/67 | I-156/66 |
|----------------------------------------------|----------|----------|
| Isd.2/54                                     | 93.42    | 72.85    |
| Co.1158                                      | 36.11    | 21.63    |
| Co.1148                                      | 118.16   | 94.96    |
| L.jaba-C                                     | 29.33    | 15.58    |

Thus it is suggested that the strains I-112/67 and I-156/66 were found superior in yielding ability compared to the commercial varieties included in the trial.

### REFERENCES

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