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# Preliminary investigation on the effect of artificial defoliation on cane quality

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Defoliation affects plant growth in many ways though it largely depends on the three factors of defoliation like timing, frequency and severity (Cook *et. al.*, 1958). Artifical defoliation is being practised mainly in the fields of pasture management, sericulture, forest management etc. (Nakano, 1975). In Bangladesh, cane growers defoliate old leaves including some photosynthetically active leaves usually once in a year from June to August, without estimating the effect of defoliation on cane growth and development and no work has been done to estimate the effect of defoliation on ultimate sugar recovery. Therefore, an investigation was carried out to determine the effect of artifical defoliation on the cane quality.

A trial was conducted at the Sugarcane Research Institute with 3 replications. Replication of each treatment was done within the row. Varieties Co. 1153 and ISD-16 were used for the present investigation. Each variety was raised in six rows of plot size 36 Mx6. 3 M, maintaining row to row distance 105 cm. Recommended doses of fertilizers and intercultural operations were practised. Following 3 treatments were given :—

$T_o$ = Control i. e. no removal of leaves.
$T_1$ = 25% leaves were removed from the lower part of stalk.
$T_2$ = 50% leaves were removed from the lower part of stalk.

Defoliation was done once in a year in the month of July at the age af approximately 8 months from the date of planting. In case of both the varieties, middle 3 adjacent rows were selected for the above treatments. Chemical analysis was carried out at an interval of 30 days starting from November, 1980 to February, 1981 taking a sample of 5 randomly selected stalks for each replication. Weight of canes was also recorded.

Differences were observed between control and defoliated canes in respect of stalks weight and recovery% cane. Results are presented in the table. In both the varieties

**Table 1. Effects of different levels of defoliation on weight of stalks and recovery % cane.**

| Variety | Treat-ment | Weight of 5 stalks (kg) | | | | | Recovery % cane | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nov. | Dec. | Jan. | Feb. | Mean | Nov. | Dec. | Jan. | Feb. | Mean |
| Co. 1158 | $T_0$ | 5.60 | 5.63 | 5.90 | 5.00 | 5.53 | 6.58 | 8.00 | 9.56 | 10.02 | 8.54 |
| | $T_1$ | 6.07 | 6.17 | 5.83 | 5.63 | 5.93 | 7.23 | 8.30 | 9.84 | 9.87 | 8.81 |
| | $T_2$ | 6.10 | 6.12 | 5.60 | 5.53 | 5.84 | 7.62 | 8.74 | 10.15 | 9.95 | 9.12 |
| ISD-16 | $T_0$ | 6.90 | 7.13 | 7.63 | 6.63 | 7.07 | 9.07 | 9.37 | 10.57 | 11.41 | 10.11 |
| | $T_1$ | 7.50 | 7.35 | 7.15 | 7.13 | 7.28 | 9.99 | 10.52 | 10.62 | 10.42 | 10.39 |
| | $T_2$ | 8.10 | 7.73 | 7.70 | 7.63 | 7.79 | 9.38 | 10.53 | 10.60 | 10.43 | 10.24 |

mean weight of defoliated canes, was found higher than the control canes. It was also observed that in the defoliated canes weight increased upto December and then it gradually decreased in the following months, while in the control canes, weight increased upto January. In the present work some differences were also found in the levels of defoliation. In Co. 1158, highest mean weight was found at 25% leaves removal level, while in ISD-16 it was found at the level of 50% leaves removal. Severity of defoliation affects differently in different varieties, perhaps due to varietal characteristics. Reduced sugarbeet root yield was obtained at every level of defoliation and the reduction being more when the crop was defoliated twice (Singh *et. al*, 1980). In both the varieties, recovery % cane was observed higher in the defoliated canes than in the control upto January and then found to be lower in the month of February. In the control canes, gradual increase in the percent recovery was fouud upto February, though the mean recovery was found till higher in the defoliated canes. In ISD-16 highest recovery was found to be at 25% level of defoliation, while in Co. 1158 at 50% level of defoliation.

In sugarbeet highest sucrose yield was observed at 25% level of defoliation (Singh *et. al*, 1980). It was observed that though the mean weight found higher at 25% level of defoliation in Co. 1158 but mean recovery found higher at 50% level of defoliation. Similar trend in results was also found in ISD-16. Here mean weight obtained higher at 50% level of defoliation, while mean recovery observed higher at 25% level of defoliation. This may be due to ripening effect of defoliation on canes. Alexander (1973) stated that various field practises like topping, water regulations etc. encourage the plants to ripen little earlier. Results of the present investingation, however, differed from those of Yamasaki and Arikado (1937) and Dillewijn (1952). They stated that defoliation permanantly decreased sucrose content of defoliated canes. They observed greater effect when young leaves were removed. But none of the authors mentioned the level of defoliation causing decrease in sucrose content. Further works are needed to ascertain this finding based on variable timing, severity and frequency of defoliation.

## REFERENCES

Alexander, A. G. 1973. Sugarcane Physiology. Elsevier Scientific publishing company, Amsterdam. p: 397-398.

Cook, C. W. ; Stoddart, L. A. and Kinsinger, F. L. 1958. Response of crested wheat grass to various clipping treatments. *Ecol. Monogr.* **28** : 237-272.

Dillewijn, C. V. 1952. Botany of Sugarcane. Chronica Botanica Co. Waltham, Mass, U, S A. p: 330-331.

Nakano, K. 1975. An experimental study of the effects of defoliation on plant growth. *J. Fac. Sci. Univ.* Tokyo, Section 3, **11** : 333-353.

Singh, K. N. ; Sachan, G. C. and Chhibber, R. C. 1980. Effect of artificial defoliation on root and sucrose yield of sugarbeet. *Indian sugar*. **29** (II) : 715-718.

Yamasaki, M. and Arikado, H. 1937. Effect of defoliation on sugar accumulation in successive joints of cane plants. Report. Govt. Sug. Exp. Sta., Taiwan, Formosa, 4 : 1-32. (Japanese, read only english summary).