

## A Note on Arrowing in Sugarcane Clumps

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Age of crop, seasonal phenomena, effect of environment, cultural and manurial treatments and influence of parent stock are some of the more important factors that affect flowering in sugarcane. Age of shoot and arrowing are positively correlated (6). Ratooning, is known to induce more arrowing (5). Increased doses of nitrogenous manures have a tendency to improve vegetative growth and retard flowering (4). Among environmental factors that have a bearing on arrowing, water-logging in the field is one (3) and the photo-period or the amount of light received by the cane clumps during their growth periods is another (1). For instance, in a trial laid out at the Sugarcane Breeding Station, Coimbatore, a majority of cane clumps receiving extra light were reported to have failed to flower. In an experiment with Co 421 at the Sugarcane Research Station, Anakapalle, during three successive years (1940-'41 to 1942-'43) arrowing in individual cane clumps was studied with reference to number of canes in each clump and the results of this study are presented in this paper.

**2. Material and Methods.** One thousand plants (primary shoots) were selected at random from a crop of Co 421, planted in rows 2'8" apart in March with single-budded setts at regular distances (10" between sett and sett along the row). It was thus possible to know that a particular shoot arose from a particular bud and demarcate the individual cane clumps clearly. Tillers arising from these plants till the end of August were marked at four-day intervals by labelling them as 1, 2, 3 and so on. Shoots coming up later on were removed as they were not likely to grow up to give useful canes by next February, the usual harvest time of Co 421 at this Station. The objective was to find out the correlation between age of shoot and arrowing and juice quality in Co 421 and the influence of shoot density on arrowing in cane clumps. In the second year of the experiment, there was practically no arrowing in this and many other varieties at Anakapalle due to uncongenial seasonal conditions. Hence the results of only 1940-'41 and 1942-'43 are considered in this paper.

Kashibuchi reported from Tainon, in Formosa "that differentiation in flower bud occurs by the end of September" (2). Co 421 usually completes flowering by the end of November at Anakapalle. Hence environmental and other factors will influence arrowing only if they are present before this period. Therefore to study the effect of the number of canes in a clump on arrowing (of canes) in the same, shoots living till the end of November in each of these thousand clumps were taken into account.



3. **Results and Conclusion.** Among the cane clumps studied (clumps were grouped according to the number of canes 1, 2, 3, etc. in each clump as shown in the table below) the percentage of arrowed cane clumps increased more or less progressively as the number of canes in each clump (shoot density) in the different groups increased. Results are presented in the following table :

| 1940-'41   |   |   |  | 1942-'43  |   |  |
|--|---|---|--|---|---|--|
| No. of canes in each clump by the end of November. | No. of clumps having the different number of canes mentioned in column (1). | No. of clumps in column (2) with arrowed canes. | No. of arrowed clumps as a percentage of the total number of clumps with the same shoot density (col. 3 as % of col. 2.) | No. of clumps having the different number of canes mentioned in column (1). | No. of clumps in column (5) with arrowed canes. | No. of arrowed clumps as a percentage of the total number of clumps with the same shoot density. |
| 1  | 2   | 3   | 4  | 5   | 6   | 7  |
| 1  | 69  | 6   | 8.70   | 186   | 14  | 7.53   |
| 2  | 133   | 17  | 12.77  | 262   | 63  | 24.04  |
| 3  | 206   | 40  | 19.42  | 267   | 80  | 29.96  |
| 4  | 224   | 62  | 27.68  | 128   | 50  | 39.06  |
| 5  | 172   | 71  | 41.29  | 30  | 14  | 46.67  |
| 6  | 88  | 37  | 42.05  | 6   | 4   | 66.67  |
| 7  | 28  | 9   | 32.14  | ...   | ...   | ...  |
| 8  | 9   | 6   | 66.67  | ...   | ...   | ...  |
| 9  | 6   | 3   | 50.00  | ...   | ...   | ...  |
| 10   | 2   | ...   | ...  | ...   | ...   | ...  |
| 11   | ...   | ...   | ...  | ...   | ...   | ...  |
| 12   | 1   | ...   | ...  | ...   | ...   | ...  |

N. B. — There was a high and significant positive correlation between shoot density in cane clumps and arrowing. The values of correlation coefficients for 1940-'41 and 1942-'43 were  $+0.8979 \pm 0.0646$  and  $+0.9822 \pm 0.0144$  respectively.

The results indicate that the factors that cause arrowing had a greater influence on the clumps with a higher shoot density than those with a fewer number of canes in each. Increase in the number of canes in a clump must have resulted in decreased nutrition to the individual shoots and as in the case of restricted manuring, induced flowering. Preliminary studies to test the applicability of this finding (that arrowing in cane clumps is positively correlated with their shoot density) in the case of two other varieties, Co 419 and Co 467, during 1946-'47 indicated substantial agreement with these results.

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