

## STUDIES ON THE EFFECT OF ARROWING IN CANES UNDER COIMBATORE CONDITIONS

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**Introduction.** In and around Coimbatore sugarcanes begin to arrow in October—November. It is not known why certain varieties arrow, while others do not. There is a certain amount of prejudice in these parts against arrowing. From what follows it will be seen that arrowing is really a disadvantage in many respects in these parts.

The work described herein is part of an investigation published elsewhere jointly with Mr. K. V. Gopala Iyer. Additional corroborative data and some new facts since obtained on the subject are now given.

**Material and Methods.** Sampling was done on a fairly large scale. For every analysis, eighteen clumps were taken at random from different plots giving from 70 to 100 canes per analysis. A few arrowed canes were selected and labelled in the field, and periodical measurements of the total length of cane from the ground level were recorded to find out the growth, if any, in the arrowed canes. For sectional analysis, the dead leaf portions of the canes were cut into three sections and analysed separately.

**Results.** *Growth:*—When once a cane arrows there is no fresh nodal formation, but only a slight elongation in the top joints as will be clear from the following table:—

**Table I.**

*Height of the canes from the ground level up to the joint just below the attachment of the sheath of the shot blade.*

Co. 290		Co. 223	
30—11—1935	16—12—1935	30—11—1935	16—12—1935
4 ft. 11½ in.	5 ft. 1 in.	5 ft. 8½ in.	5 ft. 10½ in.
4 " 8½ "	4 " 10 "	6 " 9 "	6 " 9½ "
5 " 8½ "	5 " 11½ "	6 " 0 "	6 " 1 "
5 " 7 "	5 " 8½ "	5 " 6¾ "	5 " 8¾ "
5 " 5 "	5 " 6½ "	5 " 7 "	5 " 8½ "
5 " 3½ "	5 " 6½ "	6 " 11 "	6 " 11½ "
5 " 7½ "	5 " 9½ "	5 " 0 "	5 " 2 "
6 " 3½ "	6 " 5½ "	5 " 8¼ "	5 " 11 "
Average increase about 2 ins.		Average increase about 1½ ins.	

The greater increase in the length and weight of cane after the shot blade stage is only in the millable part of the cane as the joints that were not fit to be milled when the cane was in shot blade become fit to be milled in the course of one or two months.

The non-arrowed canes, on the other hand, grow continuously and weigh at harvest more than 1½ times the maximum weight



attained by the arrowed canes. The sucrose contents also equal and even slightly excel the maximum reached by the arrowed canes.

Table II.

Average maximum weight of millable cane and maximum  
Sucrose per cent in juice.

	Co. 290		Co. 422	
	Arrowed.	Non-arrowed.	Arrowed.	Non-arrowed.
Maximum weight	1.6 lbs.	2.3 lbs.	2.2 lbs.	3.9 lbs.
Maximum sucrose	16.68 %	17.25%	19.16%	19.57%

*Yield of sugar*:—At the time of arrowing, the yield of sugar from 100 canes is more in the arrowed canes than in the non-arrowed canes. After about  $2\frac{1}{2}$  months there is deterioration in the arrowed canes, while the non-arrowed canes continue to improve. Consequently, there is a distinct loss due to arrowing at the usual time of harvest, as is clear from the following graph.

*Sectional analysis*:—The sectional analysis up to the dead leaf joints of a large number of arrowed and non-arrowed canes are given below:—

## Sugar Yields at different periods in Arrowed versus Non Arrowed Canes.

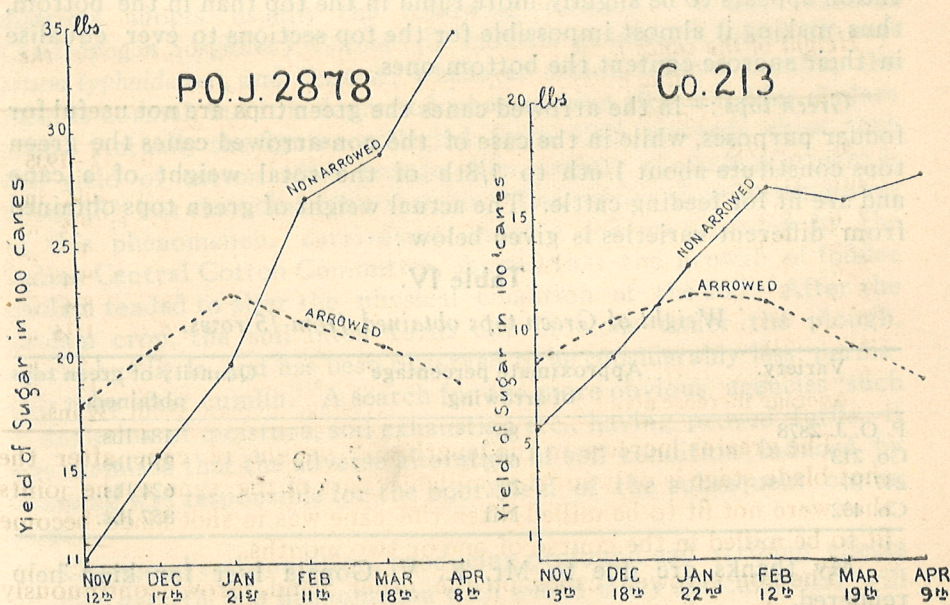




Table III.

*Increase of Sucrose Content in the Dead Leaf Portions.  
Non-arrowed (Co. 422).*

Date of analysis.	Top.	Middle.	Bottom.	Full millable cane.
18-12-1935	14.44%	14.87%	15.66%	12.08%
8-1-1936	14.90%	15.10%	16.53%	13.95%
25-1-1936	16.37%	16.91%	17.05%	15.62%
12-2-1936	18.29%	18.61%	18.62%	17.03%
11-3-1936	19.99%	20.22%	20.43%	19.50%

*Arrowed (Co. 290).*

Date of analysis.	Top.	Middle.	Bottom.	Full Millable cane.
17-12-1935	14.77%	15.68%	16.53%	15.57%
9-1-1936	16.18%	17.63%	18.16%	16.20%
20-1-1936	15.49%	17.81%	18.60%	16.68%
11-2-1936	14.65%	17.66%	18.48%	16.34%
7-3-1936	14.28%	16.79%	17.96%	15.72%
25-3-1936	14.03%	16.17%	17.49%	15.22%

Although the data in the above table refer to two cane varieties, a similar phenomenon was observed among non-arrowed and arrowed canes in the same variety. It is seen that in the non-arrowed canes there is a considerable increase in sucrose content in all sections of the dead leaf portion from December to March, and that the highest sucrose content continues to be in the bottom section. In the arrowed canes, however, there is increase in the sucrose content till about the middle of January and then deterioration commences. This deterioration appears to be slightly more rapid in the top than in the bottom, thus making it almost impossible for the top sections to ever equalise in their sucrose content the bottom ones.

*Green tops* :—In the arrowed canes the green tops are not useful for fodder purposes, while in the case of the non-arrowed canes the green tops constitute about 1/6th to 1/8th of the total weight of a cane and are fit for feeding cattle. The actual weight of green tops obtained from different varieties is given below :—

Table IV.

*Weight of Green tops obtained from 15 rows.*

Variety.	Approximate percentage of arrowing.	Quantity of green tops obtained.
P. O. J. 2878	80%	184 lbs.
Co. 213	60%	270 lbs.
247 B.	20%	624 lbs.
Co. 402	Nil	857 lbs.

My thanks are due to Mr. K. V. Gopala Iyer for kind help rendered.



**Summary and Conclusion.** In an arrowed cane there is only a slight elongation in the top joints.

Arrowed canes deteriorate after about 2½ months from the time of arrowing, while there is continuous growth and steady increase in the sucrose content of the non-arrowed canes; consequently, there is loss due to arrowing.

Though arrowing is a distinct disadvantage in many respects, an arrowing, and quick growing variety will be found useful for early crushing by factories in November, when other varieties are not rich enough in sucrose.

Periodical sectional analysis of canes from top downwards on dead leaf samples has revealed that there is a steady improvement in sucrose content in all sections.

Arrowing involves a loss of green tops suitable for fodder purposes.

## SOIL CONDITION AS AFFECTED BY CROPPING IN THE BLACK SOIL AREA OF THE TINNEVELLY DISTRICT

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The ryot of the black soil tract of the Tinnevely and Ramnad districts adopts usually the following rotation:— Fodder cholam (*Andropogon Sorghum*), Cotton, (*G. indicum gammie*), Cumbu (*Pennisetum typhoideum*), and Cotton; whenever cotton follows cumbu, the yield is normal, but it is depressed when coming after a fodder cholam crop. Actually the figures collected from 1905 onwards show that the yield of cotton after Irungu (the variety of cholam grown) is about 15% less than that after Cumbu. The results of an investigation of this phenomenon, carried out under a scheme financed by the Indian Central Cotton Committee, showed that the growth of fodder cholam tended to alter the physical condition of the soil. After the cholam crop, the soil often turns out in clods under the plough, cracks but little, and has been observed to be considerably less permeable than after cumbu. A search for the more obvious agencies such as depletion of moisture, soil exhaustion etc., having proved futile, it was surmised that the adverse alteration of soil condition induced by cropping was responsible for the poor yield of the subsequent cotton crop.

Change of soil condition, producing profound and striking effects on crop growth, is a phenomenon with which many agriculturists will