

Determining Sugarcane Maturity - A New Index

by

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Harvesting sugarcane at its peak maturity stage is desirable to get the maximum sugar yield. Cane varieties differ in their ages according to the varieties and other factors. Sucrose content in the cane steadily increases while glucose and reducing sugar gradually decrease as the canes attain near maturity. Various methods of determining the maturity in sugarcane are followed based on the physical and chemical characteristics. Some of the common methods followed are (1) Top-bottom ratio, (2) Trial boiling method, (3) Hand refractometer method, etc. Later workers have used sheath moisture ratio and leaf nitrogen content as indices for determining maturity. The present investigation aims at determining the cane maturity by green vs. dry leaves ratio as one of the other methods. Various workers on maturity indices in sugarcane have made various observations (Agharwala and Gupta, 1951, Clements, 1955, Burr *et al.* 1957 and Bonnet, 1962.)

Materials and Methods: A randomised replicated trial was laid out during 1964-66 at the Sugarcane Breeding Institute, Coimbatore, with Co. 419 and Co. 658 two of the locally popular varieties for an investigation on this aspect. Observations were recorded in two seasons with the above varieties both in the plant cane and ratoon crop after eight months in the case of Co. 658 (short duration variety) and from 9th month in the case of Co. 419 (Long duration variety). Samples of 10 kg. weight of cane were analysed in the form of whole stock, green and dry leaves sections and 1/3 stock.

Juice was then extracted and the following observations were recorded—Brix by using Brix hydrometer standardised at 20°C sucrose content by direct polariscope method. The sheath moisture was also determined from 3rd to 5th top sheath counting from the first unfolded leaf as the first one.

The green/dry leaf ratio was determined by counting the number of green leaves and completely dried leaves in a 10 kg sample periodically taken for analysis.

Results and discussion: The results of observations recorded are given in the Table 1. It could be seen that in addition to the various standards determining the maturity the green vs dry leaves ratio gradually decreases as the canes approach maturity. This conforms to the other maturity indices also in their respective tests, namely, the glucose ratio steadily decreases, sucrose increases,

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brix increases and the leaf moisture and leaf N steadily drop. The ratio of green/dry leaves gradually decreased from 2.6 to 0.7 as the plants reached maturity. In the ratoon crop also the tests revealed gradual increase in purity due to gradual increase in sucrose content in the plant, steady reduction in the glucose ratio and steady drop in the sheath moisture and leaf N, besides decrease in ratio between green and dry leaves. This clearly indicates that the green/dry leaves ratio is very much associated and can serve as an index for maturity as any other methods do.

TABLE 1. *Record of observations for various quality indices in Sugarcane Co 419 & Co.658*

Age in months	Brix		Sucrose		Purity		Leaf Moisture%		Green/dry leaf ratio	
	Whole cane		Whole cane		Whole cane		Leaf Moisture%		Green/dry leaf ratio	
	Co.419	Co.658	Co.419	Co.658	Co.419	Co.658	Co.419	Co.658	Co.419	Co.658
8½ months	12.10	11.20	10.00	10.32	7.02	7.15	82.4	83.6	2.60	2.10
9 months	13.20	12.50	10.21	11.36	78.6	80.4	81.4	82.1	2.40	2.00
9½ months	14.80	14.60	11.44	12.66	81.7	83.4	81.1	82.0	2.20	1.80
10 months	16.20	17.00	12.68	13.10	84.0	86.1	79.4	81.4	2.10	1.10
10½ months	18.60	19.00	14.16	15.66	86.9	88.4	78.2	79.3	1.80	0.98
11 months	20.20	21.00	15.81	17.00	87.3	89.0	78.3	79.2	0.99	0.84
11½ months	21.60	22.40	17.22	18.46	89.4	90.1	77.5	78.4	0.96	0.81
12 months	21.60	22.00	19.10	19.00	90.2	90.0	76.4	78.2	0.89	0.78
12½ months	21.80	20.40	19.21	18.00	19.4	87.1	73.6	75.4	0.84	0.74
13 months	22.00	19.00	18.23	17.10	90.02	86.0	72.3	74.6	0.76	0.70

Summary and conclusion: Plant crop of sugarcane Co. 419 (Long duration variety) and Co. 658 (Short duration variety) and the first ratoon of the same crops were tried in this experiment to find out whether the green vs dry leaves ratio can serve as an index for determining maturity in sugarcane. Observations showed that in both the varieties when they approached their full maturity phase the juice glucose, sheath moisture and leaf N and the green vs dry leaves ratio had all steadily decreased. Hence the green vs dry leaves ratio can also be made use of as an index to determine the maturity in sugarcane.

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