

## “A Note on Third Leaf in Sugarcane as an Indicator of Nutrient Status and Yield of the Crop”.

by

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Foliar analysis for determining the nutritional needs of the sugarcane crop has been widely adopted in many cane producing countries. In Puerto Rico, 4, 5, 6 leaf at 10—12 weeks after fertilisation of the cane is taken as an indicator of the nutrient status of the crop and various levels of N, P and K in leaf have been fixed to denote the different levels of nutrition of the crop (4). Foliar diagnosis as a routine control of manurial practices is adopted in Mauritius, British Guiana and other places. Mohan Rao (3) has reported that at Anakapalle the differences in availability and nutritive capacities of different manures are manifested in third leaf nitrogen. Recent work in Hawaii has indicated that stalk tissues are more sensitive and reliable indicator than foliar regions (1).

With the object of determining whether the nutrient content of any part of the plant reflects the nutrient status of the crop and the final yield, samples of third leaf and green leaf stem were collected eight weeks after second manuring of cane. The permanent manurial experiment, (gardenlands) was utilised for the purpose. The treatments are as follows :

- (a) Farm Yard Manure at 250 lb. N per acre ;
- (b) Ammonium sulphate at 250 lb. N per acre ;
- (c) Same as (b) + Sunnhemp at 5000 lbs. green matter per acre ;
- (d) Same as (b) + minor elements ;
- (e) Same as (b) + 100 lb.  $P_2O_5$  + 50 lb.  $K_2O$  per acre ;
- (f) No manure.

The leaf samples were analysed for N, P and K. The results of analysis are furnished in the following tables.

*Analysis of Third Leaf and Green Leaf Stem*

Results expressed as percentage on oven-dry basis

*Third Leaf.*

Head of analysis	Variety Co. 419						Variety Co. 527					
	A	B	C	D	E	F	A	B	C	D	E	F
1. Nitrogen	1.35	1.47	1.54	1.56	1.56	1.13	1.33	1.43	1.46	1.56	1.47	1.03
2. P <sub>2</sub> O <sub>5</sub>	0.58	0.54	0.51	0.54	0.58	0.52	0.52	0.49	0.55	0.55	0.54	0.54
3. K <sub>2</sub> O	1.22	1.21	1.36	1.36	1.43	0.98	1.68	1.70	1.58	1.67	1.72	1.55

*Green Leaf Stem*

Head of analysis	Variety Co. 419						Variety Co. 527					
	A	B	C	D	E	F	A	B	C	D	E	F
1. Nitrogen	0.59	0.64	0.60	0.93	0.82	0.76	0.41	0.47	0.56	0.33	0.44	0.23
2. P <sub>2</sub> O <sub>5</sub>	0.73	0.49	0.39	0.50	0.42	0.50	0.33	0.27	0.29	0.23	0.25	0.27
3. K <sub>2</sub> O	2.08	1.84	1.30	1.52	2.02	1.28	1.58	1.16	1.98	1.59	1.39	1.28

It is interesting to note that "no manure" has recorded the lowest nitrogen content in third leaf in respect of both the varieties Co. 419 and Co. 527. At equal levels of nitrogen i. e. 250 lb. per acre, 'Farm yard manure' has given a lower third leaf nitrogen than the other treatments where ammonium sulphate forms part. This is in accordance with observations made at Anakapalle regarding the poor nitrogen nutritive capacity of bulky organic manures. Not much difference is observed in third leaf nitrogen among the four treatments where ammonium sulphate at 250 lb. per acre forms part, in respect of both the varieties. Varietal variations in nitrogen index of third leaf are not indicated. This is in line with the observations made elsewhere (2).

In Co. 419, the two treatments "Farm yard manure" and "ammonium sulphate + super + potassium sulphate" have given slightly higher P<sub>2</sub>O<sub>5</sub> content in third leaf, than the others. But the difference is observed to be very small. In respect of Co. 527 not much difference is noticed among the various treatments in third leaf phosphate.

As regards potash in third leaf, in respect of both the varieties "ammonium sulphate + super + potassium sulphate" and 'no manure' have recorded the highest and lowest values respectively. Varietal variations in third leaf potash, are indicated, the early maturing variety generally containing more of this nutrient. The treatments are reflected in third leaf potash in "ammonium sulphate + super + potassium sulphate in both the varieties and 'ammonium sulphate + sunnhemp' in Co. 419.

The green leaf stem does not seem to reflect the various treatments as clearly as third leaf in respect of N, P and K.

*Cane yield and CCS:* The data on yield of cane and sugar are furnished in the following table.

Particulars.	Co. 419						Co. 527					
	A	B	C	D	E	F	A	B	C	D	E	F
1. Yield of cane in tons per acre.	52.4	56.9	49.0	47.5	58.9	46.5	48.8	59.6	56.1	64.8	62.0	30.4
2. CCS in tons per acre.	5.9	4.7	4.2	3.4	5.4	5.6	5.8	5.9	6.1	6.9	6.2	5.1

CCS: Commercial Cane Sugar.

In Co. 419, the treatments "ammonium sulphate + super + potassium sulphate" and "ammonium sulphate + minor elements" have given the highest and lowest cane yields respectively. In respect of *GCS*, Farm yard manure has recorded the highest closely followed by 'no manure'. As regards the variety Co. 527, the treatments "Ammonium Sulphate + minor elements" and 'no manure' have given the highest and lowest in respect of both cane yield and CCS.

It is of interest to observe that the trend of sugar per acre in Co. 527 is very similar to that observed in the third leaf nitrogen. The third leaf nitrogen when plotted against sugar per acre indicates a general linearity for the relationship between nitrogen content in third leaf and CCS per acre and an almost perfect linearity among the treatments where ammonium sulphate forms part. In respect of Co. 419 the nitrogen content does not reflect the yield clearly in respect of the two treatments "ammonium sulphate + sunnhemp" and "ammonium sulphate + minor elements".

**Summary:** (1) The third leaf reflects the treatments more clearly than the green leaf stem in respect of N, P and K.

(2) Varietal variations are observed in respect of third leaf potash though none are indicated with regard to nitrogen.

(3) In the variety Co. 527, a general linearity is noticed in the relationship between third leaf nitrogen and CCS and an almost perfect linearity among the treatments where ammonium sulphate forms part.

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#### LITERATURE

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#### Dr. RAMIAH'S SPEECH

"The address by Dr. K. Ramiah published in the September 1958 issue of the journal was a tape recording of his extempore speech and the editorial board regrets that for want of time the tape recorded speech could not be sent to Dr. Ramiah for revision and small changes".