

Occurrence of Blue Green Algae in the Acid Soils of Kerala

The soils of Kuttanad, the rice bowl of Kerala State, is typically peaty in nature and acidic in reaction (pH 3.6-4.3). The land is under saline water for more than six months of the year, and rice is cultivated from December to February after dewatering. A study of the algal flora of some rice growing soils of the State has been carried out by Aiyer (1965). The present communication deals with the study of the algal flora of Kuttanad soils.

The application of lime to these soils even at moderate doses (700 lb per acre) has been found to increase the available nitrogen in the soil (Table I), which may be due to, among other factors, stimulation of photoautotrophic nitrogen fixing microorganisms like blue green algae (Watanabe, 1960).

A preliminary study was made to screen out the blue green algal flora in the lime treated and un-treated soils, in the field experiments conducted in this area. Soil samples were collected up to a depth of 10 cm, and 50 ml of the soil water suspension at various dilutions were inoculated into 100 ml Benecke's medium in 250 ml Erlenmeyer flasks. The composition of the medium used was the same as that suggested by De (1939). The medium without soil inoculation served as control. The flasks were incubated in a small room under artificial light (40 watt fluorescent light) for about a month.

Abundant growth of blue green algae was noted in soils treated with lime, whereas in the untreated soils the predominant algal flora were the green ones. The blue green algae found were species of *Scytonema*,

TABLE I
Variation in available nitrogen in soils with time

	1st day lb/acre	15th day lb/acre	30th day lb/acre	60th day lb/acre
LIME TREATED SOILS				
Sample 1	228.5	245.5	251.0	243.5
„ 2	242.5	261.5	269.5	261.5
„ 3	206.0	219.0	226.0	215.1
UNTREATED SOILS				
Sample t	225.0	223.0	240.0	226.0
„ 2	240.2	251.5	256.6	245.3
„ 3	204.2	211.8	215.2	105.6

Acknowledgement

The authors are grateful to Dr. C. K. N. Nair, Principal and Additional Director of Agriculture (Research) for the facilities and encouragement rendered in

the present study. The authors are also indebted to Dr. G. S. Venkataraman, Microbiologist, Indian Agricultural Research Institute, New Delhi, for valuable suggestions.

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References

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Oscillatoria, *Anabaena*, *Nostoc* and *Camptylonemopsis*. The green algae noted were *Chlamydomonas*, *Volvox*, *Oedogonium*, *Tetraspora*, *Spirogyra* and *Sirogonium*.

The numbers of blue green algae obtained from the lime treated and untreated soils at various concentrations are given in Table II.

TABLE II
Growth of algae for various treatments and dilutions

Concentration	Lime Treated			Untreated
	1400 lb CaO/acre	700 lb CaO/acre	350 lb CaO/acre	
10 ²	Luxurious growth of <i>Nostoc</i> , <i>Anabaena</i> <i>Oscillatoria</i> and <i>Scytonema</i> noted.	Good growth of <i>Anabaena</i> and <i>Nostoc</i> observed.	Little growth of blue green algae and more vigorous growth of green algae.	Luxurious growth of green algae only found. Only a slight growth of <i>Nostoc</i> and <i>Oscillatoria</i> noted.
10 ³	Good growth of all the above organisms observed.	Good growth of <i>Nostoc</i> observed.	Slight growth of green algae.	Slight growth of green algae alone.
10 ⁴	Little growth of <i>Nostoc</i> and <i>Oscillatoria</i> noted.	Little growth of the above organisms.	No growth	No growth
10 ⁵	do.	do.	do.	do.

In the lime treated soils blue green algae were obtained even at a dilution of 10⁵ while in the untreated soils the same organism could be detected only at a dilution of 10²,

The above observations clearly show that the two powerful nitrogen fixing species *Nostoc* and *Anabaena* are the predominant nitrogen fixing organisms in the acid peaty rice soils of Kerala. Moreover, liming

the soil enhances the proliferation of these blue green algal forms and suppresses the growth of green algae. The increased amounts of available nitrogen obtained in these soils on treatment with even a low dose of lime may partially be due to the increased fixation of nitrogen by such powerful nitrogen fixers as *Nostoc* and *Anabaena*. Further work on the isolated organisms is in progress.