

පුර්ව

SOME ASPECTS OF MICROBIOLOGY OF PADDY SOILS
IN WET ZONE OF SRI LANKA

BY

The work reported in this thesis is the result
of the candidate's own investigation carried out
in the Department of Botany, University of Kelaniya.

W. G. DILANTHA FERNANDO

It has not been B.Sc. (Special) Peradeniya
for any other degree.

Date: 1984.06.01

ප්‍රකාශ අංකය	58
විෂය අංකය	

June, 1984.

I certify that this statement is correct
Thesis submitted to the
University of Kelaniya,
in partial fulfilment
of the Degree of Master
of Science in Microbiology.
Professor of Microbiology
Department of Botany
University of Kelaniya.

A B S T R A C T

The paddy soils (Phase II) does not show a remarkable increase or decrease during the rice cycle, with fertilizer application on some soils with special reference to the changes of microbial activity. There is an increase in the Phase II nitrifiers. There is a negative correlation between Phase II nitrifiers and denitrifiers in a rice cycle.

With the addition of fertilizers the soil P^H increased. In an alkaline state the bacterial numbers have decreased. With the increase in P^H , the availability of phosphorus is great and the nitrate content of soil has decreased. When NPK fertilizer was added, the bacterial numbers increased due to the presence of phosphorus. About 9 *Bacillus* species were isolated of which *B. megaterium*, *B. subtilis* and *B. coagulans* were predominant. There were also gram negative *Aeromonas, sp*, *Proteus, sp*, *Chromobacterium violaceum* and *Enterobacter* of the gram positive cocci forms *Micrococcus, sp* and *Staphylococcus, sp* dominate. The study of nitrogen fixers, denitrifiers and nitrifiers indicated that with fertilizer application and P^H changes taking place in the soil, their numbers and activity also changed. With addition of phosphorus fertilizers, the number of nitrogen fixers increased. Urea fertilizers seems to show a inhibitory effect on nitrogen fixers. There is an increase in the number of denitrifiers, with urea fertilizer applications, but with prolonged water logging their numbers have decreased.

சுயநிர்வக
மாணவியல் அறிவியல் (3-ம் ஆண்டு)
மாணவியல்

DISCUSSION

The nitrifiers (phase I) does not show a remarkable increase or decrease during the rice cycle. With fertilizer application there has been an increase in the Phase II nitrifiers. There is a negative correlation between Phase II nitrifiers and denitrifiers.

The present study is the first of its kind in the rice field in one calendar year. The data were collected from the rice field and field by the farmers. In many other countries such as China, India, Philippines and Japan, rice field nitrification has been studied.

The extreme latitudes in which rice is grown are in temperate regions. A report by Mendel and Verjans (1960) suggested that rice cultivation is limited to as far north as 45° in Canada, Ontario and as far south as 35° in New South Wales, Australia. There is evidence that rice once grew at 54° north in Sweden, in the eastern United States, rice will grow in China's inland country at about 40° N, which is considered the northernmost rice growing area in the world (1931, 1974). However, most of the world's rice is grown in the tropics and the critical determining factor for growing rice appears to be temperature.

The effects of climate on the yield of rice for the rice grower is major basic to the understanding of rice. Knowledge of its effects, especially rainfall, solar radiation, temperature and relative humidity.