

THE EFFECT OF LEUCAENA LEUCOCEPHALA (LAM) DE WIT.

GREEN MANURE INCORPORATION ON NITROGEN DYNAMICS

OF PADDY SOILS IN MAHAWELI SYSTEM C

By

AGAMPODI KAPILA NAYANANANDANA ZOYSA

Thesis

Submitted in partial fulfilment of the requirements

for the degree of

MASTER OF PHILOSOPHY

in the

POSTGRADUATE INSTITUTE OF AGRICULTURE

of the

UNIVERSITY OF PERADENIYA

SRI LANKA

C 631.874
259



401823

AGRICULTURE LIBRARY
UNIVERSITY OF PERADENIYA

Approved :

Supervisor

Keerthisinghe
.....
(Dr. G. Keerthisinghe)

Examiner

Upasena
.....
(Dr. S.H. Upasena)

Examiner

Jayakody
.....
(Dr. A.N. Jayakody)

September 1987.

401823

ABSTRACT

Field studies were conducted at Girandurukotte, Mahaweli system C during maha 1985/86 and yala 1986 to determine the effect of incorporated Leucaena leucocephala (Lam) de Wit. leaves on nitrogen dynamics of the paddy soil. The treatments were 0, 4, 8 and 12 t/ha Leucaena with 0, 43.65 and 87.30 kg/ha mineral nitrogen in a factorial combination. The rice variety was BG 94-1. The exchangeable ammonium and nitrate in soil and plant nitrogen uptake were tested at transplanting, maximum tillering, panicle initiation and harvest.

During the maha, incorporation of Leucaena produced significantly higher exchangeable ammonium values at all levels of nitrogen throughout the plant life. The exchangeable ammonium content of plots treated with more than 4 t/ha Leucaena was similar to, or even higher than, in the highest mineral nitrogen treatment, indicating that Leucaena was almost as effective as mineral nitrogen. The same trend was observed during the yala, however significant differences were observed only at transplanting.

In both seasons, nitrate concentrations did not differ significantly with the incorporation of Leucaena.

Incorporation of Leucaena increased the nitrogen uptake at each level of nitrogen during both seasons; however, these differences were significant only during the maha.

Grain yields increased significantly due to the incorporation of Leucaena at each level of nitrogen in both seasons. Incorporation of 8 t/ha Leucaena produced a yield comparable with that from the highest mineral nitrogen rate. This study demonstrated that the incorporation of Leucaena into the soil was almost as effective as application of mineral nitrogen fertiliser.