STUDIES ON THE GROWTH OF LEUCAENA LEUCOCEPHALA

1. EFFECT OF CLEAN WEEDING AND NITROGEN FERTILIZER ON EARLY ESTABLISHMENT

G. D. HILL*

ABSTRACT

Leucaena leucocephala cv. Peru was sown with a dressing of 0, 30 and 60 lb of fertilizer nitrogen per acre, plots being weeded or left unweeded. Significant responses to weeding and nitrogen were obtained. On weeded plots there was no increase in production from 30 lb of nitrogen to 60 lb of nitrogen. Nodulation of nitrogen treated plots was not affected by the levels of nitrogenous fertilizer used.

INTRODUCTION

LEUCAENA when established from seed makes slow initial growth (Takahashi and Ripperton 1949). Weed competition at establishment causes reduced forage yield (Kinch and Ripperton 1962; CSIRO Aust. 1965).

Edwards (1963) showed that nitrogen (urea) applied at sowing, in pots, increased root growth but reduced nodule dry matter. In another experiment he was unable to detect significant differences between weight of tops, roots or nodules when nitrogen was applied at 0, 2 and 4 mg per pot at sowing or at first nodule formation.

Gates (1970) has shown that for *Stylosanthes humilis* nitrogen applied at sowing stimulated nodule development and increased growth of the whole plant.

An experiment was conducted to study the effects of weed competition and of fertilizer nitrogen at sowing on the early establishment of Leucaena in the field.

MATERIALS AND METHODS

The experiment was sown on a brown clay loam at Bubia on 23rd May, 1968. A factorial design with eight replicates was used.

The treatments were:—

0 lb nitrogen per acre 30 lb nitrogen per acre 60 lb nitrogen per acre	X	not weeded weeded

Each plot comprised a single row of Leucaena 20 ft long spaced 10 ft from the next plot. Rows 10 ft apart had been found to be suitable for the cultivation of Leucaena in pastures.

The experiment was sown to the Peru strain at a rate of 10 lb per acre. Seed was scarified using the method of Gray (1962) and inoculated with *Rhizobium* strain NGR 8 prior to sowing. Weeded plots were weeded by hand to 3 ft each side of the row at fortnightly intervals from sowing to harvest.

At harvest on 1st August, 1968, the central 15 ft of each row was cut and weighed green, the entire harvest being completed in one day. At the same time three plants in the remaining part of each row were dug up and inspected for nodules.

RESULTS AND DISCUSSION

No visual responses to added nitrogen were observed at any stage. The experiment coincided with the period of day-time rain at Bubia and weed growth on unweeded plots was prolific. Principal weed species present were *Mimosa invisa, Eleusine indica, Portulaca oleraceae* and *Euphorbia geniculata.*

* Formerly Agronomist, Department of Agriculture, Stock and Fisheries, Bubia, via Lae. Present address: Department of Agronomy, University of Western Australia, Nedlands, W.A. 6009.

Effect of Nitrogen on Nodulation

No differences among treatments could be detected. All plants pulled were well nodulated and had numerous pink nodules present.

Effect of Treatments on Growth

Production of green forage for the various treatments is shown in the *Table.*

Table.—Production of green forage

Nitrogen (lb per acre)	Production (lb per acre)	
	Unweeded	Weeded
0	666	858
30	736	1473
60	973	1473

Yield responses to added nitrogen and weeding were very highly significant ($P<0.001$). The interaction nitrogen x weeding was highly significant ($P<0.01$). Yield of weeded plots which had received 30 lb of nitrogen per acre and 60 lb per acre was the same.

In unweeded plots there was a continued response to nitrogen up to 60 lb per acre, probably due to competition between the Leucaena and the weeds for the added nitrogen.

CONCLUSIONS

Early growth of Leucaena was assisted by the addition of fertilizer nitrogen and clean weeding, the optimum treatment being clean weeding and 30 lb of nitrogen per acre.

Use of fertilizer nitrogen may also be of value to assist early growth in areas where weeding is not practical because of terrain.

The addition of fertilizer nitrogen at the levels used did not appear to have an adverse effect on nodulation.

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