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EFFECT OF LAND PREPARATION ON NITROGEN AVAILABILITY TO TOBACCO

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SUMMARY

The contribution of the soil to the nitrogen nutrition of a tobacco crop grown after ploughing in a body of grass exceeded that of applied fertilizer nitrogen by a factor of at least 4.

During the 1963-64 tobacco season, a time-of-ploughing + side-dressing trial was carried out at the Millaroo Research Station, on the Burdekin River in North Queensland.

It has been observed in previous seasons that in the fine-grained soils of the Burdekin levee rapid build-up of nitrogen frequently occurred as the tobacco crop approached maturity, resulting in the production of uncurable or trashy leaf.

This trial, sited on an area of Elkin Sandy Loam which had been under Rhodes grass for 2 years, was designed to compare the effects of land preparation as normally practised (grass cover ploughed in at the end of the wet season, usually March or April) and late land preparation following removal of the grass cover by burning. A basal application of nitrogen was the standard fertilizer treatment, and nitrogen side-dressing treatments at the bud stage of growth were superimposed in some plots.

Within each land preparation treatment, a treatment was incorporated which received no fertilizer nitrogen at any stage. It is the results from the no-fertilizer and basal treatments which are the subject of this paper.

Table 1 shows the nitrate-nitrogen content of the soil samples from the nil nitrogen and basal nitrogen treatments within each land preparation treatment. Soil samples as analysed consisted of 30 cores from each plot, taken in the crop row, which were then bulked across the four replications and subsampled. Also included in this table are the commercial yields of cured leaf obtained from these treatments.

TABLE 1

NITRATE-NITROGEN IN SOIL SAMPLES AND YIELD OF CURED LEAF IN RELATION TO LAND PREPARATION

Treatment	E		L		E	L
	p.p.m. nitrate N in Soil Samples Taken 2 Weeks After Budding				Yield ("saleable" weight) lb/ac	
	0–9 in.	9–18 in.	0–9 in.	9-18 in.		
Oo	23	0	6	1	2,300	1,200
Ob	25	18	13	2	2,350	1,800

Treatments:

E = Rhodes grass ploughed in early (March 19, 1963); depth 7–8 in.

L = Rhodes grass burnt off and plots ploughed late (July 4, 1963); depth 5–6 in.

Oo = No nitrogen applied at any stage.

Ob = Basal application of 19 lb N/ac; no side-dressing.

All treatments planted early September.

Assuming a weight of 3 x 10^6 lb per ac ft of soil, the figures for the ploughed-in grass/nil nitrogen treatments indicate that the ploughing-in led to the production of some 38 lb nitrate nitrogen per acre-9 in. in excess of that produced in the burning off treatment. This figure does not take into account plant usage, and represents the excess production after the period of maximum crop growth and nutrient uptake.

Examination of the figures for cured leaf yield, assuming linearity of response to applied nitrogen up to the greatest amount applied, produces a conservative estimate of nitrogen usage in the ploughed-in/nil nitrogen treatment in excess of that in the burnt off/nil nitrogen treatment as a further 38 lb nitrogen per acre.

As the basal nitrogen application of 19 lb nitrogen per acre in the basal nitrogen treatments represented a normal district application, it is apparent that, following the normal district practice of ploughing in a body of grass at the end of the wet season, the contribution of the soil to the nitrogen nutrition of the tobacco crop exceeds that of the applied fertilizer by a factor of at least 4.

That a similar situation probably applies in other areas where tobacco production is continuing in Queensland is shown by Goodman (1965), who suggested that on Mareeba I red earth the factor involved may be at least 10.

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REFERENCE

GOODMAN, P. J. (1965).—Soil plant nitrogen relations of tobacco at Mareeba, north Queensland. *Aust. J. Exp. Agric. Anim. Husb.* 5:180-92.

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