

SUGAR BEET

LONG TERM EXPERIMENT - THE IMPROVEMENT OF SOIL CONDITION (NAS 200 ML 73)

This was the second year of the long term experiment to examine the value of short term leys and soil conditions on soil structure and the yield of arable crops.

PHASE II TREATMENT SEQUENCE 1st YEAR
CROP SUGAR BEET

METHOD

All main plots were soil sampled on 7 September 1972 at 0-6 and 6-12 in. depth for routine analysis, particle size distribution and plastic and and liquid limits.

On 14 September 20-25 ton per acre of FYM was applied with an average dry matter content of 23.4% and contained 2.43% N, 1.04% P₂O₅, 5.23% K₂O and 0.37% Mg in the dry matter. Factory waste lime (SBL) was applied at an average dry matter content of 55.3% and containing 0.49% N, 1.38% P₂O₅, 0.06% K₂O and 0.48% Mg in the dry matter, with a total neutralising value of 44.5.

3 cwt per acre of agricultural salt was given on 20 September 1972. 120 units N, 80 P₂O₅ and 150 K₂O was applied on 22 March to all but the FYM treatments which received 90 units N only as the FYM was calculated to supply 30 units N, 80 P₂O₅ and 150 K₂O.

Monotri pelleted seed was drilled at 6in. spacing on 29 March and harvested on 4 October to allow the timely drilling of winter wheat.

RESULTS

Treatment	Plant stations '000/acre	Root yield ton/acre	Sugar %	Sugar yield cwt/acre
A1) Control	29.5	19.57	15.9	61.9
A2)	30.2	18.67	16.5	61.7
A FYM	29.5	19.57	15.8	61.8
A SBL	26.0	19.00	16.4	62.6
*A 1yr ley	28.9	19.00	16.6	62.7

* Treatment not applied until 1975 equivalent to control in 1972.

1. Sugar yield was not influenced by treatment.
2. During mid and late summer, plants growing on the sugar beet sludge lime plots particularly and to a lesser extent after FYM had larger and greener leaves.

PHASE I TREATMENT SEQUENCE 2nd YEAR
CROP WINTER WHEAT

On 27 October the sugar beet tops were ploughed in and on 1 November 50 units P₂O₅ and 50 units K₂O per acre were applied. Winter wheat (Cappelle Desprez) was drilled on 3 November. On 22 March 80 units per acre of nitrogen was applied as a top dressing to all plots. The crop was harvested on 15 August.

RESULTS

Treatment	Grain yield cwt/acre	Area lodged over 45°	Grain N %
A1) Control	40.8	37.5	2.33
A2)	36.1	47.5	2.29
A FYM	37.2	72.5	2.45
A SBL	31.8	85.0	2.35
*A lyr ley	39.2	33.8	2.36

*Treatment not applied until 1974 equivalent to control in 1973.

1. Lodging was most severe where FYM or factory waste line had been applied to the previous sugar beet crop. However, the incidence of severe lodging was erratic which may explain the rather variable yields. The lowest yield was given from the factory waste line treatments but these plots lodged earlier and more severely.

CROP 3YR LEY PERENNIAL RYEGRASS:

METHOD

The 3 year ley plots in Phase II were established by sowing a 1:1 mixture of Barlana and S101 perennial ryegrass on 19 October 1972 with 3 cwt per acre of a 13:13:20 compound fertilizer. On 12 March 1973 100 units N, 30 P₂O₅ and 60 K₂O were applied for the first cut on both Phase I and II. The same rate of fertilizer was given for each of the subsequent cuts.

RESULTS

Date of harvest	Phase II 1st year ley			Phase I 2nd year ley		
	Yield D.M. cwt/acre	MAD fibre %	CP %	Yield D.M. cwt/acre	MAD fibre %	CP %
1st cut 14 June	57.9	32.6	11.7	77.9	34.5	10.3
2nd cut 9 August	22.1	28.7	19.7	26.9	28.6	15.9
Total	80.0			104.8		

1. The first cut produced a high yield of rather poor quality herbage. The high MAD fibre content and hence the poor digestibility could be expected from the rather late date of harvesting. The crude protein content was also low, again probably due to the late date of harvest.

2. The second cut produced only a moderate yield but of rather better quality.

3. The second year ley outyielded the first year ley at both harvest dates.

SOIL ORGANIC MATTER

Soil samples are taken every year at 0-6in. depth to determine any change in the level of soil organic matter.

Treatment	Phase I (after 2 yrs)		Phase II (after 1yr)	
	1971	1973	1972	1973
A1	1.9	1.9	2.1	1.9
A2	2.3	1.9	2.1	1.9
A FYM	2.0	2.1	2.1	2.0
A SBL	2.1	1.9	2.1	1.9
*A 1yr ley	2.1	1.9	2.1	1.9
3yr ley	1.9	1.9	2.0	1.8

* Treatment not yet applied, therefore equivalent to control.

1. On both Phase I and II there is a tendency for a small decline in the level of soil organic matter.
2. From the rather small number of samples so far available no effect of treatment can be distinguished.

R.W. Clare.