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54/W/BD/1 Green Manuring

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54/Bd/1.1

GREEN MANURING EXPERIMENT

Woburn Stackyard - 1954, the 1st year of revised scheme

Original scheme: Details are given in "Results of the Field Experiments 1939-47", Vol I, Section Be/1. In 1950 the fallow, lupins and ryegrass plots were split for early and late planting of cabbages. The original scheme ended with the harvesting of barley in 1953 and the cabbages in 1953-4.

Revised scheme: From 1954 onwards the rotation is: early potatoes, barley. As before each of these two crops is grown in every year on one of two randomized blocks of 40 plots each. The green manuring crops are grown according to the following scheme which is repeated every two years:

1st main crop	Early Potatoes	Early Potatoes	Early Potatoes	Early Potatoes	Early Potatoes
Green manure	-	Ryegrass	Ryegrass	Trefoil	Trefoil
2nd main crop and green manure	Barley	Barley undersown with Ryegrass	Barley	Barley undersown with Trefoil	Barley

8 plots of each block are allocated to each of these sequences. Half the plots of each group carrying ryegrass or trefoil after early potatoes are ploughed in autumn and the remainder are ploughed in the spring before the barley seedbed is prepared. The undersown green manures are ploughed in after February 1st for early potatoes.

In addition chaffed barley straw at the rate of 30 cwt per acre is applied after harvesting the barley to the plots receiving straw in the original scheme. Two levels of nitrogen are tested on each of the two main crops.

0.23 v. 0.46 cwt N per acre as nitrochalk to barley
0.6 v. 1.2 cwt N per acre as nitrochalk to potatoes

the higher level in each case being applied to the same plots.

The fallow plots of the original scheme remain fallow between each main crop in the revised scheme. The new green manuring treatments are superimposed on the plots carrying the original treatments in such a way that one comparison of the latter (lupins and rape v. clover and ryegrass) can be examined for possible residual effects. Residual effects of the original dung treatment, now discontinued, can also be determined, but any residual effects of the nitrogen treatments applied prior to 1954 have been eliminated by randomization. The green manuring and subsidiary treatments are arranged on the 32 non-fallow plots of each block in a quarter replicate with identities:

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$I \equiv (D) SPUGN \equiv (D)(X)UN \equiv S(X)PG$

where (D) = (residual) dung.
(X) = (residual) rape and lupins v. clover and ryegrass.
S = straw.
P = time of ploughing green manures after early potatoes.
U = green manures undersown (in addition to those sown after early potatoes).
G = trefoil v. ryegrass.
N = nitrogen levels to both crops.

Basal dressing: Early potatoes, 0.75 cwt P_2O_5 , 1.5 cwt K_2O per acre as granular compound fertilizer, broadcast on the flat before machine planting. Barley and green manures, nil.

Varieties: Early potatoes: Ulster Chieftain
Barley: Herta
Trefoil: English
Ryegrass: English Leafy Italian.

Plot area: 0.0395 acre.

Transition Period:

The barley of 1954 received two levels of nitrogen and was undersown according to the new scheme.

The early potatoes of 1954 received two levels of nitrogen according to the new scheme. It is not possible to make full comparisons of the old treatments in either of these crops. A full analysis of the new scheme will first be possible in 1955.

Cultivations, etc.:

Green manures: Clover and ryegrass undersown in barley: Apr 24, 1953.

Barley: Ploughed: Mar 5, 1954. Ground chalk applied: Mar 11.

Nitrochalk applied: Mar 16. Seed drilled at 3 bushels per acre: Mar 17. Trefoil and Italian ryegrass undersown: Apr 27.

Harvested: Aug 30. Variety: Herta.

Early potatoes: Ploughed (except for green manured plots):

Aug 21, 1953, Oct 2, Dec 2, and Mar 1, 1954. Ploughed (all plots): Mar 10. Nitrochalk and basal fertilizers applied:

Mar 24. Potatoes mechanically planted: Mar 26. Earthed up: June 15 and again June 25. Lifted: July 28. Variety: Ulster Chieftain.

Standard errors per plot:

Early potatoes, Total tubers: 0.973 tons per acre or 21.8% (22 d.f.)

Barley, Grain: 3.04 cwt per acre or 7.8% (18 d.f.)

Summary of Results

Early potatoes, total tubers: tons per acre

N in 1954: cwt per acre	Green manures and treatments to cabbages 1952							Mean
	Fallow	Clover* + Rye-grass*	Lupins + Rape	Dung: tons per acre		Straw: tons per acre		
				None	10	None	1½	
	(±0.486)	(±0.344)		(±0.308)				(±0.217)
0.6	3.69	4.22	4.19	3.24	4.96	4.03	4.17	4.10
1.2	4.37	4.82	4.65	4.02	5.30	4.32	5.00	4.66
Mean	4.03 (±0.344)	4.52 (±0.243)	4.42	3.63	5.13 (±0.217)	4.18	4.59	4.38

*Also undersown in barley 1953.

Barley, grain: cwt per acre

N in 1954: cwt per acre	Green manures and treatments to cabbages 1953							Mean
	Fallow	Clover + Rye-grass	Lupins + Rape	Dung: tons per acre		Straw: tons per acre		
				None	10	None	1½	
	(±1.50)	(±1.06)		(±0.95)				(±0.67)
0.23	32.2	36.9	35.5	33.5	37.2	35.6	35.1	35.4
0.46	36.8	40.3	41.7	40.2	40.1	40.5	39.8	40.1
Mean	34.5 (±1.06)	38.6 (±0.75)	38.6	36.8	38.7 (±0.67)	38.1	37.5	37.8

Excluding fallow plots

N in 1954: cwt per acre	Undersown in barley 1954			Mean
	None	Trefoil	Eye-grass	
	(±1.06)	(±1.50)		(±0.75)
0.23	36.0	36.9	35.8	36.2
0.46	40.0	41.7	42.1	41.0
Mean	38.0 (±0.75)	39.3 (±1.06)	39.0	38.6

54/Bd/1.4

Barley, straw: cwt per acre

N in 1954: cwt per acre	Green manures and treatments to cabbages 1953							Mean
	Fallow	Clover + Rye-grass	Lupins + Rape	Dung: tons per acre		Straw: tons per acre		
				None	10	None	1½	
0.23	31.5	34.6	33.3	30.2	36.7	33.5	33.4	33.5
0.46	35.8	39.3	39.4	37.6	39.7	38.0	39.3	38.6
Mean	33.7	37.0	36.3	33.9	38.2	35.8	36.3	36.1

Excluding fallow plots

N in 1954: cwt per acre	Undersown in barley 1954			Mean
	None	Trefoil	Ryegrass	
0.23	34.0	36.9	31.0	33.9
0.46	38.7	40.2	39.7	39.4
Mean	36.4	38.5	35.3	36.6