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81/W/RN/12 Organic Manuring - S. Barley, S. Beans, Ley.

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81/W/RN/12

ORGANIC MANURING

Object: To study, from crop yields and soil analyses, the effects of a range of types of organic matter - Woburn, Stackyard B.

Sponsor: G.E.G. Mattingly.

The 17th year, s. barley, s. beans, ley.

For previous years see 'Details' 1973 and 74-80/W/RN/12.

Design for s. barley: 2 blocks of 6 plots split into 8
s. beans: 2 blocks of 4 plots
1st, 2nd & 3rd year leys: 2 blocks of 2 plots.

Whole plot dimensions: 8.53 x 30.5.

Treatments: From 1966 to 1971 the experiment had a preliminary period designed to build up organic matter, derived from different sources. An arable rotation was started on two blocks in 1972 and the remaining two blocks in 1973. In 1981 two blocks were sown to s. barley to complete the testing of residues built up in the preliminary period (these blocks also included ley sown in 1980). The remaining two blocks were sown to s. beans & ley (and also included ley sown in 1979), starting a new phase accumulating organic residues.

S. barley tested all combinations of:

Whole plots

1. MANURE Organic manures and fertilisers in the preliminary period:

FYM	Farmyard manure
STRAW	Straw
FERT-FYM	Fertilisers equivalent to FYM
FERT-STR	Fertilisers equivalent to straw
CLOVRLEY	Clover/grass ley, no N
GRASSLEY	Grass ley with N for each cut

Sub plots

2. N Fertiliser nitrogen (kg N):

S. BARLEY

0
30
60
90
120
150
180
210

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S. beans tested:

MANURE	Organic manures and fertilisers in 1981, cumulative to those applied in the preliminary period:
FYM	Farmyard manure at 50 tonnes
STRAW	Straw at 7.5 tonnes plus P ₂ O ₅ at 140 kg, K ₂ O at 140 kg, MgO at 50 kg
FERT-FYM	P ₂ O ₅ at 280 kg, K ₂ O at 560 kg, MgO at 100 kg
FERT-STR	P ₂ O ₅ at 140 kg, K ₂ O at 280 kg, MgO at 50 kg

All leys are clover/grass (LC) without N except to seedbed in first year. 1st year leys tested:

PREV LEY	Previous ley:
LC(LC)	Clover/grass ley in preliminary period
LC(LN)	Grass ley with N in preliminary period

2nd & 3rd year leys tested:

PREV MAN	Previous manure:
LC(GM)	Green manures in preliminary period
LC(PT)	Peat in preliminary period

Standard applications:

- S. barley: Manures: P₂O₅ at 110 kg as superphosphate, K₂O at 60 kg as muriate of potash. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 280 l with the fungicide. Fungicide: Tridemorph at 0.53 kg.
- S. beans: Weedkiller: Simazine at 0.84 kg in 280 l. Insecticides: Phorate at 5.6 kg, pirimicarb at 0.14 kg in 280 l on two occasions.
- Clover/grass leys, 1st, 2nd and 3rd years: Manures: (0:14:28) at 1000 kg, MgO at 50 kg as kieserite. N at 50 kg to 1st year and 60 kg to 2nd year as 'Nitro-Chalk'.

Seed: S. barley: Georgie, dressed with ethirimol, sown at 160 kg.
S. beans: Minden, sown at 220 kg.
Clover/grass ley: Climax timothy at 13.4 kg, S215 Meadow fescue at 11.2 kg, Huia white clover at 3.4 kg. Mixture sown at 28 kg.

Cultivations, etc.:-

- S. barley: Ploughed in sugar beet tops: 11 Dec, 1980. P and K applied: 16 Feb, 1981. Spring-tine cultivated: 18 Feb. Spring-tine cultivated with crumbler attached, seed sown: 27 Feb. N applied: 26 Mar. Weedkillers and fungicide applied: 15 Apr. Combine harvested: 17 Aug.
- S. beans: Mg applied: 3 Dec, 1980. PK applied: 4 Dec. Organic manures applied: 16 Jan, 1981. PK and Mg applied: 16 Feb. Spring-tine cultivated: 18 Feb. Phorate applied, rotary cultivated with crumbler attached, seed sown: 6 Apr. Weedkiller applied: 7 Apr. Pirimicarb applied: 18 June, 27 July. Combine harvested: 3 Sept.
- 1st year clover/grass ley: Ploughed: 16 Jan, 1981. PK and Mg applied: 16 Feb. Spring-tine cultivated twice: 18 Feb, 8 Apr. Rotary cultivated, N applied: 7 May. Seeds sown: 13 May. Topped twice: 25 June, 20 July. Cut: 8 Sept.

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2nd year clover/grass ley: Mg applied: 3 Dec, 1980. PK applied: 4 Dec.
 N applied: 13 May, 1981. Cut: 10 June, 8 Sept.
 3rd year clover/grass ley: Mg applied: 3 Dec, 1980. PK applied: 4 Dec.
 Cut: 12 June, 1981, 8 Sept.

SPRING BARLEY

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

	N	0	30	60	90	120	150	180	210	MEAN
MANURE										
FYM	3.44	4.47	6.59	6.36	7.21	6.49	5.84	5.22	5.70	5.70
STRAW	3.84	5.73	6.73	7.48	6.46	6.81	5.95	5.64	6.08	6.08
FERT-FYM	2.39	4.17	5.56	6.12	5.50	5.64	5.27	5.16	4.98	4.98
FERT-STR	3.57	4.79	6.20	6.83	7.17	7.00	5.73	5.52	5.85	5.85
CLOVRLEY	4.14	5.80	6.89	7.12	7.07	6.48	5.88	5.84	6.15	6.15
GRASSLEY	3.58	5.35	5.90	6.82	6.80	5.68	6.03	5.36	5.69	5.69
MEAN	3.49	5.05	6.31	6.79	6.70	6.35	5.78	5.46	5.74	5.74

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	MANURE	N	MANURE N
SED	0.604	0.157	0.704
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
MANURE			0.386

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	5	0.604	10.5
BLOCK.WP.SP	42	0.386	6.7

GRAIN MEAN DM% 88.0

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

	N	0	30	60	90	120	150	180	210	MEAN
MANURE										
FYM	1.50	2.40	4.84	4.94	6.02	4.88	6.55	5.33	4.56	4.56
STRAW	1.81	3.02	4.45	5.32	6.40	6.31	7.80	6.65	5.22	5.22
FERT-FYM	1.37	2.19	3.30	4.90	5.18	4.93	4.80	5.04	3.97	3.97
FERT-STR	1.64	2.79	4.01	5.39	5.93	6.17	6.05	5.68	4.71	4.71
CLOVRLEY	1.71	2.82	4.50	5.48	5.95	5.67	5.67	6.35	4.77	4.77
GRASSLEY	1.63	2.43	4.54	5.88	6.28	5.22	6.16	6.91	4.88	4.88
MEAN	1.61	2.61	4.27	5.32	5.96	5.53	6.17	5.99	4.68	4.68

STRAW MEAN DM% 77.5

SUB PLOT AREA HARVESTED 0.00168

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SPRING BEANS

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

MANURE	FYM	STRAW	FERT-FYM	FERT-STR	MEAN
	1.74	2.00	1.57	1.53	1.71

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	MANURE
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SED	0.212

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	3	0.212	12.4

GRAIN MEAN DM% 75.4

PLOT AREA HARVESTED 0.02471

1ST YEAR LEY

1ST CUT (8/9/81) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

PREV LEY	LC(LC)	LC(LN)	MEAN
	2.74	2.58	2.66

1ST CUT MEAN DM% 20.8

PLOT AREA HARVESTED 0.00265

81/W/RN/12 2ND YEAR LEY

1ST CUT (10/6/81) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

PREV MAN	LC(GM)	LC(PT)	MEAN
	4.28	4.67	4.48

1ST CUT MEAN DM% 17.5

2ND CUT (8/9/81) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

PREV MAN	LC(GM)	LC(PT)	MEAN
	2.19	2.46	2.32

2ND CUT MEAN DM% 25.2

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

PREV MAN	LC(GM)	LC(PT)	MEAN
	6.47	7.13	6.80

TOTAL OF 2 CUTS MEAN DM% 21.3

PLOT AREA HARVESTED 0.00265

3RD YEAR LEY

1ST CUT (12/6/81) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

PREV MAN	LC(GM)	LC(PT)	MEAN
	6.22	6.10	6.16

1ST CUT MEAN DM% 24.7

2ND CUT (8/9/81) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

PREV MAN	LC(GM)	LC(PT)	MEAN
	1.29	0.69	0.99

2ND CUT MEAN DM% 27.4

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

PREV MAN	LC(GM)	LC(PT)	MEAN
	7.51	6.79	7.15

TOTAL OF 2 CUTS MEAN DM% 26.0

PLOT AREA HARVESTED 0.00265