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87/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: A.E. Johnston.

The 23rd year, w. wheat, w. oats, ley.

For previous years see 'Details' 1973 and 74-86/W/RN/12.

Design for w. wheat: 2 blocks of 8 plots split into 6

W. oats: 2 blocks of 4 plots

6th and 8th year leys: 2 blocks of 4 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. After a period of testing the residues built up, a further period of accumulation was started; on two blocks (which included ley sown in 1979) in 1981 and on the other two (which included ley sown in 1980) in 1982. On the first pair leys were ploughed for 1st test crop w. wheat in 1987. In addition to leys the second pair included w. oats.

W. wheat tested all combinations of:

Whole plots

1. TREATMNT	Previous treatments:
LC 8 GM	Eight-year clover/grass ley until 1986, green manure in the preliminary period
LC 8 PT	As above, peat in the preliminary period
LC 6 LC	Six-year clover/grass ley until 1986, clover/grass ley in the preliminary period
LC 6 LN	As above, grass ley with N in the preliminary period
FYM	Farmyard manure annually 1981 to 1985 and in the preliminary period
STRAW	Straw in both periods
FERT-FYM	Fertilizers only in both periods, rates of P, K and Mg equivalent to amounts in FYM
FERT-STR	Fertilizer only in both periods rates of P, K and Mg equivalent to amounts in straw (+P)

Sub plots

2. N	Nitrogen fertilizer in 1987 (kg N) as 'Nitro-Chalk':
0	
50	
100	
150	
200	
250	

87/W/RN/12

W. oats tested:

MANURE	Organic manures and fertilizers in 1986 (not applied in 1987), cumulative to 1985, 1983 and 1982 and to those applied in the preliminary period:
FYM	Farmyard manure at 50 tonnes
STRAW	Straw at 7.5 tonnes plus P205 at 140 kg, K20 at 140 kg, MgO at 50 kg
FERT-FYM	P205 at 280 kg, K20 at 560 kg, MgO at 100 kg
FERT-STR	P205 at 140 kg, K20 at 280 kg, MgO at 50 kg

All leys were clover/grass (LC) without N. 6th year leys tested:

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

8th year leys tested:

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

Standard applications:

W. wheat: Manures: (0:18:36) at 560 kg. Mn at 0.16 kg as manganese sulphate in 240 l applied with the prochloraz, carbendazim and growth regulator. Weedkillers: Glyphosate at 1.4 kg in 200 l. Chlortoluron at 5.6 kg in 200 l. Clopyralid at 0.07 kg, bromoxynil at 0.34 kg with mecoprop at 2.5 kg in 240 l. Fungicides: Prochloraz at 0.34 kg with carbendazim at 0.13 kg. Fenpropimorph at 0.75 kg with chlorothalonil at 0.75 kg in 200 l. Propiconazole at 0.12 kg with carbendazim and maneb (as 'Septal' at 2.5 kg) in 200 l. Growth regulator: Chlormequat chloride at 1.1 kg. Insecticide: Carbofuran at 7.5 kg. Molluscicide: Methiocarb at 0.22 kg.

W. oats: Manure: N at 90 kg as 'Nitram'. Weedkiller: Clopyralid at 0.07 kg, bromoxynil at 0.34 kg with mecoprop at 2.5 kg in 240 l.

Leys, 6th and 8th years: Manures: MgO at 50 kg as kieserite. (0:18:36) at 780 kg.

Seed: W. wheat: Mercia, sown at 190 kg.
W. oats: Bulwark, sown at 140 kg.

Cultivations, etc.:-

W. wheat: After leys only: Plough and roll: 25 July, 1986. Subsoiled, with 25 cm wings on tines 30 cm deep and 70 cm apart, in two directions at right angles: 28 Aug. All wheat plots: Glyphosate applied: 16 Sept. Methiocarb applied: 18 Sept. Ploughed plots after oats: 24 Sept. PK applied, insecticide applied, rotary harrowed with crumbler attached: 24 Sept. Seed sown: 25 Sept. Chlortoluron applied: 9 Oct. Clopyralid, bromoxynil and mecoprop applied: 14 Apr, 1987. N treatments applied: 16 Apr. Manganese, prochloraz, carbendazim and chlormequat applied: 21 Apr. Fenpropimorph and chlorothalonil

87/W/RN/12

Cultivations, etc.:-

applied: 5 June. Propiconazole, carbendazim and maneb applied: 29 June. Combine harvested: 1 Sept.
W. oats: Ploughed: 25 Sept, 1986. Rotary cultivated with crumbler attached, seed sown: 2 Oct. Clopyralid, bromoxynil and mecoprop applied: 27 Apr, 1987. N applied: 5 May. Combine harvested: 20 Aug.
Leys, 6th and 8th years: PK and Mg applied: 10 Mar, 1987. Cut: 18 June and 12 Aug.

WINTER WHEAT

GRAIN TONNES/HECTARE

***** Tables of means *****

	N	0	50	100	150	200	250	Mean
TREATMNT								
LC 8 GM		5.23	7.74	8.46	8.72	8.40	7.78	7.72
LC 8 PT		5.32	7.37	7.51	8.43	8.37	8.39	7.57
LC 6 LC		5.98	7.04	8.59	8.49	7.62	8.40	7.69
LC 6 LN		6.15	7.73	8.05	7.97	8.60	8.21	7.78
FYM		4.03	5.82	7.22	6.48	7.51	8.00	6.51
STRAW		2.95	3.89	5.82	7.16	6.50	7.75	5.68
FERT-FYM		1.36	3.05	4.48	5.06	5.25	5.77	4.16
FERT-STR		2.07	4.18	4.92	4.84	5.15	6.19	4.56
Mean		4.14	5.85	6.88	7.14	7.18	7.56	6.46

*** Standard errors of differences of means ***

Table	TREATMNT	N	TREATMNT N
s.e.d.	0.832	0.192	0.968
Except when comparing means with the same level(s) of TREATMNT			
			0.543

***** Stratum standard errors and coefficients of variation *****

Stratum	d.f.	s.e.	cv%
BLOCK.WP	7	0.832	12.9
BLOCK.WP.SP	40	0.543	8.4

GRAIN MEAN DM% 81.6

SUB PLOT AREA HARVESTED 0.00254

87/W/RN/12

WINTER OATS

GRAIN TONNES/HECTARE

***** Tables of means *****

MANURE	FYM	STRAW	FERT-FYM	FERT-STR	Mean
	5.15	4.94	4.29	5.03	4.85

GRAIN MEAN DM% 83.5

STRAW TONNES/HECTARE

***** Tables of means *****

MANURE	FYM	STRAW	FERT-FYM	FERT-STR	Mean
	5.59	4.81	4.14	4.80	4.84

STRAW MEAN DM% 76.6

PLOT AREA HARVESTED 0.00796

6TH YEAR LEY

DRY MATTER TONNES/HECTARE

***** Tables of means *****

	1ST CUT (18/6/87)	2ND CUT (12/8/87)	TOTAL OF 2 CUTS
PREV LEY			
LC(LC)	6.05	2.48	8.53
LC(LN)	6.11	1.93	8.04
MEAN	6.08	2.20	8.28
MEAN DM%	21.6	16.9	19.2

8TH YEAR LEY

DRY MATTER TONNES/HECTARE

***** Tables of means *****

	1ST CUT (18/6/87)	2ND CUT (12/8/87)	TOTAL OF 2 CUTS
PREV MAN			
LC(GM)	4.39	2.39	6.77
LC(PT)	4.63	2.31	6.94
MEAN	4.51	2.35	6.86
MEAN DM%	20.2	17.5	18.9