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88/W/RN/12 Organic Manuring - W. Wheat, Potatoes

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88/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 24th year, w. wheat, potatoes.

For previous years see 'Details' 1973 and 74-87/W/RN/12.

Design for each crop: 2 blocks of 8 plots split into 6

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 in 1987, on the second pair for 1st test crop in 1988.

1st test crop of w. wheat tested all combinations of:

Whole plots

1. TREATMNT	Previous treatments:
LC 8 GM	Eight-year clover/grass ley until 1987, 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 1987, 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 1986 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	Fertilizers only in both periods rates of P, K and Mg equivalent to amounts in straw (+P)

Sub plots

2. N	Nitrogen fertilizer in 1988 (kg N) as 'Nitro-Chalk':
0	
50	
100	
150	
200	
250	

88/W/RN/12

2nd test crop potatoes tested all combinations of:

Whole plots

1. **TREATMNT** Previous treatments, after w. wheat 1987:
 - 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 & Mg equivalent to amounts in FYM
 - FERT-STR Fertilizers only in both periods, rates of P, K & Mg equivalent to amounts in straw (+P)

Sub plots

2. **N** Nitrogen fertilizer in 1988 (kg N) as 'Nitro-Chalk':
 - 0
 - 70
 - 140
 - 210
 - 280
 - 350

Standard applications:

1st test crop:

W. wheat: Manures: (0:18:36) at 560 kg. Mn at 0.16 kg as manganese sulphate in 220 l. Weedkillers: Glyphosate at 1.4 kg in 200 l. Isoproturon at 2.1 kg with bromoxynil at 0.20 kg, ioxynil at 0.20 kg and mecoprop at 1.6 kg in 220 l. Fungicides: Propiconazole at 0.12 kg and tridemorph at 0.25 kg in 220 l. Insecticide: Carbofuran at 7.5 kg. Molluscicide: Methiocarb at 0.22 kg.

2nd test crop:

Potatoes: Manures: (0:18:36) at 1400 kg. Weedkillers: Glyphosate at 1.4 kg in 200 l. Linuron at 1.5 kg in 220 l. Fungicides: Mancozeb at 1.4 kg in 220 l on five occasions applied with the pirimicarb on the first, second and fifth. Fentin hydroxide at 0.28 kg in 220 l. Insecticide: Pirimicarb at 0.14 kg on three occasions. Nematicide: Oxamyl at 5.0 kg. Desiccant: Diquat at 0.80 kg ion in 400 l.

Seed: W. wheat: Mercia, sown at 190 kg.

Potatoes: Pentland Crown.

Cultivations, etc.:-

W. wheat: Glyphosate applied: 22 Sept, 1987. Subsoiled, tines 56 cm deep and 142 cm apart: 6 Oct. Ploughed: 14 Oct. Methiocarb applied: 21 Oct. PK applied: 22 Oct. Carbofuran applied, power harrowed, seed sown, harrowed: 23 Oct. Isoproturon, bromoxynil, ioxynil and mecoprop applied: 26 Apr, 1988. N treatments applied: 27 Apr. Manganese applied: 5 May. Fungicides applied: 22 June. Combine harvested: 26 Aug.

88/W/RN/12

Cultivations, etc.:-

Potatoes: Glyphosate applied: 22 Sept, 1987. Ploughed: 24 Feb, 1988.
 Heavy spring-tine cultivated: 5 Apr. PK applied: 8 Apr. N treatments applied: 14 Apr. Oxamyl applied, spring-tine cultivated: 20 Apr. Rotary harrowed, potatoes planted: 21 Apr. Rotary ridged, linuron applied: 13 May. Mancozeb applied: 15 July and 1 Aug. Mancozeb applied with pirimicarb: 14 June, 5 July and 15 Aug. Fentin hydroxide applied: 30 Aug. Desiccant applied: 15 Sept. Haulm mechanically destroyed: 29 Sept. Potatoes lifted: 19 Oct.

- NOTES:** (1) W. wheat: Because of water logging the yield of one plot was lost, with treatments FERT-FYM 0. An estimated value was used in the analysis.
 (2) Potatoes: Because of a weighing error yields from two plots were lost. Those with treatment combinations
 LC 6 LN LC 6 LN
 140 350
 Estimated values were used in the analysis.

WINTER WHEAT

GRAIN TONNES/HECTARE

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

TREATMNT	N	0	50	100	150	200	250	Mean
LC 8 GM		4.42	5.78	6.41	5.66	5.77	6.83	5.81
LC 8 PT		3.89	5.45	6.04	6.85	6.35	6.21	5.80
LC 6 LC		4.39	6.16	7.13	6.27	6.96	7.04	6.32
LC 6 LN		4.30	6.91	6.85	6.36	7.53	6.22	6.36
FYM		3.94	5.44	5.69	5.82	6.60	6.63	5.68
STRAW		2.81	3.78	5.12	3.77	4.46	3.91	3.98
FERT-FYM		1.96	2.64	3.71	4.00	2.79	3.03	3.02
FERT-STR		2.30	3.18	4.26	3.72	4.67	4.81	3.82
Mean		3.50	4.92	5.65	5.31	5.64	5.58	5.10

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

TREATMNT	N	TREATMNT
		N
	0.272	0.233
Except when comparing means with the same level(s) of TREATMNT		0.660
		0.658

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	7	0.272	5.3
BLOCK.WP.SP	39	0.658	12.9

GRAIN MEAN DM% 79.5

SUB PLOT AREA HARVESTED 0.00252

88/W/RN/12

POTATOES

TOTAL TUBERS TONNES/HECTARE

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

	N	0	70	140	210	280	350	Mean
TREATMNT								
LC 8 GM		47.2	60.1	70.5	71.5	71.5	64.4	64.2
LC 8 PT		46.8	67.9	69.8	75.8	72.4	73.0	67.6
LC 6 LC		52.1	63.2	71.4	65.1	71.0	70.9	65.6
LC 6 LN		47.7	69.7	70.6	72.8	67.4	68.2	66.1
FYM		48.2	61.2	67.2	72.1	64.1	65.6	63.1
STRAW		41.7	58.0	63.4	60.3	62.4	63.6	58.2
FERT-FYM		26.4	49.1	53.3	54.3	56.4	54.4	49.0
FERT-STR		30.2	51.6	57.2	57.6	54.6	51.5	50.5
Mean		42.5	60.1	65.4	66.2	65.0	64.0	60.5

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

TREATMNT	N	TREATMNT	N
	2.95		1.34
			4.56
Except when comparing means with the same level(s) of TREATMNT			3.80

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	7	2.95	4.9
BLOCK.WP.SP	38	3.80	6.3

SUB PLOT AREA HARVESTED 0.00137

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

	N	0	70	140	210	280	350	Mean
TREATMNT								
LC 8 GM		97.2	98.0	98.2	98.7	98.3	97.2	97.9
LC 8 PT		95.6	98.4	98.0	98.5	97.9	97.9	97.7
LC 6 LC		97.3	97.8	98.2	98.4	98.5	98.2	98.1
LC 6 LN		97.1	98.2	98.4	98.2	96.7	97.3	97.7
FYM		96.1	98.0	98.5	97.7	98.3	97.8	97.8
STRAW		96.8	98.2	98.3	97.6	96.7	97.4	97.5
FERT-FYM		92.9	96.6	96.4	95.8	95.7	95.9	95.6
FERT-STR		94.7	96.4	97.4	97.0	96.3	95.7	96.3
Mean		96.0	97.7	97.9	97.7	97.3	97.2	97.3

SUB PLOT AREA HARVESTED 0.00137