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## Yields of the Field Experiments 1989

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### 89/W/RN/12 Organic Manuring - W. Wheat, Potatoes

#### Rothamsted Research

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89/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:** P.R. Poulton.

The 25th year, w. wheat, potatoes.

For previous years see 'Details' 1973 and 74-88/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.

3rd test crop w. wheat, after w.wheat 1987, potatoes 1988, 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	Fertilizers only in both periods rates of P, K and Mg equivalent to amounts in straw (+P)

Sub plots

2. N	Nitrogen fertilizer in 1989 (kg N) as 'Nitro-Chalk':
0	
50	
100	
150	
200	
250	

89/W/RN/12

2nd test crop potatoes, after w. wheat 1988, 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 & 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 1989 (kg N) as 'Nitram':
0	
70	
140	
210	
280	
350	

**Standard applications:**

2nd test crop:

Potatoes: Manures: Magnesian limestone at 5.0 t. Kieserite at 680 kg. (0:18:36) at 1380 kg. Weedkiller: Linuron at 1.2 kg in 220 l. Fungicides: Mancozeb at 1.4 kg in 220 l on two occasions and at 2.0 kg in 220 l on two occasions. Fentin hydroxide at 0.28 kg in 220 l. Nematicide: Oxamyl at 5 kg. Desiccant: Dilute sulphuric acid at 280 l.

3rd test crop:

W. wheat: Manures: Magnesian limestone at 5.0 t. (0:18:36) at 560 kg/ha. Mn at 0.096 kg as manganese sulphate in 220 l, applied on two occasions. Weedkillers: Mecoprop at 2.5 kg with bromoxynil at 0.34 kg and clopyralid at 0.07 kg in 220 l. Fungicides: Prochloraz at 0.40 kg and carbendazim at 0.15 kg applied with the growth regulator in 220 l. Propiconazole at 0.12 kg in 220 l. Fenpropimorph at 0.75 kg with carbendazim at 0.25 kg and maneb at 1.6 kg in 220 l. Molluscicide: Methiocarb at 0.20 kg, also applied with seed. Nematicide: Carbofuran at 7.5 kg. Growth regulator: Chlormequat chloride at 1.6 kg.

**Seed:** Potatoes: Pentland Crown dressed 'Seedtect'.

W. wheat: Mercia, sown at 160 kg with methiocarb pellets.

89/W/RN/12

**Cultivations, etc.:-**

Potatoes: Magnesian limestone applied: 28 Oct, 1988. Ploughed 9 Dec. Kieserite applied: 3 Jan, 1989. PK applied: 4 Jan. Spring-tine cultivated: 4 May. N applied: 5 May. Nematicide applied: 8 May. Rotary cultivated, seed planted: 9 May. Weedkiller applied: 25 May. Mancozeb applied: 6, 17, 28 July and 16 Aug. Fentin hydroxide applied: 31 Aug. Desiccant applied: 25 Sept. Lifted: 6 Oct.

W. wheat: Ploughed: 27 Oct, 1988. Magnesian limestone applied: 28 Oct. Molluscicide applied: 29 Oct. PK applied, nematicide applied, spring-tine cultivated, seed sown: 31 Oct. Weedkillers applied: 28 Apr, 1989. Mn applied: 29 Apr, 22 May. N applied: 2 May. Prochloraz, carbendazim and growth regulator applied: 17 May. Propiconazole applied: 5 June. Fenpropimorph, carbendazim and maneb applied: 3 July. Combine harvested: 8 Aug.

**W. WHEAT**

**GRAIN TONNES/HECTARE**

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

TREATMNT	N	0	50	100	150	200	250	Mean
LC 8 GM		3.00	5.06	6.01	6.92	6.86	6.25	5.68
LC 8 PT		3.06	5.67	5.63	6.84	6.16	6.42	5.63
LC 6 LC		3.07	4.28	6.03	6.46	6.62	6.09	5.43
LC 6 LN		3.20	5.41	6.21	6.97	6.43	7.34	5.93
FYM		2.48	3.64	4.98	5.25	5.99	6.30	4.77
STRAW		2.57	3.52	4.30	5.27	5.46	5.80	4.49
FERT-FYM		1.32	3.31	4.92	4.21	5.24	5.40	4.07
FERT-STR		1.06	2.70	3.65	3.96	4.11	4.56	3.34
Mean		2.47	4.20	5.22	5.73	5.86	6.02	4.92

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

TREATMNT	N	TREATMNT
		N
	0.437	0.241
Except when comparing means with the same level(s) of TREATMNT		0.760
		0.681

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	7	0.437	8.9
BLOCK.WP.SP	40	0.681	13.9

GRAIN MEAN DM% 87.7

SUB PLOT AREA HARVESTED 0.00252



89/W/RN/12

POTATOES

TOTAL TUBERS TONNES/HECTARE

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

	N	0	70	140	210	280	350	Mean
<b>TREATMNT</b>								
LC 8 GM		34.2	44.9	48.2	42.8	42.9	45.9	43.2
LC 8 PT		32.9	46.8	50.0	47.5	48.4	50.4	46.0
LC 6 LC		35.3	44.0	49.9	49.5	45.5	46.2	45.1
LC 6 LN		35.1	47.7	51.9	50.4	47.7	46.6	46.5
FYM		32.4	37.5	40.8	42.2	41.3	38.4	38.8
STRAW		27.1	38.8	40.4	42.8	40.9	42.2	38.7
FERT-FYM		22.4	33.7	34.6	37.7	34.6	34.9	33.0
FERT-STR		23.7	37.7	38.6	36.9	40.2	41.7	36.5
Mean		30.4	41.4	44.3	43.7	42.7	43.3	41.0

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

	TREATMNT	N	TREATMNT
			N
	3.61	1.05	4.52
Except when comparing means with the same level(s) of			
<b>TREATMNT</b>			2.98

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	7	3.61	8.8
BLOCK.WP.SP	40	2.98	7.3

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

	N	0	70	140	210	280	350	Mean
<b>TREATMNT</b>								
LC 8 GM		95.6	95.6	95.5	96.1	94.8	96.6	95.7
LC 8 PT		96.4	96.8	96.6	96.4	96.5	96.4	96.5
LC 6 LC		96.0	96.1	97.8	96.5	96.1	97.2	96.6
LC 6 LN		96.7	97.1	97.5	96.7	96.5	95.9	96.7
FYM		93.5	95.6	95.0	96.1	94.9	93.1	94.7
STRAW		95.1	95.3	93.0	92.9	94.9	95.7	94.5
FERT-FYM		90.8	90.9	93.3	93.0	91.6	91.0	91.7
FERT-STR		92.3	96.1	93.2	93.7	95.0	94.8	94.2
Mean		94.5	95.4	95.2	95.2	95.0	95.1	95.1

SUB PLOT AREA HARVESTED 0.00137