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ROTHAMSTED RESEARCH

Yields of the Field Experiments 1991

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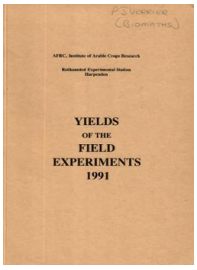

91/W/RN/12 Organic Manuring - W. Beans, W. Wheat

Rothamsted Research

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91/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 27th year, w. beans, w. wheat.

For previous years see 'Details' 1973 and 74-90/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.

4th test crop w. beans, after w. wheat 1988, potatoes 1989, w. wheat 1990 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 RES** Residues of nitrogen fertilizer to w. wheat in 1990 (kg N):

(0)
(50)
(100)
(150)
(200)
(250)

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5th test crop w. wheat, after w. wheat 1987, potatoes 1988, w. wheat 1989, w. beans 1990 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 to w. wheat in 1991 (kg N as 'Nitro-Chalk'):

0
50
100
150
200
250

Standard applications:

4th test crop:

W. beans: Manures: (0:16:36) at 560 kg. Manganese at 0.16 kg in 300 l. Weedkillers: Glyphosate at 0.54 kg in 220 l. Simazine at 0.14 kg and trietazine at 0.97 kg in 220 l. Fungicides: Chlorothalonil at 1.5 kg applied with the pirimicarb in 300 l. Insecticides: Azinphos-methyl at 0.28 kg and demeton-S-methyl sulphone at 0.085 kg in 400 l. Pirimicarb at 0.14 kg.

5th test crop:

W. wheat: Manures: (0:16:36) at 560 kg. Manganese at 0.16 kg in 300 l. Weedkillers: Glyphosate at 0.54 kg in 220 l. Diflufenican at 0.10 kg and isoproturon at 1.0 kg applied with insecticide in 220 l. Mecoprop at 0.80 kg also applied with insecticide in 220 l. Fungicides: Fenpropimorph at 0.38 kg in 210 l, and on a second occasion with chlorothalonil at 0.49 kg and flutriafol at 0.078 kg in 300 l. Insecticide: Deltamethrin at 5.0 g on two occasions.

Seed: W. beans: Banner, sown at 120 kg.
W. wheat: Mercia, sown at 150 kg.

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Cultivations, etc.:-

W. beans: Glyphosate applied: 10 Sept, 1990. P and K applied: 27 Sept. Disced: 12 Oct. Seed broadcast, ploughed: 23 Oct. Remaining weedkillers applied: 21 Nov. Manganese applied: 9 May, 1991. Azinphos-methyl and demeton-S-methyl sulphone applied: 10 May. Chlorothalonil and pirimicarb applied: 10 July. Combine harvested: 3 Sept.

W. wheat: Glyphosate applied: 10 Sept, 1990. Ploughed: 19 Sept. P and K applied, rotary harrowed with crumbler attached, seed sown: 27 Sept. Diflufenican, isoproturon and deltamethrin applied: 8 Nov. Mecoprop and deltamethrin applied: 30 Nov. Nitrogen treatments applied: 4 Apr, 1991. Fenpropimorph applied: 24 May. Manganese applied: 19 May. Fenpropimorph, chlorothalonil and flutriafol applied: 20 June. Combine harvested: 22 Aug.

W.BEANS

GRAIN TONNES/HECTARE

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

N RES TREATMNT	(0)	(50)	(100)	(150)	(200)	(250)	Mean
LC 8 GM	4.53	4.24	4.83	3.75	4.73	4.37	4.41
LC 8 PT	4.98	4.88	4.87	4.91	5.05	4.90	4.93
LC 6 LC	5.06	5.27	4.93	4.42	4.85	5.28	4.97
LC 6 LN	5.23	5.10	4.91	4.74	4.41	4.75	4.86
FYM	4.35	4.29	4.31	4.46	4.51	4.52	4.41
STRAW	4.81	4.88	4.85	4.81	4.68	5.18	4.87
FERT-FYM	4.06	4.08	4.14	4.15	4.16	4.70	4.21
FERT-STR	5.08	4.90	5.02	4.49	4.89	5.01	4.90
Mean	4.76	4.70	4.73	4.47	4.66	4.84	4.69

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

	TREATMNT	N RES	TREATMNT N RES
	0.461	0.151	0.604
Except when comparing means with the same level(s) of TREATMNT			0.428

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	7	0.461	9.8
BLOCK.WP.SP	40	0.428	9.1

GRAIN MEAN DM% 86.3

SUB PLOT AREA HARVESTED 0.00192

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91/W/RN/12

W.WHEAT

GRAIN TONNES/HECTARE

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

N TREATMNT	0	50	100	150	200	250	Mean
LC 8 GM	4.45	7.09	8.73	9.49	9.52	9.59	8.15
LC 8 PT	4.52	7.35	8.77	9.55	9.51	9.68	8.23
LC 6 LC	4.39	7.78	9.05	9.60	9.58	9.76	8.36
LC 6 LN	4.73	8.46	9.12	9.57	9.49	9.85	8.54
FYM	4.41	7.22	8.71	9.90	9.79	10.26	8.38
STRAW	3.57	6.34	8.49	9.70	9.90	10.39	8.06
FERT-FYM	2.82	6.34	8.74	8.67	9.01	9.35	7.49
FERT-STR	3.20	6.66	7.40	8.67	8.98	9.74	7.44
Mean	4.01	7.15	8.63	9.39	9.47	9.83	8.08

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

TREATMNT	N	TREATMNT N
0.644	0.136	0.734

Except when comparing means with the same level(s) of
TREATMNT 0.386

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	7	0.644	8.0
BLOCK.WP.SP	40	0.386	4.8

GRAIN MEAN DM% 87.6

STRAW TONNES/HECTARE

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

N TREATMNT	0	50	100	150	200	250	Mean
LC 8 GM	2.54	3.62	5.33	5.23	5.48	5.86	4.67
LC 8 PT	1.96	3.87	4.65	4.87	5.45	5.94	4.46
LC 6 LC	2.50	4.34	5.94	6.05	5.58	6.62	5.17
LC 6 LN	2.58	5.97	6.07	5.77	6.30	6.31	5.50
FYM	1.79	3.21	5.03	4.35	4.33	5.88	4.10
STRAW	1.98	2.06	4.63	3.53	4.37	5.24	3.63
FERT-FYM	1.73	3.00	3.60	3.80	4.75	3.19	3.35
FERT-STR	1.75	2.82	4.48	4.11	4.22	4.56	3.66
Mean	2.10	3.61	4.97	4.71	5.06	5.45	4.32

STRAW MEAN DM% 91.8

SUB PLOT AREA HARVESTED 0.00183

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