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Yields of the Field Experiments 2003

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Results of the
Classical
and other
Long-term Experiments
2003

Rothamsted Research

03/W/RN/12 - Organic Manuring

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03/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. A.J.Macdonald

The 39th year, w. rye, grass/clover ley.

For previous years see 'Details' 1973 and 74-02/W/RN/12.

Design: 4 blocks of 8 plots.

Whole plot dimensions: 8.0 x 29.5 (8.0 x 26.5 on Block III).

Treatments: From 1966 to 1971 the experiment had a preliminary period designed to build up organic matter 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, 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. A second test phase began when leys on the first pair of blocks were ploughed for the 1st test crop in 1987 and on the second pair for the 1st test crop in 1988. From 1988 two blocks, and 1989 the other two, to 1994, plots were split into 6 sub-plots to test five levels of nitrogen and nil. From 1995 to 1997 residual effects of that nitrogen were measured. In 1998 to 2000 yields were taken from whole plots only. In 2001 plots were split into half-plots to test two rates of N. For 2003* the experiment was modified to test further inputs of organic matter. An arable rotation (w. rye, s. barley, w. beans, w. wheat, forage maize) was started on seven plots within each block; the eighth was sown to a grass/clover ley.

Whole plots

1. **TREATMNT** (Not necessarily applied each year):

1966-1971/2	1979/82-1986/7	Since 2003
Fd	Fd	F
Ln	Lc6	F
St	St	St
Gm	Lc8	CC
Pt	Lc8	Co
Fs	Fs	Dg10
Dg	Dg	Dg25
Lc	Lc6	Lc

F: no organic amendment. St: chopped straw at 7.5t/ha. CC: cover crop prior to spring sown crops. Co: compost at 40t/ha. Dg10: FYM at 10t/ha. Dg25: FYM at 25t/ha. Dg: FYM at 50t/ha. Fd: fertilizers equivalent to FYM. Fs: fertilizers equivalent to straw (+P). Lc/Lc6/Lc8: grass/clover leys. Ln: grass ley + N. Gm: green manure. Pt: peat.

* ACCORDING TO EXPT. DIARY, OM ADDITION DID NOT RESUME UNTIL SEPT 2003 (1st IN THE 2003-4 CROPPING YEAR; see BOOK for 2004)

03/W/RN/12

1. **TREATMNT** (Not necessarily applied each year):(cont.)

Since 2003, all treatments, except Dg25, have also received PKS fertilizers :
20 kg P/ha, 83 kg K/ha, 36 kg S/ha.

In addition in 2003 F and CC treatments received 120 kg N/ha, St received 90 kg N/ha. Dg10 received 60 kg N/ha. No N was applied to Dg25, Co or Lc treatments.

Experimental diary:

19-Sep-02	: B :	: CleanCrop Egret at 4.0 l in 200 l
25-Sep-02	: B :	: Chalk applied at 5.0 t.
01-Oct-02	: B :	: Ploughed 35cm wide furrows
	: B :	: Rolled.
04-Oct-02	: T :	: Power harrowed Lc plots.
	: T :	: Rolled Lc plots.
08-Oct-02	: T :	: Power harrowed rye plots.
	: T :	: Drilled, Picasso/Nikita mix, tr. Baytan, at 302 seeds/m ² with 4.0 m Accord drill.
	: T :	: Rolled.
26-Nov-02	: T :	: tm)Lexus Class WSB at 60 g in 200 l.
	: T :	: tm)Hallmark with Zeon Technology at 25 ml in 200 l. to rye plots.
03-Apr-03	: T :	: Triple superphosphate at 97.5 (not to Dg25 plots).
	: T :	: Sulphate of potash at 200 kg (not to Dg25 plots).
04-Apr-03	: T :	: N as 33.5% N applied (not to Dg25, Co or Lc).
06-May-03	: T :	: Opus at 0.75 l in 200 l to rye plots.
07-May-03	: T :	: Quantum 75 DF at 20 g in 200 l to rye plots.
15-May-03	: T :	: Setter 33 at 5.0 l in 200 l to Lc plots.
10-Aug-03	: T :	: Combine harvested, plots for yield.
11-Aug-03	: T :	: Combine harvested all remaining wheat.
	: T :	: Weighted straw.
13-Aug-03	: T :	: Baled straw.

NOTE: Samples of grain were taken for chemical analysis.

03/W/RN/12

GRAIN TONNES/HECTARE

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

TREATMNT	
F (Fd)	6.82
F (Ln, Lc6)	7.39
St (St)	6.74
CC (Gm, Lc8)	7.22
Co (Pt, Lc8)	3.92
Dg10 (Fs)	6.87
Dg25 (Dg)	3.91
Mean	6.13

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

TREATMNT
0.211

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

Stratum	d.f.	s.e.	cv%
Blocks.Plots	18	0.298	4.9
GRAIN MEAN DM%	89.6		

STRAW TONNES/HECTARE

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

TREATMNT	
F (Fd)	4.27
F (Ln, Lc6)	4.54
St (St)	4.39
CC (Gm, Lc8)	4.52
Co (Pt, Lc8)	2.60
Dg10 (Fs)	4.45
Dg25 (Dg)	2.64
Mean	3.92

STRAW MEAN DM% 92.7

PLOT AREA HARVESTED 0 005290