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Results of the Classical and Other Long-term Experiments 2005

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05/W/RN/12 - Organic Manuring

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05/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.

Sponsors: P.R. Poulton and A.J. Macdonald.

The 41st year, w. beans.

For previous years see 'Details' 1973 and 74-04/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.

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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.

In 2004 all plots, except Lc (permanent grass/clover), split into 6 at random and the following nitrogen range applied as Nitro-chalk:

N0, 1, 2, 3, 4, 5 as 0, 35, 70, 105, 140, 175 kg N.

Note, no nitrogen was applied to the bean crop in 2005.

Experimental diary:

09-Sep-04	: T :	: Chopped straw applied at 7.5 t to St plots.
11-Nov-04	: B :	: Glyphosate 360 at 4.0 l in 200 l.
17-Nov-04	: T :	: Compost applied at 40 t to CO plots.
	: T :	: FYM applied at 25 t to Dg25 plots and at 10 t to Dg10 plots.
23-Nov-04	: B :	: Clipper broadcast at 30 seeds/m ² , to bean plots.
24-Nov-04	: B :	: Ploughed 35cm wide furrows, to bean plots.
07-May-05	: T :	: Sulphate of Potash at 200 kg (not to Dg25).
	: T :	: Triple Superphosphate at 97.5 kg (not to Dg25).
11-May-05	: B :	: tm)Bravo 500 at 1.0 l in 200 l to bean plots.
	: B :	: tm)Folicur at 0.5 l in 200 l to bean plots.
	: B :	: tm)Hallmark with Zeon Technology at 0.75 l in 200 l to bean plots.
13-Jul-05		: 1 st cut yield strips Lc plots only, weighed and sampled.
01-Aug-05	: T :	: Topped, Lc plots only.
03-Sep-05	: T :	: Combine harvested, bean plots for yield, swathed straw.
03-Sep-05	: T :	: Combine harvested discards, swathed straw.
08-Sep-05	: T :	: Baled straw.
20-Dec-05		: 2 nd cut yield strips Lc plots only, weighed and sampled.
21-Dec-05		: Discards mown and cuttings removed.

NOTE: Samples of grain were taken for chemical analysis.

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GRAIN TONNES/HECTARE

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

TREATMNT	
F (Fd)	1.28
F (Ln, Lc6)	1.90
St (St)	1.74
CC (Gm, Lc8)	1.56
Co (Pt, Lc8)	2.01
Dg10 (Fs)	1.41
Dg25 (Dg)	1.20
Mean	1.59

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

TREATMNT
0.346

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

Stratum	d.f.	s.e.	cv%
Blocks.Plots	18	0.489	30.8

GRAIN MEAN DM% 87.2

PLOT AREA HARVESTED 0.00619