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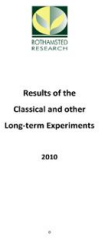
Yields of the Field Experiments 2010



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W/RN/12 Organic Manuring

Rothamsted Research

Rothamsted Research (2011) *W/RN/12 Organic Manuring ;* Yields Of The Field Experiments 2010, pp 44 - 47 **- DOI: https://doi.org/10.23637/ERADOC-1-220**

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10/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: A. J. Macdonald

The 46th year winter beans

For previous years see 'Details' 1973 and Yield Books for 74-09/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 on 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. **Treatment** (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.

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

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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.

Nitrogen
In 2008 all plots, except Lc (permanent grass/clover), split into 6 to test rates of N. For crops receiving nitrogen rates rotate as follows:
N0 > N1 > N2 > N3 > N4 > N5 > N0 etc.

For 2009 s. barley crop nitrogen rates (kg N/ha) were:
0, 35, 70, 105, 140, 175 as nitro-chalk (27% N).
No N was applied to the beans in 2010

Experimental Diary

			Rate	Unit
11-Sep-09	a	Load straw	7.50	t/ha
21-Sep-09	p	Nufosate Ace - 200 lt water	4.00	l/ha
09-Nov-09	f	Chalk	5.00	t/ha
	a	Spread straw		
11-Nov-09	f	Chalk - Finished	5.00	t/ha
	a	Spread straw		
28-Jan-10	a	Compost - Co plots	40.00	t/ha
02-Feb-10	a	FYM - Dg, 10 plot	10.00	t/ha
03-Feb-10	a	FYM - DG, 25 plot	25.00	t/ha
08-Mar-10	a	Plough - Bean plots		
09-Mar-10	s	Fuego	42.00	s/m2
	a	Combination Drilled		
17-Mar-10	p	Skirmish - 200 lt water on Beans	1.00	l/ha
23-Apr-10	a	Harrowed		
24-Apr-10	s	Fuego	32.00	seeds/m2
	a	Combination Drilled		
26-May-10	a	Baled - Ley plots		
24-Jun-10	a	Cut harvest strips, weighed and sampled - Ley plots		
09-Sep-10	a	Combine harvest, plots for yield		
22-Sep-10	a	Baled - removed		
10-Oct-10	a	Other operation - straw treatments applied as scheduled, chopped and spread		
11-Oct-10	f	compost - as scheduled		
	f	FYM - as scheduled		

Note: Beans re-drilled due to severe damage by crows

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BEAN GRAIN TONNES/HECTARE

***** Table of means *****

Treatment	
F(Fd)	0.70
F(Ln, Lc6)	1.01
st(st)	0.76
CC(Gm, Lc8)	0.86
Co(Pt, Lc8)	1.21
Dg 10 (Fs)	0.87
Dg 25 (Dg)	1.35
Mean	0.96

GRAIN TONNES/HECTARE

Standard errors of differences of means

Table	Treatment
rep	4
d.f.	18
s.e.d.	0.192

Stratum standard errors and coefficients of variations

Stratum	d.f	se	cv%
Block plots	18	0.272	28.2

Grain mean dm% 81.3

Plot area harvested 0.00619

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GRASS/CLOVER

DRY MATTER TONNES/HECTARE

***** Table of means *****

Year	1st Cut	2nd Cut	Total
2003	-	-	-
2004	1.82	-	1.82
2005	1.86	0.13	1.99
2006	4.07	-	4.07
2007	3.12	1.36	4.48
2008	5.72	1.65	7.37
2009	4.77	-	4.77
2010	4.41	-	4.41

Cut dry matter t/ha (24/6/10)

Note: See previous Yield Books (2004-09) for cutting dates

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