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Yields of the Field Experiments 2012

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R/EX/4 Exhaustion Land

Rothamsted Research

Rothamsted Research (2013) *R/EX/4 Exhaustion Land ;* Yields Of The Field Experiments 2012, pp 24 - 28 **- DOI: https://doi.org/10.23637/ERADOC-1-222**

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12/R/EX/4

EXHAUSTION LAND

Object: To study the residual effects of manures applied 1856 - 1901, and of additional phosphate applied since 1986 (P test) and of additional potassium since 2007 (K test); on the yield of continuous s. barley up to 1991, w. wheat since – Hoosfield.

The 157th year, w. wheat.

For previous years see 'Details' 1977, 1973 and Yield Books for 74-11/R/EX/4

Treatments: All combinations of:-

Whole plots (P test)

1. **OLD RES** Residues of manures applied annually 1876 – 1901:

O	None
D	Farmyard manure at 35 t
N	96 kg N as ammonium salts
P	34 kg P as superphosphate
NPKNAMG	N and P as above plus 137 kg K as sulphate of potash, 16 kg Na as sulphate of soda, 11 kg Mg as sulphate of magnesia

2. **P** Maintenance P (20 kg P) applied annually from 2000 to maintain existing levels of available P In the soil. (P1) (P2) and (P3) are residues of P applied annually 1986–1992:

	2000-12	1986-92
O	None	None
P (P1)	20 kg P	44 kg P
P (P2)	20 kg P	87 kg P
P (P3)	20 kg P	131 kg P

NOTE: P treatments were applied at 61.5 kg P in error in 2000.

Plus

Whole plots (K test, previously N test until 1991

1. OLD RES Residues of manures applied annually 1876 – 1901:

O	None
D	Farmyard manure at 35 t
N*	96 kg N as nitrate of soda
PK	34 kg P as superphosphate, 137 kg K as sulphate of potash
N*PK	N, P and K as above

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2. K Potassium applied annually from 2007 as muriate of potash

O	None
K1	75 kg K_2O (62.2 kg K)
K2	150 kg K_2O (124.5 kg K)

Whole plots
Nitrogen: 50 kg N as ammonium sulphate (to supply sufficient S) during first two weeks in March, 200 kg N as ammonium nitrate at GS31/mid-April (whichever comes first) and 50 kg N as ammonium nitrate at GS37 (not later than mid-May)

Experimental diary

Date		Application	Rate	Units
15-Aug-11	a	Combined for yields	-	
15-Aug-11	a	Straw weights	-	
29-Sep-11	f	Applied Triple Super Phosphate, as per plan.	-	
29-Sep-11	f	Applied Muriate of Potash, as per plan	-	
30-Sep-11	a	Applied Chalk, as per plan		
		Plots 022,024,074.	2	t/ha
		Plots 011,023,044,061,062,063,064, 071, 082,083,084,103.	4	t/ha
		Plots 021, 041,042,043, 051,054,081,101,102,104.	6	t/ha
03-Oct-11	a	Ploughed	-	
04-Oct-11	a	Cultipressed	-	
12-Oct-11	a	Rolled	-	
14-Oct-11	p	Sprayed Liberator in 200l/ha of water	0.6	l/ha
16-Mar-12	f	Applied Ammonium Sulphate Fertiliser	238	kg/ha
22-Mar-12	p	Sprayed Cherokee SE and Justice in 200l/ha	Ch1.0 Ju 0.125	l/ha
11-Apr-12	f	Applied Nitram Feriliser	580	kg/ha
05-May-12	p	Sprayed AllyMax, Bravo 500, Tracker, Agriguard and Starane in 200l/ha of water	Al@ 42* Br@ 1.0 Tr@ 1.0 Ag@ 2.25 St@0.5	*g/ha l/ha
05-May-12	p	Sprayed AllyMax, Bravo 500, Tracker, Agriguard and Starane 2 in 200 l/ha of water	Al@ 42*, Br@ 1.0, Tr@ 1.0, Ag@ 2.25, St@0.5	*g/ha l/ha
17-May-12	a	Cut Paths	-	
17-May-12	f	Applied Nitram	145	kg/ha
23-May-12	p	Sprayed Comet, Bravo 500 and Opus	Co@0.6 Br@1.0 Op@0.8	l/ha
13-Jun-12	p	Sprayed w/ Amistar and Prosaro in 100l/ha of water	Am@0.3 P@0.7	l/ha
14-Jun-12	a	Cut paths	-	
20-Jun-12	a	Cut Paths	-	

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06-Aug-12	a	Cut Paths	-	
07-Aug-12	p	Sprayed w/ Samurai	3	l/ha
23-Aug-12	a	Harvested.	-	
24-Aug-12	a	Harvested O+E's	-	
24-Aug-12	a	Sampled Baled and Weighed	-	
20-Sep-12	p	Sprayed Whole field w/ Weedazol EW	20	l/ha
28-Sep-12	f	Spread Muriate of Potash - plots 103,83,63,43,23	125	kg/ha
28-Sep-12	f	Spread Muriate of Potash - plots 104-94,87-73,64-54,44-34,24-14	250	kg/ha
28-Sep-12	f	Spread TSP as on sheet on plots 101-93,81-73,61-53,41-33,21-13	75	kg/ha

NOTE: Samples of grain and straw were taken for chemical analysis.

P TEST

Grain tonnes/hectare

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

P_RES	O	P1	P2	P3	Mean
OLD_RES					
O	2.43	7.22	8.36	8.72	6.68
D	4.94	8.66	8.66	8.64	7.72
N	1.43	7.78	8.21	8.45	6.47
P	3.64	8.23	8.42	8.77	7.26
NPKNAMG	3.45	8.02	8.60	8.52	7.15
Mean	3.18	7.98	8.45	8.62	7.06

Grain mean DM% 86.5

Plot area harvested 0.00538

Straw tonnes/hectare

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

P_RES	O	P1	P2	P3	Mean
OLD_RES					
O	1.61	4.01	5.18	5.73	4.13
D	2.89	5.21	6.49	6.41	5.25
N	0.97	4.51	4.95	5.43	3.96
P	2.09	4.79	5.21	5.87	4.49
NPKNAMG	2.22	4.19	5.08	6.03	4.38
Mean	1.96	4.54	5.38	5.89	4.44

Straw mean DM% 86.3

Plot area harvested 0.00538

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K TEST

Grain tonnes/hectare

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

K_Test	K0	K1	K2	Mean
OLD_RES				
O	6.23	8.03	8.51	7.25
D	6.43	7.91	8.35	7.28
N*	6.53	8.27	8.36	7.42
PK	7.48	8.53	8.65	8.03
N*PK	6.86	8.35	8.49	7.64
Mean	6.70	8.22	8.47	7.53

Standard errors of differences of means

Table	OLD_RES	K_Test	OLD_RES K_Test	
s.e.d.		0.316	0.707	min.rep
	0.354	0.274	0.612	max-min

Grain mean DM% 86.6

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K TEST

Straw tonnes/hectare

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

K_Test OLD_RES	K0	K1	K2	Mean
O	4.00	5.74	5.71	4.86
D	5.15	6.51	6.66	5.87
N*	4.79	5.63	5.94	5.29
PK	5.69	6.32	6.37	6.02
N*PK	4.58	5.65	6.13	5.24
Mean	4.84	5.97	6.16	5.45

Standard errors of differences of means

Table	OLD_RES	K_Test	OLD_RES K_Test	
s.e.d.		0.217	0.486	min.rep
	0.243	0.188	0.421	max-min
		0.154X	0.344	max.rep

Stratum standard errors and coefficients of variation
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Straw85% Straw (at 85% dry matter) tonnes/hectare

Stratum	d.f.	s.e.	cv%
Blocks.Plots	5	0.344	6.3

Straw mean DM% 88.6

Plot area harvested 0.005

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