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Yields of the Field Experiments 2014

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R/EX/4 Exhaustion Land

Rothamsted Research

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14/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 159th year, w. wheat.

For previous years see 'Details' 1977, 1973 and Yield Books for 74-12/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. In 2009 maintenance P applications were changed from 20 kg P/ha to 15 kg P/ha. This was not recorded in the yield books for 2009-13. (P1) (P2) and (P3) are residues of P applied annually 1986–1992:

	2009-Present	2000-08	1986-92
O	None	None	None
P (P1)	15 kg P	20 kg P	44 kg P
P (P2)	15 kg P	20 kg P	87 kg P
P (P3)	15 kg P	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
30-Sep-13	f	Applied MOP Fertiliser - Plots 023, 043, 063, 083, 103	125	kg/ha
30-Sep-13	f	Applied MOP Fertiliser - Plots 011, 012, 013, 014, 024, 031, 032, 033, 034, 044, 051, 052, 053, 054, 064, 071, 072, 073, 074, 084, 091, 092, 093, 094, 104	250	kg/ha
30-Sep-13	f	Applied TSP - All Plots except Plots 014, 034, 054, 074, 094	75	kg/ha
01-Oct-13	a	Topping	-	-
02-Oct-13	a	Applied Chalk - Plots 013, 014, 041, 043, 051, 054, 072	2	t/ha
02-Oct-13	a	Applied Chalk - Plots 021, 042, 044, 081, 071, 074, 091, 102, 104	4	t/ha
02-Oct-13	a	Applied Chalk - Plots 011, 012, 022, 023, 024, 031, 052, 053, 061, 062, 063, 064, 082, 083, 084, 101, 103	6	t/ha
09-Oct-13	a	Ploughed	-	-
10-Oct-13	a	Cultipressed	-	-
18-Oct-13	s	Drilled All Plots - var. Xi19	400	seeds/m^2
27-Nov-13	p	Applied Major Slug Pellets	4	kg/ha
27-Nov-13	p	Sprayed Hallmark	50	ml/ha
27-Nov-13	p	Sprayed Liberator	600	ml/ha
27-Nov-13	p	Sprayed Stomp	1.7	l/ha
10-Mar-14	f	Applied sulphate of ammonia - All Plots	238	kg/ha
01-Apr-14	f	Applied Nitram Fertilizer - All Plots	580	kg/ha
03-Apr-14	p	Sprayed Artemis	1.0	l/ha
03-Apr-14	p	Sprayed Bravo 500	1.0	l/ha
03-Apr-14	p	Sprayed BASF 3C 720	1.75	l/ha
09-Apr-14	f	Applied Kieserite - All Plots	80	kg/ha
28-Apr-14	p	Sprayed Kingdom	1.25	l/ha
28-Apr-14	p	Sprayed Bravo 500	1.0	l/ha
13-May-14	f	Applied Nitram - All Plots	145	kg/ha
16-May-14	p	Sprayed Simba	30	g/ha
16-May-14	p	Sprayed Vortex	1.5	l/ha

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06-Jun-14	p	Sprayed Cello	550	ml/ha
25-Jun-14	a	Rotavated Fallow Areas (discard surrounds)	-	-
31-Jul-14	a	Cut Paths - in and around experiment	-	-
19-Aug-14	a	Claas Harvested OE's	-	-
21-Aug-14	a	Sampo - Harvested All Plots	-	-
24-Aug-14	a	Sampled, Baled and Weighed Straw - all plots	-	-
04-Sep-14	a	Claas Combine - Harvesting Leftover Wheat from Trial	-	-

Note: Samples of grain and straw were taken for chemical analysis. The yield strips on plots 031, 034, 071, 074, 091 & 094 were made smaller this year to avoid areas where the crop had already been sampled by S. McGrath et al.

P TEST

Grain tonnes/hectare

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

P_RES	O	P1	P2	P3	Mean
OLD_RES					
O	3.63	7.34	7.91	8.06	6.74
D	6.36	8.43	8.80	8.80	8.10
N	2.79	8.33	8.32	8.65	7.02
P	6.89	8.68	8.83	9.01	8.35
NPKNAMG	5.45	8.41	8.71	9.73	8.07
Mean	5.02	8.24	8.51	8.85	7.66

Grain mean DM% 86.0

Straw tonnes/hectare

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

P_RES	O	P1	P2	P3	Mean
OLD_RES					
O	2.24	4.55	4.98	4.98	4.19
D	3.28	4.90	5.33	5.56	4.77
N	1.76	4.81	5.13	5.22	4.23
P	3.56	4.88	5.07	5.62	4.78
NPKNAMG	3.34	5.08	5.17	6.02	4.90
Mean	2.83	4.85	5.14	5.48	4.57

Straw mean DM% 91.0

Plot area harvested 0.00538, 0.00252.

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K TEST

Grain tonnes/hectare

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

K_Test	K0	K1	K2	Mean
OLD_RES				
O	7.93	9.11	9.41	8.60
D	8.56	10.01	9.84	9.25
N*	8.27	9.17	9.17	8.72
PK	9.16	9.57	9.45	9.34
N*PK	8.88	9.99	10.11	9.47
Mean	8.56	9.57	9.60	9.07

Grain mean DM% 86.2

Straw tonnes/hectare

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

K_Test	K0	K1	K2	Mean
OLD_RES				
O	3.97	5.31	5.55	4.70
D	4.34	5.55	5.84	5.02
N*	4.38	5.43	5.61	4.95
PK	5.13	5.29	5.46	5.25
N*PK	4.53	5.39	5.59	5.01
Mean	4.47	5.39	5.61	4.99

Straw mean DM% 90.9 Plot area harvested 0.00538

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