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Yields of the Field Experiments 2013

Full Table of Content

R/EX/4 Exhaustion Land

Rothamsted Research

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13/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 158th 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. (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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13/R/EX/4

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
20-Sep-12	p	Sprayed Whole field w/ Weedazol EW	20	l/ha
28-Sep-12	f	Spread MOP Fertilizer on plots - 103,83,63,43,23	125	kg/ha
28-Sep-12	f	Spread MOP Fertilizer as on sheet on 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
15-Oct-12	a	Drilled WW Xi19	400	seeds m^2
15-Nov-12	p	Sprayed Liberator and PDM, also o+e's at each end of EX/4	Li@0.6 PDM@2.7	l/ha l/ha
15-Nov-12	p	Spread Slug Pellets (Gusto)	5	kg/ha
11-Mar-13	f	Applied Kieserite	80	kg/ha
12-Mar-13	f	Applied Ammonium Sulphate Fertiliser	238	kg/ha
25-Apr-13	f	Applied Nitram	580	kg/ha
16-May-13	p	Sprayed AllyMax, Kingdom, Bravo500, NewCycocel, HatchetExtra	AM@42 Ki@1.25 Br500@1.0 NCy@2.0 Hat@1.0	g/ha l/ha l/ha l/ha l/ha
21-May-13	f	Applied Nitram	145	kg/ha
06-Jun-13	p	Sprayed Ingite and Comet	ign@1.2 com@0.4	l/ha l/ha
18-Jun-13	p	Sprayed Cello	0.55	l/ha
19-Jun-13	a	Cut Paths	—	—
04-Jul-13	a	Cut Paths	—	—
19-Jul-13	a	Cut Paths.	—	—
12-Aug-13	a	Claas - Harvested	—	—
13-Aug-13	a	Sampo - Harvested	—	—
13-Aug-13	a	baled weighed and sampled plots	—	—
20-Aug-13	a	Claas - Harvested, OE's	—	—

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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	1.83	4.32	4.45	5.45	4.01
D	3.24	5.49	6.00	5.87	5.15
N	0.89	4.78	5.15	5.81	4.16
P	3.24	5.25	6.10	6.05	5.16
NPKNAMG	3.60	5.35	5.83	6.64	5.35
Mean	2.56	5.04	5.51	5.96	4.77

Grain mean DM% 86.3

Straw tonnes/hectare

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

P_RES	O	P1	P2	P3	Mean
OLD_RES					
O	0.51	2.21	2.17	2.98	1.97
D	0.80	2.72	3.25	3.47	2.56
N	0.29	2.07	2.32	2.65	1.83
P	1.15	2.55	2.85	3.36	2.47
NPKNAMG	1.24	2.46	3.26	4.01	2.74
Mean	0.80	2.40	2.77	3.29	2.32

Straw mean DM% 87.1

Plot area harvested 0.00538, 0.00252.

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13/R/EX/4

K TEST

Grain tonnes/hectare

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

K_Test OLD_RES	K0	K1	K2	Mean
O	4.99	6.10	6.51	5.64
D	5.89	6.59	6.76	6.28
N*	4.92	5.26	5.93	5.26
PK	6.04	6.57	6.67	6.33
N*PK	5.58	6.45	7.06	6.17
Mean	5.48	6.19	6.59	5.94

Grain mean DM% 88.1

Straw tonnes/hectare

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

K_Test OLD_RES	K0	K1	K2	Mean
O	1.92	2.66	2.83	2.34
D	2.38	3.15	3.27	2.80
N*	1.67	2.23	2.45	2.01
PK	2.81	3.06	2.82	2.87
N*PK	2.36	3.47	3.39	2.89
Mean	2.23	2.91	2.95	2.58

Straw mean DM% 92.4 Plot area harvested 0.00538

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