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# Yields of the Field Experiments

[Full Table of Content](#)



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## 19/R/EX/4 - Exhaustion Land (Hoosfield)

### Rothamsted Research

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## 19/R/EX/4 EXHAUSTION LAND (Hoosfield)

**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 spring barley up to 1991, winter wheat since – Hoosfield.

The 164<sup>th</sup> year, winter wheat.

For previous years see 'Details' 1977, 1973 and Yield Books for 74-18/R/EX/4

**Treatments:** All combinations of:

Whole plots (P test)

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

Main plot

01	O	None
03	D	Farmyard manure at 35 t
05	N	96 kg N as ammonium salts
09	P	34 kg P as superphosphate
07	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. From 2016 onward P was withheld from the P(P1) sub-plots.

1986–1992:

	2016-Present	2009-2015	2000-08	1986-92
O	None	None	None	None
P (P1)	None	15 kg P	20 kg P	44 kg P
P (P2)	15 kg P	15 kg P	20 kg P	87 kg P
P (P3)	15 kg P	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:

Main Plot

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

Results of the Classical and other Long-term Experiments 2019

19/R/EX/4

2.	K	Potassium applied annually from 2007 as muriate of potash
	O	None (2 sub-plots within each treatment strip)
	K1	75 kg K <sub>2</sub> O (62.2 kg K)
	K2	150 kg K <sub>2</sub> O (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	Unit
06/09/2018	p	Sprayed Buffalo Elite	1	lt/ha
06/09/2018	p	Sprayed Samurai	2.5	lt/ha
07/09/2018	f	Applied Chalk - to plots 011, 012, 013, 023, 024, 031,034, 041, 043, 052, 054, 081, 084, 091, 104	2	t/ha
07/09/2018	f	Applied Chalk - to plots 022, 044, 053, 061, 062, 063, 064, 071, 073, 074, 082, 083, 101, 102, 103	4	t/ha
19/09/2018	f	Applied TSP - to all P plots	75	kg/ha
19/09/2018	f	Applied MOP - to plots 023, 043, 063, 083, 103	125	kg/ha
19/09/2018	f	Applied MOP - to plots 011-014, 024, 031-034, 044, 051-054, 064, 071-074, 084, 091-094, 104	250	kg/ha
20/09/2018	a	Ploughed Trials and Surrounds - thrown North	-	-
29/09/2018	a	Watkins Pressed All Ploughing	-	-
05/10/2018	s	Drilled Crusoe, trt. Beret Gold/Deter	350	sm <sup>2</sup>
05/10/2018	p	Sprayed Pontos - Winter Wheat	1	lt/ha
05/10/2018	p	Sprayed Firestorm - Winter Wheat	300	ml/ha
05/10/2018	p	Sprayed Velomax - Winter Wheat	400	ml/ha
05/10/2018	a	Flexicoil Rolled new drilling	-	-
21/11/2018	p	Sprayed Hallmark	50	ml/ha
26/03/2019	f	Applied Ammonia Sulphate (21%N, 60% SO <sub>3</sub> )	238	kg/ha
27/03/2019	p	Sprayed Deacon	625	ml/ha
27/03/2019	p	Sprayed Stefes720	1.25	lt/ha
27/03/2019	p	Sprayed Moddus	150	ml/ha
27/03/2019	p	Sprayed Bravo500	1	lt/ha
10/04/2019	f	Applied Nitram (34.5%)	580	kg/ha
13/05/2019	f	Applied Nitram (34.5%)	145	kg/ha

Results of the Classical and other Long-term Experiments 2019

19/R/EX/4

21/05/2019	f	Applied Kieserite to all plots	80	kg/ha
06/06/2019	p	Sprayed Clayton Tebuconazole	500	ml/ha
06/06/2019	p	Sprayed Vortex	1.25	lt/ha
29/07/2019	a	Topped plot ends	-	-
05/09/2019	a	Harvested all plots	-	-
06/09/2019	a	Straw weights	-	-
07/09/2019	a	Harvested Commercial Area	-	-

## Yields

### P TEST

Grain Yield, tonnes/hectare

*Tables of means*

P_RES	O	(P1)	(P2)	(P3)	Mean
OLD_RES					
O	1.07	4.25	6.64	7.48	4.86
D	2.47	7.33	9.24	8.97	7.00
N	1.30	4.16	6.81	7.91	5.05
P	2.42	7.15	8.89	8.81	6.82
NPKNAMG	2.26	6.02	8.21	9.00	6.37
Mean	1.90	5.78	7.96	8.43	6.02

Grain mean DM% 86.3

Straw Yield, tonnes/hectare

*Tables of means*

P_RES	O	(P1)	(P2)	(P3)	Mean
OLD_RES					
O	0.48	1.59	2.64	2.72	1.86
D	1.68	3.07	4.40	3.53	3.17
N	0.79	2.35	2.64	2.81	2.15
P	1.09	2.17	2.99	3.05	2.33
NPKNAMG	1.52	2.26	3.20	3.53	2.63
Mean	1.11	2.29	3.17	3.13	2.43

Straw mean DM% 95.7

Plot area harvested 0.00512.

Results of the Classical and other Long-term Experiments 2019

19/R/EX/4

**K TEST**

Grain Yield, tonnes/hectare

*Tables of means*

K_Test	K0	K1	K2	Mean
OLD_RES				
O	6.29	8.30	8.55	7.36
D	6.83	9.44	8.98	8.02
N*	5.52	8.32	8.24	6.90
PK	8.66	9.13	9.57	9.01
N*PK	7.65	8.87	9.49	8.41
Mean	6.99	8.81	8.96	7.94

Grain mean DM% 86.5

Straw Yield, tonnes/hectare

*Tables of means*

K_Test	K0	K1	K2	Mean
OLD_RES				
O	1.98	2.83	3.24	2.51
D	2.31	3.94	3.85	3.10
N*	1.90	2.97	2.99	2.44
PK	2.86	3.11	3.27	3.03
N*PK	2.49	3.16	4.08	3.06
Mean	2.31	3.20	3.49	2.83

Straw mean DM% 95.40

Plot area harvested 0.00512