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Yields of the Field Experiments 2020

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20/R/EX/4 Exhaustion Land (Hoosfield)

Rothamsted Research

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20/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 165th year, winter wheat.

For previous years see 'Details' 1977, 1973 and Yield Books for 74-19/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

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

O	None (2 sub-plots within each treatment strip)
K1	75 kg K2O (62.2 kg K)
K2	150 kg K2O (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
18/09/2019	f	Applied triple superphosphate; Plots 011, 012, 021- 024, 031, 032, 041-044, 051, 052, 061-064, 071, 072, 081-084, 091, 092, 101-104; JD6930 with Cascade Spreader	75	kg/ha
18/09/2019	f	Applied muriate of potash; Plots 023, 043, 063,083, 103; JD6930 with Cascade Spreader	125	kg/ha
18/09/2019	f	Applied muriate of potash; Plots 011-014, 024, 031-034, 044, 051-054, 064, 071-074,084, 091-094, 104; JD6930 with Cascade Spreader	250	kg/ha
26/09/2019	a	Ploughing; Thrown S; KV Five Furrow Plough with NHT7210	-	-
27/09/2019	a	Press ploughing; JD6145R with Philip Watkins Press	-	-
23/03/2020	a	Cultivation; JD6830 with Bomford Flexitine	-	-
24/03/2020	s	Drilled spring wheat, var: Tybalt; JD6830 with Accord Combination Drill No. 4	350	seeds/m2
15/05/2020	p	Sprayed Axial Pro; NH T6030 with Knight Sprayer	0.6	l/ha
15/05/2020	p	Sprayed Cello; NH T6030 with Knight Sprayer	1	l/ha
15/05/2020	p	Sprayed Presite SX; NH T6030 with Knight Sprayer	60	g/ha
15/05/2020	p	Sprayed Starane; NH T6030 with Knight Sprayer	0.4	l/ha
15/05/2020	p	Sprayed Stefes CCC 72; NH T6030 with Knight Sprayer	1	l/ha
20/05/2020	f	Applied ammonium sulphate (21% N 60% SO3); JD6930 with Cascade Spreader	238	kg/ha
08/06/2020	f	Applied Nitram (34.5% N); JD6930 with Cascade Spreader	580	kg/ha
11/06/2020	f	Applied Nitram (34.5% N); JD6930 with Cascade Spreader	145	kg/ha

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26/06/2020	f	Applied Kieserite; JD6930 with Cascade Spreader	80	kg/ha
26/06/2020	p	Sprayed Cello; NH T6030 with Knight Sprayer	1	l/ha
26/06/2020	p	Sprayed Envoy; NH T6030 with Knight Sprayer	0.2	l/ha
07/09/2020	a	Harvest Plots; Haldrup C-85	-	-
07/09/2020	a	Harvest odds and ends; Haldrup C-85	-	-
09/09/2020	a	Baled off all straw; JD6230 with Claas Baler	-	-
10/09/2020	a	Straw Weights; Tym T503 with New Holland Baler	-	-

Yields

P TEST

Grain Yield, tonnes/hectare

Tables of means

P_RES OLD_RES	O	(P1)	(P2)	(P3)	Mean
O	1.61	2.83	3.23	3.49	2.79
D	2.36	4.09	4.89	4.62	3.99
N	1.37	2.61	3.60	4.10	2.92
P	2.53	4.03	5.07	4.60	4.06
NPKNAMG	1.88	3.49	4.33	4.17	3.47
Mean	1.95	3.41	4.22	4.20	3.45
Grain mean DM%	84.2				

Straw Yield, tonnes/hectare

Tables of means

P_RES OLD_RES	O	(P1)	(P2)	(P3)	Mean
O	0.56	0.93	1.04	0.98	0.88
D	0.76	1.22	1.39	1.34	1.18
N	0.40	0.82	1.02	1.01	0.81
P	1.22	1.08	1.45	1.23	1.25
NPKNAMG	0.71	0.99	1.16	1.14	1.00
Mean	0.73	1.01	1.21	1.14	1.02
Straw mean DM%	96.2				

Plot area harvested 0.00512 ha.

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K TEST

Grain Yield, tonnes/hectare

Tables of means

K_Test	K0	K1	K2	Mean
OLD_RES				
O	3.59	4.37	4.44	4.00
D	4.69	5.45	4.76	4.90
N*	3.63	3.99	4.24	3.87
PK	4.58	4.12	4.46	4.44
N*PK	4.27	4.41	4.44	4.35
Mean	4.15	4.47	4.47	4.31
Grain mean DM%	84.2			

Straw Yield, tonnes/hectare

Tables of means

K_Test	K0	K1	K2	Mean
OLD_RES				
O	1.14	0.97	1.26	1.13
D	1.21	1.61	1.46	1.38
N*	0.78	0.93	1.04	0.88
PK	1.12	0.99	1.12	1.09
N*PK	1.04	1.24	1.34	1.16
Mean	1.06	1.15	1.24	1.13
Straw mean DM%	96.5			

Plot area harvested 0.00512 ha

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