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Yields of the Field Experiments 2010



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R/EX/4 Exhaustion Land

Rothamsted Research

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EXHAUSTION LAND

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

The 155th year, w. wheat.

For previous years see 'Details' 1977, 1973 and Yield Books for 74-09/R/EX/4

Treatments: All combinations of:-

Whole plots (P test)

1.	OLD RES	Residues of manures applied annually 1876 – 1901:			
	o D N P NPKNAMG	None Farmyard manure at 35 t 96 kg N as ammonium salts 34 kg P as superphosphate 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.	Ρ	Maintenance P (20 kg P) applied annually from 20 to maintain existing levels of available P In the so (P1) (P2) and (P3) are residues of P applied annu 1986–1992:			
	O P (P1) P (P2) P (P3)	2000-10 None 20 kg P 20 kg P 20 kg P	1986-92 None 44 kg P 87 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:
0	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

2. K	Potassium applied annually from 2007 as muriate of potash							
O K1 K2	None 75 kg K₂O (62.2 kg K) 150 kg K₂O (124.5 kg K)							
Whole plots Nitrogen:								
Experimenta	al dia	ary						
K Test			Rate	Unit				
29-Sep-09	f	Basal P (triple superphosphate) – plots 02, 04, 06, 08 and 10	75.00	kg/ha				
	f	Muriate of Potash, plots 23, 43, 63, 83 & 103	125.00	kg/ha				
	f	Muriate of Potash, plots 24, 44, 64, 84, 104	250.00	kg/ha				
P Test			Rate	Unit				
29-Sep-09	f	Triple Superphosphate – plots 011 – 013, 031 –	75.00	kg/ha				
	f	033, 051 – 053, 071 – 073 and 091- 093		•				
	I	Muriate of Potash, plots 01,03, 05, 07 & 09	250.00	kg/ha				
All Plots			Rate	Unit				
29-Sep-09	а	Spread fertiliser						
30-Sep-09	а	Plough						
01-Oct-09	а	Cultipressed						
02-Oct-09	а	Cultipressed - Second time						
05-Oct-09	а	Combination Drilled						
	S	Drilled Xi19 – at 350 seeds per m ²	166.00	kg/ha				
	р	Liberator -200 It water	0.60	l/ha				
19-Mar-10	f	Sulphate of Ammonia - As indicated on plan	238.00	kg/ha				
06-Apr-10	f	Kieserite	80.00	kg/ha				
10-Apr-10	р	Cherokee - 146 I water	1.00	l/ha				
15-Apr-10	f	Nitram	580.00	kg/ha				
18-Apr-10	р	Attribut - 146 It water	100.00	g/ha				
	р	Amber - 146 It water	1.00	l/ha				
00.14- 40	р	Oxytril CM - 146 It water	1.00	l/ha				
06-May-10	р	Bravo 500 - 200 lt water	1.00	l/ha				
	р	Tracker - 200 It water	1.00	l/ha				
40 Mar 40	р	Chlormequat 3C - 200 It water	2.25	l/ha				
12-May-10	a	Mow / Rotavate paths	1.00	l/h e				
18-May-10	p	Tomahawk	1.00	l/ha l/ha				
10 Mov 10	p f	Cleancrop Gallifrey	1.00	l/ha kg/ba				
19-May-10	f	Nitram	145.00	kg/ha				

			Rate	Unit
02-Jun-10	р	Comet - 200 It water	0.60	l/ha
	р	Opus - 200 It water	0.60	l/ha
03-Jun-10	а	Rotavated paths		
17-Jun-10	а	Cut paths		
14-Jul-10	а	Mow / Rotavate paths		
31-Aug-10	а	Combine harvest, plots for yield		
	а	Sample, bale and weigh straw		
03-Sep-10	а	Combine harvest discards		
04-Sep-10	а	Baled		

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

P TEST

GRAIN TONNES/HECTARE

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

P_RES	0	P(P1)	P(P2)	P(P3)	Mean
OLD_RES					
0	2.27	5.74	6.48	7.14	5.41
D	4.14	7.26	7.80	7.59	6.70
N	1.61	6.71	7.73	7.94	6.00
Р	4.45	7.38	8.15	7.57	6.89
NPKNAMG	3.80	6.95	7.68	8.49	6.73
MEAN	3.25	6.81	7.57	7.75	6.34

GRAIN MEAN DM% 85.9%

STRAW TONNES/HECTARE

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

P_RES OLD RES	0	P1	P2	P3	MEAN
0	0.82	2.54	3.37	3.52	2.56
D	2.12	3.81	4.31	3.97	3.55
Ν	0.84	3.25	3.87	3.80	2.94
Р	1.93	3.71	4.19	4.33	3.54
NPKNAMG	2.17	3.67	3.93	4.18	3.49
MEAN	1.58	3.40	3.93	3.96	3.22
STRAW MEAN DM%	93.5%				

K TEST

GRAIN TONNES/HECTARE

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

K_TEST OLD RES	KO	K1	K2	Mean
0	7.43	7.93	7.85	7.66
D	7.62	8.02	8.01	7.82
N*	7.88	7.87	8.36	8.00
PK	7.83	7.62	8.00	7.82
N*PK	7.59	7.88	8.59	7.91
MEAN	7.67	7.86	8.16	7.84

Standard errors of difference of means

	OLD_RES K Test	K_TEST	OLD_RES	Table
	unequal	unequal	4	rep.
	5	5	5	d.f.
min.rep	0.323	0.145		s.e.d.
max-min	0.280	0.125	0.162	
max.rep	0.229	0.102X		

(No comparisons in categories where s.e.d. marked with an X Grain mean dm% $\,\,$ 86.3 $\,$

STRAW TONNES/HECTARE

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

K_TEST OLD_RES	К0	K1	K2	Mean
0	3.85	4.54	4.15	4.10
D	3.96	4.36	4.30	4.14
N*	4.18	4.21	4.31	4.22
PK	4.41	3.94	4.36	4.28
N*PK	4.01	4.15	4.23	4.10
MEAN REP	4.08 10	4.24 5	4.27 5	4.17

Standard errors of difference of means

Table	OLD_RES	K_TEST	OLD_RES			
			K_Test			
rep.	4	unequal	unequal			
d.f.	5	5	5			
s.e.d.		0.206	0.460	min.rep		
	0.230	0.178	0.398	max-min		
		0.146X	0.325	max.rep		
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(No comparisons in categories where s.e.d. marked with an X Straw mean dm% 93.4