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# Results of the Classical and Other Long-term Experiments 2005

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## 05/R/EX/4 - Exhaustion Land

### Rothamsted Research

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05/R/EX/4

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 150th year, w. wheat.

For previous years see 'Details' 1977, 1973 and 74-04/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:

	2000-04	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)

- 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                                       |

Whole plots

Nitrogen: 50 kg N as ammonium sulphate (to supply sufficient S) during first two weeks in March, 200kg 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:**

K test:

29-Sep-04 : T : P : P basal:(triple superphosphate at 98 kg), plots 2, 4, 6, 8 & 10.

P test:

29-Sep-04 : T : K : K basal/124.5 kg (muriate of potash at 250 kg)\*, plots 1, 3, 5, 7 & 9.  
: T : P : P test:(triple superphosphate at 98 kg), plots 011-013, 031-033, 051-053, 071-073, & 091-093.

All plots

29-Sep-04 : B : : Ploughed 25 cm wide furrows.  
30-Sep-04 : B : : Cultipress.

05-Oct-04 : B : : Flexitined, combination drilled, Xi/19, tr. Sibutol  
 Secur at 350 seeds/m<sup>2</sup>.  
 : B : : Rolled.  
 25-Nov-04 : B : : tm)Hawk at 2.0 l in 200 l.  
 : B : : tm)Alpha iPU 500 at 2.5 l in 200 l.  
 : B : : tm)Nufarm Cropoil at 1.0 l in 200 l.  
 : B : : tm)Hallmark with Zeon Technology at 50 ml in 200 l.  
 15-Mar-05 : B : : Ammonium sulphate (21% N) at 238 kg  
 14-Apr-05 : B : : 34.5% N at 580 kg.  
 29-Apr-05 : B : : tm)Opus at 0.75 l in 200 l.  
 : B : : tm)Bravo 500 at 1.0 l in 200 l.  
 : B : : tm)Atlas Chlormequat 700 at 2.25 l in 200 l.  
 03-May-05 : B : : Ally SX at 30 g in 200 l.  
 10-May-05 : B : : 34.5% N at 145 kg.  
 15-May-03 : B : : tm)Bravo 500 at 1.0 l in 200 l.  
 : B : : tm)Opus at 0.75 l in 200 l.  
 : B : : tm)Starane 2 at 0.5 l in 200 l.  
 31-May-05 : B : : tm)Opus at 0.75 l in 200 l.  
 : B : : tm)Amistar Opti at 1.5 l in 200 l.  
 07-Jun-05 : B : : tm)Amistar at 0.3 l in 200 l.  
 : B : : tm)Folicur at 0.3 l in 200 l.  
 : B : : tm)Dursban 4 at 0.6 l in 200 l.  
 25-Jul-05 : B : : Rotavate down paths  
 16-Aug-05 : B : : Combine harvested, plots for yield, straw swathed.  
 17-Aug-05 : B : : Straw sampled and weighed.

\* this is wrongly entered for the 2001 - 2004 Yield Books which incorrectly stated that the basal K was 100 kg K.

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

**P TEST**

**GRAIN TONNES/HECTARE**

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

	P	O	P(P1)	P(P2)	P(P3)	Mean
<b>OLD_RES</b>						
O		4.35	9.80	9.75	9.50	8.35
D		7.85	9.98	9.61	9.42	9.21
N		4.85	9.57	10.37	9.35	8.53
P		7.84	10.18	10.35	9.55	9.48
NPKNAMG		6.59	9.44	9.49	9.79	8.83
Mean		6.30	9.79	9.91	9.52	8.88

GRAIN MEAN DM% 87.1

**STRAW TONNES/HECTARE**

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

	P	O	P(P1)	P(P2)	P(P3)	Mean
<b>OLD_RES</b>						
O		1.87	4.70	5.23	4.84	4.16
D		3.24	5.38	5.63	5.62	4.97
N		2.13	4.16	5.19	4.47	3.99
P		3.44	5.28	5.58	5.27	4.89
NPKNAMG		2.95	5.09	5.33	4.60	4.49
Mean		2.73	4.92	5.39	4.96	4.50

STRAW MEAN DM% 88.4

PLOT AREA HARVESTED 0.00538

05/R/EX/4

K TEST

GRAIN TONNES/HECTARE

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

OLD_RES	
O	6.31
D	6.72
N*	6.50
PK	7.79
N*PK	7.00
Mean	6.87

GRAIN MEAN DM% 87.7

STRAW TONNES/HECTARE

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

OLD_RES	
O	3.44
D	4.18
N*	3.51
PK	4.41
N*PK	3.62
Mean	3.83

STRAW MEAN DM% 89.7

PLOT AREA HARVESTED 0.00538