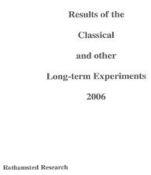
ROTHAMSTED RESEARCH

Results of the Classical and Other Long-term Experiments 2006



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Rothamsted Research

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06/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 151st year, w. wheat.

For previous years see 'Details' 1977, 1973 and 74-05/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:	
		2000-04	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, 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:

K test:

27-Sep-05 : **T** : P : P basal:(triple superphosphate at 98 kg), plots 2, 4, 6, 8 & 10.

P test:

27-Sep-05 : **T** : P : P test:(triple superphosphate at 98 kg), plots 011-013, 031-033, 051-053, 071-073, & 091-093.

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   28-Sep-05 : T : K    : K basal/124.5 kg (muriate of potash at 250 kg)*,
                          plots 1, 3, 5, 7 & 9.
All plots
   29-Sep-05 : B :      : Keiserite (30 kg Mg)
                          Ploughed 25 cm wide furrows.
   04-Oct-05 : B :      : Cultipress.
   07-Oct-05 : B :      : Cultipressed, combination drilled, Xi19, tr.
                            Redigo Twin at 350 seeds/m2, rolled.
   17-Oct-05 : B :      : Ice at 4.0 l in 200 l.
   05-Dec-05 : B :      : Hallmark with Zeon Technology at 50 ml in 200 l.
   13-Mar-06 : B :      : Ammonium sulphate (21% N) at 238 kg
   18-Apr-06 : B :      : 34.5% N at 580 kg.
   21-Apr-06 : B :      : tm)Opus at 0.75 l in 200 l.
             : B :      : tm)Bravo 500 at 1.0 l in 200 l.
             : B :      : tm)Flexity at 0.2 l in 200 l.
   17-May-06 : B :      : 34.5% N at 145 kg.
   21-May-06 : B :      : tm)Bravo 500 at 1.0 l in 200 l.
             : B :      : tm)Opus at 0.75 l in 200 l.
             : B :      : tm)Vivid at 0.4 l in 200l.
             : B :      : tm)Starane 2 at 0.75 l in 200 l.
             : B :      : tm)Ally Max SX at 42 g in 200 l.
   06-Aug-06 : B :      : Combine harvested discards, baled straw.
   23-Aug-06 : B :      : Combine harvested, plots for yield, straw swathed.
             : B :      : Straw sampled and weighed.
   25-Aug-06 : B :      : Combine harvested discards, swathed and baled
                          straw.
      * this is wrongly entered for the 2001 - 2004 Yield Books which
        incorrectly stated that the basal K was 100 kg K.
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NOTE: Samples of grain and straw were taken for chemical analysis.

NOTE:
STRAW DRY MATTER
Due to an error while weighing sub samples (fresh and dry) an average dry matter percent was calculated. The value was 87.8% (P TEST) and 87.7% (K TEST).

P TEST

GRAIN TONNES/HECTARE

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

P_RES / OLD_RES	0	P(P1)	P(P2)	P(P3)	Mean
0	1.74	7.88	8.34	8.01	6.49
D	4.72	8.85	8.45	8.36	7.60
N	1.20	7.77	8.92	8.12	6.50
P	4.87	8.56	8.66	8.00	7.52
NPKNAMG	3.75	8.38	7.82	8.80	7.19
Mean	3.26	8.29	8.44	8.26	7.06

GRAIN MEAN DM% 85.1

ESTIMATED STRAW TONNES/HECTARE

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

P_RES	0	P(P1)	P(P2)	P(P3)	Mean

OLD_RES					
O	0.85	5.17	6.00	6.21	4.56
D	2.83	6.19	6.43	6.51	5.49
N	0.77	5.19	6.29	6.10	4.59
P	2.89	6.10	6.19	5.90	5.27
NPKNAMG	2.30	6.17	6.19	6.37	5.26
Mean	1.93	5.77	6.22	6.22	5.03

STRAW MEAN DM% 87.8

PLOT AREA HARVESTED 0.00525

06/R/EX/4

K TEST

GRAIN TONNES/HECTARE

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

OLD_RES	
O	6.51
D	6.92
N*	7.18
PK	7.39
N*PK	7.08
Mean	7.02

GRAIN MEAN DM% 84.9

ESTIMATED STRAW TONNES/HECTARE

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

OLD_RES	
O	4.49
D	4.90
N*	4.93
PK	5.50
N*PK	4.88
Mean	4.94

STRAW MEAN DM% 87.7

PLOT AREA HARVESTED 0.00525