

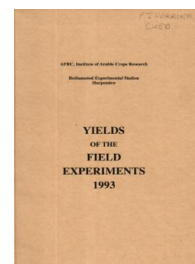
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# Yields of the Field Experiments 1993

[Full Table of Content](#)



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## Experiments - Classics

### Rothamsted Research

Rothamsted Research (1994) *Experiments - Classics* ; Yields Of The Field Experiments 1993, pp 11 - 38 - DOI: <https://doi.org/10.23637/ERADOC-1-48>

93/R/BK/1

# BROADBALK

**Object:** To study the effects of organic and inorganic manures on continuous w. wheat. From 1968 two three-year rotations were included: potatoes, beans, w. wheat and fallow, w. wheat, w. wheat. In 1979 the first rotation was changed to fallow, potatoes, w. wheat. In 1980 the second rotation reverted to continuous w. wheat. Since 1985 part of the second rotation has been added to the first to extend the rotation to fallow, potatoes, w. wheat, w. wheat, w. wheat.

The 150th year, w. wheat, fallow, potatoes.

For previous years see 'Details' 1967 and 1973, Station Report for 1966, pp. 229-231, Station Report for 1968, Part 2, Station Report for 1982, Part 2, pp. 5-44 and 74-92/R/BK/1.

## Areas harvested:

Wheat:	Section	
	0	0.00311
	1	0.00572
	3,4,5 and 6	0.00473
	8 and 9	0.00497
Potatoes:	2	0.00348

## Treatments:

Whole plots

PLOT		Fertilizers and organic manures:-		
	Plot	Treatments until 1967	Treatments from 1968	Treatments from 1985
01DN4PK	01	-	D N2 P K	D N4 P K
21DN2	21	D	D N2	D N2
22D	22	D	D	D
030	03	None	None	None
05F	05	P K Na Mg	P K (Na) Mg	PK Mg
06N1F	06	N1 P K Na Mg	N1 P K (Na) Mg	N1 P K Mg
07N2F	07	N2 P K Na Mg	N2 P K (Na) Mg	N2 P K Mg
08N3F	08	N3 P K Na Mg	N3 P K (Na) Mg	N3 P K Mg
09N4F	09	N*1 P K Na Mg	N4 P K (Na) Mg	N4 P K Mg
10N2	10	N2	N2	N2
11N2P	11	N2 P	N2 P	N2 P
12N2PNA	12	N2 P Na	N2 P Na	N2 P Na
13N2PK	13	N2 P K	N2 P K	N2 P K
14N2PKMG	14	N2 P Mg	N2 P K Mg	N2 P K Mg
15N5F	15	N2 P K Na Mg	N3 P K (Na) Mg	N5 P K Mg
16N6F	16	N*2 P K Na Mg	N2 P K (Na) Mg	N6 P K Mg
17N0+3FH	17	N2(A)	N2 1/2(P K (Na) Mg)	N0+3 1/2(PK Mg)+
18N1+3FH	18	P K Na Mg(A)	N2 1/2(P K (Na) Mg)	N1+3 1/2(PK Mg)+
19C	19	C	C	C
20N2KMG	20	N2 K Na Mg	N2 K (Na) Mg	N2 K Mg

(A) Alternating





93/R/BK/1

- NOTES:** (1) For a fuller record of treatments see 'Details' etc.  
(2) From autumn 1975 to autumn 1986, chalk was applied at 2.9 t each autumn to all plots in sets of Sections on a three-year cycle. Year 1: Sections 1,2,3. Year 2: Sections 6,7,8,9. Year 3: Sections 0,4,5. From autumn 1988 until autumn 1992 a five-year cycle was used. Year 1: Sections 1,3. Year 2: Sections 2,8. Year 3: Sections 7,9. Year 4: Sections 4,6. Year 5: Sections 0,5. None applied in autumn 1992.

**Experimental diary:**

**All sections:**

- 08-Oct-92 : T : P applied.  
13-Oct-92 : T : Mg, K and Na applied.  
14-Oct-92 : T : FYM applied.  
15-Oct-92 : B : Ploughed.  
19-Oct-92 : T : Rotary harrowed, plots 21 to 11.  
04-Nov-92 : T : Heavy spring-tine cultivated plots 01 & 12-20.

**Cropped Sections:**

**W. wheat:**

- 07-Aug-92 : T : Straw chopped (section 0 only).  
08-Oct-92 : T : Autumn N treatments applied.  
06-Nov-92 : T : Rotary harrowed, Apollo, dressed Fonofos Seed Treatment, drilled at 380 seeds per square metre.  
19-Mar-93 : T : Rolled.  
20-Apr-93 : T : Spring N treatments applied.  
22-Apr-93 : T : Astix at 2.0 l and Oxytril CM at 1.5 l in 200 l (except section 8).  
06-May-93 : T : Mistral at 1.0 l, Sportak 45 at 0.90 l and Tripart Brevis at 2.25 l in 200 l (except section 6).  
10-May-93 : T : Cheetah R at 2.5 l in 200 l (except section 8).  
04-Jun-93 : T : Starane 2 at 1.5 l in 200 l (except section 8).  
          : T : Bombardier at 2.0 l and Mistral at 1.0 l in 200 l (except section 6).  
22-Jun-93 : T : Corbel at 1.0 l and Radar at 0.50 l in 200 l (except section 6).  
04-Aug-93 : T : Roundup at 6.0 l with High Trees Mixture B at 2.9 l in 150 l (except section 8).  
17-Aug-93 : B : Combine harvested.

**Potatoes:**

- 12-Feb-93 : T : Chisel ploughed.  
20-Apr-93 : T : Spring N treatments applied.  
28-Apr-93 : T : Heavy spring-tine cultivated.  
05-May-93 : T : Rotary harrowed twice, planted Pentland Crown AA.  
14-May-93 : T : Rotary ridged.  
19-May-93 : T : Rotalin at 5.5 l in 200 l.  
24-May-93 : T : Cultivated by rotary grubber.  
22-Jun-93 : T : Ashlade Mancozeb FL at 2.25 l with Intracrop BLA at 0.2 l in 200 l.  
08-Jul-93 : T : Ashlade Mancozeb FL at 2.25 l with Intracrop BLA at 0.2 l in 200 l.  
22-Jul-93 : T : Ashlade Mancozeb FL at 2.25 l with Intracrop BLA at 0.2 l in 200 l.

93/R/BK/1

**Experimental diary:**

Cropped Sections:

Potatoes:

06-Aug-93 : T : Ashlade Mancozeb FL at 2.25 l with Intracrop BLA at 0.2 l in 200 l.  
 25-Aug-93 : T : Chiltern Super-Tin 4L at 0.56 l with Intracrop BLA at 0.20 l in 200 l.  
 15-Sep-93 : T : Stefes Diquat at 4.0 l in 200 l.  
 23-Sep-93 : T : Haulm mechanically destroyed.  
 18-Oct-93 : T : Lifted.

Fallow:

12-Feb-93 : T : Chisel ploughed.  
 24-Jun-93 : T : Cultivated by rotary grubber.

**NOTE:** Samples of grain and straw from sections 1 and 3 and samples of potato tubers from section 2 were taken for chemical analysis.

**W. WHEAT**

**GRAIN TONNES/HECTARE**

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

SECTION PLOT	3/W1	5/W2	4/W3	8/W5	6/W16	1/W27	9/W35	0/W42
01DN4PK	10.49	9.79	8.81	*	6.92	*	*	*
21DN2	10.22	8.32	7.41	3.98	6.76	8.99	9.33	8.33
22D	7.26	5.22	4.60	2.52	4.55	5.67	6.44	4.93
030	1.27	0.49	0.62	1.01	0.89	1.01	0.60	0.81
05F	1.26	0.60	0.34	2.31	1.08	1.15	0.85	0.84
06N1F	4.76	2.89	2.64	2.31	3.64	3.06	3.46	3.51
07N2F	6.56	4.84	4.42	3.16	4.24	4.80	4.53	4.60
08N3F	8.56	6.08	4.77	2.97	4.20	5.51	5.14	4.34
09N4F	8.97	7.87	5.62	3.26	5.38	5.99	6.97	5.65
10N2	6.16	2.52	3.26	0.98	1.87	1.92	2.11	1.54
11N2P	3.85	4.49	2.73	0.77	1.56	2.39	2.08	2.56
12N2PNA	3.88	3.61	1.74	0.86	1.85	2.48	2.22	2.86
13N2PK	5.96	4.09	3.59	1.67	3.39	4.05	3.53	4.44
14N2PKMG	5.57	4.24	4.18	1.18	3.71	4.85	3.90	4.76
15N5F	8.69	7.33	6.08	2.23	5.27	6.61	6.94	6.25
16N6F	9.22	7.49	7.15	2.64	5.80	7.38	8.21	6.71
17N0+3FN	8.27	6.74	4.75	1.96	4.98	5.96	6.51	5.58
18N1+3FN	8.72	7.10	5.28	2.52	5.35	6.37	6.73	5.86
19C	1.58	1.17	0.93	1.83	1.27	1.47	1.29	1.28
20N2KMG	*	*	*	*	*	1.80	*	2.65

GRAIN MEAN DM% 85.7

93/R/BK/1 W. WHEAT

STRAW TONNES/HECTARE

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

SECTION	3/W1	1/W27
PLOT		
01DN4PK	6.37	*
21DN2	4.82	4.56
22D	1.79	1.72
030	0.20	0.17
05F	0.10	0.25
06N1F	1.63	1.00
07N2F	2.26	1.83
08N3F	3.10	1.98
09N4F	3.26	2.32
10N2	2.18	0.91
11N2P	1.20	0.67
12N2PNA	1.20	0.75
13N2PK	2.25	1.84
14N2PKMG	1.54	1.99
15N5F	3.27	2.69
16N6F	3.36	3.00
17N0+3FN	3.12	2.33
18N1+3FN	3.72	2.47
19C	0.40	0.34
20N2KMG	*	0.84

STRAW MEAN DM% 88.8

CLEAN GRAIN TONNES/HECTARE, AFTER REMOVING WEED SEEDS

SECTION	8/W5
PLOT	
01DN4PK	*
21DN2	3.75
22D	1.51
030	0.74
05F	1.41
06N1F	1.95
07N2F	2.80
08N3F	2.73
09N4F	3.20
10N2	0.95
11N2P	0.74
12N2PNA	0.84
13N2PK	1.38
14N2PKMG	0.87
15N5F	2.11
16N6F	2.41
17N0+3FN	1.68
18N1+3FN	2.02
19C	1.47
20N2KMG	*



93/R/BK/1 POTATOES

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

PLOT	TOTAL TUBERS TONNES/ HECTARE	% WARE 3.81 CM (1.5 INCH) RIDDLE
01DN4PK	22.1	92.0
21DN2	37.2	92.6
22D	34.2	93.0
030	7.1	93.9
05F	13.2	91.9
06N1F	15.7	82.2
07N2F	19.5	84.8
08N3F	22.9	85.8
09N4F	25.8	90.9
10N2	6.4	89.7
11N2P	8.3	68.4
12N2PNA	9.2	75.2
13N2PK	10.2	74.4
14N2PKMG	22.7	94.5
15N5F	24.0	94.9
16N6F	27.6	96.0
17N3FH	14.2	89.2
18N3FH	20.7	96.3
19C	10.5	93.1

93/R/HB/2

# HOOS BARLEY

**Object:** To study the effects of organic and inorganic manures on continuous s. barley. From 1968 to 1978 a rotation of potatoes, beans and s. barley was practised. The rotation was discontinued in 1979 and the experiment reverted to continuous s. barley.

The 142nd year, s. barley.

For previous years see 'Details' 1967 and 1973, Station Report for 1966 and 74-92/R/HB/2.

**Treatments:** All combinations of:-

## 1. MANURE

Fertilizers and organic manures:

	Form of N 1852-1966	Additional treatments 1852-1979	Changes since 1980
---	None	-	-
-P-	None	P	-
--K	None	K(Na)Mg	-
-PK	None	PK(Na)Mg	-
A--	A	-	-
AP-	A	P	-
A-K	A	K(Na)Mg	-
APK	A	PK(Na)Mg	-
N----	N	-	-
NP---	N	P	-
N-K--	N	K(Na)Mg	-
NPK--	N	PK(Na)Mg	-
N--S-	N	Si	Si omitted
NP-S-	N	P Si	"
N-KS-	N	K(Na)MgSi	"
NPKS-	N	PK(Na)MgSi	"
N---S	N	-	Si added
NP--S	N	P	"
N-K-S	N	K(Na)Mg	"
NPK-S	N	PK(Na)Mg	"
N--SS	N	Si	-
NP-SS	N	P Si	-
N-KSS	N	K(Na)MgSi	-
NPKSS	N	PK(Na)MgSi	-
C(--)	C	-	PKMg omitted
C(P-)	C	P	"
C(-K)	C	K(Na)Mg	"
C(PK)	C	PK(Na)Mg	"
D	None	D	-
(D)	(D)	-	-
(A)	(Ashes)	-	-
-	None	-	-



93/R/HB/2

Form of N: A, sulphate of ammonia: N, nitrate of soda - each to supply 48 kg N: C, castor meal to supply 96 kg N  
 P: 35 kg P as triple superphosphate in 1974 and since 1988, single superphosphate in other years  
 K: 90 kg K as sulphate of potash  
 (Na): 16 kg Na as sulphate of soda until 1973  
 Mg: 35 kg Mg, as kieserite every third year since 1974 (sulphate of magnesia annually until 1973)  
 Si: Silicate of soda at 450 kg  
 D: Farmyard manure at 35 tonnes. (D): until 1871 only  
 (Ashes): Weed ash 1852-1916, furnace ash 1917-1932, none since

2. **N** Nitrogen fertilizer (kg N), as 'Nitro-Chalk', since 1968 (cumulative N applications until 1973, on a cyclic system since 1974):

0  
 48  
 96  
 144

Plus extra plots testing all combinations of:-

1. **MANURE** Fertilizers other than magnesium:

551AN2PK	Plot 551 AN2PK
561--PK	Plot 561 --PK
571NN2--	Plot 571 NN2
581NN2--	Plot 581 NN2

N2: 96 kg N as 'Nitro-Chalk' since 1968. Other symbols as above.

2. **MGNESIUM** Magnesium fertilizer (kg Mg) as kieserite every third year since 1974:

0  
 35

**NOTES:** (1) For a fuller record see 'Details' etc.  
 (2) Erratum: Since 1989 some records of the type of superphosphate applied were incorrect. Given above is the correct record.

**Experimental diary:**

06-Jul-92 : B : Straw baled.  
 21-Dec-92 : T : Si and K applied.  
 22-Dec-92 : T : P applied.  
 19-Jan-93 : T : FYM applied.  
 20-Jan-93 : B : Ploughed.  
 03-Mar-93 : B : Heavy spring-tine cultivated, twice.  
 04-Mar-93 : B : Rotary harrowed, Alexis, dressed Baytan, drilled at 350 seeds per square metre, rolled.

93/R/HB/2

**Experimental diary:**

30-Apr-93 : T : N applied.  
 13-May-93 : B : Ally at 30 g and Starane 2 at 1.0 l in 200 l.  
 08-Jun-93 : B : Alto 100 SL at 0.80 l and Derosal WDG at 0.31 kg in 200 l.  
 14-Aug-93 : B : Combine harvested.

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

**MAIN PLOTS**

**GRAIN TONNES/HECTARE**

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

N	0	48	96	144	Mean
<b>MANURE</b>					
---	0.80	0.55	0.74	0.73	0.71
-P-	2.19	4.17	3.95	3.57	3.47
--K	1.72	1.53	2.79	1.90	1.98
-PK	2.47	3.92	5.32	5.84	4.39
A--	0.89	1.10	0.97	0.94	0.98
AP-	2.80	3.98	3.99	4.12	3.72
A-K	0.96	1.29	1.62	1.38	1.31
APK	2.57	4.38	5.54	6.10	4.65
N----	1.09	0.67	0.66	0.85	0.82
NP---	2.87	3.93	4.24	3.99	3.76
N-K--	0.74	0.90	1.68	1.15	1.12
NPK--	2.85	4.50	5.91	5.97	4.81
N--S-	0.31	2.14	1.32	3.05	1.70
NP-S-	2.92	3.85	4.03	4.24	3.76
N-KS-	1.80	3.32	2.24	2.26	2.40
NPKS-	3.03	4.84	6.13	6.90	5.22
N---S	1.02	1.75	1.58	1.13	1.37
NP--S	2.33	3.91	4.78	5.32	4.08
N-K-S	1.46	1.75	2.03	2.73	1.99
NPK-S	2.37	4.79	5.82	5.92	4.72
N--SS	0.67	1.91	1.76	1.39	1.43
NP-SS	2.51	4.17	4.10	4.77	3.89
N-KSS	1.77	2.75	1.95	2.35	2.20
NPKSS	2.68	4.99	5.49	6.35	4.88
C(--)	1.87	2.27	3.44	3.67	2.81
C(P-)	2.41	4.44	4.07	4.95	3.97
C(-K)	1.71	3.87	4.27	5.11	3.74
C(PK)	2.69	4.49	4.97	5.69	4.46
D	5.95	5.53	5.70	5.79	5.74
(D)	2.02	2.83	2.89	5.58	3.33
(A)	1.61	1.89	3.16	2.18	2.21
-	1.19	0.68	1.17	1.14	1.04
Mean	2.01	3.03	3.38	3.66	3.02

GRAIN MEAN DM% 81.0

# 93/R/HB/2 MAIN PLOTS

## STRAW TONNES/HECTARE

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

N	0	48	96	144	Mean
MANURE					
---	0.27	0.24	0.49	0.60	0.40
-P-	0.76	1.84	1.88	1.90	1.59
--K	0.56	0.58	1.13	0.66	0.73
-PK	0.72	1.41	2.07	3.18	1.85
A--	0.28	0.42	0.25	0.35	0.32
AP-	1.00	1.99	2.32	2.15	1.87
A-K	0.32	0.50	1.02	0.81	0.66
APK	0.81	1.57	2.59	2.86	1.96
D	3.63	3.46	4.09	3.61	3.70
(D)	0.55	1.40	1.34	2.41	1.42
(A)	0.63	0.88	1.32	0.83	0.91
-	0.40	0.33	0.38	0.32	0.36
Mean	0.83	1.22	1.57	1.64	1.31

STRAW MEAN DM% 69.0

PLOT AREA HARVESTED 0.00154

## EXTRA PLOTS

## GRAIN TONNES/HECTARE

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

MANURE	551AN2PK	561--PK	571NN2--	581NN2--	Mean
MAGNESIUM					
0	4.82	0.67	3.31	0.57	2.34
35	5.18	0.69	1.94	0.89	2.18
Mean	5.00	0.68	2.62	0.73	2.26

GRAIN MEAN DM% 81.0

PLOT AREA HARVESTED 0.00329



93/R/WF/3

# WHEAT AND FALLOW

**Object:** To study the effects of fallowing on unmanured w. wheat -  
Hoosfield.

The 138th year, w. wheat.

For previous years see 'Details' 1967, 1973 and 74-92/R/WF/3.

**Whole plot dimensions:** 9.0 x 211.

## **Treatments:**

Each year there are two plots, one is sown to w. wheat, one is  
fallow; they alternate in successive years.

## **Experimental diary:**

Wheat plot:

14-Oct-92 : T : Ploughed.

19-Oct-92 : T : Rotary harrowed twice, Apollo, dressed Fonofos Seed  
Treatment, drilled at 380 seeds per square metre.

17-Aug-93 : T : Combine harvested.

Fallow plot:

05-Oct-92 : T : Ploughed.

26-May-93 : T : Cultivated by rotary grubber.

24-Jun-93 : T : Cultivated by rotary grubber.

## **GRAIN AND STRAW TONNES/HECTARE**

	GRAIN	STRAW
YIELD	1.65	1.09
MEAN DM%	73.9	77.5
PLOT AREA HARVESTED	0.04304	

93/R/EX/4

### EXHAUSTION LAND

**Object:** To study the residual effects of manures applied 1876-1901, and of additional phosphate applied since 1986, on the yield of continuous s. barley up to 1991, w. wheat since - Hoosfield.

The 138th year, w. wheat.

For previous years see 'Details' 1967, 1973 and 74-92/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 tonnes   |
| 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,<br>16 kg Na as sulphate of soda, 11 kg Mg as sulphate<br>of magnesia                     |
| 2. P RES   | Phosphate applied annually from 1986, as single<br>superphosphate in 1986 and 1987, triple<br>superphosphate from 1988 until 1992, none since: |
| O          | None   |
| P1         | 44 kg P  |
| P2         | 87 kg P  |
| P3         | 131 kg P   |

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 tonnes                                 |
| N*      | 96 kg N as nitrate of soda                                   |
| PK      | 34 kg P as superphosphate, 137 kg K as sulphate of<br>potash |
| N*PK    | N, P and K as above  |

#### Experimental diary:

P test:

30-Sep-92 : T : Muriate of potash at 167 kg.

K test:

30-Sep-92 : T : Triple superphosphate at 638 kg.

93/R/EX/4

**Experimental diary:**

All plots:

16-Sep-92 : B : Scythe at 2.0 l with Farmon Blue at 0.20 l in 200 l.  
 05-Oct-92 : B : Ploughed.  
 09-Oct-92 : B : Discd, spring-tine cultivated.  
 : B : Rotary harrowed, Mercia, dressed Cerevax, drilled at 380  
 seeds per square metre.  
 19-Apr-93 : B : 34.5% N at 560 kg.  
 13-May-93 : B : Ally at 30 g, Cheetah R at 2.5 l and Starane 2 at 1.0 l  
 in 200 l.  
 04-Jun-93 : B : Halo at 2.0 l and Mistral at 0.50 l in 200 l.  
 16-Aug-93 : B : Combine harvested.

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

**P TEST**

**GRAIN TONNES/HECTARE**

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

P RES	O	P1	P2	P3	Mean
OLD RES					
O	2.47	6.32	7.22	5.96	5.49
D	5.17	6.72	6.72	6.61	6.31
N	2.84	5.52	5.78	5.32	4.86
P	4.44	6.44	6.11	6.72	5.93
NPKNAMG	3.98	4.99	5.63	5.05	4.91
Mean	3.78	6.00	6.29	5.93	5.50

GRAIN MEAN DM% 87.9

**STRAW TONNES/HECTARE**

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

P RES	O	P1	P2	P3	Mean
OLD RES					
O	1.46	3.56	4.06	3.52	3.15
D	2.78	3.55	3.73	3.21	3.32
N	1.64	2.93	3.06	2.95	2.65
P	2.01	3.23	3.80	3.46	3.12
NPKNAMG	2.19	2.71	3.19	2.91	2.75
Mean	2.01	3.20	3.57	3.21	3.00

STRAW MEAN DM% 89.3

PLOT AREA HARVESTED 0.00589



93/R/EX/4

K TEST

GRAIN TONNES/HECTARE

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

OLD RES

O	4.87
D	5.64
N*	5.01
PK	4.82
N*PK	4.67
Mean	5.00

GRAIN MEAN DM% 88.2

STRAW TONNES/HECTARE

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

OLD RES

O	2.87
D	2.90
N*	2.80
PK	2.66
N*PK	2.67
Mean	2.78

STRAW MEAN DM% 91.7

PLOT AREA HARVESTED 0.00589

## 93/R/PG/5

### PARK GRASS

**Object:** To study the effects of organic and inorganic manures and lime on old grass (for hay).

The 138th year, hay.

For previous years see 'Details' 1967 and 1973 and 74-92/R/PG/5.

**Treatments:** Combinations of:-

Whole plots

#### 1. MANURE

Fertilizers and organic manures:

N1	Plot 1	N1
O(D)	Plot 2	None (D until 1863)
O	Plot 3	None
P	Plot 4/1	P
N2P	Plot 4/2	N2 P
N1MN	Plot 6	N1 P K Na Mg
MN	Plot 7	P K Na Mg
PNAMG	Plot 8	P Na Mg
MN(N2)	Plot 9/1	P K Na Mg (N2 until 1989)
N2MN	Plot 9/2	N2 P K Na Mg
N2PNAMG	Plot 10	N2 P Na Mg
N3MN	Plot 11/1	N3 P K Na Mg
N3MNSI	Plot 11/2	N3 P K Na Mg Si
O	Plot 12	None
D/F	Plot 13	D/F
MN(N2*)	Plot 14/1	P K Na Mg (N2* until 1989)
N2*MN	Plot 14/2	N2* P K Na Mg
MN(N2*)	Plot 15	P K Na Mg (N2* until 1875)
N1*MN	Plot 16	N1* P K Na Mg
N1*	Plot 17	N1*
N2KNAMG	Plot 18	N2 K Na Mg
D	Plot 19	D
D/N*PK	Plot 20	D/N*P K

N1, N2, N3:	48, 96, 144 kg N as sulphate of ammonia
N1*, N2*:	48, 96 kg N as nitrate of soda (30 kg N to Plot 20, only in years with no farmyard manure)
P:	35 kg P (15 kg P to Plot 20, only in years with no farmyard manure) as triple superphosphate in 1974 and since 1987, single superphosphate in other years
K:	225 kg K (45 kg K to Plot 20, only in years with no farmyard manure) as sulphate of potash
Na:	15 kg Na as sulphate of soda
Mg:	10 kg Mg as sulphate of magnesia
Si:	Silicate of soda at 450 kg
D:	Farmyard manure at 35 tonnes every fourth year
F:	Fish meal every fourth year to supply 63 kg N
MN:	P K Na Mg

93/R/PG/5

Sub plots

2. LIME Liming:

- |   |   |  |
|---|---|--|
| A | a | Ground chalk applied as necessary to achieve pH7 |
| B | b | Ground chalk applied as necessary to achieve pH6 |
| C | c | Ground chalk applied as necessary to achieve pH5 |
| D | d | None   |

**NOTE:** Lime was applied regularly, and at the same rate, to all 'a' and 'b' sub plots of Plots 1 to 17 (except 12) from 1924. Differential liming started in 1965 on certain 'b' and 'c' sub plots (except on Plot 12) and in 1976 on certain 'a' sub plots (including Plot 12) and 12b. Lime last applied in 1990.

Additional sub plots (Plots 18, 19 and 20 only) (tonnes CaCO<sub>3</sub> applied every fourth year 1920-1964):

N2KNAMG0	18-1	None
N2KNAMG2	18-2	13.5
N2KNAMG1	18-3	7.9
DO	19-1	None
D2	19-2	6.3
D1	19-3	1.1
D/N*PK0	20-1	None
D/N*PK2	20-2	5.6
D/N*PK1	20-3	1.1

Since 1965 Plot 18-1 has been split into two for treatments 'c' and 'd' above and Plot 18-3 split into two for treatments 'a' and 'b'. Plots 19 and 20 received no further chalk after 1968; plot 18/2 no further chalk after 1972.

**NOTE:** For a fuller record of treatments see 'Details' etc.

#### Experimental diary:

- 10-Feb-93 : T : P applied.
- 11-Feb-93 : T : Si applied.
- 12-Feb-93 : T : K, Na and Mg applied.
- 16-Feb-93 : T : FYM applied.
- 10-Mar-93 : B : Flat rolled.
- 19-Apr-93 : T : N as nitrate of soda applied.
- : T : N as sulphate of ammonia applied.
- 25-Jun-93 : B : First sample cut. Remaining area cut for hay.
- : B : Spread grass for hay.
- 26-Jun-93 : B : Hay turned.
- 27-Jun-93 : B : Hay turned.
- 28-Jun-93 : B : Hay turned, rowed up.
- 29-Jun-93 : B : Hay rowed up and baled.
- 12-Nov-93 : B : Second sample cut, herbage removed. Remaining area cut, herbage removed.



93/R/PG/5

**NOTES:** (1) Herbage samples from selected plots were taken for chemical analysis.  
(2) Comparison of hay and silage yields was made on selected plots.

**1ST CUT (25/6/93) DRY MATTER TONNES/HECTARE**

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

LIME PLOT	A	B	C	D	MEAN
<b>MANURE</b>					
N1 1	3.89	3.61	3.36	1.84	3.17
O(D) 2	3.80	4.89	3.07	3.13	3.72
O 3	3.57	3.97	2.59	2.32	3.11
P 4/1	4.82	5.30	3.91	3.37	4.35
N2P 4/2	3.96	3.68	4.42	2.88	3.74
N1MN 6	5.38	6.36			5.87
MN 7	5.96	6.19	6.88	5.32	6.09
PNAMG 8	4.94	5.50	4.57	3.83	4.71
MN(N2) 9/1	5.35	4.54	4.35	5.05	4.82
N2MN 9/2	6.05	5.44	6.14	4.18	5.45
N2PNAMG 10	4.52	3.51	4.77	2.41	3.80
N3MN 11/1	6.74	6.27	5.68	4.42	5.78
N3MNSI 11/2	6.72	6.09	5.84	5.27	5.98
O 12	3.47	3.62	2.80	2.97	3.21
D/F 13	5.40	6.00	5.68	5.29	5.59
MN(N2*) 14/1	5.22	4.22	3.98	4.46	4.47
N2*MN 14/2	5.60	5.89	5.61	5.26	5.59
MN(N2*) 15	4.93	5.61	5.61	5.07	5.31
N1*MN 16	5.70	5.95	5.40	4.53	5.40
N1* 17	4.19	4.18	4.19	3.76	4.08
N2KNAMG0 18/1			4.18	1.55	2.87
N2KNAMG2 18/2					4.20
N2KNAMG1 18/3	4.31	3.74			4.02
D0 19/1					6.17
D2 19/2					5.90
D1 19/3					6.24
D/N*PK0 20/1					5.56
D/N*PK2 20/2					5.45
D/N*PK1 20/3					5.83

1ST CUT MEAN DM% 25.5

93/R/PG/5

## 2ND CUT (12/11/93) DRY MATTER TONNES/HECTARE

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

LIME	PLOT	A	B	C	D	MEAN
<b>MANURE</b>						
N1	1	4.12	3.27	4.41	1.91	3.43
O(D)	2	3.51	3.27	3.67	3.58	3.51
O	3	2.90	2.67	2.95	3.51	3.01
P	4/1	2.38	2.80	3.02	3.25	2.86
N2P	4/2	3.21	3.32	2.77	1.75	2.76
N1MN	6	3.24	3.47			3.35
MN	7	3.03	3.70	4.61	3.51	3.71
PNAMG	8	2.52	2.76	3.16	3.35	2.95
MN(N2)	9/1	2.60	2.32	1.68	1.53	2.03
N2MN	9/2	3.27	2.78	2.89	2.55	2.87
N2PNAMG	10	3.01	2.98	3.31	2.23	2.88
N3MN	11/1	3.80	3.59	3.63	3.80	3.71
N3MNSI	11/2	4.19	3.48	2.94	3.69	3.57
O	12	2.05	2.10	2.56	2.69	2.35
D/F	13	3.30	3.16	3.39	4.18	3.51
MN(N2*)	14/1	3.14	2.12	1.83	2.85	2.49
N2*MN	14/2	3.30	2.92	2.39	2.28	2.72
MN(N2*)	15	2.71	3.44	3.59	3.97	3.43
N1*MN	16	3.35	3.02	3.22	3.05	3.16
N1*	17	2.38	2.84	3.51	3.54	3.07
N2KNAMG0	18/1			2.86	0.87	1.86
N2KNAMG2	18/2					3.33
N2KNAMG1	18/3	3.29	2.88			3.09
D0	19/1					4.41
D2	19/2					3.77
D1	19/3					3.82
D/N*PK0	20/1					3.86
D/N*PK2	20/2					3.49
D/N*PK1	20/3					4.27

2ND CUT MEAN DM% 22.4

93/R/PG/5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

LIME	PLOT	A	B	C	D	MEAN
MANURE						
N1	1	8.02	6.87	7.77	3.75	6.60
O(D)	2	7.31	8.16	6.74	6.71	7.23
O	3	6.48	6.64	5.54	5.83	6.12
P	4/1	7.20	8.10	6.93	6.62	7.21
N2P	4/2	7.17	6.99	7.19	4.63	6.50
N1MN	6	8.62	9.83			9.23
MN	7	8.99	9.89	11.49	8.82	9.80
PNAMG	8	7.46	8.25	7.72	7.17	7.65
MN(N2)	9/1	7.95	6.86	6.03	6.58	6.86
N2MN	9/2	9.32	8.22	9.03	6.73	8.32
N2PNAMG	10	7.53	6.49	8.08	4.64	6.69
N3MN	11/1	10.54	9.86	9.31	8.22	9.48
N3MNSI	11/2	10.91	9.57	8.77	8.96	9.56
O	12	5.52	5.72	5.36	5.65	5.56
D/F	13	8.70	9.16	9.08	9.46	9.10
MN(N2*)	14/1	8.37	6.35	5.81	7.30	6.96
N2*MN	14/2	8.90	8.81	8.00	7.54	8.31
MN(N2*)	15	7.64	9.05	9.20	9.04	8.74
N1*MN	16	9.05	8.97	8.61	7.58	8.55
N1*	17	6.56	7.03	7.71	7.31	7.15
N2KNAMG0	18/1			7.04	2.42	4.73
N2KNAMG2	18/2					7.53
N2KNAMG1	18/3	7.60	6.62			7.11
D0	19/1					10.58
D2	19/2					9.68
D1	19/3					10.07
D/N*PK0	20/1					9.43
D/N*PK2	20/2					8.94
D/N*PK1	20/3					10.09

TOTAL OF 2 CUTS MEAN DM% 24.0

PLOT AREA HARVESTED 0.00002

Some data from classical experiments are being entered into an electronic data base and some errors in tables of yields in earlier editions of this book have been found; the Park Grass corrections follow; they only affected second cut and the total of two cut tables. Only the changed parts of tables are presented.



78/R/PG/5

2ND CUT (2/11/78) DRY MATTER TONNES/HECTARE

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

LIME MANURE	A	B	C	D	MEAN
N1	1.83	2.79	1.90	2.24	2.19
O(D)	1.93	1.83	1.99	2.18	1.98
O/PLOT3	1.59	1.73	1.56	2.32	1.80
P	2.12	2.35	2.44	2.71	2.40
N2P	1.94	2.04	2.57	2.69	2.31
N1MIN	2.41	2.53			2.47
MIN	3.09	3.81	2.43	2.05	2.84
PNAMG	2.66	2.29	2.32	2.42	2.42
N2MIN	2.93	3.44	2.49	2.44	2.83
N2PNAMG	1.78	2.09	1.72	2.50	2.02
N3MIN	2.98	3.28	2.30	4.30	3.22
N3MINSI	3.24	2.68	2.53	4.92	3.34
O/PLOT12	4.01	2.77	2.45	2.21	2.86
D/F	5.50	3.55	3.21	2.79	3.77
N2*MIN	1.69	2.31	2.24	1.64	1.97
MIN(N2*)	2.75	2.94	2.36	2.61	2.66
N1*MIN	2.36	2.41	2.51	2.22	2.38
N1*	2.27	2.20	2.36	2.03	2.22
N2KNAMG0			1.12	0.83	0.98
N2KNAMG2	2.60				2.60
N2KNAMG1	2.37	2.62			2.49
D0	2.93				2.93
D2	3.77				3.77
D1	3.35				3.35
D/N*PK0	4.63				4.63
D/N*PK2	4.16				4.16
D/N*PK1	3.92				3.92

78/R/PG/5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

LIME	A	B	C	D	MEAN
MANURE					
N1	4.46	5.76	4.70	3.29	4.55
O(D)	4.43	4.57	3.90	3.99	4.22
O/PLOT3	4.26	4.53	3.12	4.02	3.98
P	5.44	6.18	5.13	5.39	5.53
N2P	5.73	6.23	7.00	6.43	6.35
N1MIN	7.69	7.66			7.67
MIN	8.11	8.91	6.42	5.48	7.23
PNAMG	5.70	5.54	5.27	5.29	5.45
N2MIN	8.41	9.05	8.71	7.41	8.39
N2PNAMG	5.95	6.89	6.33	6.32	6.37
N3MIN	8.63	8.67	7.87	8.26	8.36
N3MINSI	9.00	8.60	7.96	10.05	8.90
O/PLOT12	5.95	4.75	4.32	3.99	4.75
D/F	10.45	8.80	7.84	6.94	8.51
N2*MIN	6.38	8.02	8.03	6.51	7.23
MIN(N2*)	8.27	7.94	4.78	5.83	6.70
N1*MIN	7.63	7.67	7.49	6.25	7.26
N1*	5.48	5.72	5.46	4.28	5.23
N2KNAMG0			2.47	1.59	2.03
N2KNAMG2	5.58				5.58
N2KNAMG1	5.11	5.28			5.20
D0	7.40				7.40
D2	9.47				9.47
D1	8.54				8.54
D/N*PK0	10.12				10.12
D/N*PK2	9.35				9.35
D/N*PK1	9.14				9.14

84/R/PG/5

2ND CUT (19/11/84) DRY MATTER TONNES/HECTARE

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

LIME	A	B	C	D	MEAN
MANURE					
N2KNAMG0			0.12	0.11	0.11
N2KNAMG2	0.85				0.85

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

LIME	A	B	C	D	MEAN
MANURE					
N2KNAMG0			0.53	0.32	0.43
N2KNAMG2	2.89				2.89

89/R/PG/5

2ND CUT (26/9/89) DRY MATTER TONNES/HECTARE

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

LIME	A	B	C	D	MEAN
MANURE					
N2P	0.88	1.02	0.67	0.83	0.85

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

LIME	A	B	C	D	MEAN
MANURE					
N2P	2.11	2.26	1.90	1.68	1.99

92/R/PG/5

2ND CUT (13/11/92) DRY MATTER TONNES/HECTARE

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

LIME	A	B	C	D	MEAN
MANURE					
N2KNAMG0			4.73	2.58	3.66
N2KNAMG2	3.62				3.62

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

LIME	A	B	C	D	MEAN
MANURE					
N2KNAMG0			6.72	4.00	5.36
N2KNAMG2	6.59				6.59



93/R/BN/7

# BARNFIELD

**Object:** The experiment was designed to study the effects of organic and inorganic manures on continuous root crops. It was progressively modified to study effects on other crops.

Sections 1 and 2 the tenth year of grass/clover. The 19th year of grass on the rest of the experiment.

For previous years see 'Details' 1967 and 1973 and 74-92/R/BN/7.

**Plot dimensions:** 10.7 x 55.9.

Treatments to grass: All combinations of:-

Whole plots

1. **MANURE** Fertilizers and organic manures:

D	D
DPK	D P K
PKMG	P K (Na) Mg
P	P
PK	P K
PMG	P (Na) Mg
0	0

P: 35 kg P as triple superphosphate in 1974 and since 1987, single superphosphate in other years  
 K: 225 kg K as sulphate of potash  
 (Na): 90 kg Na as sodium chloride until 1973  
 Mg: 90 kg Mg as kieserite every fourth year since 1974 (sulphate of magnesia until 1973)  
 D: Farmyard manure at 35 tonnes (until 1975).

Quarter plots

2. **N PERCUT** Nitrogen fertilizer in 1993 (kg N per cut) as 34.5% N, cumulative to previous dressings, and residues of forms of N previously each supplying 96 kg N per annum:

75	75, previously nitrate of soda, section 3
100	100, previously sulphate of ammonia, section 4
125	125, previously sulphate of ammonia + castor meal, section 5
150	150, previously castor meal, section 6

Castor meal last applied 1961, nitrate of soda and sulphate of ammonia until 1959.

Plus one plot **MANURE** KMG 100

93/R/BN/7

Treatments to grass/clover, sections 1 and 2 (not given nitrogen fertilizer):

**MANURE** Fertilizers and organic manures as for grass above, excluding KMG.

**NOTES:** (1) P, K and D treatments were applied to Sections 1 and 2 until 1980. None were applied subsequently until the resumption of P and K treatments, only, from 1985.  
(2) Yields were not taken from section 2.

**Experimental diary:**

All sections:

09-Feb-93 : T : P applied.  
11-Mar-93 : B : Flat rolled.  
26-Mar-93 : T : K applied.  
02-Jun-93 : B : First sample cut.  
03-Jun-93 : B : Herbage removed from sample cut, cut and removed from remainder of plot.  
15-Nov-93 : B : Second sample cut.  
16-Nov-93 : B : Herbage removed from sample cut, cut and removed from remainder of plot.

Grass (Sections 3, 4, 5 and 6 only):

24-Mar-93 : T : N applied.  
09-Jun-93 : T : N applied.

**NOTE:** Herbage samples were taken for chemical analysis.

**GRASS**

**1ST CUT (2/6/93) DRY MATTER TONNES/HECTARE**

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

N PERCUT MANURE	75	100	125	150	Mean
D	6.67	6.96	7.18	7.24	7.01
DPK	6.85	6.80	5.61	6.71	6.49
PKMG	5.92	5.93	6.46	6.21	6.13
P	3.57	2.67	2.36	4.84	3.36
PK	5.82	6.21	6.58	6.19	6.20
PMG	4.08	2.43	2.26	2.68	2.86
0	4.42	3.35	3.05	2.82	3.41
Mean	5.33	4.91	4.79	5.24	5.07

**MANURE KMG 100** 6.22

Grand mean 5.11

1ST CUT MEAN DM% 21.5

93/R/BN/7

GRASS

2ND CUT (15/11/93) DRY MATTER TONNES/HECTARE

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

N PERCUT MANURE	75	100	125	150	Mean
D	3.48	4.68	5.93	4.71	4.70
DPK	3.94	4.92	4.26	4.63	4.44
PKMG	2.40	4.04	5.63	4.87	4.24
P	2.79	2.13	3.03	4.08	3.01
PK	3.15	3.97	5.14	3.71	3.99
PMG	2.44	1.87	2.90	3.50	2.68
0	1.76	2.17	3.28	3.73	2.73
Mean	2.85	3.40	4.31	4.18	3.68

MANURE KMG 100 3.75

Grand mean 3.69

2ND CUT MEAN DM% 30.5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

N PERCUT MANURE	75	100	125	150	Mean
D	10.15	11.64	13.12	11.95	11.71
DPK	10.79	11.72	9.87	11.34	10.93
PKMG	8.32	9.97	12.09	11.08	10.36
P	6.36	4.79	5.39	8.92	6.37
PK	8.96	10.18	11.72	9.90	10.19
PMG	6.53	4.30	5.15	6.18	5.54
0	6.18	5.52	6.33	6.55	6.14
Mean	8.18	8.30	9.09	9.42	8.75

MANURE KMG 100 9.97

Grand mean 8.79

TOTAL OF 2 CUTS MEAN DM% 26.0

PLOT AREA HARVESTED 0.00155



93/R/BM/7

GRASS/CLOVER

1ST CUT (2/6/93) DRY MATTER TONNES/HECTARE

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

MANURE	D	DPK	PKMG	P	PK	PMG	0	Mean
	2.57	2.29	2.29	2.05	1.73	1.98	2.93	2.26

1ST CUT MEAN DM% 16.8

2ND CUT (15/11/93) DRY MATTER TONNES/HECTARE

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

MANURE	D	DPK	PKMG	P	PK	PMG	0	Mean
	3.29	2.80	1.59	2.14	1.68	1.47	1.61	2.08

2ND CUT MEAN DM% 23.1

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

MANURE	D	DPK	PKMG	P	PK	PMG	0	Mean
	5.87	5.09	3.87	4.19	3.41	3.45	4.54	4.35

TOTAL OF 2 CUTS MEAN DM% 19.9

PLOT AREA HARVESTED 0.00155

93/R/GC/8

**GARDEN CLOVER**

**Object:** To study yields and pathogens of red clover grown continuously -  
Manor Garden.

The 140th year, red clover.

For previous years see 'Details' 1967 and 1973, and 74-92/R/GC/8.

**Design:** 2 blocks of 2 plots.

**Whole plot dimensions:** 1.00 x 1.40.

**Treatments:**

**FUNG RES**            Residual effects of fungicide to control *Sclerotinia*  
                              *trifoliorum*:

NONE                None

BENOMYL           Benomyl sprays during previous winters, last applied  
                              November 1989.

**NOTE:** Hungaropoly, sown at 30 kg in 1990.

**Experimental diary:**

29-Oct-92 : B : Hand weeded. Chalk at 1.25 t, PK as (0:18:36) at 420 kg  
                              and Epsom salts at 530 kg.

25-Jun-93 : B : First cut, hand weeded.

01-Jul-93 : T : **FUNG RES** NONE: Muriate of potash at 715 and 590 kg to  
                              first and second blocks respectively.

                  : T : **FUNG RES** BENOMYL: Muriate of potash at 500 and 550 kg.

04-Aug-93 : B : Second cut, hand weeded.

05-Aug-93 : T : **FUNG RES** NONE: Muriate of potash at 715 and 590 kg to  
                              first and second blocks respectively.

                  : T : **FUNG RES** BENOMYL: Muriate of potash at 500 and 550 kg.

02-Nov-93 : B : Third cut.

**NOTE:** Crop samples were taken for chemical analysis.

93/R/GC/8

1ST CUT (25/6/93) DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	8.18	7.05	7.61

1ST CUT MEAN DM% 19.1

2ND CUT (4/8/93) DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	5.02	5.01	5.02

2ND CUT MEAN DM% 15.2

3RD CUT (2/11/93) DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	1.63	1.36	1.49

3RD CUT MEAN DM% 21.5

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	14.83	13.41	14.12

TOTAL OF 3 CUTS MEAN DM% 18.6

PLOT AREA HARVESTED 0.00010