ROTHAMSTED RESEARCH

Yields of the Field Experiments 1992

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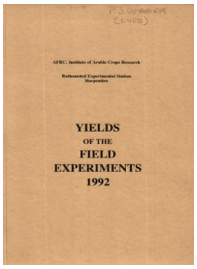

Experiments - Classicals

Rothamsted Research

Rothamsted Research (1993) *Experiments - Classicals ;* Yields Of The Field Experiments 1992, pp 11 - 35 **- DOI: https://doi.org/10.23637/ERADOC-1-47**

92/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 149th 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 74-91/R/BK/1.

Areas harvested:

Wheat:	Section	
	0	0.00311
	1	0.00572
	4,5,6 and 7	0.00473
	8 and 9	0.00497
Potatoes:	3	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
17N1+3FH	17	N2(A)	N2 1/2(P K (Na) Mg)	N1+3 1/2(PK Mg)+
18N0+3FH	18	P K Na Mg(A)	N2 1/2(P K (Na) Mg)	N0+3 1/2(PK Mg)+
19C	19	C	C	C
20NKMG	20	N2 K Na Mg	N2 K (Na) Mg	N2 K Mg

(A) Alternating

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\+ This change since 1980. Treatments shown are those to w. wheat; autumn N alternates. Potatoes receive N3 1/2 (PK Mg) on both Plots 17 and 18.

N1,N2,N3,N4,N5,N6: 48, 96, 144, 192, 240, 288 kg N (as sulphate of ammonia until 1967, except N* which was nitrate of soda. All as 'Nitro-Chalk' in spring from 1968 to 1985, as 'Nitram' since 1986.)
N0+3; N1+3: None in autumn + 144 kg N in spring; 48 kg N in autumn + 144 kg N in spring
P: 35 kg P as single superphosphate until 1987, triple superphosphate in 1974 and since 1988
K: 90 kg K as sulphate of potash
Na: 55 kg Na as sulphate of soda
(Na): 16 kg Na as sulphate of soda until 1973
Mg: 30 kg Mg annually to Plot 14, 35 kg Mg every third year to other plots since 1974. All as kieserite since 1974, previously as sulphate of magnesia annually
D: Farmyard manure at 35 tonnes
C: Castor meal to supply 96 kg N until 1988, none since
F: P K (Na) Mg H: Half rate

Strips of sub plots: Until 1967 wheat alone was grown on the experiment, with some bare fallowing on strips of sub plots. From 1968, ten sub plots were started with the following cropping:-

				70, 71, 72,															
				73, 74, 75,															
				and and and															
SECTION	Section	68	69	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92
0/W41	0*	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
1/W26	1	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
-	2	BE	W	P	BE	W	F	P	W	F	P	W	W	W	F	P	W	W	W	F
POTATOES	3	W	W	F	W	W	F	W	W	W	W	W	W	F	P	W	W	W	F	P
4/W2	4	W	P	BE	W	P	P	W	F	P	W	F	P	W	W	W	F	P	W	W
5/W1	5	W	F	W	W	F	W	W	W	W	W	W	F	P	W	W	W	F	P	W
6/W15	6**	F	W	W	F	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
7/W3	7	P	BE	W	P	BE	W	F	P	W	F	P	W	W	W	F	P	W	W	W
8/W4	8+	W	W	W	W	W	W	W	F	W	W	W	W	W	W	F	W	W	W	W
9/W34	9	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W

W = w. wheat, P = potatoes, BE = s. beans, F = fallow

* Straw incorporated since 1987. ** No sprays except weedkillers since 1985. + No weedkillers.

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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. Since autumn 1988 a five year cycle has been 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.

Experimental diary:

All Sections:
30-Sep-91 : T : P applied.
07-Oct-91 : T : K, Na and Mg applied.
09-Oct-91 : T : FYM applied.
11-Oct-91 : B : Ploughed and furrow pressed.
14-Oct-91 : B : Rotary harrowed.

Cropped Sections:

W. wheat:
31-Aug-91 : T : Straw chopped (section 0).
09-Oct-91 : T : Chalk applied at 2.9 t (sections 4 and 6)
10-Oct-91 : T : Autumn N treatments applied.
15-Oct-91 : T : Rotary harrowed, Apollo, dressed Fonofos Seed Treatment, drilled at 200 kg.
16-Oct-91 : T : Rolled.
06-Dec-91 : T : Stomp 400 at 3.3 l and Stefes IPU at 2.5 l in 200 l (except section 8).
10-Apr-92 : T : Spring N treatments applied.
14-May-92 : T : Sportak 45 at 0.90 l, Calixin at 0.50 l and Tripart Brevis at 2.25 l in 200 l (except section 6).
09-Jun-92 : T : Chiltern Olé at 2.0 l and Mistral at 1.0 l in 200 l (except section 6).
23-Jun-92 : T : Radar at 0.50 l and Mistral at 0.50 l in 200 l (except section 6).
28-Jun-92 : T : Roundup at 6.0 l with High Trees Mixture B at 2.9 l in 150 l (except section 8).
06-Aug-92 : T : Combine harvested.

Potatoes:
15-Jan-92 : T : Chisel ploughed.
10-Apr-92 : T : N treatments applied.
13-Apr-92 : T : Heavy spring-tine cultivated.
23-Apr-92 : T : Rotary harrowed, planted Pentland Crown Elite 2.
13-May-92 : T : Rotalin at 5.5 l in 400 l.
22-Jun-92 : T : Manex at 2.0 l with Nu Film P at 0.18 l in 200 l.
08-Jul-92 : T : Manex at 2.0 l and Aphox at 0.28 kg with Nu Film P at 0.18 l in 200 l.
16-Jul-92 : T : Manex at 2.0 l with Nu Film P at 0.18 l in 200 l.
28-Jul-92 : T : Manex at 2.5 l with Nu Film P at 0.18 l in 200 l.
17-Aug-92 : T : Chiltern Super-Tin 4L at 0.56 l with Nu Film P at 0.18 l in 200 l.
29-Aug-92 : T : Chiltern Super-Tin 4L at 0.56 l with Nu Film P at 0.18 l in 200 l.
10-Sep-92 : T : Reglone at 4.0 l in 200 l.
22-Sep-92 : T : Haulm mechanically destroyed.
02-Oct-92 : T : Lifted.

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Experimental diary:
Fallow:
15-Jan-92 : **T** : Chisel ploughed.
13-Apr-92 : **T** : Heavy spring-tine cultivated.
18-May-92 : **T** : Heavy spring-tine cultivated.
25-Jun-92 : **T** : Cultivated by rotary grubber.

NOTE: Samples of grain and straw from Sections 1 and 5 and samples of potato tubers from Section 3 were taken for chemical analysis.

W. WHEAT

GRAIN TONNES/HECTARE

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

SECTION / **PLOT**	5/W1	4/W2	7/W3	8/W4	6/W15	1/W26	9/W34	0/W41
01DN4PK	7.54	8.12	6.97	*	4.81	*	*	*
21DN2	8.38	9.18	8.31	4.93	6.67	8.52	8.03	8.59
22D	9.37	4.74	6.82	4.29	6.46	7.16	8.18	6.18
030	1.99	0.81	0.70	1.94	1.41	1.21	0.72	1.16
05F	1.92	1.06	0.93	2.39	1.57	1.81	1.59	1.49
06N1F	6.07	2.92	3.11	2.78	3.93	4.18	4.26	4.57
07N2F	8.75	4.89	3.94	3.67	5.03	5.68	6.07	5.39
08N3F	9.62	7.01	5.66	4.69	6.45	7.00	7.83	6.81
09N4F	9.03	7.81	7.52	5.10	6.51	7.08	8.07	7.64
10N2	7.44	2.91	2.40	2.24	3.39	3.39	2.90	2.96
11N2P	4.66	5.28	3.22	3.51	3.49	5.02	2.39	5.00
12N2PNA	5.96	5.08	3.21	3.02	5.11	3.67	3.37	5.66
13N2PK	8.05	4.15	3.37	2.87	5.34	5.31	6.55	5.35
14N2PKMG	8.29	4.08	3.59	2.84	5.30	5.55	6.59	5.99
15N5F	8.58	8.29	7.34	4.53	5.50	8.04	8.32	7.87
16N6F	8.32	7.96	7.72	4.79	4.85	7.59	8.00	7.64
17N1+3FN	9.09	7.48	7.22	3.43	6.41	7.52	8.21	7.62
18N0+3FN	9.44	7.27	6.64	2.67	6.71	7.34	8.03	7.57
19C	5.69	1.15	1.06	3.12	2.65	2.27	2.64	2.59
20NKMG	*	*	*	*	*	3.08	*	3.77

GRAIN MEAN DM% 87.5

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92/R/BK/1 W. WHEAT
STRAW TONNES/HECTARE

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

SECTION / PLOT	5/W1	1/W26
01DN4PK	8.26	*
21DN2	8.08	7.01
22D	9.37	3.95
030	0.96	0.16
05F	0.64	0.24
06N1F	3.51	1.52
07N2F	5.55	2.52
08N3F	5.48	3.43
09N4F	4.94	2.65
10N2	2.59	2.06
11N2P	1.74	2.13
12N2PNA	2.60	1.42
13N2PK	4.16	2.30
14N2PKMG	4.50	2.20
15N5F	4.77	3.52
16N6F	5.23	4.07
17N1+3FN	5.17	3.41
18N0+3FN	5.02	3.10
19C	2.95	0.40
20NKMG	*	1.67

STRAW MEAN DM% 82.4

CLEAN GRAIN TONNES/HECTARE, AFTER REMOVING WEED SEEDS

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

SECTION / PLOT	8/W4
01DN4PK	*
21DN2	4.82
22D	3.82
030	1.57
05F	1.46
06N1F	2.50
07N2F	3.37
08N3F	4.52
09N4F	4.95
10N2	2.15
11N2P	3.42
12N2PNA	2.96
13N2PK	2.47
14N2PKMG	2.10
15N5F	4.41
16N6F	4.60
17N1+3FN	2.69
18N0+3FN	1.81
19C	2.80
20NKMG	*

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92/R/BK/1 POTATOES

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

PLOT	TOTAL TUBERS TONNES/ HECTARE	% WARE 3.81 CM (1.5 INCH) RIDDLE
01DN4PK	54.0	97.7
21DN2	62.1	97.6
22D	56.5	98.7
030	10.6	92.7
05F	23.8	97.6
06N1F	25.1	95.7
07N2F	31.3	94.8
08N3F	34.1	96.9
09N4F	42.4	98.1
10N2	7.3	78.8
11N2P	7.3	78.2
12N2PNA	8.2	84.9
13N2PK	15.5	97.2
14N2PKMG	32.4	95.7
15N5F	36.5	97.0
16N6F	46.2	97.7
17N3FH	32.5	97.0
18N3FH	28.0	95.6
19C	15.1	95.1

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92/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 141st year, s. barley.

For previous years see 'Details' 1967 and 1973, Station Report for 1966 and 74-91/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	-	-

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92/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 (triple superphosphate in 1974, 1988, 1989 and 1991, 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

NOTE: For a fuller record see 'Details' etc.

Experimental diary:

15-Oct-91 : B : Chalk applied at 2.9 t.
07-Dec-91 : B : Sting CT at 2.0 l in 200 l.
11-Dec-91 : **T** : Silicate of soda and kieserite applied.
12-Dec-91 : **T** : P and K applied.
06-Jan-92 : **T** : FYM applied.
13-Jan-92 : B : Ploughed.
25-Feb-92 : B : Spring-tine cultivated.
26-Feb-92 : B : Rotary harrowed, Alexis, dressed Baytan, drilled at 150 kg, rolled.
06-May-92 : **T** : N applied.

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92/R/HB/2

Experimental diary:

15-May-92 : B : Deloxil at 1.0 l, Duplosan New System CMPP at 2.0 l and Calixin at 0.70 l in 200 l.
09-Jun-92 : B : Calixin at 0.50 l and Radar at 0.50 l in 200 l.
05-Aug-92 : B : Combine harvested.

NOTES: (1) No yields were taken from the plots **MANURE** --- and A-- owing to poor early growth and subsequent damage from rabbit grazing.
(2) Samples of grain and straw were taken for chemical analysis.

MAIN PLOTS

GRAIN TONNES/HECTARE

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

N / MANURE	0	48	96	144	Mean
---	0.00	0.00	0.00	0.00	0.00
-P-	1.86	2.93	3.35	3.92	3.01
--K	0.67	1.56	1.41	1.99	1.40
-PK	1.66	4.02	5.11	5.41	4.05
A--	0.00	0.00	0.00	0.00	0.00
AP-	2.32	3.03	2.16	2.04	2.39
A-K	0.63	0.55	0.82	0.86	0.71
APK	1.90	4.16	4.67	4.97	3.93
N----	0.58	0.39	0.32	0.63	0.48
NP---	2.32	4.19	2.83	4.34	3.42
N-K--	1.34	0.96	0.62	1.40	1.08
NPK--	2.01	4.32	4.91	5.85	4.27
N--S-	1.46	1.04	1.22	1.85	1.39
NP-S-	2.45	3.53	4.02	4.34	3.59
N-KS-	2.10	2.20	3.52	2.27	2.52
NPKS-	1.94	4.82	5.86	5.76	4.60
N---S	1.15	1.34	0.95	0.96	1.10
NP--S	2.81	4.42	3.83	4.33	3.85
N-K-S	1.09	2.80	1.94	1.65	1.87
NPK-S	2.27	4.46	5.24	5.53	4.38
N--SS	0.70	1.31	1.01	1.96	1.25
NP-SS	3.01	3.83	4.22	3.84	3.72
N-KSS	2.05	2.84	2.57	2.17	2.41
NPKSS	2.26	3.93	5.38	5.99	4.39
C(--)	1.58	2.21	2.32	3.42	2.38
C(P-)	2.22	3.74	4.29	4.56	3.70
C(-K)	2.12	3.25	3.63	4.84	3.46
C(PK)	2.11	4.22	4.92	5.05	4.08
D	6.87	7.15	7.15	7.12	7.07
(D)	2.88	2.35	2.84	3.04	2.78
(A)	1.39	1.47	1.77	3.08	1.93
-	0.52	1.13	1.57	1.26	1.12
Mean	1.82	2.75	2.95	3.26	2.70

GRAIN MEAN DM% 79.3

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92/R/HB/2

STRAW TONNES/HECTARE

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

N	0	48	96	144	Mean
MANURE					
---	0.00	0.00	0.00	0.00	0.00
-P-	0.40	1.18	2.11	2.12	1.45
--K	0.14	0.46	0.60	0.72	0.48
-PK	0.64	1.66	2.31	2.62	1.81
A--	0.00	0.00	0.00	0.00	0.00
AP-	0.81	1.82	1.59	1.86	1.52
A-K	0.22	0.17	0.22	0.29	0.23
APK	0.52	1.84	2.14	2.75	1.81
D	4.37	5.38	5.06	5.06	4.96
(D)	1.10	1.07	1.79	1.49	1.36
(A)	0.36	0.43	0.68	1.29	0.69
-	0.13	0.38	0.87	0.39	0.44
Mean	0.72	1.20	1.45	1.55	1.23

STRAW MEAN DM% 57.6

PLOT AREA HARVESTED 0.00154

EXTRA PLOTS

GRAIN TONNES/HECTARE

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

MANURE	551AN2PK	561--PK	571NN2--	581NN2--	Mean
MGNESIUM					
0	4.70	1.10	2.85	0.53	2.29
35	5.28	0.97	1.70	0.56	2.13
Mean	4.99	1.04	2.27	0.55	2.21

GRAIN MEAN DM% 84.7

PLOT AREA HARVESTED 0.00329

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92/R/WF/3

WHEAT AND FALLOW

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

The 137th year, w. wheat.

For previous years see 'Details' 1967, 1973 and 74-91/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:
15-Oct-91 : **T** : Rotary harrowed twice, Apollo, dressed Fonofos Seed Treatment, drilled at 200 kg.
17-Oct-91 : **T** : Rolled.
30-Jul-92 : **T** : Combine harvested.
Fallow plot:
20-Sep-91 : **T** : Ploughed, spring-tine cultivated, rolled.
15-Jan-92 : **T** : Chisel ploughed.
18-May-92 : **T** : Heavy spring-tine cultivated.
25-Jun-92 : **T** : Cultivated by rotary grubber.

GRAIN AND STRAW TONNES/HECTARE

	GRAIN	STRAW
YIELD	1.19	1.08
MEAN DM%	85.5	86.4
PLOT AREA HARVESTED	0.04304	

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92/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 in 1992 - Hoosfield.

The 137th year, w. wheat.

For previous years see 'Details' 1967, 1973 and 74-91/R/EX/4.

Treatments: All combinations of:-

Whole plots (P test)

1.	**OLD RES**	Residues of manures applied annually 1876-1901:
	0	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, 16 kg Na as sulphate of soda, 11 kg Mg as sulphate of magnesia
2.	**P**	Phosphate applied annually from 1986 as superphosphate until 1987, triple superphosphate since:
	0	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:
0	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 potash
N*PK	N, P and K as above

Experimental diary:

P test:

18-Sep-91 : **T** : P applied as triple superphosphate to treatment plots.
: **T** : Muriate of potash at 170 kg.

Residual N test:

18-Sep-91 : **T** : Triple superphosphate at 1420 kg.
23-Sep-91 : **T** : Triple superphosphate at 710 kg.

https://doi.org/10.23637/ERADOC-1-47

92/R/EX/4

Experimental diary:
All plots:
19-Sep-91 : B : Sting CT at 1.5 l in 200 l.
20-Sep-91 : B : Ploughed, spring-tine cultivated, rolled.
23-Sep-91 : B : Rotary harrowed, Mercia drilled at 160 kg, rolled.
14-Apr-92 : B : 34.5% N applied at 560 kg.
23-Jun-92 : B : Radar at 0.50 l and Mistral at 0.50 l in 200 l.
31-Jul-92 : B : Combine harvested.

NOTES: (1) Yields presented for **K TEST** are means of four plots.
(2) Grain and straw samples were taken for chemical analysis.

P TEST

GRAIN TONNES/HECTARE

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

P	0	P1	P2	P3	Mean
OLD RES					
0	2.70	7.97	8.17	7.96	6.70
D	6.85	8.21	8.03	8.11	7.80
N	2.43	7.94	7.92	8.11	6.60
P	5.08	7.46	7.26	7.63	6.86
NPKNAMG	4.69	7.70	7.90	7.84	7.03
Mean	4.35	7.86	7.86	7.93	7.00

GRAIN MEAN DM% 87.5

STRAW TONNES/HECTARE

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

P	0	P1	P2	P3	Mean
OLD RES					
0	1.71	6.39	6.96	6.79	5.46
D	4.72	6.60	7.21	6.43	6.24
N	1.87	6.62	7.50	7.18	5.79
P	4.27	6.03	8.13	7.60	6.51
NPKNAMG	3.82	6.39	7.20	6.91	6.08
Mean	3.28	6.41	7.40	6.98	6.02

STRAW MEAN DM% 85.1

PLOT AREA HARVESTED 0.00589

https://doi.org/10.23637/ERADOC-1-47

92/R/EX/4

K TEST

GRAIN TONNES/HECTARE

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

OLD RES	O	D	N*	PK	N*PK	Mean
	5.70	7.35	5.25	4.96	5.69	5.79

GRAIN MEAN DM% 87.8

STRAW TONNES/HECTARE

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

OLD RES	O	D	N*	PK	N*PK	Mean
	5.24	5.70	4.90	5.55	5.19	5.32

STRAW MEAN DM% 91.6

PLOT AREA HARVESTED 0.00589

https://doi.org/10.23637/ERADOC-1-47

92/R/PG/5

PARK GRASS

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

The 137th year, hay.

For previous years see 'Details' 1967 and 1973 and 74-91/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/PLOT3	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/PLOT12	Plot 12	None
D/F	Plot 13	D/F
MN(N2*14)	Plot 14/1	P K Na Mg (N2* until 1989)
N2*MN	Plot 14/2	N2* P K Na Mg
MN(N2*15)	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 single superphosphate until 1986, triple superphosphate in 1974, and since 1987
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

https://doi.org/10.23637/ERADOC-1-47

92/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. Liming ceased on plots 9/1 and 14/1 after 1989. Lime last applied in 1990.

Additional sub plots (Plots 18, 19 and 20 only) (tonnes CaCO3 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:

28-Nov-91 : **T** : P applied.
15-Jan-92 : **T** : K, Na, Mg and Si applied.
07-May-92 : **T** : N applied.
16-Jun-92 : **T** : First sample cut, herbage removed. Remaining area cut for hay.
17-Jun-92 : B : Hay turned twice with tedder.
18-Jun-92 : B : Hay turned with tedder, rowed up.
22-Jun-92 : B : Hay turned twice with tedder.
23 Jun-92 : B : Hay rowed up and baled
13-Nov-92 : B : Second sample cut, herbage removed.
14-Dec-92 : B : Remaining area cut, herbage removed.

NOTES: (1) On sub plots 'a' and 'd' of plots 03, 9/2, 11/1, 12, 14/2 and 16 hay was made, weighed and sampled on the area of the sub plots remaining after the silage cut has been removed.
(2) After the second sample cut wet weather delayed the cutting and removal of herbage on the non-yield area.

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92/R/PG/5

1ST CUT (16/6/92) DRY MATTER TONNES/HECTARE

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

LIME / MANURE	A	B	C	D	MEAN
N1	2.66	2.83	2.38	0.92	2.20
O(D)	2.15	2.80	1.75	1.63	2.08
O/PLOT3	2.06	2.78	1.47	1.58	1.97
P	2.72	3.73	2.53	2.41	2.85
N2P	2.88	3.00	3.00	2.04	2.73
N1MN	5.37	4.78			5.07
MN	5.21	5.53	4.25	3.61	4.65
PNAMG	2.67	3.03	2.52	2.32	2.64
MN(N2)	3.56	2.95	2.38	3.96	3.21
N2MN	4.89	4.34	2.77	3.48	3.87
N2PNAMG	3.50	3.61	3.29	2.68	3.27
N3MN	5.14	4.66	4.90	4.34	4.76
N3MNSI	4.43	4.34	3.99	4.07	4.21
O/PLOT12	2.13	1.88	1.24	1.39	1.66
D/F	4.29	4.89	3.67	3.16	4.00
MN(N2*14)	4.29	3.83	3.96	3.75	3.96
N2*MN	4.07	6.43	5.38	5.93	5.45
MN(N2*15)	5.11	5.23	5.30	4.06	4.93
N1*MN	4.89	5.15	4.56	4.21	4.70
N1*	3.35	3.27	2.76	2.75	3.03
N2KNAMG0			1.99	1.42	1.70
N2KNAMG2	2.96				2.96
N2KNAMG1	3.15	2.54			2.84
D0	3.72				3.72
D2	4.55				4.55
D1	3.83				3.83
D/N*PK0	4.75				4.75
D/N*PK2	4.81				4.81
D/N*PK1	4.39				4.39

1ST CUT MEAN DM% 24.2

https://doi.org/10.23637/ERADOC-1-47

92/R/PG/5

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

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

LIME / MANURE	A	B	C	D	MEAN
N1	3.32	3.18	3.46	1.63	2.89
O(D)	1.96	2.45	2.48	2.70	2.40
O/PLOT3	1.90	2.56	2.65	3.93	2.76
P	2.62	2.20	2.37	2.63	2.45
N2P	3.53	3.33	2.82	2.27	2.99
N1MN	3.44	3.60			3.52
MN	3.46	3.26	3.54	2.82	3.27
PNAMG	2.79	2.41	3.82	4.02	3.26
MN(N2)	2.23	2.18	2.03	2.74	2.30
N2MN	2.80	2.82	3.07	3.01	2.92
N2PNAMG	2.67	3.55	3.12	3.13	3.12
N3MN	3.43	3.28	3.71	3.91	3.58
N3MNSI	3.65	3.10	3.13	3.74	3.41
O/PLOT12	1.85	1.86	2.28	2.45	2.11
D/F	3.21	3.40	4.50	3.83	3.73
MN(N2*14)	3.47	3.49	1.51	1.73	2.55
N2*MN	3.07	2.67	1.97	1.51	2.31
MN(N2*15)	2.82	2.91	3.22	2.81	2.94
N1*MN	2.91	2.48	2.97	2.40	2.69
N1*	2.49	2.27	2.55	2.68	2.50
N2KNAMG0			3.33	5.83	4.58
N2KNAMG2	2.27				2.27
N2KNAMG1	4.82	3.89			4.36
D0	5.39				5.39
D2	3.88				3.88
D1	3.85				3.85
D/N*PK0	4.39				4.39
D/N*PK2	3.29				3.29
D/N*PK1	3.42				3.42

2ND CUT MEAN DM% 28.2

https://doi.org/10.23637/ERADOC-1-47

92/R/PG/5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

LIME / MANURE	A	B	C	D	MEAN
N1	5.98	6.01	5.84	2.54	5.09
O(D)	4.11	5.25	4.23	4.33	4.48
O/PLOT3	3.96	5.34	4.12	5.51	4.73
P	5.33	5.93	4.89	5.05	5.30
N2P	6.41	6.33	5.82	4.31	5.72
N1MN	8.80	8.38			8.59
MN	8.67	8.79	7.78	6.43	7.92
PNAMG	5.47	5.44	6.34	6.34	5.90
MN(N2)	5.79	5.13	4.40	6.70	5.51
N2MN	7.69	7.16	5.83	6.49	6.79
N2PNAMG	6.17	7.16	6.41	5.82	6.39
N3MN	8.57	7.94	8.61	8.24	8.34
N3MNSI	8.08	7.44	7.12	7.81	7.61
O/PLOT12	3.98	3.74	3.52	3.84	3.77
D/F	7.49	8.29	8.17	6.99	7.73
MN(N2*14)	7.76	7.31	5.47	5.48	6.51
N2*MN	7.15	9.10	7.35	7.45	7.76
MN(N2*15)	7.93	8.14	8.52	6.87	7.87
N1*MN	7.80	7.64	7.53	6.61	7.39
N1*	5.84	5.54	5.30	5.43	5.53
N2KNAMG0			5.32	7.25	6.28
N2KNAMG2	5.24				5.24
N2KNAMG1	7.97	6.43			7.20
D0	9.11				9.11
D2	8.43				8.43
D1	7.68				7.68
D/N*PK0	9.14				9.14
D/N*PK2	8.09				8.09
D/N*PK1	7.81				7.81

TOTAL OF 2 CUTS MEAN DM% 26.2

PLOT AREA HARVESTED 0.00002

https://doi.org/10.23637/ERADOC-1-47

92/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 ninth year of grass/clover. The 18th year of grass on the rest of the experiment.

For previous years see 'Details' 1967 and 1973 and 74-91/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 single superphosphate until 1987, triple superphosphate since and in 1974
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 1992 (kg N per cut) as 'Nitram', 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

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92/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:
13-Nov-91 : **T** : P applied.
14-Nov-91 : **T** : K applied.
10-Jun-92 : B : First cut.
10-Nov-92 : B : Second cut.
Grass (Sections 3, 4, 5 and 6 only):
13-Mar-92 : **T** : N applied.
18-Jun-92 : **T** : N applied.

NOTE: Herbage samples were taken for chemical analysis.

GRASS

1ST CUT (10/6/92) DRY MATTER TONNES/HECTARE

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

N PERCUT / **MANURE**	75	100	125	150	Mean
D	6.52	6.33	4.93	5.38	5.79
DPK	6.95	7.04	7.58	6.23	6.95
PKMG	5.50	6.82	5.51	6.09	5.98
P	2.74	2.13	1.55	1.25	1.92
PK	6.30	5.66	6.02	5.49	5.87
PMG	3.09	2.35	2.07	1.13	2.16
0	2.60	2.54	1.78	1.60	2.13
Mean	4.82	4.70	4.20	3.88	4.40

MANURE KMG 100 6.41

Grand mean 4.47

1ST CUT MEAN DM% 24.6

https://doi.org/10.23637/ERADOC-1-47

92/R/BN/7

GRASS

2ND CUT (10/11/92) DRY MATTER TONNES/HECTARE

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

N PERCUT / MANURE	75	100	125	150	Mean
D	5.54	5.26	5.43	6.17	5.60
DPK	5.02	5.33	4.67	5.38	5.10
PKMG	4.10	5.01	5.01	4.54	4.66
P	1.75	1.28	2.45	1.86	1.83
PK	3.87	4.83	5.03	4.00	4.43
PMG	2.38	0.85	1.74	2.58	1.89
0	1.95	1.66	2.21	2.64	2.12
Mean	3.52	3.46	3.79	3.88	3.66

MANURE KMG 100 5.28

Grand mean 3.72

2ND CUT MEAN DM% 19.8

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

N PERCUT / MANURE	75	100	125	150	Mean
D	12.06	11.59	10.36	11.55	11.39
DPK	11.98	12.36	12.25	11.61	12.05
PKMG	9.60	11.83	10.52	10.63	10.65
P	4.49	3.41	4.00	3.11	3.75
PK	10.18	10.49	11.05	9.48	10.30
PMG	5.48	3.20	3.81	3.71	4.05
0	4.55	4.19	3.99	4.24	4.24
Mean	8.33	8.15	8.00	7.76	8.06

MANURE KMG 100 11.69

Grand mean 8.19

TOTAL OF 2 CUTS MEAN DM% 22.2

PLOT AREA HARVESTED 0.00155

https://doi.org/10.23637/ERADOC-1-47

92/R/BN/7

GRASS/CLOVER

1ST CUT (10/6/92) DRY MATTER TONNES/HECTARE

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

MANURE	D	DPK	PKMG	P	PK	PMG	0	Mean
	3.31	3.81	3.32	2.84	3.10	3.06	2.29	3.10

1ST CUT MEAN DM% 13.9

2ND CUT (10/11/92) DRY MATTER TONNES/HECTARE

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

MANURE	D	DPK	PKMG	P	PK	PMG	0	Mean
	2.53	2.28	1.27	2.10	1.88	1.67	1.39	1.87

2ND CUT MEAN DM% 13.0

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

MANURE	D	DPK	PKMG	P	PK	PMG	0	Mean
	5.83	6.09	4.59	4.94	4.97	4.73	3.69	4.98

TOTAL OF 2 CUTS MEAN DM% 13.4

PLOT AREA HARVESTED 0.00568

https://doi.org/10.23637/ERADOC-1-47

92/R/GC/8

GARDEN CLOVER

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

The 139th year, red clover.

For previous years see 'Details' 1967 and 1973, and 74-91/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:

```
18-Oct-91 : B : Hand weeded.  Chalk at 1.25 t, PK as (0:18:36) at 420 kg
                and Epsom salts at 530 kg.
23-Apr-92 : B : Hand weeded.
10-Jun-92 : B : First cut.
11-Jun-92 : B : Muriate of potash at 380 kg.
30-Jul-92 : B : Second cut.
18-Aug-92 : B : Muriate of potash at 380 kg.
12-Oct-92 : B : Third cut.
```

NOTE: Plant samples were chemically analysed.

1ST CUT (10/6/92) DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	7.29	6.09	6.69

1ST CUT MEAN DM% 17.1

2ND CUT (30/7/92) DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	8.28	6.88	7.58

2ND CUT MEAN DM% 19.0

https://doi.org/10.23637/ERADOC-1-47

92/R/GC/8

3RD CUT (12/10/92) DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	2.66	1.70	2.18

3RD CUT MEAN DM% 17.5

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	18.23	14.66	16.45

TOTAL OF 3 CUTS MEAN DM% 17.9

PLOT AREA HARVESTED 0.00010

https://doi.org/10.23637/ERADOC-1-47