ROTHAMSTED RESEARCH

Yields of the Field Experiments 1984

Full Table of Content

Experiements - Classicals

Rothamsted Research

Rothamsted Research (1985) *Experiements - Classicals ;* Yields Of The Field Experiments 1984, pp 9 - 46 **- DOI: https://doi.org/10.23637/ERADOC-1-32**

84/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.

The 141st 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, and 74-83/R/BK/1.

Areas harvested:

	Section	
Wheat:	0	0.00434
	1	0.00798
	2,3,5,and 6	0.00659
	8 and 9	0.00694
Potatoes:	7	0.00659

Treatments:

Whole plots

PLOT	Plot	Fertilizers and organic manures:- Treatments until 1967	Treatments from 1968	Changes from 1980
01DN2PK	01	-	D N2 P K	-
21DN2	21	D	D N2	-
22D	22	D	D	-
030	03	None	None	-
05F	05	P K Na Mg	P K (Na) Mg	-
06N1F	06	N1 P K Na Mg	N1 P K (Na) Mg	-
07N2F	07	N2 P K Na Mg	N2 P K (Na) Mg	-
08N3F	08	N3 P K Na Mg	N3 P K (Na) Mg	-
09N4F	09	N*1 P K Na Mg	N4 P K (Na) Mg	-
10N2	10	N2	N2	-
11N2P	11	N2 P	N2 P	-
12N2PNA	12	N2 P Na	N2 P Na	-
13N2PK	13	N2 P K	N2 P K	-
14N2PKMG	14	N2 P Mg	N2 P K Mg	-
15N3F	15	N2 P K Na Mg	N3 P K (Na) Mg	-
16N2F	16	N*2 P K Na Mg	N2 P K (Na) Mg	-
17N1+3FH	17	N2(A)	N2 1/2(P K (Na) Mg)	N1+3 1/2(PK (Na) Mg)+
18N0+3FH	18	P K Na Mg(A)	N2 1/2(P K (Na) Mg)	N0+3 1/2(PK (Na) Mg)+
19C	19	C	C	-
20NKMG	20	N2 K Na Mg	N2 K (Na) Mg	-

(A) Alternating

\+ To w. wheat only; autumn N alternates. Potatoes receive N3 1/2(PK (Na) Mg) on both plots 17 and 18.

https://doi.org/10.23637/ERADOC-1-32

84/R/BK/1

N1,N2,N3,N4: 48, 96, 144, 192 kg N (as sulphate of ammonia until 1967, except N* which was nitrate of soda. All as 'Nitro-Chalk' in spring from 1968).
NO+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 (triple superphosphate in 1974)
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
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:-

SECTION	Section	68	69	70, 71, 72, 73, 74, 75, and 76	and 77	and 78	79	80	81	82	83	84
SC0/W33	0	W	W	W	W	W	W	W	W	W	W	W
SC1/W18	1	W	W	W	W	W	W	W	W	W	W	W
SC2/W1P	2	BE	W	P	BE	W	F	P	W	F	P	W
SC3/W5	3	W	W	F	W	W	F	W	W	W	W	W
-	4	W	P	BE	W	P	P	W	F	P	W	F
SC5/W6	5	W	F	W	W	F	W	W	W	W	W	W
SC6/W7	6	F	W	W	F	W	W	W	W	W	W	W
POTATOES	7	P	BE	W	P	BE	W	F	P	W	F	P
SC8/W3	8*	W	W	W	W	W	W	W	F	W	W	W
SC9/W26	9	W	W	W	W	W	W	W	W	W	W	W

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

* No weedkillers

NOTES: (1) For a fuller record of treatments see 'Details' etc.
(2) Since autumn 1975 chalk is applied at 2.9 t each autumn to sets of Sections on a three-year cycle. Year 1: Sections 1,2,3. Year 2: Sections 6,7,8 and 9. Year 3: Sections 0,4,5. Chalk is applied to all plots of each section.

Standard applications:
W. wheat: Manures: Sections 0 and 5 only: Chalk at 2.9 t. Weedkillers: (not applied to section 8): Chlortoluron at 3.5 kg in 250 l. Cyanazine at 0.30 l and mecoprop at 2.0 l in 250 l. Fungicide: Propiconazole at 0.25 kg in 250 l. Insecticide: Pirimicarb at 0.14 kg in 500 l.

https://doi.org/10.23637/ERADOC-1-32

Potatoes: Weedkillers: Linuron at 1.3 kg and paraquat at 0.50 kg ion in 500 l. Fungicide: Fentin hydroxide at 0.28 kg, on six occasions, the first in 250 l and the remainder in 200 l, applied with the insecticide on the first and third occasions. Insecticide: Pirimicarb at 0.14 kg on two occasions.
Fallow: Manures: Chalk at 2.9 t.

Seed: W. wheat: Flanders, dressed chlorfenvinphos, sown at 210 kg.
Potatoes: Pentland Crown.

Cultivations, etc.:-
All Sections: Sulphate of potash, sulphate of soda, kieserite and castor meal applied: 6 Sept, 1983. Superphosphate applied: 7 Sept. FYM applied: 8 Sept. Ploughed: 9 Sept. Spring-tine cultivated: 4 Oct.
Cropped Sections: W. wheat: Chalk to sections 0 and 5: 31 Aug, 1983. Autumn N applied: 7 Sept. Rotary harrowed, seed sown: 6 Oct. Chlortoluron applied (except Section 8): 1 Dec. Cyanazine and mecoprop applied (except Section 8): 10 Apr, 1984. Spring N applied: 13 Apr. Fungicide applied: 11 June. Insecticide applied: 28 June. Combine harvested: 14 Aug.
Potatoes: Chisel ploughed: 13 Dec, 1983. N applied: 3 Apr, 1984. Rotary harrowed, potatoes planted: 4 Apr. Rotary ridged: 10 Apr. Weedkillers applied: 3 May. Fentin hydroxide with the insecticide applied: 19 June, 16 July. Fentin hydroxide applied: 3 July, 30 July, 13 Aug, and 28 Aug. Haulm mechanically destroyed: 3 Sept. Lifted: 4 Sept.
Fallow: Chalk applied: 31 Aug, 1983. Chisel ploughed: 13 Dec. Ploughed: 1 May, 1984. Heavy spring-tine cultivated: 8 May. Ploughed: 18 June. Spring-tine cultivated: 25 June. Rotary cultivated: 23 July.

NOTE: The percentage weights of weed seeds in the recorded grain yields of plots in Section 8 were measured. Only five plots exceeded 3% (Plots 05 and 06 10%; Plot 19 5%; Plots 07 and 16 4%) and no adjustments have been made.

https://doi.org/10.23637/ERADOC-1-32

84/R/BK/1 W.WHEAT

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

SECTION PLOT	SC2/W1P	SC8/W3	SC3/W5	SC5/W6	SC6/W7	SC1/W18	SC9/W26	SC0/W33	MEAN
01DN2PK	8.92	*	8.27	8.04	7.89	*	*	*	8.28
21DN2	9.26	4.08	8.32	9.41	8.31	8.67	8.42	8.90	8.17
22D	8.56	5.03	6.62	7.11	6.30	6.59	7.34	7.13	6.83
030	3.55	1.74	2.10	1.63	1.43	2.11	1.95	2.26	2.10
05F	3.60	2.35	1.90	1.91	1.78	1.97	1.79	2.40	2.21
06N1F	5.67	2.52	3.41	3.67	3.46	3.89	4.14	4.47	3.90
07N2F	7.24	2.28	5.50	5.19	5.38	5.92	5.62	5.76	5.36
08N3F	7.90	2.90	6.19	6.28	6.27	6.82	6.58	6.87	6.23
09N4F	8.33	3.37	6.75	6.69	6.39	6.61	6.82	6.71	6.46
10N2	5.46	3.37	4.26	5.00	4.15	3.58	2.95	3.64	4.05
11N2P	6.41	2.14	3.42	4.25	4.13	3.86	2.02	4.02	3.78
12N2PNA	6.68	2.94	4.73	4.56	5.03	4.78	3.97	5.04	4.72
13N2PK	7.25	2.23	5.09	5.11	5.21	5.43	5.91	5.39	5.20
14N2PKMG	7.22	2.67	5.32	5.11	5.10	5.56	5.50	5.60	5.26
15N3F	7.79	2.59	6.03	5.86	6.21	6.23	6.10	6.44	5.91
16N2F	7.31	1.96	5.40	5.16	5.18	5.44	5.58	5.68	5.21
17N1+3FH	8.01	3.30	6.31	6.56	6.60	6.76	6.31	6.16	6.25
18N0+3FH	8.02	2.95	5.68	6.10	6.09	6.13	5.87	6.05	5.86
19C	5.52	3.14	3.45	4.04	2.85	4.00	4.15	3.89	3.88
20NKMG	*	*	*	*	*	4.03	*	3.91	3.97

GRAIN MEAN DM% 84.7

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

SECTION PLOT	SC2/W1P	SC1/W18	MEAN
01DN2PK	6.65	*	6.65
21DN2	7.43	7.65	7.54
22D	6.59	5.22	5.91
030	2.04	1.46	1.75
05F	2.20	1.52	1.86
06N1F	3.04	2.39	2.72
07N2F	4.04	3.10	3.57
08N3F	4.70	3.54	4.12
09N4F	5.30	3.84	4.57
10N2	2.20	2.32	2.26
11N2P	2.91	1.86	2.39
12N2PNA	3.19	1.80	2.49
13N2PK	3.92	2.60	3.26
14N2PKMG	3.85	2.56	3.20
15N3F	4.69	3.23	3.96
16N2F	3.90	2.79	3.35
17N1+3FH	4.98	4.05	4.52
18N0+3FH	4.15	3.09	3.62
19C	3.36	3.34	3.35
20NKMG	*	2.45	2.45

STRAW MEAN DM% 78.5

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84/R/BK/1

POTATOES

***** TABLES OF MEANS *****

PLOT	TOTAL TUBERS TONNES/ HECTARE	% WARE 3.81 CM(1.5 INCH) RIDDLE
01DN2PK	21.8	91.4
21DN2	28.6	91.9
22D	29.1	95.8
030	7.4	89.5
05F	13.7	94.6
06N1F	18.0	93.6
07N2F	21.9	92.1
08N3F	25.3	93.1
09N4F	27.9	94.4
10N2	8.4	90.3
11N2P	9.4	88.0
12N2PNA	11.7	86.0
13N2PK	17.3	91.5
14N2PKMG	20.8	93.2
15N3F	24.2	95.2
16N2F	24.2	95.2
17N3FH	19.8	93.5
18N3FH	22.2	94.6
19C	16.4	94.8

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84/R/HB/2

HOOSFIELD

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 133rd year, s. barley.

For previous years see 'Details' 1967 and 1973, Station Report for 1966 and 74-83/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	-	-

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 single superphosphate (triple superphosphate in 1974)
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)

https://doi.org/10.23637/ERADOC-1-32

84/R/HB/2

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

There are four 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) Chalk was applied at 2.9 t to all plots in 6th barley after potatoes.

Basal applications: Weedkillers: 3, 6-dichloropicolinic acid at 0.05 kg and bromoxynil at 0.24 kg with mecoprop (as 'CMPP' at 3 l) applied with the fungicide in 250 l. Fungicide: Tridemorph at 0.52 kg.

Seed: Triumph, dressed triadimenol and fuberidazole, sown at 160 kg.

Cultivations, etc.:- Chalk applied: 14 Sept, 1983. P, K and silicate of soda applied: 15 Nov. FYM applied, ploughed: 16 Nov. Spring-tine cultivated: 7 Mar, 1984. Seed sown: 8 Mar. N applied: 16 Apr. Weedkillers and fungicide applied: 16 May. Combine harvested: 18 Aug.

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84/R/HB/2

BARLEY

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N / MANURE	0	48	96	144	MEAN
---	1.25	2.00	2.04	2.00	1.82
-P-	1.53	2.64	3.68	2.83	2.67
--K	1.72	2.91	3.15	3.42	2.80
-PK	2.06	3.77	5.34	4.95	4.03
A--	0.81	1.50	1.96	1.97	1.56
AP-	1.99	2.40	2.29	2.07	2.19
A-K	1.49	2.53	3.05	2.92	2.50
APK	2.13	3.54	5.23	5.31	4.05
N---	1.57	1.76	2.31	2.23	1.97
NP--	1.91	3.16	2.98	2.75	2.70
N-K-	1.62	2.64	2.54	3.26	2.52
NPK-	2.26	4.36	5.32	5.51	4.36
N--S	2.11	3.02	2.95	3.27	2.84
NP-S	2.36	3.66	4.57	3.83	3.61
N-KS	2.19	3.52	4.62	4.37	3.67
NPKS	2.54	4.51	5.77	6.11	4.73
N---S	1.44	1.95	2.89	2.81	2.27
NP--S	2.21	4.29	4.73	4.30	3.88
N-K-S	1.90	3.16	3.35	3.05	2.86
NPK-S	2.72	4.61	5.92	6.16	4.86
N--SS	1.84	2.36	2.56	2.68	2.36
NP-SS	2.47	4.04	4.51	4.71	3.93
N-KSS	1.89	3.33	4.02	4.03	3.32
NPKSS	2.99	4.56	6.14	6.27	4.99
C(--)	1.65	2.81	3.53	3.24	2.81
C(P-)	2.20	3.81	4.52	3.88	3.60
C(-K)	2.03	3.53	4.25	4.74	3.64
C(PK)	2.55	4.57	5.63	5.76	4.63
D	7.29	7.60	7.76	7.55	7.55
(D)	2.54	3.23	4.19	3.44	3.35
(A)	1.82	3.31	3.56	4.18	3.22
-	1.71	2.71	2.63	2.92	2.49
MEAN	2.14	3.45	4.13	4.08	3.45

GRAIN MEAN DM% 84.0

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84/R/HB/2

BARLEY

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

N	0	48	96	144	MEAN
MANURE					
---	0.19	0.58	0.59	0.39	0.44
-P-	0.39	0.79	1.37	0.98	0.88
--K	0.39	0.98	0.98	1.17	0.88
-PK	0.78	1.18	2.36	1.95	1.57
A--	0.39	0.39	0.39	0.39	0.39
AP-	0.39	0.59	0.78	0.58	0.59
A-K	0.39	0.59	0.98	0.78	0.68
APK	0.39	1.36	1.77	2.34	1.47
D	3.13	3.09	3.67	3.64	3.38
(D)	0.78	1.05	1.56	1.05	1.11
(A)	0.52	0.78	1.05	1.30	0.91
-	0.52	0.78	1.05	1.04	0.85
MEAN	0.69	1.01	1.38	1.30	1.10

STRAW MEAN DM% 93.8

PLOT AREA HARVESTED 0.00007

BARLEY

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

MANURE	551AN2PK	561--PK	571NN2--	581NN2--	MEAN
MGNESIUM					
0	4.83	1.27	3.07	2.10	2.82
35	5.27	1.75	3.22	2.65	3.22
MEAN	5.05	1.51	3.15	2.38	3.02

GRAIN MEAN DM% 85.8

PLOT AREA HARVESTED 0.00331

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84/R/WF/3

WHEAT AND FALLOW

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

The 129th year, w. wheat.

For previous years see 'Details' 1967, 1973 and 74-83/R/WF/3.

Whole plot dimensions: 9.60 x 211.

Treatments:
Each year there are two plots, one is sown to w. wheat, one is fallow; they alternate in successive years. The comparison of effects of three-year and one-year fallow, started in 1932, was made for the last time in 1982.

Standard applications:
Wheat plot: Weedkillers: Chlortoluron at 3.5 kg in 250 l. 3, 6-dichloropicolinic acid at 0.07 kg and bromoxynil at 0.34 kg with mecoprop (as 'CMPP' at 4.2 l) in 200 l. Insecticide: Pirimicarb at 0.14 kg in 200 l.

Seed: Flanders, dressed chlorfenvinphos, sown at 210 kg.

Cultivations, etc:-
Wheat plot: Ploughed: 12 Sept, 1983. Spring-tine cultivated: 6 Oct. Rotary harrowed, seed sown: 7 Oct. Chlortoluron applied: 1 Dec. 3, 6-dichloropicolinic acid, bromoxynil and mecoprop applied: 17 Apr, 1984. Insecticide applied: 28 June. Combine harvested: 14 Aug.
Fallow plot: Ploughed: 12 Sept, 1983. Spring-tine cultivated: 6 Oct. Heavy spring-tine cultivated: 27 Apr, 1984. Ploughed: 2 May. Rolled, heavy spring-tine cultivated: 8 May. Ploughed: 18 June. Rolled, spring-tine cultivated: 25 June.

GRAIN AND STRAW TONNES/HECTARE

	GRAIN	STRAW
YIELD	1.95	1.21
MEAN DM%	84.4	86.8
PLOT AREA HARVESTED	0.060090	

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84/R/EX/4

EXHAUSTION LAND

Object: To study the residual effects of manures, applied 1856-1901, on the yield of continuous s. barley - Hoosfield.

The 129th year, s. barley.

For previous years see 'Details' 1967, 1973 and 74-83/R/EX/4.

Treatments: All combinations of:-

Whole plots

1. PLOTFERT(01) Plot numbers and manuring 1876-1901:

1-	Plot 1 None
2-	Plot 2 None
3D	Plot 3 D
4D	Plot 4 D
5N	Plot 5 N
6N*	Plot 6 N*
7NMIN	Plot 7 N P K Na Mg
8N*MIN	Plot 8 N* P K Na Mg
9P	Plot 9 P
10MIN	Plot 10 P K Na Mg

N - 96 kg N as ammonium salts
N* - 96 kg N as nitrate of soda
P - 34 kg P as superphosphate
K - 137 kg K as sulphate of potash
Na - 16 kg Na as sulphate of soda
Mg - 11 kg Mg as sulphate of magnesia
D - Farmyard manure at 35 tonnes
MIN - P K Na Mg

Sub plots

2. N Nitrogen fertilizer (kg N) as 'Nitro-Chalk' (basal until 1975, on a cyclic system since 1976):

0
48
96
144

For a fuller record of treatments see 'Details' 1967 etc.

Basal applications: Weedkillers: 3, 6-dichloropicolinic acid at 0.07 kg with bromoxynil at 0.34 kg and mecoprop (as 'CMPP' at 4.2 l) in 500 l. Fungicide: Tridemorph at 0.52 kg in 250 l.

Seed: Triumph, seed dressed triadimenol and fuberidazole sown at 160 kg.

Cultivations, etc.:- Ploughed: 12 Sept, 1983. Spring-tine cultivated: 8 Mar, 1984. Seed sown: 10 Mar. N treatments applied: 19 Apr. Weedkillers applied: 25 May. Fungicide applied: 6 June. Combine harvested: 17 Aug.

NOTE: PLOTFERT(01) 2- was severely grazed by hares, no yields.

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84/R/EX/4

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N PLOTFERT(01)	0	48	96	144	MEAN
1-	0.78	0.54	0.79	0.82	0.73
2-	*	*	*	*	*
3D	2.09	2.99	3.07	2.95	2.78
4D	1.22	1.65	2.34	2.65	1.96
5N	0.90	1.19	1.13	1.23	1.11
6N*	0.84	0.48	0.75	1.09	0.79
7NMIN	1.77	2.17	2.26	2.37	2.14
8N*MIN	1.38	1.69	1.69	2.10	1.71
9P	2.34	2.26	1.64	2.46	2.17
10MIN	1.82	2.16	2.59	2.82	2.35
MEAN	1.46	1.68	1.81	2.05	1.75

GRAIN MEAN DM% 83.0

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

N PLOTFERT(01)	0	48	96	144	MEAN
1-	0.34	0.21	0.27	0.41	0.31
2-	*	*	*	*	*
3D	0.54	1.16	1.64	1.44	1.20
4D	0.41	0.53	0.86	1.28	0.77
5N	0.28	0.41	0.41	0.41	0.38
6N*	0.35	0.14	0.21	0.34	0.26
7NMIN	0.48	0.96	1.11	1.30	0.96
8N*MIN	0.48	0.62	0.67	0.82	0.65
9P	0.62	0.96	0.89	1.42	0.97
10MIN	0.55	1.08	1.47	1.32	1.10
MEAN	0.45	0.67	0.84	0.97	0.73

STRAW MEAN DM% 84.7

SUB PLOT AREA HARVESTED 0.00728

https://doi.org/10.23637/ERADOC-1-32

84/R/PG/5

PARK GRASS

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

The 129th year, hay.

For previous years see 'Details' 1967 and 1973 and 74-83/R/PG/5.

Treatments: Combinations of:-

Whole plots

1. MANURE Fertilizers and organic manures:

N1	Plot 1	N1
0(D)	Plot 2	None (D until 1863)
0/PLOT3	Plot 3	None
P	Plot 4-1	P
N2P	Plot 4-2	N2 P
N1MIN	Plot 6	N1 P K Na Mg
MIN	Plot 7	P K Na Mg
PNAMG	Plot 8	P Na Mg
N2MIN	Plot 9	N2 P K Na Mg
N2PNAMG	Plot 10	N2 P Na Mg
N3MIN	Plot 11-1	N3 P K Na Mg
N3MINSI	Plot 11-2	N3 P K Na Mg Si
0/PLOT12	Plot 12	None
D/F	Plot 13	D/F
N2*MIN	Plot 14	N2* P K Na Mg
MIN(N2*)	Plot 15	P K Na Mg (N2* until 1875)
N1*MIN	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 (triple superphosphate in 1974)
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
MIN:	P K Na Mg

https://doi.org/10.23637/ERADOC-1-32

84/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.

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
D0	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'. The remaining sub plots of Plots 18, 19 and 20 are treated as 'a'.

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

Cultivations, etc.:- Mineral fertilizers (other than superphosphate) applied: 23 Nov, 1983. Superphosphate applied: 29 Nov. N treatments applied: 5 Apr, 1984. Cut: 7 June, 19 Nov.

https://doi.org/10.23637/ERADOC-1-32

84/R/PG/5

1ST CUT (7/6/84) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

LIME / MANURE	A	B	C	D	MEAN
N1	1.66	1.77	1.27	0.52	1.31
O(D)	1.49	1.69	1.28	1.20	1.42
O/PLOT3	1.55	1.99	0.98	1.08	1.40
P	1.80	2.13	1.67	1.71	1.83
N2P	3.11	2.76	3.13	1.89	2.72
N1MIN	4.37	4.17			4.27
MIN	3.07	3.21	2.16	1.59	2.51
PNAMG	1.58	1.47	1.57	1.66	1.57
N2MIN	4.91	4.74	3.85	2.84	4.08
N2PNAMG	3.38	3.37	3.15	1.98	2.97
N3MIN	5.24	5.05	4.40	2.53	4.30
N3MINSI	5.29	5.17	4.83	2.82	4.53
O/PLOT12	1.74	1.54	1.16	1.22	1.42
D/F	3.35	2.92	2.19	2.41	2.72
N2*MIN	4.67	4.71	4.92	4.57	4.72
MIN(N2*)	3.14	3.03	2.41	2.06	2.66
N1*MIN	3.80	4.54	3.40	3.36	3.78
N1*	2.13	2.15	2.22	2.19	2.17
N2KNAMG0			0.42	0.21	0.31
N2KNAMG2	2.03				2.03
N2KNAMG1	1.48	1.42			1.45
D0	2.11				2.11
D2	2.86				2.86
D1	2.68				2.68
D/N*PK0	3.80				3.80
D/N*PK2	3.67				3.67
D/N*PK1	3.51				3.51

1ST CUT MEAN DM% 21.3

https://doi.org/10.23637/ERADOC-1-32

84/R/PG/5

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

***** TABLES OF MEANS *****

LIME / MANURE	A	B	C	D	MEAN
N1	0.79	0.98	0.41	0.16	0.59
O(D)	0.55	0.49	0.34	0.39	0.44
O/PLOT3	0.46	0.67	0.20	0.36	0.42
P	0.48	0.47	0.63	0.68	0.57
N2P	0.84	1.56	0.92	0.87	1.05
N1MIN	1.91	1.58			1.75
MIN	1.34	1.46	0.91	0.47	1.05
PNAMG	0.47	0.58	0.78	0.89	0.68
N2MIN	1.40	1.71	1.08	1.57	1.44
N2PNAMG	0.60	0.81	0.63	0.45	0.62
N3MIN	1.66	1.23	1.06	2.49	1.61
N3MINSI	2.23	1.49	1.32	2.45	1.87
O/PLOT12	0.42	0.42	0.44	0.40	0.42
D/F	1.65	1.34	1.09	0.82	1.23
N2*MIN	1.83	1.79	1.66	1.35	1.66
MIN(N2*)	1.74	1.51	0.86	0.91	1.25
N1*MIN	1.44	1.46	1.29	1.43	1.40
N1*	0.51	0.95	1.87	1.69	1.25
N2KNAMGO			0.11	0.13	0.12
N2KNAMG2	0.80				0.80
N2KNAMG1	0.73	0.64			0.69
DO	0.76				0.76
D2	1.06				1.06
D1	1.07				1.07
D/N*PKO	1.46				1.46
D/N*PK2	1.61				1.61
D/N*PK1	1.54				1.54

2ND CUT MEAN DM% 20.1

https://doi.org/10.23637/ERADOC-1-32

84/R/PG/5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

LIME / MANURE	A	B	C	D	MEAN
N1	2.45	2.75	1.68	0.69	1.89
0(D)	2.05	2.19	1.62	1.59	1.86
0/PLOT3	2.01	2.65	1.17	1.45	1.82
P	2.28	2.61	2.30	2.39	2.39
N2P	3.95	4.32	4.05	2.75	3.77
N1MIN	6.28	5.75			6.02
MIN	4.41	4.68	3.06	2.06	3.55
PNAMG	2.05	2.05	2.35	2.55	2.25
N2MIN	6.31	6.44	4.93	4.41	5.52
N2PNAMG	3.98	4.18	3.78	2.43	3.59
N3MIN	6.91	6.28	5.45	5.02	5.92
N3MINSI	7.52	6.66	6.14	5.27	6.40
0/PLOT12	2.16	1.96	1.60	1.62	1.84
D/F	5.00	4.26	3.29	3.23	3.94
N2*MIN	6.50	6.50	6.58	5.92	6.38
MIN(N2*)	4.88	4.53	3.27	2.97	3.91
N1*MIN	5.24	6.01	4.69	4.78	5.18
N1*	2.65	3.10	4.09	3.88	3.43
N2KNAMG0			0.53	0.33	0.43
N2KNAMG2	2.83				2.83
N2KNAMG1	2.22	2.06			2.14
D0	2.87				2.87
D2	3.93				3.93
D1	3.75				3.75
D/N*PK0	5.26				5.26
D/N*PK2	5.29				5.29
D/N*PK1	5.05				5.05

TOTAL OF 2 CUTS MEAN DM% 20.7

PLOT AREA HARVESTED 0.00002

https://doi.org/10.23637/ERADOC-1-32

84/R/AG/6

AGDELL

Object: To study, by crop yields and soil analyses, the residual values of phosphate and potash applied in the period 1848-1951 and further dressings since 1964.

The 15th year of revised scheme, w. wheat.

For previous years see 'Details' 1967 and 1973, and 74-83/R/AG/6.

Treatments: All combinations of:-

Whole plots

1. OLDRESD — Fertilizers and organic manures applied to roots every fourth year, in the period 1848-1948:

NONE	None
PKNAMG	P K Na Mg
NPKNAMGC	N P K Na Mg C

N:	48 kg N as sulphate of ammonia
P:	41 kg P as superphosphate
K:	224 kg K as sulphate of potash
Na:	16 kg Na as sulphate of soda
Mg:	11 kg Mg as sulphate of magnesia
C:	Castor meal at 2240 kg supplying about 112 kg N

2. RN CROP — Rotation 1848-1951 and crop in 1984:

F/WHEAT	With fallow: Roots (turnips or swedes), s. barley, fallow, w. wheat 1848-1951. Wheat in 1984 (after fallow)
L/FALLOW	With legume: Roots, s. barley, legume (clover or beans), w. wheat 1848-1951. Fallow in 1984.

Half plots

3. 1964RESD — Residues of 1964 treatments:

P
K

Quarter plots

4. PREVCROP — Previous cropping 1958-69 on P-test half plots, 1958-70 on K-test half plots:

ARABLE	Arable or fallow
GRASS	Grass

https://doi.org/10.23637/ERADOC-1-32

84/R/AG/6

Sixteenth plots

5. P_2O_5 64 K_2O 64

Rates of 1964 treatments (kg): P_2O_5 to P-test half plots	K_2O to K-test half plots
0	0
500	315
1000	630
2000	1260

Thirty second plots

6. To RN CROP F/WHEAT. Residues of P_2O_5 applied 1970-72 (kg) and in 1979, 1981 and 1983 (kg):

P_2O_5 723

(0)0	None
(375)450	375 total in 1970-72, 150 in 1980, 1981 and 1983

To RN CROP F/WHEAT. Residues of K_2O applied 1973-76 (kg) and in 1979, 1981 and 1983 (kg):

K_2O 763

(0)0	None
(870)900	870 total in 1973-76, 300 in 1980, 1982 and 1983

NOTE: Treatment combinations to thirty second plots of L/FALLOW plots are not shown above.

Standard applications:

W. wheat: Manures: 'Nitro-Chalk' at 130 kg followed by 750 kg. Weedkillers: Chlortoluron at 3.5 l in 250 l. Mecoprop at 2.0 kg with ioxynil at 0.25 kg and bromoxynil at 0.25 kg in 200 l. Fungicides: Prochloraz at 0.40 kg and carbendazim at 0.15 kg in 200 l. Triadimefon at 0.12 kg with captafol at 1.3 kg in 500 l. Insecticide: Pirimicarb at 0.14 kg in 250 l.

Seed: Avalon, dressed chlorfenvinphos, sown at 200 kg.

Cultivations, etc.:-

W. wheat: Heavy spring-tine cultivated: 27 Sept, 1983. Rotary harrowed, seed sown: 28 Sept. Chlortoluron applied: 29 Sept. First N applied: 16 Feb, 1984. Second N applied: 9 Apr. Prochloraz and carbendazim applied: 14 Apr. Mecoprop, ioxynil and bromoxynil applied: 19 Apr. Triadimefon and captafol applied: 13 June. Insecticide applied: 27 June. Combine harvested: 15-17 Aug.

Fallow: Ploughed: 29 Nov, 1983. Heavy spring-tine cultivated: 20 Mar, 1984, 27 Apr, 9 May. Spring-tine cultivated: 20 June. Rotary cultivated: 12 July.

https://doi.org/10.23637/ERADOC-1-32

84/R/AG/6

WHEAT P PLOTS

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

	OLDRESD	NONE		PKNAMG		NPKNAMGC	
	P205 723	(0)0	(375)450	(0)0	(375)450	(0)0	(375)450
PREVCROP	P205 64						
ARABLE	0	7.25	8.78	9.47	9.90	7.85	6.74
	500	7.90	9.19	9.80	10.39	8.25	8.29
	1000	8.83	9.87	9.78	10.44	8.53	9.31
	2000	8.76	9.06	10.32	10.32	9.21	9.71
GRASS	0	6.46	9.54	6.26	9.17	7.77	9.15
	500	7.64	8.61	9.42	10.66	6.66	8.15
	1000	8.30	9.57	9.03	9.99	7.40	8.88
	2000	8.79	9.61	10.62	10.72	6.85	8.23

GRAIN MEAN DM% 82.6

PLOT AREA HARVESTED 0.00140

WHEAT K PLOTS

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

	OLDRESD	NONE		PKNAMG		NPKNAMGC	
	K20 763	(0)0	(870)900	(0)0	(870)900	(0)0	(870)900
PREVCROP	K20 64						
ARABLE	0	9.60	9.19	10.73	10.39	10.42	10.28
	315	8.99	9.74	10.84	10.88	10.93	10.63
	630	8.94	10.03	10.53	10.17	10.42	10.28
	1260	9.26	9.24	10.94	10.51	10.38	9.79
GRASS	0	9.49	9.90	10.66	11.09	10.15	10.39
	315	9.44	9.71	10.99	10.72	10.55	11.03
	630	9.83	9.39	10.98	10.95	9.97	10.14
	1260	9.28	9.78	10.88	10.81	9.76	9.90

GRAIN MEAN DM% 82.7

PLOT AREA HARVESTED 0.00140

https://doi.org/10.23637/ERADOC-1-32

84/R/BN/7

BARNFIELD

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

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

For previous years see 'Details' 1967 and 1973 and 74-83/R/BN/7.

Plot dimensions: Grass: 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 (triple superphosphate 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 1984 (kg N per cut) as 'Nitro-Chalk' and residues of forms of N previously each supplying 96 kg N per annum:
75	75, previously nitrate of soda
100	100, previously sulphate of ammonia
125	125, previously sulphate of ammonia + castor meal
150	150, previously castor meal

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

Plus one plot MANURE KMG 100

NOTES: (1) P K and D treatments were applied to Sections 1 and 2 until 1980 but not since.
(2) Yields were not taken from sections 1 and 2.

https://doi.org/10.23637/ERADOC-1-32

84/R/BN/7

Standard applications:
Grass/clover (Sections 1 and 2): Weedkillers: 2, 4-DB, MCPA and benazolin (as 'Legumex Extra' at 7.0 l) in 500 l.

Seed: Grass: S.215 Meadow fescue at 12 kg, Climax timothy at 12 kg, mixture sown at 24 kg.
Grass/clover: Creeping red fescue at 9 kg, timothy at 9 kg, New Zealand Huia white clover at 4 kg, mixture sown at 22 kg.

Cultivations, etc.:-
Grass: P and K applied: 22 Nov, 1983. N applied: 7 Mar, 1984. Cut: 31 May. N applied: 6 June. Cut: 19 July. N applied: 26 July. Cut: 15 Nov.
Grass/clover (Sections 1 and 2): Ploughed: 21 Oct, 1983. Heavy spring-tine cultivated: 22 Mar, 1984. Rotary harrowed: 25 Apr. Seed sown: 26 Apr. Weedkillers applied: 3 July. Topped: 23 July.

https://doi.org/10.23637/ERADOC-1-32

84/R/BN/7

1ST CUT (31/5/84) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

N PERCUT MANURE	75	100	125	150	MEAN
D	5.54	6.19	6.18	5.78	5.92
DPK	5.52	6.45	6.33	6.81	6.28
PKMG	4.68	5.69	6.39	6.66	5.85
P	4.27	5.06	5.49	4.80	4.90
PK	4.61	5.73	6.69	6.11	5.79
PMG	4.50	4.73	4.92	4.51	4.67
0	3.93	4.56	4.45	3.93	4.22
MEAN	4.72	5.49	5.78	5.52	5.38

MANURE KMG 100 5.91

GRAND MEAN 5.39

1ST CUT MEAN DM% 19.6

2ND CUT (19/7/84) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

N PERCUT MANURE	75	100	125	150	MEAN
D	3.40	3.85	3.68	3.57	3.62
DPK	3.51	3.77	3.65	3.95	3.72
PKMG	3.20	3.44	3.39	3.56	3.40
P	2.75	2.42	2.40	2.23	2.45
PK	3.30	3.43	3.36	3.45	3.39
PMG	2.85	2.24	1.87	2.06	2.26
0	2.52	2.36	1.93	1.74	2.14
MEAN	3.08	3.07	2.90	2.94	3.00

MANURE KMG 100 2.73

GRAND MEAN 2.99

2ND CUT MEAN DM% 28.0

https://doi.org/10.23637/ERADOC-1-32

84/R/BN/7

3RD CUT (15/11/84) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

N PERCUT / MANURE	75	100	125	150	MEAN
D	1.83	2.41	2.49	2.16	2.22
DPK	2.22	2.29	2.54	2.42	2.37
PKMG	1.59	2.43	2.58	2.66	2.32
P	1.65	2.17	1.59	1.92	1.83
PK	1.55	2.53	2.40	2.57	2.26
PMG	1.51	1.86	1.80	1.80	1.74
0	1.37	1.45	1.70	1.22	1.43
MEAN	1.68	2.16	2.16	2.11	2.03

MANURE KMG 100 2.19

GRAND MEAN 2.03

3RD CUT MEAN DM% 13.5

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

N PERCUT / MANURE	75	100	125	150	MEAN
D	10.77	12.44	12.35	11.51	11.77
DPK	11.26	12.51	12.52	13.18	12.37
PKMG	9.47	11.56	12.36	12.88	11.57
P	8.67	9.65	9.48	8.95	9.19
PK	9.46	11.70	12.45	12.13	11.44
PMG	8.86	8.83	8.60	8.37	8.67
0	7.82	8.37	8.08	6.89	7.79
MEAN	9.47	10.72	10.83	10.56	10.40

MANURE KMG 100 10.82

GRAND MEAN 10.41

TOTAL OF 3 CUTS MEAN DM% 20.3

SUB PLOT AREA HARVESTED 0.00568

https://doi.org/10.23637/ERADOC-1-32

84/R/GC/8

GARDEN CLOVER

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

Sponsor: J. McEwen.

The 131st year, red clover.

For previous years see 'Details' 1967 and 1973, and 74-83/R/GC/8.

Design: 2 blocks of 2 plots.

Whole plot dimensions: 1.02 x 1.42.

Treatments:

FUNGCIDE	Fungicide to control Sclerotinia trifoliorum:
NONE	None
BENOMYL	Benomyl at 0.6 kg in 800 l on 18 Oct, 1983; 18 Nov, 28 Dec, 22 Jan, 1984; 20 Feb.

Basal applications: Manures: Chalk at 1.25 t. (0:18:36) at 420 kg. Mg at 50 kg, as Epsom Salts. K_2O at 150 kg as muriate of potash in spring and after each cut except the last. Nematicide: Aldicarb at 10 kg.

Seed: Hungaropoly, sown at 34 kg in April 1983, gaps resown at 34 kg in April, 1984.

NOTE: FUNGCIDE NONE plots required about 85% of row length re-sown and FUNGCIDE BENOMYL about 8%.

Cultivations, etc.:- Chalk, PK and Mg applied: 27 Oct, 1983. Gaps resown and aldicarb applied: 4 Apr, 1984. K applied: 5 Apr. Cut and K applied: 12 June, 19 July, 20 Aug. Cut: 12 Oct.

https://doi.org/10.23637/ERADOC-1-32

84/R/GC/8

1ST CUT (12/6/84) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

FUNGCIDE	NONE	BENOMYL	MEAN
	2.74	6.13	4.44

1ST CUT MEAN DM% 18.6

2ND CUT (19/7/84) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

FUNGCIDE	NONE	BENOMYL	MEAN
	3.07	4.01	3.54

2ND CUT MEAN DM% 20.5

3RD CUT (20/8/84) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

FUNGCIDE	NONE	BENOMYL	MEAN
	1.11	1.26	1.18

3RD CUT MEAN DM% 19.6

4TH CUT (12/10/84) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

FUNGCIDE	NONE	BENOMYL	MEAN
	0.90	1.13	1.02

4TH CUT MEAN DM% 18.1

TOTAL OF 4 CUTS DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

FUNGCIDE	NONE	BENOMYL	MEAN
	7.82	12.53	10.17

TOTAL OF 4 CUTS MEAN DM% 19.2

PLOT AREA HARVESTED 0.00010

https://doi.org/10.23637/ERADOC-1-32 *pp 27*

84/S/RN/1

ROTATION I

Object: To compare nutrient cycles, uptakes of nutrients and responses to fresh P and K. To obtain an estimate of the rate of release of nutrients, particularly K, from Saxmundham soil - Saxmundham.

Sponsor: A.E. Johnston.

The 85th year, grass, w. wheat, w. beans, s. barley.

For previous years see 'Details' 1967 and 1973, and 74-83/S/RN/1.

Whole plot dimensions (original treatments): 5.49 x 40.2.

Treatments: From 1899 to 1969 the experiment followed a four-course rotation of w. wheat, roots, s. barley, legumes. Each phase of the rotation was present each year on a separate block. From 1966 each plot was divided. A small area at the south end continued under the original treatment until 1979, these plots were sown to grass in 1970, the treatments were discontinued after 1979 and yields no longer taken although the plots remain in grass. Modified treatments (NEWTREAT) were applied on the larger sub-plots from 1966 (see below).

In 1970 the rotation was stopped and each pair of blocks was divided for lucerne and grass (the original treatment sub-plots formed part of the grass area). In 1977 lucerne was ploughed on one pair of blocks to start an arable rotation testing fresh K to plots previously given none since 1899 (S/RN/1-2). In 1978 lucerne on the other pair of blocks was replaced by a grass/clover mixture; this was ploughed in 1979 for a continuing test of subsoil loosening and incorporation of PK to the subsoil (S/RN/1-3).

Since autumn 1980 the four sections of NEWTREAT grass have been ploughed up progressively to start a sequence of arable crops (S/RN/1-1) measuring the effects of soil K depletion. The sequence of crops has been:

Section	1970-80	1981	1982	1983	1984
(a)	G	W	BE	W	W
(b)	G	G	G	BE	W
(c)	G	G	G	G	BE
(d)	G	G	G	G	G

G = NEWTREAT grass, W = w. wheat, BE = w. beans.

https://doi.org/10.23637/ERADOC-1-32

84/S/RN/1

Treatments to crops in these sections were:

TREATMENT 1899-1965	NEWTREAT Grass 1966-1984	W. wheat and w. beans 1984
	MANURE	MANURE
D	(D)N	(D)P2
B	BN	B
N	(N)P2N	(N)P2
P	(P)P1N	(P)P1
K	(K)P2KN	(K)P2K
-	(-)P2N	(-)P2
PK	(PK)P1KN	(PK)P1K
NK	(NK)P2KN	(NK)P2K
NP	(NP)P1N	(NP)P1
NPK	(NPK)P1KN	(NPK)P1K

D: Farmyard manure at 15 tonnes
(D): Farmyard manure at 30 tonnes, 60 tonnes in autumn 1969, none since.
B: Bone meal at 0.5 tonnes
N: 1899-1965, 38 kg N as nitrate of soda. Since 1970, 100 kg N as 'Nitro-Chalk' per cut of grass
P: 1899-1965, 40 kg P_2O_5 as single superphosphate. 1966-79, 50 kg P_2O_5 as triple superphosphate
P1,P2: 50, 100 kg P_2O_5 as triple superphosphate
K: 1899-1965, 63 kg K_2O as muriate of potash. Since 1966, 126 kg K_2O

W. wheat in Sections (a) and (b) tested in addition to MANURE all the combinations with the following nitrogen rates (kg N) applied in spring as 'Nitro-Chalk' (40 kg N applied on 9 March, 1984, remainder on 10 Apr):

N(NC)
120
160
200
240

Part of the w. wheat in Section (b) tested in addition to MANURE all the combinations with the following nitrogen rates (kg N) applied on 17 Apr as prilled urea:

N(PU)
0
160
200

NOTE: All w. wheat in Sections (a) and (b) was given 50 kg N to the seedbed, as prilled urea, in addition to the spring nitrogen rates.

https://doi.org/10.23637/ERADOC-1-32 *pp 29*

84/S/RN/1

S/RN/1-2 tested all combinations of the following:

Whole plots

1. MANURE — Manures as defined above for arable crops:

Sub plots

2. K — Potassium (kg K_2O) as muriate of potash, total applied 1977-80

   0
   440

3. N — Nitrogen fertilizer (kg N) in spring as 'Nitro-Chalk' in addition to 50 kg N to the seedbed, as prilled urea:

   40+120 — 40 on 9 March, 1984 + 120 on 10 Apr
   40+160 — 40 on 9 Mar + 160 on 10 Apr

S/RN/1-3 tested all combinations of:

Whole plots

1. MANURE — Manures as defined above for arable crops:

Sub plots

2. TREATMNT — Cultivations etc in May, 1979 only:

   CNVNTIAL — Conventional, mouldboard ploughed
   SUBDUG — Subsoil dug by Wye double digger
   SUBDUG+F — Subsoil dug by Wye double digger incorporating 374 kg P and 712 kg K (as 0:20:20) into the subsoil at time of working

3. N — Nitrogen fertilizer (kg N) as 'Nitro-Chalk':

   30+30 — 30 on 19 Mar, 1984, 30 top dressed on 10 Apr
   30+60 — 30 on 19 Mar, 1984, 60 top dressed on 10 Apr
   30+90 — 30 on 19 Mar, 1984, 90 top dressed on 10 Apr
   30+120 — 30 on 19 Mar, 1984, 120 top dressed on 10 Apr

Standard applications:

W. wheat, on S/RN/1-1 and S/RN/1-2. Weedkillers: Chlortoluron at 2.5 kg with mecoprop, bromoxynil and ioxynil (as 'Brittox' at 3.5 l) applied with the permethrin in 220 l. Mecoprop, bromoxynil and ioxynil (as 'Brittox' at 2.1 l) in 220 l applied with the prochloraz. Fungicides: Prochloraz at 0.40 kg. Carbendazim at 0.15 kg with maneb at 1.6 kg and tridemorph at 0.37 kg plus captafol at 1.1 kg applied with the pirimicarb in 220 l. Insecticides: Permethrin at 0.06 kg. Pirimicarb at 0.14 kg.

W. beans, on S/RN/1-1: Weedkiller: Simazine at 1.1 kg in 220 l. Fungicide: Benomyl at 0.56 kg in 220 l.

Grass, on S/RN/1-1: Manures: N at 100 kg on two occasions, as ammonium nitrate on the first as 'Nitro-Chalk' on the second.

https://doi.org/10.23637/ERADOC-1-32 *pp 30*

84/S/RN/1

S. barley, on S/RN/1-3: Manures: N at 30 kg, as ammonium nitrate. Fungicides: Carbendazim at 0.15 kg, maneb at 1.6 kg and tridemorph at 0.37 kg with the pirimicarb in 220 l. Insecticide: Pirimicarb at 0.14 kg.

Seed: W. wheat: Norman, sown at 200 kg.
W. beans: Banner, sown at 250 kg.
S. barley: Triumph, seed dressed with triadimenol and fuberidazole, sown at 190 kg.

Cultivations, etc.:-
W. wheat: P, K and bonemeal treatments applied: 30 Aug, 1983. Ploughed: 9 Sept. Power harrowed, seed sown, seedbed N as prilled urea applied: 27 Sept. Chlortoluron, 'Brittox' and permethrin applied: 19 Oct. 'Brittox' with prochloraz applied: 17 Apr. Carbendazim, maneb, tridemorph, captafol and pirimicarb applied: 27 June. Combine harvested: 21 Aug.
W. beans: P, K and bonemeal treatments applied: 30 Aug, 1983. Ploughed: 13 Sept. Power harrowed, seed sown: 18 Oct. Weedkiller applied: 19 Oct. Fungicide applied: 17 Apr, 1984. Combine harvested: 9 Oct.
Grass section: P, K and bonemeal treatments applied: 31 Aug, 1983. First N, applied: 19 Mar, 1984. Cut: 11 June. Second N applied: 22 June. Cut: 23 Aug.
S. barley: P, K and bonemeal treatments applied: 31 Aug, 1983. Ploughed: 9 Sept. Power harrowed, seed sown: 19 Mar, 1984. Fungicides and insecticide applied: 22 June. Combine harvested: 22 Aug.

84/S/RN/1-1

GRASS

DRY MATTER: TONNES/HECTARE

***** TABLES OF MEANS *****

MANURE	1ST CUT(11/6/84)	2ND CUT(23/8/84)	TOTAL OF 2 CUTS
(D)N	2.03	1.94	3.97
BN	1.50	1.53	3.03
(N)P2N	1.71	1.45	3.16
(P)P1N	1.32	1.74	3.06
(K)P2KN	1.73	2.85	4.58
(-)P2N	1.42	1.77	3.19
(PK)P1KN	1.80	2.50	4.30
(NK)P2KN	1.82	2.53	4.35
(NP)P1N	1.43	1.45	2.88
(NPK)P1KN	2.08	2.13	4.21
MEAN	1.68	1.99	3.67
MEAN DM%	35.6	32.8	34.2

PLOT AREA HARVESTED 0.00095

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84/S/RN/1-1

W.WHEAT AFTER W.WHEAT

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N(NC) MANURE	120	160	200	240	MEAN
(D)P2	10.63	10.77	10.76	11.92	11.02
B	7.99	9.24	9.22	8.62	8.77
(N)P2	7.27	9.19	9.46	8.16	8.52
(P)P1	9.50	9.20	8.14	10.01	9.21
(K)P2K	9.96	10.63	11.06	10.67	10.58
(-)P2	9.99	9.63	8.66	10.03	9.58
(PK)P1K	10.74	11.09	10.69	10.90	10.86
(NK)P2K	11.47	10.28	11.17	11.76	11.17
(NP)P1	9.44	10.06	10.73	10.74	10.24
(NPK)P1K	11.22	10.82	11.06	11.41	11.13
MEAN	9.82	10.09	10.10	10.42	10.11

MEAN DM% 86.3

PLOT AREA HARVESTED 0.00075

W.WHEAT AFTER W.BEANS

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N(NC) MANURE	120	160	200	240	MEAN
(D)P2	9.21	11.98	12.17	10.76	11.03
B	8.30	10.78	10.31	8.74	9.53
(N)P2	10.12	7.50	8.03	10.66	9.08
(P)P1	10.60	8.05	8.70	11.60	9.74
(K)P2K	9.98	11.60	11.76	10.14	10.87
(-)P2	9.93	11.73	11.03	9.34	10.51
(PK)P1K	11.17	12.29	11.92	11.49	11.72
(NK)P2K	12.00	11.47	11.01	12.41	11.72
(NP)P1	9.88	11.52	10.62	11.36	10.84
(NPK)P1K	11.49	11.87	11.87	12.29	11.88
MEAN	10.27	10.88	10.74	10.88	10.69

MEAN DM% 86.2

PLOT AREA HARVESTED 0.00075

https://doi.org/10.23637/ERADOC-1-32

84/S/RN/1-1

W.WHEAT AFTER W.BEANS

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N(PU) MANURE	0	160	200	MEAN
(D)P2	9.64	11.85	10.79	10.48
B	7.42	8.64	10.15	8.41
(N)P2	7.25	7.52	10.50	8.13
(P)P1	7.71	10.08	8.99	8.63
(K)P2K	7.49	9.96	11.13	9.02
(-)P2	7.74	10.51	9.85	8.96
(PK)P1K	7.90	11.52	10.64	9.49
(NK)P2K	8.50	11.74	11.17	9.98
(NP)P1	8.35	9.72	10.63	9.26
(NPK)P1K	7.95	10.88	10.77	9.39
MEAN	8.00	10.24	10.46	9.17

MEAN DM% 85.2

PLOT AREA HARVESTED 0.00075

https://doi.org/10.23637/ERADOC-1-32

84/S/RN/1-2

W.WHEAT

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

K	0	440	MEAN
MANURE			
(D)P2	10.48	9.80	10.14
B	8.29	8.44	8.36
(N)P2	8.80	8.38	8.59
(P)P1	8.04	8.47	8.26
(K)P2K	9.79	8.93	9.36
(-)P2	8.72	8.91	8.82
(PK)P1K	9.21	8.84	9.03
(NK)P2K	9.08	10.12	9.60
(NP)P1	8.90	8.90	8.90
(NPK)P1K	8.94	9.52	9.23
MEAN	9.03	9.03	9.03

N	40+120	40+160	MEAN
MANURE			
(D)P2	9.96	10.32	10.14
B	8.22	8.50	8.36
(N)P2	8.78	8.41	8.59
(P)P1	7.64	8.88	8.26
(K)P2K	9.22	9.50	9.36
(-)P2	8.86	8.77	8.82
(PK)P1K	9.01	9.04	9.03
(NK)P2K	9.68	9.52	9.60
(NP)P1	8.43	9.37	8.90
(NPK)P1K	9.37	9.08	9.23
MEAN	8.92	9.14	9.03

N	40+120	40+160	MEAN
K			
0	8.89	9.16	9.03
440	8.94	9.12	9.03
MEAN	8.92	9.14	9.03

K	0		440	
N	40+120	40+160	40+120	40+160
MANURE				
(D)P2	9.99	10.96	9.93	9.67
B	8.36	8.21	8.08	8.79
(N)P2	8.76	8.85	8.80	7.97
(P)P1	7.28	8.80	8.00	8.95
(K)P2K	10.03	9.54	8.40	9.45
(-)P2	9.24	8.20	8.47	9.34
(PK)P1K	7.81	10.62	10.21	7.47
(NK)P2K	9.88	8.28	9.49	10.75
(NP)P1	8.80	9.00	8.06	9.74
(NPK)P1K	8.75	9.12	10.00	9.04

GRAIN MEAN DM% 84.1 PLOT AREA HARVESTED 0.00075

https://doi.org/10.23637/ERADOC-1-32

84/S/RN/1-3

S.BARLEY

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

TREATMNT MANURE	CNVNTIAL	SUBDUG	SUBDUG+F	MEAN
(D)P2	4.44	4.71	4.95	4.70
B	3.61	4.46	4.15	4.08
(N)P2	3.90	3.71	4.06	3.89
(P)P1	3.74	3.08	3.44	3.42
(K)P2K	4.42	4.23	4.04	4.23
(-)P2	4.17	3.64	3.81	3.88
(PK)P1K	3.88	3.53	3.71	3.71
(NK)P2K	4.04	4.04	4.19	4.09
(NP)P1	3.18	3.86	3.86	3.63
(NPK)P1K	3.66	3.85	3.67	3.73
MEAN	3.91	3.91	3.99	3.93

N MANURE	30+30	30+60	30+90	30+120	MEAN
(D)P2	3.96	4.43	5.26	5.14	4.70
B	3.38	3.91	4.13	4.89	4.08
(N)P2	3.29	3.61	3.91	4.75	3.89
(P)P1	2.37	3.20	4.12	3.98	3.42
(K)P2K	3.31	4.24	4.21	5.17	4.23
(-)P2	2.93	3.18	4.43	4.96	3.88
(PK)P1K	2.59	3.52	4.28	4.45	3.71
(NK)P2K	2.61	4.39	4.18	5.20	4.09
(NP)P1	2.71	3.74	3.86	4.23	3.63
(NPK)P1K	3.69	2.34	3.93	4.94	3.73
MEAN	3.08	3.66	4.23	4.77	3.93

N TREATMNT	30+30	30+60	30+90	30+120	MEAN
CNVNTIAL	3.17	3.75	4.06	4.64	3.91
SUBDUG	3.00	3.71	4.18	4.76	3.91
SUBDUG+F	3.08	3.51	4.45	4.91	3.99
MEAN	3.08	3.66	4.23	4.77	3.93

https://doi.org/10.23637/ERADOC-1-32

84/S/RN/1-3

S.BARLEY

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

MANURE	N TREATMNT	30+30	30+60	30+90	30+120
(D)P2	CNVNTIAL	3.59	4.25	4.99	4.92
	SUBDUG	4.43	4.72	5.04	4.65
	SUBDUG+F	3.86	4.32	5.76	5.85
B	CNVNTIAL	2.91	3.21	4.00	4.33
	SUBDUG	3.82	4.38	4.53	5.12
	SUBDUG+F	3.42	4.13	3.85	5.22
(N)P2	CNVNTIAL	3.74	3.61	3.54	4.72
	SUBDUG	3.11	3.08	3.79	4.83
	SUBDUG+F	3.03	4.13	4.39	4.69
(P)P1	CNVNTIAL	2.90	3.38	4.30	4.36
	SUBDUG	2.65	3.46	3.24	2.98
	SUBDUG+F	1.55	2.76	4.83	4.60
(K)P2K	CNVNTIAL	3.14	4.78	4.35	5.43
	SUBDUG	3.14	4.52	4.04	5.24
	SUBDUG+F	3.64	3.43	4.24	4.85
(-)P2	CNVNTIAL	3.50	4.30	4.02	4.88
	SUBDUG	1.84	3.02	4.63	5.06
	SUBDUG+F	3.45	2.23	4.63	4.94
(PK)P1K	CNVNTIAL	3.12	3.82	3.91	4.68
	SUBDUG	1.97	3.20	4.29	4.65
	SUBDUG+F	2.67	3.53	4.63	4.01
(NK)P2K	CNVNTIAL	2.66	4.51	4.42	4.57
	SUBDUG	2.41	4.22	4.49	5.05
	SUBDUG+F	2.75	4.42	3.64	5.97
(NP)P1	CNVNTIAL	2.37	2.98	3.58	3.80
	SUBDUG	2.69	3.70	4.18	4.86
	SUBDUG+F	3.07	4.52	3.81	4.02
(NPK)P1K	CNVNTIAL	3.75	2.66	3.52	4.72
	SUBDUG	3.97	2.74	3.56	5.14
	SUBDUG+F	3.36	1.63	4.72	4.97

GRAIN MEAN DM% 86.9

PLOT AREA HARVESTED 0.00075

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84/S/RN/2

ROTATION II

Object: To measure, by crop yields and soil analysis, the residual value of P applied as FYM or superphosphate in the periods 1899-1964 and 1965-1967 and of fresh dressings since - Saxmundham.

Sponsor: A.E. Johnston.

The 15th year of revised scheme, w. wheat, w. beans.

For previous years see 'Details' 1967 and 1973, and 74-83/S/RN/2.

Whole plot dimensions: 5.49 x 39.8.

Treatments: From 1899-1964 the experiment tested farmyard manure and nitrogen and phosphate fertilizers applied to a rotation of crops. Since 1965 the treatments have been changed to evaluate old residues of P (from FYM and superphosphate) and new residues from treatments applied 1965-1967. All crops of the rotation - potatoes, s. barley, sugar beet, s. barley - were grown until 1974. The whole experiment was sown to s. barley in 1975 and 1976, alternating w. wheat and s. barley from 1977 to 1979, alternating w. beans and w. wheat in 1980 and 1981, w. wheat alone in 1982 and 1983, w. wheat and w. beans in 1984. Combinations of the following treatments were tested on w. beans and on a third wheat after beans in 1981:

Whole plots

1. RESIDUE — Residues of previous treatments:-

		Approximate total dressing 1899-1964	Total dressing 1965-1967
(0)0	Plot 1	None	None
(D)0	Plot 2	400 tonnes FYM	None
(DP)0	Plot 3	400 tonnes FYM, 2.7 tonnes P205	None
(DP)D2	Plot 4	400 tonnes FYM, 2.7 tonnes P205	100 tonnes FYM
(DP)D2P1	Plot 5	400 tonnes FYM, 2.7 tonnes P205	100 tonnes FYM, 0.56 tonnes P205
(DP)P1	Plot 6	400 tonnes FYM, 2.7 tonnes P205	0.56 tonnes P205
(DP)P2	Plot 7	400 tonnes FYM, 2.7 tonnes P205	1.13 tonnes P205
(DP52)0	Plot 8	326 tonnes FYM, 4.3 tonnes P205 (until 1952 only)	None

https://doi.org/10.23637/ERADOC-1-32

84/S/RN/2

Sub plots

2. P Phosphate (total P205 applied in each period (kg)):

	1969-71	1973-75	1978*	1980*	1982*	1984*
(0)(0)0	0	0	0	0	0	0
(0)(3)0	0	378	0	0	0	0
(1)(3)1	126	378	120	120	120	120
(2)(3)1	252	378	120	120	120	120
(3)(3)0	378	378	0	0	0	0

* 1978, 1980 , 1982 and 1984 are the years of application for beans in 1984. Years of application for third wheat in 1984 were 1979, 1981 and 1983.

and, for wheat only, some of the combinations of 2 with:-

3. N Nitrogen fertilizer in spring (kg N) as 'Nitro-Chalk' in addition to 50 kg N at sowing:

80
120
160
200

NOTE: Plots with the combinations of RESIDUE (DP)D2, (DP)D2P1, (DP)P1, (DP)P2 with P(3)(3)(0) were used for N15 studies, yields not taken.

Standard applications:
Both crops: Manures: K_2O at 150 kg as muriate of potash.
W. wheat: Weedkillers: Isoproturon at 2.5 kg with mecoprop, bromoxynil and ioxynil (as 'Brittox' at 3.5 l) applied with the permethrin in 220 l. Mecoprop, bromoxynil and ioxynil (as 'Brittox' at 2.1 l) in 220 l applied with the prochloraz. Fungicides: Prochloraz at 0.40 kg. Carbendazim at 0.15 kg, maneb at 1.6 kg and tridemorph at 0.37 kg plus captafol at 1.1 kg applied with the pirimicarb in 220 l. Insecticides: Permethrin at 0.06 kg. Pirimicarb at 0.14 kg.
W. beans: Weedkiller: Simazine at 1.1 kg in 220 l. Fungicide: Benomyl at 0.56 kg in 220 l.

Seed: W. wheat: Hustler, sown at 400 seeds per m^2.
W. beans: Banner, sown at 250 kg.

Cultivations, etc.:-
Both crops: Muriate of potash applied: 18 Aug, 1983. Ploughed: 29 Aug.
W. wheat: Power harrowed, seed sown: 28 Sept. Isoproturon, 'Brittox' and permethrin applied: 19 Oct. N applied: 10 Apr, 1984. 'Brittox' with prochloraz applied: 17 Apr. Carbendazim, maneb, tridemorph, captafol and pirimicarb applied: 27 June. Combine harvested: 22 Aug.
W. beans: P applied: 18 Aug, 1983. Power harrowed, seed sown: 18 Oct. Weedkiller applied: 19 Oct. Fungicide applied: 17 Apr, 1984. Combine harvested, yields not recorded: 12 Oct.

https://doi.org/10.23637/ERADOC-1-32 *pp 38*

84/S/RN/2

3RD W.WHEAT AFTER BEANS

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

RESIDUE	N P	80	120	160	200
(0)0	(0)(0)0	3.01	3.71		
(0)0	(0)(3)0			2.84	5.39
(0)0	(1)(3)1		7.36		8.66
(0)0	(2)(3)1	6.83		7.98	
(0)0	(3)(3)0	5.57		7.09	
(D)0	(0)(0)0			4.73	6.16
(D)0	(0)(3)0	6.11	6.30		
(D)0	(1)(3)1	7.17		8.36	
(D)0	(2)(3)1		7.98		9.50
(D)0	(3)(3)0		7.78		7.66
(DP)0	(0)(0)0	6.27	6.20		
(DP)0	(0)(3)0			7.71	7.62
(DP)0	(1)(3)1		7.83		8.92
(DP)0	(2)(3)1	7.23		8.39	
(DP)0	(3)(3)0	5.66		8.00	
(DP)D2	(0)(0)0			8.20	8.94
(DP)D2	(0)(3)0	6.14	7.90		
(DP)D2	(1)(3)1		7.67		9.09
(DP)D2	(2)(3)1	7.37		9.48	
(DP)D2P1	(0)(0)0	7.59	7.63		
(DP)D2P1	(0)(3)0			8.35	9.26
(DP)D2P1	(1)(3)1		8.22		9.88
(DP)D2P1	(2)(3)1	7.73		8.63	
(DP)P1	(0)(0)0	7.09	7.93		
(DP)P1	(0)(3)0			8.58	9.08
(DP)P1	(1)(3)1	6.68		9.54	
(DP)P1	(2)(3)1		8.06		9.67
(DP)P2	(0)(0)0			8.83	9.53
(DP)P2	(0)(3)0	6.83	8.00		
(DP)P2	(1)(3)1	7.04		9.20	
(DP)P2	(2)(3)1		8.70		9.50
(DP52)0	(0)(0)0			8.16	8.17
(DP52)0	(0)(3)0	5.63	7.09		
(DP52)0	(1)(3)1	6.17		8.18	
(DP52)0	(2)(3)1		7.38		8.77
(DP52)0	(3)(3)0		6.32		8.32

GRAIN MEAN DM% 85.1

PLOT AREA HARVESTED 0.00075

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