ROTHAMSTED RESEARCH

Yields of the Field Experiments 1983

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Experiments - Classicals

Rothamsted Research

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83/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 140th year, w. wheat, fallow, potatoes. The 16th year of the rotations.

For previous years see 'Details' 1967 and 1973, Station Report for 1966, pp. 229-231, Station Report for 1968, Part 2, and 74-82/R/BK/1.

Areas harvested:

	Section	
Wheat:	0	0.00434
	1	0.00798
	3,4,5,and 6	0.00659
	8 and 9	0.00694
Potatoes:	2	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	-
17NO+3FH	17	N2(A)	N2 1/2(P K (Na) Mg)	NO+3 1/2(PK (Na) Mg)+
18N1+3FH	18	P K Na Mg(A)	N2 1/2(P K (Na) Mg)	N1+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.

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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	76	77	78	79	80	81	82	83
SC0/W32	0	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
SC1/W17	1	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
POTATOES	2	BE	W	P	BE	W	P	BE	W	P	BE	W	F	P	W	F	P
SC3/W4	3	W	W	F	W	W	F	W	W	F	W	W	F	W	W	W	W
SC4/W1P	4	W	P	BE	W	P	BE	W	P	BE	W	P	P	W	F	P	W
SC5/W5	5	W	F	W	W	F	W	W	F	W	W	F	W	W	W	W	W
SC6/W6	6	F	W	W	F	W	W	F	W	W	F	W	W	W	W	W	W
-/	7	P	BE	W	P	BE	W	P	BE	W	P	BE	W	F	P	W	F
SC8/W2F	8*	W	W	W	W	F	W	W	W	W	W	W	W	W	F	W	W
SC9/W25	9	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

* 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 6, 8 and 9 only: Chalk at 2.9 t. Weedkillers: (not applied to section 8): Mecoprop, bromoxynil and ioxynil (as 'Brittox' at 3.5 l) with isoproturon at 2.1 kg in 250 l. Fungicide: Propiconazole at 0.12 kg on two occasions, in 500 l on the first and in 250 l on the second.
Potatoes: Weedkillers: Linuron at 1.6 l and paraquat at 0.56 kg ion in 500 l. Fungicides: Mancozeb at 1.4 kg in 250 l. Fentin hydroxide at 0.28 kg in 250 l on five occasions with the insecticide on the first four. Insecticide: Pirimicarb at 0.14 kg.
Fallow: Manures: Chalk at 2.9 t.

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Seed: W. wheat: Flanders, dressed chlorfenvinphos, sown at 200 kg.
Potatoes: Pentland Crown.

Cultivations, etc.:-
All Sections: Superphosphate, sulphate of potash, sulphate of soda, kieserite and castor meal applied: 16 Sept, 1982. FYM applied, ploughed: 20 Sept. Spring-tine cultivated: 28 Oct.
Cropped Sections: W. wheat: Chalk to sections 6, 8 and 9: 2 Sept, 1982. Autumn N applied to plot 18: 16 Sept. Rotary harrowed, seed sown: 4 Nov. Spring N applied: 15 Apr, 1983. Weedkillers applied: 16 Apr. Propiconazole applied: 26 May, 30 June. Combine harvested: 10 Aug.
Potatoes: Chisel ploughed: 10 Feb, 1983. N applied, heavy spring-tine cultivated: 5 May. Rotary harrowed, potatoes planted: 10 May. Rotary ridged: 26 May. Weedkillers applied: 3 June. Mancozeb applied: 22 June. Fentin hydroxide with the insecticide applied: 1 July, 8 July, 18 July, 28 July. Fentin hydroxide applied: 11 Aug. Haulm mechanically destroyed: 30 Aug. Lifted: 1 Sept.
Fallow: Chalk applied: 2 Sept, 1982. Chisel ploughed: 10 Feb, 1983. Heavy spring-tine cultivated: 27 May. Ploughed: 17 June. Spring-tine cultivated: 23 June. Ploughed: 13 July. Spring-tine cultivated: 21 July.

NOTE: The percentage weights of weed seeds in the recorded grain yields of plots in Section 8 were measured. As the maximum was only 3% (Plot 05) no adjustments have been made and the figures are not separately presented.

POTATOES

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

PLOT	TOTAL TUBERS TONNES/ HECTARE	% WARE 3.81 CM(1.5 INCH) RIDDLE
01DN2PK	16.9	91.5
21DN2	20.3	92.8
22D	15.7	96.3
030	4.4	89.0
05F	8.4	93.5
06N1F	13.0	94.2
07N2F	15.4	93.7
08N3F	16.5	92.9
09N4F	14.8	90.6
10N2	4.6	81.1
11N2P	4.8	78.7
12N2PNA	6.2	81.2
13N2PK	9.7	90.9
14N2PKMG	11.7	89.7
15N3F	13.9	90.8
16N2F	13.3	90.8
17N3FH	9.2	89.7
18N3FH	8.9	90.5
19C	5.8	89.9

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83/R/BK/1 WHEAT

GRAIN TONNES/HECTARE

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

SECTION PLOT	SC4/W1P	SC8/W2F	SC3/W4	SC5/W5	SC6/W6	SC1/W17	SC9/W25	SC0/W32	MEAN
01DN2PK	7.69	*	7.05	7.39	7.58	*	*	*	7.43
21DN2	7.91	6.80	7.67	7.62	7.41	7.34	7.57	6.90	7.40
22D	5.41	4.82	5.24	4.90	4.43	5.24	5.28	5.22	5.07
030	1.96	2.23	1.59	1.44	1.36	1.69	1.82	2.24	1.79
05F	2.01	1.70	2.07	1.56	1.50	1.50	1.58	2.09	1.75
06N1F	5.04	3.19	4.58	4.06	3.38	3.52	4.02	4.05	3.98
07N2F	6.91	4.87	6.25	6.32	5.84	5.36	5.30	5.74	5.82
08N3F	7.37	5.77	6.97	6.37	6.32	5.78	6.09	6.01	6.34
09N4F	7.56	6.17	6.99	6.59	6.55	6.37	6.26	6.17	6.58
10N2	5.20	4.44	3.92	4.73	4.17	3.03	3.32	3.42	4.03
11N2P	5.73	4.14	4.38	4.34	4.54	3.82	3.39	3.96	4.29
12N2PNA	5.67	4.50	4.76	4.66	4.51	4.67	4.29	4.74	4.73
13N2PK	6.06	3.87	5.13	5.04	4.84	5.40	5.15	5.11	5.08
14N2PKMG	6.65	4.66	5.77	5.27	4.87	5.76	5.83	5.60	5.55
15N3F	6.93	5.23	6.20	6.11	6.29	6.17	6.18	6.20	6.16
16N2F	6.35	5.14	5.58	4.96	4.99	5.34	5.70	5.42	5.44
17N0+3FH	7.07	6.04	6.23	6.04	6.11	5.90	6.08	5.78	6.15
18N1+3FH	7.10	6.37	6.43	6.18	6.20	6.26	6.12	6.24	6.36
19C	4.41	2.55	3.10	3.27	2.38	3.56	3.25	2.96	3.19
20NKMG	*	*	*	*	*	2.80	*	3.21	3.01

GRAIN MEAN DM% 86.4

STRAW TONNES/HECTARE

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

SECTION PLOT	SC4/W1P	SC1/W17	MEAN
01DN2PK	6.79	*	6.79
21DN2	7.58	7.45	7.52
22D	3.63	3.99	3.81
030	1.08	0.82	0.95
05F	1.23	0.93	1.08
06N1F	3.37	3.01	3.19
07N2F	5.92	4.86	5.39
08N3F	6.21	4.97	5.59
09N4F	6.15	5.42	5.78
10N2	2.58	2.30	2.44
11N2P	3.58	2.07	2.82
12N2PNA	3.82	2.69	3.26
13N2PK	4.76	4.40	4.58
14N2PKMG	5.05	4.48	4.76
15N3F	5.55	4.77	5.16
16N2F	4.81	4.17	4.49
17N0+3FH	5.92	4.33	5.12
18N1+3FH	6.06	4.98	5.52
19C	2.15	2.00	2.07
20NKMG	*	1.65	1.65

STRAW MEAN DM% 92.9

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83/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 132nd year, s. barley.

For previous years see 'Details' 1967 and 1973, Station Report for 1966 and 74-82/R/HB/2.

Treatments: All combinations of:-
1. MANURE Fertilizers, organic manures and frequency of barley cropping:

	Form of N 1852-1966	Additional treatments 1852-1979	Changes since 1980	Number of barley crops since last non-cereal
---16F	None	-	-	16 after fallow
-P-16F	None	P	-	16 after fallow
--K16F	None	K(Na)Mg	-	16 after fallow
-PK16F	None	PK(Na)Mg	-	16 after fallow
A--16F	A	-	-	16 after fallow
AP-16F	A	P	-	16 after fallow
A-K16F	A	K(Na)Mg	-	16 after fallow
APK16F	A	PK(Na)Mg	-	16 after fallow
N----16F	N	-	-	16 after fallow
NP---16F	N	P	-	16 after fallow
N-K--16F	N	K(Na)Mg	-	16 after fallow
NPK--16F	N	PK(Na)Mg	-	16 after fallow
N--S-16F	N	Si	Si omitted	16 after fallow
NP-S-16F	N	P Si	"	16 after fallow
N-KS-16F	N	K(Na)MgSi	"	16 after fallow
NPKS-16F	N	PK(Na)MgSi	"	16 after fallow
N---S5BE	N	-	Si added	5 after beans
NP--S5BE	N	P	"	5 after beans
N-K-S5BE	N	K(Na)Mg	"	5 after beans
NPK-S5BE	N	PK(Na)Mg	"	5 after beans
N--SS5BE	N	Si	-	5 after beans
NP-SS5BE	N	P Si	-	5 after beans
N-KSS5BE	N	K(Na)MgSi	-	5 after beans
NPKSS5BE	N	PK(Na)MgSi	-	5 after beans
C(--)16F	C	-	PKMg omitted	16 after fallow
C(P-)16F	C	P	"	16 after fallow
C(-K)16F	C	K(Na)Mg	"	16 after fallow
C(PK)16F	C	PK(Na)Mg	"	16 after fallow
C(--)6BE	C	-	"	6 after beans
C(P-)6BE	C	P	"	6 after beans
C(-K)6BE	C	K(Na)Mg	"	6 after beans
C(PK)6BE	C	PK(Na)Mg	"	6 after beans
C(--)5BE	C	-	"	5 after beans
C(P-)5BE	C	P	"	5 after beans
C(-K)5BE	C	K(Na)Mg	"	5 after beans
C(PK)5BE	C	PK(Na)Mg	"	5 after beans
C(--)5PO	C	-	"	5 after potatoes
C(P-)5PO	C	P	"	5 after potatoes
C(-K)5PO	C	K(Na)Mg	"	5 after potatoes
C(PK)5PO	C	PK(Na)Mg	"	5 after potatoes

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83/R/HB/2

D16F	None	D	-	16 after fallow
(D)16F	(D)	-	-	16 after fallow
(A)16F	(Ashes)	-	-	16 after fallow
-16F	None	-	-	16 after fallow

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)
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	16th barley
561--PK	Plot 561 --PK	16th barley
571NN2--	Plot 571 NN2	16th barley
581NN2--	Plot 581 NN2	16th barley

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 5th barley after beans.

Basal applications: Weedkillers: Glyphosate at 1.4 kg in 120 l. Dicamba, mecoprop and MCPA (as 'Herrisol' at 5.0 l) in 250 l. Fungicide: Tridemorph at 0.52 kg in 250 l.

Seed: Georgie, dressed ethirimol, sown at 160 kg.

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83/R/HB/2

Cultivations, etc.:- Glyphosate applied: 27 Oct, 1982. P, K, Mg and silicate of soda applied: 8 Nov. Chalk and FYM applied: 24 Nov. Ploughed: 25 Nov. Spring-tine cultivated twice: 8 Mar, 1983. Seed sown: 9 Mar. N applied: 23 May. Weedkillers applied: 24 May. Fungicide applied: 21 June. Combine harvested: 9 Aug.

BARLEY

STRAW TONNES/HECTARE

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

N	0	48	96	144	MEAN
MANURE					
---16F	0.19	0.18	0.38	0.39	0.29
-P-16F	0.35	0.38	0.77	1.56	0.76
--K16F	0.19	0.38	0.56	0.19	0.33
-PK16F	0.19	1.14	1.52	1.53	1.09
A--16F	0.20	0.19	0.39	0.39	0.29
AP-16F	0.59	0.78	0.95	1.16	0.87
A-K16F	0.19	0.39	0.59	0.39	0.39
APK16F	0.38	1.35	1.73	1.73	1.30
D16F	3.09	2.84	3.60	2.82	3.09
(D)16F	0.24	1.26	0.77	0.77	0.76
(A)16F	0.26	0.51	0.52	0.78	0.52
-16F	0.25	0.25	0.52	0.51	0.38
MEAN	0.51	0.80	1.02	1.02	0.84

STRAW MEAN DM% 90.8

PLOT AREA HARVESTED 0.00007

BARLEY

GRAIN TONNES/HECTARE

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

MANURE	551AN2PK	561--PK	571NN2--	581NN2--	MEAN
MGNESIUM					
0	3.20	0.33	1.28	1.30	1.53
35	3.04	0.40	1.66	1.49	1.65
MEAN	3.12	0.37	1.47	1.40	1.59

GRAIN MEAN DM% 85.4

PLOT AREA HARVESTED 0.00327

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83/R/HB/2

BARLEY

GRAIN TONNES/HECTARE

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

N	0	48	96	144	MEAN
MANURE					
---16F	0.47	0.89	1.24	1.03	0.91
-P-16F	0.95	1.49	2.15	3.11	1.92
--K16F	0.32	0.92	1.42	1.03	0.92
-PK16F	0.78	1.99	2.68	2.82	2.07
A--16F	0.68	0.97	0.79	1.51	0.99
AP-16F	1.47	2.56	2.58	2.63	2.31
A-K16F	0.47	0.86	1.10	1.19	0.90
APK16F	0.78	1.60	1.78	3.28	1.86
N----16F	0.87	0.80	1.39	1.12	1.04
NP---16F	1.18	2.69	2.92	3.27	2.51
N-K--16F	0.66	1.12	0.72	1.24	0.93
NPK--16F	1.04	2.16	3.62	3.93	2.69
N--S-16F	1.39	1.12	1.64	1.46	1.40
NP-S-16F	0.96	2.58	3.25	3.44	2.56
N-KS-16F	1.17	1.43	2.07	2.83	1.88
NPKS-16F	1.30	1.91	3.61	4.91	2.93
N---S5BE	1.06	1.53	1.32	2.51	1.60
NP--S5BE	1.30	2.65	3.59	3.40	2.73
N-K-S5BE	0.40	1.12	1.91	1.24	1.16
NPK-S5BE	1.03	2.39	3.09	4.10	2.65
N--SS5BE	0.79	1.66	2.05	1.77	1.57
NP-SS5BE	1.30	2.59	3.98	3.79	2.91
N-KSS5BE	1.17	1.37	1.96	2.54	1.76
NPKSS5BE	0.84	2.66	3.21	4.28	2.75
C(--)16F	0.72	1.85	2.44	3.39	2.10
C(P-)16F	1.17	2.25	2.94	3.71	2.52
C(-K)16F	1.12	2.01	2.79	3.46	2.34
C(PK)16F	1.06	2.44	3.46	3.89	2.71
C(--)6BE	1.20	2.32	2.23	2.04	1.95
C(P-)6BE	0.96	2.43	2.56	3.09	2.26
C(-K)6BE	0.91	1.44	2.28	2.41	1.76
C(PK)6BE	1.50	2.70	2.90	3.37	2.62
C(--)5BE	0.79	1.58	2.63	2.37	1.84
C(P-)5BE	1.38	2.24	3.39	3.54	2.64
C(-K)5BE	0.72	2.06	2.24	2.28	1.82
C(PK)5BE	1.17	2.11	4.04	4.30	2.90
C(--)5PO	0.91	1.77	1.96	2.37	1.75
C(P-)5PO	1.25	2.38	3.13	3.40	2.54
C(-K)5PO	0.79	1.79	2.71	2.39	1.92
C(PK)5PO	0.84	2.73	3.75	3.59	2.73
D16F	2.06	3.51	2.79	4.91	3.31
(D)16F	0.29	1.83	1.98	1.47	1.39
(A)16F	0.96	1.43	1.42	1.77	1.39
-16F	0.91	0.94	1.33	1.35	1.13
MEAN	0.98	1.88	2.43	2.76	2.01

GRAIN MEAN DM% 85.2

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83/R/WF/3

WHEAT AND FALLOW

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

The 128th year, w. wheat.

For previous years see 'Details' 1967, 1973 and 74-82/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: Isoproturon at 2.1 kg and mecoprop, bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 250 l.

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

Cultivations, etc:-
Wheat plot: Ploughed: 7 Sept, 1982. Spring-tine cultivated: 29 Oct. Heavy spring-tine cultivated, spring-tine cultivated, rotary harrowed, seed sown: 18 Jan, 1983. Weedkillers applied: 16 Apr. Combine harvested: 10 Aug.
Fallow plot: Ploughed: 7 Sept, 1982. Heavy spring-tine cultivated: 25 May, 1983. Ploughed: 16 June. Spring-tine cultivated: 23 June. Ploughed: 14 July. Spring-tine cultivated: 21 July.

GRAIN AND STRAW TONNES/HECTARE

	GRAIN	STRAW
YIELD	1.73	0.69
MEAN DM%	77.0	93.3
PLOT AREA HARVESTED	0.06009	

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83/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 128th year, s. barley.

For previous years see 'Details' 1967, 1973 and 74-82/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: Glyphosate at 1.4 kg in 250 l. Dicamba, mecoprop and MCPA (as 'Herrisol' at 5.0 l) in 500 l applied with the fungicide. Fungicide: Tridemorph at 0.52 kg.

Seed: Georgie, dressed ethirimol, sown at 160 kg.

Cultivations, etc.:- Glyphosate applied: 28 Oct, 1982. Ploughed: 1 Dec. Rotary harrowed, seed sown: 10 Mar, 1983. N treatments applied: 5 May. 'Herrisol' with the fungicide applied: 8 June. Combine harvested: 8 Aug.

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83/R/EX/4

GRAIN TONNES/HECTARE

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

N	0	48	96	144	MEAN
PLOTFERT(01)					
1-	0.97	1.65	1.32	1.68	1.40
2-	0.63	1.32	1.28	1.70	1.23
3D	2.00	3.46	4.50	4.51	3.62
4D	0.99	3.01	3.66	4.01	2.92
5N	0.80	1.94	1.46	1.99	1.55
6N*	0.49	1.18	0.36	0.58	0.65
7NMIN	1.67	2.92	4.05	3.79	3.11
8N*MIN	0.56	2.14	2.10	2.54	1.83
9P	2.77	2.76	3.24	4.56	3.33
10MIN	0.99	2.01	1.79	2.67	1.87
MEAN	1.19	2.24	2.38	2.80	2.15

GRAIN MEAN DM% 85.1

STRAW TONNES/HECTARE

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

N	0	48	96	144	MEAN
PLOTFERT(01)					
1-	0.21	0.58	0.59	0.81	0.55
2-	0.22	0.40	0.43	0.59	0.41
3D	0.22	0.94	2.01	2.73	1.47
4D	0.42	0.90	1.12	2.41	1.21
5N	0.15	0.51	0.55	0.80	0.50
6N*	0.14	0.48	0.14	0.27	0.26
7NMIN	0.49	1.10	1.56	2.71	1.47
8N*MIN	0.15	0.93	0.61	0.87	0.64
9P	0.36	1.03	1.48	3.01	1.47
10MIN	0.14	0.76	0.58	0.96	0.61
MEAN	0.25	0.76	0.91	1.52	0.86

STRAW MEAN DM% 88.7

SUB PLOT AREA HARVESTED 0.00728

https://doi.org/10.23637/ERADOC-1-44

83/R/PG/5

PARK GRASS

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

The 128th year, hay.

For previous years see 'Details' 1967 and 1973 and 74-82/R/PG/5.

Treatments:

Whole plots

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
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
O/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-1-44

83/R/PG/5

Sub plots

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.:- Superphosphate applied: 22 Dec, 1982. Other mineral fertilizers applied: 20 Jan, 1983. N treatments applied: 4 May. Cut: 15 June, 2 Nov.

https://doi.org/10.23637/ERADOC-1-44

83/R/PG/5

1ST CUT (15/6/83) DRY MATTER TONNES/HECTARE

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

LIME / MANURE	A	B	C	D	MEAN
N1	2.16	1.84	1.56	0.66	1.55
0(D)	2.10	2.70	1.25	0.88	1.73
0/PLOT3	2.09	2.54	1.04	0.99	1.66
P	2.08	2.94	1.99	1.86	2.22
N2P	2.99	3.39	2.58	2.69	2.91
N1MIN	4.42	5.08			4.75
MIN	4.62	4.99	2.86	2.31	3.70
PNAMG	1.80	2.14	2.15	1.96	2.01
N2MIN	5.39	5.31	5.05	3.51	4.82
N2PNAMG	2.97	3.49	3.24	2.67	3.09
N3MIN	6.19	5.19	5.73	4.04	5.29
N3MINSI	5.84	6.08	5.96	3.95	5.46
0/PLOT12	1.74	1.30	0.91	0.84	1.20
D/F	5.93	6.30	5.31	4.70	5.56
N2*MIN	4.78	5.22	5.45	4.91	5.09
MIN(N2*)	4.83	4.62	2.80	2.31	3.64
N1*MIN	5.08	5.15	4.69	3.64	4.64
N1*	2.36	2.25	1.64	1.12	1.84
N2KNAMG0			0.79	1.56	1.17
N2KNAMG2	1.64				1.64
N2KNAMG1	1.17	1.49			1.33
D0	3.11				3.11
D2	3.71				3.71
D1	3.19				3.19
D/N*PK0	4.04				4.04
D/N*PK2	5.36				5.36
D/N*PK1	4.71				4.71

1ST CUT MEAN DM% 22.7

https://doi.org/10.23637/ERADOC-1-44

83/R/PG/5

2ND CUT (2/11/83) DRY MATTER TONNES/HECTARE

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

LIME / MANURE	A	B	C	D	MEAN
N1	1.56	1.55	0.98	0.47	1.14
0(D)	1.30	1.78	1.11	0.98	1.29
0/PLOT3	1.06	1.19	0.77	0.64	0.91
P	1.21	1.43	1.16	0.86	1.16
N2P	1.02	1.76	1.22	1.98	1.50
N1MIN	1.76	1.54			1.65
MIN	1.66	1.84	1.18	0.91	1.40
PNAMG	1.01	1.18	1.30	1.33	1.20
N2MIN	1.91	2.24	1.29	2.15	1.90
N2PNAMG	1.16	1.60	1.03	1.93	1.43
N3MIN	2.05	1.60	1.26	2.47	1.84
N3MINSI	2.28	1.96	1.27	2.59	2.03
0/PLOT12	1.10	1.00	1.09	1.13	1.08
D/F	2.67	2.10	1.79	1.94	2.13
N2*MIN	1.72	2.31	2.47	1.67	2.04
MIN(N2*)	1.57	1.73	1.04	1.08	1.35
N1*MIN	1.89	1.99	1.90	1.55	1.83
N1*	1.21	1.56	2.36	1.81	1.74
N2KNAMG0			0.44	0.33	0.39
N2KNAMG2	1.43				1.43
N2KNAMG1	1.14	1.23			1.18
D0	1.91				1.91
D2	1.81				1.81
D1	2.07				2.07
D/N*PK0	2.20				2.20
D/N*PK2	2.20				2.20
D/N*PK1	2.33				2.33

2ND CUT MEAN DM% 21.9

https://doi.org/10.23637/ERADOC-1-44

83/R/PG/5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

LIME / MANURE	A	B	C	D	MEAN
N1	3.72	3.39	2.53	1.13	2.69
0(D)	3.40	4.48	2.36	1.87	3.03
0/PLOT3	3.15	3.73	1.82	1.62	2.58
P	3.29	4.37	3.15	2.73	3.38
N2P	4.00	5.15	3.80	4.67	4.41
N1MIN	6.18	6.62			6.40
MIN	6.28	6.83	4.03	3.22	5.09
PNAMG	2.80	3.32	3.45	3.29	3.22
N2MIN	7.30	7.55	6.34	5.66	6.71
N2PNAMG	4.13	5.09	4.27	4.60	4.52
N3MIN	8.23	6.79	6.99	6.51	7.13
N3MINSI	8.12	8.05	7.23	6.55	7.49
0/PLOT12	2.84	2.30	2.00	1.97	2.28
D/F	8.60	8.40	7.10	6.64	7.68
N2*MIN	6.49	7.52	7.92	6.58	7.13
MIN(N2*)	6.40	6.35	3.84	3.39	4.99
N1*MIN	6.98	7.13	6.58	5.19	6.47
N1*	3.58	3.81	4.00	2.93	3.58
N2KNAMG0			1.23	1.88	1.56
N2KNAMG2	3.07				3.07
N2KNAMG1	2.31	2.72			2.52
D0	5.02				5.02
D2	5.52				5.52
D1	5.25				5.25
D/N*PK0	6.24				6.24
D/N*PK2	7.56				7.56
D/N*PK1	7.04				7.04

TOTAL OF 2 CUTS MEAN DM% 22.3

PLOT AREA HARVESTED 0.00002

https://doi.org/10.23637/ERADOC-1-44

83/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 14th year of revised scheme, w. wheat.

For previous years see 'Details' 1967 and 1973, and 74-82/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 1983:

FALLOW	With fallow: Roots (turnips or swedes), s. barley, fallow, w. wheat 1848-1951. Fallow in 1983
WHEAT	With legume: Roots, s. barley, legume (clover or beans), w. wheat 1848-1951. W. wheat 1983 (after w. beans 1982)

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-1-44

83/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 WHEAT. Residues of P_2O_5 applied 1970-72 (kg) and in 1980 and 1982 (kg):
P_2O_5 722		
(0)0		None
(375)300		375 total in 1970-72, 150 in 1980, 150 in 1982
		To RN CROP WHEAT. Residues of K_2O applied 1973-76 (kg) and in 1980 and 1982 (kg):
K_2O 762		
(0)0		None
(870)600		870 total in 1973-76, 300 in 1980, 300 in 1982

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

Standard applications:
W. wheat: Manures: 'Nitro-Chalk' at 130 kg followed by 770 kg. Weedkillers: Mecoprop at 3.2 l with isoproturon at 2.1 kg in 250 l applied with the prochloraz. Glyphosate at 1.4 kg in 250 l. Fungicides: Prochloraz at 0.40 kg. Propiconazole at 0.12 kg in 250 l.

Seed: Avalon, sown at 180 kg.

Cultivations, etc.:-
W. wheat: Ploughed: 7 Sept, 1982. Spring-tine cultivated: 2 Oct. Rotary harrowed, seed sown: 15 Oct. First N applied: 16 Mar, 1983. Second N applied: 15 Apr. Mecoprop, isoproturon and prochloraz applied: 16 Apr. Propiconazole applied: 17 June. Glyphosate applied: 4 Aug. Combine harvested: 12 Aug.
Fallow: Ploughed: 7 Sept, 1982. Rotary cultivated: 24 May, 20 June, 1983. Spring-tine cultivated: 2 Aug.

https://doi.org/10.23637/ERADOC-1-44

83/R/AG/6

WHEAT P PLOTS

GRAIN TONNES/HECTARE

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

	OLDRESD	NONE		PKNAMG		NPKNAMGC	
	P205 722	(0)0	(375)300	(0)0	(375)300	(0)0	(375)300
PREVCROP	P205 64						
ARABLE	0	7.57	9.21	7.87	7.99	7.55	8.06
	500	7.51	8.86	8.32	8.46	7.15	8.06
	1000	8.55	8.46	8.08	8.41	8.15	8.53
	2000	8.94	8.96	8.62	9.03	7.78	7.89
GRASS	0	5.99	9.35	6.96	8.56	6.13	7.62
	500	8.77	9.20	6.82	6.54	8.13	8.11
	1000	8.65	9.10	8.13	8.05	7.71	8.45
	2000	8.67	9.04	7.33	5.32	7.90	7.56

GRAIN MEAN DM% 86.3

WHEAT K PLOTS

GRAIN TONNES/HECTARE

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

	OLDRESD	NONE		PKNAMG		NPKNAMGC	
	K20 762	(0)0	(870)600	(0)0	(870)600	(0)0	(870)600
PREVCROP	K20 64						
ARABLE	0	8.19	9.03	8.53	8.41	8.59	8.33
	315	8.26	9.58	8.13	8.32	7.92	7.33
	630	8.47	8.67	8.27	8.55	8.15	8.48
	1260	9.00	9.40	9.03	8.36	8.34	8.72
GRASS	0	8.50	8.98	7.99	8.45	8.11	8.55
	315	8.75	8.93	8.20	8.48	8.04	8.25
	630	8.71	9.12	8.91	8.61	8.18	8.77
	1260	8.63	9.43	8.36	9.07	8.36	8.77

GRAIN MEAN DM% 86.4

PLOT AREA HARVESTED (OLDRESD NONE) 0.00131

PLOT AREA HARVESTED (REMAINDER) 0.00146

https://doi.org/10.23637/ERADOC-1-44

83/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 fallow. The ninth year of grass on the rest of the experiment.

For previous years see 'Details' 1967 and 1973 and 74-82/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 1983 (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 (fallow) until 1980 but not since.

https://doi.org/10.23637/ERADOC-1-44

83/R/BN/7

Standard applications:
Grass: Weedkillers: Glyphosate at 1.4 kg in 250 l. Paraquat at 1.1 kg ion in 250 l. Dicamba, mecoprop and MCPA (as 'Herrisol' at 5.0 l) in 250 l.
Fallow: Weedkillers: Paraquat at 1.1 kg ion in 250 l.

Seed: S.215 Meadow fescue at 12 kg, Climax timothy at 12 kg, mixture sown at 24 kg.

NOTE: Sowing in August, 1982 failed and the crop was re-sown in March, 1983.

Cultivations, etc.:-
Grass: Glyphosate applied: 20 June, 1982. P applied: 25 June. K applied: 2 July. Ploughed: 30 July. Disced: 9 Aug. Rotary harrowed: 18 Aug. Rotary harrowed, seed sown: 25 Aug. Paraquat applied: 20 Nov. Spring-tine cultivated: 8 Mar, 1983. Seed re-sown: 12 Mar. N applied: 25 May. 'Herrisol' applied: 16 June. Cut: 11 July. N applied: 15 July. Cut: 1 Nov.
Fallow: Ploughed: 30 July, 1982. Disced: 9 Aug, 18 Aug. Paraquat applied: 20 Nov. Spring-tine cultivated: 8 Mar, 1983. Heavy spring-tine cultivated: 26 May. Rotary cultivated: 16 June. Spring-tine cultivated: 23 June. Spring-tine cultivated, rotary harrowed: 11 Oct.

https://doi.org/10.23637/ERADOC-1-44

83/R/BN/7

1ST CUT (11/7/83) DRY MATTER TONNES/HECTARE

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

N PERCUT MANURE	75	100	125	150	MEAN
D	3.40	3.64	3.61	3.58	3.56
DPK	3.09	3.88	3.87	4.23	3.77
PKMG	1.81	2.16	2.56	2.22	2.19
P	1.47	1.55	2.05	2.19	1.81
PK	1.78	2.28	2.59	1.68	2.08
PMG	2.07	2.15	2.59	1.25	2.01
0	0.81	0.95	1.22	1.14	1.03
MEAN	2.06	2.37	2.64	2.33	2.35

MANURE KMG 100 1.88

GRAND MEAN 2.33

1ST CUT MEAN DM% 29.4

83/R/BN/7

2ND CUT (1/11/83) DRY MATTER TONNES/HECTARE

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

N PERCUT MANURE	75	100	125	150	MEAN
D	2.50	2.59	2.37	2.12	2.39
DPK	2.55	2.72	2.65	2.36	2.57
PKMG	1.25	1.98	2.30	1.77	1.83
P	0.87	1.17	1.33	0.68	1.01
PK	1.27	2.38	2.20	1.04	1.72
PMG	1.23	1.69	1.53	0.59	1.26
0	0.95	0.93	1.11	0.87	0.96
MEAN	1.52	1.92	1.93	1.35	1.68

MANURE KMG 100 1.75

GRAND MEAN 1.68

2ND CUT MEAN DM% 22.8

https://doi.org/10.23637/ERADOC-1-44

83/R/BN/7

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

N PERCUT / MANURE	75	100	125	150	MEAN
D	5.90	6.23	5.98	5.69	5.95
DPK	5.63	6.60	6.51	6.59	6.33
PKMG	3.06	4.14	4.86	3.98	4.01
P	2.34	2.72	3.38	2.87	2.83
PK	3.04	4.66	4.79	2.72	3.80
PMG	3.30	3.84	4.12	1.84	3.27
0	1.76	1.88	2.33	2.02	2.00
MEAN	3.58	4.29	4.57	3.67	4.03

MANURE KMG 100 3.63

GRAND MEAN 4.01

TOTAL OF 2 CUTS MEAN DM% 26.1

SUB PLOT AREA HARVESTED 0.00568

https://doi.org/10.23637/ERADOC-1-44

83/R/GC/8

GARDEN CLOVER

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

Sponsor: J. McEwen.

The 130th year, red clover.

For previous years see 'Details' 1967 and 1973, and 74-82/R/GC/8.

Design: 2 blocks of 2 plots.

Whole plot dimensions: 1.02 x 1.42.

Treatments:

FUNG RES	Fungicide residues:
NONE	None
BENOMYL	Benomyl in the winters of 1979/80, 1980/81 and 1981/82.

Basal applications: Manures: Chalk at 1.25 t. (0:18:36) at 420 kg. Mg at 50 kg, as Epsom Salts. Nematicide: Aldicarb at 10 kg. Irrigation: 20 mm.

Seed: Hungaropoly, sown at 34 kg.

Cultivations, etc.:- Hand dug, root stumps carted, PK, Mg and chalk applied: 8 March, 1983. Sown, aldicarb applied: 14 Apr. Irrigation applied: 20 July. Cut: 28 July, 31 Aug, 27 Sept.

https://doi.org/10.23637/ERADOC-1-44

83/R/GC/8

1ST CUT (28/7/83) DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	MEAN
	2.44	2.36	2.40

1ST CUT MEAN DM% 23.3

2ND CUT (31/8/83) DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	MEAN
	1.28	1.33	1.30

2ND CUT MEAN DM% 30.7

3RD CUT (27/9/83) DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	MEAN
	0.77	0.84	0.81

3RD CUT MEAN DM% 15.7

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	MEAN
	4.49	4.53	4.51

TOTAL OF 3 CUTS MEAN DM% 23.2

PLOT AREA HARVESTED 0.00008

https://doi.org/10.23637/ERADOC-1-44

83/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 84th year, grass, w. wheat, w. beans, s. barley.

For previous years see 'Details' 1967 and 1973, and 74-82/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 being continued under the original treatment until 1979 (OLDTREAT), modified treatments (NEWTREAT) being applied on the larger sub-plots (see below).

In 1970 the rotation was stopped and each pair of blocks was divided for lucerne and grass (the OLDTREAT sub-plots form a part of the Grass area). In 1977 lucerne was ploughed on one pair of blocks to start an arable rotation and in 1978 lucerne on the other blocks was replaced by a grass/clover mixture. The grass/clover mixture was ploughed in 1979 for a test of subsoiling. Part of the grass area on two of the blocks was ploughed in autumn 1980 and added to the arable rotation area; the remainder of the grass on these two blocks was destroyed after the first cut in 1982; part of the arable rotation area was added to these two blocks for a new test on the effects of soil K depletion. Treatments to the remaining grass in 1983 were:

TREATMENT 1899-1965	OLDTREAT Grass 1966-79	NEWTREAT Grass 1966-83
	MANURE	MANURE
D	(D)	(D)N
B	B	BN
N	N	(N)P2N
P	P	(P)P1N
K	K	(K)P2KN
-	-	(-)P2N
PK	PK	(PK)P1KN
NK	NK	(NK)P2KN
NP	NP	(NP)P1N
NPK	NPK	(NPK)P1KN

D: Farmyard manure at 15 tonnes
(D): Farmyard manure at 30 tonnes (1966-1969 15 tonnes on OLDTREAT), 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 (38 kg N on OLDTREAT) per cut as ammonium nitrate ('Nitro-Chalk' until 1982)
P: 1899-1965 40 kg P205 as single superphosphate. Since 1966 50 kg P205 as triple superphosphate

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P1,P2: 50, 100 kg P205 as triple superphosphate
K: 1899-1965 63 kg K20 as muriate of potash. Since 1966 - 126 kg K20 (75 kg K20 on OLDTREAT)

NOTES: (1) For a fuller record of treatments see 'Details' etc.
(2) On OLDTREAT grass, clover appeared naturally on some plots in 1975. To unify the plots, white clover was sown on all at 33 kg.
(3) From 1980 treatments have not been applied to OLDTREAT grass and yields have not been taken.

The pair of blocks in arable crops from 1977 were sown to w. wheat in 1983. Yields were not taken.

MANURE — Manures applied 1899-1965 and 1966-83:

(D)P2N
BN
(N)P2N
(P)P1N
(K)P2KN
(-)P2N
(PK)P1KN
(NK)P2KN
(NP)P1N
(NPK)P1KN

N: 40 kg N as 'Nitro-Chalk' at drilling; 160 kg N as ammonium nitrate in spring. Other symbols as above.

The pair of blocks testing subsoiling were sown to s. barley and tested all combinations of:

Whole plots

1. MANURE (as for w. wheat above but with basal N at 30 kg N as ammonium nitrate at sowing) and:

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 P at 374 kg and K at 712 kg (as 0:20:20) into the subsoil at the time of working

Sub plots

3. N — Nitrogen fertilizer (kg N) as 'Nitro-Chalk' in addition to the 30 kg N at sowing:

30
60
90
120

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The new test on the effects of soil K depletion included w. beans on the area after grass 1982 and w. wheat on the area after arable. W. wheat tested all combinations of:-

Whole plots

1. MANURE (as for w. wheat on arable crop test blocks above)

Sub plots

2. N Nitrogen fertilizer (kg N) as 'Nitro-Chalk' in spring in addition to 40 kg N at sowing:-

120
160
200
240

W. beans tested:-

Whole plots

1. MANURE (as for w. wheat above but without basal N)

Standard applications:
W. wheat, on arable crops from 1977, and new soil K depletion test: Weedkillers: Mecoprop, bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 220 l with isoproturon at 2.5 kg and with the permethrin. Fungicides: Carbendazim at 0.15 kg, maneb at 1.6 kg and tridemorph at 0.37 kg with captafol at 1.0 kg in 220 l applied with the pirimicarb. Propiconazole at 0.12 kg in 220 l (to new soil K depletion test only). Insecticides: Permethrin at 0.05 kg. Pirimicarb at 0.14 kg.
W. beans: Weedkiller: Simazine at 1.1 l in 220 l. Fungicide: Benomyl at 0.28 kg in 220 l, on two occasions.
S. barley: Weedkillers: Mecoprop, bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 220 l. Fungicides: Carbendazim at 0.15 kg, maneb at 1.6 kg and tridemorph at 0.37 kg applied in 220 l with the insecticide. Insecticide: Pirimicarb at 0.14 kg.

Seed: W. wheat: Norman, sown at 400 seeds per m^2.
W. beans: Throws MS, sown at 250 kg.
S. barley: Triumph, seed dressed with ethirimol, sown at 180 kg.

Cultivations, etc.:-
W. wheat on arable crops from 1977 and on new soil K depletion test: P and K treatments applied: 3 Sept, 1982. Ploughed: 15 Sept. Power harrowed, seedbed N applied, seed sown: 29 Sept. 'Brittox', isoproturon and permethrin applied: 28 Oct. Treatment N applied (to new soil K depletion test only): 27 Apr, 1983. Basal N applied (to arable crops for 1977 only): 28 Apr. Bonemeal applied: 28 Apr. Carbendazim, maneb, tridemorph, captafol and pirimicarb applied: 30 June. Propiconazole applied to new soil K depletion test only: 13 July. Combine harvested: 9 Aug.
W. beans: P and K treatments applied: 3 Sept, 1982. Ploughed: 15 Sept. Power harrowed, seed sown: 28 Oct. Weedkiller applied: 29 Oct. Bonemeal applied: 28 Apr, 1983. Fungicide applied: 4 May, 30 June. Combine harvested: 26 Aug.

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S. barley: P and K treatments applied: 3 Sept, 1982. Ploughed: 19 Oct.
Power harrowed, seedbed N applied, seed sown: 10 Mar, 1983.
Treatment N and bonemeal applied: 28 Apr. Weedkiller applied: 4 May.
Fungicides and insecticide applied: 30 June. Combine harvested:
10 Aug.
Grass section: P, K and bonemeal treatments applied: 23 Feb, 1983.
N applied: 10 Mar. Cut: 30 June. N applied: 13 July. Cut: 15 Nov.

GRASS

DRY MATTER TONNES/HECTARE

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

	1ST CUT(30/6/83)	2ND CUT(15/11/83)	TOTAL OF 2 CUTS
MANURE			
(D)N	5.40	0.85	6.25
BN	5.23	0.68	5.91
(N)P2N	5.31	0.57	5.89
(P)P1N	4.97	0.47	5.44
(K)P2KN	5.84	0.86	6.70
(-)P2N	5.94	1.07	7.02
(PK)P1KN	6.12	1.21	7.33
(NK)P2KN	6.46	1.52	7.98
(NP)P1N	5.57	1.08	6.65
(NPK)P1KN	5.91	1.30	7.20
MEAN	5.68	0.96	6.64
MEAN DM%	29.3	42.0	35.7

PLOT AREA HARVESTED 0.00095

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W.WHEAT

GRAIN TONNES/HECTARE

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

N MANURE	120	160	200	240	MEAN
(D)P2N	9.76	9.95	8.49	8.87	9.27
BN	8.94	8.38	8.78	7.72	8.46
(N)P2N	7.81	8.24	8.95	8.12	8.28
(P)P1N	8.95	8.27	7.71	9.43	8.59
(K)P2KN	9.85	11.40	10.00	9.75	10.25
(-)P2N	9.48	9.02	8.81	9.82	9.28
(PK)P1KN	+	9.98*	10.08*	+	
(NK)P2KN	11.00	10.13	10.31	9.41	10.21
(NP)P1N	9.19	9.06	10.12	8.93	9.32
(NPK)P1KN	10.27*	+	+	10.00*	

* THESE PLOTS WERE DUPLICATED

+ TREATMENT COMBINATION MISSING

GRAIN MEAN DM% 82.0

PLOT AREA HARVESTED 0.00075

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W.BEANS

GRAIN TONNES/HECTARE

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

MANURE	
(D)P2	3.08
B	2.47
(N)P2	2.39
(P)P1	3.01
K)P2K	4.16
(-)P2	3.18
PK)P1K	4.63
(NK)P2K	4.40
(NP)P1	3.07
(NPK)P1K	4.67
MEAN	3.51

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	MANURE
SED	0.215

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	9	0.215	6.1

GRAIN MEAN DM% 86.2

PLOT AREA HARVESTED 0.00556

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S. BARLEY

GRAIN TONNES/HECTARE

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

TREATMNT MANURE	CNVNTIAL	SUBDUG	SUBDUG+F	MEAN
(D)P2N	5.11	5.76	5.72	5.53
BN	4.14	4.57	4.60	4.44
(N)P2N	4.48	4.67	4.58	4.58
(P)P1N	3.96	4.05	4.37	4.13
(K)P2KN	4.83	4.44	4.49	4.59
(-)P2N	4.88	4.75	4.66	4.76
(PK)P1KN	4.46	4.76	4.57	4.59
(NK)P2KN	4.58	4.76	5.05	4.79
(NP)P1N	3.86	4.05	4.35	4.09
(NPK)P1KN	4.30	4.47	4.51	4.43
MEAN	4.46	4.63	4.69	4.59

N MANURE	30	60	90	120	MEAN
(D)P2N	3.47	5.67	5.93	7.05	5.53
BN	2.73	4.63	4.83	5.55	4.44
(N)P2N	2.86	3.86	5.57	6.01	4.58
(P)P1N	2.37	3.70	4.74	5.70	4.13
(K)P2KN	2.73	4.23	5.40	5.99	4.59
(-)P2N	2.80	4.37	5.46	6.41	4.76
(PK)P1KN	2.33	4.24	5.56	6.24	4.59
(NK)P2KN	2.82	4.38	5.62	6.36	4.79
(NP)P1N	2.34	3.65	4.93	5.43	4.09
(NPK)P1KN	2.77	3.79	5.13	6.01	4.43
MEAN	2.72	4.25	5.32	6.07	4.59

N TREATMNT	30	60	90	120	MEAN
CNVNTIAL	2.59	4.16	5.31	5.78	4.46
SUBDUG	2.93	4.10	5.30	6.18	4.63
SUBDUG+F	2.65	4.50	5.35	6.26	4.69
MEAN	2.72	4.25	5.32	6.07	4.59

https://doi.org/10.23637/ERADOC-1-44

83/S/RN/1

S. BARLEY

GRAIN TONNES/HECTARE

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

MANURE	N / TREATMNT	30	60	90	120
(D)P2N	CNVNTIAL	3.19	5.00	5.58	6.66
	SUBDUG	3.46	6.16	6.37	7.06
	SUBDUG+F	3.75	5.85	5.83	7.42
BN	CNVNTIAL	2.64	4.30	4.56	5.05
	SUBDUG	3.91	4.36	4.25	5.76
	SUBDUG+F	1.64	5.23	5.68	5.85
(N)P2N	CNVNTIAL	3.02	3.92	5.52	5.45
	SUBDUG	3.46	3.42	5.49	6.32
	SUBDUG+F	2.11	4.24	5.71	6.27
(P)P1N	CNVNTIAL	2.32	3.44	4.84	5.25
	SUBDUG	2.53	3.51	4.62	5.55
	SUBDUG+F	2.28	4.14	4.77	6.30
(K)P2KN	CNVNTIAL	3.16	4.59	5.43	6.15
	SUBDUG	2.01	3.96	5.99	5.78
	SUBDUG+F	3.01	4.13	4.79	6.02
(-)P2N	CNVNTIAL	2.77	4.50	6.19	6.06
	SUBDUG	2.79	4.63	5.17	6.43
	SUBDUG+F	2.85	3.98	5.03	6.75
(PK)P1KN	CNVNTIAL	1.74	4.37	5.66	6.04
	SUBDUG	2.75	3.95	5.99	6.34
	SUBDUG+F	2.49	4.41	5.03	6.34
(NK)P2KN	CNVNTIAL	2.26	4.24	5.84	5.96
	SUBDUG	2.90	4.06	5.63	6.45
	SUBDUG+F	3.30	4.85	5.39	6.65
(NP)P1N	CNVNTIAL	1.98	3.62	4.85	5.00
	SUBDUG	2.51	3.21	4.69	5.80
	SUBDUG+F	2.52	4.13	5.25	5.49
(NPK)P1KN	CNVNTIAL	2.83	3.58	4.58	6.20
	SUBDUG	2.96	3.78	4.82	6.31
	SUBDUG+F	2.51	4.01	6.01	5.51

GRAIN MEAN DM% 84.6

SUB PLOT AREA HARVESTED 0.00081

https://doi.org/10.23637/ERADOC-1-44

83/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 14th year of revised scheme, w. wheat.

For previous years see 'Details' 1967 and 1973, and 74-82/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. Combinations of the following treatments were tested on second and third wheats after beans in 1980 and 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

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Sub plots

2. P — Phosphate (total P_2O_5 applied in each period (kg)):

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

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

and some of the combinations of 2 with:-

3. N — Nitrogen fertilizer in spring (kg N) as 'Nitro-Chalk' in addition to 40 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.

Basal applications: Manures: K_2O at 188 kg as muriate of potash. Weedkillers: Mecoprop, bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 220 l with isoproturon at 2.5 kg and with the permethrin. Fungicides: Benomyl at 0.28 kg in 220 l. Carbendazim at 0.15 kg, maneb at 1.6 kg and tridemorph at 0.37 kg in 220 l with captafol at 1.0 kg and with the pirimicarb. Insecticides: Permethrin at 0.05 kg. Pirimicarb at 0.14 kg.

Seed: Hustler, sown at 180 kg.

Cultivations, etc.:- K applied: 2 Sept, 1982. Test P applied for second wheat after beans only: 3 Sept. Ploughed: 15 Sept. Seed sown: 30 Sept. 'Brittox', isoproturon and permethrin applied: 28 Oct. Test N applied: 27 Apr, 1983. Benomyl applied: 4 May. Carbendazim, maneb, tridemorph, captafol and pirimicarb applied: 30 June. Combine harvested: 10 Aug.

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83/S/RN/2

2ND WHEAT AFTER BEANS

GRAIN TONNES/HECTARE

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

RESIDUE	N P	80	120	160	200
(0)0	(0)(0)0	4.73	5.34		
(0)0	(0)(3)0			5.29	7.51
(0)0	(1)(3)1		8.01		8.98
(0)0	(2)(3)1	7.79		8.54	
(0)0	(3)(3)0	6.71		7.38	
(D)0	(0)(0)0			7.05	6.32
(D)0	(0)(3)0	7.07	7.31		
(D)0	(1)(3)1	7.71		8.56	
(D)0	(2)(3)1		8.22		7.24
(D)0	(3)(3)0		7.30		7.74
(DP)0	(0)(0)0	7.10	7.35		
(DP)0	(0)(3)0			8.07	8.36
(DP)0	(1)(3)1		8.25		8.08
(DP)0	(2)(3)1	7.63		8.35	
(DP)0	(3)(3)0	7.06		7.70	
(DP)D2	(0)(0)0			7.52	8.08
(DP)D2	(0)(3)0	6.89	7.65		
(DP)D2	(1)(3)1		8.31		8.01
(DP)D2	(2)(3)1	7.61		8.77	
(DP)D2P1	(0)(0)0	7.17	8.05		
(DP)D2P1	(0)(3)0			7.67	7.08
(DP)D2P1	(1)(3)1		7.53		7.89
(DP)D2P1	(2)(3)1	7.80		7.76	
(DP)P1	(0)(0)0	7.55	8.10		
(DP)P1	(0)(3)0			8.31	7.89
(DP)P1	(1)(3)1	7.30		8.40	
(DP)P1	(2)(3)1		8.52		8.01
(DP)P2	(0)(0)0			7.87	7.80
(DP)P2	(0)(3)0	7.70	7.32		
(DP)P2	(1)(3)1	7.17		7.73	
(DP)P2	(2)(3)1		8.25		7.57
(DP52)0	(0)(0)0			7.32	6.63
(DP52)0	(0)(3)0	7.34	7.93		
(DP52)0	(1)(3)1	6.76		8.53	
(DP52)0	(2)(3)1		8.27		7.60
(DP52)0	(3)(3)0		8.12		7.20

GRAIN MEAN DM% 84.9

PLOT AREA HARVESTED 0.00075

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83/S/RN/2

3RD WHEAT AFTER BEANS

GRAIN TONNES/HECTARE

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

RESIDUE	N P	80	120	160	200
(0)0	(0)(0)0			5.44	6.94
(0)0	(0)(3)0	5.26	5.62		
(0)0	(1)(3)1	7.32		8.40	
(0)0	(2)(3)1		8.70		8.19
(0)0	(3)(3)0		8.46		7.39
(D)0	(0)(0)0	6.31	7.82		
(D)0	(0)(3)0			8.15	7.36
(D)0	(1)(3)1		7.21		8.31
(D)0	(2)(3)1	7.01		8.09	
(D)0	(3)(3)0	6.84		7.46	
(DP)0	(0)(0)0			7.62	8.62
(DP)0	(0)(3)0	7.35	7.68		
(DP)0	(1)(3)1	7.43		8.58	
(DP)0	(2)(3)1		8.27		8.13
(DP)0	(3)(3)0		8.45		7.85
(DP)D2	(0)(0)0	7.14	8.30		
(DP)D2	(0)(3)0			8.82	8.52
(DP)D2	(1)(3)1	7.78		8.54	
(DP)D2	(2)(3)1		8.58		8.76
(DP)D2P1	(0)(0)0			8.34	8.41
(DP)D2P1	(0)(3)0	7.99	8.60		
(DP)D2P1	(1)(3)1	7.87		8.57	
(DP)D2P1	(2)(3)1		8.46		8.69
(DP)P1	(0)(0)0			8.53	8.40
(DP)P1	(0)(3)0	7.62	8.32		
(DP)P1	(1)(3)1		8.19		8.69
(DP)P1	(2)(3)1	7.83		8.93	
(DP)P2	(0)(0)0	7.32	8.36		
(DP)P2	(0)(3)0			8.44	7.74
(DP)P2	(1)(3)1		8.35		8.29
(DP)P2	(2)(3)1	7.55		8.67	
(DP52)0	(0)(0)0	7.26	7.79		
(DP52)0	(0)(3)0			8.18	7.87
(DP52)0	(1)(3)1		7.45		8.31
(DP52)0	(2)(3)1	7.70		7.99	
(DP52)0	(3)(3)0	7.32		8.05	

GRAIN MEAN DM% 84.6

PLOT AREA HARVESTED 0.00075

https://doi.org/10.23637/ERADOC-1-44