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Yields of the Field Experiments 1987

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Experiments - Classics

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87/R/BK/1

BROADBALK

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

The 144th 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, 74-86/R/BK/1.

Areas harvested:

Wheat:	Section	
	0	0.00298
	1	0.00548
	4,5,6,and 7	0.00453
	8 and 9	0.00477
Potatoes:	3	0.00695

Treatments:

Whole plots

PLOT	Fertilizers and organic manures:-			
	Plot	Treatments until 1967	Treatments from 1968	Treatments from 1985
01DN4PK	01	-	D N2 P K	D N4 P K
21DN2	21	D	D N2	D N2
22D	22	D	D	D
030	03	None	None	None
05F	05	P K Na Mg	P K (Na) Mg	PK Mg
06N1F	06	N1 P K Na Mg	N1 P K (Na) Mg	N1 P K Mg
07N2F	07	N2 P K Na Mg	N2 P K (Na) Mg	N2 P K Mg
08N3F	08	N3 P K Na Mg	N3 P K (Na) Mg	N3 P K Mg
09N4F	09	N*1 P K Na Mg	N4 P K (Na) Mg	N4 P K Mg
10N2	10	N2	N2	N2
11N2P	11	N2 P	N2 P	N2 P
12N2PNA	12	N2 P Na	N2 P Na	N2 P Na
13N2PK	13	N2 P K	N2 P K	N2 P K
14N2PKMG	14	N2 P Mg	N2 P K Mg	N2 P K Mg
15N5F	15	N2 P K Na Mg	N3 P K (Na) Mg	N5 P K Mg
16N6F	16	N*2 P K Na Mg	N2 P K (Na) Mg	N6 P K Mg
17NO+3FH	17	N2(A)	N2 1/2(P K (Na) Mg)	NO+3 1/2(PK Mg)+
18N1+3FH	18	P K Na Mg(A)	N2 1/2(P K (Na) Mg)	N1+3 1/2(PK Mg)+
19C	19	C	C	C
20NKMG	20	N2 K Na Mg	N2 K (Na) Mg	N2 K Mg

(A) Alternating

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

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N1,N2,N3,N4,N5,N6: 48, 96, 144, 192, 240, 288 kg N (as sulphate of ammonia until 1967, except N* which was nitrate of soda. All as 'Nitro-Chalk' in spring from 1968 to 1985, as 'Nitram' since 1986.)

N0+3; N1+3: None in autumn + 144 kg N in spring; 48 kg N in autumn + 144 kg N in spring

P: 35 kg P as single superphosphate (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 subplots: 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	70, 71, 72,			73, 74, 75,			79	80	81	82	83	84	85	86	87
		68	69	76	77	78	and									
SC0/W36B	0*	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
SC1/W21B	1	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
-	2	BE	W	P	BE	W	F	P	W	F	P	W	W	W	W	F
POTATOES	3	W	W	F	W	W	F	W	W	W	W	W	W	W	F	P
SC4/W2B	4	W	P	BE	W	P	P	W	F	P	W	F	P	W	W	W
SCS/W1	5	W	F	W	W	F	W	W	W	W	W	W	W	F	P	W
SC6/W10B	6**	F	W	W	F	W	W	W	W	W	W	W	W	W	W	W
SC6/W10S	6**	F	W	W	F	W	W	W	W	W	W	W	W	W	W	W
SC7/W3B	7	P	BE	W	P	BE	W	F	P	W	F	P	W	W	W	W
SC8/W6B	8+	W	W	W	W	W	W	W	F	W	W	W	W	W	W	W
SC9/W29B	9	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W

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

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

B = Brimstone, S = Squareheads Master

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.

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Standard applications:

W. wheat: Manures: Chalk at 2.9 t (sections 0, 4 and 5 only).
Weedkillers (not applied to section 8): Methabenzthiazuron at 3.2 kg in 200 l. Clopyralid at 0.07 kg, bromoxynil at 0.34 kg and mecoprop at 2.5 kg in 200 l. Fungicides (not applied to section 6): Prochloraz at 0.40 kg and carbendazim at 0.15 kg in 200 l with the growth regulator. Fenpropimorph at 0.75 kg with chlorothalonil at 1.0 kg in 200 l. Propiconazole at 0.12 kg with carbendazim at 0.25 kg and maneb at 1.6 kg in 200 l. Growth regulator (not applied to section 6): Chlormequat chloride at 1.3 kg.

Potatoes: Weedkiller: Linuron at 1.6 kg in 500 l. Fungicides: Mancozeb at 1.4 kg on four occasions in 200 l, applied with the insecticide on the second. Fentin hydroxide at 0.28 kg in 200 l. Insecticide: Pirimicarb at 0.14 kg. Haulm desiccant: Diquat at 0.80 kg in 500 l.

Fallow: Weedkiller: Glyphosate at 1.4 kg in 200 l on two occasions.

Seed: W. wheat: Brimstone, dressed fonofos, and Squareheads Master, untreated, both sown at 190 kg.

Potatoes: Pentland Crown.

Cultivations, etc.:-

All Sections:

Kieserite, sulphate of soda and castor meal applied: 19 Sept, 1986. Sulphate of potash applied: 22 Sept. Superphosphate applied: 6 Oct. FYM applied, ploughed, disced, rotary harrowed: 8 Oct.

Cropped Sections:

W. wheat: Straw chopped (section 0): 5 Sept, 1986. Chalk applied (sections 0, 4 and 5): 26 Sept. Rotary harrowed, seed sown: 10 Oct. Methabenzthiazuron applied (except section 8): 17 Oct. N treatments applied: 14 Apr, 1987. Remaining weedkillers applied (except section 8): 15 Apr. Prochloraz, carbendazim and the growth regulator applied (except section 6): 6 May. Fenpropimorph and chlorothalonil applied (except section 6): 16 June. Propiconazole with carbendazim and maneb applied (except section 6): 10 July. Combine harvested: 8 Sept.

Potatoes: Heavy spring-tine cultivated: 17 Feb, 1987. N treatments applied: 14 Apr. Rotary harrowed, potatoes planted: 16 Apr. Rotary ridged: 27 Apr. Weedkiller applied: 30 Apr. Mancozeb applied: 24 June, 8 July, 28 July and 10 Aug. Pirimicarb applied: 8 July. Fentin hydroxide applied: 28 Aug. Haulm desiccant applied: 4 Sept. Lifted: 23 Sept.

Fallow: Heavy spring-tine cultivated: 17 Feb, 1987. Rotary harrowed: 27 Apr. Deep-tine cultivated: 28 Apr. Spring-tine cultivated: 29 Apr. Glyphosate applied: 22 June. Heavy spring-tine cultivated: 30 June. Glyphosate applied: 17 Aug.

87/R/BK/1 W. WHEAT

GRAIN TONNES/HECTARE

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

SECTION PLOT	5/W1B	4/W2B	7/W3B	8/W5B	6/W10B	6/W10S	1/W21B	9W29B	0/W36B	Mean
01DN4PK	7.90	8.16	8.74	*	5.69	*	*	*	*	7.62
21DN2	8.92	9.32	8.44	1.88	7.32	*	8.54	8.97	7.42	7.60
22D	9.45	6.44	6.21	2.10	7.05	*	6.67	7.70	6.57	6.53
030	1.86	1.15	1.10	2.29	1.33	1.04	1.47	1.24	1.52	1.44
05F	2.04	1.28	0.93	2.61	1.47	1.02	1.41	1.31	1.28	1.48
06N1F	4.77	4.01	2.01	3.23	3.39	2.22	3.21	3.55	3.28	3.30
07N2F	6.95	5.51	3.99	2.02	4.37	3.04	5.32	4.89	4.62	4.52
08N3F	8.25	6.52	5.50	1.93	6.35	3.05	5.95	6.47	5.70	5.52
09N4F	8.77	7.09	6.53	2.34	5.79	2.87	6.18	6.71	6.01	5.81
10N2	6.46	6.49	3.77	1.55	3.45	2.19	3.18	2.90	2.90	3.66
11N2P	6.11	5.64	5.12	1.97	4.18	3.16	4.69	3.89	4.95	4.41
12N2PNA	6.88	5.58	4.82	2.23	4.89	3.21	4.39	4.88	4.98	4.65
13N2PK	6.86	5.39	4.12	1.65	4.40	2.65	5.24	5.54	4.54	4.49
14N2PKMG	6.82	5.73	3.83	1.95	4.67	2.89	5.22	5.40	5.04	4.62
15N5F	9.06	7.53	4.93	1.29	4.74	2.25	6.84	6.81	6.52	5.55
16N6F	9.32	7.78	6.02	2.13	4.37	2.09	7.54	6.96	4.92	5.68
17N0+3FN	8.16	6.74	4.96	2.03	6.15	3.43	6.91	6.39	6.39	5.68
18N1+3FN	9.03	8.06	5.60	2.37	6.26	2.37	7.10	6.37	7.20	6.04
19C	6.08	4.33	2.30	2.32	2.06	1.62	3.68	2.49	2.61	3.05
20NKMG	*	*	*	*	*	*	1.64	*	2.08	1.86

GRAIN MEAN DM% 78.0

STRAW TONNES/HECTARE

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

SECTION PLOT	5/W1B	1/W21B	Mean
01DN4PK	6.52	*	6.52
21DN2	7.30	6.21	6.76
22D	5.57	4.96	5.26
030	0.92	*	0.92
05F	0.91	0.97	0.94
06N1F	2.07	2.50	2.29
07N2F	3.02	2.80	2.91
08N3F	3.68	*	3.68
09N4F	4.44	4.00	4.22
10N2	2.75	3.33	3.04
11N2P	2.67	1.93	2.30
12N2PNA	3.15	1.94	2.55
13N2PK	3.21	2.81	3.01
14N2PKMG	3.67	2.71	3.19
15N5F	4.47	3.76	4.12
16N6F	5.09	4.59	4.84
17N0+3FN	4.47	3.57	4.02
18N1+3FN	5.06	4.42	4.74
19C	2.63	3.32	2.97
20NKMG	*	1.33	1.33

STRAW MEAN DM% 85.6

87/R/BK/1 POTATOES

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

PLOT	TOTAL TUBERS TONNES/ HECTARE	% WARE 3.81 CM (1.5 INCH) RIDDLE
01DN4PK	38.3	94.7
21DN2	36.9	91.3
22D	35.9	96.1
030	9.5	94.4
05F	17.4	94.9
06N1F	25.3	89.8
07N2F	32.0	92.9
08N3F	42.5	94.6
09N4F	43.0	98.0
10N2	5.5	84.2
11N2P	6.6	66.7
12N2PNA	6.9	69.2
13N2PK	22.3	85.4
14N2PKMG	35.3	92.9
15N5F	40.9	94.6
16N6F	40.1	97.1
17N3FH	27.4	97.0
18N3FH	26.8	96.9
19C	17.4	94.3

87/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 136th year, s. barley.

For previous years see 'Details' 1967 and 1973, Station Report for 1966 and 74-86/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

87/R/HB/2

Mg: 35 kg Mg, as kieserite every third year since 1974 (sulphate of magnesia annually until 1973)

Si: Silicate of soda at 450 kg

D: Farmyard manure at 35 tonnes. (D): until 1871 only

(Ashes): Weed ash 1852-1916, furnace ash 1917-1932, none since

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

0
48
96
144

Plus extra plots testing all combinations of:-

1. MANURE Fertilizers other than magnesium:

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

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

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

0
35

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

Basal applications: Weedkillers: Glyphosate at 1.4 kg in 200 l. Clopyralid at 0.07 kg and bromoxynil at 0.34 kg with mecoprop at 2.5 kg in 200 l. Fungicide: Tridemorph at 0.52 kg in 200 l.

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

Cultivations, etc.: - Glyphosate applied: 6 Nov, 1986. Silicate of soda, K and P applied: 28 Nov. FYM applied, ploughed: 2 Dec. Spring-tine cultivated, seed sown: 16 Mar, 1987. N applied: 24 Apr. Remaining weedkillers applied: 5 May. Fungicide applied: 29 May. Combine harvested: 21 Aug.

87/R/HB/2

GRAIN TONNES/HECTARE

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

N	0	48	96	144	Mean
MANURE					
---	0.95	1.56	2.27	1.98	1.69
-P-	2.38	3.92	3.39	3.35	3.26
--K	1.82	2.66	3.47	2.94	2.72
-PK	2.30	3.64	5.26	5.54	4.19
A--	1.46	1.56	1.48	2.36	1.72
AP-	2.79	3.79	2.43	1.81	2.71
A-K	1.48	1.97	2.38	2.85	2.17
APK	2.51	4.14	5.47	5.77	4.47
N----	1.82	2.59	2.12	2.95	2.37
NP---	2.65	4.28	3.32	2.34	3.15
N-K--	1.60	1.70	2.21	2.32	1.96
NPK--	2.91	4.39	5.10	5.74	4.54
N--S-	1.80	3.45	3.23	2.99	2.87
NP-S-	2.88	3.91	4.43	4.47	3.92
N-KS-	1.90	3.04	4.42	5.23	3.65
NPKS-	2.47	4.56	5.48	5.68	4.55
N---S	1.83	2.13	2.46	3.46	2.47
NP--S	3.43	4.21	5.34	4.29	4.32
N-K-S	1.74	2.73	3.11	2.49	2.52
NPK-S	2.67	3.83	5.01	6.23	4.44
N--SS	1.73	2.49	3.06	3.37	2.66
NP-SS	3.39	4.75	4.61	4.70	4.36
N-KSS	1.57	2.76	3.27	3.39	2.75
NPKSS	2.11	4.52	6.30	5.44	4.59
C(--)	1.83	3.39	3.70	4.18	3.28
C(P-)	2.64	3.98	4.08	4.46	3.79
C(-K)	1.54	4.02	3.92	5.00	3.62
C(PK)	1.97	3.90	5.01	5.31	4.05
D	5.89	6.14	5.87	6.18	6.02
(D)	1.98	4.34	3.96	3.98	3.57
(A)	2.90	3.59	3.83	4.01	3.58
-	2.21	2.52	2.81	1.96	2.37
Mean	2.29	3.45	3.84	3.96	3.38

GRAIN MEAN DM% 84.8

87/R/HB/2

STRAW TONNES/HECTARE

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

N	0	48	96	144	Mean
MANURE					
---	0.35	0.72	0.91	0.91	0.72
-P-	0.91	1.85	1.85	2.59	1.80
--K	0.71	1.23	2.15	2.02	1.53
-PK	1.09	2.16	3.10	3.68	2.51
A--	0.54	0.73	0.72	1.10	0.77
AP-	1.10	2.01	1.66	1.29	1.52
A-K	0.72	1.42	1.24	1.41	1.20
APK	1.09	1.97	3.26	3.97	2.57
D	3.54	4.35	4.68	4.69	4.32
(D)	0.96	2.40	2.20	2.64	2.05
(A)	1.19	1.92	1.94	2.17	1.81
-	0.72	1.43	1.69	2.27	1.53
Mean	1.08	1.85	2.12	2.39	1.86

STRAW MEAN DM% 89.2

PLOT AREA HARVESTED 0.00161

EXTRA PLOTS

GRAIN TONNES/HECTARE

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

MANURE	551AN2PK	561--PK	571NN2--	581NN2--	Mean
MGNESIUM					
0	4.34	1.04	3.76	2.30	2.86
35	4.97	1.39	3.69	2.35	3.10
Mean	4.65	1.22	3.72	2.33	2.98

GRAIN MEAN DM% 85.3

PLOT AREA HARVESTED 0.00344

87/R/WF/3

WHEAT AND FALLOW

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

The 132nd year, w. wheat.

For previous years see 'Details' 1967, 1973 and 74-86/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.

Seed: Brimstone, dressed fonofos, sown at 190 kg.

Cultivations, etc.:-

Wheat plot: Rotary harrowed, seed sown: 11 Oct, 1986. Combine harvested: 1 Sept, 1987.

Fallow plot: Ploughed: 10 Oct, 1986. Rotary harrowed: 27 Apr, 1987.

Deep-tine cultivated: 28 Apr. Heavy spring-tine cultivated: 22 June, 30 June. Cultivated by rotary grubber: 19 Aug.

GRAIN AND STRAW TONNES/HECTARE

	GRAIN	STRAW
YIELD	1.06	0.76
MEAN DM%	82.8	87.5
PLOT AREA HARVESTED	0.06009	

87/R/EX/4

EXHAUSTION LAND

Object: To study the residual effects of manures applied 1856-1901, and of additional phosphate applied since 1986, on the yield of continuous s. barley - Hoosfield.

The 132nd year, s. barley.

For previous years see 'Details' 1967, 1973 and 74-86/R/EX/4.

Treatments: All combinations of:-

Whole plots

1. OLD RES Residues of manures applied annually 1876-1901:
 - 0 None
 - D Farmyard manure at 35 tonnes
 - N 96 kg N as ammonium salts
 - P 34 kg P as superphosphate
 - NPKNAMG N and P as above plus 137 kg K as sulphate of potash, 16 kg Na as sulphate of soda, 11 kg Mg as sulphate of magnesia

2. P Phosphate applied annually from 1986:
 - 0 None
 - P1 44 kg P as superphosphate
 - P2 87 kg P as superphosphate
 - P3 131 kg P as superphosphate

plus all combinations of:-

1. OLD RES Residues of manures applied annually 1876-1901:
 - 0 None
 - D Farmyard manure at 35 tonnes
 - N* 96 kg N as nitrate of soda
 - PK 34 kg P as superphosphate, 137 kg K as sulphate of potash
 - N*PK N, P and K as above

2. N87 Nitrogen fertilizer (kg N) as 'Nitro-Chalk' until 1985, as 'Nitram' since 1986 (basal until 1975, on a cyclic system since 1976):
 - 0
 - 48
 - 96
 - 144

NOTE: All plots in the combination OLD RES, P were given N at 144 kg as 'Nitram' and K at 83 kg as muriate of potash.

Basal applications: Weedkillers: Clopyralid at 0.07 kg and bromoxynil at 0.34 kg with mecoprop at 2.5 kg in 200 l. Fungicide: Tridemorph at 0.52 kg in 200 l.

87/R/EX/4

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

Cultivations, etc.: - P and K applied: 10 Oct, 1986. Ploughed: 6 Nov. Spring-tine cultivated, seed sown: 19 Mar, 1987. N applied: 23 Apr. Weedkillers applied: 28 May. Fungicide applied: 24 June. Combine harvested: 21 Aug.

PHOSPHATE PLOTS

GRAIN TONNES/HECTARE

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

	P	0	P1	P2	P3	Mean
OLD RES						
O		2.80	4.31	4.52	4.57	4.05
D		3.79	4.72	4.82	5.05	4.60
N		2.57	4.17	4.70	4.33	3.94
P		4.07	4.43	4.69	4.37	4.39
NPKNAMG		3.75	4.47	4.77	4.98	4.49
Mean		3.39	4.42	4.70	4.66	4.29

GRAIN MEAN DM% 87.4

STRAW TONNES/HECTARE

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

	P	0	P1	P2	P3	Mean
OLD RES						
O		1.17	2.63	2.88	2.48	2.29
D		2.35	3.15	3.24	3.39	3.03
N		1.13	2.32	3.05	2.74	2.31
P		2.26	3.14	2.90	2.88	2.79
NPKNAMG		2.19	2.87	2.94	3.00	2.75
Mean		1.82	2.82	3.00	2.90	2.63

STRAW MEAN DM% 76.5

PLOT AREA HARVESTED 0.00728

87/R/EX/4

NITROGEN PLOTS

GRAIN TONNES/HECTARE

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

	N87	0	48	96	144	Mean
OLD RES						
0	0.66	1.71	1.32	1.58	1.32	
D	2.17	4.54	3.28	3.45	3.36	
N*	1.11	1.77	1.25	1.51	1.41	
PK	1.36	2.60	2.03	2.45	2.11	
N*PK	1.47	3.82	2.38	2.35	2.51	
Mean	1.35	2.89	2.05	2.27	2.14	

GRAIN MEAN DM% 86.6

STRAW TONNES/HECTARE

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

	N87	0	48	96	144	Mean
OLD RES						
0	0.41	0.75	0.77	0.88	0.70	
D	1.06	1.96	1.64	2.06	1.68	
N*	0.63	0.89	0.64	0.94	0.77	
PK	0.95	1.67	1.67	1.99	1.57	
N*PK	1.09	1.59	1.22	1.45	1.34	
Mean	0.83	1.37	1.19	1.46	1.21	

STRAW MEAN DM% 72.9

PLOT AREA HARVESTED 0.00728

87/R/PG/5

PARK GRASS

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

The 132nd year, hay.

For previous years see 'Details' 1967 and 1973 and 74-86/R/PG/5.

Treatments: Combinations of:-

Whole plots

1. MANURE

Fertilizers and organic manures:

N1	Plot 1	N1
O(D)	Plot 2	None (D until 1863)
O/PLOT3	Plot 3	None
P	Plot 4-1	P
N2P	Plot 4-2	N2 P
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

87/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):

N2K NAMGO	18-1	None
N2K NAMG2	18-2	13.5
N2K NAMG1	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: 27 Nov, 1986.
Remaining mineral fertilizers applied: 10 Dec. Fish meal applied: 11 Dec. Chain harrowed: 17 Apr, 1987. N applied: 22 Apr. Cut: 29 June, 3 Dec.

87/R/PG/5

1ST CUT (29/6/87) DRY MATTER TONNES/HECTARE

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

LIME MANURE	A	B	C	D	MEAN
N1	2.99	2.80	1.66	0.48	1.98
O(D)	2.45	3.07	1.86	1.36	2.18
O/PLOT3	2.26	3.41	1.50	1.39	2.14
P	2.91	3.18	2.45	2.38	2.73
N2P	3.79	3.52	3.68	2.72	3.43
N1MIN	5.48	4.98			5.23
MIN	5.13	4.94	4.34	3.59	4.50
PNAMG	3.10	3.29	3.07	2.99	3.11
N2MIN	5.24	6.00	5.45	4.78	5.37
N2PNAMG	3.94	3.69	3.47	2.27	3.34
N3MIN	6.19	5.82	5.74	5.20	5.73
N3MINSI	6.67	6.20	5.63	5.17	5.92
O/PLOT12	2.51	1.96	1.53	1.71	1.93
D/F	4.52	4.87	4.61	4.29	4.57
N2*MIN	6.12	6.08	5.76	5.10	5.76
MIN(N2*)	4.52	5.02	2.69	3.01	3.81
N1*MIN	4.81	5.79	4.88	4.03	4.88
N1*	2.91	2.96	2.81	2.71	2.85
N2KNAMGO			0.86	0.60	0.73
N2KNAMG2	3.21				3.21
N2KNAMG1	2.98	2.60			2.79
D0	4.43				4.43
D2	4.96				4.96
D1	4.39				4.39
D/N*PK0	5.40				5.40
D/N*PK2	5.68				5.68
D/N*PK1	5.00				5.00

1ST CUT MEAN DM% 22.7

87/R/PG/5

2ND CUT (3/12/87) DRY MATTER TONNES/HECTARE

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

LIME MANURE	A	B	C	D	MEAN
N1	3.04	2.49	2.36	1.02	2.23
O(D)	2.93	2.58	2.51	2.53	2.64
O/PLOT3	2.67	2.78	3.45	4.24	3.28
P	2.66	2.81	3.29	5.13	3.47
N2P	2.15	1.61	2.16	1.28	1.80
N1MIN	2.60	2.69			2.65
MIN	3.38	3.04	3.20	3.45	3.27
PNAMG	2.77	3.36	4.98	4.34	3.86
N2MIN	2.54	3.08	2.40	1.24	2.32
N2PNAMG	2.07	2.13	2.91	0.88	2.00
N3MIN	3.54	3.29	3.35	2.80	3.24
N3MINSI	4.47	3.89	3.05	3.25	3.67
O/PLOT12	3.08	2.76	2.03	2.84	2.68
D/F	6.09	6.77	4.43	3.51	5.20
N2*MIN	1.82	3.44	2.40	3.68	2.84
MIN(N2*)	3.31	3.36	2.88	3.00	3.14
N1*MIN	3.42	2.84	2.81	2.42	2.87
N1*	2.71	3.21	4.21	2.86	3.25
N2KNAMG0			1.89	1.21	1.55
N2KNAMG2	3.27				3.27
N2KNAMG1	2.99	2.71			2.85
D0	4.41				4.41
D2	4.02				4.02
D1	3.70				3.70
D/N*PK0	4.24				4.24
D/N*PK2	3.95				3.95
D/N*PK1	3.89				3.89

2ND CUT MEAN DM% 33.4

87/R/PG/5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

LIME MANURE	A	B	C	D	MEAN
N1	6.03	5.28	4.03	1.50	4.21
O(D)	5.38	5.64	4.37	3.89	4.82
O/PLOT3	4.93	6.19	4.95	5.62	5.42
P	5.56	5.99	5.74	7.51	6.20
N2P	5.95	5.14	5.84	4.00	5.23
N1MIN	8.08	7.67			7.88
MIN	8.51	7.98	7.54	7.05	7.77
PNAMG	5.87	6.65	8.05	7.34	6.98
N2MIN	7.77	9.08	7.86	6.02	7.68
N2PNAMG	6.02	5.82	6.38	3.15	5.34
N3MIN	9.73	9.10	9.08	7.99	8.98
N3MINSI	11.14	10.09	8.68	8.42	9.59
O/PLOT12	5.59	4.72	3.56	4.54	4.60
D/F	10.62	11.64	9.04	7.80	9.77
N2*MIN	7.94	9.52	8.16	8.78	8.60
MIN(N2*)	7.83	8.39	5.57	6.01	6.95
N1*MIN	8.23	8.63	7.69	6.45	7.75
N1*	5.62	6.17	7.01	5.57	6.09
N2KNAMG0			2.75	1.81	2.28
N2KNAMG2	6.48				6.48
N2KNAMG1	5.97	5.31			5.64
D0	8.83				8.83
D2	8.98				8.98
D1	8.09				8.09
D/N*PK0	9.63				9.63
D/N*PK2	9.63				9.63
D/N*PK1	8.89				8.89

TOTAL OF 2 CUTS MEAN DM% 28.1

PLOT AREA HARVESTED 0.00002

87/R/AG/6

AGDELL

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

The 18th year of revised scheme, ley.

For previous years see 'Details' 1967 and 1973, and 74-86/R/AG/6.

NOTE: Yields were not taken and no new treatments were applied.

Basal applications: Manures: 'Nitram' at 130 kg and later at 200 kg.

Cultivations, etc.: - First N applied: 6 Apr, 1987. Cut: 4 June. Second N applied: 12 June.

87/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 fourth year of grass/clover. The 13th year of grass on the rest of the experiment.

For previous years see 'Details' 1967 and 1973 and 74-86/R/BN/7.

Plot dimensions: 10.7 x 55.9.

Treatments to grass: All combinations of:-

Whole plots

1. MANURE Fertilizers and organic manures:

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

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 1987 (kg N per cut) as 'Nitram' and residues of forms of N previously each supplying 96 kg N per annum:

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

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

plus one plot MANURE KMG 100

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

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

87/R/BN/7

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

Cultivations, etc.:-

All sections: P applied: 27 Nov, 1986. K applied: 28 Nov. Cut: 2 June, 1987, 26 Aug, 2 Dec.

Grass (Sections 3, 4, 5 and 6) only: N applied: 11 June, 28 Aug.

GRASS

1ST CUT (2/6/87) DRY MATTER TONNES/HECTARE

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

N PERCUT MANURE	75	100	125	150	Mean
D	4.40	5.49	5.89	5.83	5.40
DPK	5.47	6.18	6.46	6.27	6.09
PKMG	3.59	4.40	5.84	6.37	5.05
P	2.33	2.34	2.25	1.79	2.18
PK	4.11	5.52	5.53	5.34	5.13
PMG	3.06	2.33	2.21	1.95	2.39
0	2.49	2.12	1.88	1.88	2.09
Mean	3.64	4.06	4.29	4.21	4.05

MANURE KMG 100 4.98

Grand mean 4.08

1ST CUT MEAN DM% 20.2

2ND CUT (26/8/87) DRY MATTER TONNES/HECTARE

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

N PERCUT MANURE	75	100	125	150	Mean
D	4.44	5.46	5.57	5.73	5.30
DPK	5.14	5.50	6.17	5.44	5.56
PKMG	4.15	4.89	4.87	5.03	4.73
P	2.96	1.55	0.94	0.95	1.60
PK	4.26	4.69	5.13	4.98	4.76
PMG	2.98	1.94	1.47	1.12	1.88
0	2.22	1.69	1.07	1.20	1.55
Mean	3.74	3.67	3.60	3.49	3.63

MANURE KMG 100 4.96

Grand mean 3.67

2ND CUT MEAN DM% 26.9

87/R/BN/7

GRASS

3RD CUT (2/12/87) DRY MATTER TONNES/HECTARE

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

N PERCUT MANURE	75	100	125	150	Mean
D	1.60	2.08	2.40	2.16	2.06
DPK	1.80	2.50	2.59	2.44	2.33
PKMG	1.38	1.50	1.85	1.78	1.63
P	0.94	0.73	0.33	0.64	0.66
PK	1.49	1.90	2.24	2.01	1.91
PMG	0.70	0.48	0.34	0.48	0.50
0	0.28	0.27	0.30	0.31	0.29
Mean	1.17	1.35	1.43	1.40	1.34

MANURE KMG 100 1.88

Grand mean 1.36

3RD CUT MEAN DM% 22.9

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

N PERCUT MANURE	75	100	125	150	Mean
D	10.45	13.03	13.86	13.72	12.76
DPK	12.42	14.18	15.22	14.14	13.99
PKMG	9.13	10.79	12.56	13.18	11.41
P	6.23	4.62	3.51	3.38	4.44
PK	9.86	12.11	12.90	12.33	11.80
PMG	6.74	4.76	4.02	3.56	4.77
0	4.99	4.09	3.25	3.40	3.93
Mean	8.54	9.08	9.33	9.10	9.01

MANURE KMG 100 11.82

Grand mean 9.11

TOTAL OF 3 CUTS MEAN DM% 23.3

PLOT AREA HARVESTED 0.00568

87/R/BN/7

GRASS/CLOVER

1ST CUT (2/6/87) DRY MATTER TONNES/HECTARE

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

MANURE	D	DPK	PKMG	P	PK	PMG	0	Mean
	3.16	3.12	2.48	1.54	1.90	2.05	1.56	2.26

1ST CUT MEAN DM% 19.8

2ND CUT (26/8/87) DRY MATTER TONNES/HECTARE

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

MANURE	D	DPK	PKMG	P	PK	PMG	0	Mean
	2.51	2.80	2.27	2.18	2.48	2.91	1.85	2.43

2ND CUT MEAN DM% 18.2

3RD CUT (2/12/87) DRY MATTER TONNES/HECTARE

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

MANURE	D	DPK	PKMG	P	PK	PMG	0	Mean
	0.64	0.54	0.39	0.19	0.23	0.17	0.20	0.34

3RD CUT MEAN DM% 24.5

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

MANURE	D	DPK	PKMG	P	PK	PMG	0	Mean
	6.31	6.46	5.13	3.92	4.61	5.13	3.61	5.02

TOTAL OF 3 CUTS MEAN DM% 20.8

PLOT AREA HARVESTED 0.00568

87/R/GC/8

1ST CUT (30/7/87) DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	2.87	3.28	3.08

1ST CUT MEAN DM% 12.6

2ND CUT (1/9/87) DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	2.40	2.21	2.30

2ND CUT MEAN DM% 13.0

3RD CUT (25/9/87) DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	0.91	0.73	0.82

3RD CUT MEAN DM% 12.0

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	6.18	6.22	6.20

TOTAL OF 3 CUTS MEAN DM% 12.5

PLOT AREA HARVESTED 0.00010